SEGWAY

UT6

SERVICE MANUA



2026/08/25 V1.0

Preface

This manual provides detailed guidance on diagnostics, maintenance procedures, component adjustments, and specification data for the UT6 model, intended solely for use by qualified service personnel.

All information, illustrations, and product descriptions in this manual reflect the vehicle's condition at the time of publication. To ensure optimal performance, safety, and quality, the vehicle is subject to ongoing development and improvement; consequently, some descriptions in this manual may not exactly match the vehicle's current configuration. Always refer to the vehicle's actual condition. If in doubt, contact an authorised Segway dealer for the most up-to-date information.

1. This manual is provided by Segway Technology Co., Ltd. and has been prepared by trained technical personnel. Maintenance or repair carried out by untrained personnel, or without the proper tools and equipment, may result in personal injury and could damage vehicle components, potentially rendering the vehicle inoperative.
2. Correct maintenance and servicing are essential to ensure the safety of personnel and the reliable operation of the vehicle. When replacing components, only original parts of the correct specification, or compliant parts approved by Segway Technology Co., Ltd., should be used. The use of non-approved or non-compliant parts is strictly prohibited.
3. The procedures recommended in this manual have been validated as efficient and reliable. Certain operations require the use of Segway-specific tools.

No part of this manual may be reproduced, stored, or transmitted in any form without the written permission of Segway Technology Co., Ltd. This applies to all text, illustrations, and tables contained herein.

Instructions for Using Hyperlinks

1. Navigating via the Contents Page
    a. Open the manual and go directly to the "Contents" section.
    b. Locate the required maintenance item; each entry lists the corresponding page number.
    c. To navigate: click the entry in the contents; the system will automatically display the relevant section without manual page turning.
2. Navigating via Header Links
    a. Each page features fixed links in the header area for quick navigation.
    b. To return to the contents: click the header text.
3. Navigating via "refer to" Links
    a. Within the maintenance sections, "refer to" links indicate related procedures, supplementary notes, or associated component repairs.
    b. To navigate: click the text following "refer to"; the system will display the corresponding related content automatically.

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1.1.1 Instruction for Using This Manual

1.1.1.1 Overview

1. **This manual addresses repair issues through three main sections: System Overview (theoretical support), Fault Diagnosis (problem identification), and Repair Procedures (problem resolution).**
   a. System Overview
      - This section includes the system description, service tools, service data, precautions, component diagrams, and related information.
      - System Description: Describes the system components and working principles, addresses issues from a holistic system perspective, provides theoretical guidance for repairs, and analyzes problems from a system-wide perspective.
      - Service Tools: Lists the necessary tools to be prepared before performing repairs on this system.
      - Service Data: Provides the standard data and parameters required for servicing in this section.
      - Precautions: Lists the precautions to be observed during servicing. Always read this section before starting work to prevent incorrect procedures, component damage, or personal injury.
      - Component Diagrams: Display the locations, names, and related information of the components in this section, assisting service personnel in quickly familiarizing themselves with the content.
   b. Fault Diagnosis: Divided into common fault diagnosis and diagnostic trouble code (DTC) diagnosis.
      - Common Fault Diagnosis: Describes common or potential faults that occur in the vehicle, identifies possible fault locations, and provides corrective actions to help diagnose and address issues more effectively.
      - Diagnostic Trouble Code Diagnosis: Refers to faults identified by the diagnostic trouble codes detected by the diagnostic tester, and provides a logical process for diagnosing and rectifying vehicle faults as quickly as possible.
   c. Repair Procedures:
      - The repair procedures are categorized into Inspection and Adjustment, Removal and Installation, and Disassembly and Assembly.
      - The vehicle is organized by system, providing detailed and accurate guidance for the inspection, testing, removal, repair, and installation of each system component, thereby improving repair quality and efficiency.
      - Inspection and Adjustment: Involves the inspection, testing, and adjustment of system components or the entire system, including the measurement of certain fundamental technical parameters.
2. **This manual does not provide detailed descriptions of the following basic operations, but they are essential during actual service work.**
   a. Clean removed parts as necessary.
   b. Perform a visual inspection.
3. **Each section of this manual includes specific precautions. Always read the Precautions section before beginning work to prevent improper handling, component damage, or personal injury.**

1.1.1.2 Terminology

1. Standard Value: Represents the standard used for determining component quality or assembly inspection, or for correcting and adjusting relevant parts or assemblies, expressed as a range.
2. Limit Value: Indicates the standard for component quality judgment or assembly inspection, representing the maximum or minimum value of a part or assembly that meets functional or strength requirements.
3. Torque: Measured in ft-lb/N·m, provides the specified range for torque to be applied when installing fasteners such as bolts and nuts.

1.1.1.3 Units

1. Some units used in this manual follow the International System of Units (SI).
   - For example: meter (m), kilogram (kg), second (s), ampere (A), etc.
2. Torque is provided in both Imperial and SI units.
   - Torque (ft-lbs/N·m).

1.1.1.4 Service Procedure

1. This manual includes illustrations for key steps and operations in each procedure, with detailed descriptions of operating methods, reference data, and helpful information to support service tasks.
2. The procedure is presented in the following sequence:
   a. The illustration shows what needs to be done and where it should be performed.
   b. The operation title specifies what needs to be done.
   c. The procedure steps detail how to complete the task and provide additional information, such as WARNING, CAUTION, and NOTICE statements.

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1.2.1 WARNING, CAUTION, and NOTICE Statements

1.2.1.1 WARNING, CAUTION, and NOTICE Statements

WARNING:
• Requires appropriate measures to prevent personal injury or loss of life.

CAUTION:
• Emphasizes the importance of following specific diagnostic or repair procedures, as failure to do so may result in personal injury or component damage.

NOTICE:
• Provides extra information to enhance work efficiency during repairs.

1.2.2 Warnings and Precautions

1.2.2.1 Vehicle Support Point Precautions

WARNING:

- To avoid injury, always use axle stands for additional support when working underneath or around a vehicle supported only by a jack.
- To prevent vehicle damage, serious injury, or even death, use axle stands to support the body opposite the side of the removed component when lifting the vehicle.

CAUTION:

- Ensure the vehicle is parked on a clean, solid, level, and stable surface before starting the support operation.
- Verify that all lifting equipment meets standards and is in proper working condition.
- Ensure the load is evenly distributed and the vehicle remains stable, with no shifting.

NOTICE:

- Always select the designated support points carefully when lifting the vehicle to ensure safe support.

1.2.2.2 Engine Oil Warning Information

1. Health warnings.
   a. Prolonged or repeated contact with engine oil may remove the skin's natural oils, leading to dryness, irritation, and dermatitis.
   b. Engine oil contains substances that may pose a skin cancer risk. Appropriate skin protection and washing facilities must be used, and contamination should be removed immediately.
2. Recommended precautions.
   a. Avoid prolonged or repeated contact with engine oil, especially used oil.
   b. Wear protective clothing, including oil-resistant gloves.
   c. Do not place oil-soaked cloths in pockets. Wear pocketless overalls to prevent this.
   d. Keep protective clothing clean and store it separately.
   e. Wear safety goggles and a face shield during operations, and ensure eye wash stations are available.
   f. Do not use petroleum, kerosene, diesel fuel, petrol, or solvents to clean your skin.
   g. Seek immediate medical attention if any skin conditions develop.

1.2.2.3 Electrical System Maintenance Precautions

1. Before replacing electrical system components or performing repairs, disconnect the vehicle power and then remove the negative battery terminal to prevent short circuits.
2. Before disconnecting or reconnecting the negative battery cable, switch off all electrical devices and turn off the vehicle power.
3. Do not apply excessive force when disconnecting a connector.
4. Before connecting a connector, ensure that the terminals are not bent or damaged, and then securely connect it.
5. When installing a connector with a retaining bolt, tighten the bolt to the specified torque.
6. Do not drop or strike the control module, as this may cause excessive impact damage.
7. Avoid condensation on the control module due to rapid temperature changes, and prevent water droplets from contacting it. If water is found on the control module, dry it thoroughly before installation.
8. Do not allow oil or any other fluids to contact the control module connector.
9. Avoid using volatile fluids to clean the control module.
10. When using a digital multimeter, ensure the test probes do not touch each other to avoid short circuits.
11. If the fuse has blown, check the circuit for a short.
12. Always replace a blown fuse with one of the same amperage rating.

1.2.2.4 Application of Anti-Corrosion Agents and Primer

1. Precautions for applying anti-corrosion agent and primer:
   a. Splashes of anti-corrosion agent or primer on sensors or actuators may affect their performance.
   b. Use protective covers for sensors and actuators when applying anti-corrosion agent or primer.

1.2.2.5 Important Road Test Warnings

1. Do not carry out any dismantling operations prior to the completion of the road test and complete visual inspection. This ensures that tyre pressures and vehicle load remain in the same state as when the issue was discovered.
2. Adjusting tyre pressures, vehicle load, or other settings may obscure the issue, prevent accurate diagnosis, or introduce additional faults.
3. Perform a visual inspection as part of routine checks and record any issues found.
   a. Record tyre pressures but do not adjust them at this stage.
   b. Record fluid leaks, loose nuts and bolts, and wear marks or chafing caused by component contact.
   c. Inspect the load area for any abnormal loading conditions.
4. Road test the vehicle, repeating the process as necessary to confirm the fault.
5. As soon as the symptom reappears, perform a prompt inspection to aid in determining the correct diagnostic procedure.
6. Repeat the road test and prompt inspection to confirm the fault. This may not always identify the exact cause but can help rule out non-issue areas.

1.3 Vehicle Specifications

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1.3.1 Vehicle Specifications

1.3.1.1 Vehicle Specifications

Vehicle Specifications

Key Specifications				
Model Designation	SGW570F-U1	SGW570F-U2	SGW570F-U3	SGW570F-U4
Dimensions (L × W × H) (mm)	27-inch tyre: 3050 × 1600 × 1950 mm			
	30-inch tyre: 3050 × 1600 × 1980 mm			/
Wheelbase (mm)	2110			
Front Track (mm)	1350			
Rear Track (mm)	1320			
Approach Angle (°)	> 75			
Departure Angle (°)	> 65			
Ground Clearance (mm)	27-inch Tyres: 320			
	30-inch Tyres: 350			/
Turning Diameter	9000±500			
Seat Height (mm)	450			
Steering Wheel Diameter (mm)	350			
Kerb Weight (kg)	675			
Maximum Payload Capacity (kg)	454	272		
Battery	Maintenance-free Lead-acid Battery (12V 32Ah)			
Instrument Cluster Type	TFT Colour Display, Monochrome LCD Instrument Cluster or Segmented LCD, Depending on Specification			
Front Winch Capacity (lb/m)	4500			
Steering Gear Type	Rack and Pinion, Dual-Output			
Air Cleaner Type	Paper Element			
Silencer Type	Reactive Type			
Shift Mechanism	Mechanical			
Steering Lock Type	Steering shaft locked by mechanical pin			
Front Suspension Stroke (mm)	230			
Rear Suspension Stroke (mm)	265			
Front	Independent Double Wishbone			

Key Specifications					
Model Designation		SGW570F-U1	SGW570F-U2	SGW570F-U3	SGW570F-U4
Suspension Type	Rear	Independent Double Wishbone			
Damper (Shock Absorber)	Front	Coil Spring with Hydraulic Damper			
	Rear	Coil Spring with Hydraulic Damper			

Wheel Alignment Settings

Key Specifications					
Model Designation		SGW570F-U1	SGW570F-U2	SGW570F-U3	SGW570F-U4
Wheel Alignment Settings	Front Wheel Camber	0° ± 1°; Left/Right Deviation ≤ 1°			
	Rear Wheel Camber	0° ± 1°; Left/Right Deviation ≤ 1°			

1.3.1.2 Engine Specifications

Key Specifications					
Model Designation		SGW570F-U1	SGW570F-U2	SGW570F-U3	SGW570F-U4
Engine Type		Single-Cylinder, Liquid-Cooled, Four-Stroke, 4-Valve, DOHC			
Engine Model		199MS-1			
Engine Displacement (ml)		567			
Compression Ratio		10.7±0.5:1			
Maximum Power / RPM		30kW/7000rpm			
Maximum Torque / RPM		50N.m/4500rpm			
Bore × Stroke (mm)		99×73.6			
Starting System		Electric Start			
Ignition System		EFI			
Lubrication System		Pressure-Splash Lubrication			
Cooling System		Liquid Cooling			
Transmission	CVT	0.601～2.967			
	Gear Ratio	L:27.73			
		H:15.99			
		R:22.84			
	Driveline Type	Shaft Drive			
	Front Axle	3.667			
Coolant Boiling/ Freezing Point (°C)		107/-35			

1.3.1.3 Vehicle Fluid Specifications and Quantities

Key Specifications					
Model Designation		SGW570F-U1	SGW570F-U2	SGW570F-U3	SGW570F-U4
Coolant Capacity (L)		4.8L			
Brake Fluid Capacity (ml)		Maintain level between MIN and MAX marks on brake fluid reservoir			
Lubricating Oil Grade	Engine	SAE 10W-40 / SJ or Higher			
	Front Axle	SAE 80W-90, API GL-5			
	Rear Axle	SAE 80W-90, API GL-5			
Lubricating Oil Capacity (ml)	Engine	2.2 L (without Replacing the Oil Filter) 2.4 L (with Oil Filter Replacement)			
	Front Axle	260 mL			
	Rear Axle	200 (without Differential); 240 (with Differential)			
Fuel Tank Capacity (L)		43±2			
Fuel Specification		87#(US)/petrol(E10)/92#(GB)			

1.3.1.4 Brake System Specifications

Key Specifications					
Model Designation		SGW570F-U1	SGW570F-U2	SGW570F-U3	SGW570F-U4
Service Brakes	Type of Brake	Hydraulic Disc			
	Brake Operation Method	Right-Foot Pedal Operation			
Parking Brake System	Type of Brake	Mechanical - Rear Wheel Side			
	Brake Operation Method	Hand-operated Brake			
Brake Lever and Pedal	Parking brake lever travel	60~80 mm			
	Brake pedal travel	25~30 mm			
Brake Fluid Type		DOT4			
Brake Pad Thickness	Standard value (mm)	5.0			
	Service Limit (mm)	1.5			

Key Specifications					
Model Designation		SGW570F-U1	SGW570F-U2	SGW570F-U3	SGW570F-U4
Brake Disc Thick-ness (mm)	Standard value (mm)	5 mm			
	Service Limit (mm)	4.0			
Brake Disc Run-out (mm)	Standard value (mm)	0.08			
	Service Limit (mm)	0.1			

1.3.1.5 Wheel and Tyre Specifications

Key Specifications					
Model Designation		SGW570F-U1	SGW570F-U2	SGW570F-U3	SGW570F-U4
Tyre Type (Size)	Front wheel specifications	27×9.00-14(NHS) 27×9.00R14(NHS) 30×10.00R14 (NHS)		27×9.00-14 74J 27×9.00R14 74J 30×10.00R14 86G	27×9.00-1474J 27×9.00R14 74J
	Rear wheel specifications	27×11.00-14(NHS) 27×11.00R14(NHS) 30×10.00R14 (NHS)		27×11.00-1481J 27×11.00R14 81J 30×10.00R14 86G	27×11.00-1481J 27×11.00R14 81J
Rim Type (Size)	Front wheel specifications	Aluminium or Steel Wheel (AT14 × 6.5)			
	Rear wheel specifications	Aluminium or Steel Wheel (AT14 × 7.0)			
Tyre Inflation Pres-sure	Front Wheel (27 in / 30 in)	70±10kPa（10PSI）			
	Rear Wheel (27 in / 30 in)	110±10kPa (16PSI)			

1.3.1.6 Lamp and Bulb Specifications

Key Specifications					
Model Designation		SGW570F-U1	SGW570F-U2	SGW570F-U3	SGW570F-U4
Hea-dla-mp	Headlamp	H4/55W×2 /10000cd			
	Front Position Lamp	LED×2			
	Daytime Running Lamp (DRL)	LED×2			
	Front Direction Indicator Lamp	Amber / 1 × LED / 4.8 W (if Equipped)			

Key Specifications					
Model Designation		SGW570F-U1	SGW570F-U2	SGW570F-U3	SGW570F-U4
Rear Combination Lamp	Rear Stop Lamp	Red 21W (P21/5W)			
	Rear Position Lamp	Red 5W (P21/5W)			
	Rear Direction Indicator	Amber / 10 W / RY10W (if Equipped)			
Rear Number Plate Lamp		White / 5 W / W5W or LED (if Equipped)			

1.4 Vehicle Identification

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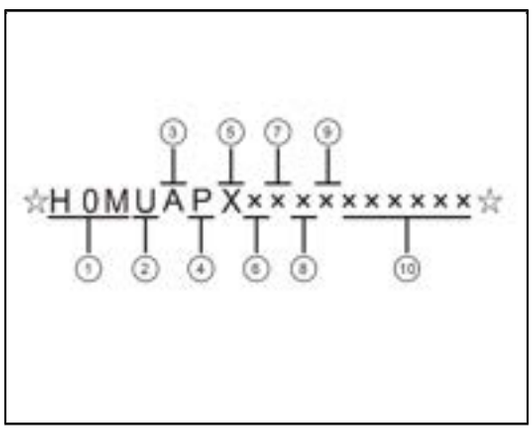
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1.4.1 Identification

1.4.1.1 Vehicle Identification Number (VIN)

1. The Vehicle Identification Number (VIN) is located on the cross tube of the frame beneath the seat cushion. It is also displayed on the VIN plate. This number should be provided when ordering replacement parts from an authorized dealer or as a reference if the vehicle is stolen.
2. Meaning of the Vehicle Identification Number (VIN)

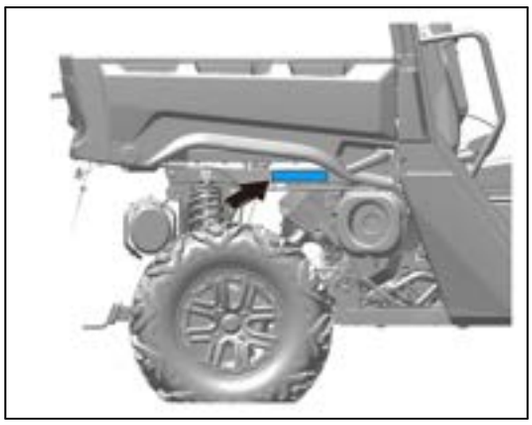


a. Explanation of the Vehicle Identification Number (VIN)

Serial Number	Description of the Serial Number
1	World Manufacturer Identifier (WMI)
2	Vehicle Type
3	Powertrain Type
4	Engine Nominal Displacement
5	Rated Power of Drive Motor
6	Design Sequence
7	Check Digit
8	Year of Manufacture
9	Assembly Plant
10	Production Sequence Number

b. Year of Manufacture Cross-Reference Table

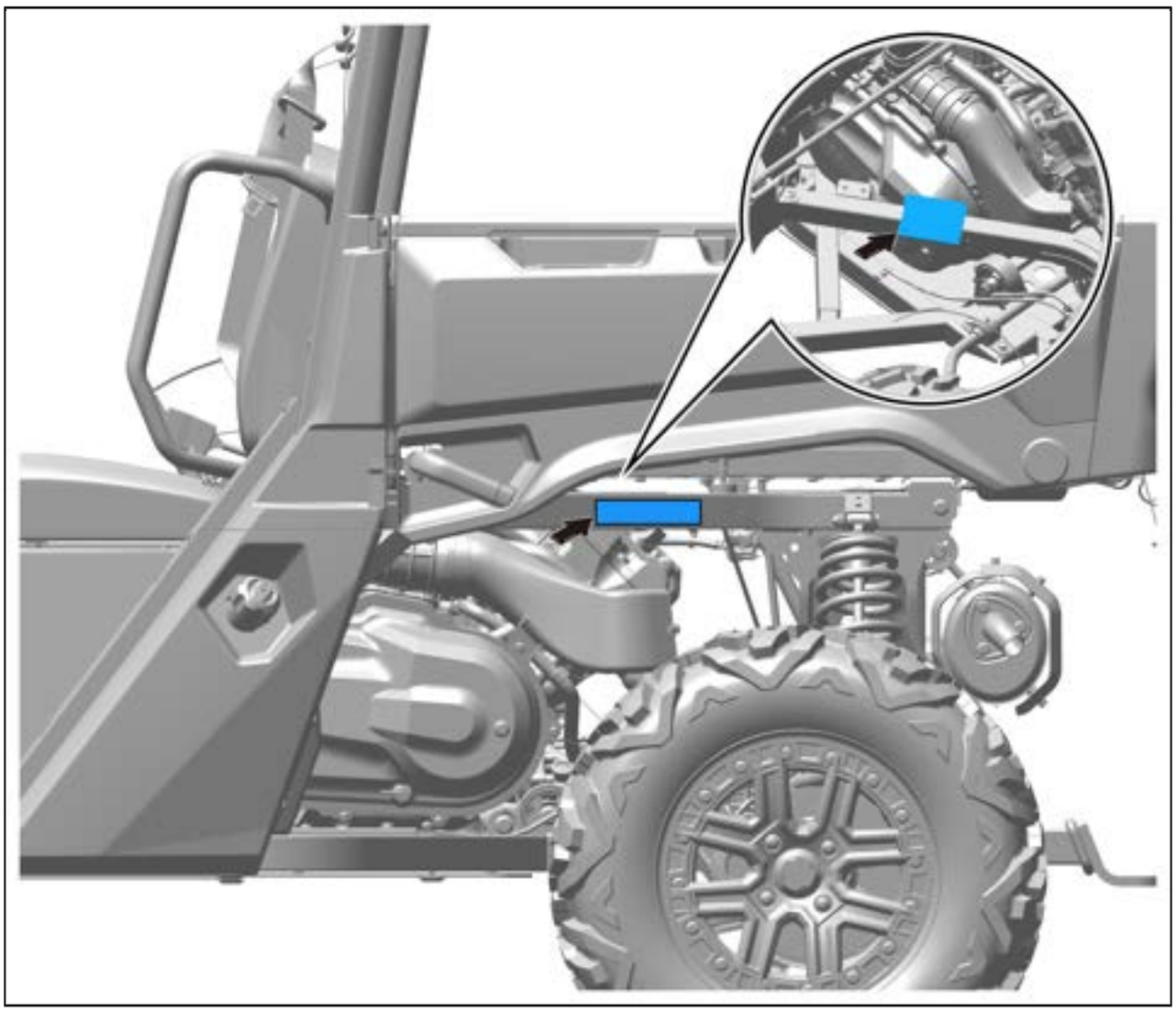
Code	K	L	M	N	P	R	S	T	V	W
Year	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Code	X	Y	1	2	3	4	5	6	7	8
Year	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Code	9	A	B	C	D	E	F	G		
Year	2039	2040	2041	2042	2043	2044	2045	2046		



c. The Vehicle Identification Number (VIN) is stamped on the cargo box bracket welded assembly.

1.4.1.2 Vehicle Identification Plate

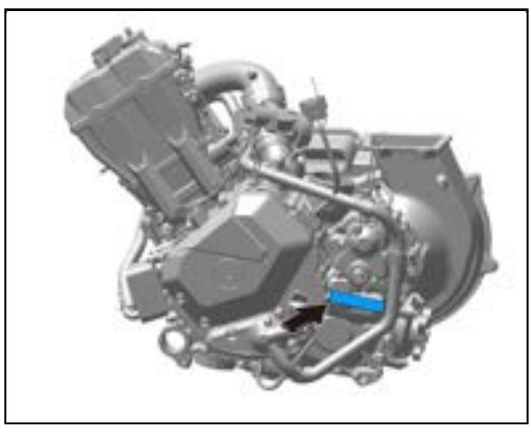
Vehicle Identification Plate Location



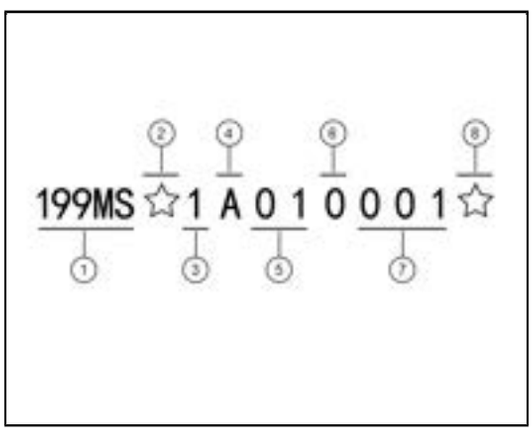
The installation location of the vehicle identification plate is shown in the illustration. This location may vary depending on local market regulations.

1.4.1.3 Engine Serial Number

1. Engine Serial Number



a. The engine serial number is located on the alternator side of the engine.



b. Engine Serial Number Identification

Serial Number	Description of the Serial Number
1	Engine Model
2	Start Character
3	Year of Manufacture
4	Month of Manufacture
5	Day of Manufacture
6	Special Status Code
7	Production Sequence Number
8	End Character

c. Month of Manufacture Cross-Reference Table

Code	A	B	C	D	E	F	G	H	J	K	L	M
Corresponding Month	January	February	March	April	May	June	July	August	September	October	November	December

1.5 Vehicle Lifting and Lowering

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1.5.1.1 Vehicle Lifting and Lowering.....22

1.5.1 Vehicle Lifting and Lowering

1.5.1.1 Vehicle Lifting and Lowering

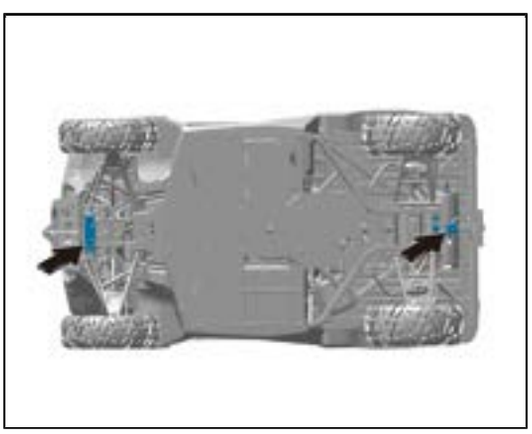
CAUTION:
• Always wear protective gloves and non-slip footwear during the procedure. Do not stay under the vehicle at any time to avoid the risk of falling objects or vehicle overturning. • The jack and axle stands must be rated for the vehicle's weight. Do not use damaged, worn-out, or incorrectly rated lifting equipment. • Always use the designated load-bearing points on the frame. Never support the vehicle under weak body sections to avoid deformation or component damage. • When lowering the vehicle, never release the hydraulic pressure suddenly. Lower the vehicle slowly and evenly to prevent component damage or personal injury from sudden descent.

1. Lifting the Vehicle

   a. Park the vehicle on a flat, stable surface free of slip hazards, turn off the engine, and engage the parking brake.

   b. Engage the 4WD mode and ensure the four-wheel-drive system is functioning properly to improve stability during the lifting process.

   c. Shift the shift lever to position P and ensure that the parking lock is fully engaged to prevent unintended vehicle movement.



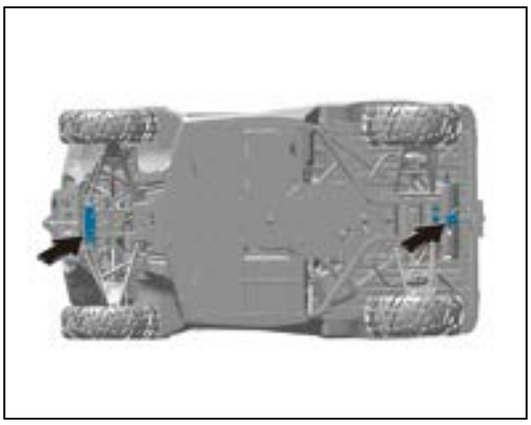
   d. Position the hydraulic jack under the designated front lifting point of the vehicle. Never lift against weak body sections. Raise the vehicle slowly to an appropriate height, ensuring enough clearance to place the axle stands securely.

   e. Place one jack under each support point on both sides of the frame, adjusting the height to ensure a secure fit against the frame.

   f. Lower the hydraulic jack slowly until the front of the vehicle is fully supported by the two axle stands. Gently rock the vehicle to confirm it is securely supported, with no movement or displacement. Once confirmed, remove the jack and proceed with the repairs.

2. Lowering the Vehicle

   a. After completing the repair, remove all tools and debris from beneath the vehicle and ensure there are no obstacles to hinder the lowering process.



b. Position the hydraulic jack under the designated front frame support point and raise the vehicle slowly until the load is gradually transferred from the axle stands to the jack, and the stands are completely unloaded.

c. Remove the axle stands one at a time from both sides and store them in the designated area. Do not leave them beneath the vehicle.

d. Keep the hydraulic jack stable and lower it very slowly, ensuring the front of the vehicle contacts the ground smoothly. Monitor for any tilt, abnormal noises, or other irregularities during the process. If any issues arise, stop immediately and investigate.

e. Once the vehicle is fully settled, continue lowering the hydraulic jack until it is completely separated from the frame support point, then remove the jack.

f. Recheck the vehicle's parked condition to ensure it is level and there is no risk of movement. Disengage 4WD mode, then organize the tools and clean the work area.

1.6 Health and Safety

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1.6.1 Health and Safety

1.6.1.1 Acids and Alkalis

1. Examples include corrosive substances like sodium carbonate and sulphuric acid.
2. Used for cleaning batteries and other components.
3. These substances are irritating or corrosive to the eyes, skin, nose, and throat. They may cause burns and damage ordinary protective clothing.
4. Avoid contact with eyes, skin, and clothing. Wear appropriate protective clothing, gloves, and safety goggles. Avoid inhaling spray mist. Ensure that appropriate washing facilities are available nearby for immediate first aid in case of splashing incidents.
5. Display eye hazard warning signs in a prominent location.

1.6.1.2 Adhesives and Sealants

1. Important precautions for using adhesives and sealants.
   a. Ensure that the bonding surface is clean before applying adhesive or sealant. Wipe it with the specified cleaner to avoid impairing adhesion. When using sealant, ensure that room-temperature curing sealant does not enter threaded blind holes. If it does, hydraulic lock may occur during tightening, damaging fasteners and/or other components. This can prevent the correct clamping force, impair the sealing effect, and cause components to loosen or separate, potentially leading to severe damage to the engine and other parts.
2. Health and Safety
   a. Materials used in adhesives and sealants may contain hazardous substances. Prolonged exposure can cause acute or chronic poisoning, occupational diseases, skin disorders, and other health issues. Use appropriate ventilation equipment while applying adhesive to ensure proper airflow in the work area. Wear protective gloves, a mask, and protective clothing during operation. After work, wash hands thoroughly and maintain a clean, tidy, and hygienic work area.
   b. Waste adhesive and solvent-contaminated materials should be promptly cleaned up and must not be allowed to accumulate.
   c. These products should be stored in a no-smoking area and maintained clean during use. Whenever possible, apply them using an appropriate applicator or container.
3. Adhesive/Sealant Repairs
   a. During a vehicle malfunction or accident, body deformation, panel cracks, and detached welds may occur. Additionally, local damage to the engine, chassis, and other components may result in adhesive or sealant products detaching or being damaged. During vehicle repairs, select adhesives with equivalent performance based on the component material and functional requirements. The following adhesives and sealants can be used during vehicle repairs.
   b. Body Repair:
      • If the vehicle body is deformed or cracked, the adhesive applied to it may peel off or crack. During the repair process, the adhesive-coated areas must be repaired.
      • First, scrape off the adhesive from the body surface. Residual adhesive can be cleaned with alcohol. Use the specified cleaner to clean the bonding area, ensuring no residual adhesive or contaminants remain. Then, apply the repair adhesive to restore bonding and sealing.
   c. Component Repair:
      • If certain components, such as the engine or transmission, are damaged, bonding and sealing

repairs may be necessary. Clean the bonding surfaces thoroughly before applying sealant, ensuring no burrs, cracks, or splits that could impair bonding.

1.6.1.3 Battery

1. Charging a battery generates flammable hydrogen gas. Always perform charging in a well-ventilated area, away from open flames, electrical sparks, and other ignition sources. Smoking near the battery is strictly prohibited.
2. Wear safety goggles and acid-resistant gloves during operation to prevent electrolyte splashes and corrosion. Avoid contact between metal objects and battery terminals to prevent short circuits and sparks.
3. Avoid prolonged exposure of the battery to direct sunlight or placement in high-temperature environments during charging. High temperatures can accelerate electrolyte evaporation, cause plate degradation, increase the risk of gas buildup, and may lead to battery swelling and a reduced lifespan.
4. Only use charging equipment that matches the battery's specifications, and strictly adhere to the prescribed procedures to avoid overcharging and prevent damage to the battery.

1.6.1.4 Chemicals

1. Chemical substances such as solvents, sealants, adhesives, coatings, resin foams, battery acid, engine coolant, brake fluid, fuel, lubricants, and greases must be handled with care during their use, storage, and disposal. These substances may be toxic, hazardous, corrosive, irritant, or highly flammable, and may also release harmful fumes, odors, or dust.
2. Prolonged or excessive exposure to such chemicals may result in immediate or long-term, temporary or permanent, cumulative or superficial damage. In severe cases, it may be life-threatening or reduce life expectancy.
3. Chemical substances — actions to be followed
   a. Read and comply with all warnings and precautions on the material container, along with any accompanying leaflets, posters, or other instructions. Health and safety data sheets are available from the manufacturer.
   b. Immediately remove chemical residues from skin and clothing in case of contamination. Change heavily contaminated clothing without delay and thoroughly wash the affected areas.
   c. Strictly follow the work instructions and wear appropriate protective clothing to avoid direct contact with skin and eyes.
   d. After handling chemicals, ensure thorough washing before taking a break, eating, drinking, smoking, or using washing facilities, with special focus on hands, face, and other exposed areas.
   e. Keep the work area clean and orderly, and avoid spilling chemical substances.
4. Chemical substances — actions to be avoided
   a. Do not mix chemical substances unless directed by the manufacturer. Some substances may react to form other toxic or harmful chemicals, release hazardous gases, or cause explosions and other incidents.
   b. Do not spray chemical substances in enclosed spaces.
   c. Do not heat chemical substances unless specified by the manufacturer. Some are highly flammable, while others may release toxic or harmful gases when heated.

d. Do not leave chemical containers open. The released vapours may accumulate to levels that are toxic, harmful, or explosive. Some vapours are heavier than air and may accumulate in confined spaces.

e. Do not place chemical substances in unmarked containers.

f. Do not use chemical substances to clean hands or clothing. Chemicals, particularly solvents and fuels, may dry out the skin, cause allergic reactions, lead to dermatitis, or allow harmful substances to be absorbed through the skin.

g. Do not store other chemical substances in empty containers unless they have been thoroughly cleaned under supervision.

h. Do not inhale or smell chemical substances. Even brief exposure to high concentrations of vapours can result in poisoning or injury.

1.6.1.5 Dust

1. Powders, dust, and contaminants can be irritants, hazardous, or toxic. Avoid inhaling powdered chemicals or dust generated during dry abrasive operations. In poorly ventilated areas, wear respiratory protection that complies with safety standards to prevent inhalation of dust.
2. Fine dust from combustible materials may pose an explosion hazard. Keep it away from ignition sources and take necessary precautions to prevent explosions.

1.6.1.6 Exhaust Gases

1. Exhaust gases contain various toxic and harmful substances, such as carbon oxides, acetaldehyde, and lead. The engine should only operate in an enclosed space with suitable exhaust extraction equipment, or in a well-ventilated open area.

1.6.1.7 Fibre Insulation

1. The fibrous surface and sharp edges of rigid fibres may cause skin irritation or mechanical injury.
2. Strictly follow the work procedures during handling and wear protective gloves to minimize direct contact with fibres.

1.6.1.8 Fire Hazard

1. Many materials used in vehicle repairs are highly flammable. Some materials release toxic or harmful gases when burned.
2. Always observe fire safety when storing or handling flammable materials or solvents, particularly near electrical equipment or welding areas.
3. Before using electrical or welding equipment, ensure the work area is free from fire hazards.
4. When welding or using heating equipment, ensure a suitable fire extinguisher is readily available near the work area.

1.6.1.9 First Aid

1. In addition to adhering to all applicable laws and regulations, the workplace must be equipped with personnel who have been professionally trained and certified in first aid.
2. If chemical solvents come into contact with the eyes, rinse immediately with clean water for a

minimum of 10 minutes.
3. In case of skin contamination, wash the affected area thoroughly with soap and clean water.
4. Anyone exposed to toxic gases should be moved to fresh air immediately. If symptoms persist, seek medical attention without delay.
5. If chemical liquid is ingested by accident, inform the doctor of the details on the container or label. Unless specifically instructed, do not induce vomiting.

1.6.1.10 Polyurethane Foam

1. Uncured components are irritating and may be harmful to the skin and eyes. Wear gloves and safety goggles when handling these materials.
2. Individuals with chronic respiratory conditions, asthma, bronchitis, or hereditary allergies should not handle or come into contact with uncured materials.
3. The dust, vapour, or spray from this material may cause direct irritation and allergic reactions and could be toxic or harmful.
4. Avoid inhaling vapour or spray. These materials must only be handled in a well-ventilated area, and appropriate respiratory protection must be worn. Do not remove the face mask immediately after spraying. Wait until the vapour and mist have fully dispersed before removing it.
5. Burning uncured components or cured foam generates toxic and harmful gases. During foam operations, smoking, naked flames, and the use of electrical equipment that may produce sparks are strictly prohibited unless all vapour and mist have been fully cleared. Hot cutting of foam materials, including special foams, must be performed in a well-ventilated area.

1.6.1.11 Fuel

1. Minimise skin contact with fuel. If contact occurs, wash the affected area immediately and thoroughly with soap and running water.
2. If fuel gets into the eyes, do not rub them. Rinse thoroughly with plenty of running water for at least 15 minutes. Seek medical attention if necessary.
3. Always keep fuel-related operations away from naked flames, electrical sparks, and sources of high heat. Smoking is strictly prohibited in the work area, which must be well-ventilated.
4. Before starting work, discharge any static electricity from the body by touching a metal part of the vehicle. This helps prevent the risk of igniting fuel vapour, which could lead to fire or explosion.
5. Fuel must be stored in sealed, dedicated containers only. Open containers are prohibited. Containers should be kept away from fire and heat sources and must be clearly labelled.
6. Prevent fuel leakage during operations. If leakage occurs, it must be cleaned up immediately. Spilled fuel must not be left in the work area.
7. Waste fuel must be collected separately in a designated recovery container. It must not be disposed of casually and should be managed by a certified organisation in accordance with relevant regulations.

1.6.1.12 General Workshop Tools and Equipment

1. Always ensure that all tools and equipment are in good working condition and operated strictly

according to the prescribed procedures.

2. Tools and equipment must not be used for any purposes other than those for which they were designed. Never overload lifting equipment such as hoists, jacks, chassis stands, or slings. Their rated capacities must not be exceeded. Overloading may cause damage that is not immediately apparent, but this can lead to serious accidents the next time the equipment is used.
3. Wear appropriate eye protection when using grinding wheels, chisels, or sandblasting equipment.
4. Do not use damaged or malfunctioning tools or equipment, especially high-speed devices such as grinding wheels. A damaged grinding wheel may fracture without warning and cause serious injury.
5. Appropriate respiratory protection must be worn when using sandblasting equipment, handling asbestos-containing materials, or carrying out spraying operations.
6. The workplace must be equipped with effective ventilation systems to control the levels of dust, spray mist, and fumes in the environment.

1.6.1.13 Lubricants and Greases

1. Avoid prolonged or repeated contact with mineral oils and greases, as all types of lubricating oils and greases can irritate the eyes and skin.
2. Do not allow engine oil to stain clothing, especially undergarments.
3. Avoid wearing heavily soiled clothing or footwear contaminated with oil. Regularly wash all workwear.
4. If cuts, abrasions, or other bodily injuries occur, provide immediate first aid.
5. Prior to working, apply a suitable barrier cream to the skin to aid in the removal of any oil contamination later.
6. Wash thoroughly with soap and running water to remove all oil. A skin cleanser and nail brush may be used as needed. Apply a lanolin-based skin cream to replace the natural oils stripped from the skin during washing.
7. Never use petrol, kerosene, diesel fuel, gas oil, thinners, or solvents to clean the skin.
8. If skin irritation occurs, seek medical assistance immediately.
9. If possible, remove any surface oil contamination from components before handling them.
10. If there is a risk of eye contact, wear safety goggles or a face shield (e. g., chemical splash goggles or a visor). Suitable eye-wash facilities must also be provided.
11. Environmental Protection Precautions:
    a. Used engine oil and oil filters must be given to an authorized waste disposal contractor for proper disposal at an approved facility or sent to a licensed waste oil recovery centre. If you are unsure about waste disposal procedures, contact the relevant local authorities.
    b. It is illegal to pour waste oil onto the ground, into drains, ditches, or water sources. Pollution control laws may vary by region.

1.6.1.14 Noise

1. Certain vehicle maintenance operations may generate high noise levels that can cause hearing damage. Appropriate hearing protection, such as earplugs or earmuffs, must be worn to meet safety standards.

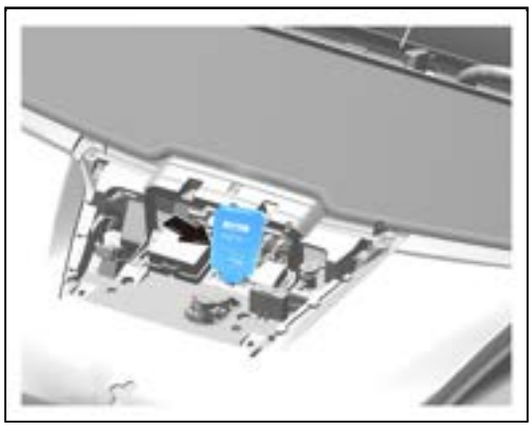
1.7 Diagnosis and Repair

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1.7.1 Diagnostic Information

1.7.1.1 Using the Diagnostic Tester

1. Connecting the Diagnostic Tester



a. Connect the VCI diagnostic connector to the vehicle's OBD diagnostic interface and ensure a secure connection.

b. Turn the vehicle power to the ON position (without starting the engine), power on the diagnostic tester, and wait for initialization to complete.



c. On the Segway tablet, open the VCI management menu and establish a Bluetooth connection with the VCI diagnostic interface. Confirm successful connection.

d. Open the diagnostic software, select UT6 V2.3.3, and perform data reading or other operations as needed.

1.7.1.2 Fault Diagnosis and Rectification

1. Diagnostic Guidelines and Troubleshooting Methods

Type of Procedure	Details	Troubleshooting Methods
DTC-Based Diagnosis	The diagnostic procedure is based on stored Diagnostic Trouble Codes (DTCs).	1. Identify the faulty component using the DTC detection conditions and a process of elimination.
		2. Inspect the relevant components using the diagnostic tester and systematically eliminate suspected faults.
Symptom-Based Diagnosis (with Stored DTCs)	The diagnostic procedure is based on the fault symptoms.	1. Narrow down the faulty component based on the fault symptom using a process of elimination, then inspect the relevant components with the diagnostic tester and eliminate suspected faults.

2. Troubleshooting Procedure

Step	Description
Step 1	1. Gather detailed information regarding when the electrical fault occurred.
Step 2	1. Operate the affected system and perform a road test if necessary.
	2. Verify the fault parameters.
Step 3	1. Collect the necessary diagnostic information, including: Wiring diagrams, system schematics, relevant sections of the service manual, and other related technical information.
	2. Use system operation knowledge and customer feedback to perform diagnostics.
Step 4	1. Check the system for sticking, loose connectors, or damaged harnesses.
	2. Identify the circuits and components involved, and diagnose them using the circuit diagram and harness layout.
Step 5	1. Repair the circuit and replace components as necessary.
Step 6	1. Test the system under all modes to ensure it operates correctly under all conditions. Ensure no new faults are introduced during diagnostic or repair procedures.

1.7.1.3 Simulation Testing

1. Intermittent faults and other issues that cannot be detected during road testing can be identified through simulation tests. By replicating the operating conditions and environment at the time of fault occurrence, potential vehicle faults can be effectively pinpointed.

NOTICE:
• A comprehensive description of the fault provided by the customer is crucial for accurately replicating the conditions under which the symptoms occur.

2. Simulation tests are classified into six main categories:
   Vehicle Vibration Testing.
   Faults that arise when driving over rough roads can be investigated through this test. For vibration-related conditions, inspect the following vehicle components:

   a. Connectors and Harnesses: Identify which connectors and harnesses could affect the electrical system under investigation. While observing the system for the simulated fault, gently shake or wiggle each connector and harness. This test may identify loose or faulty electrical connections.

NOTICE:
• Prolonged exposure of connectors to damp environments may result in the formation of a corrosive oxide layer on the terminals, which is difficult to detect visually without disconnecting the connector. If an intermittent fault occurs in the system, terminal corrosion is likely the cause. It is recommended to disconnect the relevant connectors, inspect, and clean the terminal areas.

b. Sensors and Relays: Gently shake the sensors and relays in the system under inspection. This may identify any sensors or relays that are loose or improperly mounted.

c. Vehicle vibration can lead to electrical faults for various reasons. Focus on the following conditions:

NOTICE:
• **First, confirm that the system grounding is correct. Then, using the method described above, gently vibrate the harness or components to check for loose connections. Simultaneously, refer to the circuit diagram to test wiring continuity and perform voltage tests.**

- The connector is improperly seated.
- The harness is too short, causing it to stretch due to vibration or movement.
- The harness is positioned directly against a bracket or the surface of moving components.
- The earth wire is loose, dirty, or corroded.
- The harness is routed too close to high-temperature components.

d. Inside the trim panels

- Improper securing of the harness may cause entanglement during the installation of adjacent parts, and vehicle vibration may lead to excessive wear of the harness around brackets and mounting screws.
- During vehicle vibration, unsecured or loose harnesses may get caught by moving components. If the harness passes beneath a mounting point, inspect for any entrapment or damage.

Thermal Sensitivity Testing

a. If a fault occurs after prolonged exposure to summer sun or extended operation, and local overheating of the harness or electrical system is suspected, a thermal sensitivity test can be performed.

b. Use a heat gun or other SST to heat the faulty system components and conduct the thermal sensitivity test.

CAUTION:
• **The component heating temperature must not exceed 60°C.** • **If the fault reoccurs during heating, apply heat insulation to the relevant components and replace them if necessary.**

Cold Soak Testing

a. If a fault disappears after warming up the vehicle in winter, and local icing of the harness or electrical system is suspected, the following two methods can be used for investigation:

b. Use a heat gun or other SST to heat the faulty system components and conduct the thermal sensitivity test.

- Method 1: Park the vehicle outdoors overnight to ensure the ambient temperature is low enough to replicate the fault. The next morning, promptly inspect the suspected faulty components.
- Method 2: Place the suspected faulty components in a cold chamber until fully frozen. Reinstall them into the vehicle, then retest. If the fault recurs, repair or replace the component.

Leak Testing

a. Check for leaks in the cooling system.

b. If the fault only occurs in high humidity or during rainy or snowy weather, and water ingress into electrical components is suspected, simulate a car wash by spraying water on the vehicle to check for any points of water leakage.

Load Testing

a. If the fault occurs only when electrical equipment is turned on, sequentially activate the audio system, fog lamps, and other devices to establish the relationship between the equipment load and the fault. Use this load test to identify the fault location.

Voltage Drop Testing

a. The voltage drop test is primarily used to identify potential issues that could affect the normal functioning of electrical components and circuits.

b. Use a digital multimeter to test the target circuit.

c. If the resistance of an individual harness measured with the digital multimeter is close to 0Ω, and the voltage drop test results are within the specifications, the harness and associated circuit are considered to be functioning normally.

1.7.2 Repair Instructions

1.7.2.1 Service Instructions

1. Trim Panels
   a. Pre-coated parts are fasteners such as studs and nuts that are coated with sealant during manufacturing.
   b. If a pre-coated part has been re-tightened, removed, or relocated, the specified sealant must be reapplied.
   c. Before reusing a pre-coated part, thoroughly remove any remaining sealant, blow the threaded area clean with compressed air to ensure no contaminants remain, and then evenly apply the specified sealant to the bolt or nut threads.
   d. After applying the sealant, allow it to cure according to the manufacturer's specifications until it reaches the required initial set.
2. Washers
   a. Install a sealing ring at the washer interface according to sealing requirements to prevent leakage.
3. Bolts, Nuts, and Screws
   a. Before use, check bolts, nuts, and screws for thread damage. If the damage exceeds the specified limit, replace the part.
   b. Adhere strictly to the specified torque standards for each type of bolt, and tighten the fastener to the recommended torque.
4. Battery
   a. Before servicing on-board electrical systems or circuits, always disconnect the negative battery terminal to prevent short circuits and protect electrical components.
   b. To avoid damaging the battery terminal, loosen the terminal bolt and lift the cable terminal vertically. Never twist or lever the terminal or cable.
   c. Clean the battery terminal and cable terminal surfaces with a clean cloth. Do not use a file or abrasive tool, as this may damage the plating.
   d. Position the cable terminal carefully onto the battery terminal and tighten the terminal bolt to ensure a firm connection. Never use a hammer to fit the terminal onto the post.
5. Electrical Components
   a. When disconnecting an electrical connector, grasp the connector body and pull it apart. Do not pull on the harness directly, as this may cause the terminal to detach or the harness to break.
   b. Never allow electrical components to fall. If dropped onto a hard surface, replace them immediately and do not reuse them.
   c. When checking continuity at an electrical connector terminal, gently insert the test probe to avoid damaging or bending the terminal.
   d. After replacing an electrical component, perform a functional test on both the component and the related system to ensure proper operation.
6. Push-in Clips
   a. When removing a push-in clip, use the designated clip removal tool and follow the prescribed procedure to avoid damaging the clip or the base.

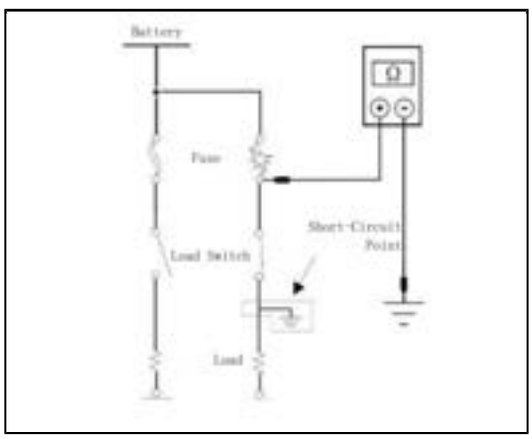
1.7.3 Electrical Circuit Fault Repair

1.7.3.1 Fuse Inspection and Servicing

NOTICE:

- For electrical system faults, first check if the fuse has blown, and then assess the preliminary cause of the fuse failure.

1. Inspecting the circuit of the blown fuse



a. Remove the blown fuse and disconnect all circuit switches associated with it.

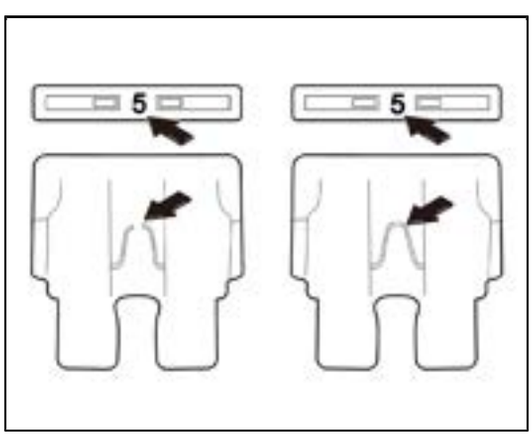
b. Measure the resistance between the load terminal of the blown fuse and the ground.

c. If the resistance value is close to 0Ω, a short circuit may exist somewhere between the switch and the load.

d. If the resistance value is not 0Ω, no short circuit is present. The fault may be elsewhere, such as a sudden over-voltage at the load, which could cause the fuse to blow.

e. The main causes of short circuits are as follows:
   - Wear causing damage to the outer surface of the harness.
   - Water ingress into connectors or electrical components.

2. Fuse Replacement Procedure



a. When replacing the fuse, ensure the new fuse is rated for the correct current strength.
   - The fuse on the left in the image is blown, while the one on the right is intact.

CAUTION:

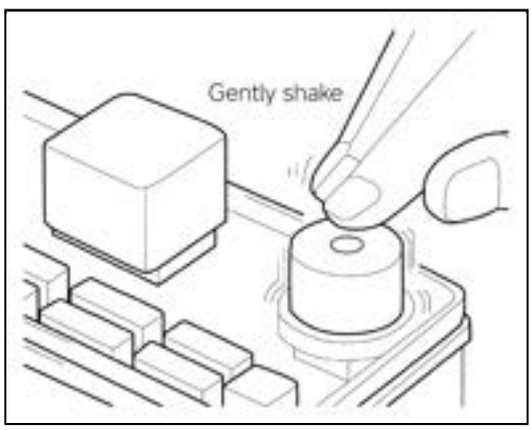
- Never use fuses with different ratings.
- Always replace the fuse with one of the same type.

1.7.3.2 Handling Intermittent Faults

NOTICE:

- To assist in identifying intermittent faults, first ask the customer about the vehicle's driving conditions, weather conditions, fault frequency, and symptoms, and then try to replicate the fault.
- Check if the test circuit is damaged or functioning normally, and confirm and eliminate any faults.
- Refer to the fault diagnosis sections at the start of each system chapter to narrow down the possible failure causes.

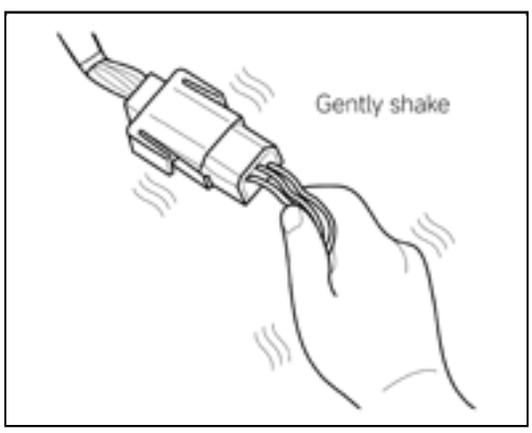
1. Vibration Testing



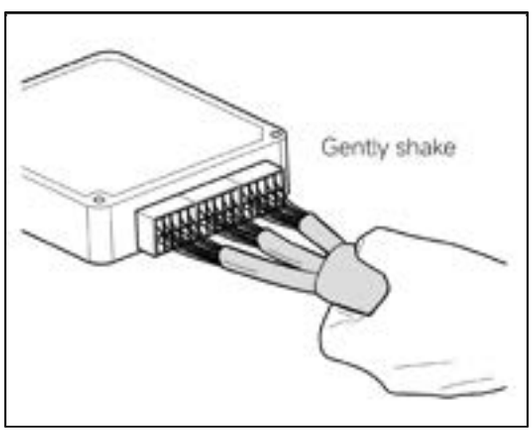
a. Perform vibration testing on the relevant components and sensors.
   - Lightly tap the suspected faulty sensor with your finger and observe if the fault reoccurs.

CAUTION:

- Never apply excessive force, as this could damage the relay and cause an open circuit.

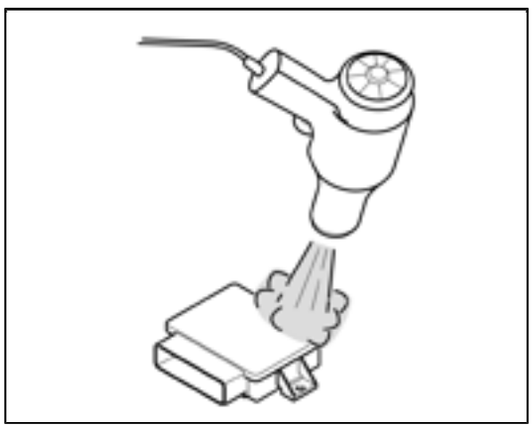


b. Perform vibration testing on the connectors.
   - Gently shake the connector both horizontally and vertically to observe if the fault reappears.



c. Perform vibration testing on the connectors.
   - Gently shake the harness and connectors both horizontally and vertically to check if the fault recurs.
   - Pay special attention to the condition of the earth wire and grounding points.

2. Heating Method



a. Use a hairdryer or similar tool to heat the suspected fault area and observe if the fault reappears.

CAUTION:

- **Strictly control the heating temperature and avoid damaging any components during the process.**
- **Never apply direct heat to controllers or any type of electronic control unit (ECU).**

3. Spraying Method

a. Perform a spray test on areas of the vehicle suspected to be affected by moisture or water ingress and observe if the fault reappears.

CAUTION:

- **Never spray water directly onto the engine or chassis electrical components.**
- **Never spray water directly onto any electronic components.**

4. Other Methods

a. Activate all electrical loads of the vehicle and observe if the fault reappears.

1.7.3.3 Dealing with Historical Faults

1. **If the fault is not present under current conditions but has occurred in the past, it may be persistent, and the following steps should be taken for diagnosis.**

a. Confirm whether the user has replaced the fuse or disconnected any related connectors.

b. If the user has replaced the fuse or disconnected the connector, first clear the diagnostic trouble code and verify if the code has been reset.

c. If the diagnostic trouble code has not been reset, the diagnostic process is complete.

d. If the diagnostic trouble code has been reset, follow the diagnostic process for the specific code, and then check the relevant harness and connectors.

2.1 Service Information

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2.1.1 Scheduled Maintenance

2.1.1.1 Scheduled Maintenance

1. Regular and thorough maintenance ensures that the vehicle remains in optimal condition for safety and reliability. The scheduled maintenance plan outlines the inspection, adjustment, and lubrication requirements for each critical component. The key components of the vehicle must be inspected, cleaned, lubricated, adjusted, and any worn parts replaced as needed. If replacement parts are required during inspection, Segway genuine parts must be used, which can be obtained through authorized Segway dealers.
2. Maintenance and adjustments are essential for the proper functioning of the vehicle. If the user is unfamiliar with the maintenance and adjustment procedures, it is recommended that these be carried out by an authorized Segway dealer. The maintenance schedule is based on standard operating conditions. If the vehicle is used under harsh conditions, the inspection and maintenance intervals should be shortened.
   a. Definition of Harsh Conditions:
      • Frequent operation in muddy, waterlogged, or sandy environments; prolonged use in dusty conditions; frequent short-distance driving in cold weather; competitive driving or prolonged high-speed operation; extended low-speed, heavy-load driving; long-term vehicle storage.

2.1.1.2 Running-in Checklist

Item	Service Interval (Whichever Occurs First)			Notes
	Cumulative Operating Time (hours)	Usage Time (months)	Mileage (km)	
Fuel System	25	1	320	Running-in Inspection: Cycle pressurisation of the fuel pump; inspect fuel lines and connections for leaks and wear.
Engine Oil Change	25	1	320	Running-in Inspection: Replace engine oil and the oil filter.
Front Axle Oil	25	1	320	Running-in Inspection: Check axle oil level.
Rear Axle Oil	25	1	320	Running-in Inspection: Check axle oil level.

2.1.1.3 Regular Checklist

1. Ensure that maintenance is carried out at the recommended intervals shown in the table. Some

tasks must be performed based on either time or mileage, whichever occurs first.

	Item	Service Interval (Whichever Occurs First)			Notes
		Cumulative Operating Time (hours)	Usage Time (months)	Mileage (km)	
▶	Brake Pad Wear	10	Monthly	160	Regular inspection, replace if necessary
	Battery	20	Monthly	320	Inspect terminals; clean; test
▶	Air Filter, Element	50	No fixed interval	800	Inspect; replace if necessary, and check more often if used under harsh conditions
▶	Full Lubrication	50	3	800	Lubricate all components, bearings, cables, and more.
	Throttle Body	50	6	800	Check if pipes are properly sealed and for any air leaks
	Drive Belt	50	6	800	Inspect, adjust, replace if necessary
	Cooling System	100	12	1600	Seasonal check of coolant strength; test pressure system every year
▶	Engine Oil Change	100	12	1600	Replace engine oil and the filter
▶	Fuel Lines and Fasteners	100	12	1600	Check for leaks and ensure all fasteners are secure
▶	Front Axle Oil	100	12	1600	Fluid Replacement
▶	Rear Axle Oil	100	12	1600	Fluid Replacement
D	Fuel System/Filter	100	12	1600	Cycle pressurisation of the fuel pump to check for leaks at the filler cap, fuel lines/rail, and fuel pump; replace lines every two years.
▶	Radiator (if applicable)	100	12	1600	Inspect; clean exterior surfaces
▶	Cooling Hoses (if applicable)	100	12	1600	Inspect for leaks
▶	Engine Mounts	100	12	1600	Inspecting
	Exhaust Silencer/ Pipes/Connections	100	12	1600	Inspect; clean; replace worn parts
D	Spark Plug	100	12	1600	Inspect and replace as

Item		Service Interval (Whichever Occurs First)			Notes
		Cumulative Operating Time (hours)	Usage Time (months)	Mileage (km)	
					necessary
D	Clutch (Driving and Driven)	100	12	1600	Inspect; clean; replace worn parts
D	Front Wheel Hub Bearings	100	12	1600	Inspect and replace as necessary
D	Brake Fluid Type	200	24	3200	Replace every two years
	Spark Arrester	100	12	1600	Clean Thoroughly
►	Engine Coolant	No specific cumulative time	60	No specified mileage	Replace the coolant
D	Valve Gap Adjustment	500	No fixed interval	8000	Inspect and adjust as necessary
D	Toe Alignment Adjustment	No specific cumulative time	No fixed interval	No specified mileage	Adjust as required
	Headlamp Beam Adjustment	No specific cumulative time	No fixed interval	No specified mileage	Periodic inspection and adjustment

All maintenance services are triggered by the "whichever comes first" principle (whichever condition—cumulative operating time, usage time, or mileage—occurs first), with all details fully documented in the service log.

- ►: Vehicles with high usage require more frequent servicing
- D: Requires authorized dealer or professional technician

WARNING:

- Services marked with "D" are high-risk; improper handling could result in component failure and serious injury or even death. Such services must be performed by authorized dealers or qualified technicians.

2.1.1.4 Lubrication of Points

The front and rear control arms, anti-roll bars, and propshafts are equipped with grease nipples. Regularly grease these points, ensuring that the components are clean and dry before lubrication.

Item	Recommen-ded Grease Type	Number of Lubrication Points	Grease Capacity	Lubrication Instructions	Lubrication Frequency
Front and Rear Anti-Roll Bars	Semi-Synthetic Waterproof Grease	4 Locations	Grease Nipple (max 2 pumps)	Fill Without Spillage	Every 800 km
Front Upper and Lower Control Arms	Semi-Synthetic Waterproof Grease	8 Locations	Grease Nipple (max 2 pumps)	Fill Without Spillage	Every 800 km
Rear Upper and Lower Control Arms	Semi-Synthetic Waterproof Grease	6 Locations	Grease Nipple (max 2 pumps)	Fill Without Spillage	Every 800 km
Propeller shaft	Semi-Synthetic Waterproof Grease	2 Locations	Grease Nipple (max 2 pumps)	Fill Without Spillage	Every 800 km
Rear Left and Right Hub Carriers	Semi-Synthetic Waterproof Grease	4 Locations	Grease Nipple (max 2 pumps)	Fill Without Spillage	Every 800 km

2.1.1.5 General Vehicle Inspection and Maintenance

1. **Perform the following pre-drive checks daily and service the vehicle during each scheduled maintenance interval.**
   a. Checking the engine oil level
   b. Inspecting tyre condition and checking pressure
   c. Fill the Fuel Tank to the Correct Level
   d. Check all brakes and inspect brake fluid level
   e. Inspect Headlamps, Tail Lamps, Indicators, Instruments, and Switches
   f. Verify Switch Functionality
   g. Ensure Wheel Nuts Are Tightened and Split Pins Are Secure
   h. Inspect Engine Air Intake and Air Cleaner; Replace Element if Needed
   i. Verify Steering Operation, Checking for Abnormal Looseness
   j. Visual Inspection for Loose Parts: Inspect for Any Damaged or Loose Nuts, Bolts, or Fasteners
   k. Check Engine Coolant and Coolant Recovery Bottle Level
   l. Inspect Drive Shaft Dust Boots for Tears or Damage on Front and Rear Boots
   m. Inspect All Front and Rear Suspension Components for Wear or Damage
   n. Frame, Nuts, Bolts, and Fasteners

o. Regularly check the torque of all fasteners as per the maintenance schedule, and ensure split pins are correctly fitted; refer to the specific torque values listed in each chapter.

2.1.2 Inlet and Exhaust System

2.1.2.1 Inspecting the air cleaner element

1. The air cleaner element must be renewed at the specified service intervals. Under extremely dusty conditions, the air cleaner element must be renewed more frequently.
2. To remove the air cleaner element assembly, See: Air Cleaner Element Assembly. If the cleaner element is oil-soaked or heavily contaminated with dust, replace it with a new one. If it is not heavily oiled or severely clogged with dust, remove the air cleaner, face the intake side downwards, and tap it lightly on the ground to dislodge most of the dust. Use compressed air to blow from the inside of the element outwards (do not blow inwards from the intake side) to remove the remaining dust.
3. Whenever the cleaner element is replaced, inspect the air cleaner drain outlet and make sure it is free from debris to ensure proper drainage. If necessary, remove the drain plug beneath the outlet to facilitate drainage

2.1.2.2 Inspecting exhaust heat shields

1. Inspect the exhaust heat shields
   a. Inspect the exhaust heat shields for damage or deformation; ensure mounting bolts/clips are secure and intact

2.1.2.3 Inspecting spark arrester

1. Inspect the spark arrester
   a. Periodically remove carbon deposits from the exhaust pipe
   b. Clean the spark arrester with soapy water; if necessary, use a wire brush to remove carbon and debris from the mesh (recommended every 100 hours of operation)
   c. If the spark arrester mesh is damaged or deformed, replace it with a new OEM unit

2.1.3 Cooling System

2.1.3.1 Inspecting radiator

1. Inspect the radiator
   a. Check the radiator for mud or blockages, and clean it as follows if necessary
      - Rinse the back of the radiator core from top to bottom with low-pressure water from a hose, following the direction of the fins.
      - Clean all surfaces of the radiator core until there is no visible dirt or debris remaining
      - Use low-pressure compressed air to blow the back of the radiator core vertically downward along the fins until no moisture remains.

CAUTION:
• In dusty areas, it should be cleaned more frequently than the recommended intervals. After driving in muddy conditions, clean the radiator screen and radiator immediately. • When cleaning the radiator with steam, observe the following precautions to prevent damage to the radiator. Keep the steam cleaner nozzle at least 0.5 m away from the radiator core. • Do not use a high-pressure washer, as it may damage the fins and affect the radiator's cooling efficiency • Do not bend or damage the radiator core or fins • Carefully straighten any bent corrugated fins if required • Replace the radiator if more than 20% of the effective airflow area is blocked, or if the fins cannot be straightened or repaired

2.1.3.2 Cooling System Flush

CAUTION:
• Never open the expansion tank cap when the engine is hot. The cooling system is pressurised when hot; opening the cap may result in hot coolant spraying, which could cause burns. • Avoid using alcohol- or methanol-based antifreeze, or coolant mixed with such antifreeze. Using incorrect coolant may cause corrosion of aluminium components and damage the cooling system.

1. Turn off the engine and allow the coolant to cool to room temperature. Remove the expansion tank cap, position a collection container, release the lower radiator hose clamp, and remove the hose to drain the coolant. Refit the hose and tighten the clamp after draining.
2. Add a cooling system cleaner to the radiator, then fill with fresh water. Replace the expansion tank cap and tighten it securely.
3. Start the engine and idle for 10 minutes to allow the cleaner to circulate completely.
4. Turn off the engine and allow the coolant to cool to room temperature. Remove the expansion tank cap, position a collection container, release the lower radiator hose clamp, and remove the

hose to drain the cleaner. Refit the hose and tighten the clamp after draining.

5. Fill the radiator with fresh water, replace the expansion tank cap and tighten it, then start the engine and idle for 5 to 10 minutes for the initial flush.
6. Turn off the engine and allow the coolant to cool to room temperature. Remove the expansion tank cap, position a collection container, release the lower radiator hose clamp, and remove the hose to drain the cleaner. Refit the hose and tighten the clamp after draining.
7. Continue flushing with fresh water 2–3 times until the water drained is clear and free of visible debris, completing the system flush.
8. Add coolant to the radiator, ensuring the fluid level reaches the specified mark in the expansion tank. Replace and tighten the expansion tank cap.
9. Start the engine and idle for 20 minutes, checking all hose connections and the system for any leaks.
10. Turn off the engine and allow it to cool. Recheck the expansion tank fluid level and top it up if below the specified mark.

2.1.3.3 Inspecting cooling lines

1. The radiator hose is under high pressure; incorrect connections can cause coolant leaks or hose rupture. Visually inspect the hose for signs of deterioration or damage, and squeeze the hose to check its elasticity: it should not be hard, brittle, soft, or swollen.
2. Replace any hose immediately if there are signs of wear, cracks, or bulges.
3. Check that hoses are securely connected to fittings and ensure hose clamps are tightened to the specified torque.
   - Inspect all engine hoses for cracks, ageing, wear, or leaks, and replace them if necessary.
   - Inspect the sealing and tightness of all hose clamps, and replace any that are loose, deformed, or corroded.

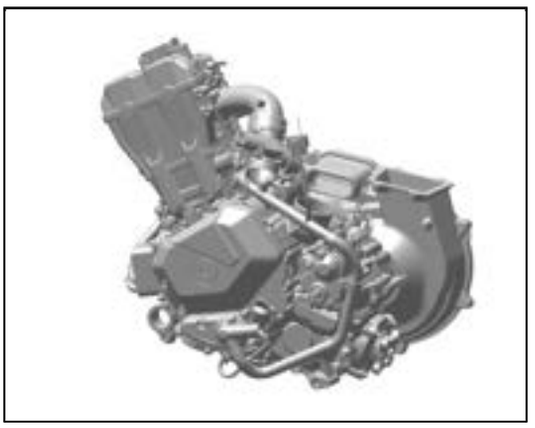
3.1 Engine Operation and Maintenance

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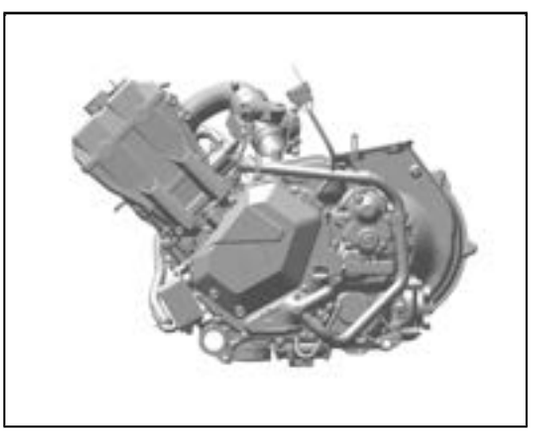
3.1.1 Engine Appearance

3.1.1.1 Engine Overview

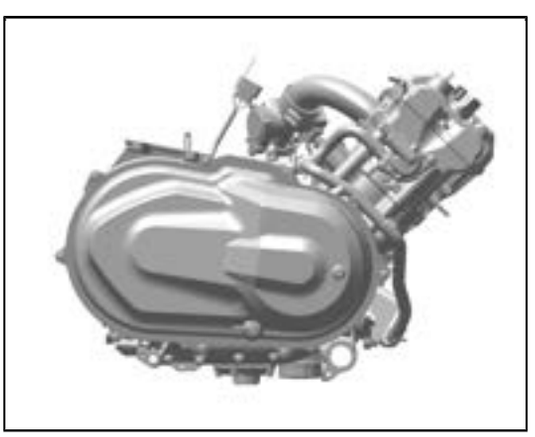
1. Engine Overview



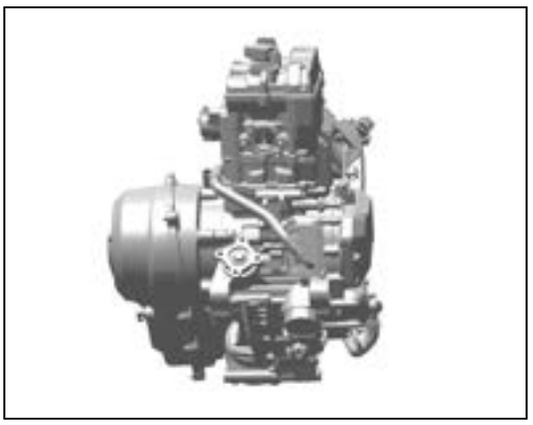
a. Engine – Front View



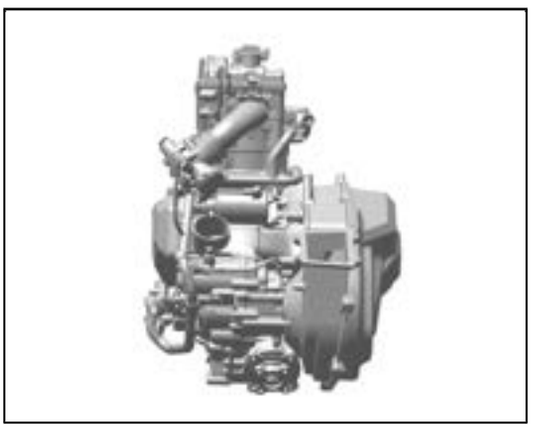
b. Engine – Left Side View



c. Engine – Right Side View



d. Engine – Main View



e. Engine – Rear View



f. Engine – Top View

3.1.2 Engine Technical Features and Structural Specifications

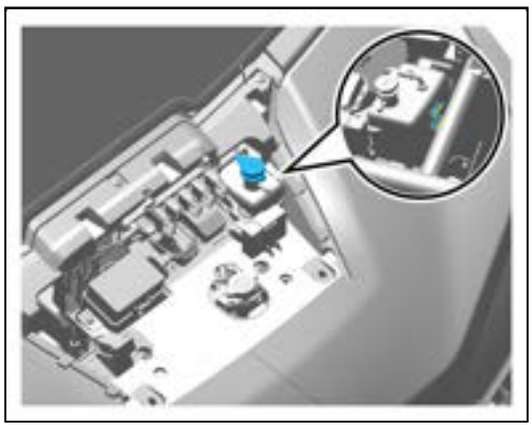
3.1.2.1 Engine Specifications

Key Specifications					
Model Designation		SGW570F-U1	SGW570F-U2	SGW570F-U3	SGW570F-U4
Engine Type		Single-Cylinder, Liquid-Cooled, Four-Stroke, 4-Valve, DOHC			
Engine Model		199MS-1			
Engine Displacement (ml)		567			
Compression Ratio		10.7±0.5:1			
Maximum Power / RPM		30kW/7000rpm			
Maximum Torque / RPM		50N.m/4500rpm			
Bore × Stroke (mm)		99×73.6			
Starting System		Electric Start			
Ignition System		EFI			
Lubrication System		Pressure-Splash Lubrication			
Cooling System		Liquid Cooling			
Trans-mis-sion	CVT	0.601～2.967			
	Gear Ratio	L:27.73			
		H:15.99			
		R:22.84			
	Driveline Type	Shaft Drive			
	Front Axle	3.667			
Coolant Boiling/ Freezing Point (°C)		107/-35			

3.1.3 Engine Operating Precautions

3.1.3.1 Engine Operating Precautions

1. Engine Coolant

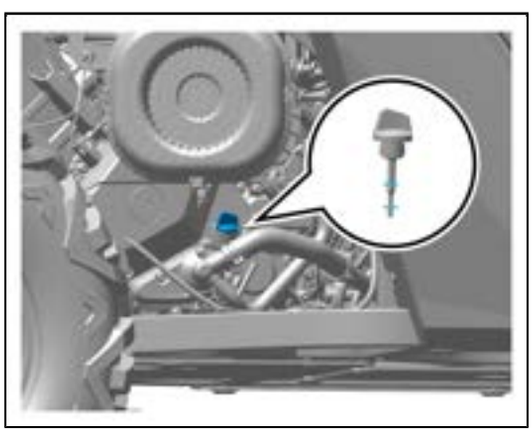


a. Check the engine coolant level; if it is below the minimum mark, top up to the specified level.

CAUTION:

- Do not use coolant containing high concentrations of silicates.
- Ensure the coolant level is sufficient while the engine is running to prevent overheating, excessive wear, or severe failures like cylinder scoring.

2. Engine Oil



a. Check the engine oil level and top up if it falls below the minimum mark.

CAUTION:

- Low oil levels can cause poor lubrication, overheating, and increased engine wear, shortening engine life.

3. Fuel Specification

a. Check the engine oil level and top up if it falls below the minimum mark.

4. Starting the Engine

a. Turn the ignition key to start the starter; the starter will engage.

b. After ignition, release the key to stop the starter and prevent damage from overrun.

CAUTION:

- Do not operate the starter for more than 5 seconds at a time.
- If the first attempt fails, wait 30 seconds before retrying to avoid overheating the starter.
- If the engine still fails to start after multiple attempts, check the fuel pressure, ignition system, and electrical connections.

5. Idle

a. Allow the engine to idle for a few minutes after starting to warm it up.

b. After ignition, release the key to stop the starter and prevent damage from overrun.

CAUTION:
• **The engine's idle speed has been factory-calibrated to 1230 ± 120 rpm to meet national emission standards.** • **The idle control system is precisely calibrated and should not be adjusted by the user.** •

6. Driving
   a. Keep the coolant temperature between 80–95°C during driving.
   b. The oil pressure should not drop below 0.2 MPa at moderate speeds.
7. Parking
   a. Do not turn off the engine immediately after heavy load or high-speed operation. Idle for 3–5 minutes to allow the engine temperature to lower.
8. Wet Conditions or Water Crossing
   a. Ensure the air cleaner housing is sealed when driving through water or flooded roads. Poor sealing could allow water into the engine cylinders, leading to severe mechanical failure.
9. Winter Warm-Up
   a. In cold temperatures, oil viscosity increases, reducing lubrication performance. Do not accelerate or load the engine immediately after startup. Idle for about 7 minutes until oil and coolant reach normal temperature, ensuring proper lubrication before driving.

CAUTION:
• **Driving the engine in winter without adequate lubrication can cause excessive wear, especially on components like the camshaft, potentially leading to seizure.**

10. Engine Electrical System Maintenance Safety Guidelines
    a. Unauthorized modification of electrical systems or wiring is strictly prohibited, as unapproved alterations can cause overloads, short circuits, or sparks, leading to fire and equipment damage risks.
    b. Disconnect power before performing electrical system maintenance: follow the steps below in order:
       • Turn off the ignition.
       • Switch off all lighting and electrical devices.
       • Disconnect the negative terminal of the battery.
    c. Always ensure electrical devices are off when disconnecting or reconnecting the battery. Failure to do so may cause transient voltage, damaging sensitive components like the ECU, sensors, or control modules.
    d. Before restoring power, ensure all tools are removed, wiring is secure, and the battery terminal is reconnected in the correct order. Gradually enable electrical devices to verify system functionality.

3.1.4 Routine Engine Inspection and Maintenance

3.1.4.1 Routine Engine Inspection and Maintenance

Item		Service Interval (Whichever Occurs First)			Notes
		Cumulative Operating Time (hours)	Usage Time (months)	Mileage (km)	
►	Air Filter, Element	50	No fixed interval	800	Inspect; replace if necessary, and check more often if used under harsh conditions
	Throttle Body	50	6	800	Check if pipes are properly sealed and for any air leaks
	Drive Belt	50	6	800	Inspect, adjust, replace if necessary
►	Engine Oil Change	100	12	1600	Replace engine oil and the filter
►	Fuel Lines and Fasteners	100	12	1600	Check for leaks and ensure all fasteners are secure
D	Fuel System/Filter	100	12	1600	Cycle pressurisation of the fuel pump to check for leaks at the filler cap, fuel lines/rail, and fuel pump; replace lines every two years.
►	Radiator (if applicable)	100	12	1600	Inspect; clean exterior surfaces
►	Cooling Hoses (if applicable)	100	12	1600	Inspect for leaks
►	Engine Mounts	100	12	1600	Inspecting
	Exhaust Silencer/ Pipes/Connections	100	12	1600	Inspect; clean; replace worn parts
D	Spark Plug	100	12	1600	Inspect and replace as necessary
D	Clutch (Driving and Driven)	100	12	1600	Inspect; clean; replace worn parts
	Spark Arrester	100	12	1600	Clean Thoroughly

Item		Service Interval (Whichever Occurs First)			Notes
		Cumulative Operating Time (hours)	Usage Time (months)	Mileage (km)	
►	Engine Coolant	No specific cumulative time	60	No specified mileage	Replace the coolant
D	Valve Gap Adjustment	500	No fixed interval	8000	Inspect and adjust as necessary

All maintenance services are triggered by the "whichever comes first" principle (whichever condition—cumulative operating time, usage time, or mileage—occurs first), with all details fully documented in the service log.

- ►: Vehicles with high usage require more frequent servicing
- D: Requires authorized dealer or professional technician

WARNING:

- Services marked with "D" are high-risk; improper handling could result in component failure and serious injury or even death. Such services must be performed by authorized dealers or qualified technicians.

3.1.4.2 Inspecting engine components

1. **Inspect ignition cables for any damage.**
   a. Check ignition cables and rubber boots for damage or ageing. Replace if necessary.
   b. Inspect connections between the ignition cable and coil, and between the coil and spark plug. Correct installation if abnormalities are found.
   c. Check for dirt or debris at connection points and clean if necessary.
2. **Inspect engine idle speed and carbon monoxide levels.**
   a. Inspecting engine idle speed and carbon monoxide levels
      - Engine coolant temperature: 80–90°C
      - All lights, electric cooling fans, and vehicle accessories: switched off
      - Gear lever position: Neutral (N)
   b. Attach a carbon monoxide tester, increase engine speed to 2,500 rpm, and hold for a minimum of 10 seconds.
   c. Return engine to idle and measure carbon monoxide levels at both high and low idle speeds.
3. **Inspect exhaust pipe connectors for air leaks.**
   a. Ensure the exhaust pipe is correctly positioned and does not interfere with other vehicle parts.
   b. Inspect the exhaust pipe for damage from stone impacts, knocks, or scrapes.
   c. Start the engine and let it idle. Check all exhaust connectors for air leaks.

4. Coolant Pump Leak Inspection

a. Minor water seepage from the coolant pump drain hole during operation is normal. The coolant pump uses a mechanical seal, which requires coolant lubrication for the sliding faces. Under normal conditions, coolant escapes as vapour or mist through the designed drain and vent holes.

b. Temporary coolant pump leakage is often a short-term issue. The leaked fluid is usually coolant from the drain or vent holes and does not result in significant coolant loss or impair engine cooling performance.

c. Assess the coolant pump for defects and avoid misjudging normal seepage. Replace the pump only if a fault is confirmed.

3.1.5 Engine Storage and Recommissioning

3.1.5.1 Engine storage

1. Fully drain the coolant from the engine block.
2. Clean the engine exterior using cleaning petrol.
3. Seal the engine air intake, coolant inlet/outlet ports, and sensor interfaces with protective plugs.
4. Place the prepared engine carefully into a dedicated packaging box.

3.1.5.2 Engine Unsealing

1. Remove protective plugs from engine interfaces and check for any residual contaminants.
2. Use a specialised cleaner to remove oil and grease from the engine exterior and wipe clean.
3. Fill the engine with the specified grade and amount of oil, as per technical specifications.

3.2 Engine Mechanical System

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3.2.1 Specifications

3.2.1.1 Fastener Specifications

Item	Torque (N·m)	Torque (ft-lbs)
Shift Arm Assembly Mounting Bolt M6×25	12±2	8.8±1.5
Remove the M10 × 1.25 × 25 retaining bolt from the rear section of the front propeller shaft.	51.6	70
Cylinder head cover mounting bolt	12±2	8.8±1.5
Chain guard mounting bolt M6×20.	10±2	7.4±1.5
Camshaft sprocket mounting bolt M6×12.	18	13
Camshaft cover mounting bolt M6×65.	10±2	7.4±1.5
Tensioner adjuster bolt M6×25.	10±2	7.4±1.5
Tensioner mounting bolt	10±2	7.4±1.5
Chain guide plate assembly II mounting bolt	10±2	7.4±1.5
Cylinder head mounting bolt M6×90.	10±2	7.4±1.5
Cylinder head mounting bolt M11×150.	12+35+180°	8.8+25.8+180°
Spark Plug	13±2	9.6±1.5
Propeller shaft flange mounting bolt M12×30	120±8	88.5±5.9
Mainshaft bearing retaining plate mounting bolt M6×16	10±2	7.4±1.5
Propeller shaft round nut M55×1.5×6.	120±8	88.1±5.9
Piston oil jet plug	4±0.3	3.0±0.2
Oil Pressure Relief Valve Assembly	20±2	14.8±1.5
Pressure relief valve cover mounting bolt M6×25.	10±2	7.4±1.5
Pressure relief valve cover mounting bolt M8×30.	12±2	8.9±1.5
Oil strainer cover mounting bolt M6×25	10±2	7.4±1.5
Bearing retaining plate mounting bolt M8×25.	32±2	24±1
Drive bevel gear nut M22	140±10	103.3±7.4
Drive bevel gear bearing housing assembly bolt M8×30	35±2	25.8±1.5
Right crankcase mounting bolt M6×40.	10±2	7.4±1.5
Left crankcase mounting bolt M6×65.	10±2	7.4±1.5
Left crankcase mounting bolt M8×40.	26	20
Left crankcase cover mounting bolt M8×70	26	20
Parking detent bolt	25±2	18.4±1.5
Shift detent bolt	25±2	18.4±1.5
Shift detent plate mounting bolt M6×21	14±2	10.3±1.5
Shift driven gear mounting bolt M6×40	14±2	10.3 ±1.5

Item	Torque (N·m)	Torque (ft-lbs)
Shift shaft cover mounting bolt M6×20	10±2	7.4±1.5
Cylinder block mounting bolt M6×25.	10±2	7.4±1.5
Inspection cover	12±2	8.9±1.5
Magneto stator mounting bolt M6×35	10±2	7.4±1.5
Starter one-way clutch mounting bolt M6×16	18±2	13.3±1.5
Magneto lead clamp mounting bolt M6×16	10±2	7.4±1.5
Oil pump cover mounting bolt M6×20.	10±2	7.4±1.5
Oil pump drive gear retaining bolt M10×25	80±5	59.0±3.7
Filter cover mounting bolt M6×25	10	7
Engine drain plug M14	18	13
Oil filter adapter	35±5	25.8±3.7
Oil Filter	18	13
Oil cooler mounting bolt M6×16	10	7
Magneto rotor assembly retaining nut M18×1.5	180±8	132.8±5.9
Water pump assembly mounting bolt M6×35.	10±2	7.4±1.5
Water pump assembly mounting bolt M6×60.	10±2	7.4±1.5
CVT inner cover assembly mounting bolt M6 × 28	15±2	11.1±1.5
CVT drive pulley mounting bolt M12×142	100±8	73.8±5.9
CVT driven pulley mounting bolt M10×80.	80±5	59±3.7
CVT outer cover mounting bolt M6×28.	10±2	7.4±1.5
Injector assembly mounting bolt M6×16	10±2	7.4±1.5
Gear position sensor assembly mounting bolt M6×20.	10±2	7.4±1.5
Crankshaft position sensor mounting bolt M6×16	10±2	7.4±1.5
Oil Pressure Sensor	14±2	10.3±1.5
Ignition coil mounting bolt M6×20	10±2	7.4±1.5
Coolant Temperature Sensor	12±2	8.9±1.5
Coolant hose connector	18±2	13.3±1.5
Thermostat cover mounting bolt M6×20.	10±2	7.4±1.5
Starter Motor Mounting Bolt M6×30	10±2	7.4±1.5
Throttle Body Retaining Clamp	12±2	8.9±1.5

3.2.1.2 Service Specifications

Key Specifications					
Model Designation		SGW570F-U1	SGW570F-U2	SGW570F-U3	SGW570F-U4
Engine Type		Single-Cylinder, Liquid-Cooled, Four-Stroke, 4-Valve, DOHC			
Engine Model		199MS-1			
Engine Displacement (ml)		567			
Compression Ratio		10.7±0.5:1			
Maximum Power / RPM		30kW/7000rpm			
Maximum Torque / RPM		50N.m/4500rpm			
Bore × Stroke (mm)		99×73.6			
Starting System		Electric Start			
Ignition System		EFI			
Lubrication System		Pressure-Splash Lubrication			
Cooling System		Liquid Cooling			
Trans-mis-sion	CVT	0.601～2.967			
	Gear Ratio	L:27.73			
		H:15.99			
		R:22.84			
	Driveline Type	Shaft Drive			
	Front Axle	3.667			
Coolant Boiling/ Freezing Point (°C)		107/-35			
Engine Oil Grade		SAE 10W-40 / SJ or Higher			
Engine Oil Capacity		2.2 L (without Replacing the Oil Filter) 2.4 L (with Oil Filter Replacement)			

3.2.1.3 Specifications and Capacities

Camshaft

Item	Standard		Service Limit
Camshaft Lobe Height	Intake Valve	40.36±0.04 mm	40.27 mm
	Exhaust	40.08±0.04 mm	39.99 mm
Camshaft Journal Diameter (All)	22.954 - 22.975 mm		22.944 mm
Camshaft Bore Diameter (All)	23.000 - 23.021 mm		23.044 mm
Camshaft Oil Clearance	0.025 - 0.067 mm		0.1 mm
Camshaft End Float	0.10 - 0.25 mm		0.4 mm
Camshaft Run-Out	TIR ≤0.02 mm		TIR 0.1 mm

Cylinder Head and Valves

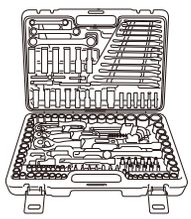
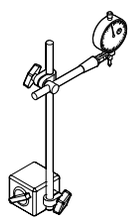
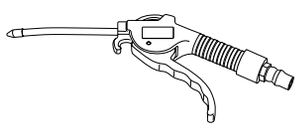
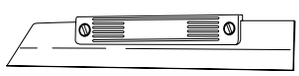
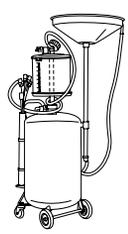
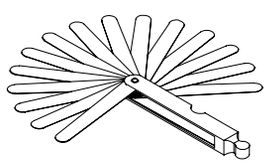
Item	Standard		Service Limit
Cylinder Pressure (Acceptable Range)	450 ~700 kPa		—
Cylinder Head Height	120.5±0.03 mm		—
Valve Spring Free Length	42.5 mm		41.4 mm
Valve Guide Internal Diameter	5.500 - 5.512 mm		—
Valve Clearance (Cold)	Intake Valve	0.10 - 0.20 mm	—
	Exhaust	0.20 - 0.30 mm	—
Valve Head Thickness	Intake Valve	0.7 mm	0.3 mm
	Exhaust	0.9 mm	0.5 mm
Valve Stem Diameter	Intake Valve	5.475 - 5.490 mm	—
	Exhaust	5.455 - 5.470 mm	—
Valve Oil Clearance	Intake Valve	0.010 - 0.040 mm	—
	Exhaust	0.030 - 0.060 mm	—
Valve Overall Length	Intake Valve	95.50 mm	—
	Exhaust	96.10 mm	—

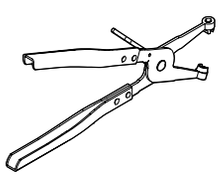
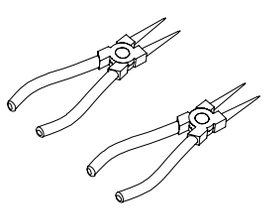
Piston and Connecting Rod

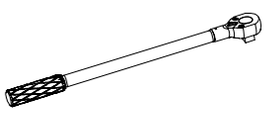
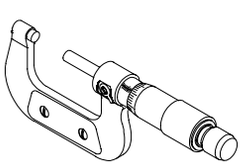
Item	Standard		Service Limit
Piston Diameter	I	98.931 - 98.941 mm	98.81 mm
	II	98.939 - 98.949 mm	98.82 mm
Piston Pin Bore Internal Diameter	22.004 - 22.010 mm		—
Piston Pin Diameter	21.995 - 22.000 mm		—
Piston Ring End Gap	First Compression Ring	0.20 - 0.35 mm	0.5 mm
	Second Compression Ring	0.35 - 0.55 mm	0.7 mm
	Oil Ring Assembly	0.20 - 0.70 mm	0.9 mm
Piston Ring to Groove Clearance	First Compression Ring	0.020 - 0.060 mm	0.12 mm
	Second Compression Ring	0.020 - 0.060 mm	0.12 mm
Piston Ring Groove Width	First Compression Ring	1.22 - 1.25 mm	1.32 mm
	Second Compression Ring	1.22 - 1.25 mm	1.32 mm
Piston Ring Thickness	First Compression Ring	1.17 - 1.19 mm	1.10 mm
	Second Compression Ring	1.17 - 1.19 mm	1.10 mm
Connecting Rod Small End Diameter	22.010 - 22.023 mm		—
Main Bearing Journal Diameter	40.995 - 41.005 mm		40.97 mm
Balance Shaft Journal Outside Diameter	29.980 - 29.993 mm		29.92 mm

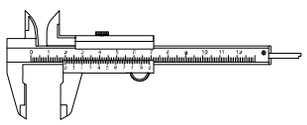
3.2.2 Service Tools

3.2.2.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)
2	Dial Indicator		Measuring clearances
3	Air Blow Gun		Cleaning engine parts
4	Knife-Edge Straightedge		Measuring the flatness of components
5	Waste Oil Drainer		Recovering fluids
6	Feeler Gauge		Measuring clearances

Item No.	Tool Description	Tool Diagram	Purpose/Use
7	Oil Can		Lubricating parts
8	Engine Oil Pressure Gauge		Checking oil pressure
9	Torque Angle Gauge		Measuring torque angle during fastener installation
10	Hose Clamp Pliers		Removing and installing hose clamps
11	Circlip Pliers		Removing and installing circlips
12	Internal Dial Caliper Gauge		Measuring internal diameter

Item No.	Tool Description	Tool Diagram	Purpose/Use
13	Dial Bore Gauge		Measuring internal diameter
14	Torque Wrench		Measuring torque during fastener tightening
15	Compression Tester		Checking cylinder compression
16	Valve Spring Compressor		Removing and installing valve collets and springs
17	Valve Stem Seal Pliers		Removing valve stem seals
18	Outside Micrometer		Measuring external diameter of components

Item No.	Tool Description	Tool Diagram	Purpose/Use
19	Vernier Caliper		Measuring dimensions
20	Oxygen Sensor Socket		Removing and installing the oxygen sensor
21	Oil Filter Wrench		Removing and installing the oil filter
22	Spark Plug Wrench		Removing and installing spark plugs
23	Piston Ring Removal Pliers		Removing and installing piston rings

3.2.2.2 Special Service Tools (SSTs) and Equipment

Item No.	Tool Number	Tool Description	Tool Diagram	Purpose/Use
1	E01GZ0000008	CVT Drive Pulley Pushrod		Removing the drive pulley
2	E01-E200001-000-00	CVT Driven Pulley Pushrod Bolt (M6)		Removing and installing the drive belt
3	A10-R493101-000-00	CVT pulley holding tool		Holding the pulley
4	A10-R493102-000-00	Oil Seal Driver 28×47×7	/	Installing the oil seal
5	E01GZ0000002	Oil Seal Driver 35×52×7		Installing the oil seal
6	E01GZ0000003	Oil Seal Driver 44×60×7		Installing the oil seal
7	E01GZ0010001	Oil Seal Driver 15×25×5		Installing the oil seal
8	E01GZ0000005	Oil Seal Driver 20×30×7		Installing the oil seal

Item No.	Tool Number	Tool Description	Tool Diagram	Purpose/Use
9	E01GZ0000006	M55 Pin Spanner		Removing and installing locknuts
10	E01GZ0000007	M65 Pin Spanner		Installing the oil seal
11	/	Magneto Rotor Holding Tool		Holding the magneto rotor
12	E01GZ0010001	Magneto Rotor Puller		Removing the magneto rotor

3.2.2.3 Consumables

Component Name	Specifications	Description
Lint-Free Cleaning Cloth	/	Cleaning dirt and stains
Threadlocker	4242	Apply to the installation threads of the following components: oil flow orifices, piston oil jet plug, bearing retaining plate plates, drive bevel gear bearing housing, reduction driven gear mounting nuts, round nuts, drive bevel gear bearing housing assembly mounting bolts, mainshaft bearing retaining plate mounting bolts, oil pump drive gear mounting bolts, timing driven sprocket mounting bolts, starter one-way clutch mounting bolts, magneto stator assembly mounting bolts, and CVT inner cover assembly mounting bolts.
Engine Oil	SAE10W/40-SJ	Apply to the following components: O-rings, balance shaft journals, the mating surfaces between the connecting rods and the crankshaft, piston pin ends, outer rotor of the oil pump, cylinder walls, internal bore of the valve stem seals, valve stems, and outer diameters of the balance shaft and crankshaft ends.
Retaining Compound	648	Apply to the outer circumference of the 44×60×7/10.5 oil seal.
Silicone Rubber Sealant	596/5699	Apply to the following areas: the mating faces of the left and right crankcases, and the rubber grommet where the magneto wiring exits the left crankcase cover.
Threadlocker	Loctite 243 Threadlocker	Apply to the installation threads of the following components: propeller shaft flange bolts, magneto rotor assembly nuts.

3.2.3 Description and Operation

3.2.3.1 Warnings and Precautions

1. Never connect or disconnect any system components, such as battery cables, injectors, fuel pumps, or ECU wiring, while the electrical system is powered, regardless of whether the engine is running.
2. When servicing the engine, personnel must wear safety boots, work gloves, safety goggles, and other appropriate personal protective equipment to ensure their safety.
3. When servicing the engine, follow these safety precautions: switch off the engine, allow it to cool, remove any sources of ignition, and ensure a fire extinguisher is readily available in the work area.
4. Before draining the engine coolant or oil, or servicing the exhaust system, allow the engine to cool completely.
5. After removing any oil pipes, seal the unions to prevent blockage or leakage of the oil lines.
6. Exercise great care when dismantling the engine to avoid damaging mating or sliding surfaces.
7. During engine dismantling, seal all openings with tape or an equivalent material to prevent the ingress of contaminants.
8. When dismantling, label and organise the components in a systematic manner to aid troubleshooting and reassembly.
9. Clean and inspect all components thoroughly before repair or replacement.
10. When assembling the engine, tighten bolts and nuts progressively in multiple stages to the same torque, starting with the central bolts or nuts and then the diagonally opposite inner and outer bolts or nuts. Follow the specified sequence if provided.
11. When raising or lowering the vehicle, ensure that no personnel or unrelated objects are beneath the vehicle.
12. Certain removal and installation procedures during servicing require the use of SST, which are critical for safe operation.
13. When using chemical products, always follow the manufacturer's safety instructions strictly.
14. During servicing, ensure fuel isolation, electrical isolation, and pressure release are performed in accordance with the specified procedures to avoid vehicle damage or personal injury.
15. Always follow the procedures outlined in this manual during maintenance and repair work.
16. When separating bonded components, ensure the tools used are softer than the components to prevent damage. If components are made of aluminium, use wooden or resin tools for separation.
17. During service work, always follow the tightening torques and adjustment data specified in the Service Manual.
18. After installation, ensure all fasteners are tightened to the specified torque.
19. During servicing, always replace single-use gaskets, O-rings, oil seals, circlips, and any damaged components.
20. When assembling the engine, check all oil passages and pipes for blockages.
21. Take appropriate dust protection measures when dismantling the engine to prevent contamination of precision parts.
22. Always use genuine parts for replacement to avoid abnormal engine operation or damage.
23. To avoid damaging electrical components during removal and installation, do not excessively

bend wires or handle components roughly.

24. When cleaning engine components with a washing machine, consider cleaning progressively as components are dismantled to improve efficiency.
25. If no washing machine is available, use an appropriate cleaning agent to clean the components.
26. After repairing and assembling the engine, start it and increase the engine speed to check for leaks of coolant, fuel, oil, and intake/exhaust gases.

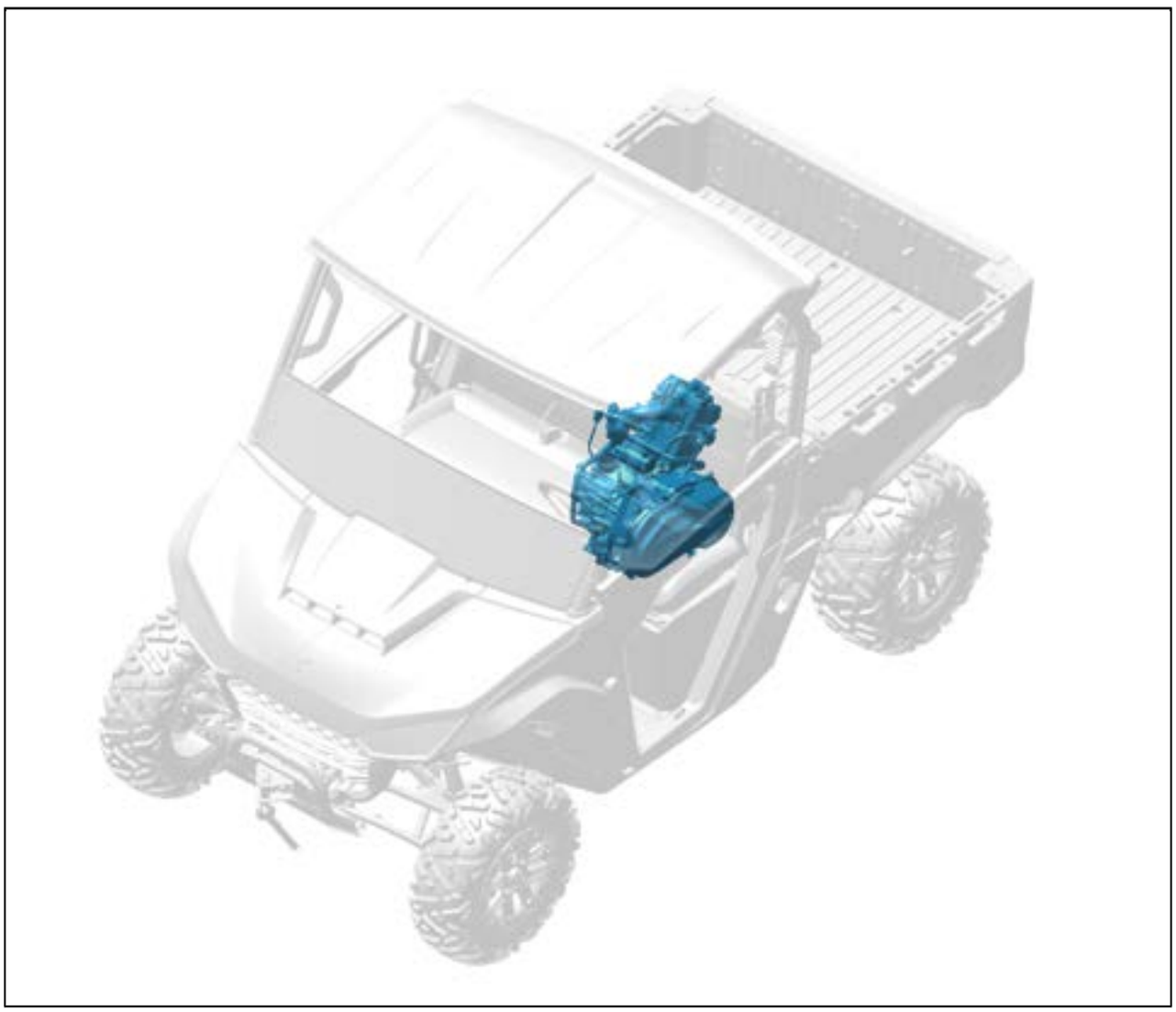
3.2.3.2 System Description

1. System Description
   a. The 199MS-1 engine is built upon the core principles of cleanliness, power, and quiet operation. Its key systems feature advanced design, manufacturing, and process technologies to ensure superior engine performance, providing excellent fuel economy, outstanding power delivery, exceptional NVH qualities, as well as high reliability and durability.
   b. Engine composition: The engine block acts as the framework of the engine and serves as the mounting foundation for all its mechanisms and systems. All primary internal and external components and accessories are mounted to it, bearing various loads. Therefore, the engine block must possess sufficient strength and rigidity. The engine block assembly primarily consists of the cylinder block, cylinder liner, cylinder head, and cylinder head gasket.
   c. Valves are critical components of the engine. Structurally, they are classified into intake valves and exhaust valves. The function of the intake valve is to draw air into the engine to mix with fuel for combustion; the exhaust valve's function is to expel the exhaust gases after combustion.
   d. The piston is the "core" of the engine. Besides operating in a harsh environment, it continuously performs reciprocating motion from Bottom Dead Center (BDC) to Top Dead Center (TDC) and back, executing the intake, compression, power, and exhaust strokes.
   e. Lubrication system: During engine operation, all moving parts exert force on one another while engaging in high-speed relative motion. This relative motion inevitably causes surface friction, accelerating wear. Therefore, to reduce wear and frictional resistance, and to extend service life, the engine must be equipped with a lubrication system. The function of the lubrication system is to continuously supply an adequate amount of clean engine oil at the proper temperature to the friction surfaces of all moving parts during engine operation. This forms an oil film between the friction surfaces to achieve fluid friction, thereby reducing frictional resistance, lowering power consumption, and minimizing component wear, ultimately enhancing the engine's reliability and durability. Lubrication methods include pressure lubrication, splash lubrication, and grease lubrication.
2. Main Components
   a. The engine primarily comprises the cylinder head, cylinder block, crankshaft and connecting rod assembly, valve mechanism and timing drive system, intake and exhaust systems, lubrication system, and associated components.

3.2.4 Component Location and Exploded View

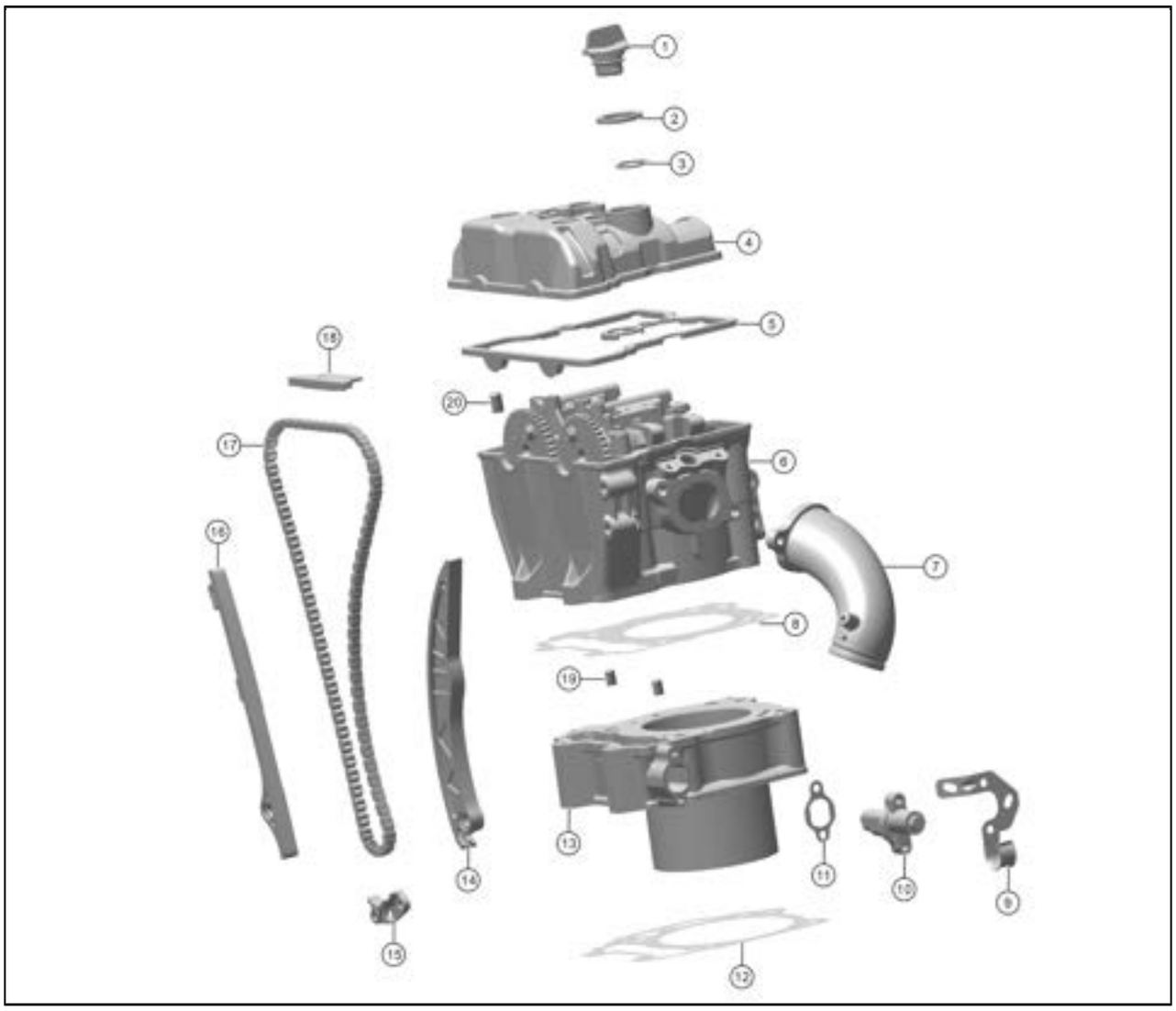
3.2.4.1 Component Location Diagram

Engine Mechanical System



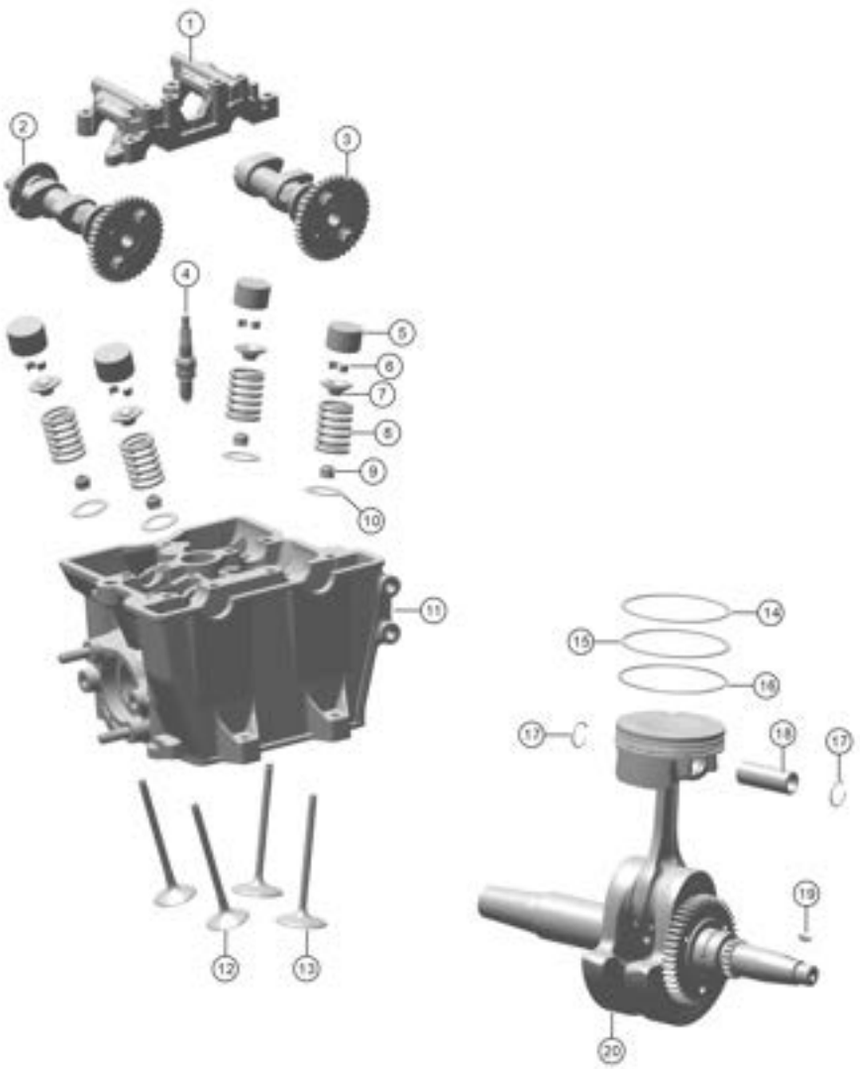
3.2.4.2 Exploded View Diagram

Cylinder Block & Cylinder Head



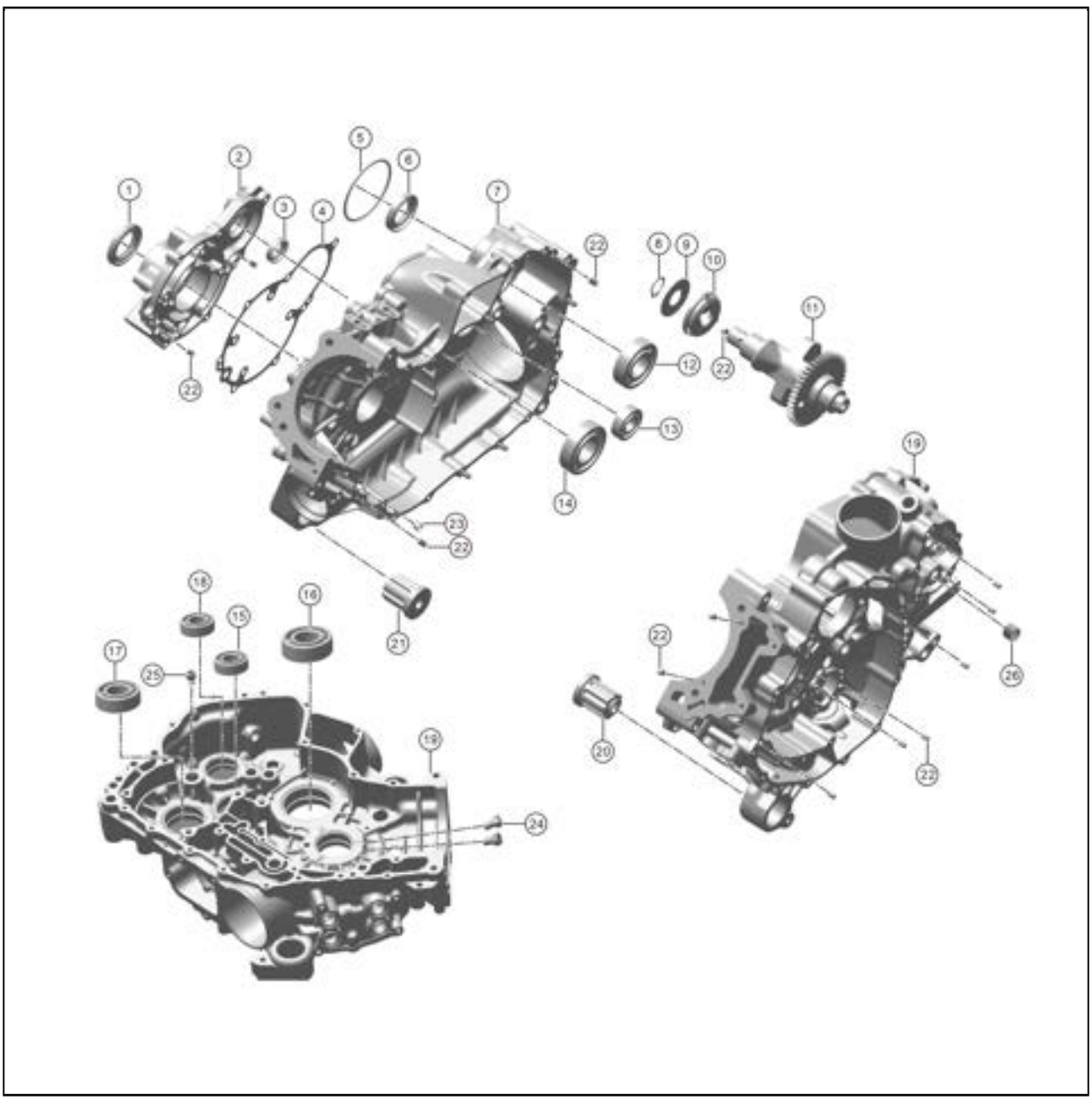
1	Fuel Filler Cap	8	Cylinder Head Gasket Set	15	Chain Guard
2	Oil Filler Cap O-ring	9	Line Retaining Plate	16	Chain Tensioner Guide Assembly
3	O-ring (22 × 3)	10	Tensioner Assembly	17	Timing Chain Assembly
4	Cylinder Head Cover	11	Tensioner Gasket	18	Chain Tensioner Guide Assembly II
5	Cylinder Head Cover Seal	12	Cylinder Block Gasket	19	Dowel pin 6×10.
6	Cylinder Head Assembly	13	Cylinder Assembly	20	Dowel pin 10×14.
7	Intake Pipe Assembly	14	Timing Chain Tensioner Guide		

Valve Train and Piston Connecting Rod Assembly



1	Camshaft Cap	8	Valve Spring	15	Second Compression Ring
2	Exhaust Camshaft	9	Valve Stem Seal	16	Oil Control Rail
3	Inlet Camshaft	10	Valve Spring Seat	17	Piston Pin Circlip
4	Spark Plug	11	Cylinder Head	18	Piston Pin
5	Valve Tappet	12	Exhaust Valve	19	Woodruff Key
6	Valve Collet	13	Intake Valve	20	Crankshaft and Connecting Rod Assembly
7	Valve Spring Retainer	14	Top Compression Ring		

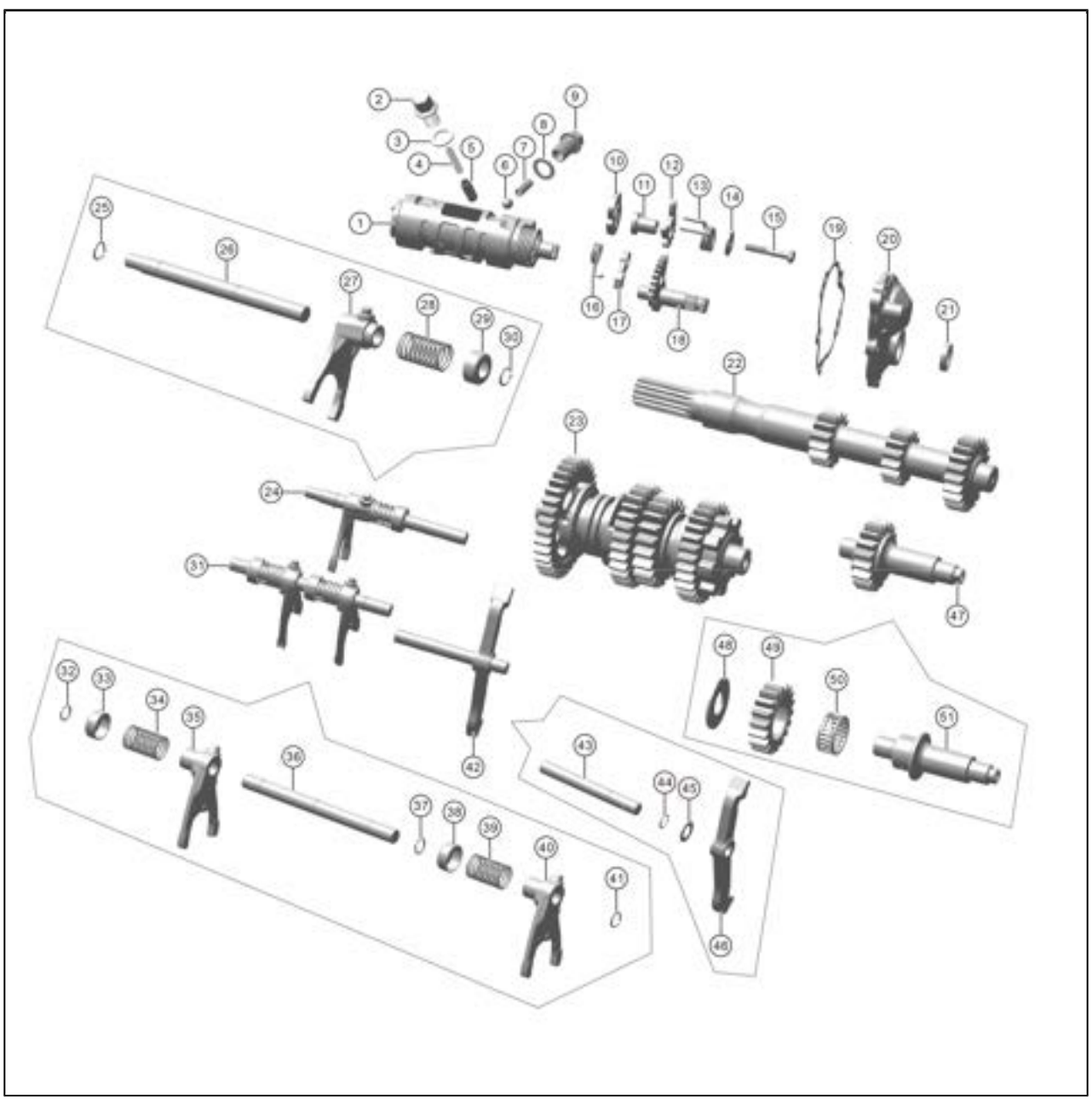
Crankcase



1	Oil Seal 35 × 52 × 7	10	Breather Bush	19	Left Crankcase
2	Right Crankcase Cover	11	Balance Shaft	20	Damper Bush
3	Oil Seal 20 × 30 × 7	12	Deep-Groove Ball Bearing 62/28 P5C3	21	Damper Bush
4	Right Crankcase Cover Gasket	13	Deep-Groove Ball Bearing 6203	22	Parallel pin 6 × 10
5	O-ring 73 × 3.0	14	Deep-Groove Ball Bearing 6206	23	Hollow Pin φ8.5×φ10×13
6	Oil Seal 28 × 47 × 7	15	Deep-Groove Ball Bearing 6204-Z	24	Piston oil jet plug

7	Right Crankcase	16	Deep-Groove Ball Bearing 6206	25	Flow Orifice
8	External Circlip	17	Deep-Groove Ball Bearing 6204-Z	26	Needle roller bearing HK121612
9	Breather Cover	18	Deep-Groove Ball Bearing 6004		

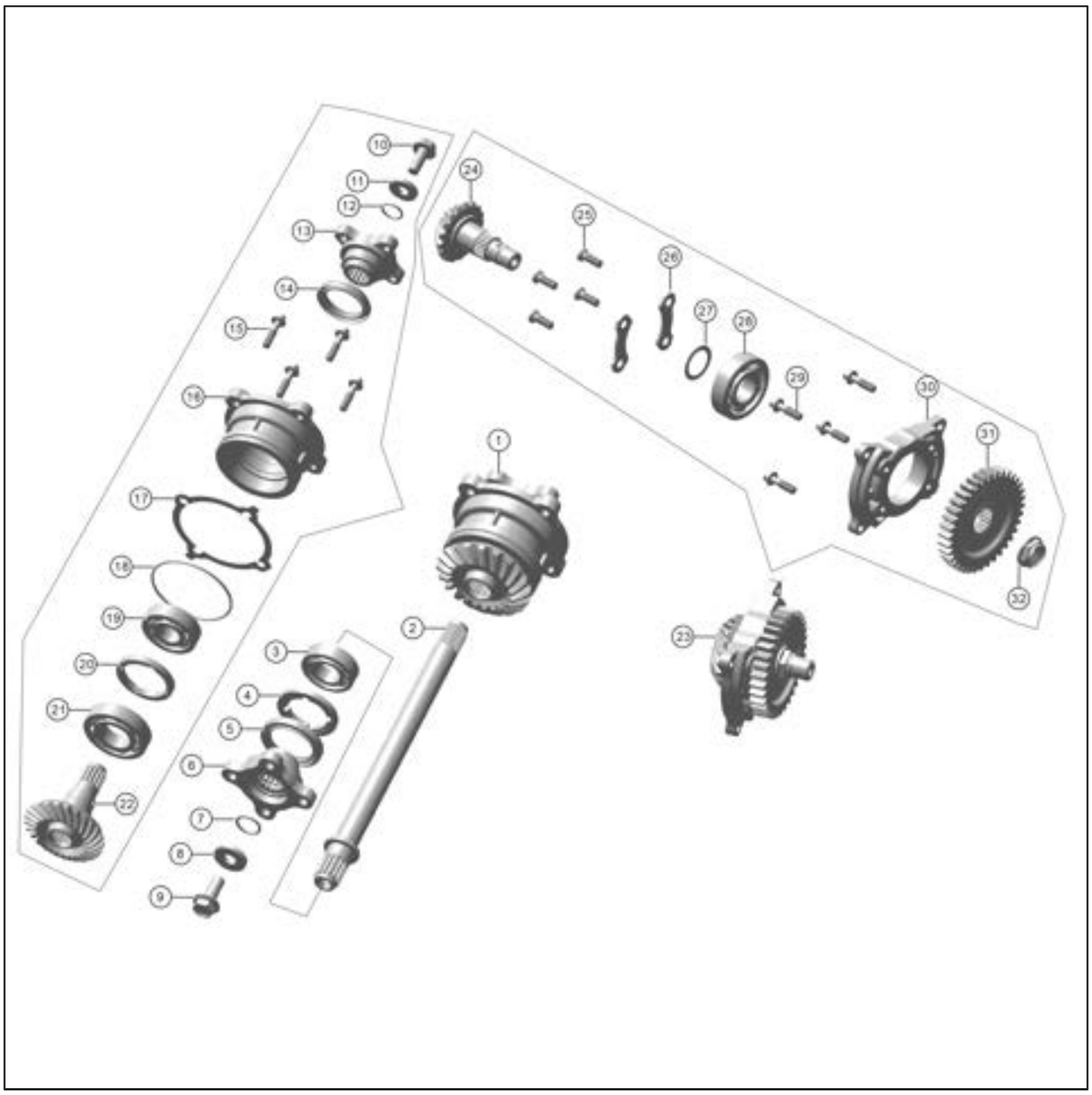
Shift Mechanism



1	Shift Drum Assembly	18	Shift Shaft Assembly	35	H/R Selector Fork
2	Parking detent bolt	19	Shift Shaft Cover Gasket	36	H/R Selector Fork Shaft
3	Aluminium Washer	20	Shift Shaft Cover	37	External Circlip 12

	14×21×1.5				
4	Parking Return Spring	21	Oil Seal 15 × 25 × 5	38	Selector Fork Spring Seat
5	Parking Pawl Push Pin	22	Mainshaft	39	Selector Fork Spring
6	Steel Ball 9.5	23	Countershaft Assembly	40	H/R Selector Fork
7	Shift Detent Spring	24	L (Low-Range) Selector Fork Shaft Assembly	41	External Circlip 12
8	Aluminium Washer 14×21×1.5	25	External Circlip 12	42	Parking Pawl Assembly
9	Shift detent bolt	26	L Selector Fork Shaft	43	Parking Pawl Shaft
10	Shift Detent Wheel	27	L Selector Fork	44	External Circlip 12
11	Bush	28	Selector Fork Spring	45	Plain Washer 12 × 20 × 1
12	Shift Driven Gear	29	Selector Fork Spring Seat	46	Parking Pawl
13	Shift Torsion Spring	30	External Circlip 12	47	Reverse Idler Gear Shaft Assembly
14	Washer 6.5 × 22 × 2	31	High/Reverse (H/R) Selector Fork Shaft Assembly	48	Washer 17 × 38 × 2
15	Hex Head Bolt M6 × 40	32	External Circlip 12	49	Reverse Idler Gear
16	Shift Detent Plate Spring	33	Selector Fork Spring Seat	50	Needle roller bearing K252913
17	Shift Detent Plate	34	Selector Fork Spring	51	Reverse Idler Gear Shaft

Drive and Driven Bevel Gear Assembly



1	Driven Bevel Gear Assembly	12	O-ring (20 × 2.65)	23	Drive Bevel Gear Assembly
2	Propeller shaft	13	Propeller Shaft Flange	24	Drive Bevel Gear
3	Deep-Groove Ball Bearing 6205	14	Oil Seal 44 × 60 × 7	25	Torx Countersunk Head Screw M8×25
4	Round Nut M55 × 1.5 × 6-LH	15	Bolt M8×35	26	Bearing Retaining Plate
5	Oil Seal 44 × 60 × 7	16	Driven Bevel Gear Bearing Housing	27	Drive Bevel Gear Shim
6	Propeller Shaft Flange	17	Driven Bevel Gear Shim	28	Deep-Groove Ball Bearing 6328P5C3
7	O-ring (20 × 2.65)	18	O-ring (88 × 2.8)	29	Bolt M8×30

8	Plain Washer 12.5 × 32 × 5	19	Deep-Groove Ball Bearing 6328P5C3	30	Drive Bevel Gear Bearing Housing
9	Hex Flange Bolt M12 × 1.25 × 30	20	Round Nut M55	31	Reduction Driven Gear
10	Hex Flange Bolt M12 × 1.25 × 30	21	Deep-Groove Ball Bearing 6207	32	Hex flange nut M22
11	Plain Washer 12.5 × 32 × 5	22	Driven Bevel Gear		

3.2.5 General Fault Diagnosis and Operation

3.2.5.1 Fault Symptom List

Fault Symptom	Possible Causes	Recommended Repair Procedure
Engine difficult to start	1. Low ambient or engine temperature	Preheat the engine as per specifications
	2. Low battery voltage	Recharge the battery; replace if the issue persists See: Battery
	3. Faulty starter	Replace the starter assembly See: Starter Motor
	4. Empty fuel tank	Refill with the specified fuel grade
	5. Poor fuel quality	Replace with the specified fuel grade
	6. Incorrect engine oil grade	Replace with manufacturer-specified oil grade
	7. Blocked intake system	Clean or replace the air cleaner element and intake system See: Air Cleaner Element Assembly
	8. Faulty coolant temperature sensor	Replace the coolant temperature sensor See: Coolant Temperature Sensor
	9. Faulty throttle body	Clean or replace the throttle body See: Throttle Body
	10. Faulty crankshaft position sensor	Replace the crankshaft position sensor See: Crankshaft Position Sensor
	11. Low fuel pressure	Check the fuel pump and filter; replace if required See: Fuel Pump Assemblyor See: Fuel Filter.
	12. Faulty injector(s)	Replace fuel injector. See: Fuel Injector
	13. Faulty ignition coil	Replace the ignition coil. See: Ignition Coil Assembly
	14. Faulty spark plug(s)	Clean or replace the spark plug(s) See: Spark Plug Assembly
	15. Incorrect valve clearance	Adjust the valve clearance See: Timing Mechanism, Magneto, and Oil Pump Assembly.
	16. Incorrect ignition timing	Adjust the ignition timing See: Timing Mechanism, Magneto, and Oil Pump Assembly.

Fault Symptom	Possible Causes	Recommended Repair Procedure
	17. Low cylinder compression pressure	1. Valve Clearance Inspection and Adjustment See: Timing Mechanism, Magneto, and Oil Pump Assembly.
		1. Inspect the pistons, piston rings, and cylinder walls for wear 2. Inspect the cylinder head gasket for damage or leakage See: Cylinder Block and Piston
Engine idling issues	1. Air intake system leak	Inspect and repair the air leak; replace seals/hoses if needed
	2. Faulty coolant temperature sensor	Replace the coolant temperature sensor See: Coolant Temperature Sensor
	3. Faulty throttle body	Clean or replace the throttle body See: Throttle Body
	4. Low fuel pressure	Check the fuel pump and filter; replace if required See: Fuel Pump Assemblyor See: Fuel Filter.
	5. Faulty injector(s)	Replace fuel injector. See: Fuel Injector
	6. Faulty ignition coil	Replace the ignition coil. See: Ignition Coil Assembly
	7. Faulty spark plug(s)	Clean or replace the spark plug(s) See: Spark Plug Assembly
	8. Low cylinder compression pressure	1. Valve Clearance Inspection and Adjustment See: Timing Mechanism, Magneto, and Oil Pump Assembly.
		1. Inspect the pistons, piston rings, and cylinder walls for wear 2. Inspect the cylinder head gasket for damage or leakage See: Cylinder Block and Piston
Poor engine acceleration performance	1. Poor fuel quality	Replace with the specified fuel grade
	2. Blocked intake system	Clean or replace the air cleaner element and intake system See: Air Cleaner Element Assembly
	3. Faulty coolant temperature sensor	Replace the coolant temperature sensor See: Coolant Temperature Sensor

Fault Symptom	Possible Causes	Recommended Repair Procedure
	4. Faulty throttle body	Clean or replace the throttle body See: Throttle Body
	5. Low fuel pressure	Check the fuel pump and filter; replace if required See: Fuel Pump Assemblyor See: Fuel Filter.
	6. Faulty injector(s)	Replace fuel injector. See: Fuel Injector
	7. Faulty ignition coil	Replace the ignition coil. See: Ignition Coil Assembly
	8. Faulty spark plug(s)	Clean or replace the spark plug(s) See: Spark Plug Assembly
	9. Faulty canister control valve	Replace the canister control valve See: Charcoal Canister Solenoid Valve
	10. Incorrect ignition timing	Adjust the ignition timing See: Timing Mechanism, Magneto, and Oil Pump Assembly.
	11. Low cylinder compression pressure	1. Valve Clearance Inspection and Adjustment See: Timing Mechanism, Magneto, and Oil Pump Assembly.
		1. Inspect the pistons, piston rings, and cylinder walls for wear 2. Inspect the cylinder head gasket for damage or leakage See: Cylinder Block and Piston
Insufficient engine power output	1. Poor fuel quality	Replace with the specified fuel grade
	2. Blocked intake system	Clean or replace the air cleaner element and intake system See: Air Cleaner Element Assembly
	3. Blocked exhaust system	Clean or unblock the exhaust system
	4. Modifications or excessive length in intake/exhaust piping	Restore intake/exhaust pipe layout to OEM specifications
	5. Faulty coolant temperature sensor	Replace the coolant temperature sensor See: Coolant Temperature Sensor
	6. Faulty throttle body	Clean or replace the throttle body See: Throttle Body
	8. Low fuel pressure	Check the fuel pump and filter; replace if required

Fault Symptom	Possible Causes	Recommended Repair Procedure
		See: Fuel Pump Assembly or See: Fuel Filter.
	9. Faulty injector(s)	Replace fuel injector. See: Fuel Injector
	10. Faulty ignition coil	Replace the ignition coil. See: Ignition Coil Assembly
	11. Faulty spark plug(s)	Clean or replace the spark plug(s) See: Spark Plug Assembly
	12. Faulty canister control valve	Replace the canister control valve See: Charcoal Canister Solenoid Valve
	13. Incorrect ignition timing	Adjust the ignition timing See: Timing Mechanism, Magneto, and Oil Pump Assembly.
	14. Low cylinder compression pressure	1. Valve Clearance Inspection and Adjustment See: Timing Mechanism, Magneto, and Oil Pump Assembly.
		1. Inspect the pistons, piston rings, and cylinder walls for wear 2. Inspect the cylinder head gasket for damage or leakage See: Cylinder Block and Piston
Abnormal exhaust smoke – black	1. Blocked intake system	Clean or replace the air cleaner element and intake system See: Air Cleaner Element Assembly
	2. Blocked exhaust system	Clean or unblock the exhaust system; replace components as needed
	3. Faulty coolant temperature sensor	Replace the coolant temperature sensor See: Coolant Temperature Sensor
	5. Faulty oxygen sensor	Replace the oxygen sensor See: Oxygen Sensor
	6. Excessive valve clearance	Adjust valve clearance to OEM specification See: Timing Mechanism, Magneto, and Oil Pump Assembly.
	7. Faulty injector(s)	Replace fuel injector. See: Fuel Injector
	8. Incorrect ignition timing	Adjust the ignition timing See: Timing Mechanism, Magneto, and Oil Pump Assembly.

Fault Symptom	Possible Causes	Recommended Repair Procedure
	9. Low cylinder compression pressure	1. Valve Clearance Inspection and Adjustment See: Timing Mechanism, Magneto, and Oil Pump Assembly.
		1. Inspect the pistons, piston rings, and cylinder walls for wear 2. Inspect the cylinder head gasket for damage or leakage See: Cylinder Block and Piston
Abnormal exhaust smoke – white	1. Low ambient or engine temperature	Preheat the engine as per specifications
	2. Poor fuel quality (presence of water or contaminants)	Replace with the specified fuel grade
	3. Cracked or damaged cylinder body, coolant entering cylinder	Inspect and repair the cylinder body; replace if unrepairable See: Cylinder Block and Piston
Abnormal exhaust smoke – blue	1. Incorrect engine oil grade	Replace with manufacturer-specified oil grade
	2. Faulty valve, valve guide or valve stem seal	Replace the valve stem seals; replace the valves/valve guides if necessary See: Timing Mechanism, Magneto, and Oil Pump Assembly.
	3. Worn piston or piston rings, poor sealing	Replace with OEM-spec pistons and rings See: Cylinder Block and Piston
	4. Severe carbon fouling of spark plug	Thoroughly clean the carbon deposits; replace spark plug if cleaning fails See: Spark Plug Assembly
	5. Engine oil level excessively high	Drain excess oil and restore level to OEM specifications See: Draining Engine Oil
	6. Cylinder compression pressure not to OEM specification	1. Valve Clearance Inspection and Adjustment 2. Inspect the pistons, piston rings, and cylinder walls for wear 3. Inspect the cylinder head gasket for damage or leakage See: Cylinder Block and Piston
	7. Excessive carbon build-up in the combustion chamber	Thoroughly clean carbon deposits from the combustion chamber See: Cylinder Block and Piston

Fault Symptom	Possible Causes	Recommended Repair Procedure
Low engine oil pressure	1. Insufficient oil level	Top up with OEM-specified oil of the correct grade
	2. Deteriorated engine oil (oxidised or contaminated)	Replace engine oil and filter with OEM-spec components See: Checking engine oil quality
	3. Blocked oil filter	Replace the oil filter See: Oil Filter
	4. Malfunctioning engine oil pressure sensor	Replace the oil pressure sensor See: Oil Pressure Sensor
	5. Faulty oil pump or oil pressure relief valve	Inspect the pressure relief valve, replace if needed, renew oil pump assembly if faulty See: Oil Pump
Engine over-temperature	1. Faulty coolant temperature sensor	Replace the coolant temperature sensor See: Coolant Temperature Sensor
	2. Low coolant level or leakage	Top up with specified coolant; check and repair any leaks See: Coolant Draining and Filling
	3. Faulty radiator (blockage or leakage)	Clear radiator passages, repair leaks, replace if unrepairable See: Engine Radiator Body
	4. Faulty fan motor	Replace the fan motor See: Radiator Fan Assembly
	5. Thermostat fault (stuck closed)	Replace Thermostat See: Thermostat Assembly
	6. Faulty coolant pump (damaged impeller or leakage)	Replace the coolant pump assembly See: Coolant Pump Assembly
	7. Incorrect ignition timing	Adjust the ignition timing See: Timing Mechanism, Magneto, and Oil Pump Assembly.
	8. Excessive carbon build-up on piston crowns	Thoroughly clean carbon deposits from the piston crowns See: Cylinder Block and Piston
Engine abnormal noise – progressively increasing sound	1. Exhaust system fault (leakage/loose components)	Inspect the exhaust system, tighten any loose components, and replace the seals as necessary See: Inspecting exhaust system
	2. Valve mechanism fault	1. Adjust valve clearance to OEM specification 2. Replace the valve springs 3. Replace the valves or valve guides

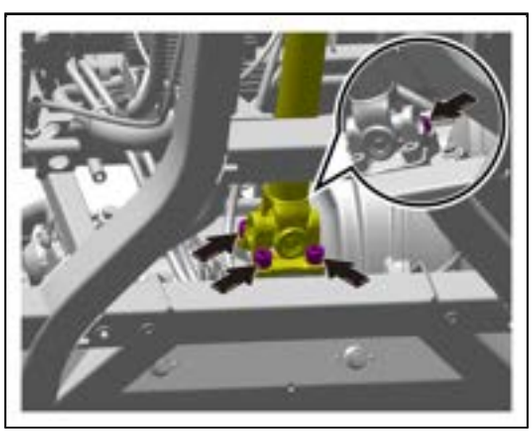
Fault Symptom	Possible Causes	Recommended Repair Procedure
		4. Grind the valve seating surfaces 5. Replace the camshaft See: Timing Mechanism, Magneto, and Oil Pump Assembly.
	3. Excessive camshaft axial play	Adjust the camshaft axial play to the OEM specifications and replace the thrust plate if required See: Timing Mechanism, Magneto, and Oil Pump Assembly.
	4. Piston failure (wear/carbon deposit/seizure)	1. Thoroughly clean carbon deposits from the piston crowns 2. Replace the piston pin and bush 3. Replace the piston or cylinder assembly 4. Replace the piston rings with OEM-specification parts See: Cylinder Block and Piston
	5. Excessive crankshaft axial play	Adjust the crankshaft axial play to OEM specifications and replace the thrust washers if necessary See: Crankcase and Transmission Assembly
Engine abnormal noise – sudden onset	1. Injector fault (clogging/ damaged)	Replace fuel injector. See: Fuel Injector
	2. Piston seizure/scored cylinder wall	Replace the piston and cylinder assembly, and verify that the lubrication system is functioning properly See: Cylinder Block and Piston
	1. Oil strainer distortion or damage	Inspect the oil strainer; if it cannot be repaired, replace the oil strainer assembly See: Oil Filter Screen
	2. Low engine oil pressure	Diagnose the cause of low oil pressure and rectify the issue, ensuring the oil pressure is within OEM specifications See: Checking engine oil pressure

3.2.6 Repair Procedure Guidance

3.2.6.1 Engine Assembly

Removal Procedure

1. To drain or refill the coolant, See: Coolant Draining and Refilling.
2. To relieve the fuel system pressure, See: Relieving Fuel System Pressure.
3. To drain engine oil, See: Draining Engine Oil.
4. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
5. To remove the rear cargo box assembly, See: Rear Cargo Box Assembly.
6. To remove the air cleaner assembly, See: Air Cleaner Assembly.
7. To remove the CVT air intake duct 1, See: CVT Intake Pipe 1.
8. Remove CVT air intake duct connector 1, See: CVT Air Duct Connector 1.
9. To remove the CVT air intake duct 2, See: CVT Intake Pipe 2.
10. Remove CVT air intake duct connector 2, See: CVT Air Duct Connector 2.
11. To remove the CVT air duct, See: CVT Air Duct.
12. To remove the CVT air duct connector, See: CVT Air Duct Connector.
13. To remove the exhaust downpipe assembly, See: Exhaust Downpipe Assembly.
14. To remove the rear propeller shaft assembly, See: Rear Propeller Shaft Assembly.
15. Removing the rear section of the front propeller shaft assembly

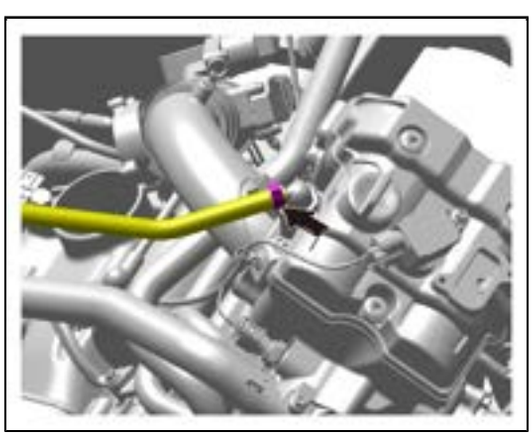


a. Remove the 4 M10 × 1.25 × 25 mounting bolts and detach the rear section of the front propeller shaft.

Torque: 51.6 ft-lbs(70N·m)

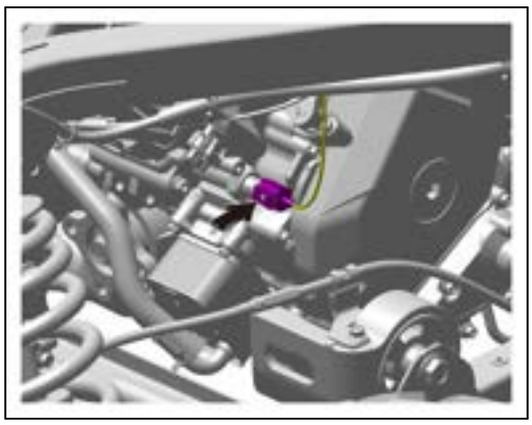
NOTICE:
• When installing the front propeller shaft mounting bolts, apply thread-locking compound to the threaded ends.

16. Disconnect the Wiring Harness Connectors and Associated Connections.



a. Remove the retaining clamp and disconnect the high-pressure fuel pipe at the injector end.

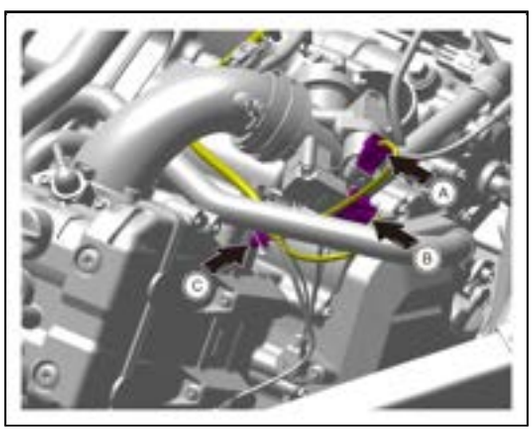
NOTICE:
• The retaining clamp is a single-use part. Always replace it with a new one after removal.



b. Disconnect the oil pressure sensor wiring harness connector. Release the wiring harness retaining clips and cut the cable ties along the harness.

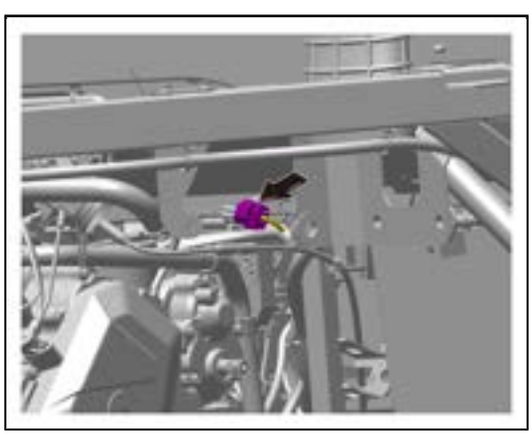
NOTICE:

- **Cable ties on the harness are single-use and must be replaced after removal.**



c. Disconnect throttle body connectors A and B.

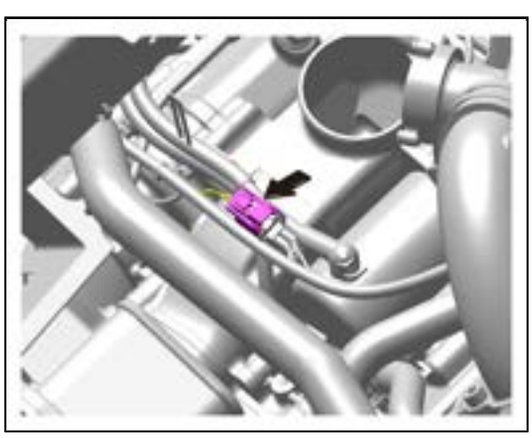
d. Remove wiring harness retaining clip C.



e. Disconnect the gear position sensor wiring harness connector. Release the wiring harness retaining clips and cut the cable ties along the harness.

NOTICE:

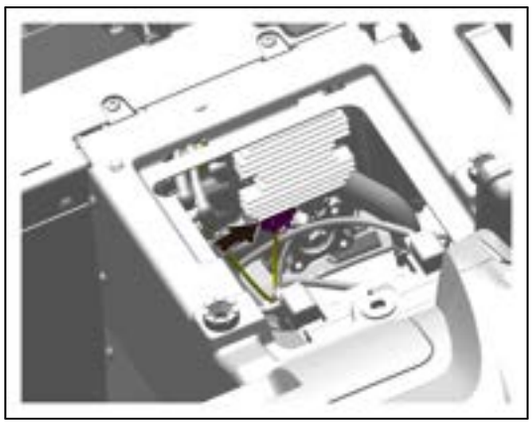
- **Cable ties on the harness are single-use and must be replaced after removal.**



f. Disconnect the crankshaft position sensor wiring harness connector. Release the wiring harness retaining clips and cut the cable ties along the harness.

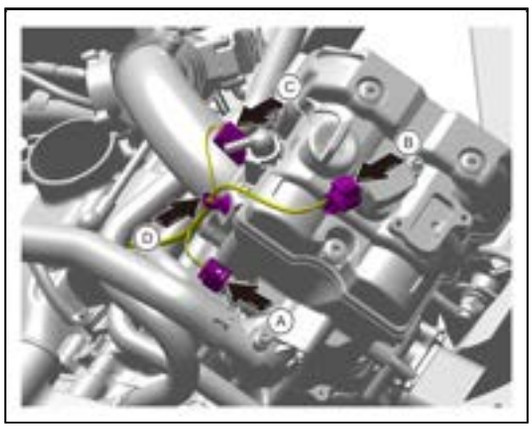
NOTICE:

- **Cable ties on the harness are single-use and must be replaced after removal.**



g. Disconnect the magneto stator assembly wiring harness connector. Release the wiring harness retaining clips and cut the cable ties along the harness.

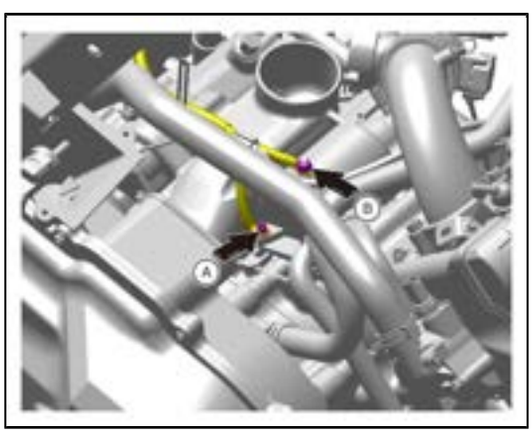
NOTICE:
• **Cable ties on the harness are single-use and must be replaced after removal.**



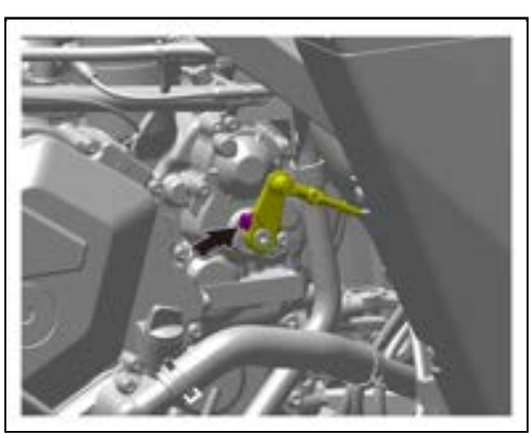
h. Disconnect coolant temperature sensor wiring harness connector A, ignition coil wiring harness connector B and fuel injector wiring harness connector C. Release the wiring harness retaining clips and cut the cable ties along the harness.

NOTICE:
• **Cable ties on the harness are single-use and must be replaced after removal.**

i. Remove wiring harness retaining clip D and position the wiring harness so that it does not obstruct the work.

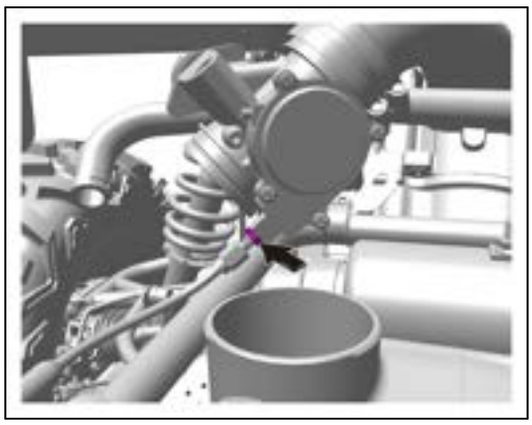


j. Remove earth lead mounting bolt A and starter motor positive cable retaining nut B. Disconnect the starter motor wiring and position it so that it does not obstruct the work.

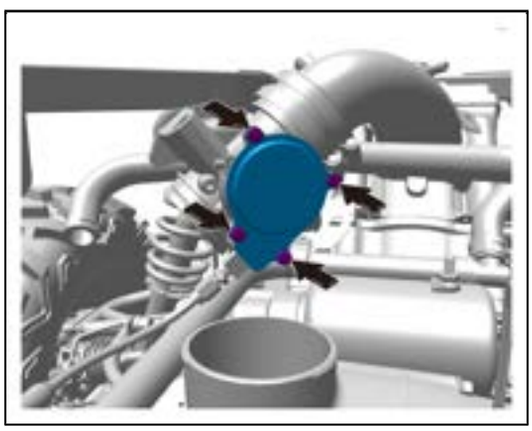


k. Mark the fitted position of the shift control arm assembly in relation to the shift shaft assembly.

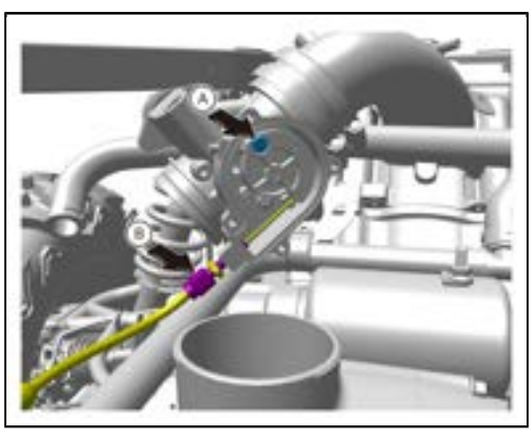
l. Remove the bolt securing the shift control arm assembly to the engine assembly, then detach the shift control arm assembly.



m. Loosen the mounting nut for the throttle cable.

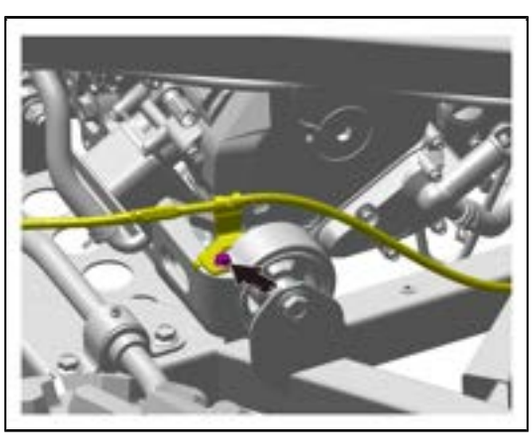


n. Remove the 4 bolts securing the throttle body assembly cover, then remove the throttle body assembly cover.



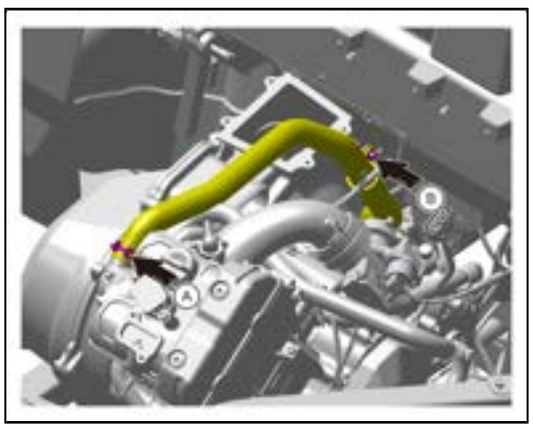
o. Release throttle cable retaining clip A.

p. Loosen throttle cable retaining nut B sufficiently to disengage the throttle cable.



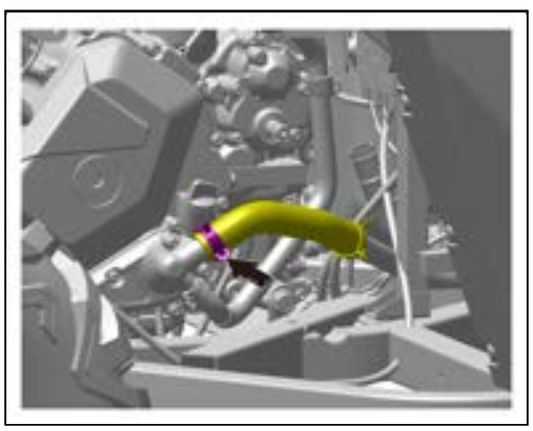
q. Remove the parking brake cable mounting bolt and position the parking brake cable so that it does not obstruct the work.

17. Removing the coolant hose assemblies



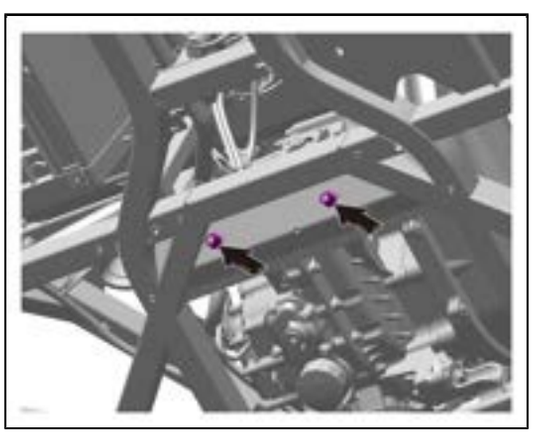
a. Loosen clamp A.

b. Remove M6 × 16 mounting bolt B from the engine coolant outlet hose clamp. Disconnect the engine coolant outlet hose and position it so that it does not obstruct the work.



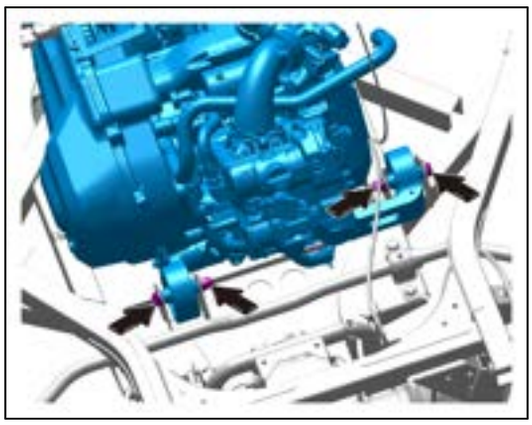
c. Loosen the retaining clamp securing the engine coolant inlet hose, then disconnect it.

18.Removing the engine assembly



a. Remove the 2 M10 × 1.25 lower engine mounting nuts.

Torque: 36.1 ± 3.7 ft-lbs (49 ± 5 N·m).

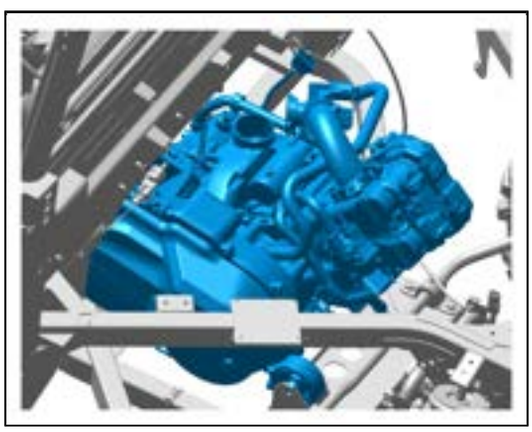


b. Remove the 2 M12 × 1.25 mounting nuts and 2 M12 × 1.25 × 85 mounting bolts from the rear engine mounting bracket.

Torque: 64.9 ± 5.9 ft-lbs (88 ± 8 N·m).

NOTICE:

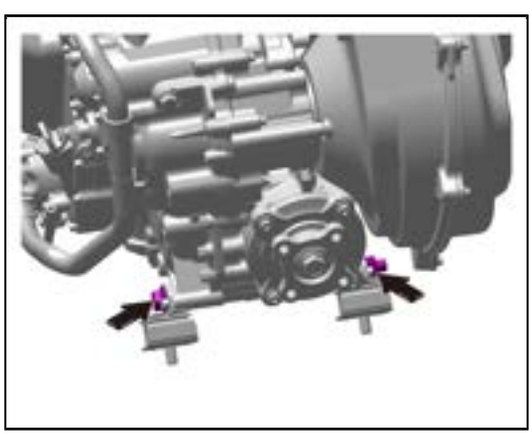
- **Hold the mounting bolt to prevent it from turning, then remove the rear engine mounting bracket nut.**



c. Lift the engine assembly out with assistance.

CAUTION:

- **Before removing the engine assembly, arrange the harness, lines, brackets, and other components to avoid interference.**
- **The engine assembly is heavy. Ensure proper support during removal to avoid sudden slipping, which may lead to component damage or injury.**

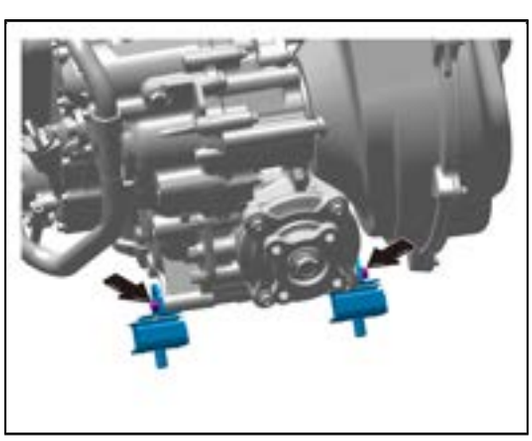


d. Remove the M12 × 1.25 × 210 engine mount insulator bolt and the M12 × 1.25 nut.

Torque: 64.9 ± 5.9 ft-lbs (88 ± 8 N·m).

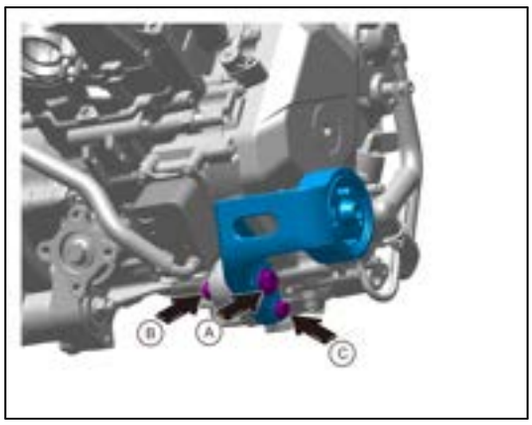
NOTICE:

- **Hold the mounting bolt to prevent it from turning, then remove the engine mount insulator nut.**



e. Remove the 2 M6 × 12 mounting bolts, then remove the 2 engine mount insulators.

Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).



f. Remove M12 × 1.25 × 70 mounting bolt A and M12 × 1.25 mounting nut B from the right rear engine mounting bracket.

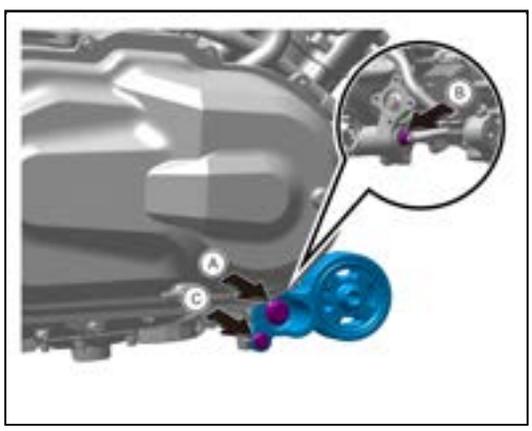
Torque: 64.9 ± 5.9 ft-lbs (88 ± 8 N·m).

NOTICE:

- **Hold the mounting bolt to prevent it from turning, then remove the right rear engine mounting bracket nut.**

g. Remove M8 × 30 mounting bolt C, then remove the right rear engine mounting bracket.

Torque: 17±1.5 ft-lbs (23±2N·m)



h. Remove M12 × 1.25 × 70 mounting bolt A and M12 × 1.25 mounting nut B from the left rear engine mounting bracket.

Torque: 64.9 ± 5.9 ft-lbs (88 ± 8 N·m).

NOTICE:

- **Hold the mounting bolt to prevent it from turning, then remove the left rear engine mounting bracket nut.**

i. Remove M8 × 30 mounting bolt C, then remove the left rear engine mounting bracket.

Torque: 17±1.5 ft-lbs (23±2N·m)

Installation Procedure

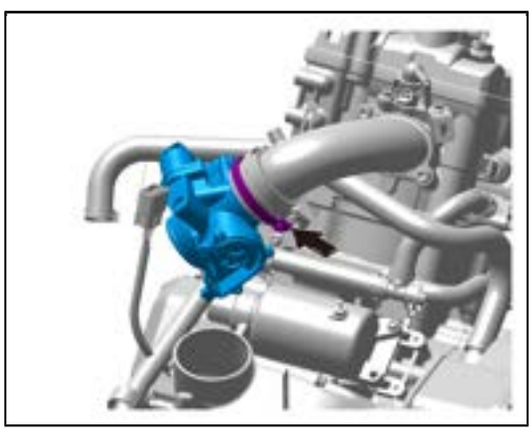
1. **Install the engine assembly by reversing the removal procedure, following the instructions below:**
   a. After installation, fill with engine oil and coolant.
   b. After installation, connect the battery negative cable, start the vehicle, bleed the cooling system, verify that the engine runs normally without abnormal noise, and check the pipe/hose joints to ensure there are no oil or coolant leaks.

3.2.6.2 External Engine Components

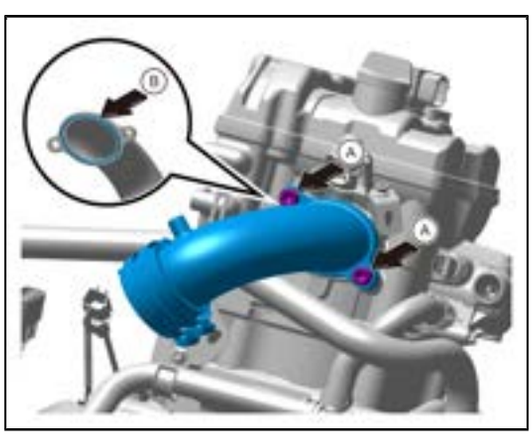
Removal Procedure

CAUTION:
• Clean the engine surface prior to removal to prevent debris from entering the engine and causing damage during servicing.

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To drain the coolant, See: Coolant Draining and Refilling.
3. To drain the engine oil, See: Draining Engine Oil.
4. To remove the engine assembly, See: Engine Assembly.
5. Removing the intake pipe assembly



a. Loosen the clamp, detach the throttle body and remove it.

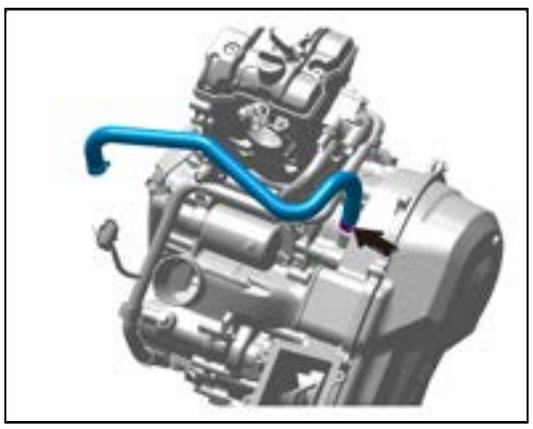


b. Remove the 2 bolts (M8×25) securing the intake pipe assembly and remove the assembly.

c. Remove O-ring B (48.8 × 2.6).

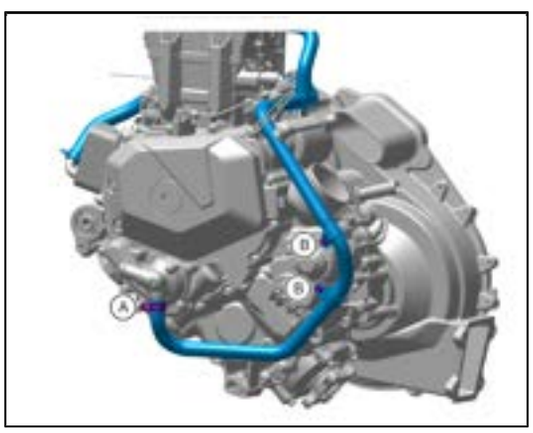
CAUTION:
• The seal is a single-use part and must be replaced with a new one upon installation.

6. Removing the crankcase breather hose



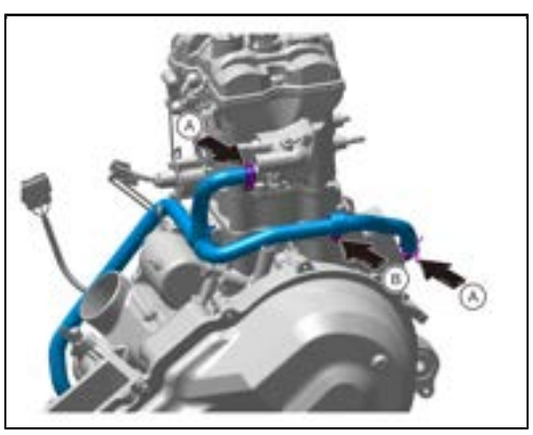
a. Loosen the clamp, disconnect the crankcase breather hose and remove it.

7. Removing the coolant hose assemblies



a. Loosen hose clamp A and disconnect the small coolant loop pipe assembly.

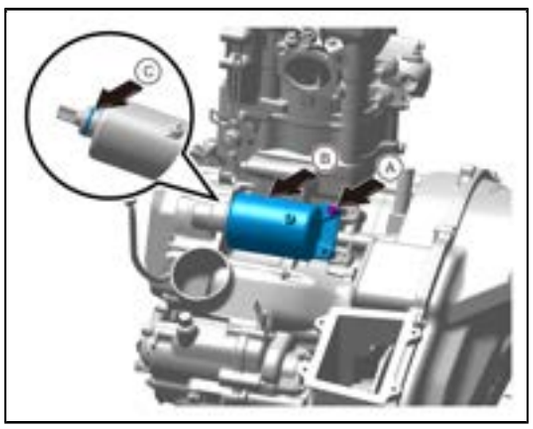
b. Remove the 2 bolts B securing the small coolant loop pipe assembly.



c. Loosen the 2 clamps A and disconnect the coolant hose assembly.

d. Remove the mounting bolts B of the coolant pipe assembly and remove the assembly.

8. Removing the starter motor

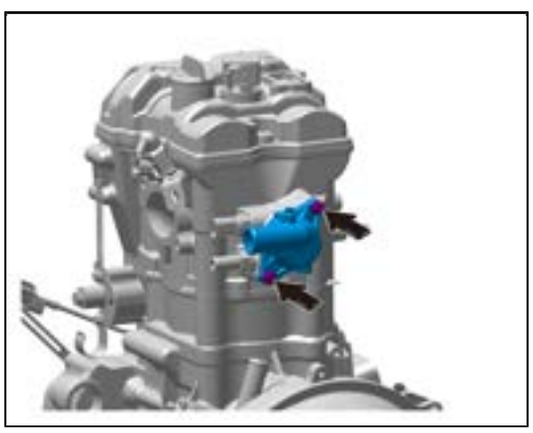


a. Remove M6 × 30 starter motor mounting bolt A, then remove starter motor B and O-ring C.

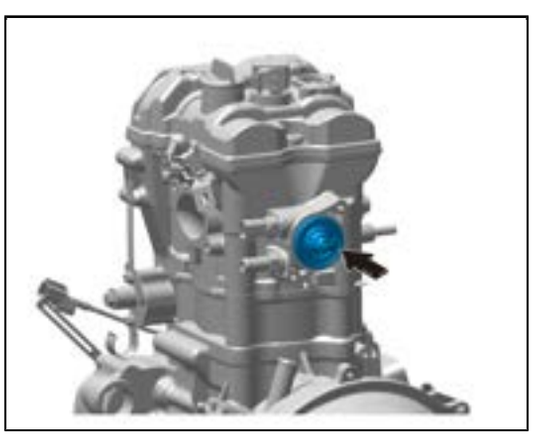
CAUTION:

- **The seal is a single-use part and must be replaced with a new one upon installation.**

9. Removing the thermostat

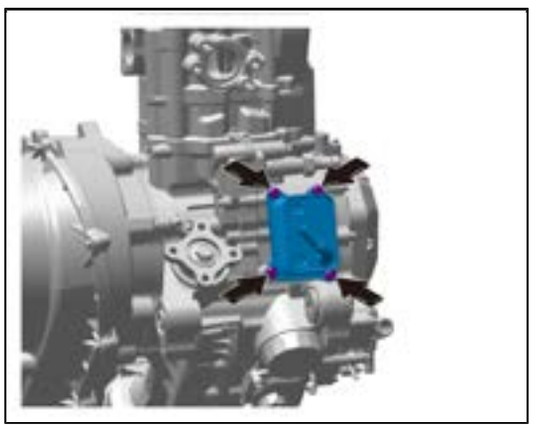


a. Remove the 2 bolts (M6×20) securing the thermostat cover and remove the cover.

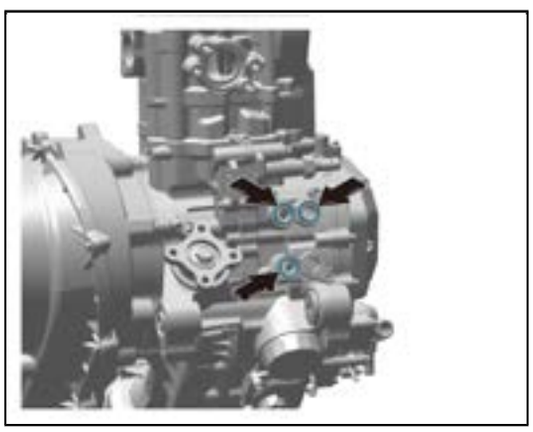


b. Remove the thermostat.

10.Removing the oil cooler assembly

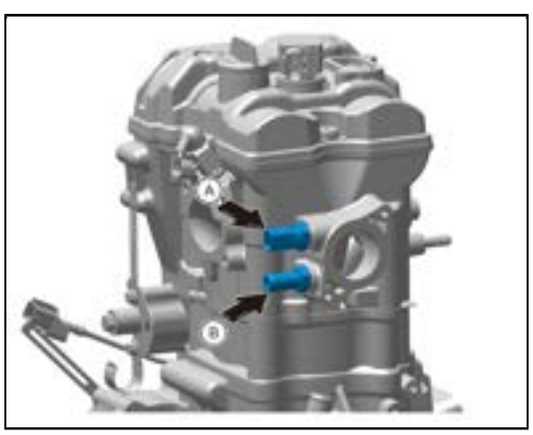


a. Remove the 4 bolts securing the oil cooler assembly and remove the assembly.



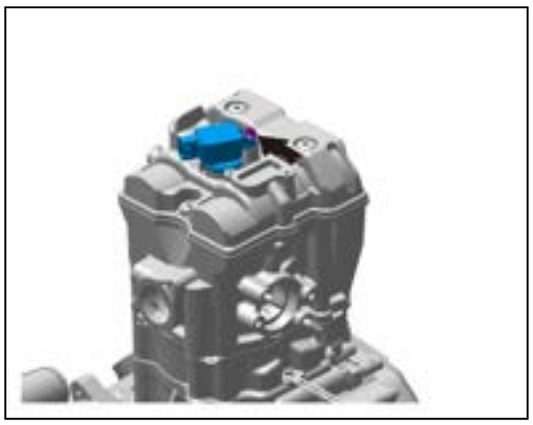
b. Remove three O-rings.

11. Removing engine electrical components

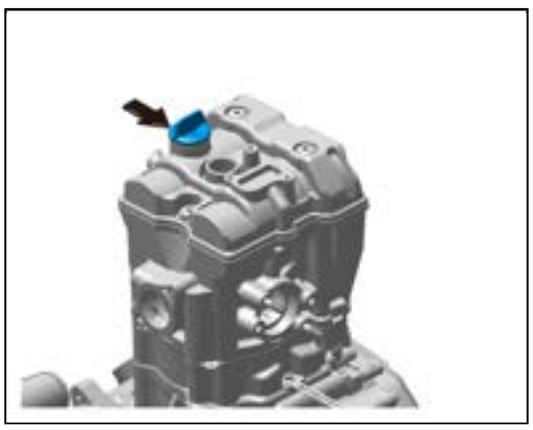


a. Remove and take out coolant temperature sensor A.

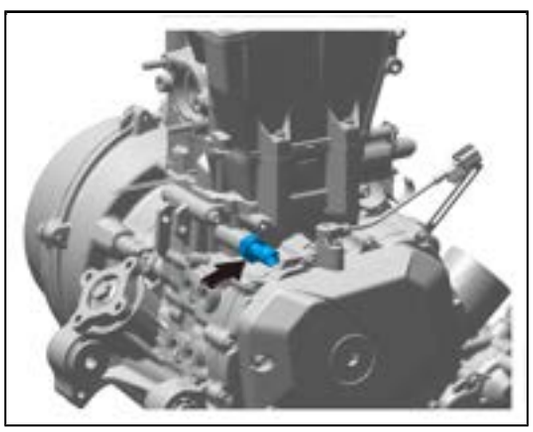
b. Remove and take out coolant hose connector B.



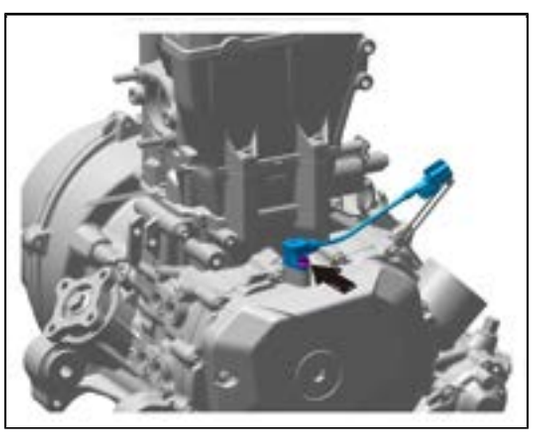
c. Remove the ignition coil mounting bolt and remove the coil.



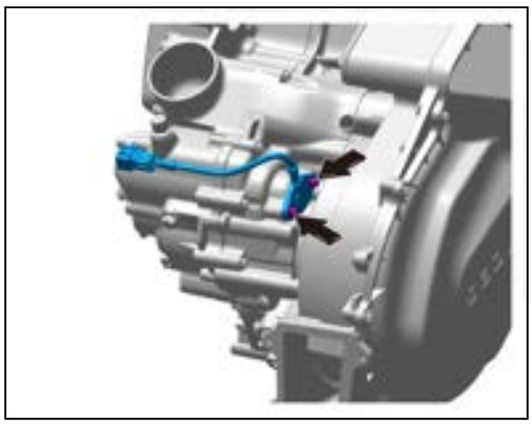
d. Remove and detach the fuel filler cap.



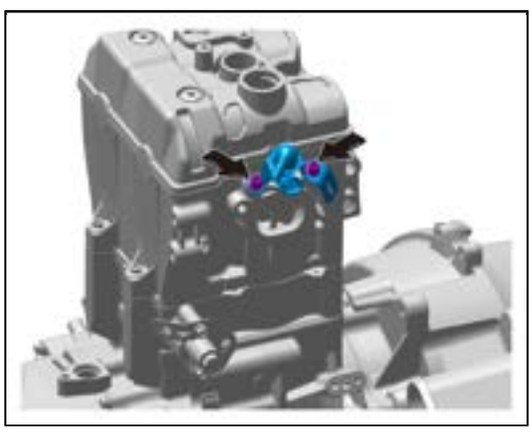
e. Remove and detach the oil pressure sensor.



f. Remove the crankshaft position sensor bolt and extract the sensor.

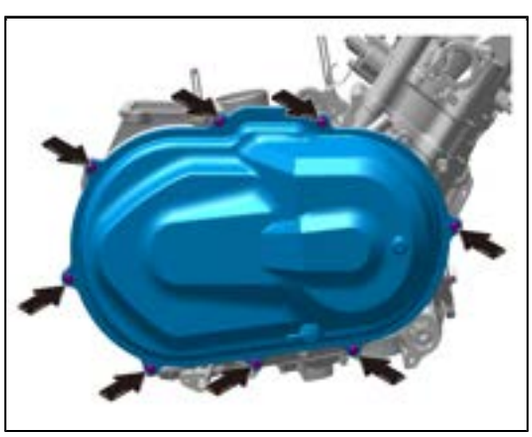


g. Remove the 2 bolts securing the gear position sensor assembly and extract the assembly.

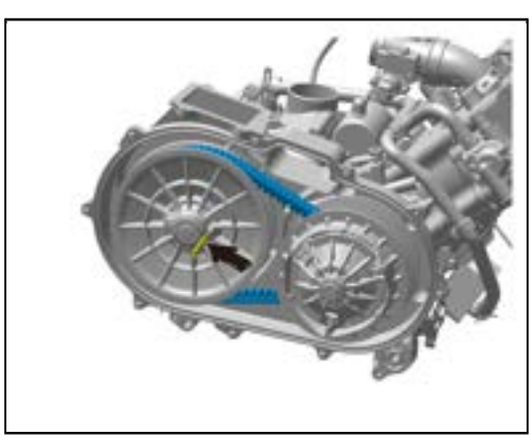


h. Remove the 2 bolts securing the injector retainer and sequentially remove the harness bracket, injector retainer, injector connecting pipe, and injectors.

12. Removing the CVT transmission assembly



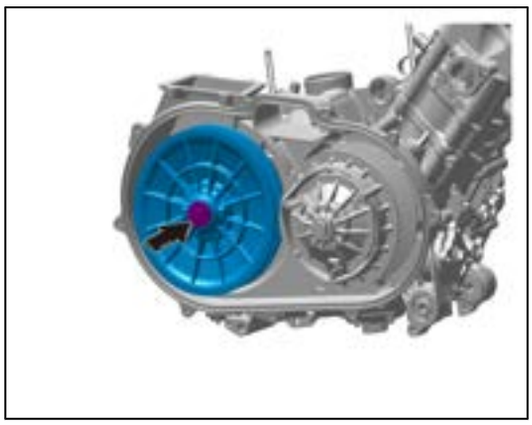
a. Remove the 8 mounting bolts, then remove the CVT outer cover.



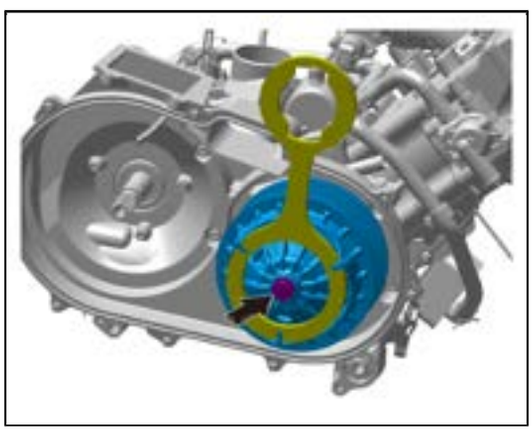
b. Thread the SST into the threaded hole of the driven pulley until the CVT belt can be disengaged.

SST: CVT driven pulley pushrod bolt (M6) (E01-E200001-000-00)

c. Remove the CVT drive belt.



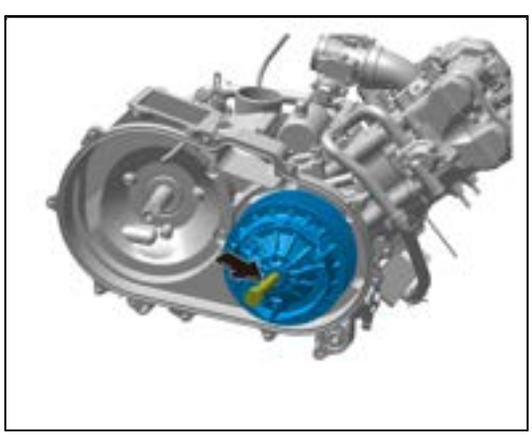
d. Undo the CVT driven pulley mounting bolt by turning it anticlockwise, then remove the CVT driven pulley.



e. Use the SST pulley clamp to hold the CVT drive pulley and remove the mounting bolt clockwise.

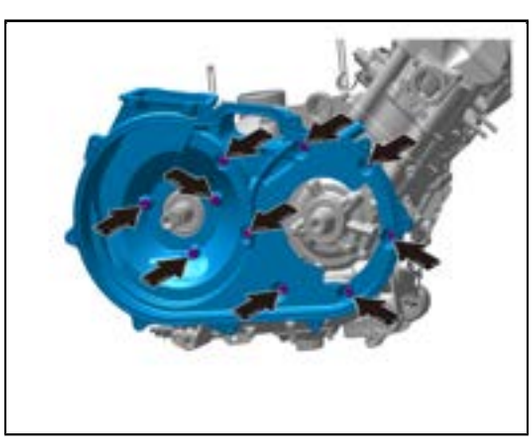
SST: CVT pulley holding tool (A10-R493101-000-00).

CAUTION:
• The CVT drive pulley mounting bolt is left threaded and should be turned clockwise to remove.

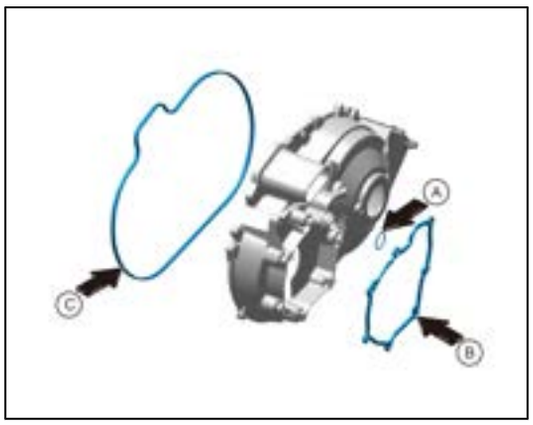


f. Using the drive pulley pushrod bolt, remove and extract the CVT drive pulley assembly.

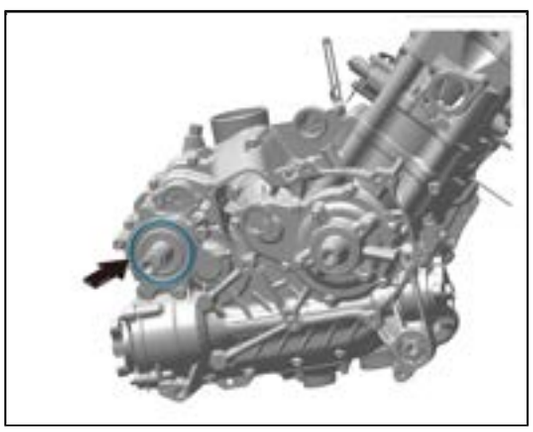
SST: CVT drive pulley pushrod (E01GZ0000008)



g. Remove the 10 mounting bolts of the CVT inner cover assembly and remove the assembly.

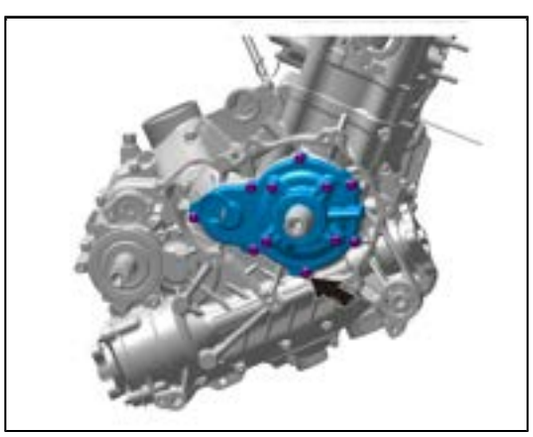


h. Remove the O-ring 30×3 A, inner cover seal B, and outer cover seal C.

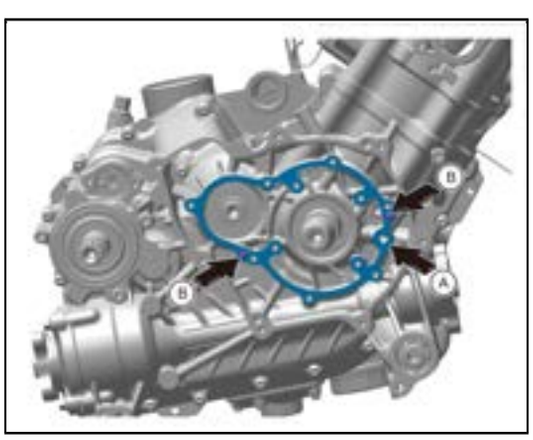


i. Remove the O-ring (73 × 3).

13. Removing the right crankcase cover



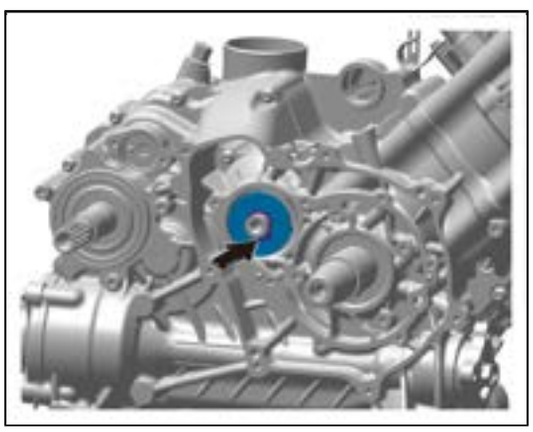
a. Remove the 11 mounting bolts of the right crankcase cover and remove the cover.



b. Remove right crankcase cover gasket A and the 2 parallel pins B.



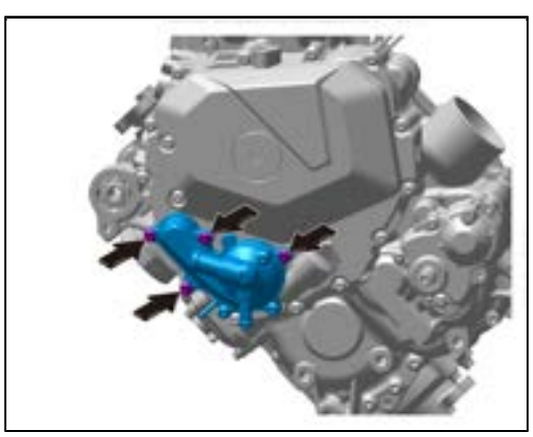
c. Remove the inner oil seal (20×30×7) A and outer oil seal (35×52×7) B from the right crankcase cover.



d. Use circlip pliers to remove the external circlip (20).

e. Sequentially remove the external circlip (20), breather cover, and breather bush.

14. Removing the coolant pump assembly



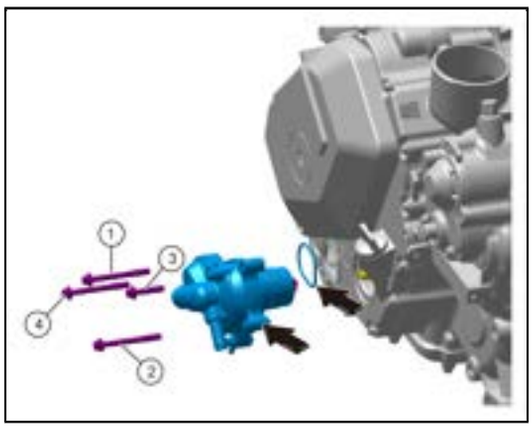
a. Remove the 4 mounting bolts of the coolant pump assembly and remove the assembly.

Inspecting and cleaning

1. Inspect the removed parts for damage, deterioration or distortion. Replace any unserviceable parts with new ones before installation.
2. Clean the housing and gear assemblies, and wipe all parts clean with a lint-free cloth.

Installation Procedure

1. Installing the coolant pump assembly



a. Fit the coolant pump body seal into its groove, ensuring that the seal is not twisted or deformed.

NOTICE:

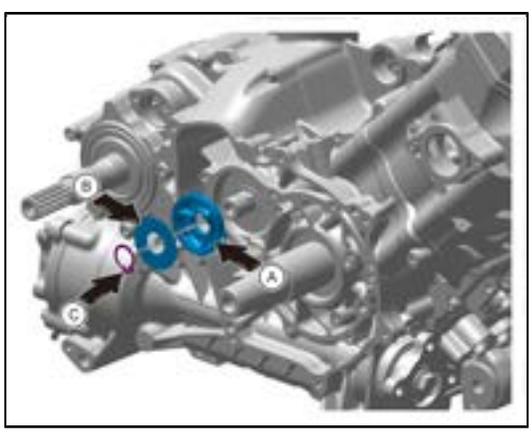
- **O-rings are single-use parts and must not be reused. Always install new O-rings.**
- **Apply grease to the O-ring before fitting.**

b. Align the slot in the coolant pump shaft with the flat on the oil pump shaft in the mounting bore. While keeping them aligned, push the coolant pump assembly into position, rotating it slightly as necessary.

c. Tighten the mounting bolts in the sequence shown in the illustration.

Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).

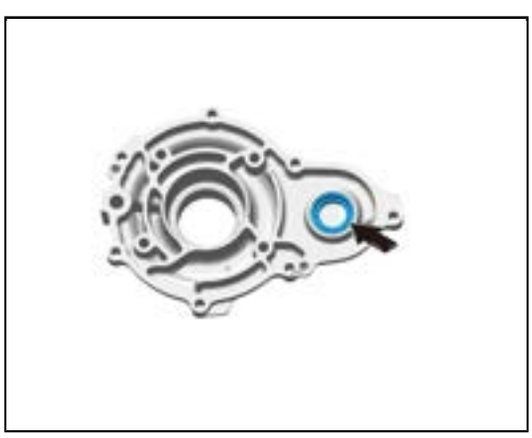
2. Installing the right crankcase cover



a. Install the breather bush A on the balance shaft, aligning its notch with the dowel pin on the balance shaft.

b. Install the breather cover B on the balance shaft.

c. Using circlip pliers, install external circlip C (20) onto the balance shaft groove, with the sharp edge facing outwards.



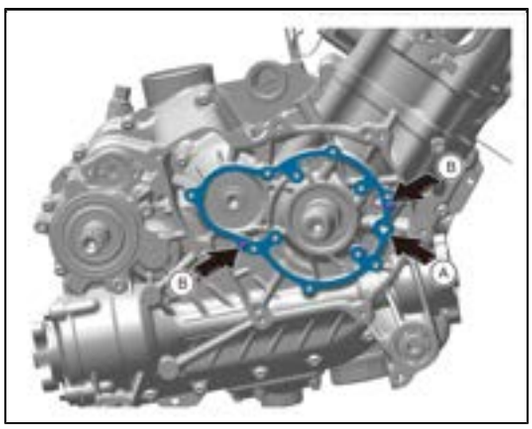
d. Apply a small amount of engine oil to the outer diameter of oil seal 20×30×7, then use the SST to install the seal in the right crankcase.

SST: 20×30×7(E01GZ0000005) oil seal driver.

CAUTION:

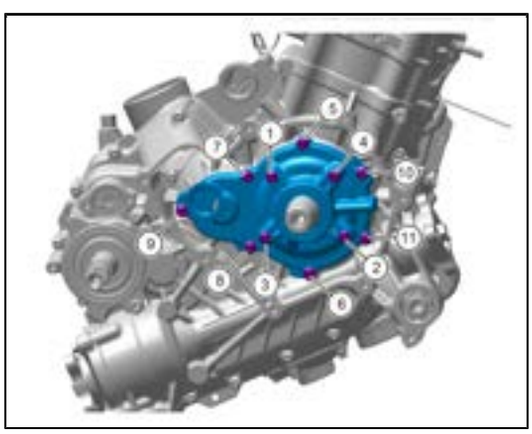
- **If either the right crankcase half or the right crankcase cover is damaged and requires replacement, they must be renewed as a matched set.**

NOTICE:
• The oil seal is a single-use part. Always fit a new oil seal during installation. • Apply grease to the oil seal surface during installation.



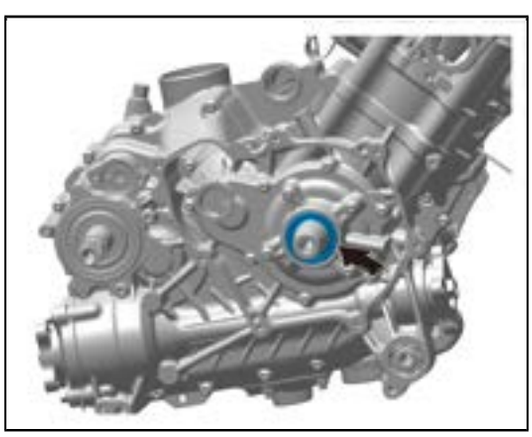
e. Clean the mating surfaces of the right crankcase cover and right crankcase with a lint-free cloth. Install the 2 parallel pins B and right crankcase cover gasket A.

NOTICE:
• The gasket is single-use only and must be replaced with a new one during installation.



f. Fit the right crankcase cover over the crankshaft and on to the right crankcase, then install the 11 right crankcase cover mounting bolts.

Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).

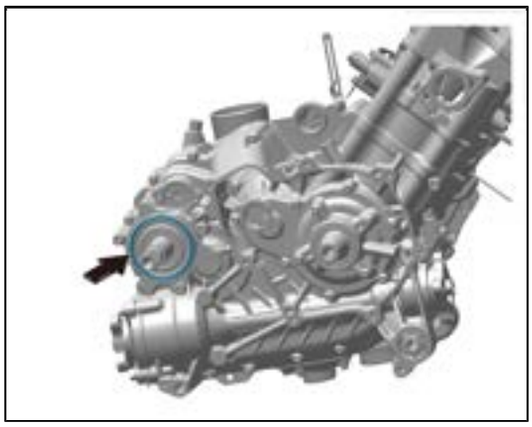


g. Apply a uniform coat of engine oil to the outer diameter of oil seal 35×52×7, then use the SST to install the seal in the right crankcase cover.

SST: 35×52×7(E01GZ0000002) oil seal driver.

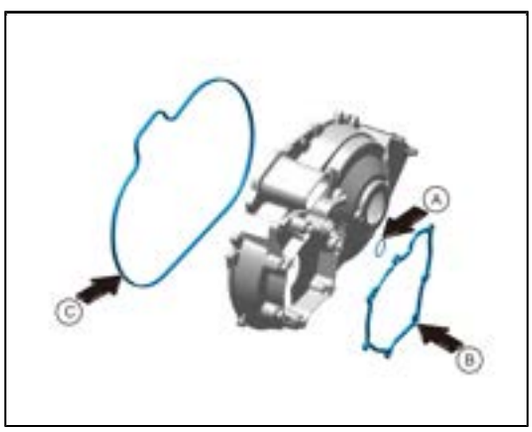
NOTICE:
• The oil seal is a single-use part. Always fit a new oil seal during installation. • Apply grease to the oil seal surface during installation.

3. Installing the CVT transmission assembly



a. Fit the 73 × 3 O-ring into the seal groove of the CVT driven pulley bush, ensuring that the O-ring is not twisted or distorted.

NOTICE:
• O-rings are single-use parts and must not be reused. Always install new O-rings. • Apply grease to the O-ring before fitting.

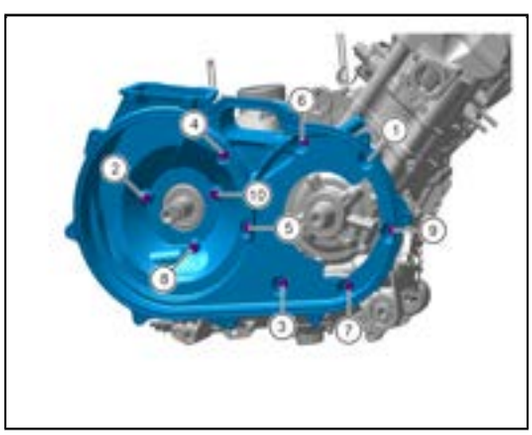


b. Install the O-ring 30 × 3 A to the CVT inner cover assembly. Ensure that the O-ring is not twisted or distorted.

c. Install CVT inner cover gasket B to the CVT inner cover assembly, aligning it with the locating pins, then press it down evenly until fully seated.

d. Turn the CVT inner cover assembly over so the flatter side faces upwards, and install the outer cover seal C onto the CVT inner cover assembly.

NOTICE:
• The seals are single-use parts and must not be reused. Always install new seals during assembly.



e. Install the CVT inner cover assembly to the right crankcase over the crankshaft and mainshaft. Apply a suitable threadlocker to the leading threads of the bolts, then install the 10 CVT inner cover mounting bolts and tighten them in the sequence shown.

Torque: 11.1 ± 1.5 ft-lbs (15 ± 2 N·m).



f. Install the CVT drive pulley onto the crankshaft, then fit the flanged bush and mounting bolt.

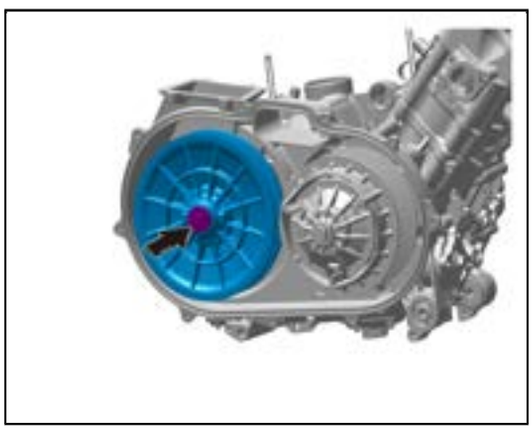
g. Using the SST, hold the CVT drive pulley and tighten the mounting bolt anticlockwise.

SST: CVT pulley holding tool (A10-R493101-000-00).

Torque: 73.8 ± 5.9 ft-lbs (100 ± 8 N·m).

CAUTION:

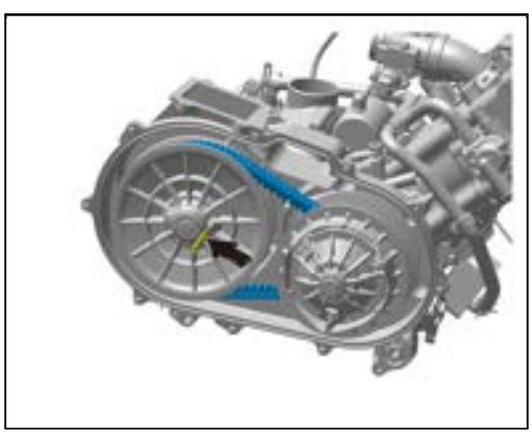
- **The CVT drive pulley mounting bolt has a left thread and must be tightened by turning it anticlockwise.**



h. Install the CVT driven pulley onto the mainshaft, then fit the flanged bush and mounting bolt.

i. Tighten the mounting bolt clockwise.

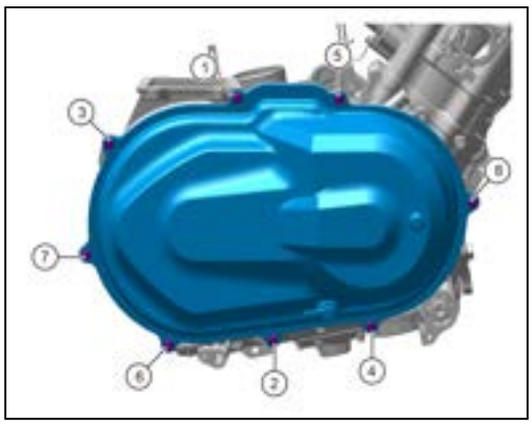
Torque: 59 ± 3.7 ft-lbs (80 ± 5 N·m).



j. Screw the pulley pushrod bolt into the threaded hole on the driven pulley, then install the CVT belt.

SST: CVT driven pulley pushrod bolt (M6) (E01-E200001-000-00)

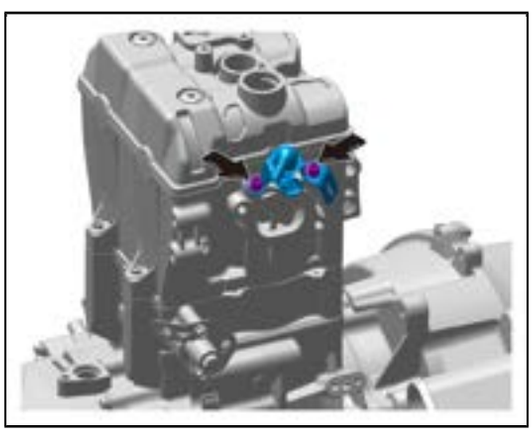
k. Remove the driven pulley pushrod bolt, then rotate the driven pulley 2 to 3 turns to set the CVT belt tension correctly.



l. Install the CVT outer cover to the inner cover, then fit the 8 CVT outer cover bolts in the sequence shown.

Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).

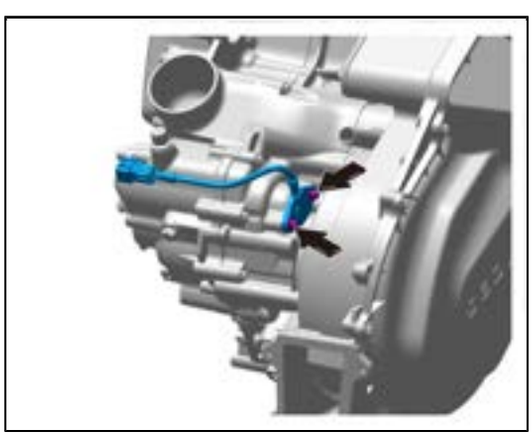
4. Installing the engine electrical components



a. Apply a small amount of engine oil to the upper injector O-ring. Press the injector connecting pipe onto the injector, then install the injector retaining plate to the connecting pipe.

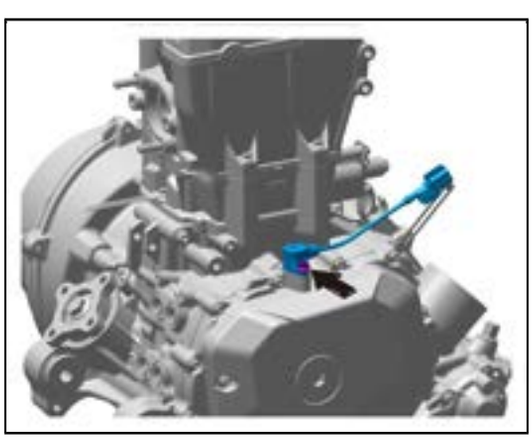
b. Position the harness bracket and assembled injector assembly at the mounting points, then secure them with 2 mounting bolts.

Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).



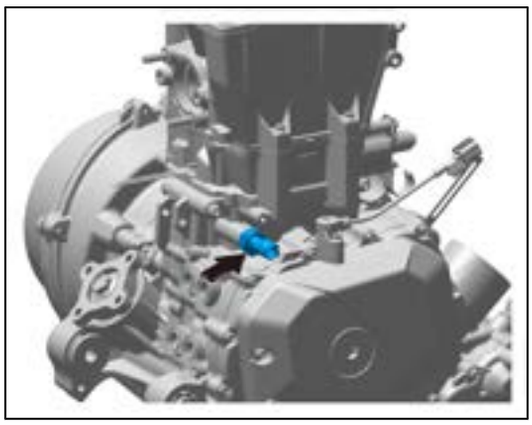
c. Install the gear position sensor assembly to the crankcase and secure it with 2 mounting bolts.

Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).



d. Install the crankshaft position sensor to the left crankcase cover, then fit the mounting bolt.

Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).



e. Install the engine oil pressure sensor to the crankcase and tighten it securely.

Torque: 10.3 ± 1.5 ft-lbs (14 ± 2 N·m).

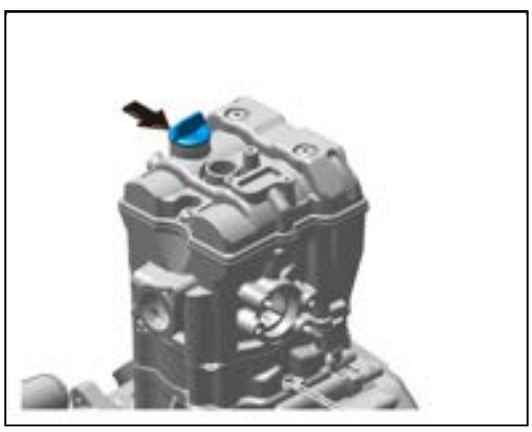


f. Fit the oil filler cap o-ring to the fuel filler cap and press it fully into place by hand.

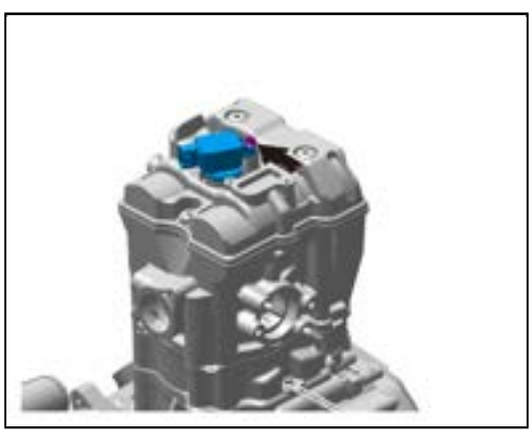
g. Install the 22 × 3 O-ring into the seal groove on the fuel filler cap.

NOTICE:

- **The seals are single-use parts and must not be reused. Always install new seals during assembly.**

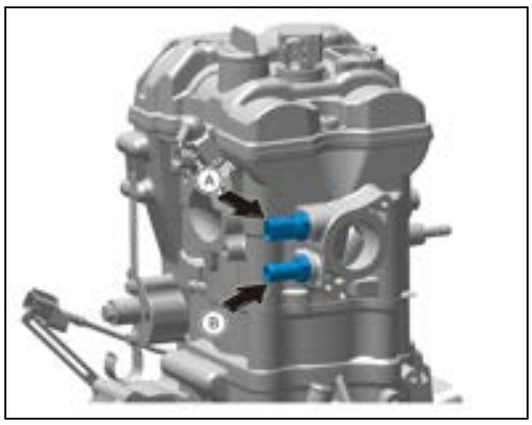


h. Install the fuel filler cap to the cylinder head cover.



i. Position the ignition coil in place, then install the mounting bolt.

Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).



j. Install the coolant temperature sensor A to the cylinder head and tighten it securely.

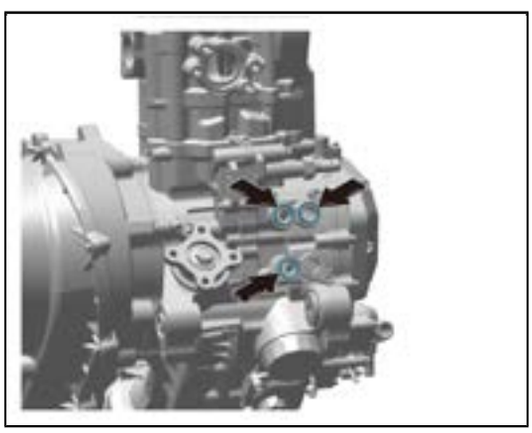
Torque: 8.9 ± 1.5 ft-lbs (12 ± 2 N·m).

k. Fit the 14 × 21 × 1.5 aluminium washer to the coolant hose connector.

l. Install the coolant hose union B to the cylinder head and tighten securely.

Torque: 13.3 ± 1.5 ft-lbs (18 ± 2 N·m).

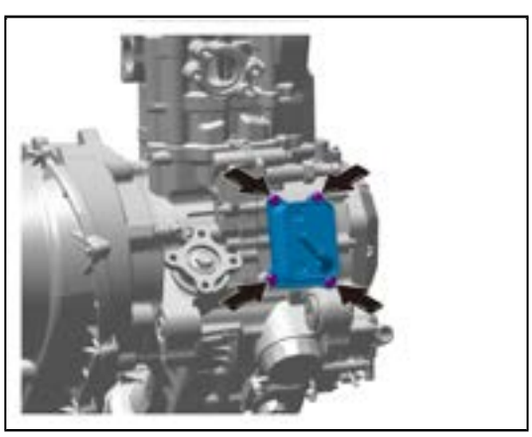
5. Installing the engine oil cooler assembly



a. Install the 3 O-rings into the recesses of the left crankcase half.

NOTICE:

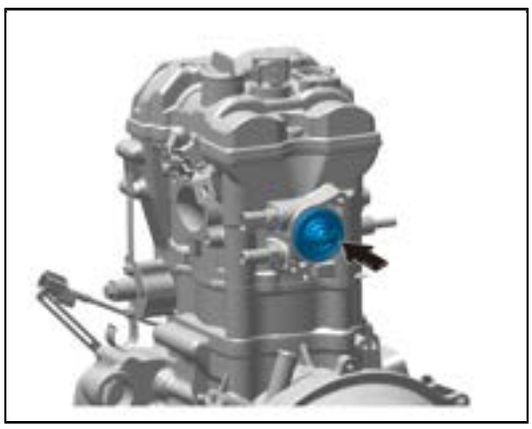
- O-rings are single-use parts and must not be reused. Always install new O-rings.
- Apply grease to the O-ring before fitting.



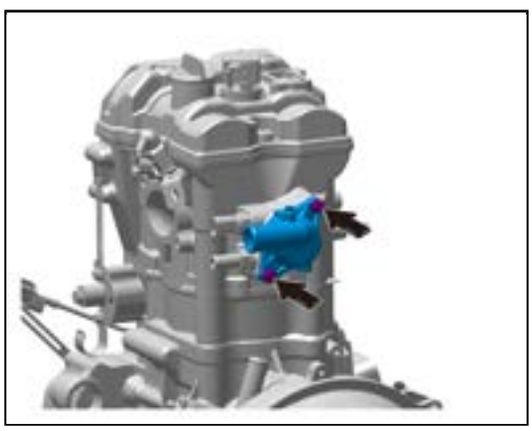
b. Install the engine oil cooler assembly to the housing, then tighten the 4 mounting bolts in a diagonal sequence.

Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).

6. Installing the thermostat



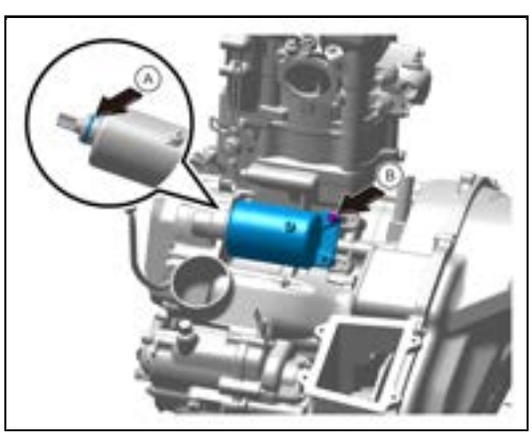
a. Insert the thermostat into the mounting bore.



b. Install the thermostat cover to the cylinder head and secure it with 2 mounting bolts.

Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).

7. Installing the starter motor



a. Install starter motor O-ring A and lightly coat the O-ring with engine oil.

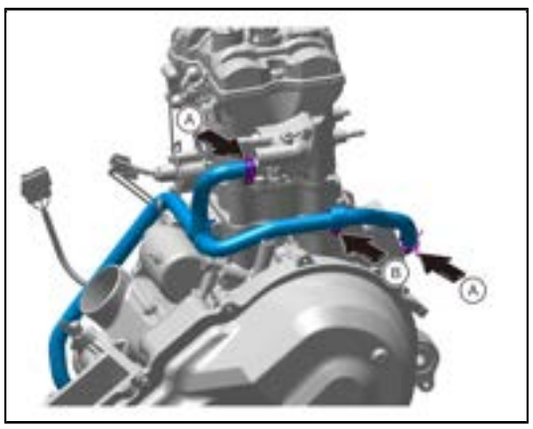
CAUTION:

- **The seal is a single-use part and must be replaced with a new one upon installation.**

b. Install the starter motor on the crankcase. Install and tighten M6 × 30 starter motor mounting bolt B.

Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).

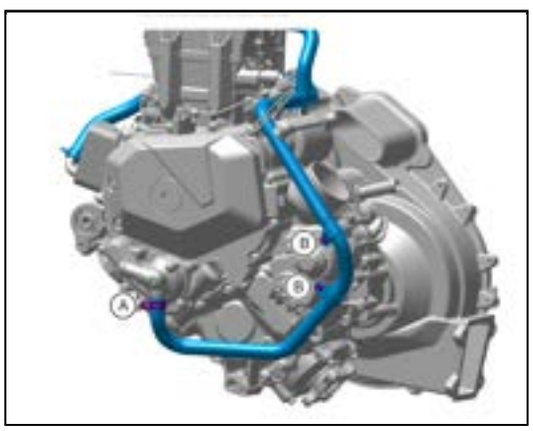
8. Installing the coolant hose assembly



a. Install the coolant hose assembly to the engine.

b. Connect the coolant hose assembly, then secure it with 2 hose clips (A) and mounting bolt (B).

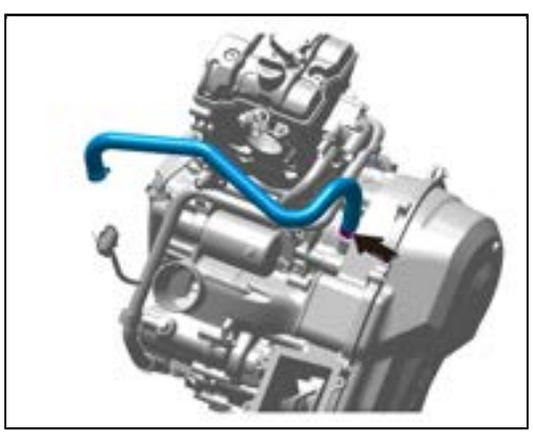
Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).



c. Connect the coolant hose assembly, then secure it with hose clip (A) and 2 mounting bolts (B).

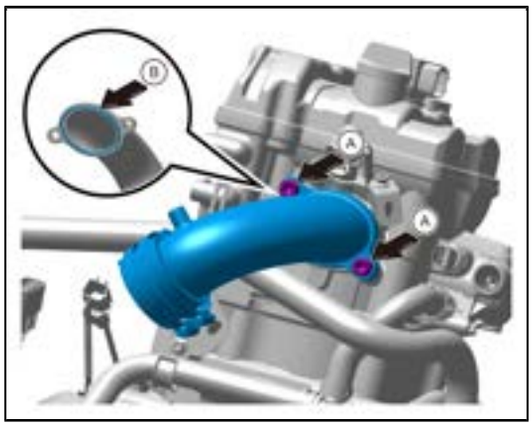
Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).

9. Installing the crankcase breather hose



a. Position the crankcase breather hose correctly, then install the retaining clamp.

10.Installing the intake pipe assembly



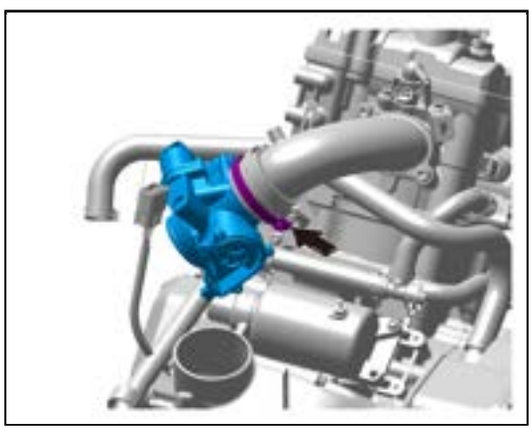
a. Install intake manifold O-ring B (48.8 × 2.6).

CAUTION:

- **The seal is a single-use part and must be replaced with a new one upon installation.**

b. Position the intake manifold on the cylinder head and install the 2 mounting bolts A (M8 × 25).

Torque: 18.4 ± 1.5 ft-lbs (25 ± 2 N·m).



c. Install the throttle body, ensuring that the locating lug engages correctly in the slot in the intake pipe, then tighten the retaining clamp.

Torque: 8.9 ± 1.5 ft-lbs (12 ± 2 N·m).

11. To install the engine assembly, See: Engine Assembly.
12. To refill engine with oil, See: Refilling Engine Oil.
13. To fill with coolant, See: Coolant Draining and Refilling.
14. To connect the negative battery, See: Battery Power Connection/Disconnection Procedure.

3.2.6.3 Cylinder Head Cover

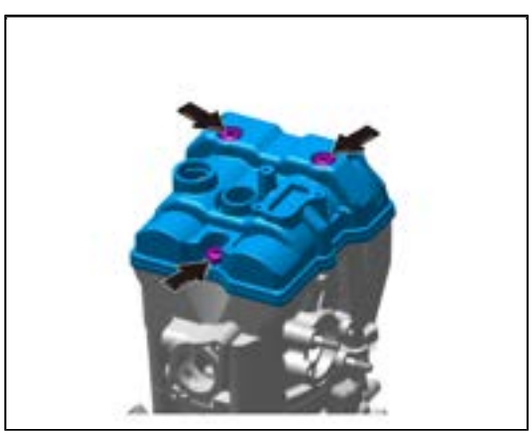
Removal Procedure

CAUTION:
• Clean the engine surface prior to removal to prevent debris from entering the engine and causing damage during servicing.

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the ignition coil assembly, See: Ignition Coil Assembly.
3. Removing the cylinder head cover



a. Remove and detach the fuel filler cap.



b. Remove the 3 cylinder head cover bolts, then lift off the cylinder head cover.



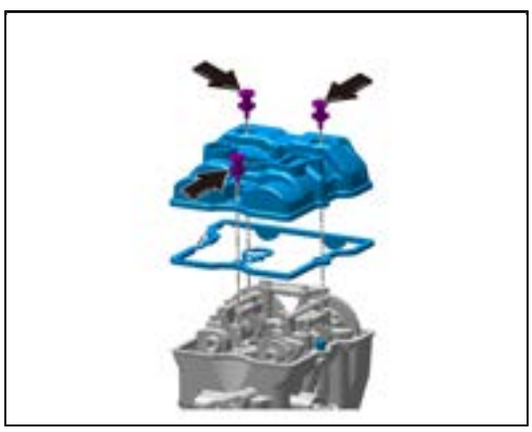
c. Remove the cylinder head cover gasket.



d. Remove the locating dowel pin.

Installation Procedure

1. Installing the cylinder head cover

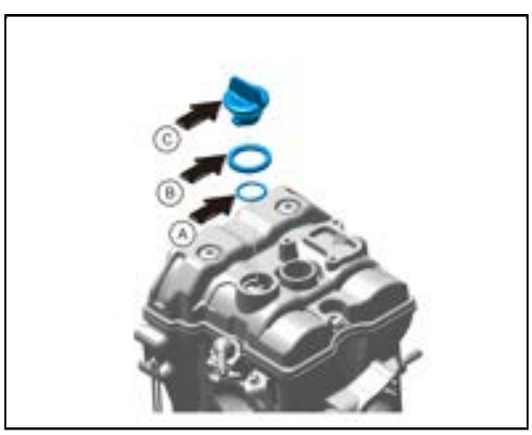


a. Install the locating dowel pin. Fit the cylinder head cover gasket onto the cylinder head and press it by hand until fully seated.

b. Position the cylinder head cover and secure it with the 3 mounting bolts.

Torque: 8.8 ± 1.5 ft-lbs (12 ± 2 N·m).

CAUTION:
• Inspect all parts for wear or damage before installation and replace as necessary. • Clean any oil from the mating surfaces of the cylinder head cover and cylinder head before installation.



c. Install O-ring A (22 × 3) and oil filler cap o-ring B, then tighten fuel filler cap C.

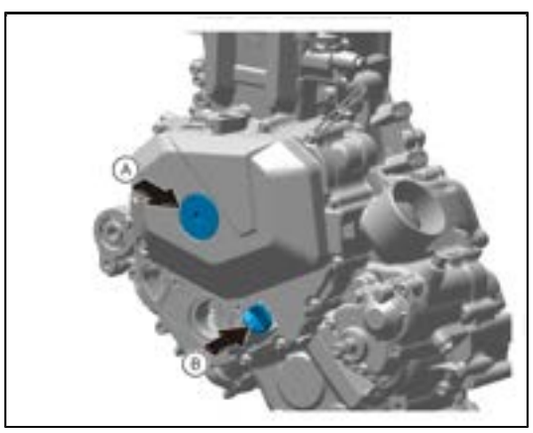
CAUTION:
• The seal is a single-use part and must be replaced with a new one upon installation.

2. To install the ignition coil assembly, See: Ignition Coil Assembly.
3. To connect the negative battery, See: Battery Power Connection/Disconnection Procedure.

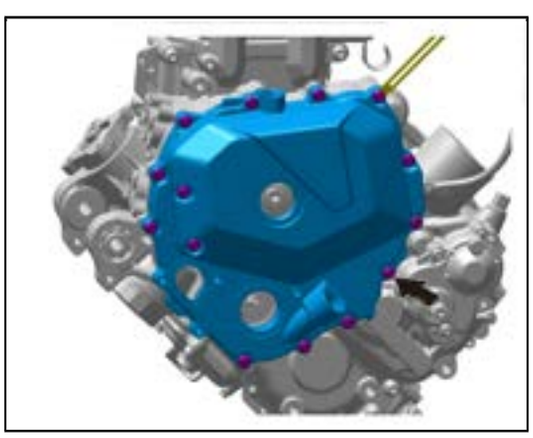
3.2.6.4 Timing Mechanism, Magneto, and Oil Pump Assembly.

Removal Procedure

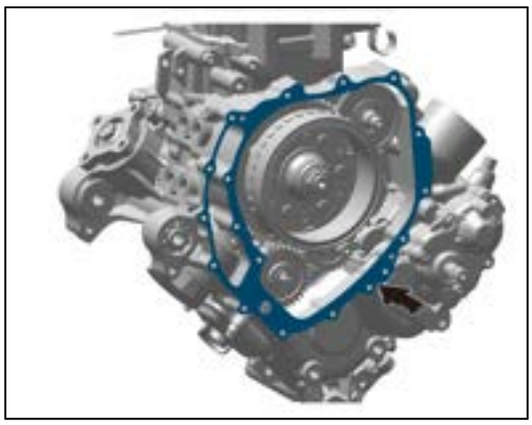
1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To drain the coolant, See: Coolant Draining and Refilling.
3. To drain the engine oil, See: Draining Engine Oil.
4. To remove the rear cargo box assembly, See: Rear Cargo Box Assembly.
5. To remove the air cleaner assembly, See: Air Cleaner Assembly.
6. To remove the throttle body, See: Throttle Body.
7. To remove the crankshaft position (CKP) sensor, See: Crankshaft Position (CKP) Sensor.
8. To remove the coolant pump assembly, See: Coolant Pump Assembly.
9. To remove the ignition coil assembly, See: Ignition Coil Assembly.
10. To remove the cylinder head cover, See: Cylinder Head Cover.
11. Removing the magneto assembly



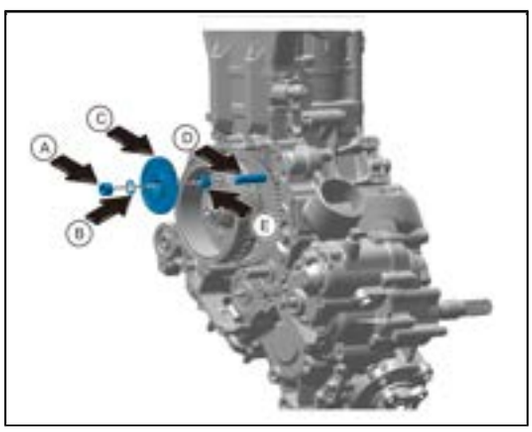
a. Remove the inspection cover A.
b. Remove the oil dipstick B.



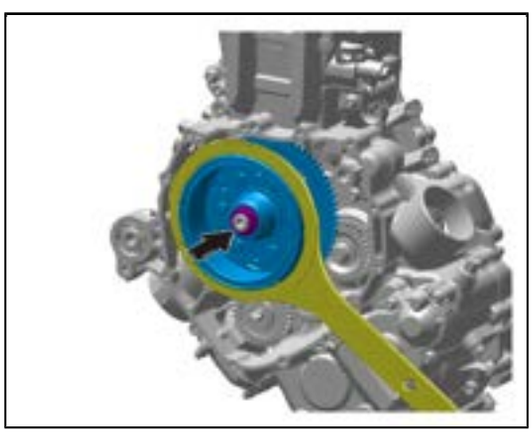
c. Remove the 14 mounting bolts of the left crankcase cover assembly and remove the harness bracket and cover assembly.



d. Remove the left crankcase cover gasket.

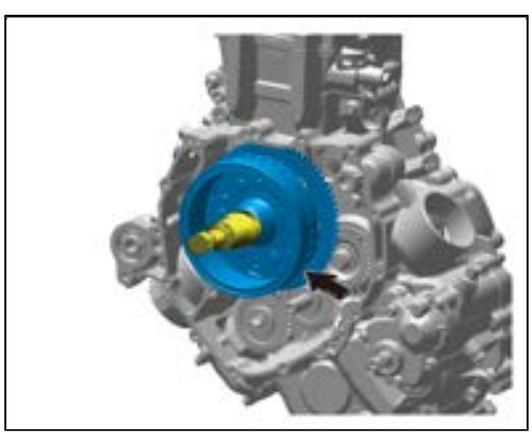


e. Remove the 12×18×12 bush A, 12×20×1 plain washer B, compound gear assembly C, K121616 needle roller bearing D, and idler gear shaft E in sequence.



f. Use the magneto rotor holding tool to remove the magneto rotor retaining nut.

SST: Magneto rotor holding tool

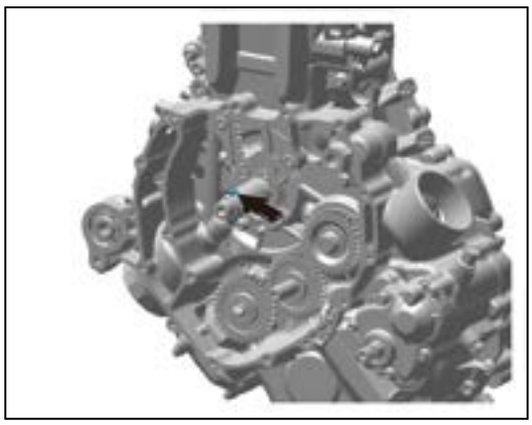


g. Pull out the magneto rotor assembly using the SST.

SST: Magneto rotor puller (E01GZ0010001)

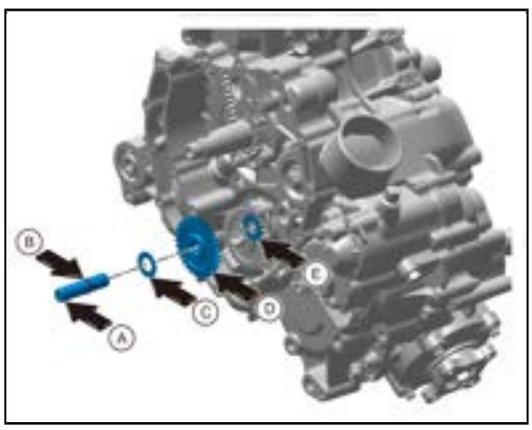
CAUTION:

- If the magneto rotor is difficult to remove, lightly tap the end of the puller while turning it. Do not strike the magneto rotor. Striking it may cause the magnets to lose their magnetism.

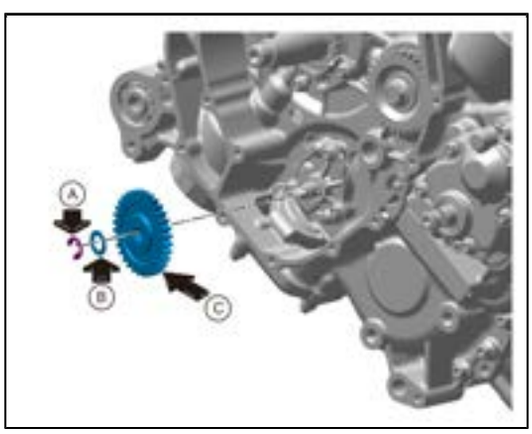


h. Remove the Woodruff key.

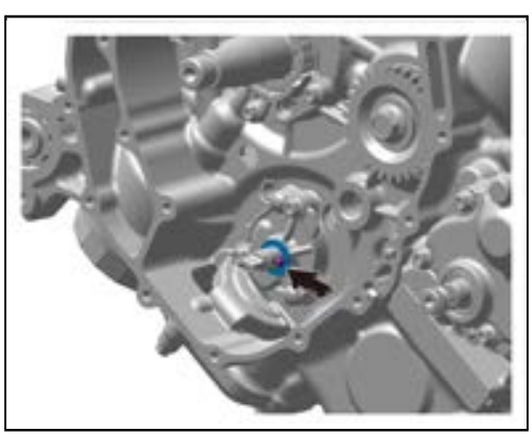
12. Removing the oil pump and gears



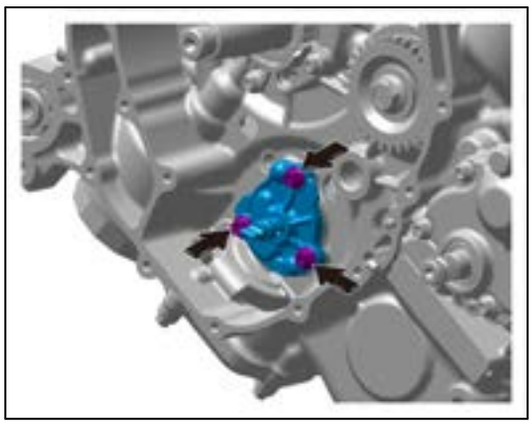
a. Remove the oil pump idler gear shaft A, external circlip B, 15×28×1 washer C, oil pump idler gear assembly D and 15×28×1 washer E in that order.



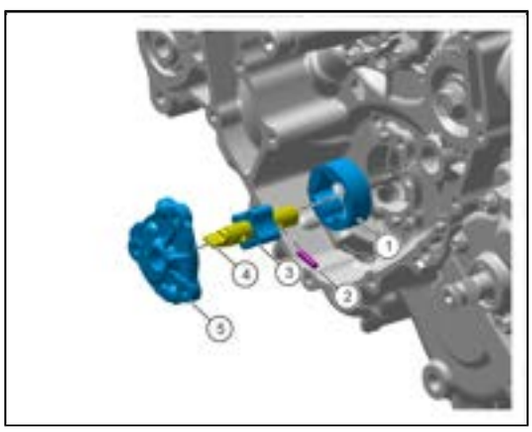
b. Using circlip pliers, remove the circlip A, then remove the 12×20×1 plain washer B and oil pump driven gear C.



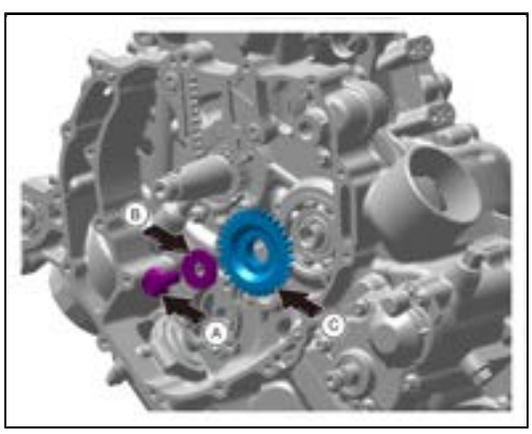
c. Remove the P4×15.8 needle roller and 12×20×1 plain washer.



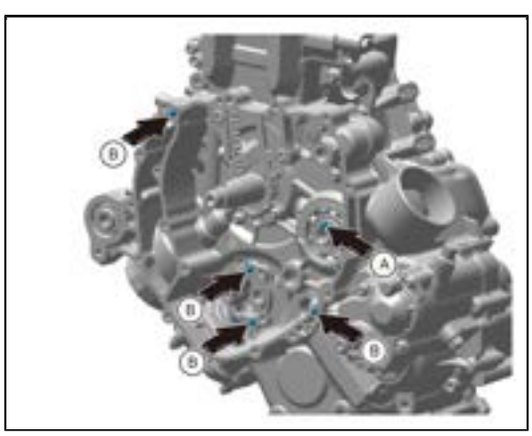
d. Remove the 3 oil pump cover bolts.



e. Remove the oil pump cover 5, oil pump shaft 4, inner rotor 3, P4×15.8-2 needle roller, and outer rotor 1 in sequence.

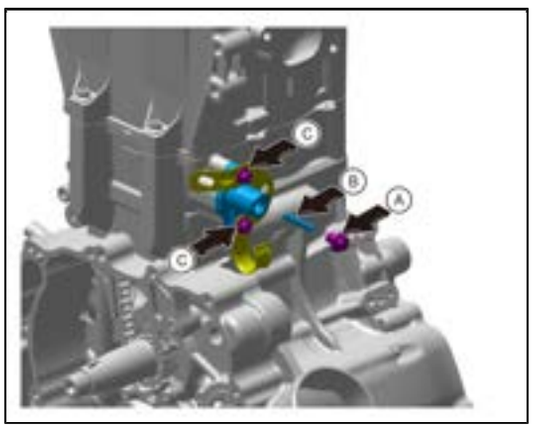


f. Remove the oil pump drive gear mounting bolt A, then remove the 10×30×3 plain washer B and oil pump drive gear C in that order.



g. Remove the parallel key A and the 4 parallel pins B.

13. Removing the timing mechanism

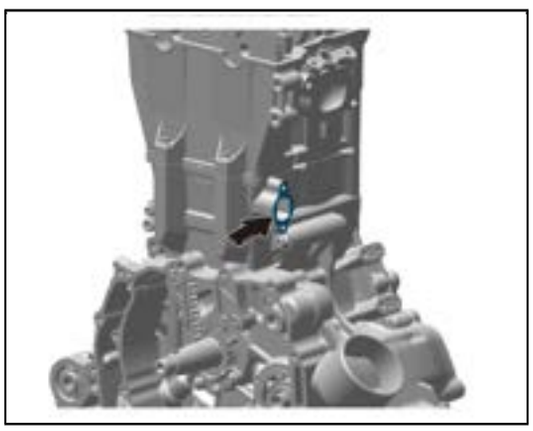


a. Remove the tensioner adjuster access plug A and take out the compression spring B.

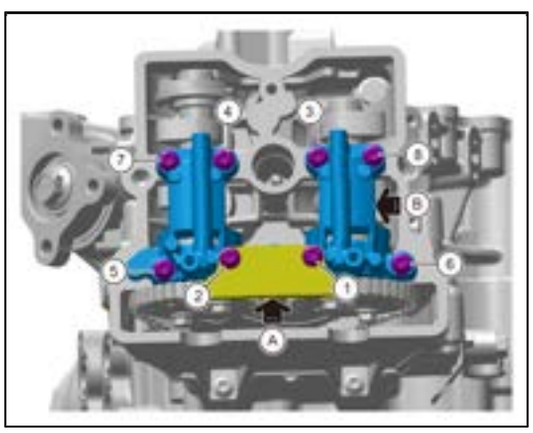
b. Remove the 2 tensioner mounting bolts C, then remove the tensioner along with the line retaining plate.

CAUTION:

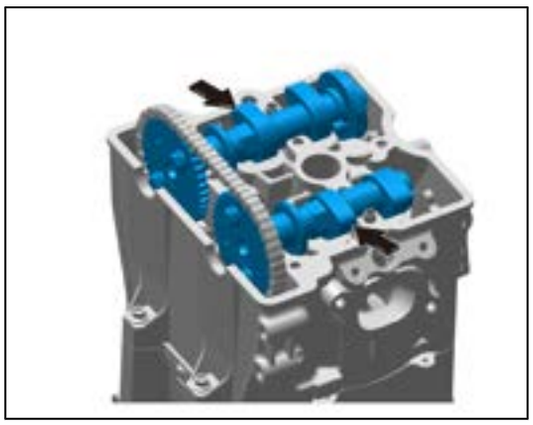
- **Once the tensioner pushrod extends, it cannot automatically retract, causing immediate chain slack. During removal, never loosen the mounting bolts only halfway; once loosened, they must be completely removed, and the tensioner must be reset to specification before refitting to avoid damaging the tensioner and timing chain.**
- **Do not rotate the crankshaft during the removal procedure.**



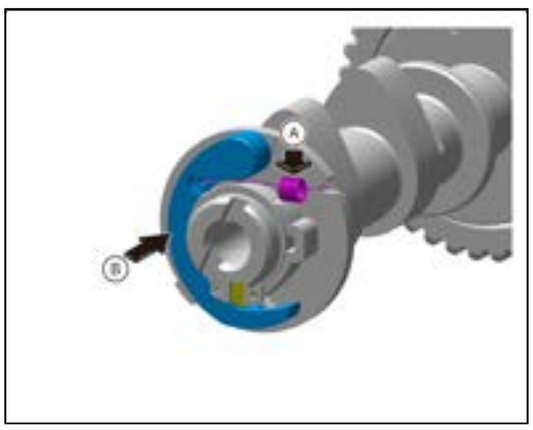
c. Remove the tensioner gasket.



d. Remove the 8 mounting bolts for the camshaft cover and chain guide assembly II in sequence. Remove the chain guide assembly II A and camshaft cover B.



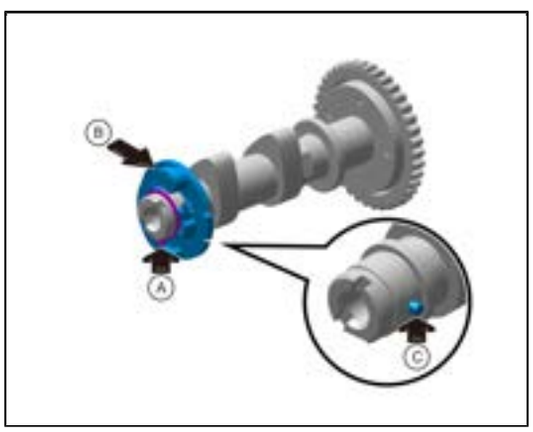
e. Remove the intake and exhaust camshafts.



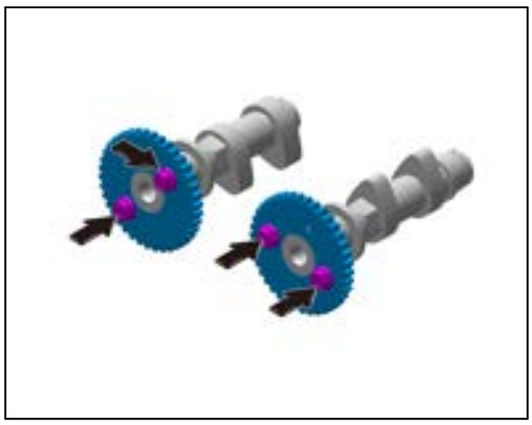
f. An automatic decompressor is integrated into the end of the exhaust camshaft. At low cranking speeds, the mechanism extends the decompressor pin to slightly open the exhaust valve, releasing cylinder compression pressure and reducing starting resistance. Once the engine reaches operating speed, centrifugal force automatically retracts the pin, restoring normal valve sealing and allowing standard compression strokes.

g. Visually inspect spring A for breakage, deformation, or missing coils; renew immediately if any abnormality is found.

h. Remove spring A, and manually move the centrifugal weight B back and forth to check for smooth operation. If the weight binds or moves unevenly, renew the automatic decompressor assembly. Also inspect the exhaust camshaft for damage, and renew it if necessary.

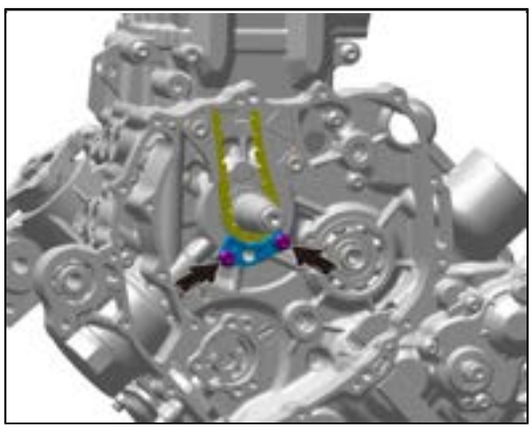


i. Remove the automatic decompressor circlip A from the exhaust camshaft, then remove the automatic decompressor B and the dowel pin C.

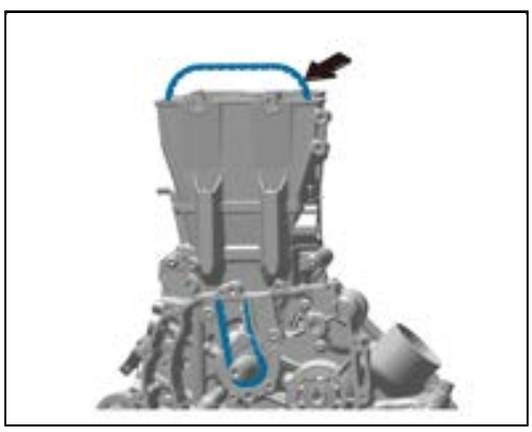


j. Match-mark the intake and exhaust camshafts to ensure correct refitting.

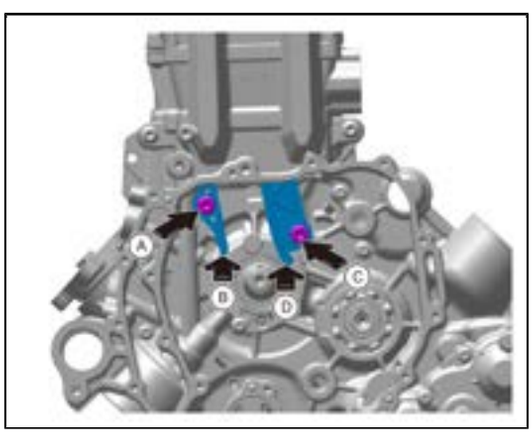
k. Remove the 4 camshaft sprocket mounting bolts, then remove the intake and exhaust sprockets.



l. Remove the 2 bolts securing the chain guard, then remove the guard.



m. Remove the timing chain shaft.

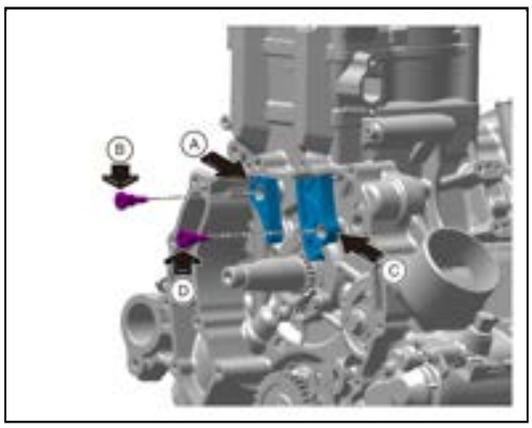


n. Remove the timing chain guide mounting bolt A, then remove the timing chain guide B.

o. Remove the timing chain tensioner guide mounting bolt C, then remove the timing chain tensioner guide D.

Installation Procedure

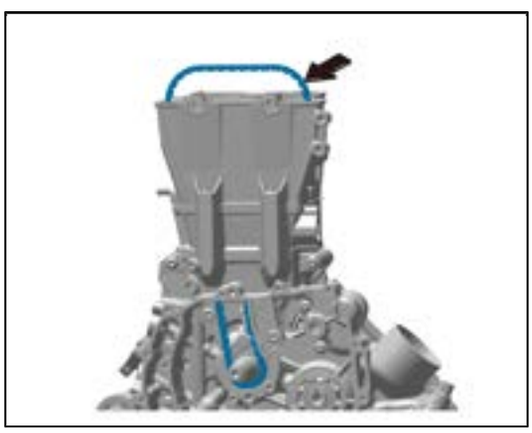
1. Installing the timing mechanism



a. Position the timing chain guide A into place and install the mounting bolt B.

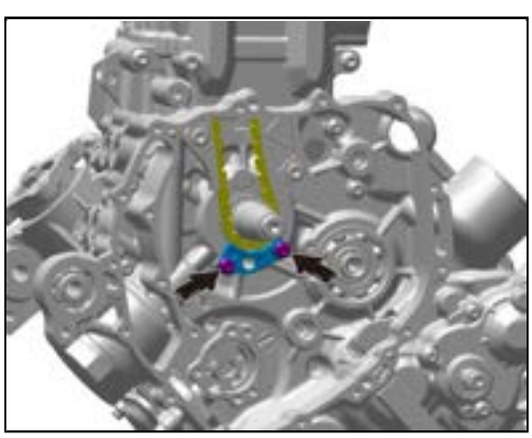
   Position the timing chain tensioner guide C into place and install the mounting bolt D.

   Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).



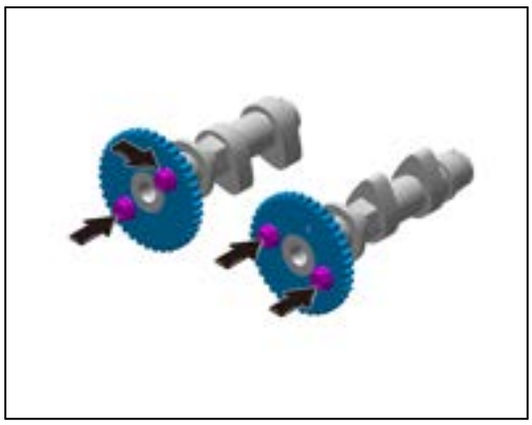
b. Rotate the crankshaft until the piston reaches top dead centre (TDC).

c. Fit the timing chain into position and engage it with the crankshaft sprocket.



d. Position the chain guard beneath the timing chain assembly and secure with the 2 mounting bolts.

   Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).

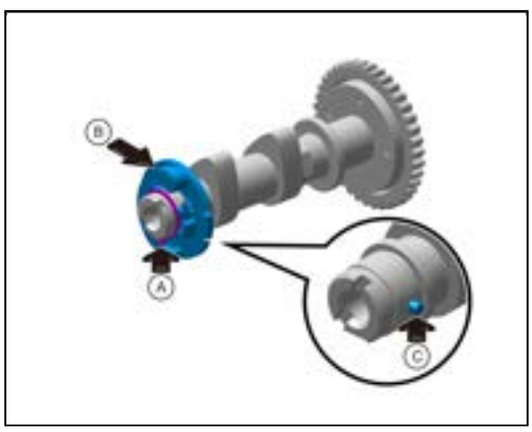


e. Inspect the camshaft sprocket teeth for wear or damage. Renew if worn or damaged.

f. Fit the sprockets onto the intake and exhaust camshafts.

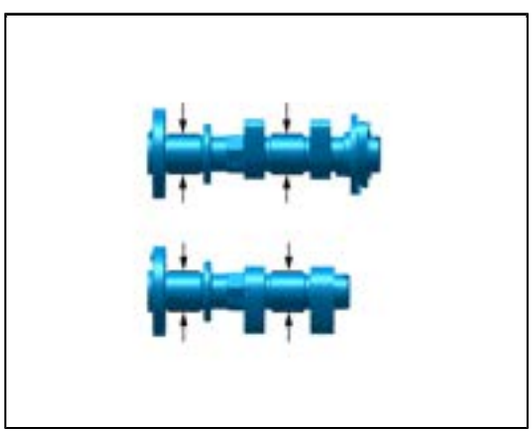
g. Apply a medium-strength threadlocker to the mounting bolts, then install the 4 sprocket mounting bolts.

Torque: 13 ft-lbs (18 N·m)



h. Install the dowel pin C onto the exhaust camshaft, install the automatic decompressor B, and secure it with the circlip A.

2. Inspecting camshaft

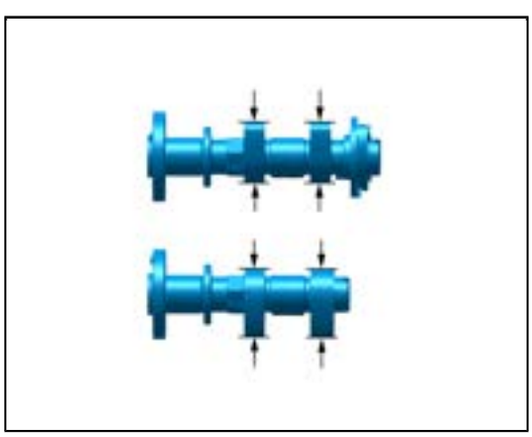


a. Measure the outer diameter of the camshaft journal using a micrometer.

Standard	Service limit
22.954~22.975 mm	22.944 mm

CAUTION:

- **Replace the camshaft if it is damaged or if any part exceeds the service limit for wear.**

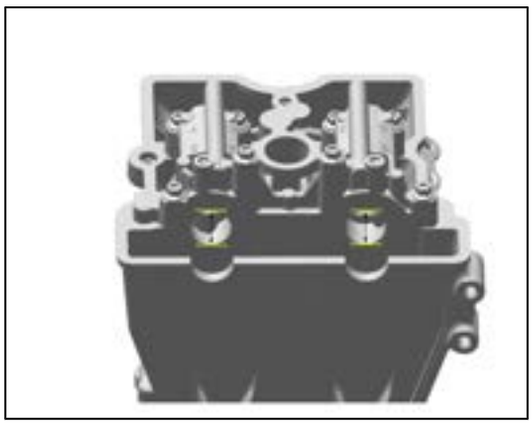


b. Measure the height of the cam lobes using a micrometer.

Position	Standard	Service limit
Intake Valve	40.08±0.04 mm	39.99 mm
Exhaust	40.36±0.04 mm	40.27 mm

CAUTION:

- **Replace the camshaft if the wear on the cam lobes exceeds the service limit.**



c. Install the camshaft caps and tighten the bolts in the specified sequence and torque. Measure the internal diameter of the camshaft bore.

Standard	Service limit
23.000~23.021 mm	23.044 mm

CAUTION:

- **Replace the cylinder head if the camshaft bore is damaged or worn beyond the service limit.**

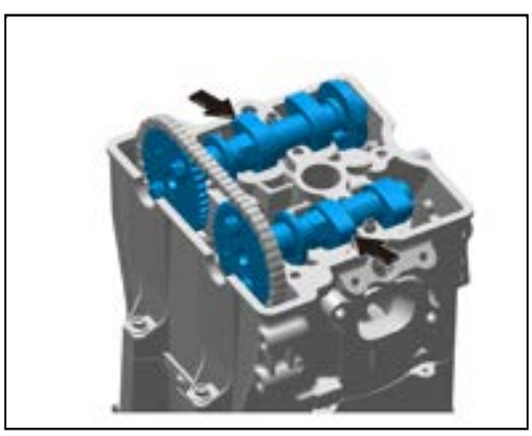
d. Calculate the clearance by subtracting the camshaft journal outer diameter from the camshaft cap inner diameter, and compare it to the specification.

Standard	Service limit
0.025~0.067 mm	0.10 mm

CAUTION:

- **The cylinder head and camshaft caps are line-bored as a matched set and must be replaced together.**

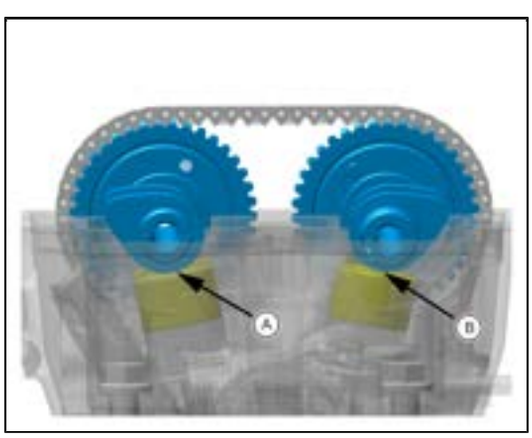
3. Installing camshaft



a. Place the intake and exhaust camshafts onto the cylinder head with the cam lobes splayed outwards.

b. Engage the timing chain with the timing sprockets.

4. Inspecting and adjusting valve clearance



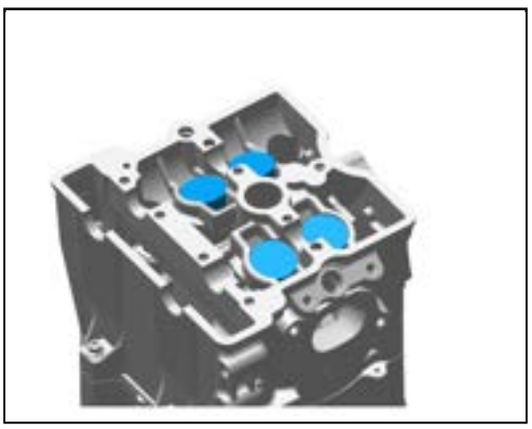
a. Measure valve clearances A and B using a feeler gauge.

b. Repeat the procedure until all 4 valves have been checked

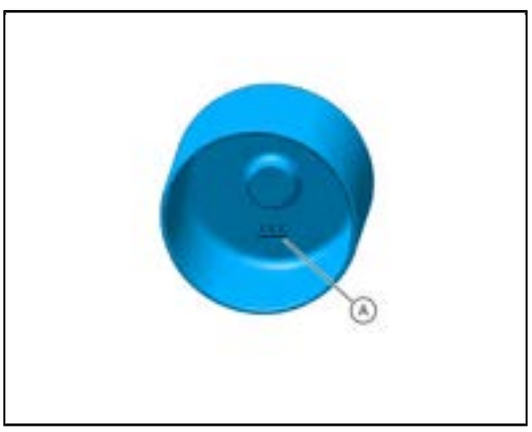
Measure the valve clearance when the engine is cold	
Exhaust	0.2 - 0.3 mm
Intake Valve	0.1 - 0.2 mm

CAUTION:

- **If the valve clearance is out of specification, remove the camshaft cover and camshaft, and adjust the clearance**



c. Remove the tappet for any valve that does not meet the required clearance



d. Note the three-digit number A marked on the bottom of the tappet

e. Compare the recorded valve clearance with the three-digit number on the tappet, and select an appropriate tappet for replacement based on the method below

f. Subtract the required valve clearance from the measured value. Example: 0.27 mm − 0.20 mm = 0.07 mm

g. Divide the three-digit number on the tappet by 100: 520 ÷ 100 = 5.20 mm

h. Add the results from the two steps: 0.07 mm + 5.20 mm = 5.27 mm

i. Multiply the sum by 100 to get the correct tappet specification: 5.27 mm × 100 = 527

j. Refer to the tappet specification table and select the tappet closest to the calculated value. Since size 527 is unavailable, round up and select tappet 528

CAUTION:

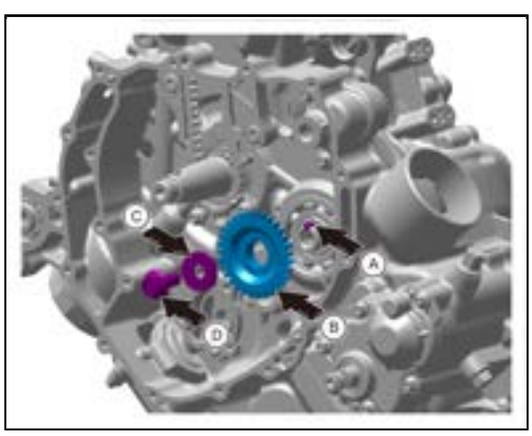
- **Valve clearance specifications and measurements must be in millimetres (mm). A 480 tappet corresponds to a tappet thickness of 4.80 mm**

k. Tappet Specifications

Part Number	F01-A20007-	001	002	003	004	005	006	007	008	009
Three-Digit Number		480	482	484	486	488	490	492	494	496

Part Number	F01-A20007-	010	011	012	013	014	015	016	017	018
Three-Digit Number		498	500	502	504	506	508	510	512	514
Part Number	F01-A20007-	019	020	021	022	023	024	025	026	027
Three-Digit Number		516	518	520	522	524	526	528	530	532
Part Number	F01-A20007-	028	029	030	031	032	033	034	035	036
Three-Digit Number		534	536	538	540	542	544	546	548	550
Part Number	F01-A20007-	037	038	039	040	041	042	043	044	045
Three-Digit Number		552	554	556	558	560	562	564	566	568
Part Number	F01-A20007-	046	047	048	049	050	051			
Three-Digit Number		570	572	574	576	578	580			

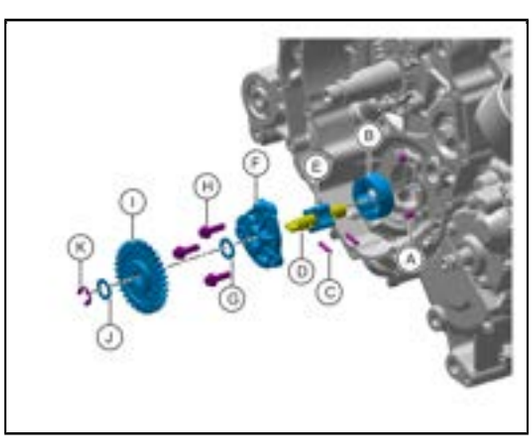
5. Installing the oil pump and gears



a. Install parallel key A and oil pump drive gear B on to the balance shaft.

b. Apply a suitable threadlocker to the leading threads of mounting bolt D, fit plain washer C, and tighten the bolt.

Torque: 59.0 ± 3.7 ft-lbs (80 ± 5 N·m).



c. Install the 2 dowel pins A into their corresponding bores in the left crankcase half.

d. Place the oil pump outer rotor B into the corresponding bore in the left crankcase assembly. Insert the P4×15.8 C needle roller into the lower hole of the inner rotor E, then fit the inner rotor on to the oil pump shaft D, ensuring that the needle roller is correctly seated in the inner rotor groove.

e. Install the oil pump shaft assembly into the oil pump outer rotor.

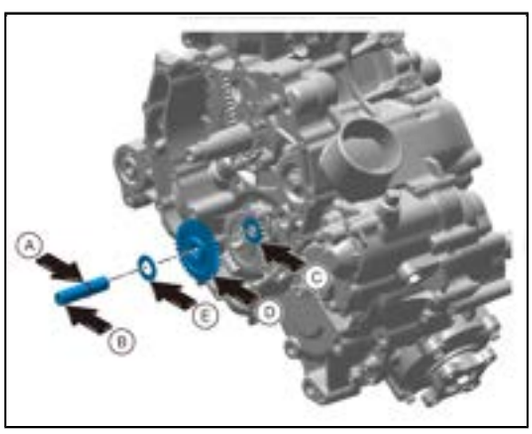
f. Spray the oil pump outer rotor with a suitable amount of engine oil, align the dowel pins, position the oil pump cover F, and install the 3 oil pump cover mounting bolts H.

Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).

g. Fit the 12×20×1 G plain washer to the oil pump shaft. Insert the P4×15.8 C needle roller into the upper hole in the oil pump shaft, then install the oil pump driven gear I, ensuring that the needle roller is correctly seated in the bore of the driven gear. Fit the other 12×20×1 J plain washer, then use long-nose pliers to install the circlip K in the upper groove of the oil pump shaft. Rotate the oil pump driven gear and check that it turns freely without binding.

NOTICE:

- **Ensure that the marked side of the oil pump driven gear faces outwards.**
- **After installation, rotate the oil pump driven gear and check that it turns freely without binding.**

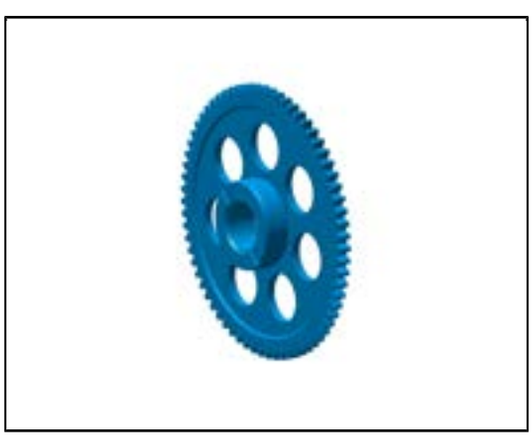


h. Using circlip pliers, install external circlip 15 A in the groove of the oil pump idler gear shaft.

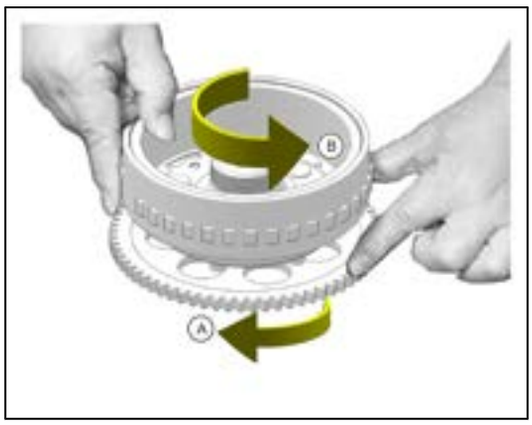
i. Fit the 15×28×1 washer C, oil pump idler gear D and 15×28×1 washer E, in that order, to the shorter end of the oil pump idler gear shaft opposite the circlip.

j. Install the assembled oil pump idler gear shaft into the corresponding bore in the crankcase, ensuring that the idler gear fully meshes with the oil pump driven gear and oil pump drive gear.

6. Installing the magneto assembly

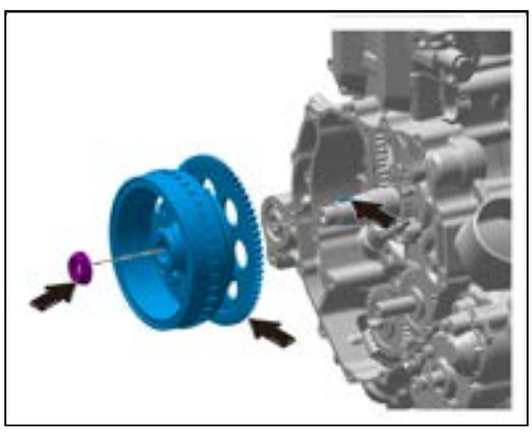


a. Inspect the one-way gear prior to installation. Replace the one-way gear if worn or damaged.



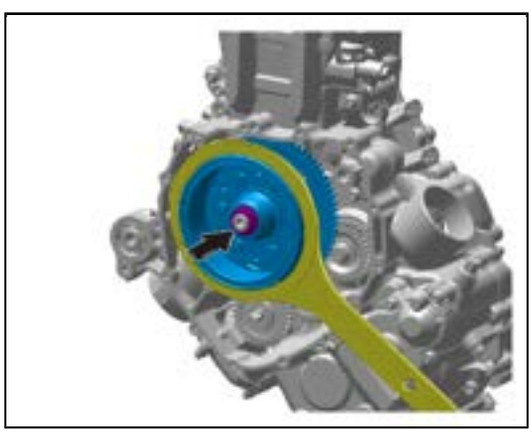
b. Install the starter one-way gear into the overrunning clutch.

c. Rotate the magneto rotor in the direction of Arrow B, and rotate the one-way gear in the opposite direction (Arrow A). It should rotate smoothly without abnormal noise and lock firmly in the reverse direction, indicating normal starter one-way clutch operation.



d. Using a copper hammer, tap the Woodruff key into the slot at the front end of the crankshaft. Ensure that the front edge sits slightly lower than the rear edge and that the key is secure.

e. Align the keyway in the magneto rotor assembly with the Woodruff key on the front of the crankshaft, and install the rotor onto the crankshaft.



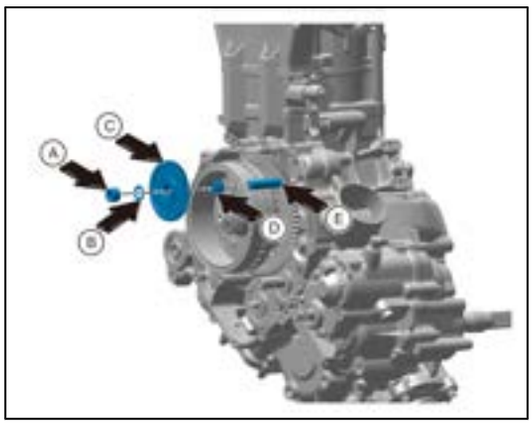
f. Apply a continuous bead of threadlocker to the leading threads on the magneto end of the crankshaft, and install the retaining nut.

g. Use the magneto rotor holding tool to tighten the magneto rotor retaining nut.

SST: Magneto rotor holding tool

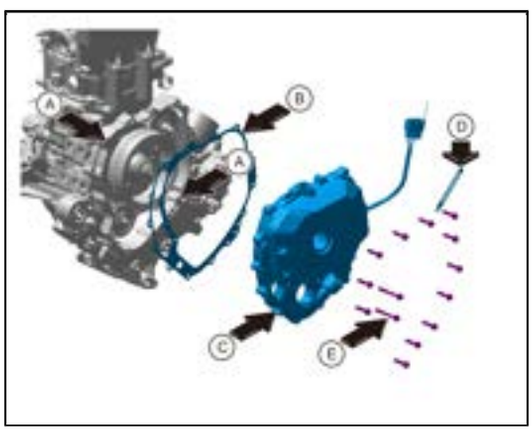
Torque: 132.8 ± 5.9 ft-lbs (180 ± 8 N·m).

CAUTION:
• After installation, check that the starter driven gear assembly rotates clockwise only and does not rotate anticlockwise.



h. Fit bush A 12×18×12, plain washer B 12×20×1, needle roller D K121616 and the compound gear assembly C to the compound gear shaft E in that order.

i. Install the assembled compound gear shaft into the corresponding bore in the crankcase, ensuring that the compound gear assembly fully meshes with the starter driven gear assembly and the oil pump drive gear.



j. Wipe the mating surfaces of the left crankcase and cover with a lint-free cloth, install the 2 parallel pins A into their corresponding bores in the left crankcase, and fit a new left crankcase cover gasket B.

NOTICE:

- **The gasket is single-use only and must be replaced with a new one during installation.**

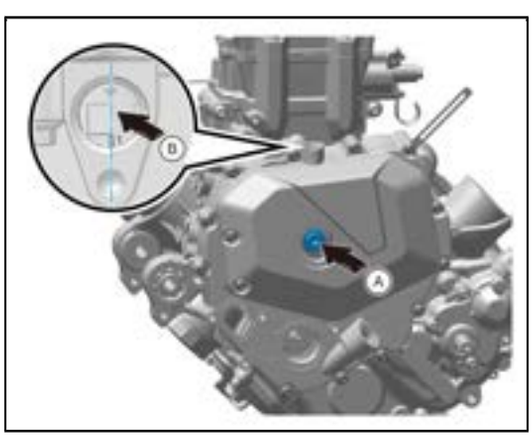
k. Using a sealant gun, apply a suitable sealant around the magneto lead grommet on the left crankcase cover. Fit the left crankcase cover assembly C to the left crankcase, then install the harness bracket D and the 14 left crankcase cover mounting bolts E.

Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).

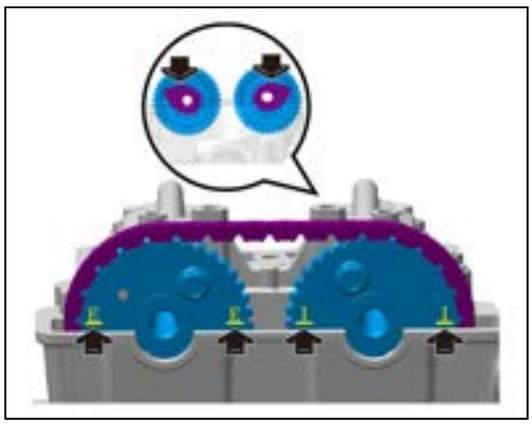
CAUTION:

- **Do not omit the harness bracket.**

7. Timing Adjustment



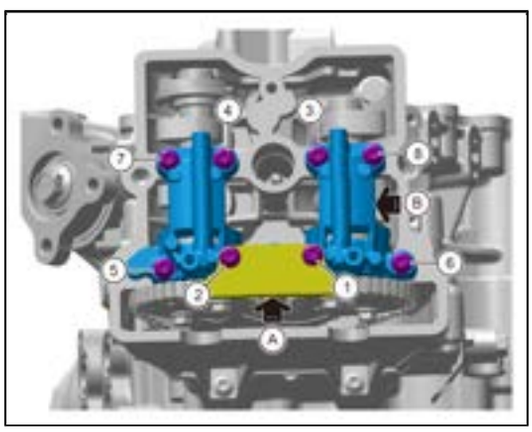
a. Use a socket on the magneto rotor retaining nut A to rotate the crankshaft counterclockwise until the piston is at Top Dead Center (TDC) and the flywheel TDC mark B is aligned with or centered in the crankshaft position sensor mounting hole.



b. Ensure the intake and exhaust camshaft lobes are pointing outwards and upwards.

c. Lift the timing chain to disengage it from the intake side, and adjust the camshaft angle until the intake cam 'I-I' mark is parallel with the cylinder head mating surface.

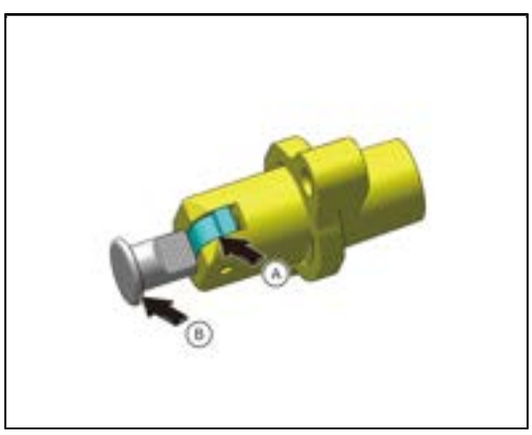
d. Adjust the camshaft angle until the exhaust cam 'E-E' mark is parallel with the cylinder head mating surface.



e. Install the camshaft cover B and chain guide assembly II A onto the cylinder head, and tighten the 8 camshaft cover mounting bolts in the sequence shown in the illustration.

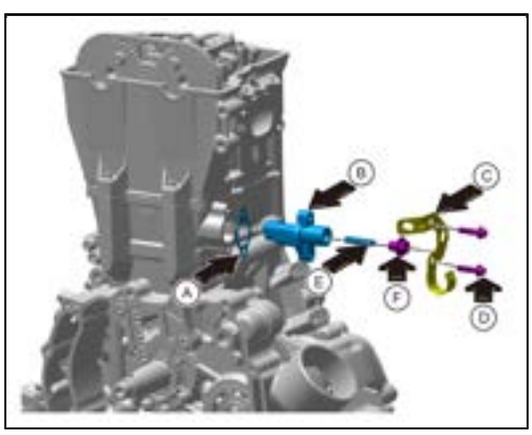
Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).

NOTICE:
• Bolts ①-② specification: M6×65.
• Bolts ③-⑧ specification: M6×35.



f. Depress the stopper A to release the ratchet, and push the pushrod B back into the tensioner body.

CAUTION:
• When installing the tensioner, ensure the stopper A is facing downwards.



g. Fit tensioner gasket A onto the cylinder block.

h. Install tensioner B with the line retaining plate C onto the cylinder block, and secure with mounting bolts D.

i. Insert rod spring E into the tensioner and install adjusting bolt F.

Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).

NOTICE:
• The gasket is single-use only and must be replaced with a new one during installation.

CAUTION:

- After installation, rotate the crankshaft to verify it turns freely without binding.
- Verify the timing marks: the intake side 'I-I' mark and exhaust sprocket 'E-E' mark must be parallel to the mating surface, the piston at TDC, the camshaft lobes pointing outwards and upwards, and the flywheel TDC mark aligned with or centered in the crankshaft position sensor mounting hole.
- Do not install the engine if timing marks are misaligned. Identify the cause and reassemble correctly before proceeding.

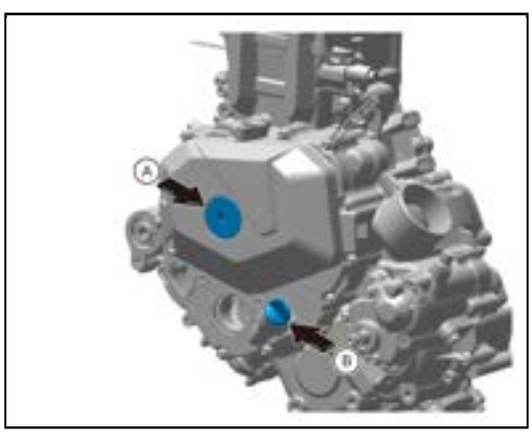


j. Install O-ring 18×3.5 on the oil dipstick.

k. Install O-ring 35×3.5 on the inspection cover.

NOTICE:

- O-rings are single-use parts and must not be reused. Always install new O-rings.
- Apply grease to the O-ring before fitting.



l. Apply a small amount of engine oil to the inspection cover O-ring, then install the inspection cover A on the left crankcase cover assembly.

Torque: 8.9 ± 1.5 ft-lbs (12 ± 2 N·m).

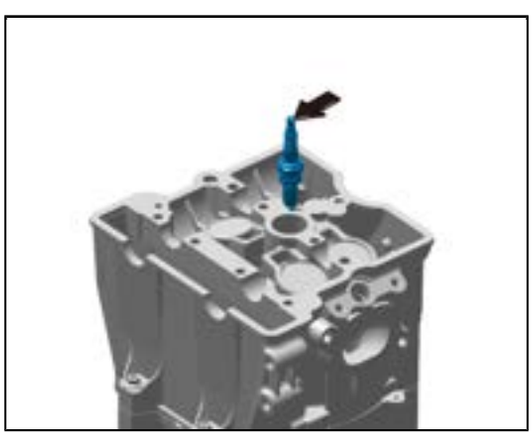
m. Apply a small amount of engine oil to the oil dipstick O-ring, then install the oil dipstick B in the left crankcase cover assembly.

8. To install the cylinder head cover, See: Cylinder Head Cover.
9. To install the ignition coil assembly, See: Ignition Coil Assembly.
10. To install the coolant pump assembly, See: Coolant Pump Assembly.
11. To install the crankshaft position (CKP) sensor, See: Crankshaft Position (CKP) Sensor.
12. To install the throttle body, See: Throttle Body.
13. To install the air cleaner assembly, See: Air Cleaner Assembly.
14. To install the rear cargo box assembly, See: Rear Cargo Box Assembly.
15. To refill engine with oil, See: Refilling Engine Oil.
16. To fill with coolant, See: Coolant Draining and Refilling.
17. To connect the negative battery, See: Battery Power Connection/Disconnection Procedure.
18. To bleed the cooling system, refer to See: Cooling System Bleeding Procedure.

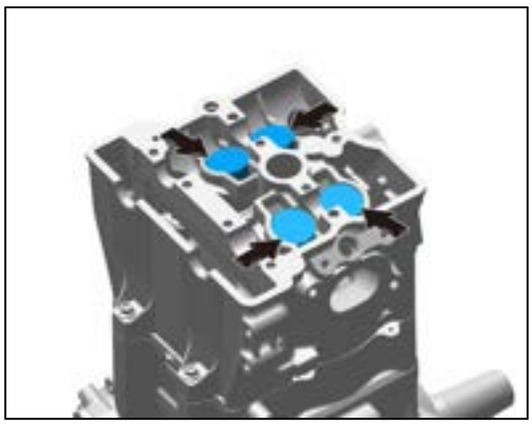
3.2.6.5 Cylinder Head and Valves

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To drain the coolant, See: Coolant Draining and Refilling.
3. To drain the engine oil, See: Draining Engine Oil.
4. To relieve the fuel system pressure, See: Relieving Fuel System Pressure.
5. To remove the rear cargo box assembly, See: Rear Cargo Box Assembly.
6. To remove the air cleaner assembly, See: Air Cleaner Assembly.
7. To remove the throttle body, See: Throttle Body.
8. To remove the intake manifold, See: Intake Manifold.
9. To remove the exhaust downpipe assembly, See: Exhaust Downpipe Assembly.
10. To remove the fuel injector, See: Fuel Injector.
11. To remove the crankshaft position (CKP) sensor, See: Crankshaft Position (CKP) Sensor.
12. To remove the coolant pump assembly, See: Coolant Pump Assembly.
13. To remove the thermostat assembly, See: Thermostat Assembly.
14. To remove the coolant hose connector, See: Coolant Hose Connector.
15. To remove the engine coolant temperature (ECT) sensor, See: Engine Coolant Temperature (ECT) Sensor.
16. To remove the ignition coil assembly, See: Ignition Coil Assembly.
17. To remove the cylinder head cover, See: Cylinder Head Cover.
18. To remove the timing mechanism, magneto, and oil pump assembly, See: Timing Mechanism, Magneto, and Oil Pump Assembly.
19. Removing the cylinder head and valves



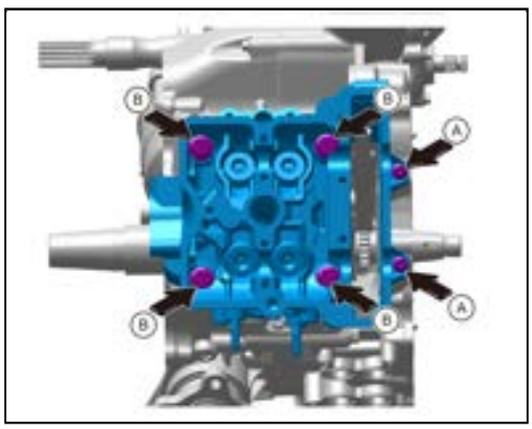
a. Remove and Extract the Spark Plug



b. Remove the 4 valve tappets.

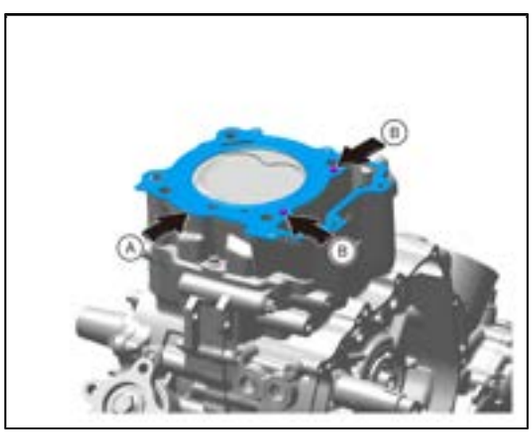
CAUTION:

- **Mark the Installed Position of Each Valve Tappet, or Arrange Them According to Their Original Positions to Prevent Misassembly**



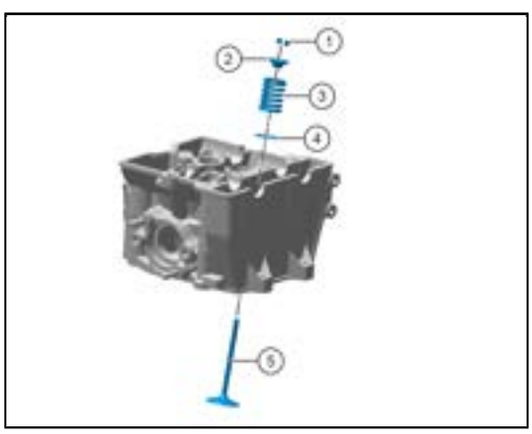
c. Remove the 2 cylinder head mounting bolts A.

d. Remove the 4 cylinder head mounting bolts B and remove the cylinder head.



e. Remove Cylinder Head Gasket Assembly A

f. Remove the 2 locating dowels B.

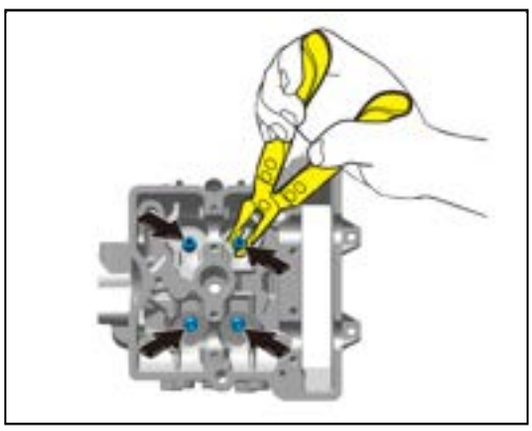


g. Compress the Valve Spring Using a Valve Spring Compressor

h. Remove in Sequence: Valve Collet ①, Valve Spring Retainer ②, Valve Spring ③, Valve Spring Seat ④, and Valve ⑤

NOTICE:

- Remove the Remaining Valve Assemblies in the Same Manner
  Mark the Installed Position of Each Component Set, or Arrange Removed Parts by Their Original Positions to Prevent Confusion with Other Components



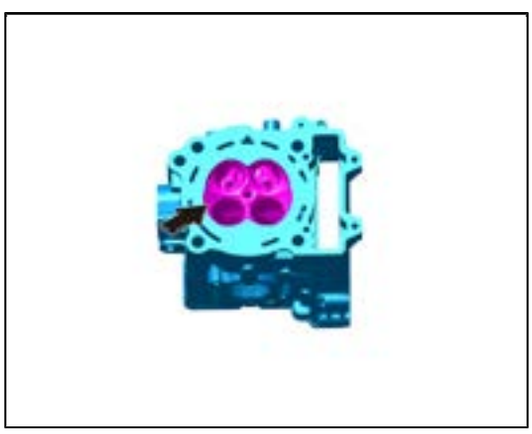
i. Remove the 4 valve stem seals using valve stem seal pliers.

CAUTION:

- Valve Stem Seals are Single-Use and Must Be Replaced with New Ones During Installation

Clean and Inspect

1. Clean the cylinder head

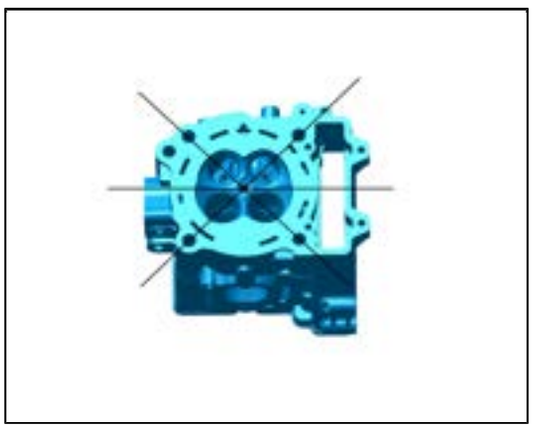


a. Remove all carbon deposits from the combustion chambers and valve areas using a carbon cleaner.

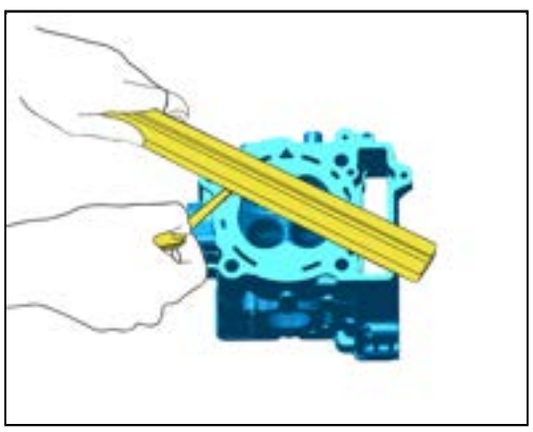
CAUTION:

- Do not clean the cylinder head with a metal scraper, coarse wire brush, or abrasive cleaner, as this could damage the cylinder head.
- Thoroughly clean the cylinder head surface before inspection, removing all traces of gasket material and carbon build-up.

2. Inspecting cylinder head



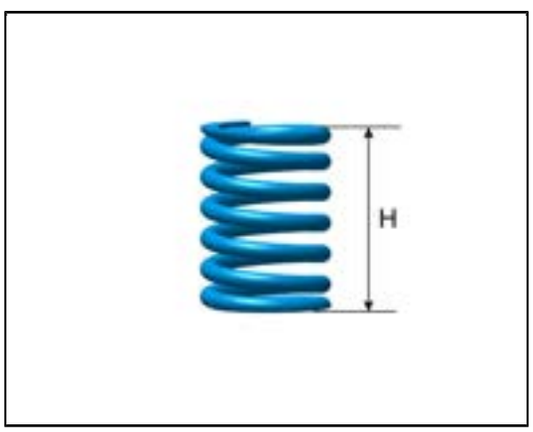
a. Check flatness by placing a straightedge along the mating surfaces in the specified directions: lengthwise, crosswise, and diagonally.



b. Use a feeler gauge to measure the gap between the straightedge and the mating surface. The flatness limit for the cylinder head bottom face is 0.05 mm.

CAUTION:
• Replace the cylinder head if its lower face flatness exceeds the service limit.

3. Inspecting the valve springs

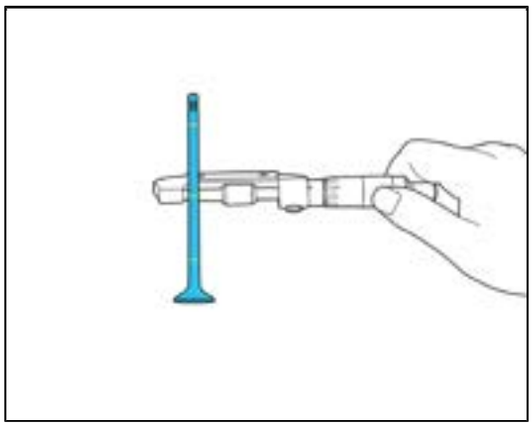


a. Use a vernier caliper to measure the free length of each valve spring and compare it to the standard value.

Standard value: 42.5 mm

Service limit: 41.4 mm

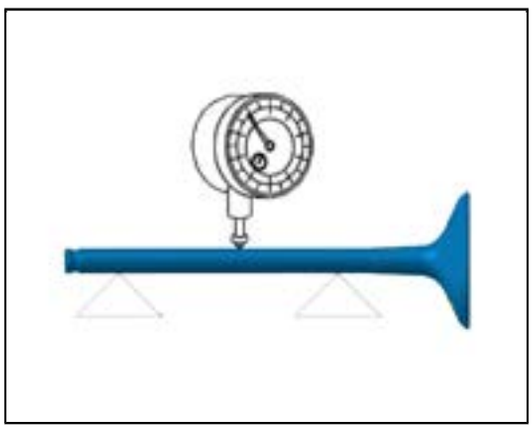
4. Inspecting the valves/valve guides



a. Measure the valve stem diameter at three locations with a micrometer, then measure again at 90° to the first set, making six measurements in total. Compare with the standard values.

Exhaust valve stem diameter: 5.455–5.470 mm

Inlet valve stem diameter: 5.475–5.490 mm

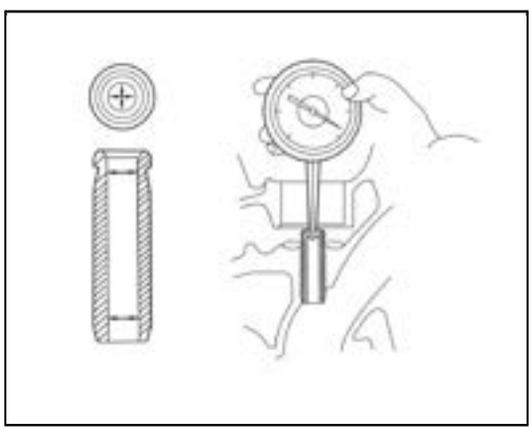


b. Inspect the valve stem tip and valve collet groove for any signs of wear or damage.

c. Check for valve stem bending by placing the valve in V-blocks and measuring with a dial indicator.

CAUTION:

- **Valves can typically be reconditioned or refaced. However, if they are severely worn, burnt, bent, or damaged, they must be replaced.**



d. Measure the internal diameter of the valve guide at three points using an internal micrometer, then measure again at 90° to the first set, for a total of six measurements. Compare with the standard values.

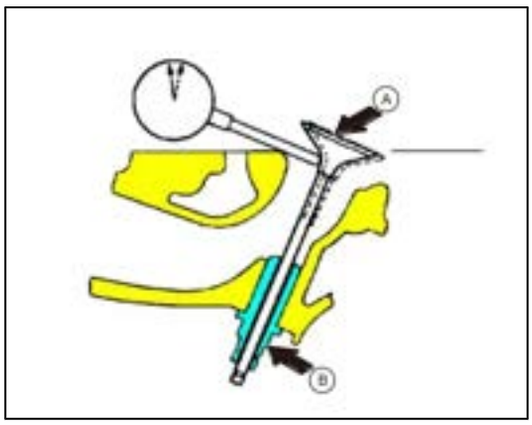
Valve guide internal diameter: 5.500–5.515 mm

CAUTION:

- **Ensure all valve guides and valves are measured. The valve guides cannot be replaced independently; replace the complete cylinder head assembly.**

NOTICE:

- **If a small internal micrometer is unavailable, measure the valve-to-guide clearance using the rocking method to check for valve guide wear, as described below.**



e. Insert a new valve (A) into guide (B). Position a dial indicator on the valve, perpendicular to the valve stem, near the cylinder head mating surface.

f. Move the valve back and forth to measure the valve-to-guide clearance, and repeat the measurement at a right angle to the first direction.

g. Valve-to-guide clearance (rocking method) is as follows:

Exhaust standard clearance: 0.09– 0.17 mm; service limit: 0.34 mm

Inlet standard clearance: 0.03– 0.11 mm; service limit: 0.28 mm

CAUTION:

- **The reading does not reflect the true valve-to-guide clearance, as the measuring point is located above the guide.**
- **If the reading exceeds the service limit, replace the cylinder head and camshaft cap assembly.**

5. Inspecting the valve seats

a. Apply marking compound to the valve face. Insert the valve into the corresponding valve seat and rotate quickly clockwise.

b. Remove the valve and check that the valve seat shows a full, properly-sized contact mark.

c. Valve seat contact outside diameter:

Exhaust: 31.8–31.9 mm

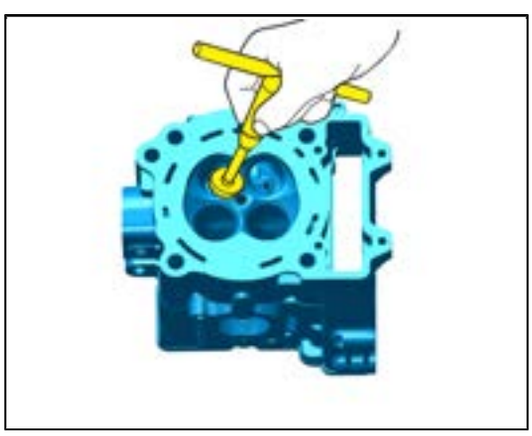
Inlet: 36.8–36.9 mm

d. Seat contact width:

Exhaust: 1.5–1.6 mm

Inlet: 1.0–1.1 mm

6. Recondition the valve seats.

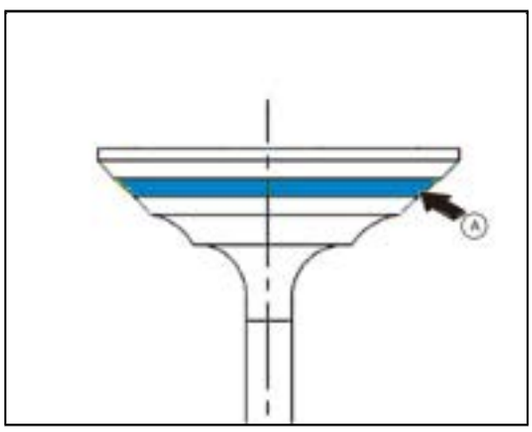


a. Insert the pilot into the valve guide and apply cutting oil to both the seat and the cutter.

b. Attach the 46° cutter to the pilot head, make a light cut, and inspect the machined area of the seat.

NOTICE:

- If the contact area is less than 75% of the seat circumference, rotate the pilot 180° and perform another light cut.
- If the cutter touches an unmachined part of the seat, check the pilot. Check for burrs, scratches, or misalignment. If the pilot is bent, it must be replaced.
- If the cutter contacts the same position continuously, the valve guide is deformed due to improper installation.
- If the contact area after the initial cut is greater than 75%, continue cutting until all pitting is removed and a new contact surface appears.



c. Apply a thin layer of Prussian blue to the valve seat. Insert the valve into the guide and gently seat it several times.

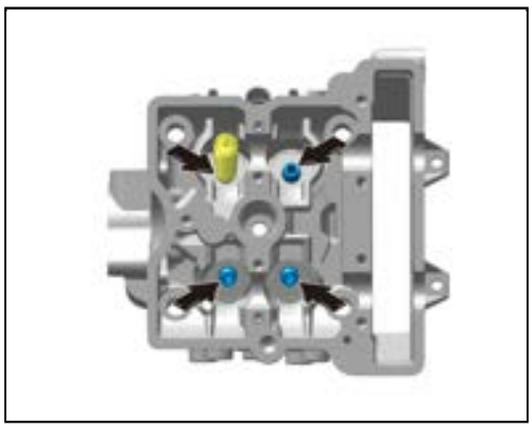
d. Remove the valve and check where the Prussian blue marks contact between the seat and the valve face. The seat should contact the centre or slightly above the centre of the valve, with the correct width.

NOTICE:

- If the indicated seat contact is at the top edge of the valve face and touches edge area A, the contact point is too high. Use a 30° cutter to lower the seat.
- If it is too low, use a 60° cutter to raise the seat. When the contact area is centred on the valve face, measure the seat width.
- If the seat contact is too wide or uneven, use the top and bottom cutters to reduce the seat width.
- If the seat contact is too narrow, use a 45° cutter to widen it. After each cut, recheck the valve face contact and seat width.

Installation Procedure

1. Installing the cylinder head

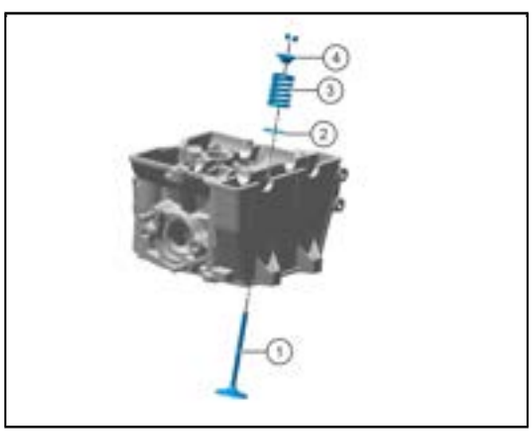


a. Apply Engine Oil to the Sealing Lip of the Valve Stem Seal and to the Internal Retaining Clip

b. Align the valve stem seal with the valve guide, and use a valve stem seal installer to press it fully into place.

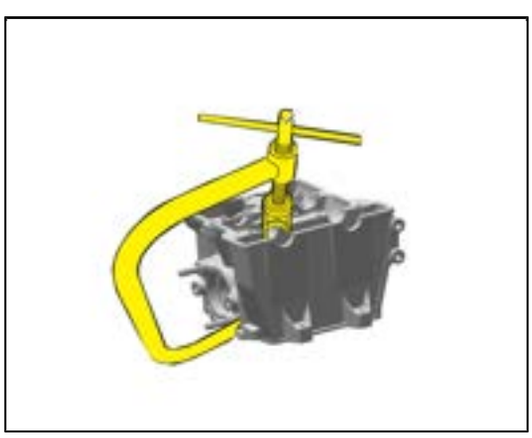
CAUTION:

- **When Fitting the Oil Seal Spring, Ensure it is Correctly Positioned and the Sealing Lip Remains Undamaged**



c. Apply Engine Oil to the Valve Stem Seat and Tip, and Gently Insert the Valve into the Guide According to Marks, Pushing Fully Home

d. Install in Sequence: Intake/Exhaust Valve ①, Valve Spring Seat ②, Valve Spring ③, and Valve Spring Retainer④



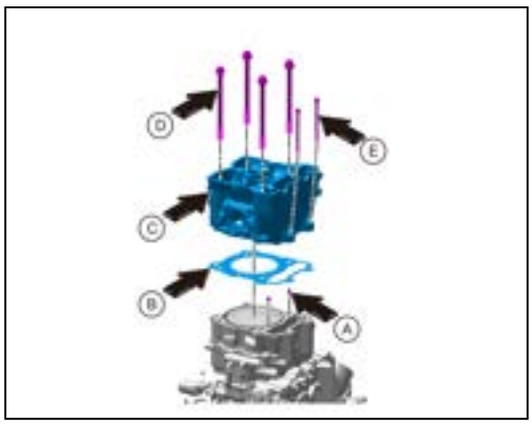
e. Using a Valve Spring Compressor, Compress the Spring so the Tool Head Sits Securely on the Upper Retainer. Rotate the Handle Clockwise Until the Collet Seating Position is Exposed

f. Apply a Small Amount of Grease to Both Sides of the Collets. Using a Small Flat-Bladed Screwdriver, Hold and Insert the Collets into the Valve Groove

g. Slowly Release the Valve Spring Compressor and Remove the Tool

NOTICE:

- **After Installation, Tap the Valve Spring Lightly to Ensure Collets are Properly Seated**
  Install the Remaining Valve Assemblies in the Same Manner



h. Fit the 2 dowel pins A into the cylinder head and install a new cylinder head gasket assembly B.

i. Install cylinder head assembly C onto the dowel pins, install the 4 cylinder head mounting bolts D, and tighten them in a crisscross pattern in multiple stages.

Step 1 Torque: 12 N·m (8.8 ft-lbs)

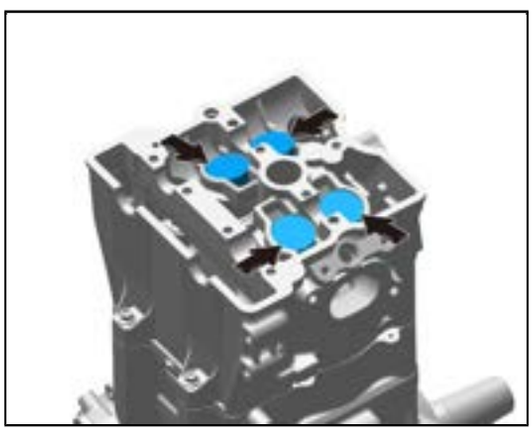
Step 2 Torque: 35 N·m (25.8 ft-lbs)

Step 3: Tighten an additional 180°

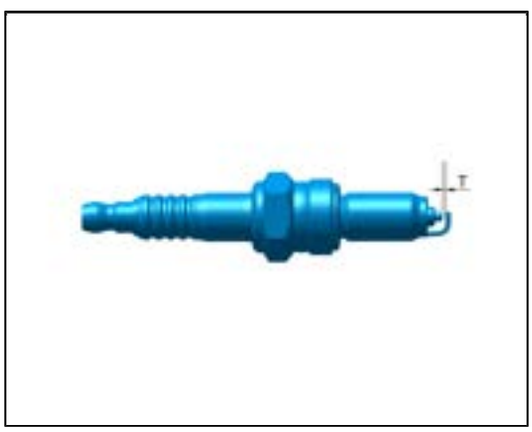
j. Install the 2 cylinder head side mounting bolts E.

Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).

CAUTION:
• Cylinder Head Gasket Assembly is Single-Use and Must Be Replaced with a New One After Removal



k. Install the 4 valve tappets.



l. Check the Spark Plug Electrode Gap with a Feeler Gauge (0.6– 0.8 mm). Replace with a New Spark Plug if Out of Specification



m. Install and Tighten the Spark Plug

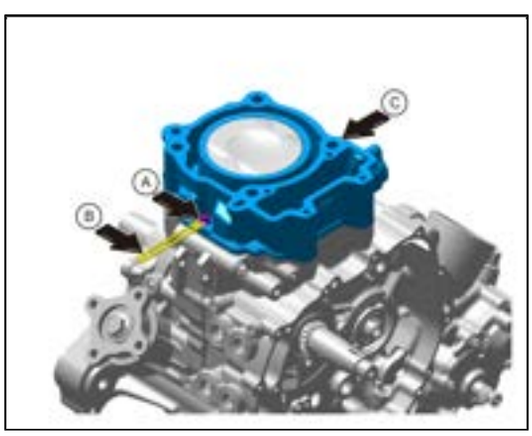
Torque: 9.6 ± 1.5 ft-lbs (13 ± 2 N·m).

2. To install the timing mechanism, magneto, and oil pump assembly, See: Timing Mechanism, Magneto, and Oil Pump Assembly.
3. To install the cylinder head cover, See: Cylinder Head Cover.
4. To install the ignition coil assembly, See: Ignition Coil Assembly.
5. To install the engine coolant temperature (ECT) sensor, See: Engine Coolant Temperature (ECT) Sensor.
6. To install the coolant hose connector, See: Coolant Hose Connector.
7. To install the thermostat assembly, See: Thermostat Assembly.
8. To install the coolant pump assembly, See: Coolant Pump Assembly.
9. To install the crankshaft position (CKP) sensor, See: Crankshaft Position (CKP) Sensor.
10. To install the exhaust downpipe assembly, See: Exhaust Downpipe Assembly.
11. To install the intake manifold, See: Intake Manifold.
12. To install the throttle body, See: Throttle Body.
13. To install the fuel injector, See: Fuel Injector.
14. To install the air cleaner assembly, See: Air Cleaner Assembly.
15. To install the rear cargo box assembly, See: Rear Cargo Box Assembly.
16. To refill engine with oil, See: Refilling Engine Oil.
17. To fill with coolant, See: Coolant Draining and Refilling.
18. To connect the negative battery, See: Battery Power Connection/Disconnection Procedure.
19. To bleed the cooling system, refer to See: Cooling System Bleeding.

3.2.6.6 Cylinder Block and Piston

Removal Procedure

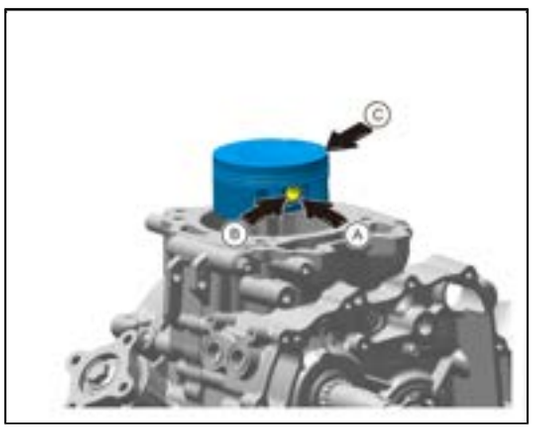
1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To drain the coolant, See: Coolant Draining and Refilling.
3. To drain the engine oil, See: Draining Engine Oil.
4. To relieve the fuel system pressure, See: Relieving Fuel System Pressure.
5. To remove the rear cargo box assembly, See: Rear Cargo Box Assembly.
6. To remove the air cleaner assembly, See: Air Cleaner Assembly.
7. To remove the throttle body, See: Throttle Body.
8. To remove the intake manifold, See: Intake Manifold.
9. To remove the exhaust downpipe assembly, See: Exhaust Downpipe Assembly.
10. To remove the fuel injector, See: Fuel Injector.
11. To remove the crankshaft position (CKP) sensor, See: Crankshaft Position (CKP) Sensor.
12. To remove the coolant pump assembly, See: Coolant Pump Assembly.
13. To remove the thermostat assembly, See: Thermostat Assembly.
14. To remove the coolant hose connector, See: Coolant Hose Connector.
15. To remove the engine coolant temperature (ECT) sensor, See: Engine Coolant Temperature (ECT) Sensor.
16. To remove the ignition coil assembly, See: Ignition Coil Assembly.
17. To remove the cylinder head cover, See: Cylinder Head Cover.
18. To remove the timing mechanism, magneto, and oil pump assembly, See: Timing Mechanism, Magneto, and Oil Pump Assembly.
19. To remove the cylinder head and valves, See: Cylinder Head and Valves.
20. Removing the piston



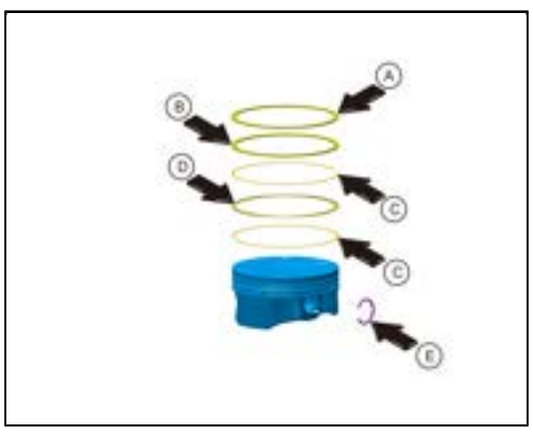
a. Remove cylinder assembly mounting bolt A, then remove plastic-coated cable clip B and cylinder assembly C.



b. Remove cylinder block gasket A and the 2 dowel pins B.



c. Remove piston pin circlip A, then withdraw piston pin B and piston C.



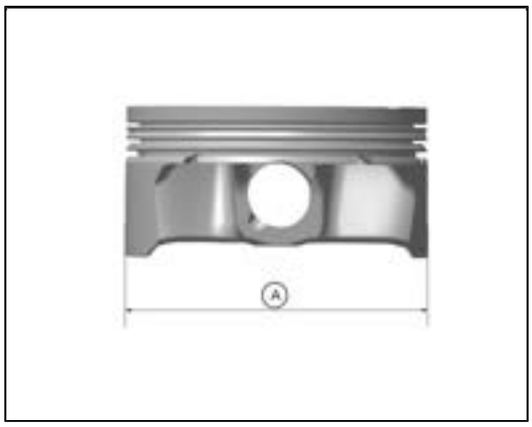
d. Remove top compression ring A, second compression ring B, upper and lower oil control rails C, and oil control rail expander D.

e. Remove piston pin circlip E from the opposite side.

Installation Procedure

CAUTION:
• Before installation, inspect all parts for damage or deterioration. Renew any defective parts and clean all reusable parts.

1. Inspecting the piston



a. Inspect the piston outer diameter

b. Measure the outer diameter A of each piston 5 mm above the bottom of the piston, perpendicular to the piston pin.

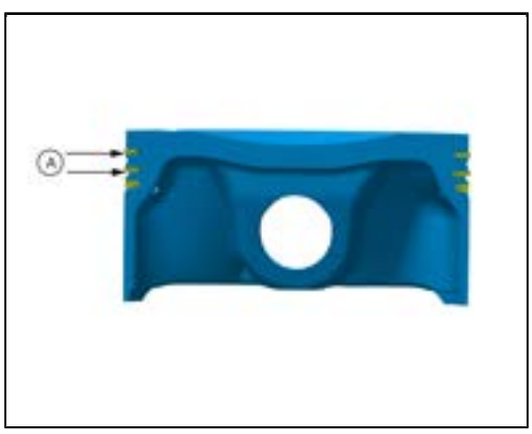
Piston Diameter		
Standard	I	98.931 - 98.941 mm
	II	98.939 - 98.949 mm
Service limit	I	98.81 mm
	II	98.82 mm

CAUTION:

- **If the measurement is below the service limit, replace the piston.**

c. Subtract the piston outer diameter from the cylinder bore diameter to obtain the piston-to-cylinder clearance.

Standard: 0.051 to 0.069 mm



d. Inspect the ring lands for uneven groove wear.

e. The piston rings must be perfectly parallel to the groove faces. If they are not, replace the piston and all piston rings.

f. Insert the piston ring into the groove and use a feeler gauge to measure the piston ring-to-groove clearance at position A in several places.

Piston ring-to-groove clearance	
First Compression Ring	0.020 - 0.060 mm
Second Compression Ring	0.020 - 0.060 mm
Service limit	0.12 mm

NOTICE:

- **If the piston ring groove clearance exceeds the service limit, measure the piston ring thickness and groove width as outlined below to determine whether to replace the piston rings, the piston, or both.**



g. Use a vernier caliper to measure the width of the piston ring groove at several points around its circumference.

Piston Ring Groove Width	
First Compression Ring	1.22 - 1.25 mm
Second Compression Ring	1.22 - 1.25 mm
Service limit	1.32 mm

CAUTION:

- **If the width of either piston ring groove exceeds the service limit at any point, replace the piston.**

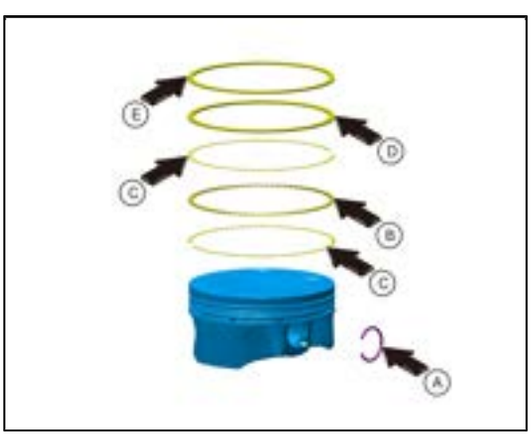
h. Use a micrometer to measure the thickness of each piston ring at several points around its circumference.

Piston Ring Thickness	
First Compression Ring	1.17 - 1.19 mm
Second Compression Ring	1.17 - 1.19 mm
Service limit	1.10 mm

CAUTION:

- **When fitting new piston rings to a used piston, check the wear of the piston ring grooves for evenness. The piston rings must be perfectly parallel to the sides of the ring grooves. If they are not, replace the piston.**

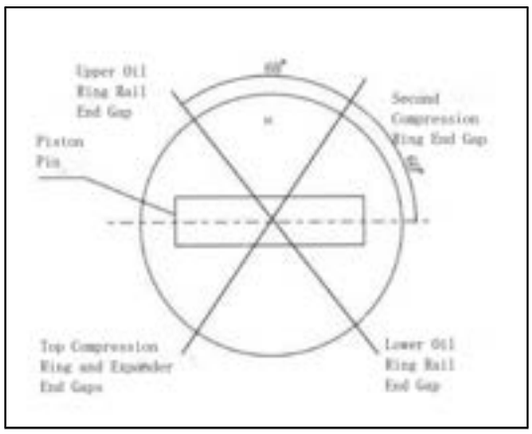
2. Installing the piston



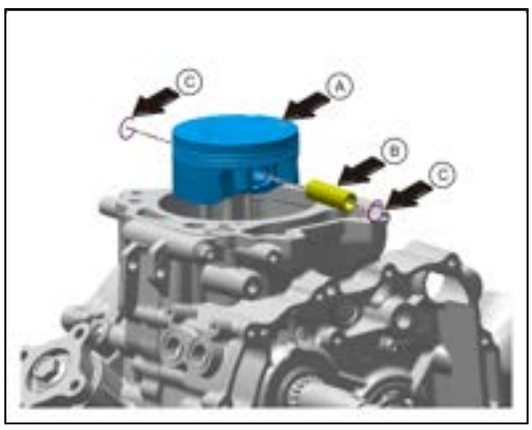
a. Using long-nose pliers, fit piston pin circlip A into the circlip groove in the piston pin bore. Make sure the circlip gap is not aligned with the notch in the circlip groove.

b. Fit expander ring B into the lowest oil control rail groove of the piston, then fit one scraper rail C above and one below the expander ring.

c. Fit second compression ring D into the middle ring groove of the piston, then fit the top compression ring E into the upper ring groove.



d. Position the piston rings correctly. Make sure the markings on the compression rings face upwards. Stagger the ring gaps 120° apart. Do not position any ring gap in line with the piston pin bore, or on the inlet or exhaust side.

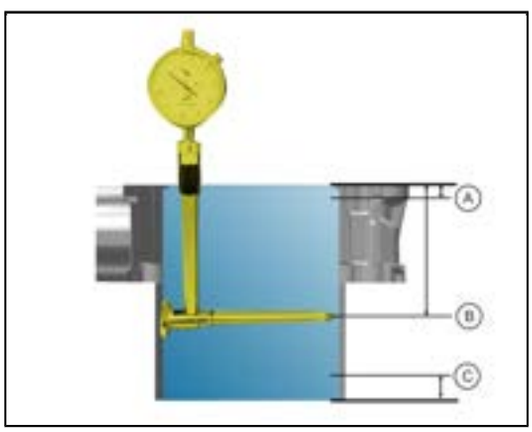


e. Fit piston A to the crankshaft and connecting rod assembly. Insert piston pin B, then fit piston pin circlip C using long-nose pliers.

CAUTION:

- **The "EX" mark on the piston must face the exhaust side of the engine, namely the oil cooler side.**

3. Inspecting the cylinder block



a. Inspect the cylinder bore diameter

b. As cylinder wear varies, use a dial bore gauge to measure the front-to-rear and side-to-side diameters at the three positions shown in the illustration (6 measurements in total).

Measurement position A: 10 mm from the top surface of the cylinder block.

Measurement position B: 60 mm from the top surface of the cylinder block.

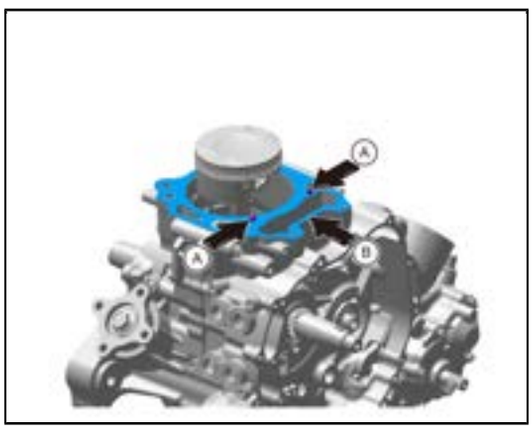
Measurement position C: 20 mm from the bottom surface of the cylinder block.

Cylinder bore diameter		
Standard	I	98.992 - 99.0000 mm
	II	99.000 - 99.008 mm
Service limit	I	99.08 mm
	II	99.09 mm

CAUTION:

- If any cylinder bore diameter measurement exceeds the service limit, replace the cylinder block.

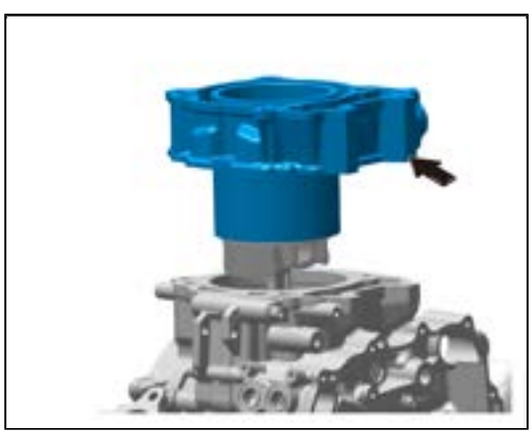
4. Installing the cylinder block



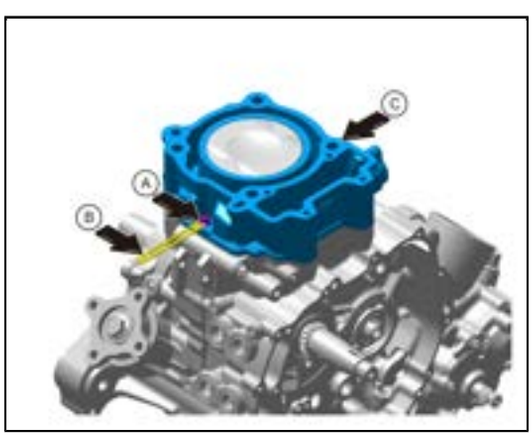
a. Install the 2 dowel pins A and cylinder block gasket B.

NOTICE:

- The cylinder block gasket is a single-use part. Always fit a new gasket during installation.



b. Position the cylinder block for installation, then carefully guide the piston into the cylinder bore. Press the cylinder block down until it seats against the crankcase.



c. Position cylinder block A on the crankcase.

d. Insert mounting bolt B through plastic-coated cable clip C, install it in the specified position, and tighten.

Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).

5. To install the cylinder head and valves, See: Cylinder Head and Valves.
6. To install the timing mechanism, magneto, and oil pump assembly, See: Timing Mechanism,

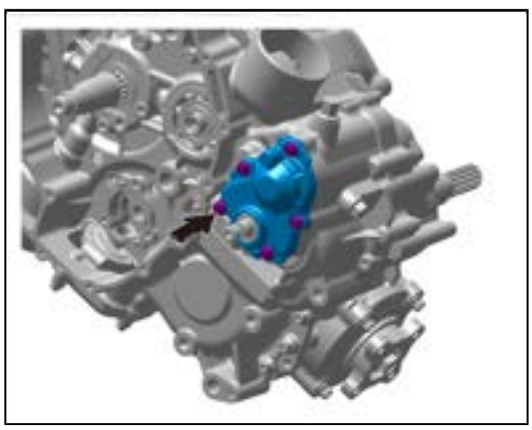
Magneto, and Oil Pump Assembly.

7. To install the cylinder head cover, See: Cylinder Head Cover.
8. To install the ignition coil assembly, See: Ignition Coil Assembly.
9. To install the engine coolant temperature (ECT) sensor, See: Engine Coolant Temperature (ECT) Sensor.
10. To install the coolant hose connector, See: Coolant Hose Connector.
11. To install the thermostat assembly, See: Thermostat Assembly.
12. To install the coolant pump assembly, See: Coolant Pump Assembly.
13. To install the crankshaft position (CKP) sensor, See: Crankshaft Position (CKP) Sensor.
14. To install the exhaust downpipe assembly, See: Exhaust Downpipe Assembly.
15. To install the intake manifold, See: Intake Manifold.
16. To install the throttle body, See: Throttle Body.
17. To install the fuel injector, See: Fuel Injector.
18. To install the air cleaner assembly, See: Air Cleaner Assembly.
19. To install the rear cargo box assembly, See: Rear Cargo Box Assembly.
20. To refill engine with oil, See: Refilling Engine Oil.
21. To fill with coolant, See: Coolant Draining and Refilling.
22. To connect the negative battery, See: Battery Power Connection/Disconnection Procedure.
23. To bleed the cooling system, refer to See: Cooling System Bleeding.

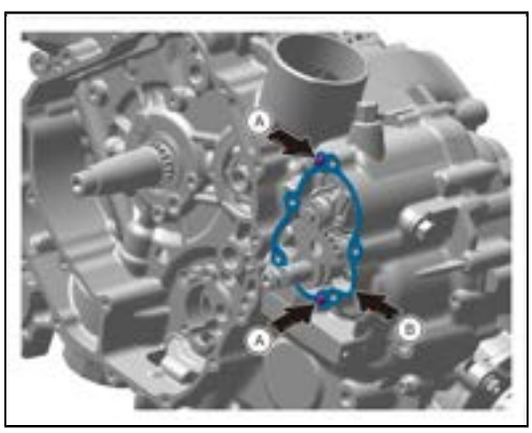
3.2.6.7 Crankcase and Transmission Assembly

Removal Procedure

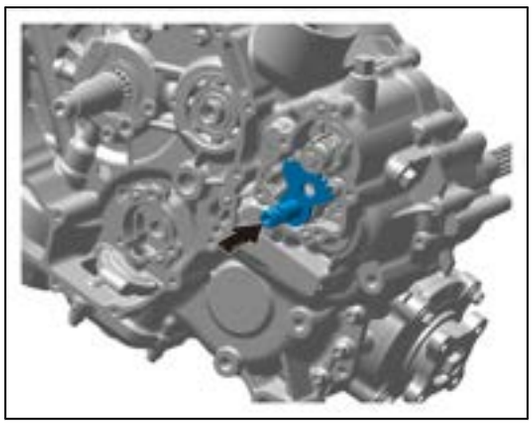
1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To drain the coolant, See: Coolant Draining and Refilling.
3. To drain the engine oil, See: Draining Engine Oil.
4. To relieve the fuel system pressure, See: Relieving Fuel System Pressure.
5. To remove the rear cargo box assembly, See: Rear Cargo Box Assembly.
6. To remove the engine assembly, See: Engine Assembly.
7. To remove external engine components, See: External Engine Components.
8. To remove the cylinder head cover, See: Cylinder Head Cover.
9. To remove timing mechanism, magneto, and oil pump assembly, See: Timing Mechanism, Magneto, and Oil Pump Assembly.
10. To remove the cylinder head and valves, See: Cylinder Head and Valves.
11. To remove cylinder block and piston, See: Cylinder Block And Piston.
12. Removing the shift mechanism



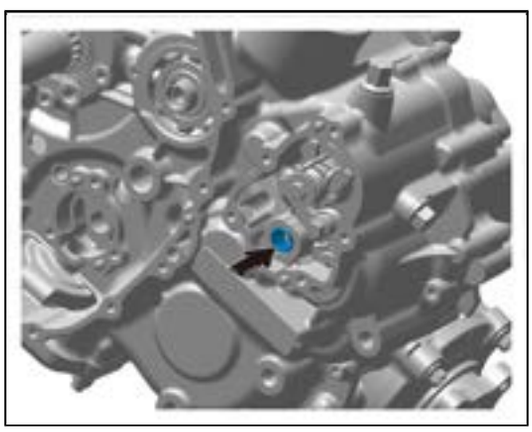
a. Remove the 5 shift shaft cover mounting bolts, then remove the shift shaft cover.



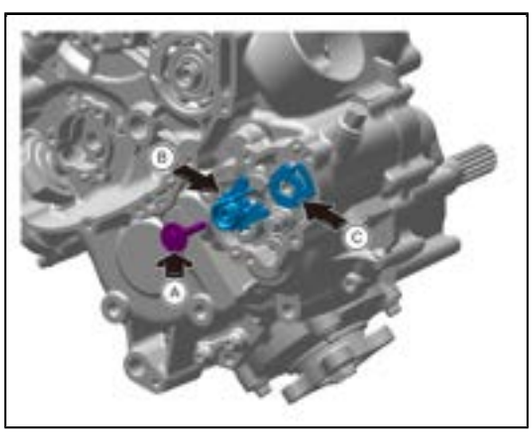
b. Remove the shift shaft cover gasket B and the 2 parallel pins A.



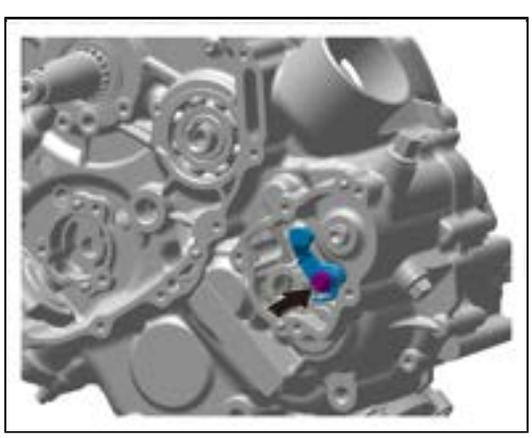
c. Remove the shift shaft assembly.



d. Remove the needle roller bearing.



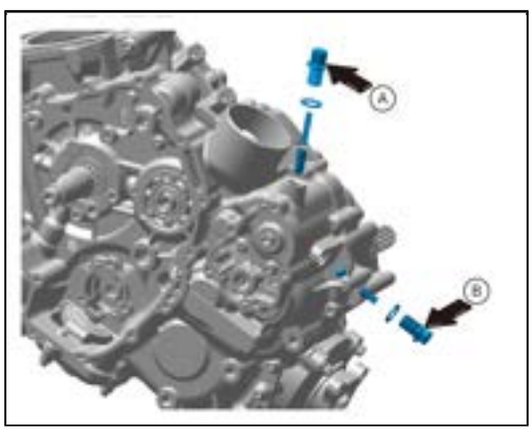
e. Remove the shift driven gear assembly mounting bolt A, then remove the shift driven gear B and shift detent wheel C.



f. Remove the mounting bolt, then remove the shift detent plate and detent plate spring.



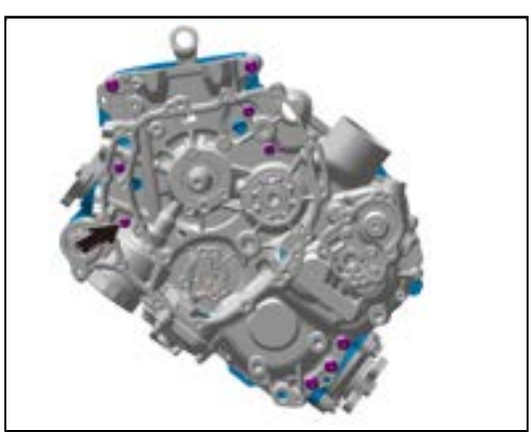
g. Remove the 15 × 25 × 5 oil seal.



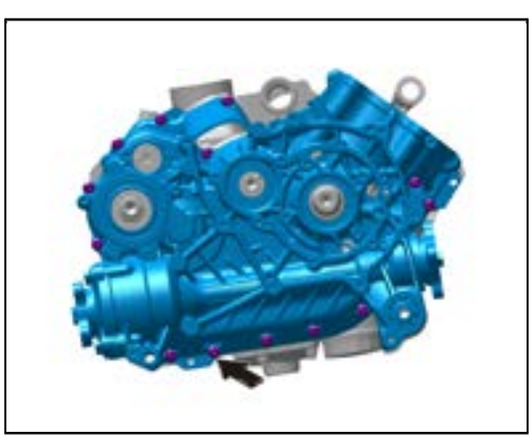
h. Remove parking detent bolt A, then remove the 14 × 21 × 1.5 aluminium washer, parking detent spring and parking pawl push pin in sequence.

i. Remove shift detent bolt B, then remove the 14 × 21 × 1.5 aluminium washer, gear position detent spring and 9.5 mm steel ball in sequence.

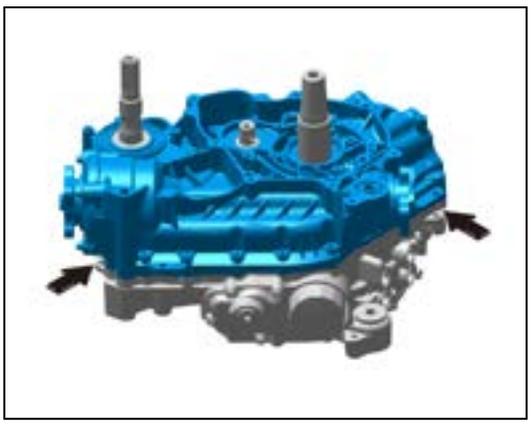
13. Removing the crankcase



a. From the left crankcase side, remove the 9 bolts securing the left crankcase to the right crankcase.



b. From the right crankcase side, remove the 13 bolts securing the right crankcase to the left crankcase.



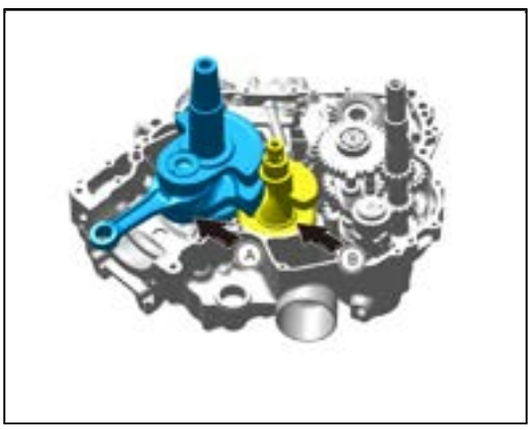
c. Turn the engine until it is horizontal.

d. Carefully separate the crankcase halves at the designated prying points, then remove the right crankcase assembly.

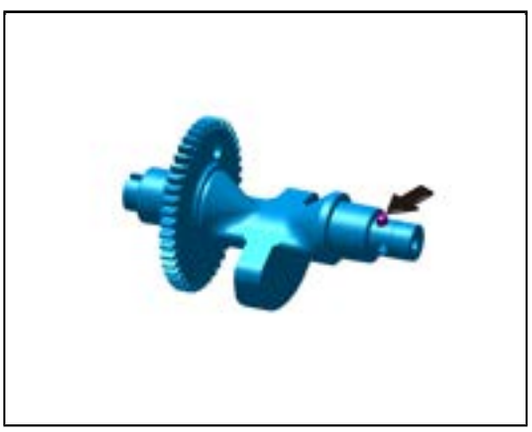
CAUTION:

- **Before removing the right crankcase assembly, make sure the engine is horizontal. This prevents components in the left crankcase from sliding out suddenly when the right crankcase assembly is removed, which may cause component damage or personal injury.**

14. Removing the crankshaft and balance shaft assemblies

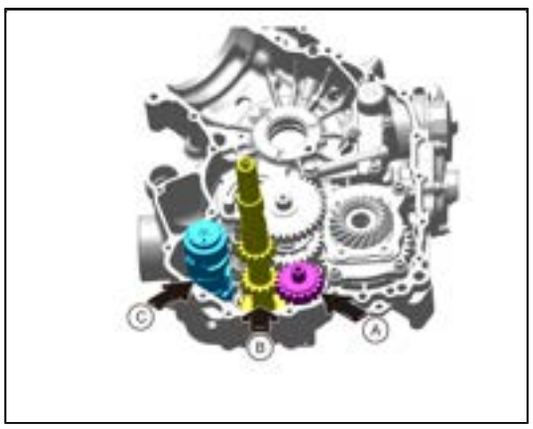


a. Remove crankshaft and connecting rod assembly A and balance shaft assembly B.



b. Remove the 6 × 10 parallel pin from the balance shaft assembly.

15.Removing the shift assembly



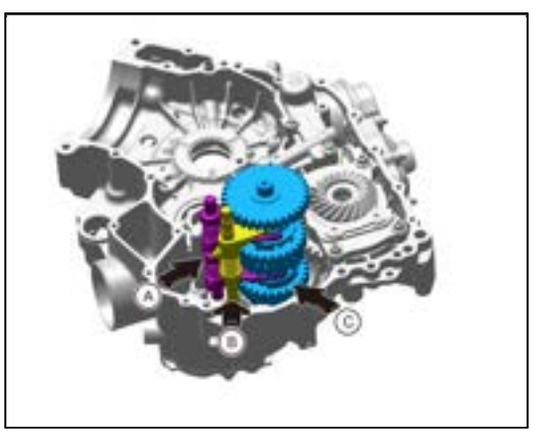
a. Remove reverse idler gear shaft assembly A from the housing.

b. Remove mainshaft B from the crankcase.

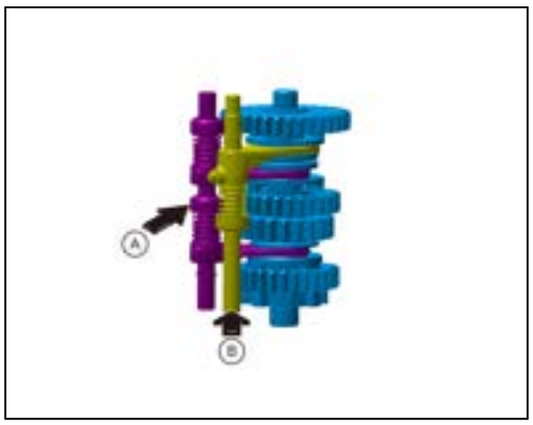
c. Remove shift drum assembly C from the gearbox.



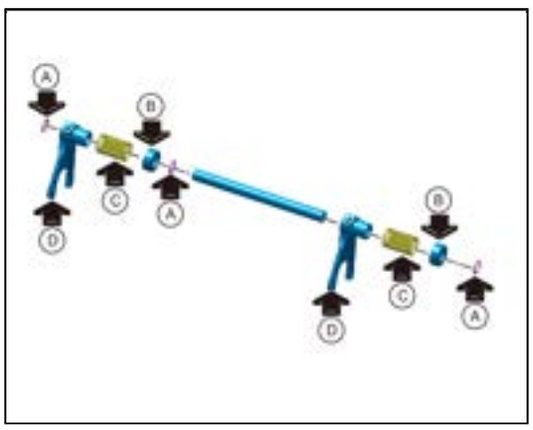
d. Sequentially remove washer A, reverse idler gear B, needle roller C, and reverse idler gear shaft D from the reverse idler gear shaft assembly.



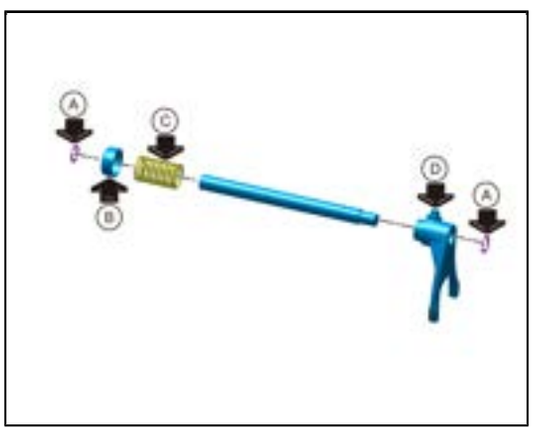
e. Remove H/R selector fork shaft assembly A, L-range selector fork assembly B, and secondary shaft assembly 2 C together from the left crankcase.



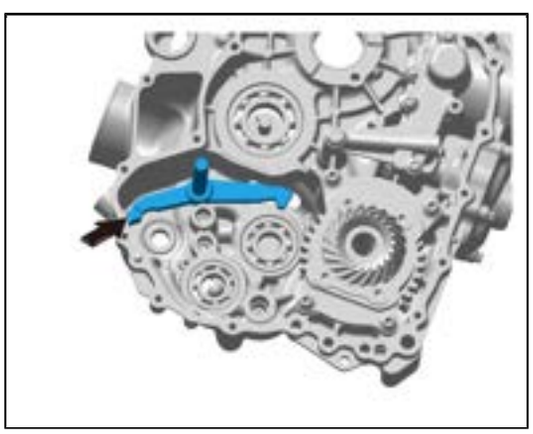
f. Remove H/R selector fork shaft assembly A and L-range selector fork assembly B from the transmission.



g. Use circlip pliers to remove the circlip A from the H/R selector fork shaft, then remove the selector fork spring seat B, spring C, and H/R selector fork D in sequence.



h. Use circlip pliers to remove the circlip A from the L selector fork shaft, then remove the selector fork spring seat B, spring C, and L selector fork D in sequence.

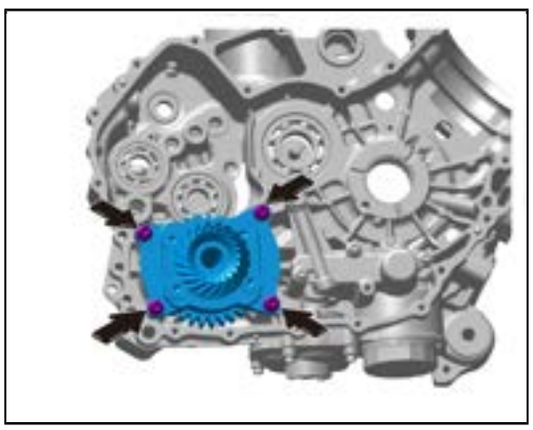


i. Remove the parking pawl assembly.

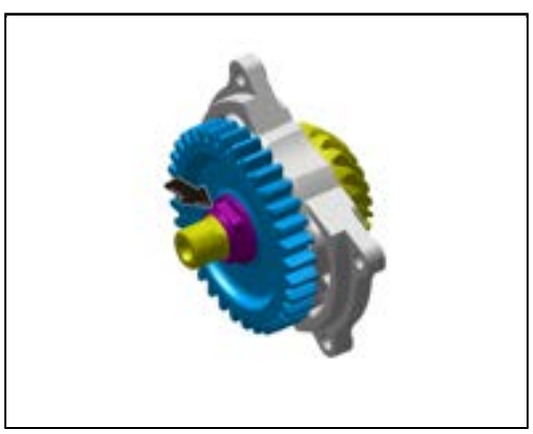


j. Using circlip pliers, remove the External Circlip A, followed by the Plain Washer B and Parking Pawl C.

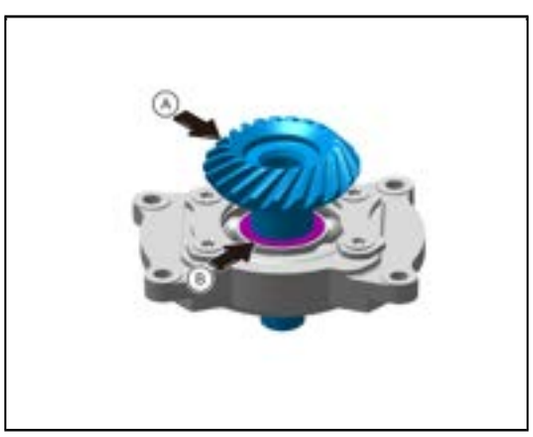
16.Removing the drive bevel gear from the housing



a. Remove the 4 bolts securing the drive bevel gear and then remove the gear.



b. Remove the nut and remove the reduction driven gear.



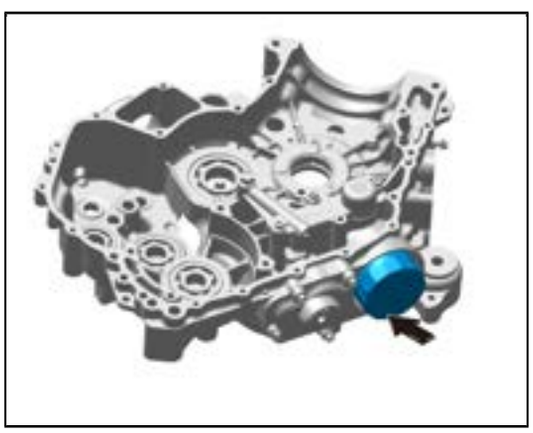
c. Remove drive bevel gear A and the corresponding shim B.



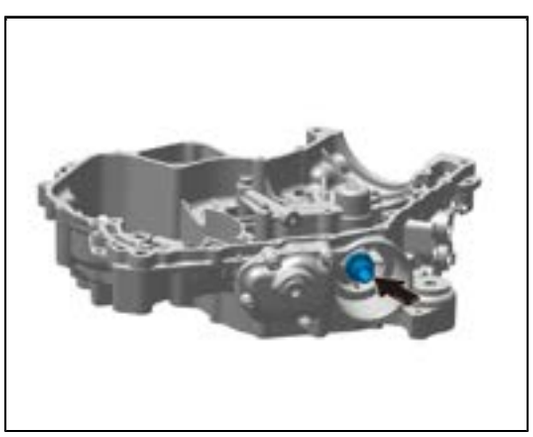
d. Remove the 4 mounting bolts from the bearing retainers, then remove the plates.

e. Press out the deep-groove ball bearing 6305P5C3.

17. Removing the lubrication system components from the engine block



a. Remove the engine oil filter.



b. Remove the oil filter adapter.

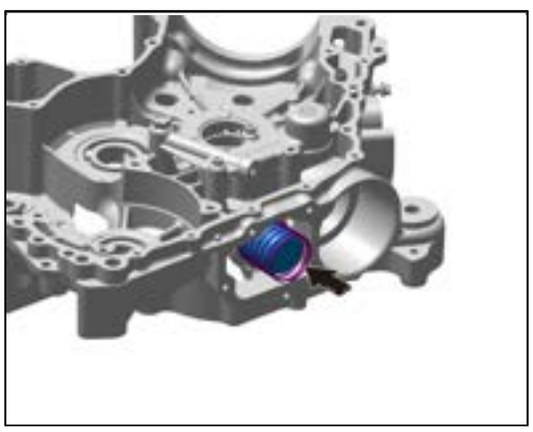


c. Remove the oil drain plug A.

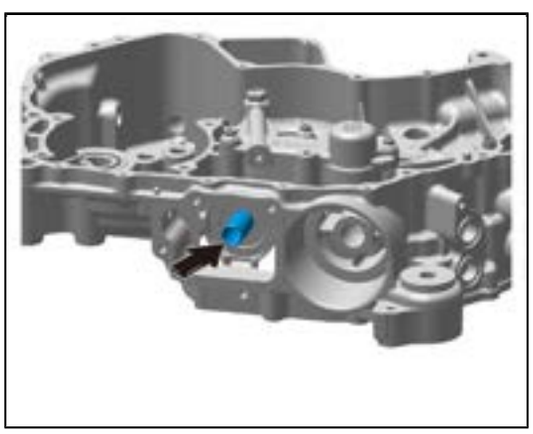
d. Remove the 4 mounting bolts B and remove the strainer cover.



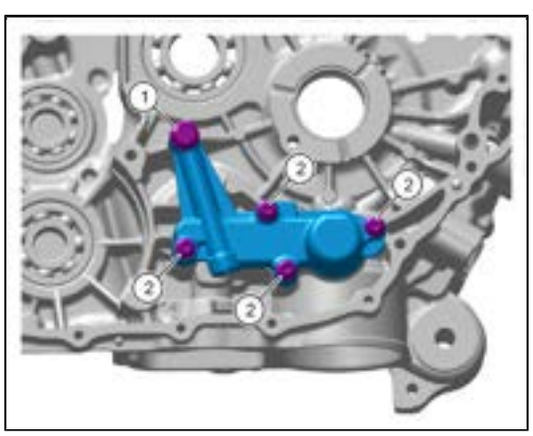
e. Remove the 82 × 3.1 O-ring.



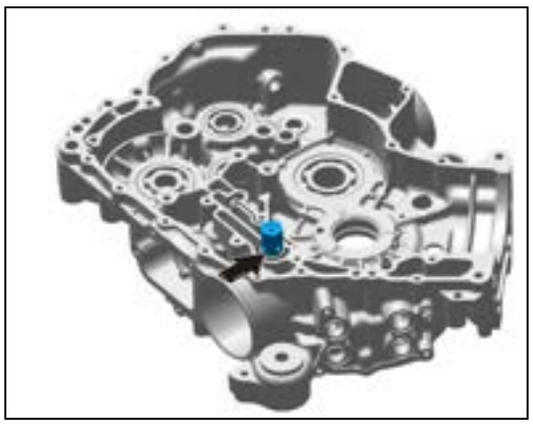
f. Remove the oil strainer spring and oil filter screen assembly.



g. Remove the oil pickup pipe from the sump.

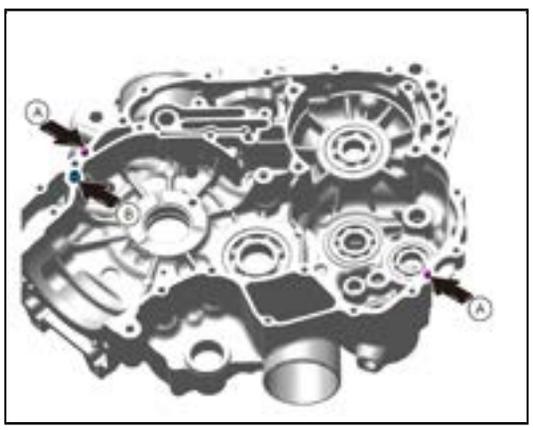


h. Remove mounting bolt ① and the 4 bolts ② from the oil pressure relief valve cover assembly.



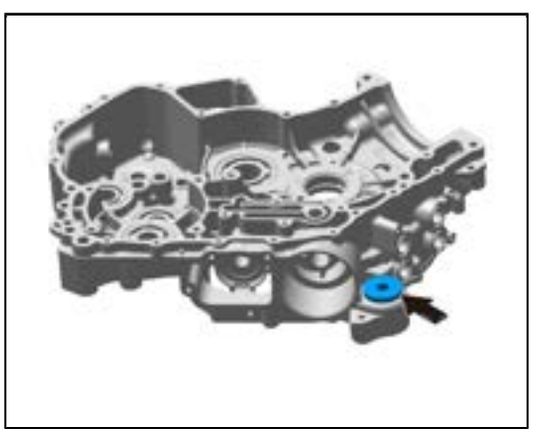
i. Remove the oil pressure relief valve assembly.

18.Removing the left crankcase

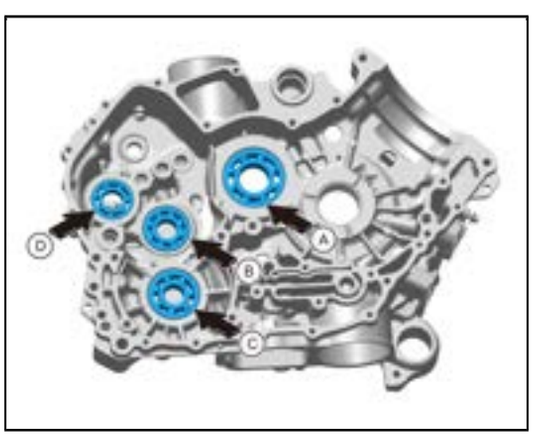


a. Remove the 2 parallel pins A from the crankcase.

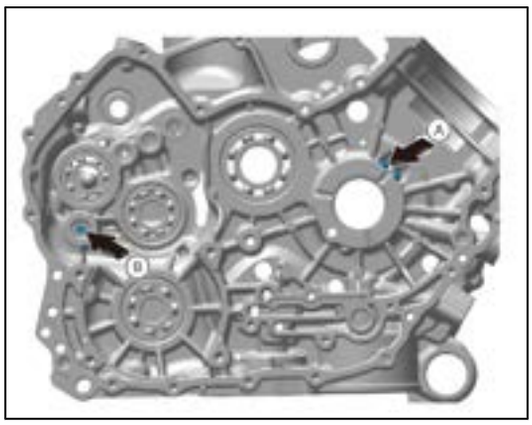
b. Remove the hollow dowel pin B.



c. Remove the rubber mount assembly from the crankcase.



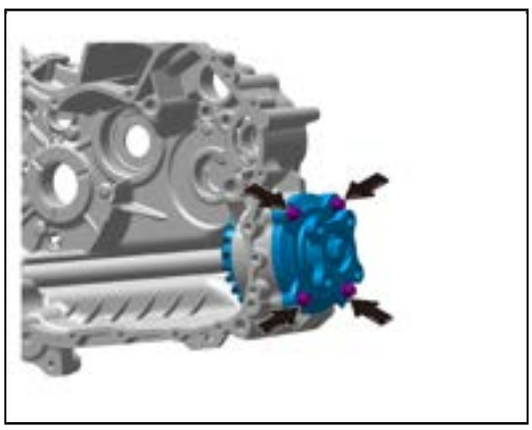
d. Remove deep-groove ball bearings A (6206), B (6204Z), C (6304), and D (6004).



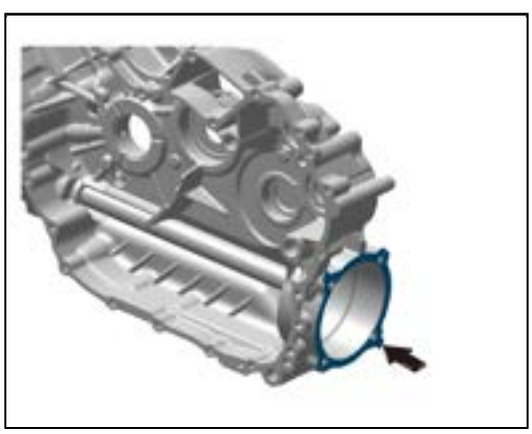
e. Remove the 2 piston oil jet plugs A from the block.

f. Remove the flow orifice B from the oil system.

19.Removing the right crankcase



a. Remove the 4 mounting bolts from the driven bevel gear bearing housing, then detach the bearing housing assembly.



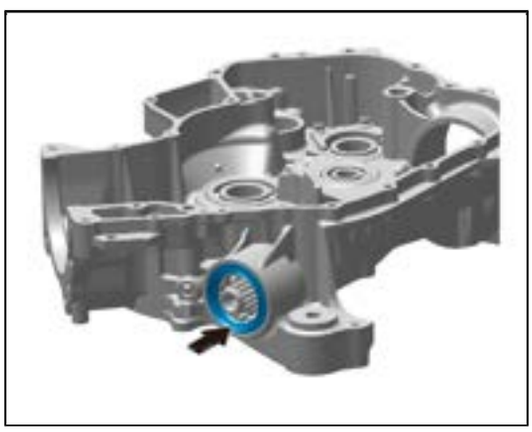
b. Remove the driven bevel gear shim.



c. Remove the 88 × 2.8 O-ring.



d. Remove the propeller shaft flange mounting bolts, then remove the flange.



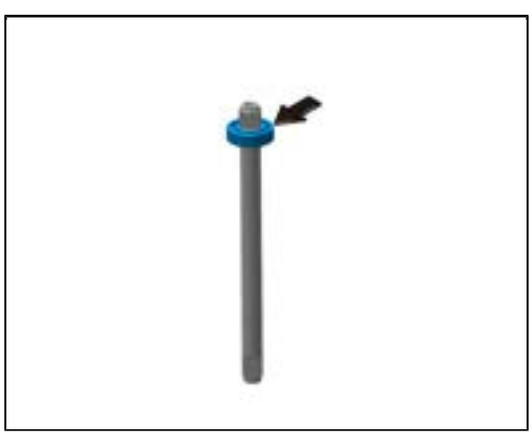
e. Remove the 44 × 60 × 7/10.5 oil seal.



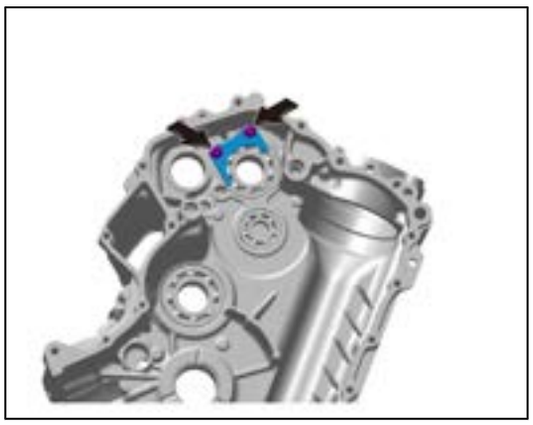
f. Use the SST to remove the M55 × 1.5 × 6 round nut.

SST: M55 (E01GZ0000006) pin spanner.

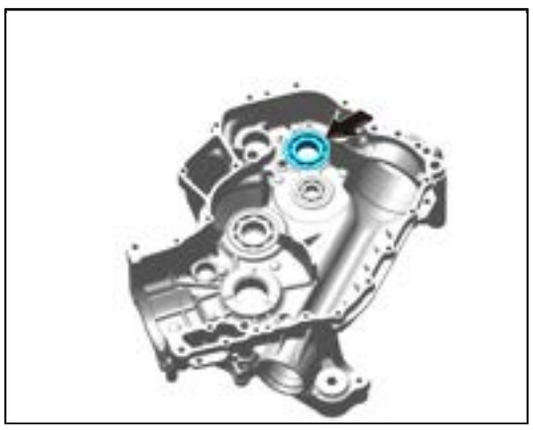
g. Extract the propeller shaft and bearing assembly.



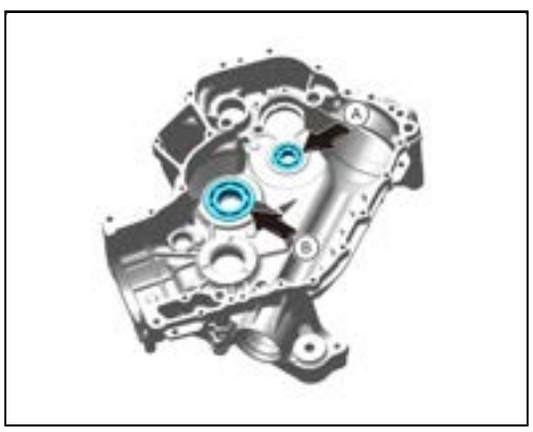
h. Remove the 6205 deep-groove ball bearing.



i. Remove the 2 bolts securing the mainshaft bearing retaining plate, then remove the retainer.



j. Remove the 62/28 deep-groove ball bearing.



k. Remove the deep-groove ball bearings A (6203) and B (6206).



l. Remove the 28 × 47 × 7 oil seal.

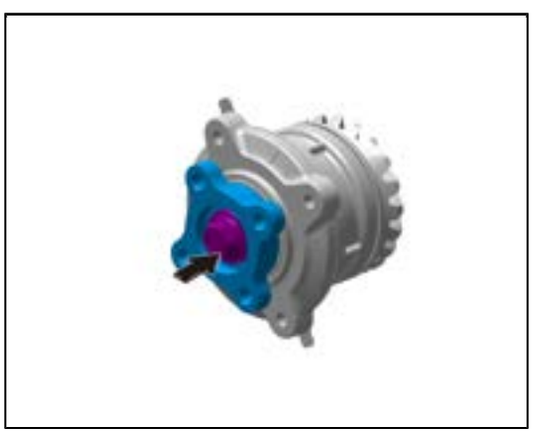


m. Remove the rubber mount assembly from the crankcase.

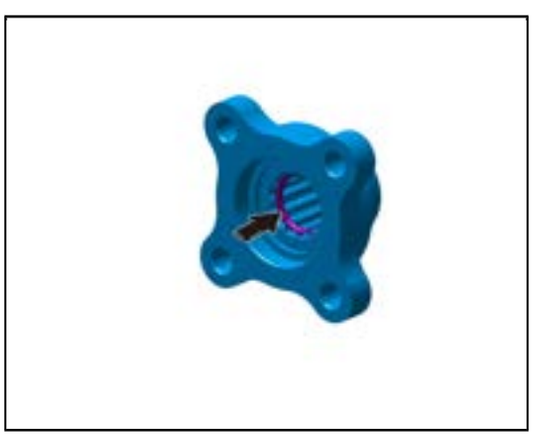
20.Disassembling the driven bevel gear bearing housing assembly



a. Remove the 88 × 2.8 O-ring.



b. Remove the propeller shaft flange mounting bolts, then remove the flange.



c. Remove the 20 × 2.65 O-ring.



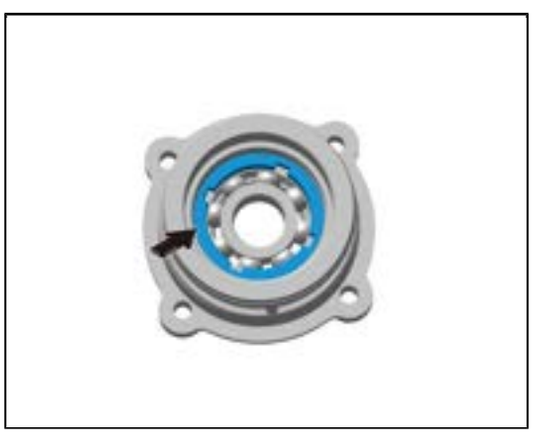
d. Remove the 44 × 60 × 7/10.5 oil seal.



e. Remove the driven bevel gear.



f. Remove the 6207 P5 C3 deep-groove ball bearing.



g. Use the SST to remove the M65 × 1.5 × 8-LH round nut.

SST: M65 (E01GZ0000007) pin spanner.



h. Remove the 6305 P5 C3 deep-groove ball bearing.

Installation Procedure

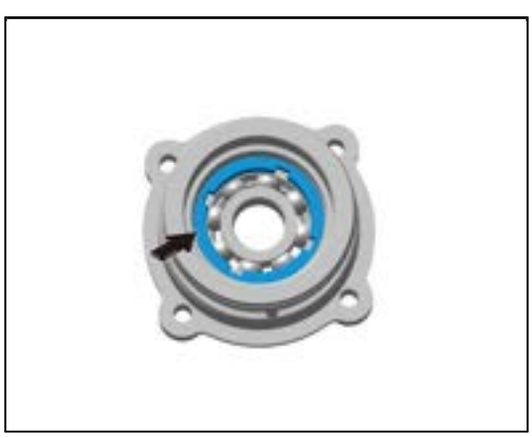
CAUTION:
• Before installation, inspect all parts for damage or deterioration. Renew any defective parts and clean all reusable parts.

1. Assembling the driven bevel gear bearing housing



a. Position the 6305 P5 C3 deep-groove ball bearing on the driven bevel gear bearing housing, ensuring the marked side faces up.

b. Place the SST onto the deep-groove ball bearing and use a press to seat the bearing fully.



c. Apply a uniform coating of threadlocker to the threads of the M65 × 1.5 × 8-LH round nut.

d. Screw the round nut in by 2-3 threads, then tighten it using the SST.

SST: M65 (E01GZ0000007) pin spanner.

Torque: 101.05 ± 5.9 ft-lbs (137 ± 8 N·m).



e. Position the 6207 P5 C3 deep-groove ball bearing on the driven bevel gear bearing housing, ensuring the marked side faces up.

f. Place the SST on the deep-groove ball bearing and use a press to seat the bearing onto the lower shoulder of the driven bevel gear bearing housing.



g. Use the SST to press the 44 × 60 × 7/10.5 oil seal into the shoulder of the driven bevel gear bearing housing bore.

SST: 44×60×7(E01GZ0000003) oil seal driver.

NOTICE:

- **The oil seal is a single-use part. Always fit a new oil seal during installation.**
- **Apply a suitable amount of retaining compound to the outer circumference of the oil seal during installation.**



h. Install the driven bevel gear.



i. Apply engine oil to O-ring A, then insert it into the internal groove of Propeller Shaft Flange B.

j. Install propeller shaft flange B and plain washer C onto the driven bevel gear, then secure with mounting bolt D.

Torque: 88.5 ± 5.9 ft-lbs (120 ± 8 N·m).

NOTICE:

- **The O-ring is a single-use part. Always replace with a new O-ring during installation.**



k. Install the 88 × 2.8 O-ring into the external groove of the driven bevel gear bearing housing.

NOTICE:

- **The O-ring is a single-use part. Always replace with a new O-ring during installation.**

2. Installing the right crankcase



a. Inspect the rubber mount assembly for wear or damage; replace with a new component if required.

Install the rubber mount assembly into the right crankcase.

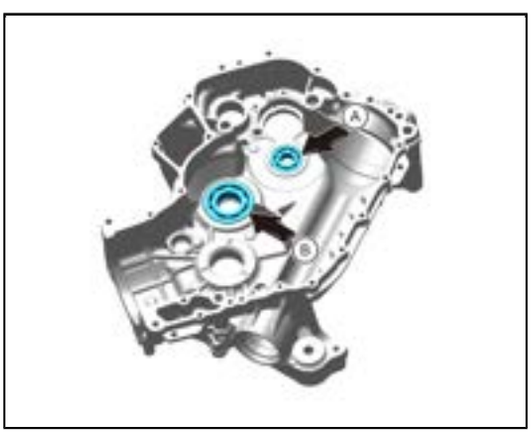


b. Install the 28 × 47 × 7 oil seal using the SST.

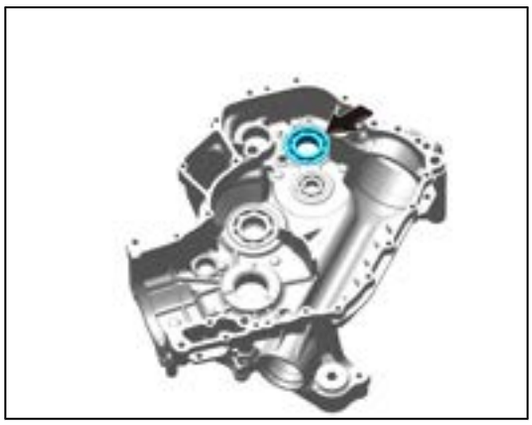
SST: 28×47×7 (A10-R493102-000-00) oil seal driver.

NOTICE:

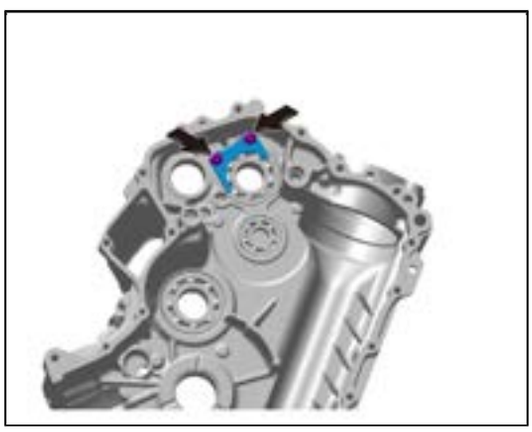
- **The oil seal is a single-use part. Always fit a new oil seal during installation.**
- **Apply grease to the oil seal surface during installation.**



c. Use the SST to install deep-groove ball bearings A (6203) and B (6206).

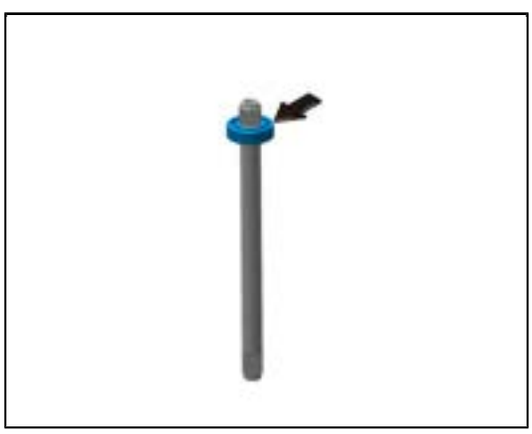


d. Use the SST to install the 62/28 deep-groove ball bearing.



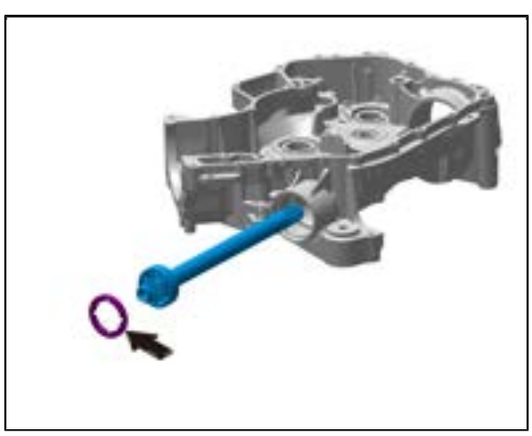
e. Install the mainshaft bearing retaining plate over the bearing. Apply threadlocker to the front threads of the bolts, then secure the retainer with 2 mounting bolts.

Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).



f. Place the deep-groove ball bearing 6205 onto the propeller shaft with the marked side facing upwards.

g. Use the SST to press the bearing onto the locating surface of the propeller shaft.

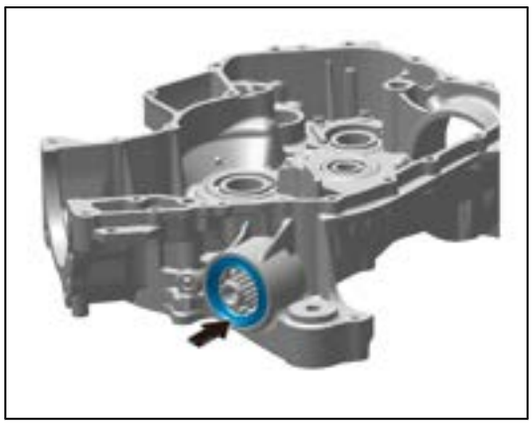


h. Install the propeller shaft and bearing assembly into the right crankcase.

i. Apply threadlocker to the M55 × 1.5 × 6-LH round nut threads, install it into the threaded hole in the right crankcase, and tighten using the SST.

SST: M55 (E01GZ0000006) pin spanner.

Torque: 88.1 ± 5.9 ft-lbs (120 ± 8 N·m).

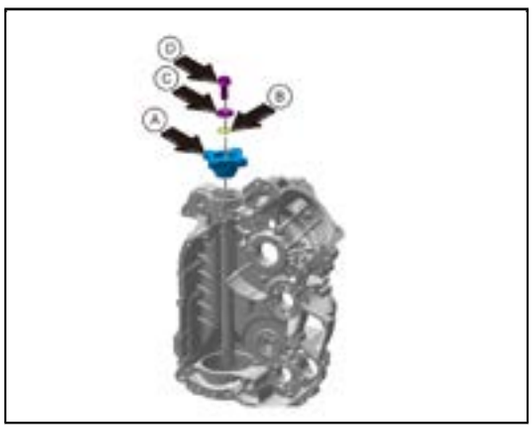


j. Use the SST to install the 44 × 60 × 7/10.5 oil seal onto the right crankcase.

SST: 44×60×7(E01GZ0000003) oil seal driver.

NOTICE:

- **The oil seal is a single-use part. Always fit a new oil seal during installation.**
- **Apply grease to the oil seal surface during installation.**



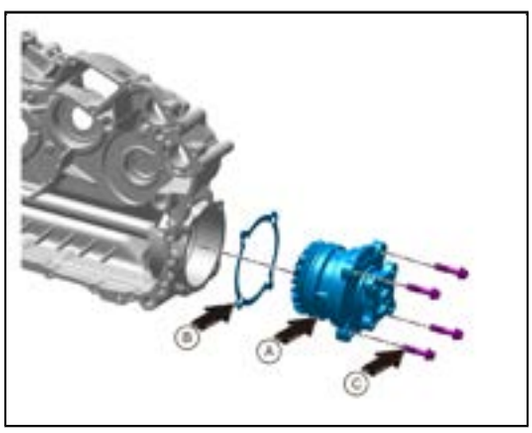
k. Install O-ring B into the internal groove of the Propeller Shaft Flange A.

l. Mount the coupling flange onto the propeller shaft. Insert Plain Washer C and mounting Bolt D in sequence, and tighten the bolt.

Torque: 88.5 ± 5.9 ft-lbs (120 ± 8 N·m).

NOTICE:

- **The O-ring is a single-use part. Always replace with a new O-ring during installation.**
- **Apply grease to the seal surface during installation.**



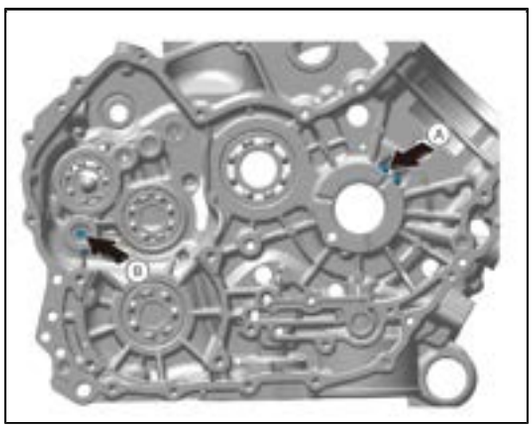
m. Wipe the mounting surfaces of the right crankcase and the driven bevel gear bearing housing assembly with a lint-free cloth.

n. Apply a thin, even layer of engine oil to the O-ring of the driven bevel gear bearing housing assembly, then install assembly A onto the right crankcase.

o. Position 2 driven bevel gear shims B beneath the driven bevel gear bearing housing assembly, then secure it with 4 bolts C.

Driven bevel gear backlash: 0.15~0.25 mm

3. Fitting the left crankcase

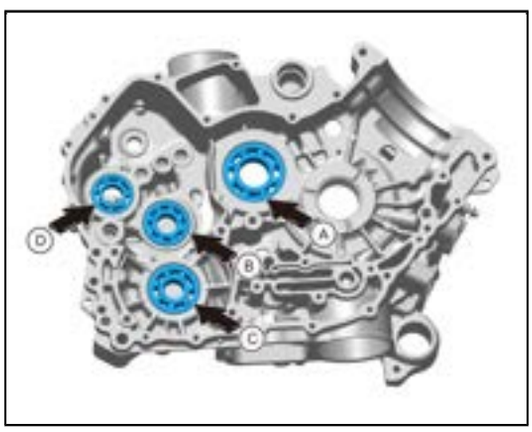


a. Inspect the flow orifices and piston cooling oil jets for debris; clean the mounting bores if necessary.

b. Apply threadlocker to the threads of the 2 piston oil jet plugs A, then install them into the left crankcase.

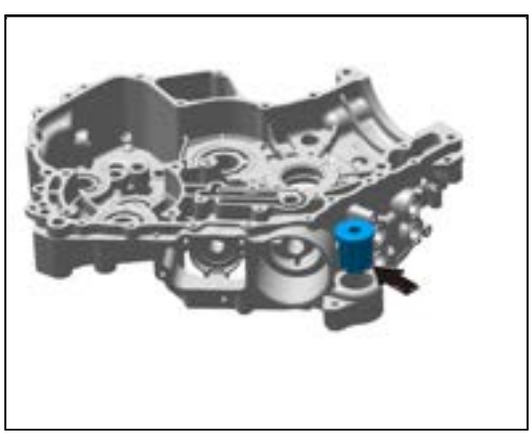
Torque: 3.0 ± 0.2 ft-lbs (4 ± 0.3 N·m).

c. Apply a small amount of threadlocker to the flow orifice B threads, then install it into the left crankcase.



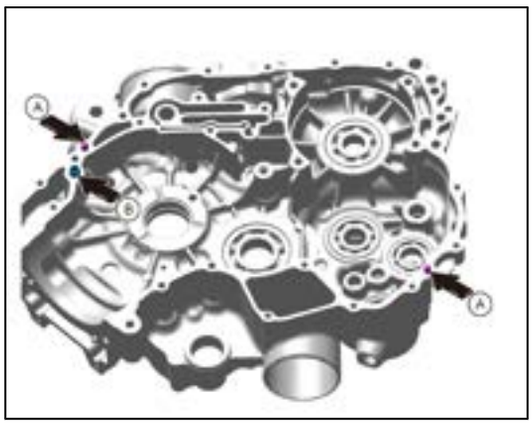
d. Wipe the bearing mounting bores using a clean, lint-free cloth.

e. Select the appropriate SST and install the deep-groove ball bearings: A (6206), B (6204Z), C (6304), and D (6004) into the left crankcase in sequence.



f. Inspect the rubber mount assembly for wear or damage; replace with a new component if required.

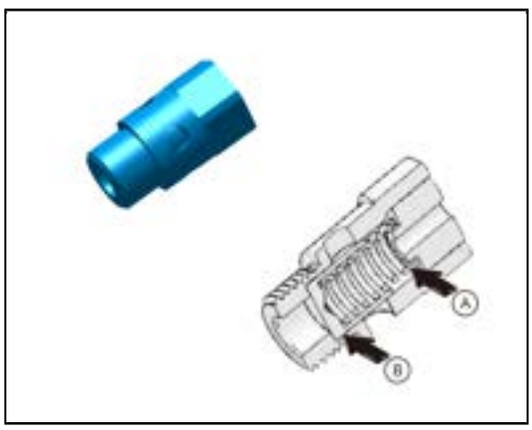
g. Install the damper bush assembly into the left crankcase.



h. Install the 2 parallel pins A into the left crankcase.

i. Install the hollow dowel B into the left crankcase.

4. Installing the lubrication system components

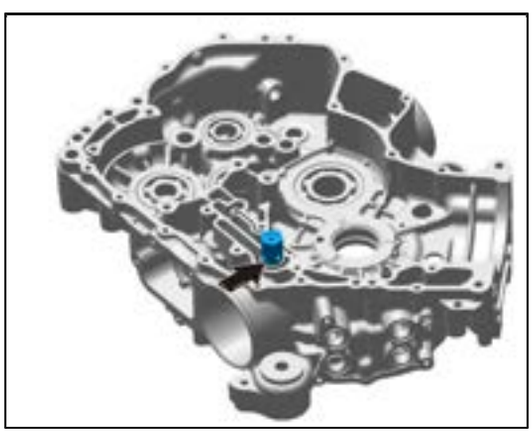


a. Before installing the oil pressure relief valve, use a metal rod to depress the internal valve to verify that valve A moves smoothly and returns to its original position under the tension of spring B.

b. If the valve binds, clean the relief valve using a high-flash-point solvent and blow out any debris with compressed air.

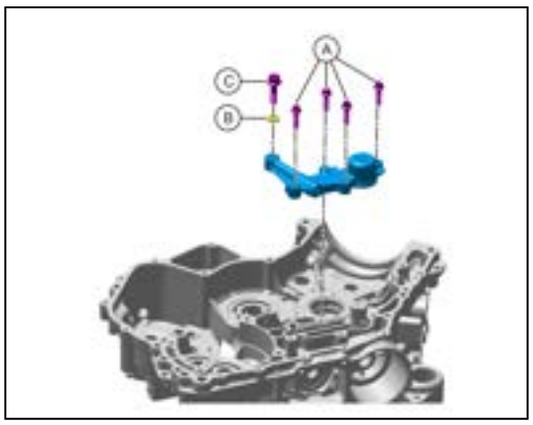
c. If the valve still does not move smoothly after cleaning, renew the oil pressure relief valve.

CAUTION:
• The oil pressure relief valve cannot be disassembled; it must be checked as a complete assembly.



d. Apply a medium-strength threadlocker to the threads of the oil pressure relief valve assembly, and install it into the left crankcase.

Torque: 14.8 ± 1.5 ft-lbs (20 ± 2 N·m).

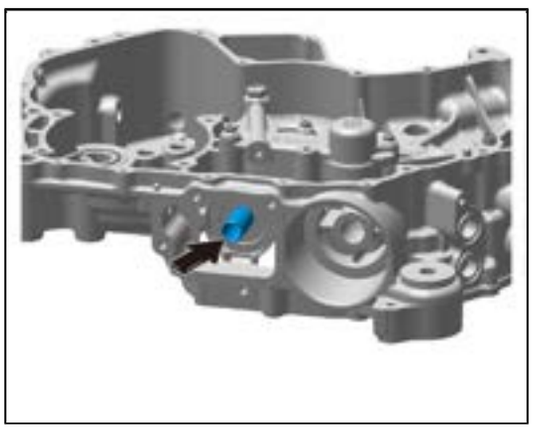


e. Install the pressure relief valve cover assembly to the left crankcase, and tighten the 4 mounting bolts A.

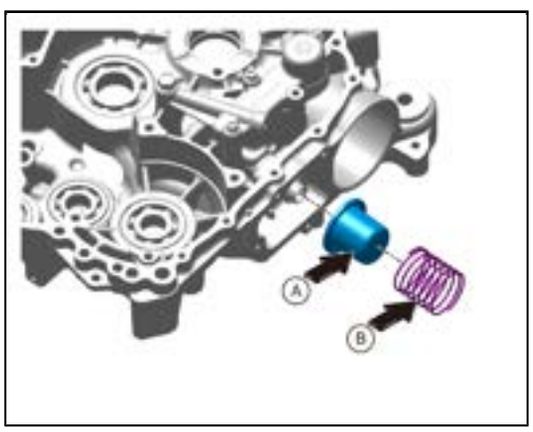
Bolt A torque: 7.4±1.5 ft-lbs (10±2 N·m)

f. Install the washer B and banjo bolt C.

Bolt C torque: 8.9±1.5 ft-lbs (12±2 N·m)



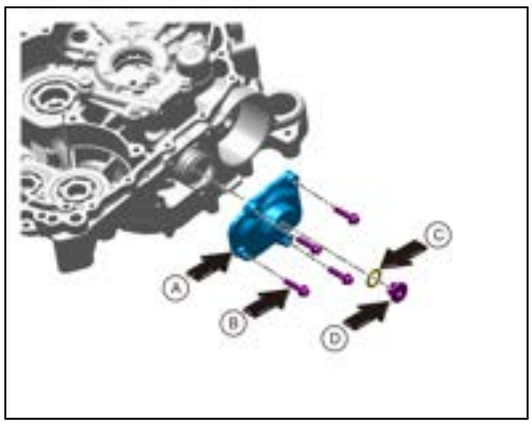
g. Install the oil pickup pipe into the left crankcase.



h. Install the oil filter screen A and oil strainer spring B into the left crankcase.



i. Fit the 82 × 3.1 O-ring into the groove of the strainer cover.



j. Install the strainer cover A onto the left crankcase. Tighten the 4 mounting bolts B diagonally.

Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).

k. Install a new copper crush washer C and the oil drain plug D.

Torque: 13 ft-lbs (18 N·m)

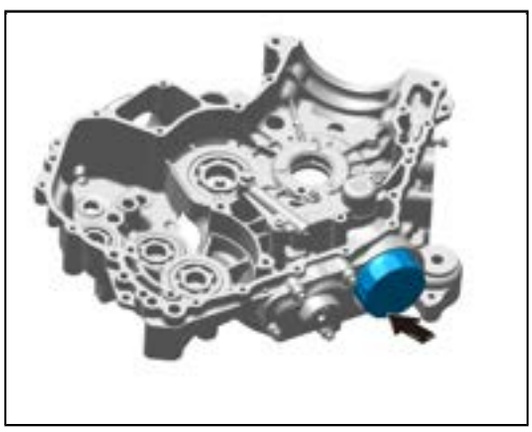
NOTICE:

- **The oil filler plug copper crush washer is a single-use part; always install a new washer during reassembly.**



l. Install the oil filter adapter into the corresponding threaded hole with the short end facing inwards. Tighten it using an appropriate tool.

Torque: 25.8 ± 3.7 ft-lbs (35 ± 5 N·m).



m. Apply engine oil to the surface of the oil filter O-ring. Screw the oil filter onto the adapter by hand, then tighten with a suitable tool.

Torque: 14.8 ± 1.5 ft-lbs (20 ± 2 N·m).

5. Installing the drive bevel gear



a. Place the deep-groove ball bearing 6305P5C3 on the drive bevel bearing housing, with the markings facing upwards. Use SST and a press to fit the bearing onto the housing up to the locating shoulder.

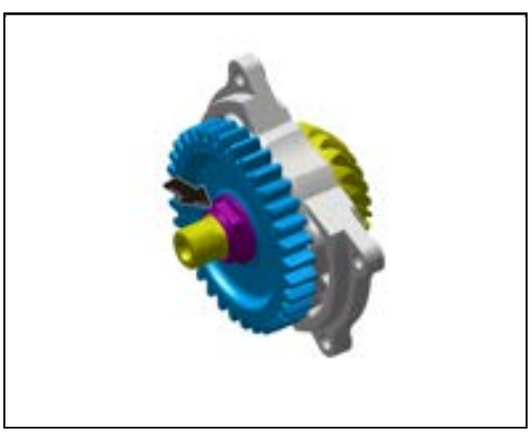
b. Place the 2 bearing thrust plates onto the drive bevel gear bearing housing with the chamfered side of the mounting holes facing upwards.

c. Secure the bearing thrust plates with 4 bolts.

Torque: 32 ± 2 ft-lbs (24 ± 1 N·m).



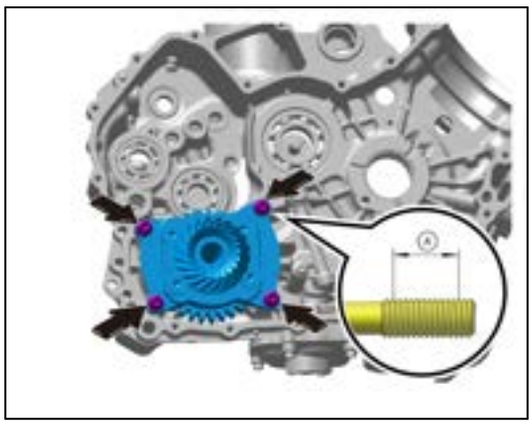
d. Install the drive bevel gear shim A, followed by the drive bevel gear B, in sequence.



e. Pass the drive bevel gear through the bearing thrust plates, then fit the reduction driven gear onto the bevel gear.

f. Apply thread-locking sealant to the nut threads, then install and tighten the nut.

Torque: 103.3 ± 7.4 ft-lbs (140 ± 10 N·m).

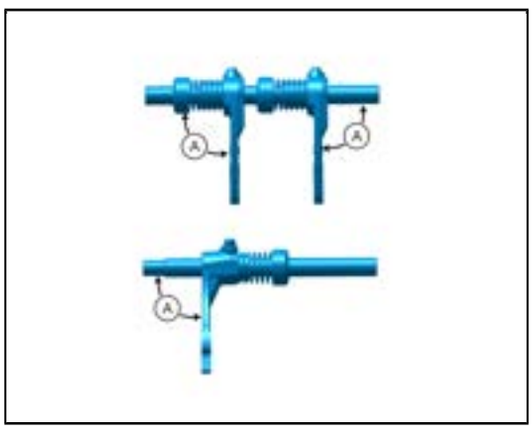


g. Install the drive bevel gear bearing housing assembly into the left crankcase's corresponding bore.

h. Apply an appropriate amount of threadlocker/ sealant to the crankcase mounting bolts A (12 mm) area, then install the bolts into their corresponding threaded holes in a diagonal cross-pattern.

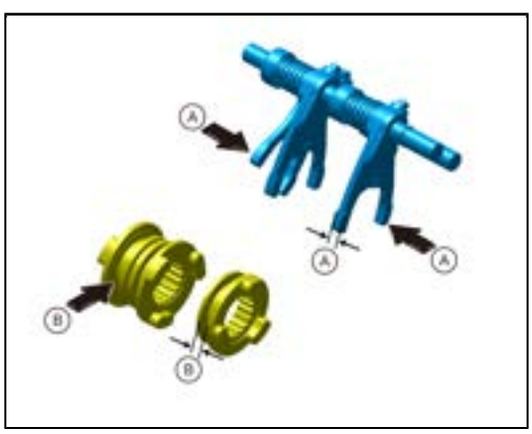
Torque: 25.8 ± 1.5 ft-lbs (35 ± 2 N·m).

6. Inspecting selector fork and gear cluster



a. Visually inspect the angle A of each selector fork; the standard angle is 90°.

b. If a selector fork is bent, it must be renewed. A bent selector fork can cause stiff shifting or cause the transmission to jump out of gear under load.



c. Measure the thickness of each selector fork ear A; if the thickness is below the service limit due to excessive wear, the selector fork must be renewed.

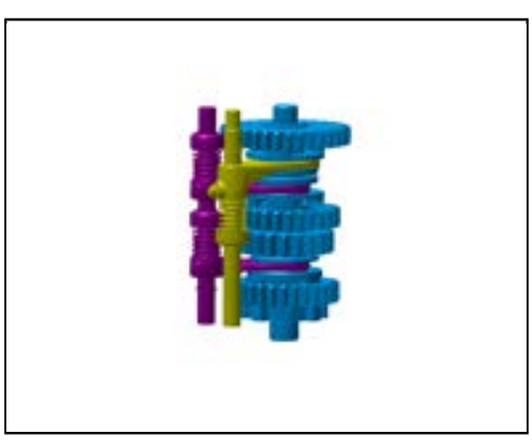
Standard: 5.8 to 5.9 mm

Service Limit: 5.7 mm

d. Measure the width of the gear groove B; if the width exceeds the service limit, the corresponding gear must be renewed.

Standard: 6.0 to 6.1 mm

Service Limit: 6.2 mm



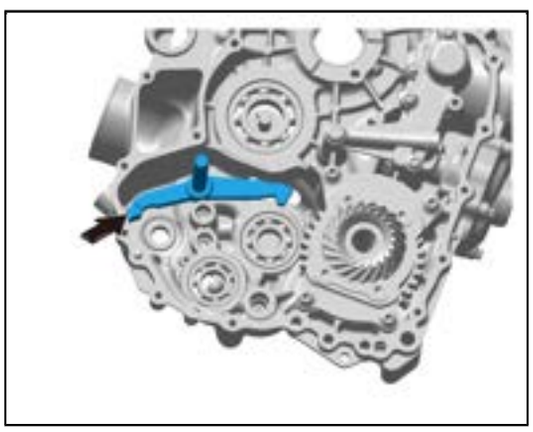
e. Visually inspect all gears in the transmission and shift mechanism; they must be renewed if damaged or excessively worn.

7. Installing the shift assembly

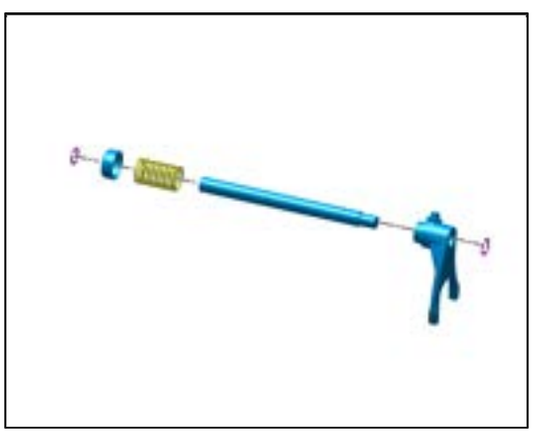


a. Install the Parking Pawl A and Plain Washer B onto the parking pawl shaft in sequence from bottom to top.

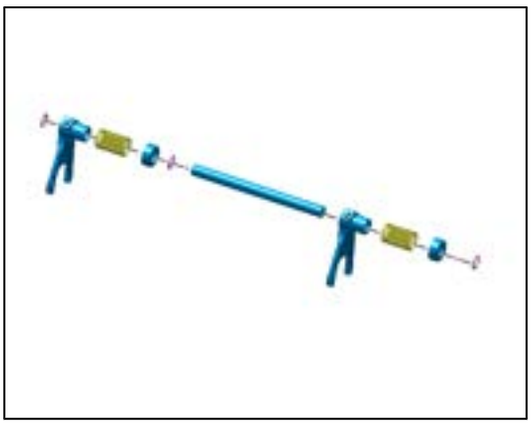
b. Use circlip pliers to install the circlip C into the groove.



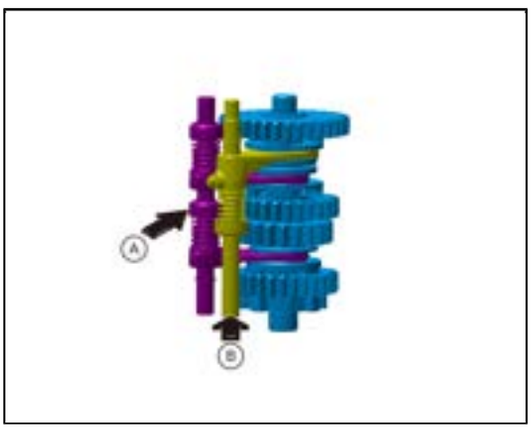
c. Install the parking pawl assembly onto the corresponding bore of the left crankcase housing.



d. Install the selector fork spring seat, spring, and L selector fork onto the L selector fork shaft in the sequence shown, and use circlip pliers to install the circlip into the groove.



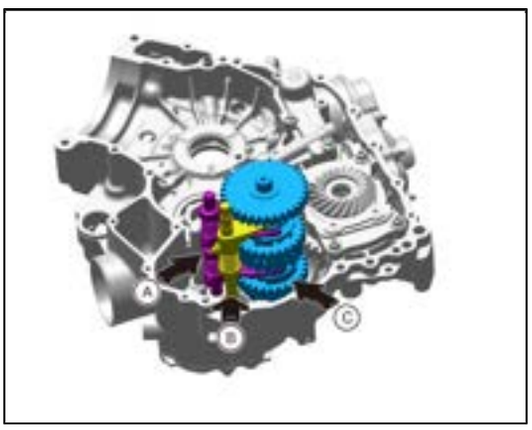
e. Install the selector fork spring seat, spring, and R/H selector fork onto the R/H selector fork shaft in the sequence shown, and use circlip pliers to install the circlip into the groove.



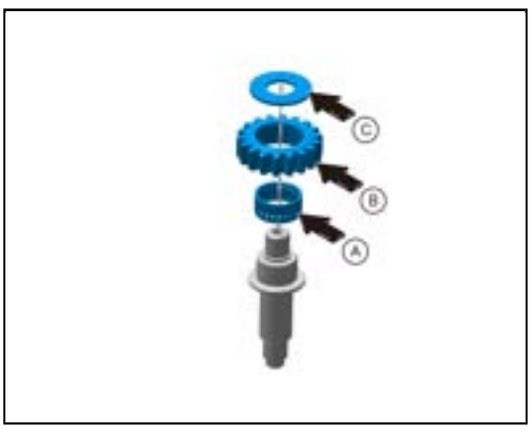
f. Install the H/R selector fork assembly A and L fork assembly B onto the countershaft assembly, ensuring the forks engage with their respective bushings.

CAUTION:

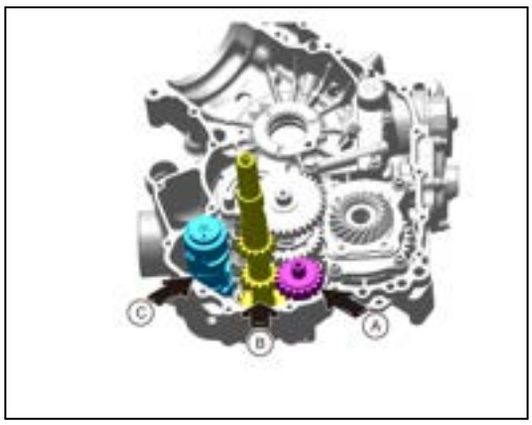
- **Prior to installation, check that one shim is present on both the upper and lower ends of the countershaft assembly.**



g. Apply engine oil to the bores in the left crankcase, then install the H/R selector fork assembly A, L fork assembly B, and countershaft assembly C into their respective locations in the left crankcase.



h. Sequentially fit the needle roller A, reverse idler gear B, and spacer C onto the reverse idler gear shaft.

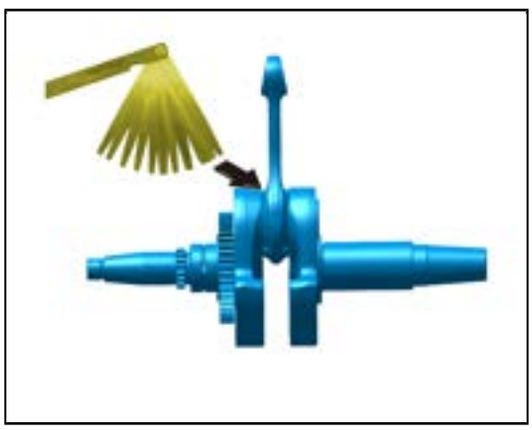


i. Install the reverse idler gear assembly A into the corresponding bore in the left crankcase housing.

j. Install the shift drum assembly C into the corresponding bore of the left crankcase and position the H/R and L selector fork roller pins into the drum slots. Press the top contact of the drum manually and ensure it returns to its normal position after releasing.

k. Install the mainshaft B into the corresponding bore in the left crankcase, ensuring that the gears mesh correctly with adjacent gears.

8. Inspecting crankshaft assembly

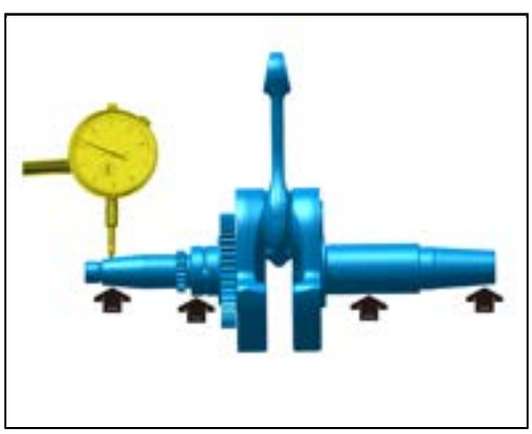


a. Inspecting connecting rod big end side clearance

b. Use a feeler gauge to measure the side clearance between the connecting rod big end and either crank web. If the measurement exceeds the standard specification, the crankshaft and con-rod assembly must be renewed.

Standard: 0.13 to 0.48 mm

Service Limit: 0.7 mm

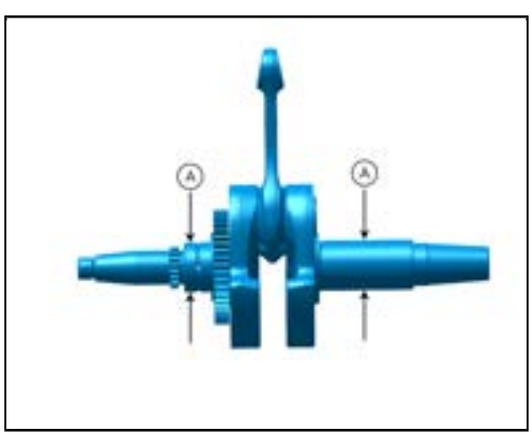


c. Crankshaft Runout Inspection

d. Use a dial indicator to measure the radial runout while slowly rotating the crankshaft. If the runout exceeds the service limit, the crankshaft and con-rod assembly must be renewed.

Standard: TIR ≤ 0.04 mm

Service Limit: TIR 0.1 mm



e. Use an outside micrometer to measure the crankshaft main journals and crankpins.

f. Repeat the measurement at 90° intervals on the same journal to check for any out-of-round wear (ovality).

g. If any journal is worn beyond the service limit, the crankshaft and con-rod assembly must be renewed.

Standard: 40.995 to 41.005 mm

Service Limit: 40.97 mm



h. Use a dial caliper or inside micrometer to measure the internal diameter of the main bearings in the left and right crankcases.

i. Repeat the measurement at 90° intervals on the same bearing to check for any out-of-round wear.

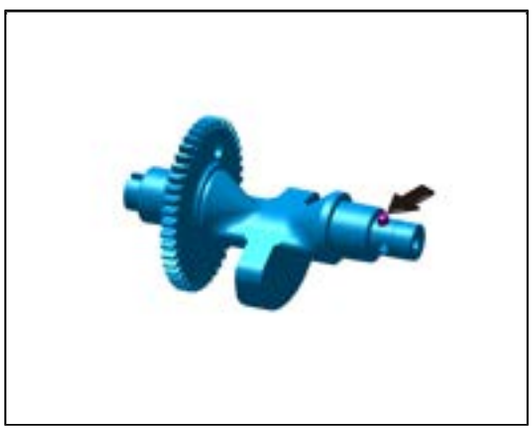
j. If any main bearing internal diameter is worn beyond the service limit, the crankcase must be renewed.

Standard: 41.040 to 41.050 mm

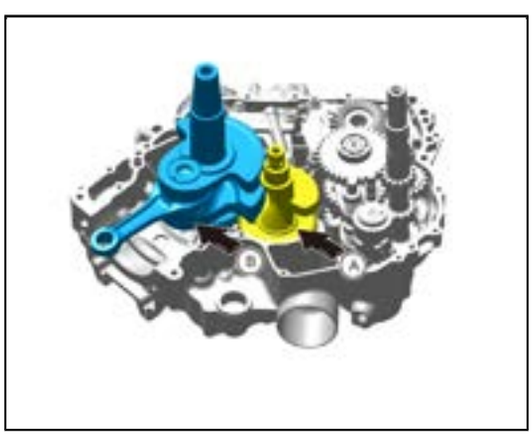
Service Limit: 41.08 mm

CAUTION:
• If either the right crankcase half or the right crankcase cover is damaged and requires replacement, they must be renewed as a matched set.

9. Install the crankshaft assembly and balance shaft assembly.



a. Fit the 6 × 10 parallel pin to the balance shaft assembly.



b. Spray a suitable amount of engine oil to the balance shaft A journals, then install the balance shaft assembly into the corresponding bores in the left crankcase housing.

c. Blow through the crankshaft oil passages with compressed air. Apply a suitable amount of engine oil to the connecting rod-to-crankshaft joint, then install the crankshaft and connecting rod assembly B into the corresponding bores in the left crankcase.

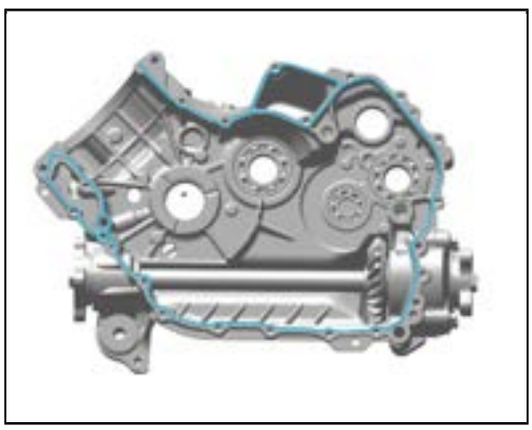


d. Position the crankshaft and connecting rod assembly and the balance shaft assembly so that the mark on the balance shaft gear aligns with mark A on the crankshaft gear.

CAUTION:

- **After installation, apply engine oil to all gears, rotate the mainshaft, and check for smooth movement. If any binding occurs, identify and resolve the issue.**

10.Installing the crankcase



a. Remove all residual sealant and oil from the mating faces of the left and right crankcase assemblies, then wipe clean with a lint-free cloth.

b. Apply new sealant to the mounting face of the right crankcase assembly at the positions shown in the illustration. Apply a continuous bead with no breaks or misalignment. Bead diameter: 0.8–1.5 mm.

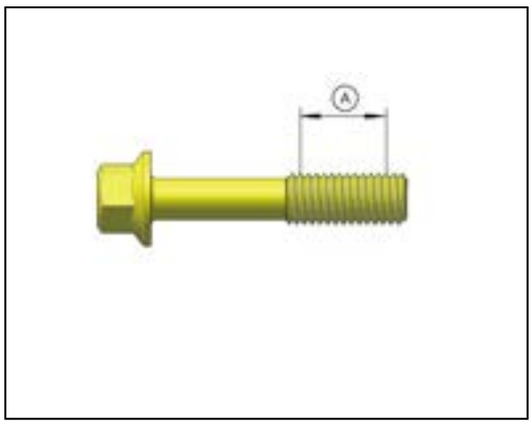
CAUTION:

- **When cleaning the crankcase mating faces, do not allow residual sealant or other contaminants to enter the crankcase.**
- **After applying sealant to the right crankcase, assemble it to the left crankcase within 5 minutes.**

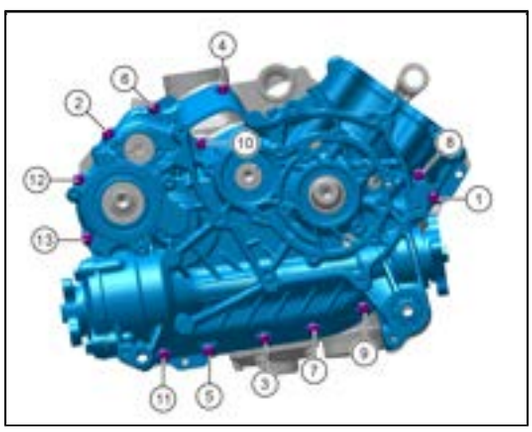


c. Turn the engine until it is horizontal.

d. Right Crankcase Assembly Installation

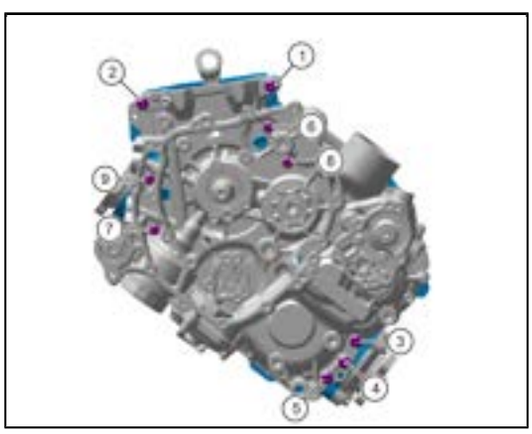


e. Apply a medium-strength threadlocker to the crankcase mounting bolts A (12 mm) area.



f. Install the 13 bolts securing the right crankcase to the left crankcase in the sequence shown in the illustration.

Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).

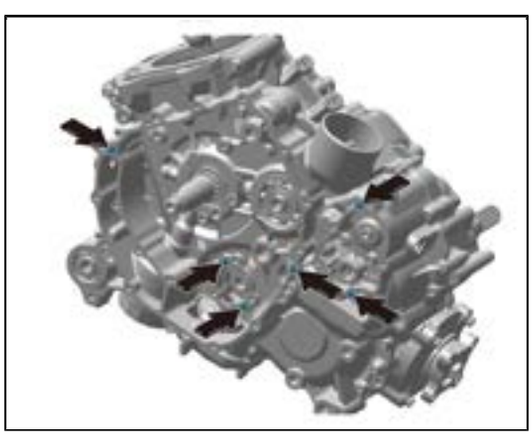


g. Install the 9 bolts securing the left crankcase to the right crankcase in the sequence shown in the illustration.

①–② M8×70 bolt torque: 20 ft-lbs (26 N·m)

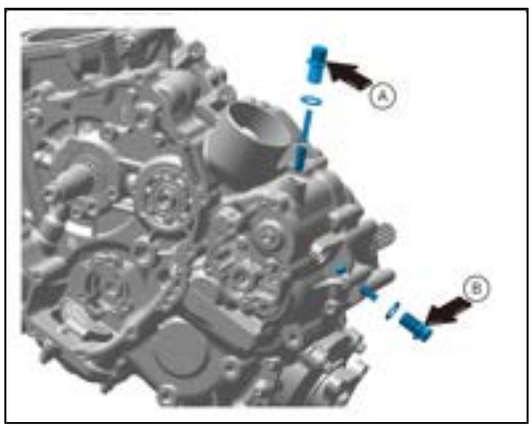
③–⑤ M8×40 bolt torque: 20 ft-lbs (26 N·m)

⑥–⑨ M6×65 bolt torque: 7.4 ±1.5 ft-lbs (10 ±2 N·m)



h. Fit the six dowel pins to the left crankcase assembly.

11. Installing the shift mechanism

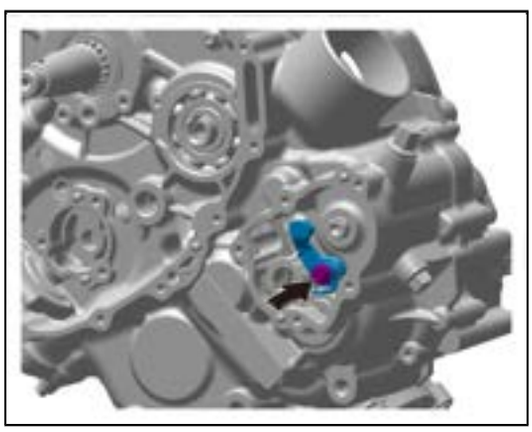


a. Install the parking pawl push pin, parking detent spring, 14 × 21 × 1.5 aluminium washer and parking detent bolt A in sequence.

Torque: 18.4 ± 1.5 ft-lbs (25 ± 2 N·m).

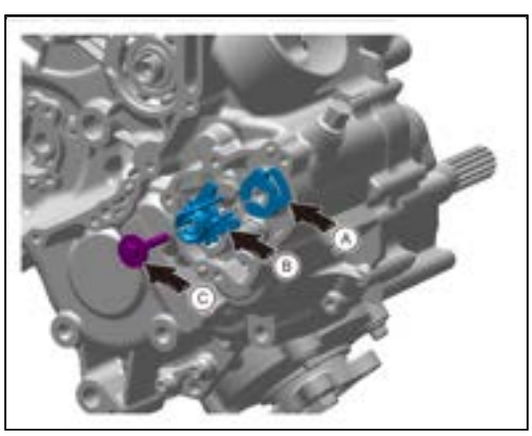
b. Install the 9.5 mm steel ball, gear position detent spring, 14 × 21 × 1.5 aluminium washer and shift detent bolt B in sequence.

Torque: 18.4 ± 1.5 ft-lbs (25 ± 2 N·m).



c. Fit the shift detent plate and detent plate spring to the left crankcase, then install the mounting bolt.

Torque: 10.3 ± 1.5 ft-lbs (14 ± 2 N·m).

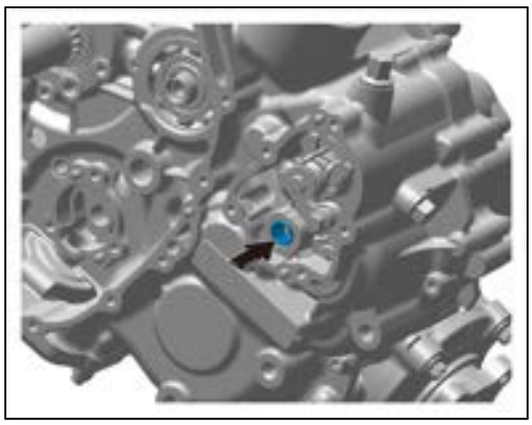


d. Fit shift detent wheel A to the shift drum assembly.

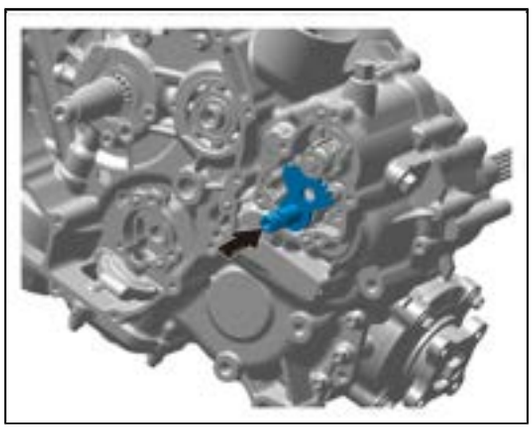
e. Fit shift driven gear B to the shift drum assembly. Make sure both ends of the shift torsion spring are engaged in the slots of the shift detent wheel.

f. Install mounting bolt C.

Torque: 10.3 ± 1.5 ft-lbs (14 ± 2 N·m).



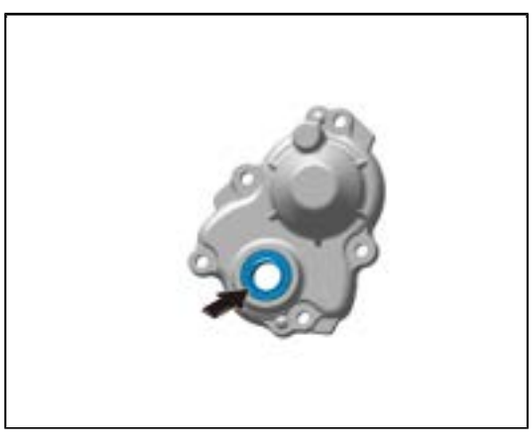
g. Fit the needle roller bearing to the left crankcase.



h. Install the shift shaft assembly on the left crankcase.



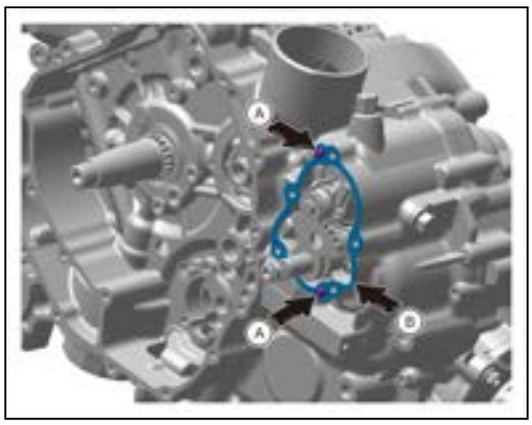
i. Position the shift shaft assembly so that its mark aligns with mark A on the shift driven gear.



j. Install the 15 × 25 × 5 oil seal using the SST.

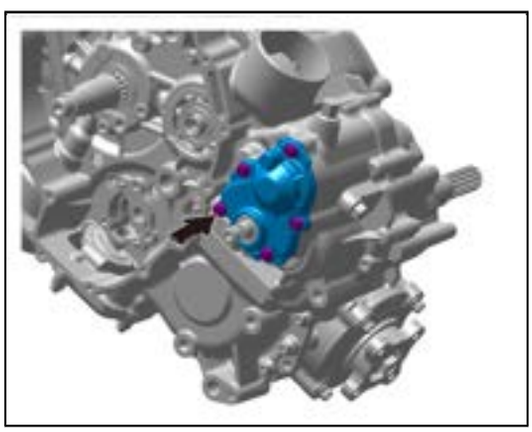
SST: 15×25×5(E01GZ0000004) oil seal driver.

NOTICE:
• The oil seal is a single-use part. Always fit a new oil seal during installation. • Apply grease to the oil seal before installation. Install the oil seal with the spring side facing downwards.



k. Install the 2 parallel pins A into their corresponding bores in the left crankcase assembly, and fit a new shift shaft cover gasket B.

NOTICE:
• The gasket is single-use only and must be replaced with a new one during installation.



l. Install the shift shaft cover to the left crankcase, apply medium-strength threadlocker to the mounting bolts, and tighten the 5 shift shaft cover mounting bolts.

Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).

12. To install cylinder block and piston, See: Cylinder Block and Piston.
13. To install the cylinder head and valves, See: Cylinder Head and Valves.
14. To install timing mechanism, magneto, and oil pump assembly See: Timing Mechanism, Magneto, and Oil Pump Assembly.
15. To install the cylinder head cover, See: Cylinder Head Cover.
16. To install external engine components, See: External Engine Components.
17. To install the engine assembly, See: Engine Assembly.
18. To install the rear cargo box assembly, See: Rear Cargo Box Assembly.
19. To refill engine with oil, See: Refilling Engine Oil.
20. To fill with coolant, See: Coolant Draining and Refilling.
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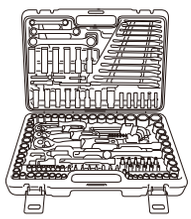
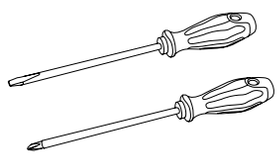
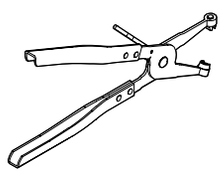
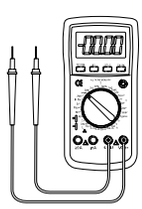
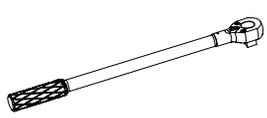
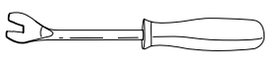
3.3.1 Specifications

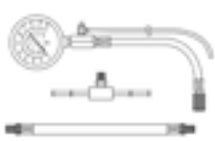
3.3.1.1 Fastener Specifications

Item	Torque (N·m)	Torque (ft-lbs)
Oil Pressure Sensor	14±2	10.3±1.5
Oxygen Sensor	37±3	36.9±7.4
Gear Position Sensor Assembly	9.8	7.2
Ignition Coil	10	7.3
Spark Plug	15	11

3.3.2 Service Tools

3.3.2.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)
2	Screwdriver		Removing screws
3	Hose Clamp Pliers		Removing and installing hose clamps
4	Digital multimeter		Measuring current, voltage and resistance
5	Torque Wrench		Tightening bolts and nuts to the specified torque
6	Trim clip removal tool		Removing clips

Item No.	Tool Description	Tool Diagram	Purpose/Use
7	Oxygen Sensor Socket		Removing and installing the oxygen sensor
8	Compression Tester		Checking cylinder compression pressure
9	Fuel pressure gauge		Measuring fuel system pressure

3.3.3 Description and Operation

3.3.3.1 Warnings and Precautions

1. If any engine control system component, such as the ECU, throttle body or sensor assembly, is damaged, replace it as an assembly. Do not attempt to dismantle, repair and reuse it.
2. Only use components specified by the manufacturer. Otherwise, correct operation of the engine control system cannot be guaranteed.
3. Do not remove or dismantle engine control system components or their electrical connectors unless instructed to do so. Incorrect operation may result in the following:
   a. Deformed, loose or damaged connector terminals.
   b. Ingress of moisture, oil, dust or other foreign matter into the connector.
   c. Seal failure, resulting in poor contact, signal interference or short circuits.
   d. Abnormal operation of the engine control system, and possible system malfunction or engine shutdown.
4. Before disconnecting or connecting a connector, turn the power supply to the OFF position. Failure to do so may damage electrical components. Never disconnect a connector while the engine is running.
5. Before disconnecting the negative battery terminal, turn the power supply to the OFF position and switch off all electrical loads.
6. Engine control system components are generally highly reliable. If a vehicle or engine abnormality occurs, first check that the related mechanical components are in good condition and that the system connectors, harnesses and earth leads are properly connected.
7. Most occasional or intermittent faults in the electronic control system are caused by physical defects or poor connections in the harnesses and connectors. Typical causes include:
   a. Broken harnesses or internal conductor breaks, particularly in areas subject to repeated bending or vibration.
   b. Connectors not fully engaged, resulting in poor contact.
   c. Loose terminals, terminal back-out or terminals accidentally pulled out.
   d. Oxidation, contamination or moisture inside the connector, causing increased contact resistance or signal interruption.
8. Harnesses rarely break in the middle of a run; open circuits usually occur at connectors. Carefully inspect the harness at the sensors and connectors.
9. Poor contact is usually caused by terminal corrosion, contamination or insufficient contact pressure. If no obvious abnormality is found but the fault disappears after the connector is disconnected and reconnected, determine that the harness or connector has an intermittent connection fault. Clean, repair or replace as necessary.
10. Do not pierce the harness with a fine needle to check system electrical signals.
11. Before confirming that an engine control system component is faulty, perform repeated substitution tests.
12. Handle sensors with care during installation and transportation to prevent damage. Any impact or dropping may seriously impair sensor performance.
13. Before installing system components, use a sealant scraper or wire brush to remove foreign

matter, old sealant and oil from the mounting surface. Ensure that the sealing surface is flat, smooth and clean. Thoroughly remove any residual sealant from mounting holes, threaded holes and threads to prevent impaired sealing performance.

14. When installing sensors, actuators and other components, tighten the mounting bolts or nuts to the specified torque.
15. Remove the oxygen sensor only after the engine has cooled completely. Do not carry out this operation while the engine is hot, as burns or other personal injury may occur. During handling, prevent the oxygen sensor body, especially the sensing element tip, from coming into contact with water, oil, cleaning agents or other liquids. Contamination, performance deterioration or permanent damage may result.
16. The engine fuel system is designed for high-pressure fuel delivery. All fuel pipes are made from dedicated high-pressure-resistant material. Even when the engine is stopped, high residual pressure may remain in the fuel lines. Before carrying out any removal or service work on the fuel system, relieve the fuel system pressure in accordance with the specified procedure. Do not disconnect fuel lines before the pressure has been relieved. High-pressure fuel may spray out unexpectedly, causing personal injury, fire or environmental contamination.
17. Fuel pipe removal and fuel filter replacement must be carried out by qualified service personnel in a well-ventilated area away from naked flames. During the operation, prevent fuel from splashing onto the engine or hot exhaust components.
18. Do not test the fuel pump without petrol or in water. Never reverse the positive and negative terminals of the fuel pump.
19. Idle speed is fully controlled by the engine control system. Manual adjustment is not required.
20. When jump-starting a vehicle equipped with an electronically controlled engine using another vehicle, switch off all electrical loads and turn the power supply to the OFF position before connecting or disconnecting the jump leads.
21. When carrying out arc welding on the vehicle, disconnect both the positive and negative battery terminals. If necessary, remove the electronic control module (ECU) to prevent damage to the ECU caused by high voltage during welding.
22. When carrying out body repairs near the ECU or sensors, avoid impact to prevent damage to electronic components.
23. Before removing or installing the engine ECU, discharge static electricity from the body, for example by wearing an anti-static wrist strap or touching an earth point. Otherwise, static electricity may damage the ECU internal circuits, causing latent or permanent damage.
24. When cleaning the engine or carrying out inspections in rainy conditions, prevent water from splashing onto the ECU and its wiring.
25. The vehicle electrical system uses negative earth. When installing the battery, make sure the positive and negative terminals are not reversed, otherwise electronic components may be damaged.
26. If an actual fault is present, clearing the DTCs with a diagnostic tester will not rectify the fault. If the root cause is not eliminated, the ECU will detect the fault again during subsequent operation and store the same DTC. Therefore, recurrence of the DTC is a key basis for determining whether an actual fault is present. After completing the repair and confirming that the system operates normally, clear all current and history DTCs to ensure accurate diagnostic

records and to prevent interference with subsequent fault diagnosis.

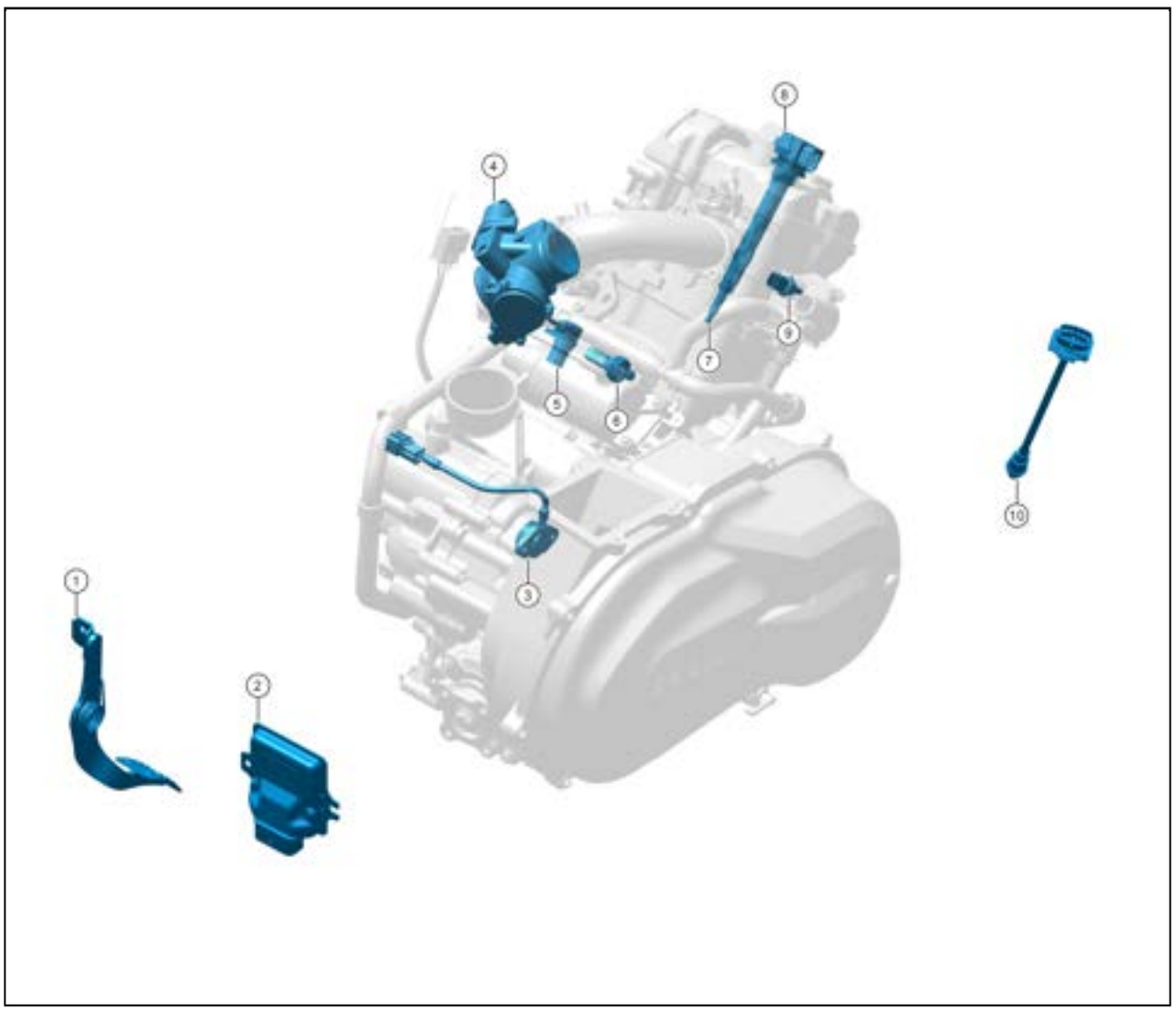
3.3.3.2 System Description

1. System Description
   a. The engine control system mainly consists of sensors, the ECU assembly and actuators. It controls the intake air volume, fuel injection quantity and ignition advance angle during engine operation.
2. Basic Principles
   a. In the engine control system, sensors serve as input devices. They measure various physical parameters, such as temperature and pressure, and convert them into corresponding electrical signals.
   b. The ECU receives input signals from the sensors, processes them according to the programmed control logic, and outputs the corresponding control signals to the power driver circuits. The driver circuits actuate the relevant actuators to operate the engine in accordance with the specified control strategy.
   c. The ECU diagnostic system also monitors the system components and control functions. Once a fault is detected and confirmed, the fault information is stored in memory.
3. Main Components
   a. The engine control system consists of the ECU assembly, engine oil pressure sensor, crankshaft position sensor, throttle body, oxygen sensor, coolant temperature sensor and other related components.
   b. Engine Oil Pressure Sensor
      • The engine oil pressure sensor assembly is an absolute pressure sensor. It is installed in the engine main oil gallery and feeds the engine oil pressure signal back to the control system.
   c. Crankshaft Position Sensor
      • The crankshaft position sensor is generally installed on the cylinder block or transmission. It detects the current crankshaft position and determines top dead centre (TDC) of No. 1 cylinder.
   d. Coolant Temperature Sensor
      • The coolant temperature sensor monitors the engine coolant temperature and supplies coolant temperature information to the engine ECU, enabling more precise engine control.
   e. Throttle Body
      • The throttle body is one of the main components of the engine air intake system. Its primary function is to adjust the intake passage opening according to the driver's demand, thereby controlling the intake air volume to meet the engine requirements under different operating conditions.

3.3.4 Component Location and Exploded View

3.3.4.1 Exploded View Diagram

Engine Control System



1	Accelerator Pedal Assembly	6	Oil Pressure Sensor
2	ECU Assembly	7	Spark Plug Assembly
3	Gear Position Sensor Assembly	8	Ignition Coil
4	Throttle Body	9	Coolant Temperature Sensor
5	Crankshaft Position Sensor	10	Oxygen Sensor

3.3.5 Component Construction, Operating Principle and Fault Inspection

3.3.5.1 ECU Assembly

1. **Function Description**
   a. The ECU continuously receives real-time engine operating data from the engine management system sensors. Based on the system calibration and stored calibration data, it then controls the relevant actuators to regulate engine operation.
2. **Electrical Characteristics**
   a. Operating Voltage:

      Nominal voltage: 13.5V

      Fully functional operating voltage range: 9V to 16V

      Restricted functional operating voltage range: 6V - 9V, 16V - 18V

      Diagnostic function guaranteed voltage range: 8V - 16V

   b. Operating Current:

      Operating current: < 10A @ 13.5V

      Quiescent current: < 1mA @ 13.5V

   c. Electrical Protection:

      Overvoltage protection: The ECU can withstand an overvoltage of 24V for 60 seconds (at an ambient temperature of 23°C ± 5°C). If the system returns to normal operating voltage within 60 seconds, the ECU will resume normal operation.

      Reverse polarity protection: If UBR (Pins 15, 16) is powered via the main relay, the ECU can withstand a reverse voltage of 14.0V for 60 seconds (at an ambient temperature of 23°C ± 5°C, with all other connections correct). If the system returns to normal operating voltage within 60 seconds, the ECU will resume normal operation.

      Output stage protection: The control module drive stage is equipped with diagnostic and protection functions for conditions such as short circuit to ground, short circuit to battery (power supply), and open circuit. Note: The ECU ignition pins do not feature short-circuit protection.
3. **Fault Diagnosis**
   a. ECU pins 16 and 17 are connected to the diagnostic CAN bus lines. The CAN bus can be used to retrieve fault information stored in the ECU and to issue diagnostic commands, such as clearing fault records and initiating adaptive learning procedures. When checking the ECU for faults, inspect the connectors for correct and secure engagement and check the terminals for bending, deformation or other damage.

3.3.5.2 Gear Position Sensor

1. **Function**
   a. The gear position sensor detects the actual gear position signal of the CVT transmission shift control mechanism and converts it into an electrical signal. The signal is transmitted to the engine control unit and the transmission control unit for vehicle control logic determination and safety protection.

2. Operating Principle

a. The gear position sensor detects the mechanical position of the shift shaft and converts the shift status into an electrical signal for transmission to the ECU. The control unit uses this signal to identify the selected gear and perform start interlock and shift control.

3.3.5.3 Crankshaft Position Sensor

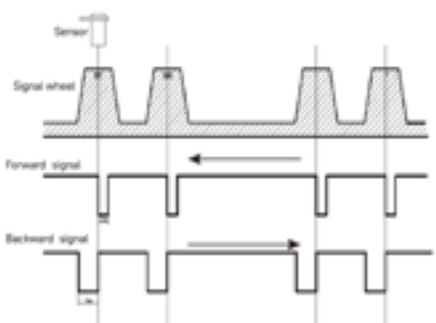
1. Function

a. The crankshaft position sensor detects crankshaft speed and angular position, and provides the ECU with signals for ignition timing, fuel injection timing and idle speed control. It is a key sensor for normal engine operation.

2. Operating Principle

a. The crankshaft position sensor operates on the Hall effect. As the crankshaft rotates, the teeth and gaps pass the sensor alternately, causing the sensor output voltage to switch between high and low levels and generate a series of square-wave pulse signals.

3. Characteristics



a. Voltage Output Curve

b. Electrical Specifications

Specifications	Symbol	Lower Limit	Nominal Value	Upper Limit	Units
Forward Rotation Output Pulse Width	Tfw	38.25	45	51.75	us
Reverse Rotation Output Pulse Width	Tbw	76.5	90	103.5	us
Supply Voltage	Us	4.75	-	16	V
Output Signal Voltage	Uso	0	-	18	V
Output Signal Low Voltage	Uol	-	-	0.5	V
Output Signal High Voltage	Uoh	Uso-0.5	Uso-0.3	-	V

4. Fault Diagnosis and Troubleshooting

CAUTION:
• Before troubleshooting the component, first inspect the harness connections. Proceed with component diagnosis only after confirming that the harness is in good condition.

   a. Inspect the crankshaft position sensor for external damage. Check the housing for cracks, the connector terminals for corrosion, and the connector interior for water ingress.

   b. Using an oscilloscope, check whether the crankshaft position sensor output signal voltage is within the specified electrical parameter range, and whether the forward and reverse rotation signal pulse widths are normal.

3.3.5.4 Oil Pressure Sensor

Function Description

1. The engine oil pressure sensor is used to detect the engine oil pressure. It is generally screwed into an oil gallery in the cylinder block. The sensor contains a variable resistor. One end provides the output signal, and the other end is connected to a sliding arm that is connected to earth. When the oil pressure increases, pressure is applied to the diaphragm through the lubrication oil passage connection, causing the diaphragm to deflect. The diaphragm moves the sliding arm to a low-resistance position, increasing the output current in the circuit. Conversely, when the oil pressure decreases, the output current decreases. This sensor uses a normally open contact. The operating pressure is 250 ± 10 kPa, and the maximum operating temperature is above 150° C. When the engine oil pressure is low, the oil pressure warning lamp on the instrument cluster remains illuminated.

Fault Diagnosis

1. If there is no oil pressure reading, check the harness connector for a poor connection.
2. If the harness connector is secure, the sensor is likely faulty and should be replaced.

WARNING:
• Always diagnose oil pressure faults promptly; operating the engine with a fault may cause damage.

3.3.5.5 Throttle Body

Throttle Body Assembly

1. The throttle body assembly links the engine to the air cleaner and controls the throttle plate opening via the throttle cable to meet different driver inputs. The structure and dimensions of the main throttle passage directly influence engine air intake; modifying the passage can alter engine performance at various speeds. The assembly consists of a mechanical throttle body, a three-in-one sensor (intake manifold pressure, intake air temperature, and throttle position), and a stepper motor.

Three-in-One Sensor

1. Components
   a. The three-in-one sensor comprises the intake manifold pressure, intake air temperature, and throttle position sensors.
2. Principle
   a. The IAT sensor uses a thermistor that reacts rapidly to temperature changes. The intake manifold pressure sensor connects through a pressure channel to the main throttle passage and measures absolute intake pressure. Pressure changes in the main passage cause corresponding changes in the sensor output voltage; the ECU calculates the absolute pressure in the main passage from this voltage. The throttle position sensor is a linear-output angular sensor, comprising 2 arcuate resistive tracks and 2 sliding arms. The sliding arms' pivot aligns with the throttle body shaft. A 5 V supply is applied across the resistive tracks. As the throttle rotates, the sliding arms move along the tracks, outputting a voltage proportional to the angle, functioning as a rotary potentiometer.
3. Performance Characteristics
   a. Intake Air Temperature (IAT) Sensor

      R25：2kΩ±3%

      B25/85：3520k±2%
   b. Throttle Position Sensor (TPS)

      Operating Temperature: -30°C to +110°C
   c. Intake Manifold Pressure Sensor

      Sensitivity: 0.5 mV/kPa

Stepper Motor

1. Principle
   a. The stepper motor consists of multiple steel stators arranged in a circle around a rotor. Each stator has a coil wound around it; the rotor is a permanent magnet with a nut at its centre. All stator coils remain continuously energised. Changing the current direction of a coil rotates the rotor by a fixed angle. Sequentially changing the current in each stator coil generates a rotating magnetic field, causing the rotor to turn in a defined direction. Reversing the sequence of coil currents will reverse the rotor's rotation direction. The nut at the rotor centre drives a lead screw. The lead screw is prevented from rotating and moves linearly along the axis, hence called a linear shaft. The lead screw tip is a plunger that can extend or retract, varying the idle intake passage cross-section up to full closure. Each reversal of coil current rotates the rotor by a fixed step angle, equal to 360° divided by the number of stators or coils. Correspondingly, the lead screw moves a fixed distance per step. The ECU regulates the number of coil current reversals to control stepper motor movement, adjusting the bypass passage cross-section and airflow.
2. Stepper Motor Flow Characteristics
   a. The ECU regulates the number of coil current reversals to control stepper motor movement, adjusting the bypass passage cross-section and airflow.

3.3.5.6 Oxygen Sensor

Function Description

1. Used in the electronic fuel injection feedback system, enabling closed-loop control and enhancing ECU air–fuel ratio regulation accuracy. Installed in the exhaust near the engine, it

measures oxygen content to check fuel combustion, ensuring maximum HC, CO, and NOx conversion efficiency in the three-way catalytic converter.

Operating Principle

1. Principle

a. It works by converting the oxygen concentration difference across the sensor ceramic tube into a voltage signal. When the sensor ceramic tube reaches 350°C, the solid electrolyte conducts. Oxygen molecules are catalysed into ions by platinum electrodes, which move through the ceramic, enabling diffusion across it. This property converts the oxygen concentration difference into a potential difference, generating an electrical signal. In a rich mixture, low exhaust oxygen produces a high ion concentration difference across the ceramic, giving a high potential difference and output voltage (~800–1000 mV). In a lean mixture, higher exhaust oxygen lowers the potential difference and output (~100 mV). The voltage changes sharply near the stoichiometric air–fuel ratio (λ = 1).

Sensor Parameters

1. Performance Parameters

Item	New Oxygen		Resistance at Terminals A and C (kΩ)	
Exhaust Gas Temperature	350℃	850℃	350℃	850℃
Sensor Voltage at λ = 0.97 (mV)	840±70	710±70	840±70	710±70
Sensor Voltage at λ = 1.10 (mV)	20±50	55±30	20±50	40±40
Sensor Internal Resistance (kΩ)	≤1.0	≤0.1	≤1.5	≤0.3
Response Time (ms) (600 mV → 300 mV)	≤150	≤150	≤300	≤200
Response Time (ms) (300 mV → 600 mV)	≤150	≤150	≤300	≤200

2. Electrical Characteristics

Item	New Oxygen	Specifica-tions	Units
Insulation Resistance between new sensor heating element and connector	Heating Element Resistance at Ambient Temperature	≥30	MΩ
	Exhaust Gas Temperature 350°C	≥30	MΩ
	Exhaust Gas Temperature 850°C	≥30	KΩ
Supply Voltage at Connector	Rated Voltage	12	V
	Continuous Operating Voltage	12~14	V
	Maximum Voltage Sustainable for 1% of Lifetime (Exhaust ≤ 850°C)	15	V
	Maximum Voltage Sustainable for 75 s (Exhaust ≤ 350°C)	24	V
	Test Voltage	13	V

Heating Power at 13 V Operating Voltage under Thermal Equilibrium (Exhaust Temperature 350 °C, Exhaust Flow ~0.7 m/s)	12	W
Heating Current at 13 V Operating Voltage, Ambient Temperature −40 °C (Exhaust Temperature 350 °C, Exhaust Flow ~0.7 m/s)	5	A
Fuse for Heating Circuit	8	A

Fault Diagnosis

CAUTION:
• When checking for oxygen sensor signal faults, run the engine for at least 5–10 minutes to ensure the sensor has fully heated.

Oxygen Sensor Fault Check:

1. Check that the sensor harness connector is securely fitted. Disconnect the connector and inspect the sensor and harness pins for bending or deformation.
2. Check the resistance between pins 1 and 4, and the voltage between pin 1 and the main relay.
3. Reconnect the connector and run the engine for a short period. Check the voltage between pins A and C.
4. Additionally, the oxygen sensor provides indirect feedback; faults in other sensors may also trigger an oxygen sensor fault.
   a. Battery Voltage Unreliable
   b. Manifold Absolute Pressure (MAP) Signal Unreliable
   c. Engine Coolant Temperature (ECT) Sensor Signal Unreliable
   d. Injector Drive Circuit Fault

3.3.5.7 Coolant Temperature Sensor

Function Description

1. The Coolant Temperature Sensor monitors engine coolant temperature. It outputs a signal to the ECU to determine engine operating conditions and provides a signal to the instrument cluster for visual assessment of engine status. The engine coolant temperature sensor is normally located on the intake side of the cylinder block. Tilt the rear cargo box to access the sensor.

Operating Principle

1. Principle



a. The Sensor incorporates an NTC thermistor, whose resistance varies with ambient temperature, allowing accurate and timely measurement of small temperature changes. Measuring its output resistance reflects the temperature of the medium in contact. Terminals A and C output a signal to the ECU, while Terminal B is left floating.

Performance Parameters

1. Power: 0.25 W under Standard Operating Conditions
2. Operating Temperature: -30°C to +130°C
3. Insulation Resistance: Apply 500 V DC between A–C Circuit and B Circuit; Insulation Resistance Exceeds 10 MΩ.
4. Resistance–Temperature Characteristics

Temperature Range (°C)	Resistance at Terminals A and C (kΩ)
-20±0.1	13.71~16.49
25±0.1	1.825~2.155
80±0.1	0.303~0.326
110±0.1	0.1383~0.1451
	Resistance Value at Terminal B (Ω)
50±0.2	176~280
80±0.2	63.4~81.4
110±0.2	24.6~30.6

Fault Diagnosis

Coolant Temperature Sensor Malfunction Check:

1. Check that the sensor harness connector is securely fitted. Disconnect the connector and inspect the sensor and harness pins for bending or deformation.
2. Remove the sensor, inspect the probe for deformation, and check the resistance between Pins A and C.
3. Reconnect the connector and check the voltage between Pins A and C.

3.3.5.8 Engine Speed Sensor

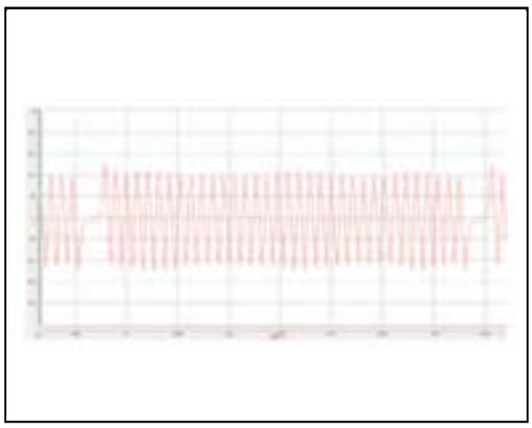
Function Description

1. The speed sensor operates on the magnetoelectric principle. As the shaft rotates, it drives the signal wheel. The teeth of the signal wheel cut through the magnetic flux, inducing an AC

voltage across the sensor coil. This output is sent to the ECU and represents crankshaft speed and position.

Technical Specifications

1. The speed sensor outputs a sine wave voltage signal.



a. The output signal is shown in the diagram on the left.

Coil resistance (at 23°C): 950 ± 20 Ω

Coil inductance (at 1000 Hz): 450 ± 15 mH

Fault Diagnosis

1. If the engine fails to start and all other fault points have been ruled out, use a multimeter to check if the coil resistance of the speed sensor meets the technical specifications.
2. If the resistance value is normal, use an oscilloscope to check if the voltage signal output by the sensor is correct.

CAUTION:
• When the sensor's pins are reversed, the first tooth signal after a missing tooth in the output voltage signal will be negative, which may cause engine misfire, unstable idle speed, or failure to start.

3.3.6 DTC Diagnosis and Procedure

3.3.6.1 DTC List

DTC List

DTC	Fault Description	Possible Causes	Recommended Repair Procedure
P003212	Bank 1 oxygen sensor heater control circuit high	Oxygen sensor harness failure	See: Diagnostic Trouble Code (DTC) diagnosis: P003212, P003111, P003013, P013217, P013116, P013029, P013413, P005212, P005111, P005013, P015217, P015116, P015029, P015413
		Oxygen sensor malfunction	
		ECU failure	
P003111	Bank 1 oxygen sensor heater control circuit low	Oxygen sensor harness failure	
		Oxygen sensor malfunction	
		ECU failure	
P003013	Bank 1 oxygen sensor heater control circuit open	Oxygen sensor harness failure	
		Oxygen sensor malfunction	
		ECU failure	
P013217	Bank 1 oxygen sensor signal circuit high	Oxygen sensor harness failure	
		Oxygen sensor malfunction	
		ECU failure	
P013116	Bank 1 oxygen sensor signal circuit low	Oxygen sensor harness failure	
		Oxygen sensor malfunction	
		ECU failure	
P013029	Bank 1 oxygen sensor signal implausible	Oxygen sensor harness failure	
		Oxygen sensor malfunction	
		ECU failure	
P013413	Bank 1 oxygen sensor signal fault	Oxygen sensor harness failure	
		Oxygen sensor malfunction	
		ECU failure	

DTC	Fault Description	Possible Causes	Recommended Repair Procedure
P005212	Bank 2 oxygen sensor heater control circuit voltage high	Oxygen sensor harness failure	
		Oxygen sensor malfunction	
		ECU failure	
P005111	Bank 2 oxygen sensor heater control circuit voltage low	Oxygen sensor harness failure	
		Oxygen sensor malfunction	
		ECU failure	
P005013	Bank 2 oxygen sensor heater control circuit open	Oxygen sensor harness failure	
		Oxygen sensor malfunction	
		ECU failure	
P015217	Bank 2 oxygen sensor signal circuit voltage too high	Oxygen sensor harness failure	
		Oxygen sensor malfunction	
		ECU failure	
P015116	Bank 2 oxygen sensor signal circuit voltage too low	Oxygen sensor harness failure	
		Oxygen sensor malfunction	
		ECU failure	
P015029	Bank 2 oxygen sensor signal implausible	Oxygen sensor harness failure	
		Oxygen sensor malfunction	
		ECU failure	
P015413	Bank 2 oxygen sensor signal fault	Oxygen sensor harness failure	
		Oxygen sensor malfunction	
		ECU failure	
P069212	Cooling fan control circuit high (low speed)	Fan control harness failure	See: DTC Diagnosis: P069212, P069111, P048013
		Fan relay failure	
		ECU failure	

DTC	Fault Description	Possible Causes	Recommended Repair Procedure
P069111	Cooling fan control circuit low (low speed)	Fan control harness failure	
		Fan relay failure	
		ECU failure	
P048013	Cooling fan control circuit open (low speed)	Fan control harness failure	
		Fan relay failure	
		ECU failure	
P057129	Brake Switch Signal out of Synchronisation	Brake switch wiring harness fault	See: DTC Diagnosis: P057129, P05711C
		Brake switch fault	
		ECU failure	
P05711C	Brake light signal circuit fault	Brake switch wiring harness fault	
		Brake switch fault	
		ECU failure	
P068816	Main relay output voltage signal fault	Main relay control wiring harness fault	See: DTC Diagnosis: P068816, P068829
		Main relay fault	
		ECU failure	
P068829	Main relay output voltage implausible	Main relay control wiring harness fault	
		Main relay fault	
		ECU failure	
P062912	Fuel pump relay control circuit high	Fuel pump relay control wiring harness fault	See: DTC Diagnosis: P062912, P062811, P062713
		Fuel pump relay failure	
		ECU failure	
P062811	Fuel pump relay control circuit fault	Fuel pump relay control wiring harness fault	
		Fuel pump relay failure	
		ECU failure	
P062713	Fuel pump relay control circuit fault	Fuel pump relay control wiring harness fault	
		Fuel pump relay failure	
		ECU failure	
P064100	Internal 5V sensor supply 1 fault	Power supply circuit fault	See: Diagnostic Trouble Code (DTC) diagnosis:
		ECU failure	

DTC	Fault Description	Possible Causes	Recommended Repair Procedure
P065100	Internal 5V sensor supply 2 fault	Power supply circuit fault	P064100, P065100, P210629, P060696, P060697, P060647, P060617, P060616, P060649, P060648, P060691
		ECU failure	
P210629	Load monitoring fault	Power supply circuit fault	
		ECU failure	
P060696	A/D converter zero-point test monitoring fault	Power supply circuit fault	
		ECU failure	
P060697	A/D converter reference voltage test monitoring fault	Power supply circuit fault	
		ECU failure	
P060647	Monitoring module feedback fault	Power supply circuit fault	
		ECU failure	
P060617	ECU controller fault (5V overvoltage monitoring fault)	Power supply circuit fault	
		ECU failure	
P060616	ECU controller fault (5V undervoltage monitoring fault)	Power supply circuit fault	
		ECU failure	
P060649	Monitoring module interrogation fault	Power supply circuit fault	
		ECU failure	
P060648	Monitoring error response fault	Power supply circuit fault	
		ECU failure	
P060691	DVE (throttle actuator) driver shut-off due to overvoltage	Power supply circuit fault	
		ECU failure	
U007388	CAN bus-off fault	CAN harness fault.	See：DTC Diagnosis: U007388、U014087、U012187、U015587、U019887、U029300
		ECU failure	
U012187	Lost communication or invalid data between ECU and BCM	BCM failure	
		CAN harness fault.	
		ECU failure	
U014087	Lost communication with ABS control module	ABS control module fault	
		CAN harness fault.	
		ECU failure	
U015587	Lost communication or invalid data between ECU and ICM (Instrument Cluster)	ICM failure	
		CAN harness fault.	
		ECU failure	
U019887	Lost communication	TBOX failure	

DTC	Fault Description	Possible Causes	Recommended Repair Procedure
	or invalid data between ECU and TBOX	CAN harness fault.	
		ECU failure	
U029300	Lost communication or invalid data between ECU and VCU	VCU failure	
		CAN harness fault.	
		ECU failure	
P0133	Bank 1 oxygen sensor slow response - rich to lean and lean to rich	Oxygen sensor malfunction	See: DTC Diagnosis: P0133, P0153
		Oxygen Sensor Connector	
		Intake System and Vacuum Line Air Leak	
		Exhaust System Leak	
P0153	Bank 2 oxygen sensor slow response - rich to lean and lean to rich	Oxygen sensor malfunction	
		Oxygen Sensor Connector	
		Intake System and Vacuum Line Air Leak	
		Exhaust System Leak	
P030000	Misfire	Injector failure	See: DTC Diagnosis: P030000, P030100, P130A00, P030200
		Ignition coil failure	
		Spark plug failure	
		Insufficient airtightness	
		Mechanical failure	
P030100	Cylinder 1 misfire detected	Injector failure	
		Ignition coil failure	
		Spark plug failure	
		Insufficient airtightness	
		Mechanical failure	
P130A00	Cylinder Deactivation Due to Misfire	Injector failure	
		Ignition coil failure	
		Spark plug failure	
		Insufficient airtightness	
		Mechanical failure	
P030200	Cylinder 2 misfire detected	Injector failure	

DTC	Fault Description	Possible Causes	Recommended Repair Procedure
		Ignition coil failure	
		Spark plug failure	
		Insufficient airtightness	
		Mechanical failure	
P056216	System battery voltage too low	Battery voltage too low	See: DTC Diagnosis: P056216, P05601C
		ECU harness failure	
		ECU failure	
P05601C	System battery voltage signal unreasonable	Battery voltage too low	
		ECU harness failure	
		ECU failure	
P056317	System battery voltage signal too high	Battery voltage too high	See: DTC Diagnosis: P056317
		Alternator failure	
		ECU failure	
P010817	Cylinder 1 intake manifold pressure sensor circuit high	Intake Manifold Pressure Sensor harness failure	See: DTC Diagnosis: P010817, P010716, P2A0D17, P2A0C16
		Intake manifold pressure sensor malfunction	
		ECU failure	
P010716	Cylinder 1 intake manifold pressure sensor circuit low	Intake Manifold Pressure Sensor harness failure	
		Intake manifold pressure sensor malfunction	
		ECU failure	
P2A0D17	Cylinder 2 intake manifold pressure sensor circuit high	Intake Manifold Pressure Sensor harness failure	
		Intake manifold pressure sensor malfunction	
		ECU failure	
P2A0C16	Cylinder 2 intake manifold pressure sensor circuit low	Intake Manifold Pressure Sensor harness failure	
		Intake manifold pressure sensor malfunction	
		ECU failure	
P011317	IAT sensor circuit high	IAT sensor harness failure	See: DTC Diagnosis: P011317, P011216
		IAT sensor malfunction	
		ECU failure	
P011216	IAT sensor circuit low	IAT sensor harness	

DTC	Fault Description	Possible Causes	Recommended Repair Procedure
		failure	
		IAT sensor malfunction	
		ECU failure	
P011817	Engine Coolant Temperature (ECT) sensor circuit high	Engine coolant temperature sensor harness failure	See: DTC Diagnosis: P011817, P011716
		Engine coolant temperature sensor malfunction	
		ECU failure	
P011716	Engine Coolant Temperature (ECT) sensor circuit low	Engine coolant temperature sensor harness failure	
		Engine coolant temperature sensor malfunction	
		ECU failure	
P045912	EVAP canister purge valve control circuit high	EVAP Canister Purge Valve Control Circuit Wiring Fault	See: DTC Diagnosis: P011817, P011716
		EVAP Canister Purge Valve Control Fault	
		ECU failure	
P045811	EVAP canister purge valve control circuit low	EVAP Canister Purge Valve Control Circuit Wiring Fault	
		EVAP Canister Purge Valve Control Fault	
		ECU failure	
P044413	Charcoal canister control valve control circuit open	EVAP Canister Purge Valve Control Circuit Wiring Fault	
		EVAP Canister Purge Valve Control Fault	
		ECU failure	
P026212	Cylinder 1 fuel injector control circuit high	Fuel Injector Control Circuit Wiring Fault	See: DTC Diagnosis: P026212、P026111、P020113、P026512、P026411、P020213
		Injector failure	
		ECU failure	

DTC	Fault Description	Possible Causes	Recommended Repair Procedure
P026111	Cylinder 1 fuel injector control circuit low	Fuel Injector Control Circuit Wiring Fault	
		Injector failure	
		ECU failure	
P020113	Cylinder 1 fuel injector control circuit open	Fuel Injector Control Circuit Wiring Fault	
		Injector failure	
		ECU failure	
P026512	Cylinder 2 fuel injector control circuit high	Fuel Injector Control Circuit Wiring Fault	
		Injector failure	
		ECU failure	
P026411	Cylinder 2 fuel injector control circuit low	Fuel Injector Control Circuit Wiring Fault	
		Injector failure	
		ECU failure	
P020213	Cylinder 2 fuel injector control circuit open	Fuel Injector Control Circuit Wiring Fault	
		Injector failure	
		ECU failure	
P050129	Vehicle speed signal failure	Vehicle Speed Sensor Wiring Fault	See: DTC Diagnosis: P050129
		Vehicle speed sensor malfunction	
		ECU failure	
P032200	Crankshaft Speed Sensor - No Signal	Crankshaft Speed Sensor Wiring Fault	See: DTC Diagnosis: P032200
		Crankshaft Speed Sensor Fault	
		ECU failure	
P230100	Cylinder 1 ignition coil control circuit high	Ignition Coil Control Circuit Wiring Fault	See: DTC Diagnosis: P230100, P230400, P230000, P230300
		Ignition coil failure	
		ECU failure	
P230400	Cylinder 2 ignition coil control circuit high	Ignition Coil Control Circuit Wiring Fault	
		Ignition coil failure	

DTC	Fault Description	Possible Causes	Recommended Repair Procedure
		ECU failure	
P230000	Cylinder 1 ignition coil control circuit low	Ignition Coil Control Circuit Wiring Fault	
		Ignition coil failure	
		ECU failure	
P230300	Cylinder 2 ignition coil control circuit low	Ignition Coil Control Circuit Wiring Fault	
		Ignition coil failure	
		ECU failure	
P012317	Electronic throttle position sensor 1 signal circuit high	Electronic throttle position sensor harness failure	See: Diagnostic Trouble Code (DTC) diagnosis: P012317, P012216, P012129, P022317, P022216, P022129, P212317, P212216, P213829, P212817, P212716
		Electronic throttle position sensor failure	
		ECU failure	
P012216	Electronic throttle position sensor 1 signal circuit low	Electronic throttle position sensor harness failure	
		Electronic throttle position sensor failure	
		ECU failure	
P012129	Electronic throttle position sensor 1 signal implausible	Electronic throttle position sensor harness failure	
		Electronic throttle position sensor failure	
		ECU failure	
P022317	Electronic throttle position sensor 2 signal circuit high	Electronic throttle position sensor harness failure	
		Electronic throttle position sensor failure	
		ECU failure	
P022216	Electronic throttle position sensor 2 signal circuit low	Electronic throttle position sensor harness failure	
		Electronic throttle position sensor failure	
		ECU failure	

DTC	Fault Description	Possible Causes	Recommended Repair Procedure
P022129	Electronic throttle position sensor 2 signal implausible	Electronic throttle position sensor harness failure	
		Electronic throttle position sensor failure	
		ECU failure	
P212317	Electronic accelerator pedal position sensor 1 signal circuit high	Electronic accelerator pedal position sensor wiring harness fault	
		Electronic accelerator pedal position sensor fault	
		ECU failure	
P212216	Electronic accelerator pedal position sensor 1 signal circuit low	Electronic accelerator pedal position sensor wiring harness fault	
		Electronic accelerator pedal position sensor fault	
		ECU failure	
P213829	Electronic accelerator pedal position sensor signal implausible	Electronic accelerator pedal position sensor wiring harness fault	
		Electronic accelerator pedal position sensor fault	
		ECU failure	
P212817	Electronic accelerator pedal position sensor 2 signal circuit high	Electronic accelerator pedal position sensor wiring harness fault	
		Electronic accelerator pedal position sensor fault	
		ECU failure	
P212716	Electronic accelerator pedal position sensor 2 signal circuit low	Electronic accelerator pedal position sensor wiring harness fault	
		Electronic accelerator pedal position sensor fault	

DTC	Fault Description	Possible Causes	Recommended Repair Procedure
		ECU failure	
P210612	Electronic throttle driver stage fault (short circuit)	Electronic Throttle Control Wiring Fault	See: Diagnostic Trouble Code (DTC) diagnosis: P210612、P210619、P210692、P210613、P156800、P154500、P154522、P154521、P156500、P060694、P060692、P060664、P060661、P060667、P06061C、P060655、P060600、P060662、P155900、P157900、P156400、P155929
		Electronic Throttle Control Fault	
		ECU failure	
P210619	Electronic throttle driver stage fault (overtemperature or overcurrent)	Electronic Throttle Control Wiring Fault	
		Electronic Throttle Control Fault	
		ECU failure	
P210692	Electronic throttle driver stage fault (implausible)	Electronic Throttle Control Wiring Fault	
		Electronic Throttle Control Fault	
		ECU failure	
P210613	Electronic throttle driver stage fault (open circuit)	Electronic Throttle Control Wiring Fault	
		Electronic Throttle Control Fault	
		ECU failure	
P156800	Return spring test - upper limit exceeded	Return spring test - upper limit exceeded	
		ECU failure	
P154500	DVE (throttle actuator) position deviation fault	DVE Position Deviation	
		ECU failure	
P154522	Throttle body PID regulation - upper limit exceeded	Throttle body PID regulation - upper limit exceeded	
		ECU failure	
P154521	Throttle body PID regulation - lower limit exceeded	Throttle body PID regulation - lower limit exceeded	
		ECU failure	
P156500	Electronic throttle lower stop initialization adaptation fault	Electronic throttle lower stop initialization adaptation fault	
		ECU failure	
P060694	Electronic throttle	Electronic Throttle	

DTC	Fault Description	Possible Causes	Recommended Repair Procedure
	safety monitoring function fault (Level 2 torque monitoring fault)	Control Safety Monitoring Fault	
		ECU failure	
P060692	Electronic throttle safety monitoring function fault (Level 2 engine speed monitoring fault)	Electronic Throttle Control Safety Monitoring Fault	
		ECU failure	
P060664	Electronic throttle safety monitoring function fault (load signal, wiring harness, or ECU fault)	Electronic Throttle Control Safety Monitoring Fault	
		ECU failure	
P060661	Electronic throttle safety monitoring function fault (ignition angle signal, wiring harness, or ECU fault)	Electronic Throttle Control Safety Monitoring Fault	
		ECU failure	
P060667	Electronic throttle safety monitoring function fault (ECU error response monitoring fault)	Electronic Throttle Control Safety Monitoring Fault	
		ECU failure	
P06061C	Electronic throttle safety monitoring function fault (throttle body signal, wiring harness, or ECU fault)	Electronic Throttle Control Safety Monitoring Fault	
		ECU failure	
P060655	Electronic throttle safety monitoring function fault (corruption code monitoring fault)	Electronic Throttle Control Safety Monitoring Fault	
		ECU failure	
P060600	Electronic throttle safety monitoring function fault (safety monitoring fuel cut-off fault)	Electronic Throttle Control Safety Monitoring Fault	
		ECU failure	
P060662	Electronic throttle safety monitoring	Electronic Throttle Control Safety	

DTC	Fault Description	Possible Causes	Recommended Repair Procedure
	function fault (Level 2 accelerator pedal signal plausibility fault)	Monitoring Fault	
		ECU failure	
P155900	Throttle limp-home position adaptation fault	Throttle limp-home position adaptation fault	
		ECU failure	
P157900	Electronic throttle adaptation conditions not met	Electronic throttle adaptation conditions not met	
		ECU failure	
P156400	System voltage out of range for electronic throttle adaptation	System voltage out of range for electronic throttle adaptation	
		ECU failure	
P155929	Throttle mechanical lower stop re-adaptation fault	Throttle mechanical lower stop re-adaptation fault	
		ECU failure	
P041212	Secondary air injection control valve circuit high	Secondary Air Injection Control Valve Wiring Fault	See： DTC Diagnosis: P041212, P041411, P041313
		ECU failure	
P041411	Secondary air injection control valve circuit low	Secondary Air Injection Control Valve Wiring Fault	
		ECU failure	
P041313	Secondary air injection control valve circuit open	Secondary Air Injection Control Valve Wiring Fault	
		ECU failure	
P065011	MIL (Malfunction Indicator Lamp) control circuit low	Fault	See： DTC Diagnosis: P065011, P065013, P065012
		ECU failure	
P065013	MIL Control Circuit Open	Malfunction Indicator Lamp (MIL) Control Circuit Fault	
		ECU failure	
P065012	MIL control circuit high	Malfunction Indicator Lamp (MIL) Control Circuit Fault	

DTC	Fault Description	Possible Causes	Recommended Repair Procedure
		ECU failure	
P213800	Accelerator pedal travel check fault	Accelerator pedal travel check fault	See: DTC Diagnosis: P213800
		ECU failure	

3.3.6.2 Diagnostic Trouble Code (DTC) diagnosis: P003212, P003111, P003013, P013217, P013116, P013029, P013413, P005212, P005111, P005013, P015217, P015116, P015029, P015413

DTC Description

DTC	Fault Description	Possible Causes
P003212	Bank 1 oxygen sensor heater control circuit high	Oxygen sensor harness failure
		Oxygen sensor malfunction
		ECU failure
P003111	Bank 1 oxygen sensor heater control circuit low	Oxygen sensor harness failure
		Oxygen sensor malfunction
		ECU failure
P003013	Bank 1 oxygen sensor heater control circuit open	Oxygen sensor harness failure
		Oxygen sensor malfunction
		ECU failure
P013217	Bank 1 oxygen sensor signal circuit high	Oxygen sensor harness failure
		Oxygen sensor malfunction
		ECU failure
P013116	Bank 1 oxygen sensor signal circuit low	Oxygen sensor harness failure
		Oxygen sensor malfunction
		ECU failure
P013029	Bank 1 oxygen sensor signal implausible	Oxygen sensor harness failure
		Oxygen sensor malfunction
		ECU failure
P013413	Bank 1 oxygen sensor signal fault	Oxygen sensor harness failure
		Oxygen sensor malfunction
		ECU failure
P005212	Bank 2 oxygen sensor heater control circuit voltage high	Oxygen sensor harness failure
		Oxygen sensor malfunction
		ECU failure

DTC	Fault Description	Possible Causes
P005111	Bank 2 oxygen sensor heater control circuit voltage low	Oxygen sensor harness failure
		Oxygen sensor malfunction
		ECU failure
P005013	Bank 2 oxygen sensor heater control circuit open	Oxygen sensor harness failure
		Oxygen sensor malfunction
		ECU failure
P015217	Bank 2 oxygen sensor signal circuit voltage too high	Oxygen sensor harness failure
		Oxygen sensor malfunction
		ECU failure
P015116	Bank 2 oxygen sensor signal circuit voltage too low	Oxygen sensor harness failure
		Oxygen sensor malfunction
		ECU failure
P015029	Bank 2 oxygen sensor signal implausible	Oxygen sensor harness failure
		Oxygen sensor malfunction
		ECU failure
P015413	Bank 2 oxygen sensor signal fault	Oxygen sensor harness failure
		Oxygen sensor malfunction
		ECU failure

Diagnostic procedure: Bank 2 oxygen sensor fault (Example).

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No — Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No

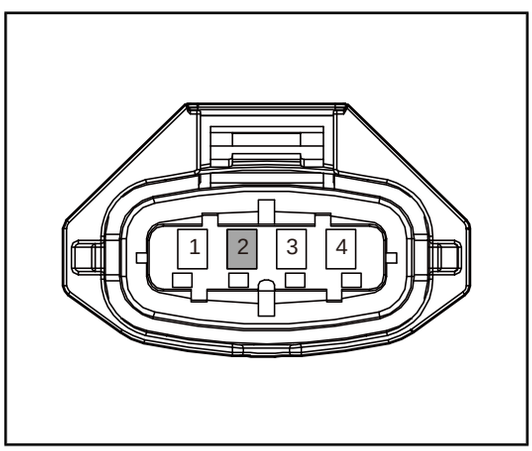
Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

Step 3	Checking the oxygen sensor heater control wiring harness

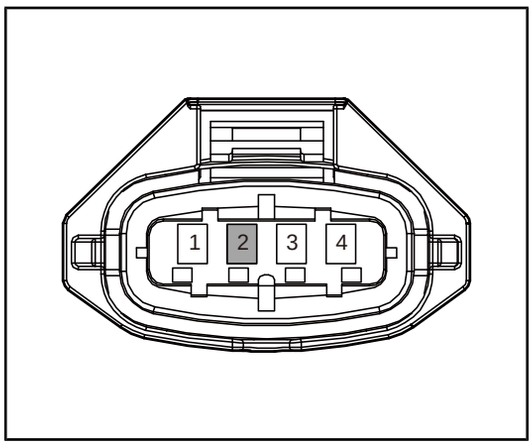
a. Turn the vehicle power "OFF".
b. Disconnect the oxygen sensor connector B066.
c. Turn the vehicle power "ON".
d. Use a digital multimeter to measure the voltage between terminal 2 of the ECU connector B066 and earth.

Voltage value:



Terminal number	Terminal number	Standard value
B066(2)	Earth	0V

e. Turn the vehicle power "OFF".
f. Use a digital multimeter to measure the resistance value between terminal 2 of the oxygen sensor



connector B066 and earth.

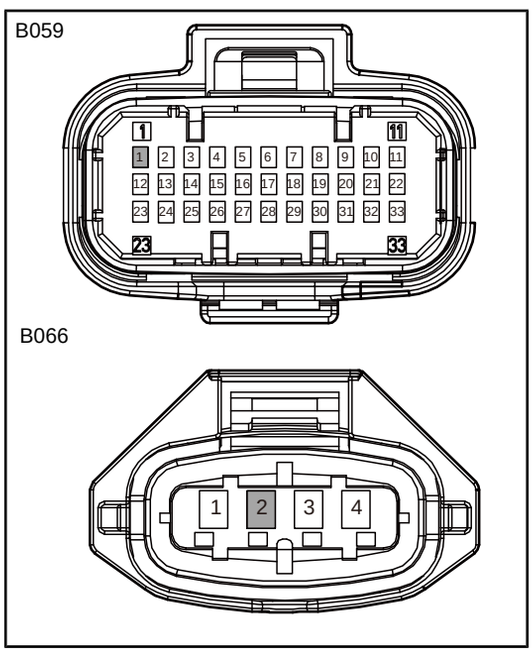
Resistance value:

Terminal number	Terminal number	Standard value
B066(2)	Earth	> 10kΩ

g. Disconnect the ECU connector B076.

h. Use a digital multimeter to measure the resistance value between terminal 2 of the oxygen sensor connector B066 and terminal 1 of the ECU connector B059.

Resistance value:



Terminal number	Terminal number	Standard value
B066(2)	B059(1)	< 1Ω

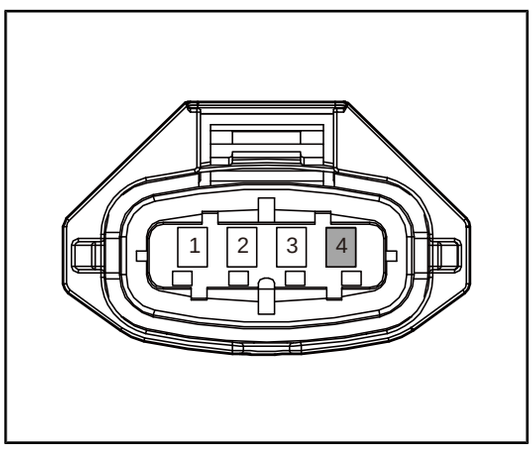
i. Is the result normal?

No — Repair or replace the oxygen sensor heater control wiring harness.

Yes

Step 4	Inspecting the oxygen sensor signal harness

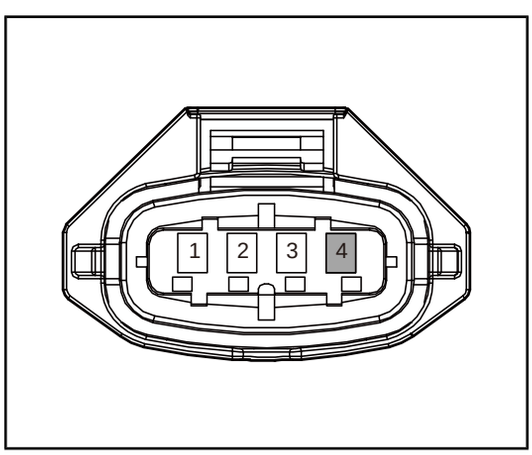
a. Turn the vehicle power "OFF".
b. Disconnect the oxygen sensor connector B066.
c. Turn the vehicle power "ON".
d. Use a digital multimeter to measure the voltage between terminal 4 of the oxygen sensor connector B066 and earth.



Voltage value:

Terminal number	Terminal number	Standard value
B066(4)	Earth	0V

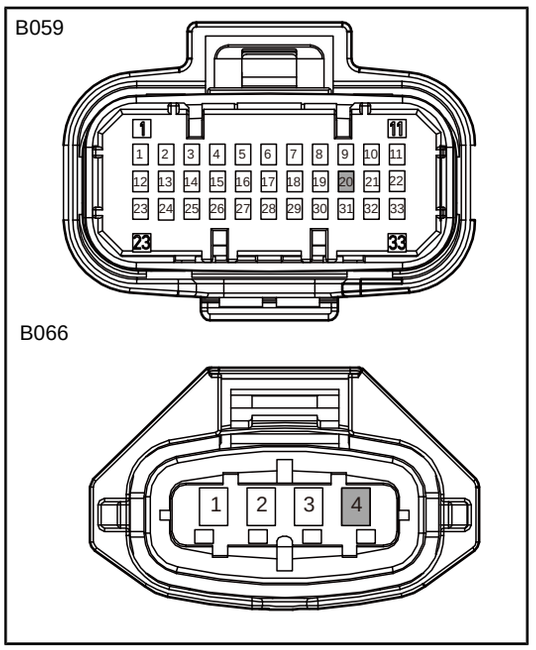
e. Turn the vehicle power "OFF".
f. Use a digital multimeter to measure the resistance value between terminal 4 of the oxygen sensor connector B066 and earth.



Resistance value:

Terminal number	Terminal number	Standard value
B066(4)	Earth	> 10kΩ

g. Disconnect the ECU connector B059.
h. Use a digital multimeter to measure the resistance value between terminal 4 of the oxygen sensor connector B066 and terminal 20 of the ECU



connector B059.

Resistance value:

Terminal number	Terminal number	Standard value
B066(4)	B059(20)	< 1Ω

i. Is the result normal?

No — Repair or replace the oxygen sensor signal harness.

Yes

Step 5	Inspecting the oxygen sensor

a. Turn the vehicle power "OFF".
b. Disconnect the oxygen sensor connector B066.
c. Inspect the oxygen sensor.
d. Is the result normal?

No — Repair or replace the oxygen sensor.

Yes

Step 6	Inspecting the ECU

a. Replace the ECU with a new one.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check during a test drive.
d. Is the result normal?

Yes → Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

3.3.6.3 DTC Diagnosis: P069212, P069111, P048013

DTC Description

DTC	Fault Description	Possible Causes
P069212	Cooling fan control circuit high (low speed)	Fan control harness failure
		Fan relay failure
		ECU failure
P069111	Cooling fan control circuit low (low speed)	Fan control harness failure
		Fan relay failure
		ECU failure
P048013	Cooling fan control circuit open (low speed)	Fan control harness failure
		Fan relay failure
		ECU failure

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No → Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No

Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

Step 3	Inspecting the fan control circuit

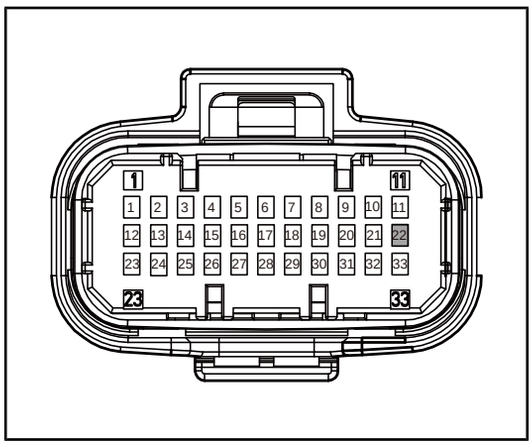
a. Turn the vehicle power "OFF".
b. Disconnect the fan relay.
c. Turn the vehicle power "ON".
d. Use a digital multimeter to measure the voltage between terminal 85 of the fan relay socket and earth.
Voltage value:

Terminal number	Terminal number	Standard value
Fan relay socket (85).	Earth	0V

e. Turn the vehicle power "OFF".
f. Use a digital multimeter to measure the resistance value between terminal 85 of the fan relay socket and earth.
Resistance value:

Terminal number	Terminal number	Standard value
Fan relay socket (85).	Earth	> 10kΩ

g. Disconnect ECU connector B059.
h. Use a digital multimeter to measure the resistance value between terminal 85 of the fan relay socket



and terminal 22 of the ECU connector B059.

Resistance value:

Terminal number	Terminal number	Standard value
Fan relay socket (85).	B059(22)	< 1Ω

i. Is the result normal?

No — Repair or replace the fan control harness.

Yes

Step 4	Checking the fan relay

a. Turn the vehicle power "OFF".
b. Disconnect the fan relay.
c. Inspect the fan relay.
d. Is the result normal?

No — Replace the relay with one of the same type and rating.

Yes

Step 5	Inspecting the ECU

a. Replace the ECU with a new one.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check during a test drive.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

3.3.6.4 DTC Diagnosis: P057129, P05711C

DTC Description

DTC	Fault Description	Possible Causes
P057129	Brake Switch Signal out of Synchronisation	Brake switch wiring harness fault
		Brake switch fault
		ECU failure
P05711C	Brake light signal circuit fault	Brake switch wiring harness fault
		Brake switch fault
		ECU failure

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No — Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

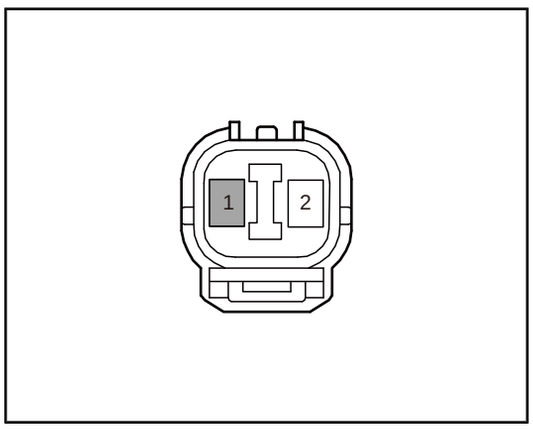
No — Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

Step 3	Inspecting the brake pedal switch wiring harness

a. Turn the vehicle power "OFF".
b. Disconnect the foot brake switch connector B043.
c. Use a digital multimeter to measure the voltage between terminal 1 of the foot brake switch connector B043 and earth.

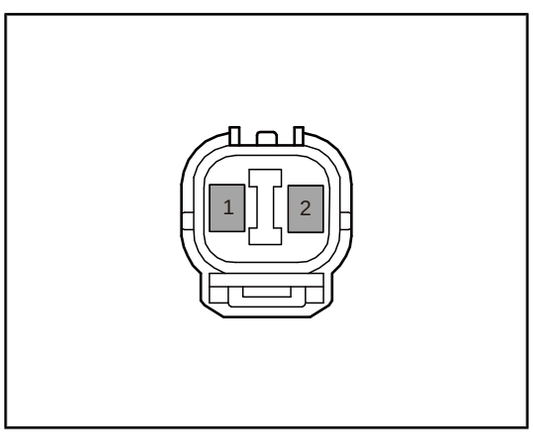
Resistance value:



Terminal number	Terminal number	Standard value
B043(1)	Earth	< 1Ω

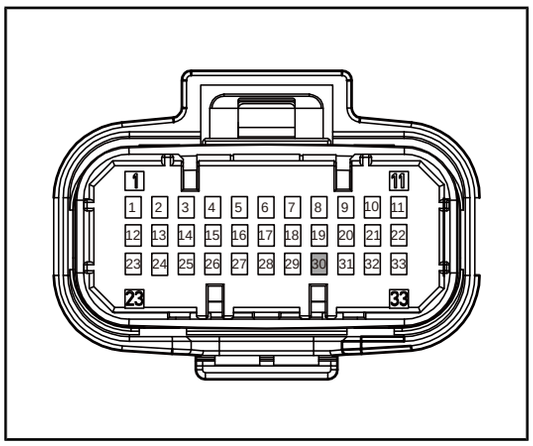
d. Using a digital multimeter, measure the resistance between terminals 2 and 1 of brake pedal switch connector B043.

Resistance value:



Terminal number	Terminal number	Standard value
B043(2)	B043(1)	> 10kΩ

e. Connect the foot brake switch connector B043.
f. Disconnect ECU connector B059.
g. Turn the vehicle power "ON".
h. Depress the foot brake pedal.
i. Use a digital multimeter to measure the resistance between terminal 30 of the ECU connector B059



and earth.

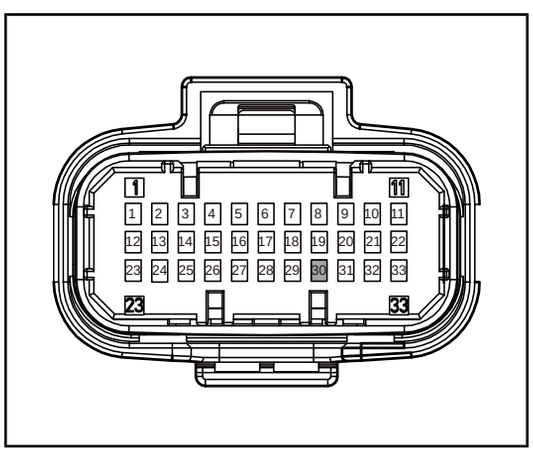
Resistance value:

Terminal number	Terminal number	Standard value
B059(30)	Earth	< 1Ω

j. Loosen the brake pedal switch.

k. Use a digital multimeter to measure the resistance between terminal 30 of the ECU connector B059 and earth.

Resistance value:



Terminal number	Terminal number	Standard value
B059(30)	Earth	> 10kΩ

l. Is the result normal?

No — Repair or replace the wiring associated with the brake pedal switch.

Yes

Step 4	Inspecting the ECU

a. Replace the ECU with a new one.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check during a test drive.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

3.3.6.5 DTC Diagnosis: P068816, P068829

DTC Description

DTC	Fault Description	Possible Causes
P068816	Main relay output voltage signal fault	Main relay control wiring harness fault
		Main relay fault
		ECU failure
P068829	Main relay output voltage implausible	Main relay control wiring harness fault
		Main relay fault
		ECU failure

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No — Check the battery and alternator.

Yes

Step 2	Retrieve DTC

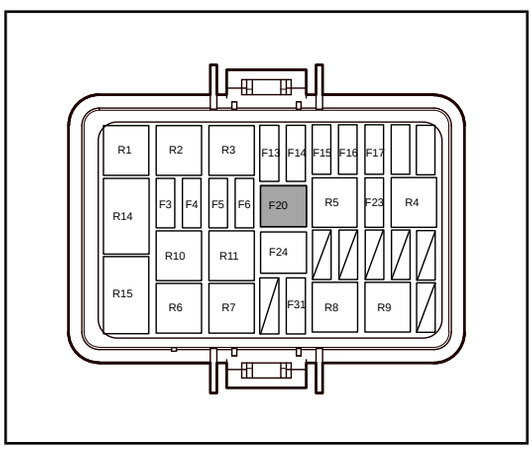
a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No — Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

Step 3	Inspecting the fuse

a. Switch the vehicle power “OFF” and disconnect the battery earthing cable.



b. Remove the fuse F20 (50A) from the fuse box.
c. Check if the fuse is blown.

Yes — Replace with a fuse of the same specification.

No

Step 4	Checking the main relay control circuit

a. Turn the vehicle power "OFF".
b. Disconnect the main relay.
c. Turn the vehicle power "ON".
d. Use a digital multimeter to measure the voltage between terminal 85 of the main relay socket and earth.
Voltage value:

Terminal number	Terminal number	Standard value
Main Relay Base (Terminal 85)	Earth	0V

e. Turn the vehicle power "OFF".

f. Use a digital multimeter to measure the resistance value between terminal 85 of the main relay socket and earth.

Resistance value:

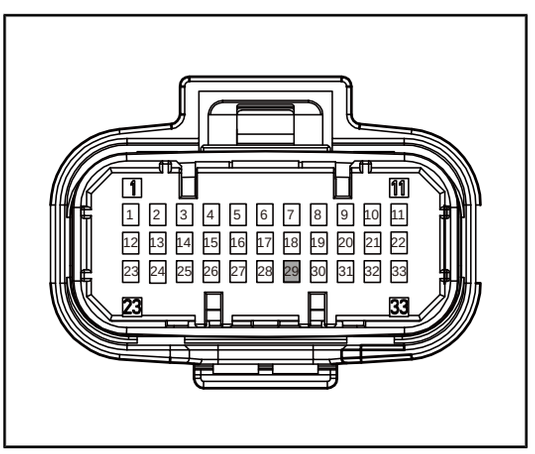
Terminal number	Terminal number	Standard value
Main Relay Base (Terminal 85)	Earth	> 10kΩ

g. Disconnect ECU connector B059.

h. Use a digital multimeter to measure the resistance value between terminal 85 of the main relay socket and terminal 29 of the ECU connector B059.

Resistance value:

Terminal number	Terminal number	Standard value
Main Relay Base (Terminal 85)	B059(29)	< 1Ω



i. Is the result normal?

No — Repair or replace the main relay wiring harness.

Yes

Step 5	Checking the main relay

a. Turn the vehicle power "OFF".
b. Disconnect the fan relay.
c. Inspect the fan relay.
d. Is the result normal?

No → Rectify the relevant fault.

Yes

Step 6	Inspecting the ECU

a. Replace the ECU with a new one.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check during a test drive.
d. Is the result normal?

Yes → Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

3.3.6.6 Diagnostic Trouble Code (DTC) diagnosis: P012317, P012216, P012129, P022317, P022216, P022129, P212317, P212216, P213829, P212817, P212716

DTC Description

DTC	Fault Description	Possible Causes
P012317	Electronic throttle position sensor 1 signal circuit high	Electronic throttle position sensor harness failure
		Electronic throttle position sensor failure
		ECU failure
P012216	Electronic throttle position sensor 1 signal circuit low	Electronic throttle position sensor harness failure
		Electronic throttle position sensor failure
		ECU failure
P012129	Electronic throttle position sensor 1 signal implausible	Electronic throttle position sensor harness failure
		Electronic throttle position sensor failure
		ECU failure
P022317	Electronic throttle	Electronic throttle position sensor harness failure

DTC	Fault Description	Possible Causes
	position sensor 2 signal circuit high	Electronic throttle position sensor failure
		ECU failure
P022216	Electronic throttle position sensor 2 signal circuit low	Electronic throttle position sensor harness failure
		Electronic throttle position sensor failure
		ECU failure
P022129	Electronic throttle position sensor 2 signal implausible	Electronic throttle position sensor harness failure
		Electronic throttle position sensor failure
		ECU failure
P212317	Electronic accelerator pedal position sensor 1 signal circuit high	Electronic accelerator pedal position sensor wiring harness fault
		Electronic accelerator pedal position sensor fault
		ECU failure
P212216	Electronic accelerator pedal position sensor 1 signal circuit low	Electronic accelerator pedal position sensor wiring harness fault
		Electronic accelerator pedal position sensor fault
		ECU failure
P213829	Electronic accelerator pedal position sensor signal implausible	Electronic accelerator pedal position sensor wiring harness fault
		Electronic accelerator pedal position sensor fault
		ECU failure
P212817	Electronic accelerator pedal position sensor 2 signal circuit high	Electronic accelerator pedal position sensor wiring harness fault
		Electronic accelerator pedal position sensor fault
		ECU failure
P212716	Electronic accelerator pedal position sensor 2 signal circuit low	Electronic accelerator pedal position sensor wiring harness fault
		Electronic accelerator pedal position sensor fault
		ECU failure

The following diagnostic procedure uses an electronic throttle position sensor fault as an example.

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel

displays normal battery voltage.

b. Is the result normal?

No — Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No — Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

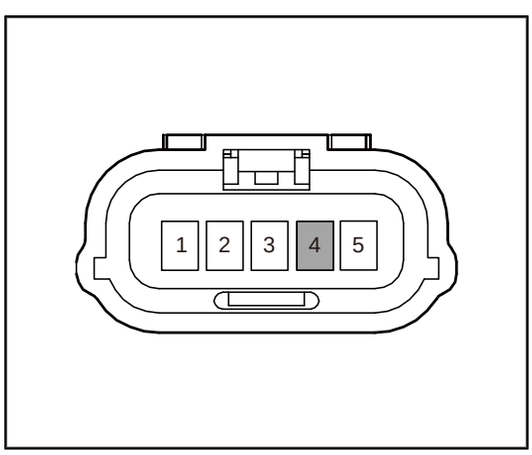
Yes

Step 3	Inspecting the throttle position sensor circuit

a. Turn the vehicle power "OFF".
b. Disconnect connector B069 from the integrated TPS/intake air temperature/intake pressure sensor.
c. Turn the vehicle power "ON".
d. Using a digital multimeter, measure the voltage between terminal 4 of integrated TPS/intake air temperature/intake pressure sensor connector B069 and ground.

Voltage value:

Terminal number	Terminal number	Standard value
B069(4)	Earth	0V

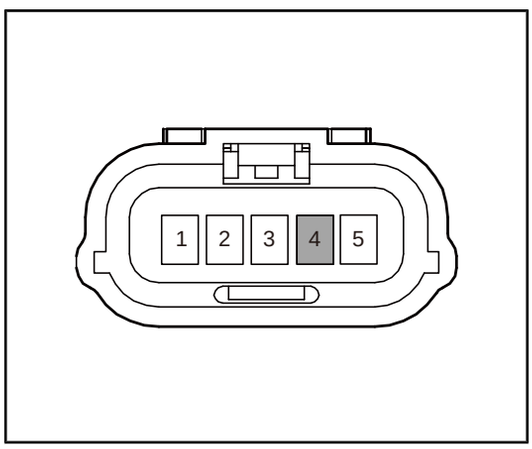


e. Turn the vehicle power "OFF".

f. Using a digital multimeter, measure the resistance between terminal 4 of integrated TPS/intake air temperature/intake pressure sensor connector B069 and ground.

Resistance value:

Terminal number	Terminal number	Standard value
B069(4)	Earth	> 10kΩ



g. Is the result normal?

No → Repair or replace the intake manifold pressure sensor harness.

Yes

Step 4	Inspecting the throttle position sensor

a. Turn the vehicle power "OFF".

b. Inspect the throttle position sensor.

c. Is the result normal?

No → Repair or replace the integrated TPS/intake air temperature/intake pressure sensor.

Yes

Step 5	Inspecting the ECU

a. Replace the ECU with a new one.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check during a test drive.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

3.3.6.7 DTC Diagnosis: P062912, P062811, P062713

DTC Description

DTC	Fault Description	Possible Causes
P062912	Fuel pump relay control circuit high	Fuel pump relay control wiring harness fault
		Fuel pump relay failure
		ECU failure
P062811	Fuel pump relay control circuit fault	Fuel pump relay control wiring harness fault
		Fuel pump relay failure
		ECU failure
P062713	Fuel pump relay control circuit fault	Fuel pump relay control wiring harness fault
		Fuel pump relay failure
		ECU failure

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No — Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No

Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

Step 3	Checking the fuel pump relay control circuit

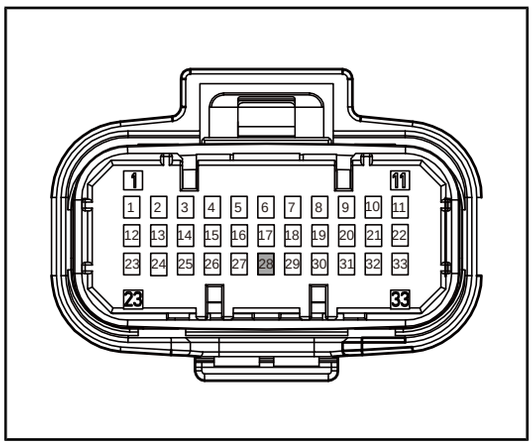
a. Turn the vehicle power "OFF".
b. Disconnect the fuel pump relay.
c. Turn the vehicle power "ON".
d. Use a digital multimeter to measure the voltage between terminal 85 of the fuel pump relay socket and earth.
Voltage value:

Terminal number	Terminal number	Standard value
Fuel pump relay socket (85).	Earth	0V

e. Turn the vehicle power "OFF".
f. Use a digital multimeter to measure the resistance value between terminal 85 of the fuel pump relay socket and earth.
Resistance value:

Terminal number	Terminal number	Standard value
Fuel pump relay socket (85).	Earth	> 10kΩ

g. Disconnect ECU connector B059.
h. Use a digital multimeter to measure the resistance value between terminal 85 of the fuel pump relay



socket and terminal 28 of the ECU connector B059.

Resistance value:

Terminal number	Terminal number	Standard value
Fuel pump relay socket (85).	B059(28)	< 1Ω

i. Is the result normal?

No — Repair or replace the fuel pump relay control wiring harness.

Yes

Step 4	Inspecting the fuel pump relay

a. Turn the vehicle power "OFF".
b. Disconnect the fuel pump relay.
c. Inspect the fuel pump relay.
d. Is the result normal?

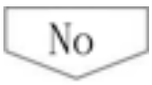
No — Rectify the relevant fault.

Yes

Step 5	Inspecting the ECU

a. Replace the ECU with a new one.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check during a test drive.
d. Is the result normal?

Yes — Fault rectified.



Recheck according to the above Diagnostic Procedure.

3.3.6.8 Diagnostic Trouble Code (DTC) diagnosis: P064100, P065100, P210629, P060696, P060697, P060647, P060617, P060616, P060649, P060648, P060691

DTC Description

DTC	Fault Description	Possible Causes
P064100	Internal 5V sensor supply 1 fault	Power supply circuit fault
		ECU failure
P065100	Internal 5V sensor supply 2 fault	Power supply circuit fault
		ECU failure
P210629	Load monitoring fault	Power supply circuit fault
		ECU failure
P060696	A/D converter zero-point test monitoring fault	Power supply circuit fault
		ECU failure
P060697	A/D converter reference voltage test monitoring fault	Power supply circuit fault
		ECU failure
P060647	Monitoring module feedback fault	Power supply circuit fault
		ECU failure
P060617	ECU controller fault (5V overvoltage monitoring fault)	Power supply circuit fault
		ECU failure
P060616	ECU controller fault (5V undervoltage monitoring fault)	Power supply circuit fault
		ECU failure
P060649	Monitoring module interrogation fault	Power supply circuit fault
		ECU failure
P060648	Monitoring error response fault	Power supply circuit fault
		ECU failure
P060691	DVE (throttle actuator) driver shut-off due to overvoltage	Power supply circuit fault
		ECU failure

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No → Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No → Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

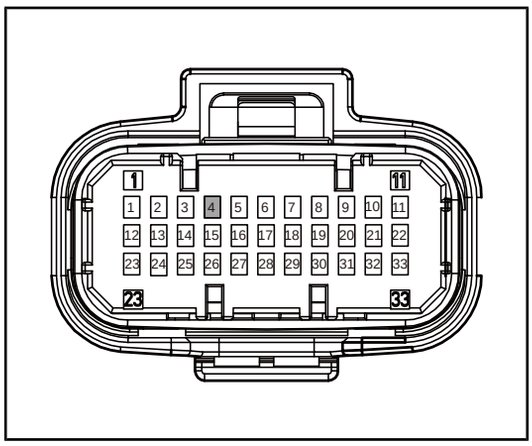
Step 3	Inspecting the ECU power supply

a. Switch the vehicle power “OFF” and disconnect the battery earthing cable.
b. Disconnect the ECU connector B059.
c. Connect the battery earth cable and start the vehicle.
d. Use a digital multimeter to measure the voltage between terminal 4 of the ECU connector B059

and earth.

Voltage value:

Terminal number	Terminal number	Standard value
B059(4)	Earth	11 ~ 14V



e. Is the result normal?

No → Repair or replace the ECU power supply harness.

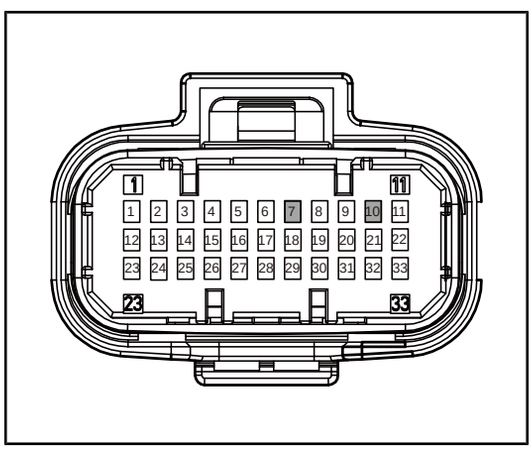
Yes

Step 4	Inspecting the ECU earth connection

a. Switch the vehicle power "OFF" and disconnect the battery earthing cable.
b. Disconnect the ECU connector B059.
c. Connect the battery earth cable and start the vehicle.
d. Use a digital multimeter to measure the resistance between terminal 7 and 10 of the ECU connector B059 and earth.

Resistance value:

Terminal number	Terminal number	Standard value
B059(7)	Earth	< 1Ω
B059(10)	Earth	< 1Ω



e. Is the result normal?

No — Repair or replace the ECU earth strap.

Yes

Step 5	Inspecting the ECU

a. Replace the ECU with a new one.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check during a test drive.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

3.3.6.9 DTC Diagnosis: U007388、U014087、U012187、U015587、U019887、U029300

DTC Description

DTC	Fault Description	Possible Causes
U007388	CAN bus-off fault	CAN harness fault.
		ECU failure
U014087	Lost communication or invalid data between ECU and BCM	BCM failure
		CAN harness fault.
		ECU failure
U012187	Lost communication with ABS control module	ABS control module fault
		CAN harness fault.
		ECU failure
U015587	Lost communication or invalid data between ECU and ICM (Instrument Cluster)	ICM failure
		CAN harness fault.
		ECU failure
U019887	Lost communication or invalid data between ECU and TBOX	TBOX failure
		CAN harness fault.
		ECU failure

DTC	Fault Description	Possible Causes
U029300	Lost communication or invalid data between ECU and VCU	VCU failure
		CAN harness fault.
		ECU failure

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No — Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No — Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

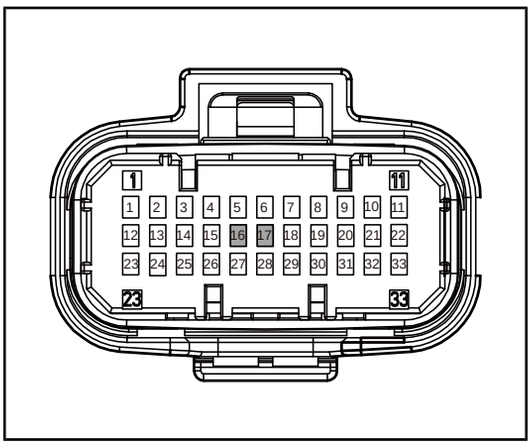
Step 3	Checking the ECU CAN bus voltage

a. Switch the vehicle power supply OFF, then disconnect the battery earth cable.
b. Disconnect ECU harness connector B059.
c. Connect the battery earth cable and start the vehicle.
d. Using a digital multimeter, measure the voltage between each of terminals 16 and 17 of T-ECU

module connector B059 and earth.

Voltage value:

Terminal number	Terminal number	Standard value
B059(17)	Earth	Approximately 2.6 V
B059(16)	Earth	Approximately 2.4 V

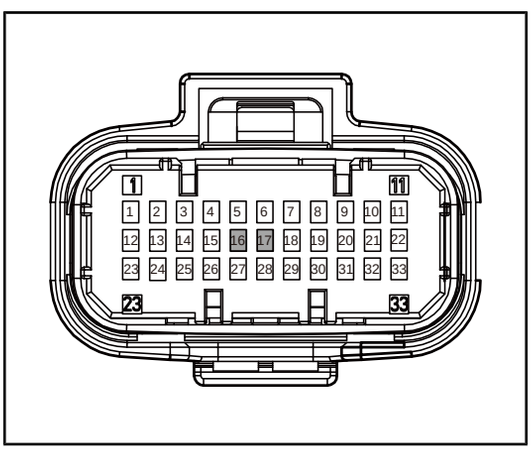


e. Turn the vehicle power "OFF".

f. Using a digital multimeter, measure the resistance between terminals 16 and 17 of ECU connector B059 and earth.

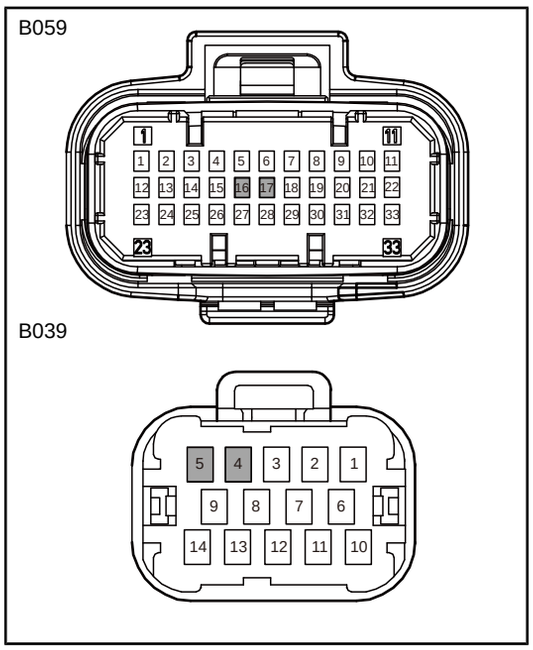
Resistance value:

Terminal number	Terminal number	Standard value
B059(17)	Earth	> 10kΩ
B059(16)	Earth	> 10kΩ



g. Disconnect the T-BOX connector B039.

h. Using a digital multimeter, measure the resistance between terminals 16 and 17 of ECU connector B059 and terminals 4 and 5 of T-BOX connector



B039.

Resistance value:

Terminal number	Terminal number	Standard value
B059(17)	B039(4)	< 1Ω
B059(16)	B039(5)	< 1Ω

i. Is the result normal?

No — Repair or replace the CAN harness.

Yes

Step 4	Checking T-BOX

a. Turn the vehicle power "OFF".
b. Disconnect the T-BOX connector B039.
c. Check T-BOX.
d. Is the result normal?

No — Replace the T-BOX (telematics unit).

Yes

Step 5	Inspecting the ECU

a. Replace the ECU with a new one.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check during a test drive.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

3.3.6.10 DTC Diagnosis: P0133, P0153

DTC Description

DTC	Fault Description	Possible Causes
P0133	Bank 1 oxygen sensor slow response - rich to lean and lean to rich	Oxygen sensor malfunction
		Oxygen Sensor Connector
		Intake System and Vacuum Line Air Leak
		Exhaust System Leak
P0153	Bank 2 oxygen sensor slow response - rich to lean and lean to rich	Oxygen sensor malfunction
		Oxygen Sensor Connector
		Intake System and Vacuum Line Air Leak
		Exhaust System Leak

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No — Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No — Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

Step 3	Checking the intake system and vacuum lines

a. Operate the vehicle.
b. Inspect the engine air intake system and vacuum lines for any signs of air leaks.

Yes — Repair or replace the faulty component.

No

Step 4	Inspecting the exhaust system

a. Operate the vehicle.
b. Check for exhaust leaks upstream of the oxygen sensor.

Yes — Repair or replace the faulty component.

No

Step 5	Inspecting the oxygen sensor harness

a. Turn the vehicle power "OFF".
b. Disconnect the oxygen sensor connector B066.
c. Inspect the oxygen sensor wiring harness for signs of melting, chafing, crushing, or breakages.
d. Inspect the oxygen sensor connector for backed-out pins, loose connections, oxidation, or water

ingress corrosion.

e. Is the result normal?

No → Repair or replace the oxygen sensor harness.

Yes

Step 6	Inspecting the oxygen sensor

a. Turn the vehicle power "OFF".
b. Disconnect the oxygen sensor connector B066.
c. Inspect the oxygen sensor.
d. Is the result normal?

No → Replace the oxygen sensor.

Yes

Step 7	Inspecting the ECU

a. Replace the ECU with a new one.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check during a test drive.
d. Is the result normal?

No → Rectify the fault.

Yes

Recheck according to the above Diagnostic Procedure.

3.3.6.11 DTC Diagnosis: P030000, P030100, P130A00, P030200

DTC Description

DTC	Fault Description	Possible Causes
P030000	Misfire	Injector failure
		Ignition coil failure
		Spark plug failure
		Insufficient airtightness
		Mechanical failure
P030100	Cylinder 1 misfire detected	Injector failure
		Ignition coil failure
		Spark plug failure
		Insufficient airtightness
		Mechanical failure
P130A00	Cylinder Deactivation Due to Misfire	Injector failure
		Ignition coil failure
		Spark plug failure
		Insufficient airtightness
		Mechanical failure
P030200	Cylinder 2 misfire detected	Injector failure
		Ignition coil failure
		Spark plug failure
		Insufficient airtightness
		Mechanical failure

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No — Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No — Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

Step 3	Checking for DTCs

a. Read and store the DTCs.
b. Determine whether DTCs related to the fuel injector, ignition coil, oxygen sensor, or fuel system are present.
c. Check if the DTC exists.

No — Fault rectified.

Yes

Step 4	Inspecting the fuel injectors

a. Turn the vehicle power "OFF".
b. Swap the injector with one from a correctly operating cylinder.
c. Operate the vehicle.
d. Check if the DTC follows the injector to the previously normal cylinder.

Yes — Replace fuel injector

No

Step 5	Inspecting the ignition coil

a. Turn the vehicle power "OFF".
b. Swap the ignition coil with one from a correctly

operating cylinder.

c. Operate the vehicle.
d. Check if the DTC follows the ignition coil to the previously normal cylinder.

Yes → Replace Ignition Coil

No

Step 6	Inspecting the spark plug

a. Check the spark plug for carbon deposits.
b. Inspect the spark plug centre electrode for erosion or rounding, and the side electrode for pitting.
c. Check the spark plug ceramic for yellow or black tracking marks.
d. Verify the spark plug initial electrode gap (0.6–0.9 mm) is correct.
e. Is the result normal?

No → Replace the spark plug.

Yes

Step 7	Checking the ignition system

a. Perform a spark ignition test.
b. Is the result normal?

No → Rectify the relevant fault.

Yes

Step 8	Checking cylinder pressure

a. Measure the cylinder compression.
b. Is the result normal?

No → Rectify the relevant fault.

Yes

Step 9	Inspecting mechanical components

a. Check the intake and exhaust valves for burning, bending, or carbon deposits causing sticking.
b. Inspect the piston rings for wear, breakage, or seizure.
c. Check the cylinder head gasket for damage.
d. Inspect the valve mechanism for faults.
e. Verify the valve timing is correct.
f. Is the result normal?

No → Rectify the relevant fault.

Yes

Recheck according to the above Diagnostic Procedure.

3.3.6.12 DTC Diagnosis: P056216, P05601C

DTC Description

DTC	Fault Description	Possible Causes
P056216	System battery voltage too low	Battery voltage too low
		ECU harness failure
		ECU failure
P05601C	System battery voltage signal unreasonable	Battery voltage too low
		ECU harness failure
		ECU failure

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel

displays normal battery voltage.

b. Is the result normal?

No → Check the battery and alternator.

Yes

Step 2	Retrieve DTC

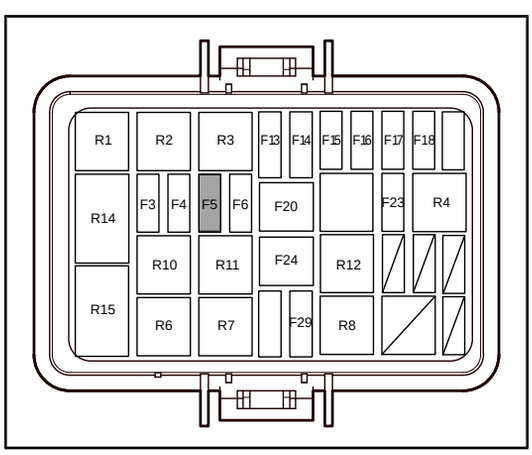
a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No → Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

Step 3	Inspecting the fuse

a. Switch the vehicle power “OFF” and disconnect the battery earthing cable.



b. Remove the fuse F5 (15A) from the fuse box.
c. Check if the fuse is blown.

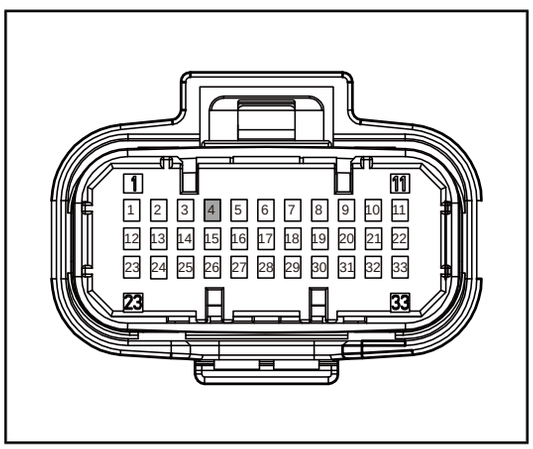
Yes → Replace with a fuse of the same specification.

No

Step 4	Inspecting the ECU power supply

a. Switch the vehicle power "OFF" and disconnect the battery earthing cable.
b. Disconnect the ECU connector B059.
c. Connect the battery earth cable and start the vehicle.
d. Use a digital multimeter to measure the voltage between terminal 4 of the ECU connector B059 and earth.

Voltage value:



Terminal number	Terminal number	Standard value
B059(4)	Earth	11 ~ 14V

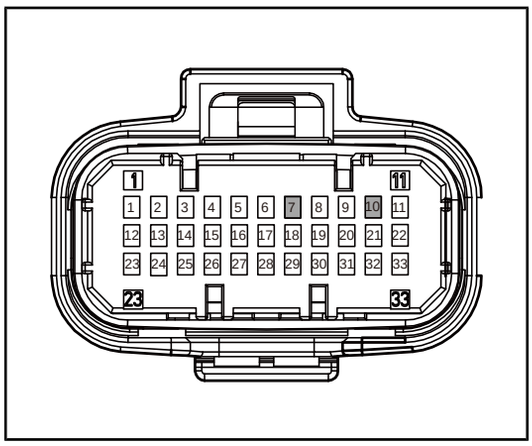
e. Is the result normal?

No — Repair or replace the ECU power supply harness.

Yes

Step 5	Inspecting the ECU earth connection

a. Switch the vehicle power "OFF" and disconnect the battery earthing cable.
b. Disconnect ECU connector B059.
c. Connect the battery earth cable and start the vehicle.
d. Use a digital multimeter to measure the resistance between terminal 7 and 10 of the ECU connector



B059 and earth.

Resistance value:

Terminal number	Terminal number	Standard value
B059(7)	Earth	< 1Ω
B059(10)	Earth	< 1Ω

e. Is the result normal?

No — Repair or replace the ECU earth strap.

Yes

Step 6	Inspecting the ECU

a. Replace the ECU with a new one.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check during a test drive.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

3.3.6.13 DTC Diagnosis: P056317

DTC Description

DTC	Fault Description	Possible Causes
P056317	System battery voltage signal too high	Battery voltage too high
		Alternator failure
		ECU failure

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No → Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No → Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

Step 3	Inspecting the battery

a. Switch the vehicle power "OFF" and disconnect the battery earthing cable.
b. Use a digital multimeter to measure the voltage between the positive and negative terminals of the battery.
Voltage value:

Terminal number	Terminal number	Standard value
Positive terminal of the battery.	Negative terminal of the battery.	11 ~ 14V

c. Is the result normal?

No → Repair or replace the battery.

Yes

Step 4	Inspecting the alternator

a. Connect the battery earth cable and start the engine.
b. Use a digital multimeter to measure the voltage between the alternator B+ terminal and earth.
Voltage value:

Terminal number	Terminal number	Standard value
Alternator (+).	Earth	13 ~ 14V

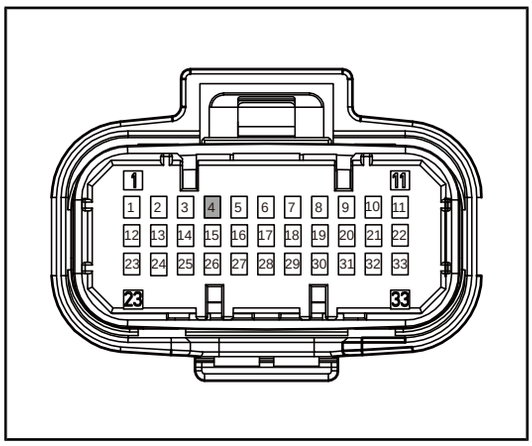
c. Is the result normal?

No → Repair or replace the alternator.

Yes

Step 5	Inspecting the ECU power supply

a. Switch the vehicle power “OFF” and disconnect the battery earthing cable.
b. Disconnect the ECU connector B059.
c. Connect the battery earth cable and start the vehicle.
d. Use a digital multimeter to measure the voltage between terminal 4 of the ECU connector B059



and earth.

Voltage value:

Terminal number	Terminal number	Standard value
B059(4)	Earth	11 ~ 14V

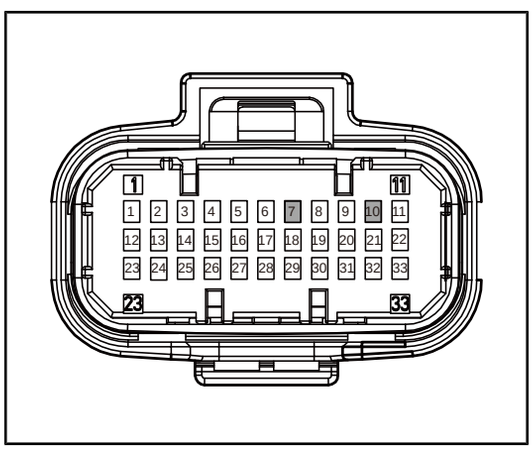
e. Is the result normal?

No — Repair or replace the ECU power supply harness.

Yes

Step 6	Inspecting the ECU earth connection

a. Switch the vehicle power “OFF” and disconnect the battery earthing cable.
b. Disconnect the ECU connector B059.
c. Connect the battery earth cable and start the vehicle.
d. Use a digital multimeter to measure the resistance between terminal 7 and 10 of the ECU connector B059 and earth.



Resistance value:

Terminal number	Terminal number	Standard value
B059(7)	Earth	< 1Ω
B059(10)	Earth	< 1Ω

e. Is the result normal?

No — Repair or replace the ECU earth strap.

Yes

Step 7	Inspecting the ECU

a. Replace the ECU with a new one.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check during a test drive.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

3.3.6.14 DTC Diagnosis: P010817, P010716, P2A0D17, P2A0C16

DTC Description

DTC	Fault Description	Possible Causes
P010817	Cylinder 1 intake manifold pressure sensor circuit high	Intake Manifold Pressure Sensor harness failure
		Intake manifold pressure sensor malfunction
		ECU failure
P010716	Cylinder 1 intake manifold pressure sensor circuit low	Intake Manifold Pressure Sensor harness failure
		Intake manifold pressure sensor malfunction
		ECU failure
P2A0D17	Cylinder 2 intake manifold pressure sensor circuit high	Intake Manifold Pressure Sensor harness failure
		Intake manifold pressure sensor malfunction
		ECU failure
P2A0C16	Cylinder 2 intake manifold pressure sensor circuit low	Intake Manifold Pressure Sensor harness failure
		Intake manifold pressure sensor malfunction
		ECU failure

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No → Check the battery and alternator.

Yes

Step 2	Retrieve DTC

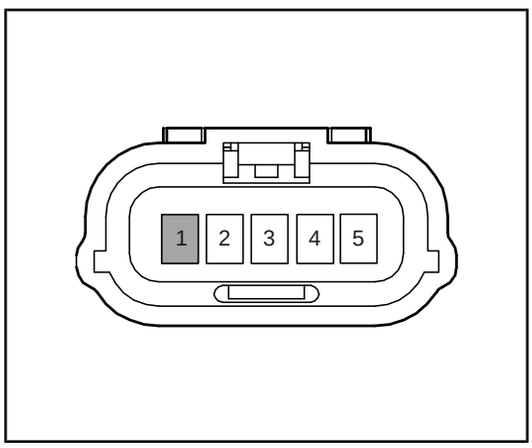
a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No → Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

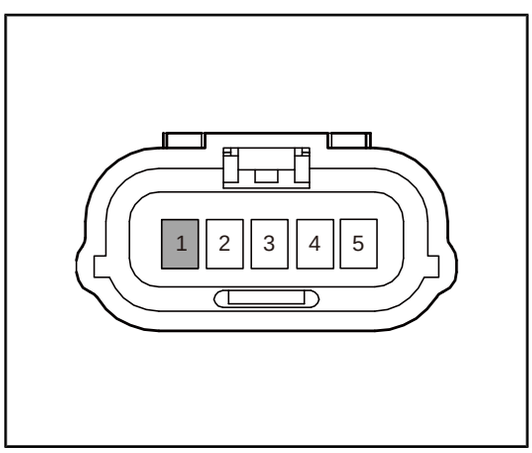
Step 3	Inspecting the intake manifold pressure sensor circuit

a. Turn the vehicle power "OFF".
b. Disconnect the intake manifold pressure sensor connector B069.
c. Turn the vehicle power "ON".
d. Use a digital multimeter to measure the voltage between terminal 1 of the intake manifold pressure sensor connector B069 and earth.
Voltage value:



Terminal number	Terminal number	Standard value
B069(1)	Earth	0V

e. Turn the vehicle power "OFF".
f. Use a digital multimeter to measure the resistance value between terminal 1 of the intake manifold pressure sensor connector B069 and earth.
Resistance value:



Terminal number	Terminal number	Standard value
B069(1)	Earth	> 10kΩ

g. Is the result normal?

No — Repair or replace the intake manifold pressure sensor harness.

Yes

Step 4	Inspecting the intake manifold pressure sensor

a. Turn the vehicle power "OFF".
b. Inspect the intake manifold pressure sensor.
c. Is the result normal?

No — Repair or replace the throttle body assembly.

Yes

Step 5	Inspecting the ECU

a. Replace the ECU with a new one.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check during a test drive.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

3.3.6.15 DTC Diagnosis: P011317, P011216

DTC Description

DTC	Fault Description	Possible Causes
P011317	IAT sensor circuit high	IAT sensor harness failure
		IAT sensor malfunction
		ECU failure
P011216	IAT sensor circuit low	IAT sensor harness failure
		IAT sensor malfunction
		ECU failure

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No — Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

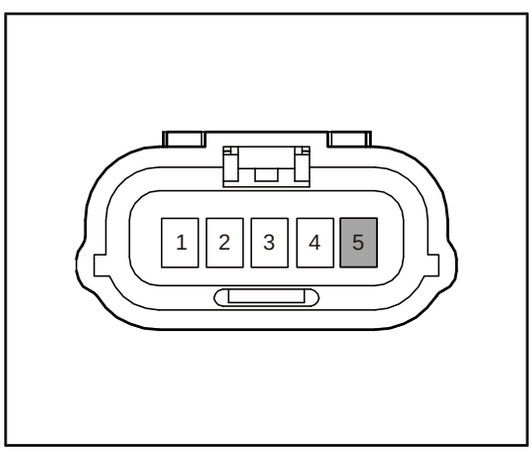
No — Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

Step 3	Inspecting the IAT sensor circuit

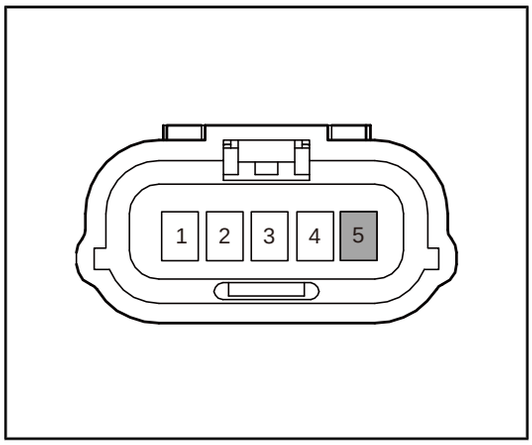
a. Turn the vehicle power "OFF".
b. Disconnect the IAT sensor connector B069.
c. Turn the vehicle power "ON".
d. Use a digital multimeter to measure the voltage between terminal 5 of the IAT sensor connector B069 and earth.

Voltage value:



Terminal number	Terminal number	Standard value
B069(5)	Earth	0V

e. Turn the vehicle power "OFF".
f. Use a digital multimeter to measure the resistance



value between terminal 5 of the IAT sensor connector B069 and earth.

Resistance value:

Terminal number	Terminal number	Standard value
B069(5)	Earth	> 10kΩ

g. Is the result normal?

No — Repair or replace the IAT sensor harness.

Yes

Step 4	Inspecting the IAT sensor

a. Turn the vehicle power "OFF".
b. Inspecting the IAT sensor
c. Is the result normal?

No — Repair or replace the throttle body assembly.

Yes

Step 5	Inspecting the ECU

a. Replace the ECU with a new one.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check during a test drive.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

3.3.6.16 DTC Diagnosis: P011817, P011716

DTC Description

DTC	Fault Description	Possible Causes
P011817	Engine Coolant Temperature (ECT) sensor circuit high	Engine coolant temperature sensor harness failure
		Engine coolant temperature sensor malfunction
		ECU failure
P011716	Engine Coolant Temperature (ECT) sensor circuit low	Engine coolant temperature sensor harness failure
		Engine coolant temperature sensor malfunction
		ECU failure

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No — Check the battery and alternator.

Yes

Step 2	Retrieve DTC

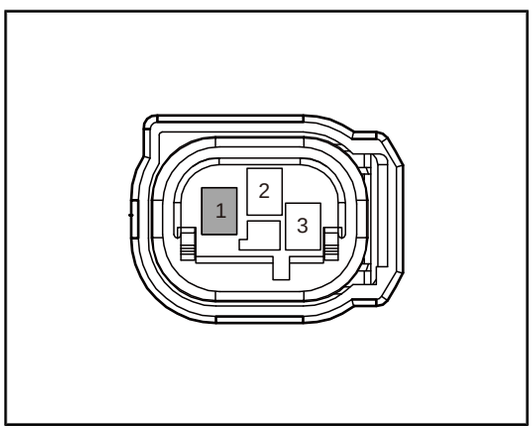
a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No — Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

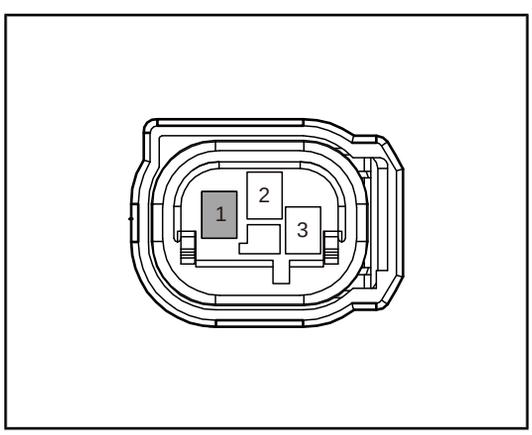
Step 3	Inspecting the engine coolant temperature sensor line

a. Turn the vehicle power "OFF".
b. Disconnect the engine coolant temperature sensor connector B063.
c. Turn the vehicle power "ON".
d. Use a digital multimeter to measure the resistance value between terminal 1 of the engine coolant temperature sensor connector B063 and earth.
Voltage value:



Terminal number	Terminal number	Standard value
B063(1)	Earth	0V

e. Turn the vehicle power "OFF".
f. Use a digital multimeter to measure the resistance value between terminal 1 of the engine coolant temperature sensor connector B063 and earth.
Resistance value:



Terminal number	Terminal number	Standard value
B063(1)	Earth	> 10kΩ

g. Is the result normal?

No — Repair or replace the engine coolant temperature sensor harness.

Yes

Step 4	Inspecting the engine coolant temperature sensor

a. Turn the vehicle power "OFF".
b. Inspect the engine coolant temperature sensor.
c. Is the result normal?

No — Repair or replace the engine coolant temperature sensor.

Yes

Step 5	Inspecting the ECU

a. Replace the ECU with a new one.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check during a test drive.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

3.3.6.17 DTC Diagnosis: P045912, P045811, P044413

DTC Description

DTC	Fault Description	Possible Causes
P045912	EVAP canister purge valve control circuit high	EVAP Canister Purge Valve Control Circuit Wiring Fault
		EVAP Canister Purge Valve Control Fault
		ECU failure
P045811	EVAP canister purge valve control circuit low	EVAP Canister Purge Valve Control Circuit Wiring Fault
		EVAP Canister Purge Valve Control Fault
		ECU failure
P044413	Charcoal canister	EVAP Canister Purge Valve Control Circuit Wiring

DTC	Fault Description	Possible Causes
	control valve control circuit open	Fault
		EVAP Canister Purge Valve Control Fault
		ECU failure

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No → Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No → Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

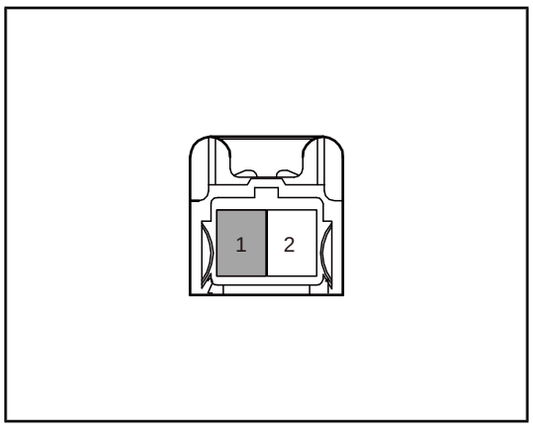
Step 3	Inspecting the EVAP canister purge control valve control circuit

a. Turn the vehicle power "OFF".
b. Disconnect the charcoal canister control valve connector B058.
c. Turn the vehicle power "ON".
d. Use a digital multimeter to measure the voltage between terminal 1 of the charcoal canister control

valve connector B058 and earth.

Voltage value:

Terminal number	Terminal number	Standard value
B058(1)	Earth	0V

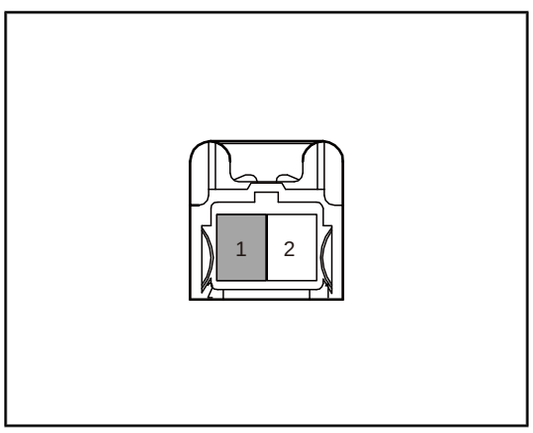


e. Turn the vehicle power "OFF".

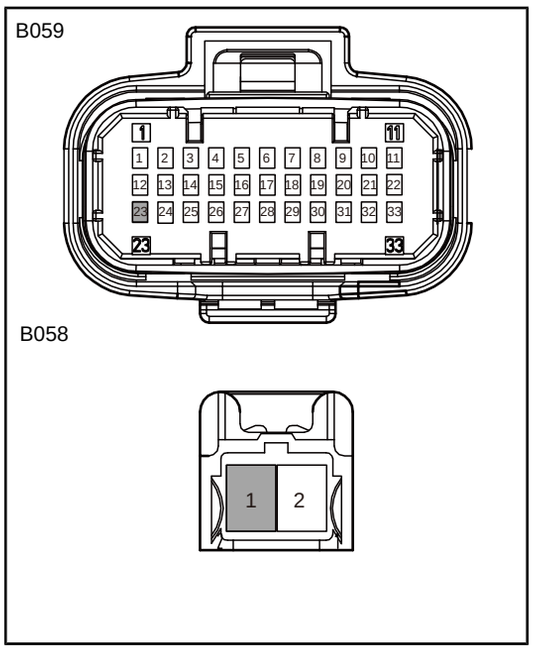
f. Use a digital multimeter to measure the resistance value between terminal 1 of the charcoal canister control valve connector B058 and earth.

Resistance value:

Terminal number	Terminal number	Standard value
B058(1)	Earth	> 10kΩ



g. Use a digital multimeter to measure the resistance value between terminal 1 of the charcoal canister control valve connector B058 and terminal 23 of



the ECU connector B059.

Resistance value:

Terminal number	Terminal number	Standard value
B058(1)	B059(23)	< 1Ω

h. Is the result normal?

No — Repair or replace the harness of the charcoal canister control valve.

Yes

Step 4	Inspecting the charcoal canister control valve

a. Turn the vehicle power "OFF".
b. Inspecting the charcoal canister control valve.
c. Is the result normal?

No — Repair or replace the charcoal canister control valve.

Yes

Step 5	Inspecting the ECU

a. Replace the ECU with a new one.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check during a test drive.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

3.3.6.18 DTC Diagnosis: P026212、P026111、P020113、P026512、P026411、P020213

DTC Description

DTC	Fault Description	Possible Causes
P026212	Cylinder 1 fuel injector control circuit high	Fuel Injector Control Circuit Wiring Fault
		Injector failure
		ECU failure
P026111	Cylinder 1 fuel injector control circuit low	Fuel Injector Control Circuit Wiring Fault
		Injector failure
		ECU failure
P020113	Cylinder 1 fuel injector control circuit open	Fuel Injector Control Circuit Wiring Fault
		Injector failure
		ECU failure
P026512	Cylinder 2 fuel injector control circuit high	Fuel Injector Control Circuit Wiring Fault
		Injector failure
		ECU failure
P026411	Cylinder 2 fuel injector control circuit low	Fuel Injector Control Circuit Wiring Fault
		Injector failure
		ECU failure
P020213	Cylinder 2 fuel injector control circuit open	Fuel Injector Control Circuit Wiring Fault
		Injector failure
		ECU failure

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No — Check the battery and alternator.

Yes

Step 2	Retrieve DTC

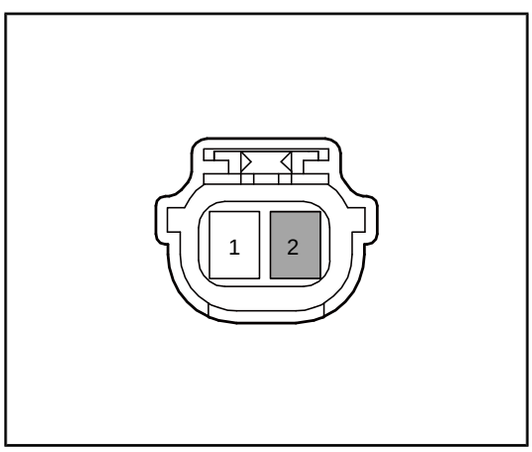
a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No — Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

Step 3	Inspecting the fuel injector control circuit

a. Turn the vehicle power "OFF".
b. Disconnect fuel injector connector B064.
c. Turn the vehicle power "ON".
d. Measure the voltage between terminal 2 of injector connector B064 and earth using a digital multimeter.



Voltage value:

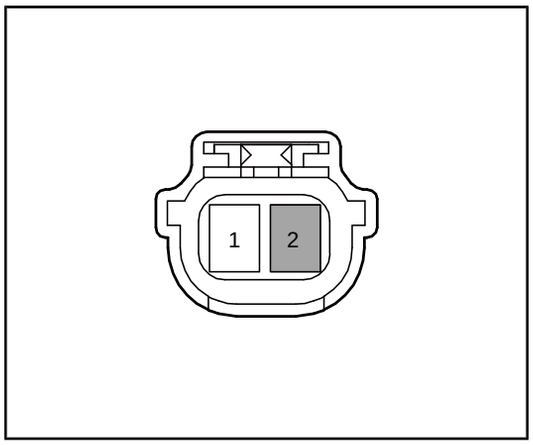
Terminal number	Terminal number	Standard value
B064(2)	Earth	0V

e. Turn the vehicle power "OFF".
f. Measure the resistance between terminal 2 of

injector connector B064 and earth using a digital multimeter.

Resistance value:

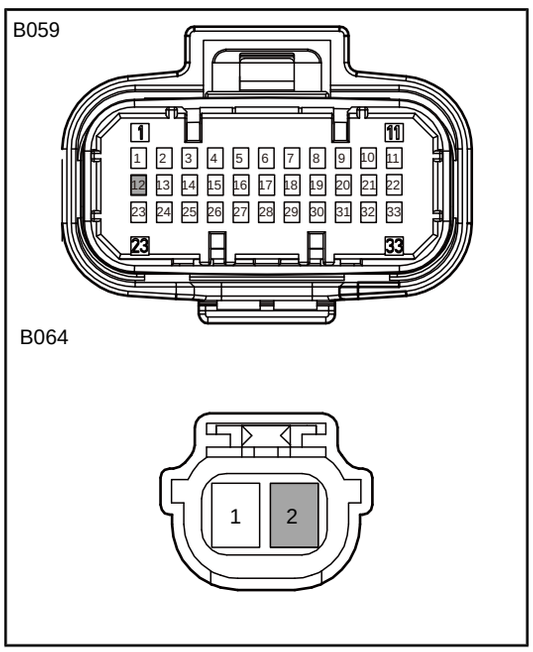
Terminal number	Terminal number	Standard value
B064(2)	Earth	> 10kΩ



g. Using a digital multimeter, measure the resistance between terminal 2 of fuel injector connector B064 and terminal 12 of ECU connector B059.

Resistance value:

Terminal number	Terminal number	Standard value
B064(2)	B059(12)	< 1Ω



h. Is the result normal?

No — Repair or replace the fuel injector harness

Yes

Step 4	Inspecting the fuel injectors

a. Turn the vehicle power "OFF".
b. Inspecting the fuel injectors.
c. Is the result normal?

No — Repair or replace the fuel injector.

Yes

Step 5	Inspecting the ECU

a. Replace the ECU with a new one.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check during a test drive.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

3.3.6.19 DTC Diagnosis: P050129

DTC Description

DTC	Fault Description	Possible Causes
P050129	Vehicle speed signal failure	Vehicle Speed Sensor Wiring Fault
		Vehicle speed sensor malfunction
		ECU failure

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No — Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

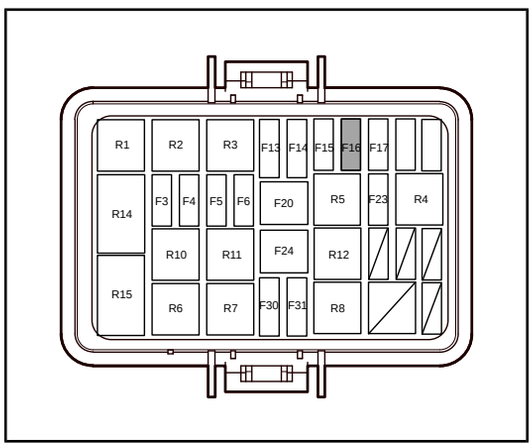
No — Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

Step 3	Inspecting the fuse

a. Switch the vehicle power “OFF” and disconnect the

battery earthing cable.



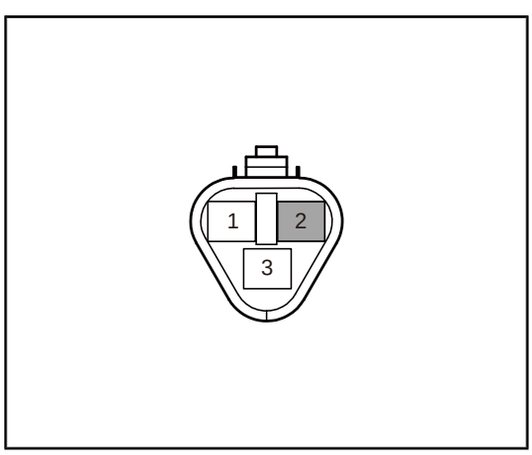
b. Remove the fuse F16 (10A) from the fuse box.
c. Check if the fuse is blown.

Yes — Replace with a fuse of the same specification.

No

Step 4	Checking the vehicle speed sensor power supply circuit

a. Turn the vehicle power "OFF".
b. Disconnect vehicle speed sensor connector B041.
c. Turn the vehicle power "ON".
d. Use a digital multimeter to measure the voltage between terminal 2 of the oxygen sensor connector B041 and earth.
Voltage value:



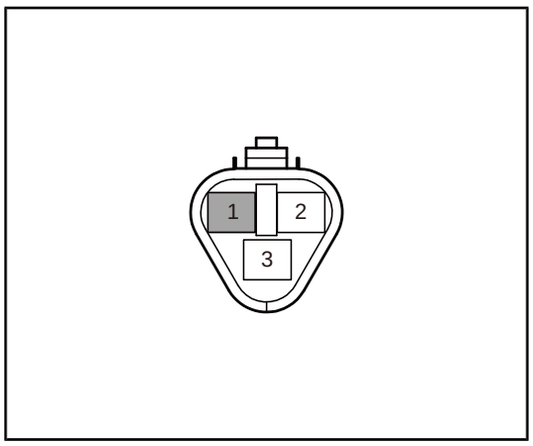
Terminal number	Terminal number	Standard value
B041(2)	Earth	11 ~ 14V

e. Turn the vehicle power "OFF".
f. Use a digital multimeter to measure the resistance value between terminal 1 of the oxygen sensor

connector B041 and earth.

Resistance value:

Terminal number	Terminal number	Standard value
B041(1)	Earth	< 1Ω



g. Is the result normal?

No — Repair or replace the vehicle speed sensor wiring harness.

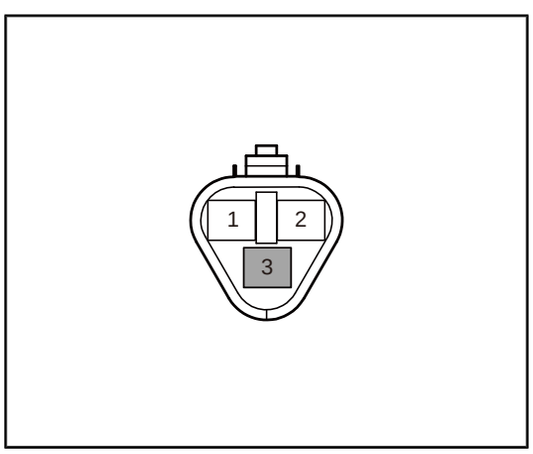
Yes

Step 5	Checking the vehicle speed sensor signal circuit

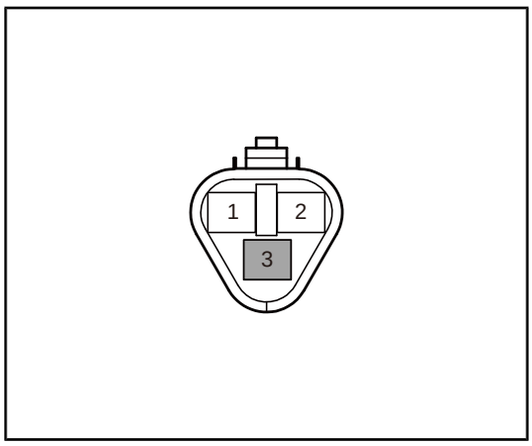
a. Turn the vehicle power "OFF".
b. Disconnect vehicle speed sensor connector B041.
c. Turn the vehicle power "ON".
d. Use a digital multimeter to measure the voltage between terminal 3 of the oxygen sensor connector B041 and earth.

Voltage value:

Terminal number	Terminal number	Standard value
B041(3)	Earth	0V



e. Turn the vehicle power "OFF".
f. Use a digital multimeter to measure the resistance value between terminal 3 of the oxygen sensor



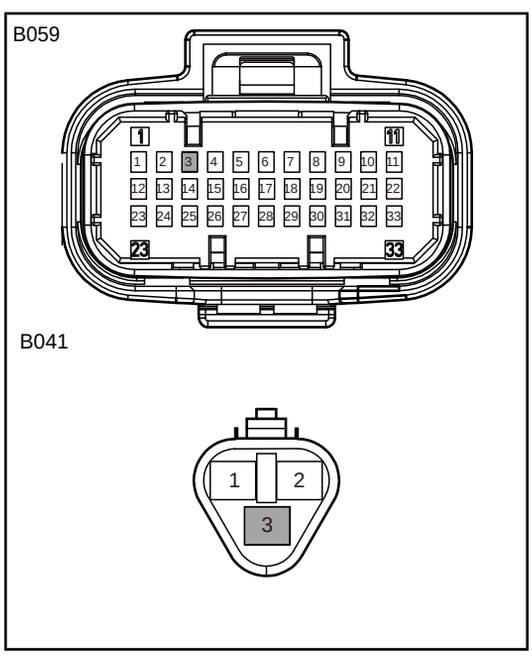
connector B041 and earth.

Resistance value:

Terminal number	Terminal number	Standard value
B041(3)	Earth	> 10kΩ

g. Using a digital multimeter, measure the resistance between terminal 3 of fuel injector connector B041 and terminal 3 of ECU connector B059.

Resistance value:



Terminal number	Terminal number	Standard value
B041(3)	B059(3)	< 1Ω

h. Is the result normal?

No — Repair or replace the vehicle speed sensor signal wiring harness.

Yes

Step 6	Inspecting vehicle speed sensor

a. Turn the vehicle power "OFF".
b. Check the vehicle speed sensor.
c. Is the result normal?

No → Repair or replace the vehicle speed sensor.

Yes

Step 7	Inspecting the ECU

a. Replace the ECU with a new one.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check during a test drive.
d. Is the result normal?

Yes → Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

3.3.6.20 DTC Diagnosis: P032200

DTC Description

DTC	Fault Description	Possible Causes
P032200	Crankshaft Speed Sensor - No Signal	Crankshaft Speed Sensor Wiring Harness Fault
		Crankshaft Speed Sensor Fault
		ECU failure

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No → Check the battery and alternator.

Yes

Step 2	Retrieve DTC

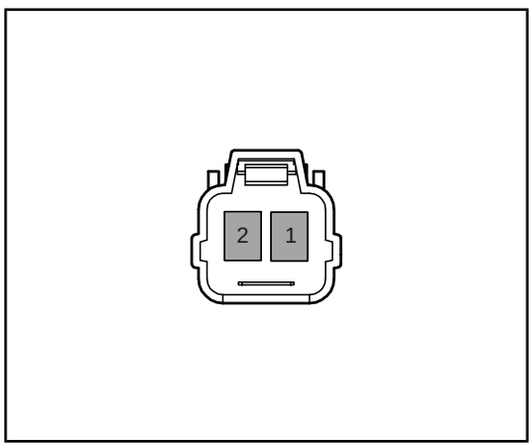
a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No → Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

Step 3	Checking the crankshaft position sensor circuit

a. Turn the vehicle power "OFF".
b. Disconnect crankshaft position sensor connector B062.
c. Turn the vehicle power "ON".
d. Using a digital multimeter, measure the voltage between terminals 1 and 2 of crankshaft position



sensor connector B062 and ground.

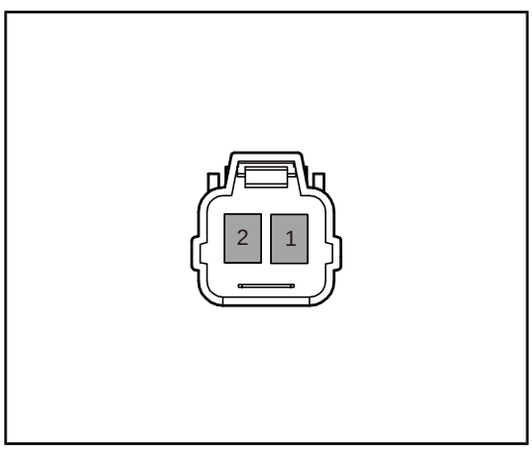
Voltage value:

Terminal number	Terminal number	Standard value
B062(1)	Earth	0V
B062(2)	Earth	0V

e. Turn the vehicle power "OFF".

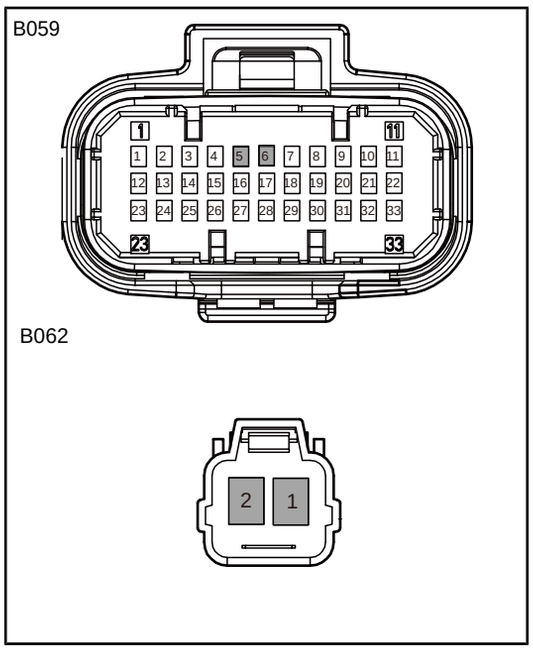
f. Using a digital multimeter, measure the resistance between terminals 1 and 2 of crankshaft position sensor connector B062 and ground.

Resistance value:



Terminal number	Terminal number	Standard value
B062(1)	Earth	> 10kΩ
B062(2)	Earth	> 10kΩ

g. Using a digital multimeter, measure the resistance between terminals 1 and 2 of crankshaft position sensor connector B062 and terminals 5 and 6 of



ECU connector B059.

Resistance value:

Terminal number	Terminal number	Standard value
B062(1)	B059(5)	< 1Ω
B062(2)	B059(6)	< 1Ω

h. Is the result normal?

No — Repair or replace the crankshaft position sensor harness.

Yes

Step 4	Inspecting the crankshaft position sensor

a. Turn the vehicle power "OFF".
b. Inspect the crankshaft position sensor.
c. Is the result normal?

No — Repair or replace the crankshaft position sensor.

Yes

Step 5	Inspecting the ECU

a. Replace the ECU with a new one.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check during a test drive.
d. Is the result normal?

Yes → Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

3.3.6.21 DTC Diagnosis: P230100, P230400, P230000, P230300

DTC Description

DTC	Fault Description	Possible Causes
P230100	Cylinder 1 ignition coil control circuit high	Ignition Coil Control Circuit Wiring Fault
		Ignition coil failure
		ECU failure
P230400	Cylinder 2 ignition coil control circuit high	Ignition Coil Control Circuit Wiring Fault
		Ignition coil failure
		ECU failure
P230000	Cylinder 1 ignition coil control circuit low	Ignition Coil Control Circuit Wiring Fault
		Ignition coil failure
		ECU failure
P230300	Cylinder 2 ignition coil control circuit low	Ignition Coil Control Circuit Wiring Fault
		Ignition coil failure
		ECU failure

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No → Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

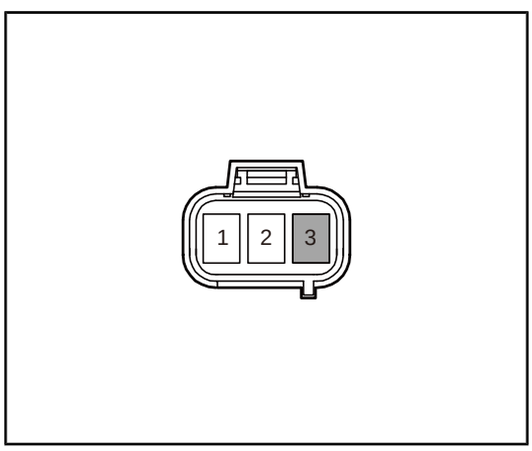
No → Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

Step 3	Checking the ignition coil control circuit

a. Turn the vehicle power "OFF".
b. Disconnect ignition coil connector B065.
c. Turn the vehicle power "ON".
d. Using a digital multimeter, measure the voltage between terminal 3 of ignition coil connector B065 and ground.

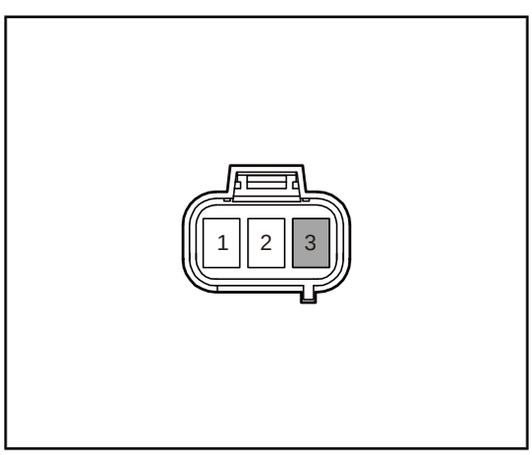
Voltage value:



Terminal number	Terminal number	Standard value
B065(3)	Earth	0V

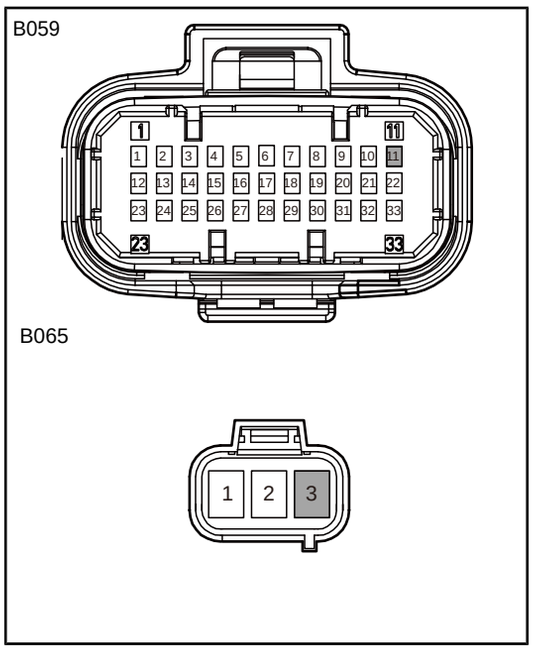
e. Turn the vehicle power "OFF".
f. Use a digital multimeter to measure the resistance between terminal 3 of ignition coil connector B065 and ground.

Resistance value:



Terminal number	Terminal number	Standard value
B065(3)	Earth	> 10kΩ

g. Using a digital multimeter, measure the resistance between terminal 3 of ignition coil connector B065



and terminal 11 of ECU connector B059.

Resistance value:

Terminal number	Terminal number	Standard value
B065(3)	B059(11)	< 1Ω

h. Is the result normal?

No — Repair or replace the ignition coil wiring harness.

Yes

Step 4	Inspecting the ignition coil

a. Turn the vehicle power "OFF".
b. Inspecting the ignition coil.
c. Is the result normal?

No — Repair or replace the ignition coil.

Yes

Step 5	Inspecting the ECU

a. Replace the ECU with a new one.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check during a test drive.
d. Is the result normal?

Yes → Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

3.3.6.22 DTC Diagnosis: P230100, PDiagnostic Trouble Code (DTC) diagnosis: P210612、P210619、P210692、P210613、P156800、P154500、P154522、P154521、P156500、P060694、P060692、P060664、P060661、P060667、P06061C、P060655、P060600、P060662、P155900、P157900、P156400、P155929

DTC Description

DTC	Fault Description	Possible Causes
P210612	Electronic throttle driver stage fault (short circuit)	Electronic Throttle Control Wiring Fault
		Electronic Throttle Control Fault
		ECU failure
P210619	Electronic throttle driver stage fault (overtemperature or overcurrent)	Electronic Throttle Control Wiring Fault
		Electronic Throttle Control Fault
		ECU failure
P210692	Electronic throttle driver stage fault (implausible)	Electronic Throttle Control Wiring Fault
		Electronic Throttle Control Fault
		ECU failure
P210613	Electronic throttle driver stage fault (open circuit)	Electronic Throttle Control Wiring Fault
		Electronic Throttle Control Fault
		ECU failure
P156800	Return spring test - upper limit exceeded	Return spring test - upper limit exceeded
		ECU failure
P154500	DVE (throttle actuator) position deviation fault	DVE Position Deviation
		ECU failure
P154522	Throttle body PID regulation - upper limit exceeded	Throttle body PID regulation - upper limit exceeded
		ECU failure
P154521	Throttle body PID regulation - lower limit exceeded	Throttle body PID regulation - lower limit exceeded
		ECU failure
P156500	Electronic throttle lower stop initialization adaptation fault	Electronic throttle lower stop initialization adaptation fault
		ECU failure
P060694	Electronic throttle safety monitoring function fault (Level 2 torque monitoring	Electronic Throttle Control Safety Monitoring Fault
		ECU failure

DTC	Fault Description	Possible Causes
	fault)	
P060692	Electronic throttle safety monitoring function fault (Level 2 engine speed monitoring fault)	Electronic Throttle Control Safety Monitoring Fault
		ECU failure
P060664	Electronic throttle safety monitoring function fault (load signal, wiring harness, or ECU fault)	Electronic Throttle Control Safety Monitoring Fault
		ECU failure
P060661	Electronic throttle safety monitoring function fault (ignition angle signal, wiring harness, or ECU fault)	Electronic Throttle Control Safety Monitoring Fault
		ECU failure
P060667	Electronic throttle safety monitoring function fault (ECU error response monitoring fault)	Electronic Throttle Control Safety Monitoring Fault
		ECU failure
P06061C	Electronic throttle safety monitoring function fault (throttle body signal, wiring harness, or ECU fault)	Electronic Throttle Control Safety Monitoring Fault
		ECU failure
P060655	Electronic throttle safety monitoring function fault (corruption code monitoring fault)	Electronic Throttle Control Safety Monitoring Fault
		ECU failure
P060600	Electronic throttle safety monitoring function fault (safety monitoring fuel cut-off fault)	Electronic Throttle Control Safety Monitoring Fault
		ECU failure
P060662	Electronic throttle safety monitoring function fault (Level 2 accelerator pedal signal plausibility fault)	Electronic Throttle Control Safety Monitoring Fault
		ECU failure

DTC	Fault Description	Possible Causes
P155900	Throttle limp-home position adaptation fault	Throttle limp-home position adaptation fault
		ECU failure
P157900	Electronic throttle adaptation conditions not met	Electronic throttle adaptation conditions not met
		ECU failure
P156400	System voltage out of range for electronic throttle adaptation	System voltage out of range for electronic throttle adaptation
		ECU failure
P155929	Throttle mechanical lower stop re-adaptation fault	Throttle mechanical lower stop re-adaptation fault
		ECU failure

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No — Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No — Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

Step 3	Checking the electronic throttle and related sensors

a. Turn the vehicle power "OFF".
b. Check the electronic throttle and related sensors.
c. Is the result normal?

No → Replace the faulty component.

Yes

Step 4	Inspecting the ECU

a. Replace the ECU with a new one.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check during a test drive.
d. Is the result normal?

No → Rectify the fault.

Yes

Recheck according to the above Diagnostic Procedure.

3.3.6.23 DTC Diagnosis: P041212, P041411, P041313

DTC Description

DTC	Fault Description	Possible Causes
P041212	Secondary air injection control valve circuit high	Secondary Air Injection Control Valve Wiring Fault
		ECU failure
P041411	Secondary air injection control valve circuit low	Secondary Air Injection Control Valve Wiring Fault
		ECU failure
P041313	Secondary air injection control valve circuit open	Secondary Air Injection Control Valve Wiring Fault
		ECU failure

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No — Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No — Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

Step 3	Checking the secondary air injection control valve wiring harness

a. Turn the vehicle power "OFF".
b. Inspect the secondary air injection control valve wiring harness for heat damage, abrasion, crushing or broken wires.
c. Inspect the connector for backed-out pins, loose connections, oxidation, or water ingress corrosion.
d. Is the result normal?

No → Repair or Replace Faulty Harness

Yes

Step 4	Inspecting the ECU

a. Replace the ECU with a new one.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check during a test drive.
d. Is the result normal?

No → Rectify the fault.

Yes

Recheck according to the above Diagnostic Procedure.

3.3.6.24 DTC Diagnosis: P065011, P065013, P065012

DTC Description

DTC	Fault Description	Possible Causes
P065011	MIL (Malfunction Indicator Lamp) control circuit low	Fault
		ECU failure
P065013	MIL Control Circuit Open	Malfunction Indicator Lamp (MIL) Control Circuit Fault
		ECU failure
P065012	MIL control circuit high	Malfunction Indicator Lamp (MIL) Control Circuit Fault
		ECU failure

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No — Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No — Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

Step 3	Checking the MIL control circuit

a. Turn the vehicle power "OFF".
b. Inspect the MIL control circuit wiring for signs of heat damage, chafing, pinching or breaks.
c. Inspect the connector for backed-out pins, loose connections, oxidation, or water ingress corrosion.
d. Is the result normal?

No → Repair or Replace Faulty Harness

Yes

Step 4	Inspecting the ECU

a. Replace the ECU with a new one.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check during a test drive.
d. Is the result normal?

No → Rectify the fault.

Yes

Recheck according to the above Diagnostic Procedure.

3.3.6.25 DTC Diagnosis: P213800

DTC Description

DTC	Fault Description	Possible Causes
P213800	Accelerator pedal travel check fault	Accelerator pedal travel check fault
		ECU failure

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No → Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No → Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

Step 3	Checking the accelerator pedal

a. Turn the vehicle power "OFF".
b. Check the accelerator pedal assembly.
c. Is the result normal?

No → Repair or replace the accelerator pedal.

Yes

Step 4	Inspecting the ECU

a. Replace the ECU with a new one.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check during a test drive.
d. Is the result normal?

No — Rectify the fault.

Yes

Recheck according to the above Diagnostic Procedure.

3.3.7 Inspecting and adjusting

3.3.7.1 Checking the ignition system

Spark Test

WARNING:
• Directly using a high-voltage cable for spark testing may cause personal injury and damage the module; strictly prohibit this method. • The engine is extremely hot when running; exercise caution to avoid burns when operating on a recently stopped engine.

1. Ensure the Vehicle is in Neutral (N) and Apply the Parking Brake.
2. Relieve Fuel System Pressure and Disconnect the Injector Plug.

CAUTION:
• Failure to Disconnect the Injector May Result in a Fire Hazard.

3. Remove the Ignition Coil and Spark Plug.
4. Connect the Ignition Coil to the Spark Plug, Ensuring the Spark Plug is Earthed at a Reliable Engine Grounding Point.
5. Start the Engine and Observe the Spark Plug's Spark Condition.
   a. Normal Spark: Strong Blue-White Spark, Uniform Firing Rhythm, Concentrated Spark with No Spread, Continuous Firing Without Interruption.
   b. Abnormal Spark – No Spark: No Electrical Spark Between Spark Plug Electrodes.
   c. Abnormal Spark – Weak Spark: Weak Red/Yellow Spark, Low Intensity, Short Arc Length, or Intermittent Firing.
   d. Abnormal Spark – Irregular Firing: Intermittent or Misaligned Spark, Spread Arc.
6. Turn Off the Engine and Switch Off the Ignition.
7. Install the Spark Plug and Ignition Coil.

Inspecting spark plug assembly

1. Inspect Spark Plug Assembly.
   a. Technical Specification: Model and Part Number Must Match Vehicle Configuration.
   b. Clean the Spark Plug Using a Bristle Brush.

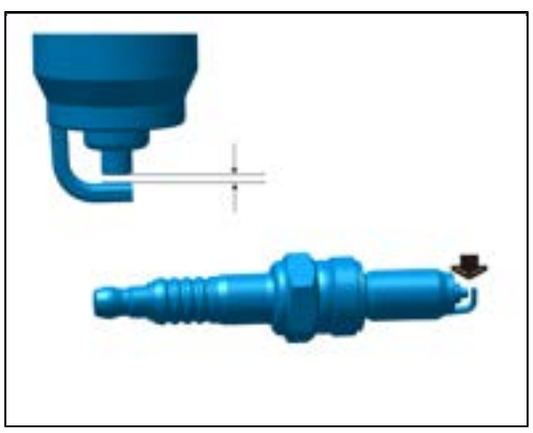
CAUTION:
• Do Not Apply Force Between Electrodes, as this May Damage the Centre Electrode.

   c. Inspect the Spark Plug Threads for Damage and Replace if Necessary.

d. Check for Severe Carbon Deposits Near the Spark Plug Electrode and Replace if Present.

CAUTION:
• If Carbon Deposits Form on the Spark Plug, After Fully Warming Up the Engine, Run at 2000–2500 rpm Under No Load for 5 Minutes to Attempt Carbon Removal. • During Frequent Short Trips in Winter, Carbon Deposits Easily Accumulate on Spark Plug Electrodes and Ceramic Body. Excessive Carbon Deposits (Large Blackened Areas) Can Cause Unstable Idle or Difficult Starting; Remove Using the No-Load Idle Method Described Above. • When Performing No-Load Idle, Ensure the Parking Brake is Engaged, Depress the Service Brake, and Place the Shift Lever in Neutral (N) or Park (P) to Prevent Accidental Vehicle Movement and Potential Injury.

e. Inspect Spark Plug Electrodes for Severe Erosion and Replace if Necessary.



f. Check Spark Plug Electrode Gap; Repair or Replace if Out of Specification.

Spark Plug Electrode Gap: 0.6–0.9 mm

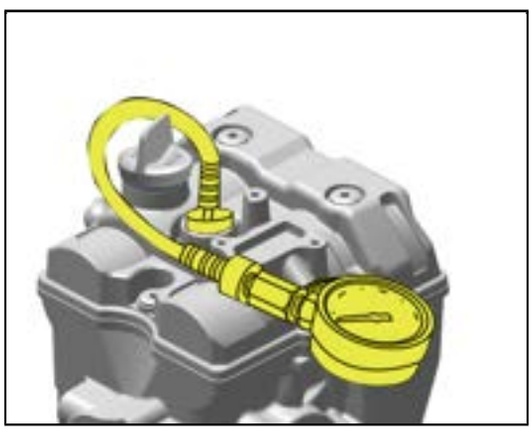
g. Replace the Spark Plug if Any of the Following Faults Occur.
   - Ceramic Body Cracked or Broken.
   - Electrode Broken.

h. Perform Swap Inspection.
   - Perform When Visual Inspection of Spark Plug Shows No Anomalies.
   - Swap the Faulty Spark Plug with a Working One and Operate the Vehicle Under Fault Conditions. If the misfire DTC follows the spark plug to the known good cylinder, replace the spark plug.

3.3.7.2 Checking cylinder pressure

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the ignition coil assembly, See: Ignition Coil Assembly.
3. To remove the spark plug, See: Spark Plug.
4. Checking cylinder pressure



a. Securely attach the compression gauge and adapter hose to the spark plug hole

b. Start the engine, keep the throttle fully open, and allow the starter motor to crank the engine a few times

c. Stop cranking when the gauge reading stops increasing and record the pressure

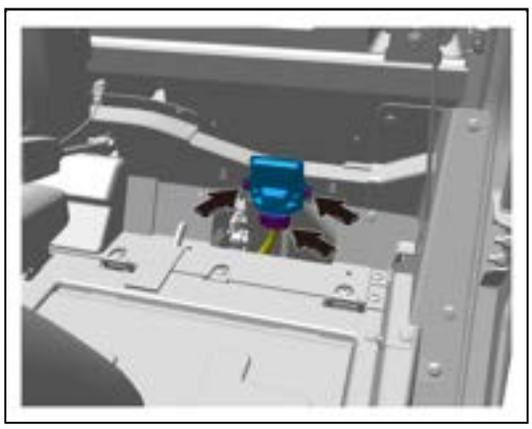
Cylinder pressure (acceptable range): 450–700 kPa at 300 rpm

3.3.8 Repair Procedure Guidance

3.3.8.1 ECU Assembly

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the driver's seat assembly, See: Driver's Seat Assembly.
3. To remove the ECU cover, See: ECU Cover.
4. Removing the ECU assembly



a. Disconnect the ECU assembly harness connector.

b. Remove the 2 mounting bolts of the ECU assembly and take it off.

CAUTION:
The ECU is a non-serviceable component. If deemed faulty, it must be renewed as a complete assembly.

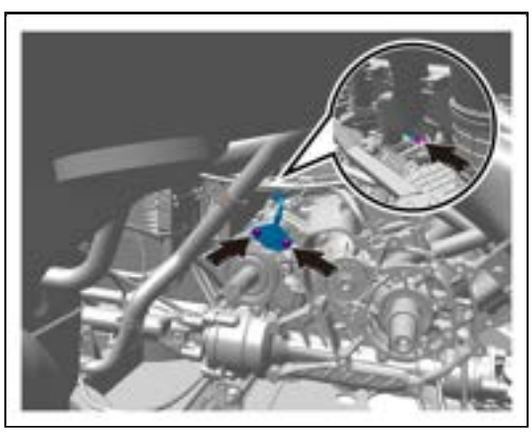
Installation Procedure

1. Install the ECU assembly by following the reverse steps of removal, with the following considerations:
   a. Program the ECU assembly when replacing it.
   b. Perform throttle body self-learning after installation.
   c. Turn the ignition switch to the "ON" position and wait for 60 seconds. Start the vehicle and turn it off once idle stabilizes.
   d. Turn the ignition switch to the "OFF" position and wait 10 seconds; the self-learning procedure is now complete.

3.3.8.2 Gear Position Sensor Assembly

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the CVT air duct, See: CVT Air Duct.
3. To remove the CVT air duct connector, See: CVT Air Duct Connector.
4. To remove the CVT air intake duct 2, See: CVT Intake Pipe 2.
5. Remove CVT air intake duct connector 2, See: CVT Air Duct Connector 2.
6. To remove the CVT outer cover, See: CVT Outer Cover.
7. To remove the CVT drive belt, See: CVT Drive Belt.
8. To remove the CVT driven pulley, See: CVT Driven Pulley.
9. To remove the CVT drive pulley, See: CVT Drive Pulley.
10. To remove the CVT inner cover assembly, See: CVT Inner Cover Assembly.
11. Removing the gear position sensor assembly



a. Tilt the rear cargo box to the open position, disconnect the gear position sensor assembly wiring harness connector, and release the wiring harness retaining clips along the harness.

b. Remove the 2 bolts securing the gear position sensor assembly and extract the assembly.

Torque: 7.2 ft-lbs(9.8N·m)

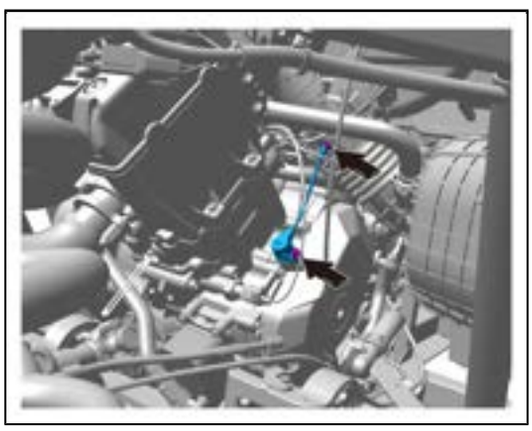
Installation Procedure

1. Install the gear position sensor assembly by following the reverse steps of removal.

3.3.8.3 Crankshaft Position Sensor

Removal Procedure

1. **To disconnect the negative battery terminal,** See: Battery Power Connection/Disconnection Procedure.
2. **Removing the crankshaft position sensor**



a. Disconnect the crankshaft position sensor wiring harness connector.

b. Remove the crankshaft position sensor mounting bolt M6×16 and take the sensor off.

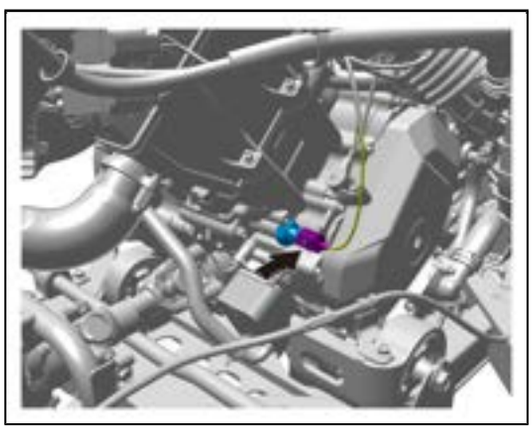
Installation Procedure

1. **Install the crankshaft position sensor by following the reverse steps of removal, with the following considerations:**
   a. After installation, check if the connector is properly secured and the connection is fully seated.
   b. Inspect each part before installation for any deterioration or damage. If defects are found, replace the part.
   c. Pay attention to the installation torque when replacing the crankshaft position sensor.
   d. Do not replace the crankshaft position sensor while the vehicle is powered on.
   e. Clean the installation hole before installing the crankshaft position sensor to prevent metal shavings or debris.
   f. Apply a small amount of lubricating oil to the seal ring before inserting the sensor into the mounting hole. Gently screw the sensor in, do not strike it.

3.3.8.4 Oil Pressure Sensor

Removal Procedure

1. **To disconnect the negative battery terminal,** See: Battery Power Connection/Disconnection Procedure.
2. **Removing the oil pressure sensor**



a. Disconnect the oil pressure sensor harness connector.

b. Remove the oil pressure sensor.

Torque: 10.3 ± 1.5 ft-lbs (14 ± 2 N·m).

CAUTION:
If the vehicle is hot, allow it to cool before carrying out removal procedures to prevent burns.

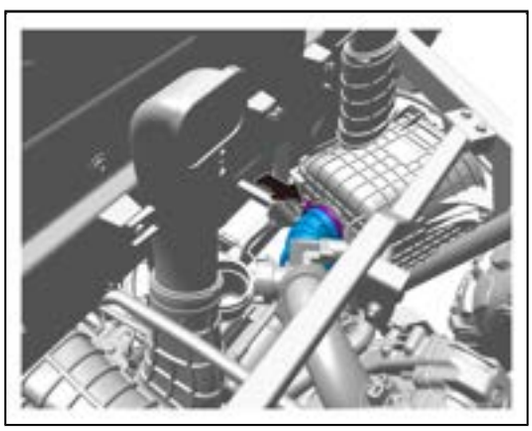
Installation Procedure

1. **Install the oil pressure sensor by following the reverse steps of removal, with the following considerations:**
   a. After installation, check if the connector is properly secured and the connection is fully seated.
   b. Inspect each part before installation for any deterioration or damage. If defects are found, replace the part.
   c. The oil pressure sensor ispre-coated with sealant and should not be reused. If reuse is necessary, apply sealant to the threads to ensure proper sealing.

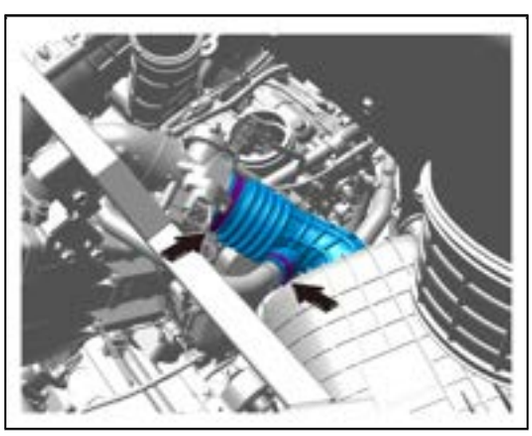
3.3.8.5 Throttle Body

Removal Procedure

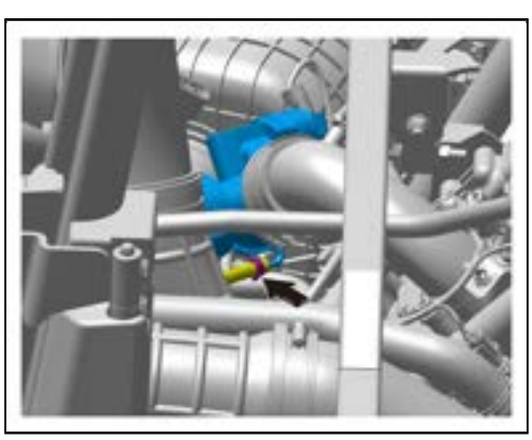
1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the CVT air intake duct 2, See: CVT Intake Pipe 2.
3. Removing the throttle body



a. Loosen the clamp and disconnect the intake pipe.

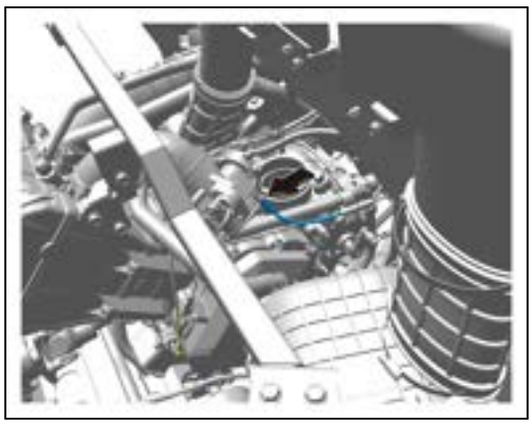


b. Loosen the 2 clamps and disconnect the intake pipe.

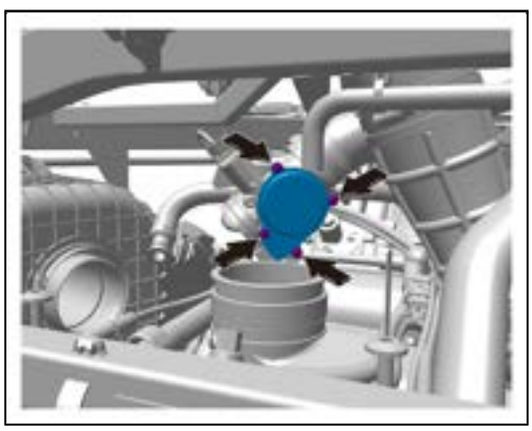


c. Loosen the clamp and disconnect the vapour hose.

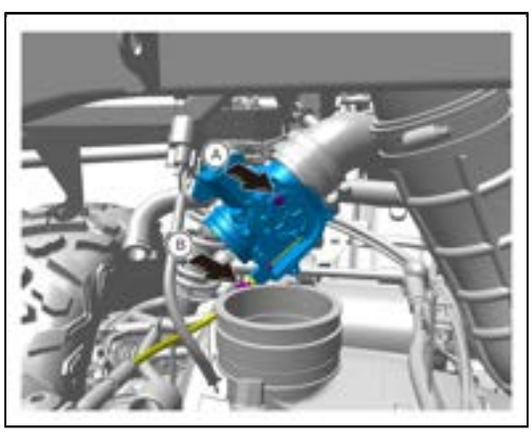
NOTICE:
This procedure applies only to vehicles equipped with an EVAP canister.



d. Loosen the mounting nut for the throttle cable.



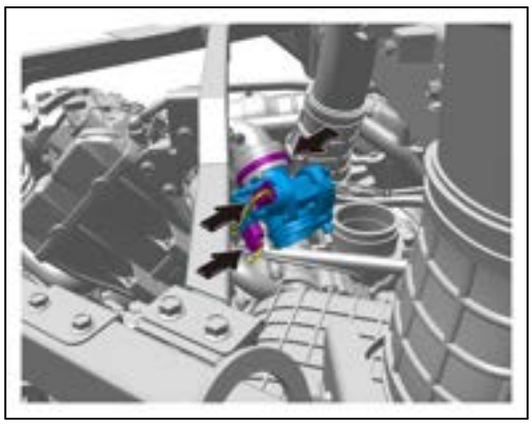
e. Remove the 4 mounting bolts from the throttle body cover, then remove the throttle body cover.



f. Release throttle cable retaining clip A.

CAUTION:
The retaining clip may become detached and lost. Keep it in a safe place after removal to prevent loss.

g. Loosen throttle cable retaining nut B sufficiently to disengage the throttle cable.



h. Disconnect the 2 harness connectors of the throttle body.

i. Loosen the hose clamp, remove the throttle body, and take it out.

Installation Procedure

1. **Install the throttle body following the reverse steps of removal, with the following considerations:**

   a. Perform throttle body self-learning after installation.

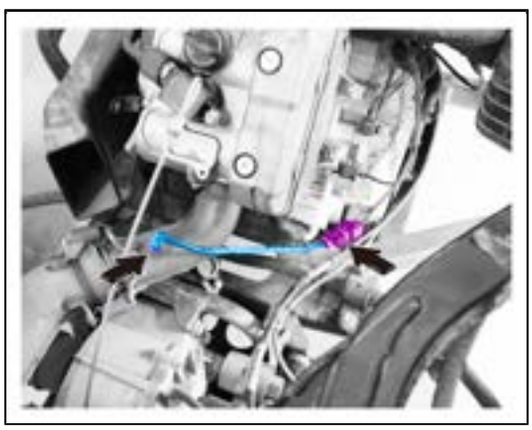
   b. Turn the ignition switch to the "ON" position and wait for 60 seconds. Start the vehicle and turn it off once idle stabilizes.

   c. Turn the ignition switch to the "OFF" position and wait 10 seconds; the self-learning procedure is now complete.

3.3.8.6 Oxygen Sensor

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. Removing the oxygen sensor



a. Disconnect the harness connector of the oxygen sensor.

NOTICE:

- **The harness cable tie is a single-use part and must be replaced after removal.**

b. Use the oxygen sensor removal and installation tool to remove the oxygen sensor.

Torque: 36.9 ± 7.4 ft-lbs (37 ± 3 N·m).

CAUTION:

- **Do not perform maintenance while the exhaust system is hot to avoid severe burns. Repairs should only be carried out once the system has cooled down.**

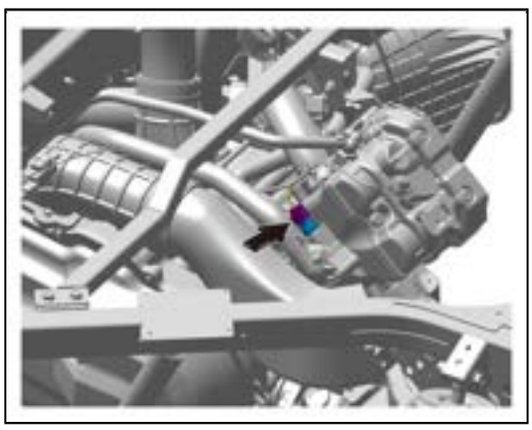
Installation Procedure

1. Install the oxygen sensor following the reverse steps of removal, and take note of the following:
   a. After installation, check if the connector is properly secured and the connection is fully seated.
   b. Inspect each part before installation for any deterioration or damage. If defects are found, replace the part.
   c. Pay attention to the installation torque when replacing the oxygen sensor.
   d. Do not replace the oxygen sensor while the vehicle is powered on.
   e. Clean the mounting hole before installing the oxygen sensor to prevent debris such as iron filings.
   f. Apply a small amount of lubricating oil to the seal ring before inserting the sensor into the mounting hole. Gently screw the sensor in, do not strike it.

3.3.8.7 Coolant Temperature Sensor

Removal Procedure

1. To drain the coolant, See: Coolant Draining and Refilling.
2. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
3. Removing the coolant temperature sensor



a. Tilt the rear cargo box to the open position and disconnect the coolant temperature sensor wiring harness connector.

b. Remove and detach the coolant temperature sensor.

CAUTION:

- **Do not perform maintenance while the coolant is hot to avoid severe burns. Repairs should only be carried out once the system has cooled down.**

Installation Procedure

1. Install the coolant temperature sensor following the reverse steps of removal, and take note of the following:

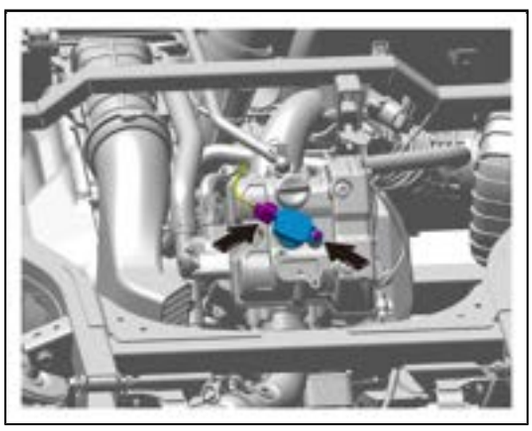
   a. Inspect each part before installation for any deterioration or damage. If defects are found, replace the part.

   b. After filling with coolant, bleed the cooling system following See: the standard bleeding procedure.

3.3.8.8 Ignition Coil Assembly

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. Removing the ignition coil assembly



a. Tilt the rear cargo box open, then disconnect the ignition coil wiring harness connector.

b. Remove the ignition coil assembly mounting bolt, then remove the ignition coil assembly.

Torque: 7.3 ft-lbs (10 N·m)

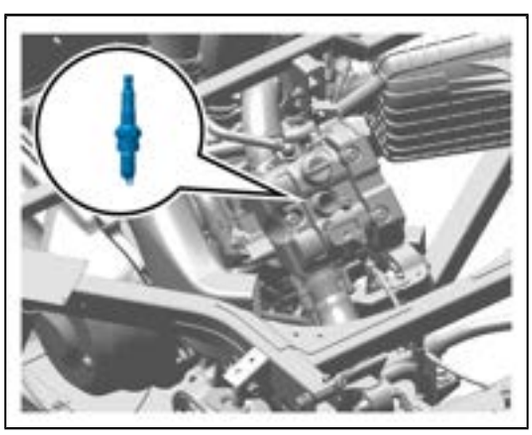
Installation Procedure

1. Install the ignition coil assembly in the reverse order of removal.

3.3.8.9 Spark Plug Assembly

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the ignition coil assembly, See: Ignition Coil Assembly.
3. Removing the spark plug(s)



a. Using the SST, loosen and remove the spark plug assembly.

Torque: 11 ft-lbs(15N·m)

CAUTION:
Never allow a spark plug to drop onto a hard surface. Such an impact can cause internal damage to the component.

NOTICE:
Place a clean cloth over the spark plug hole during removal to prevent any debris from falling into the combustion chamber.

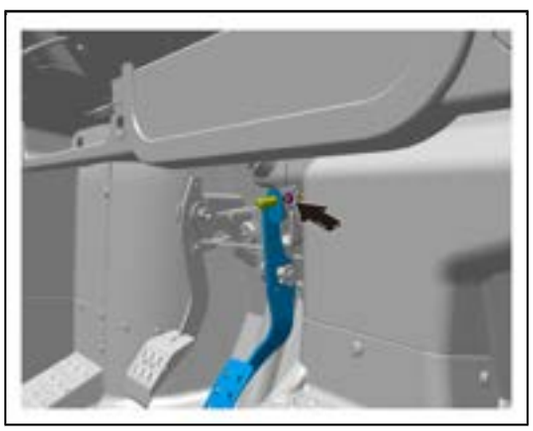
Installation Procedure

1. Install the spark plug in the reverse order of removal, noting the following:
   a. If an incorrect spark plug is fitted, engine performance may be reduced. When replacing, fit only spark plugs that meet the vehicle specification.

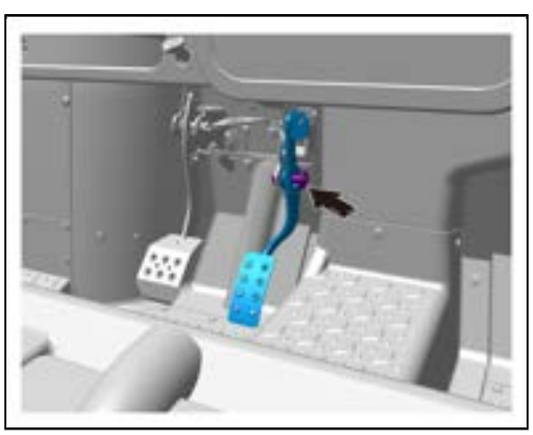
3.3.8.10 Accelerator Pedal Assembly

Removal Procedure

1. Removing the accelerator pedal assembly



a. Loosen the throttle cable retaining nut and disconnect the throttle cable.



b. Remove the washer, withdraw the pivot pin, and remove the accelerator pedal assembly.

Installation Procedure

1. Install the accelerator pedal assembly in the reverse order of removal.

3.4 Fuel System

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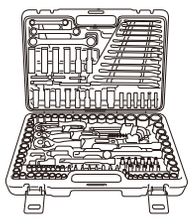
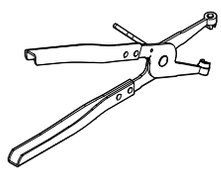
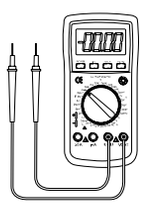
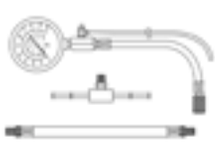
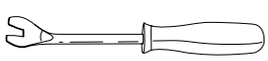
3.4.1 Specifications

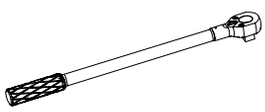
3.4.1.1 Fastener Specifications

Item	Torque (N·m)	Torque (ft-lbs)
Fuel Tank Mounting Bolt, M6 × 30	8～12	5.9～8.9
Install the fuel pump cap.	75	55.3
EVAP Canister Mounting Bolt, M6 × 16	8～12	5.9～8.9
Heat Shield Mounting Bolt, M6 × 16	8～12	5.9～8.9
Fuel Injector Mounting Bolt, M6 × 16	9.8	7.2

3.4.2 Service Tools

3.4.2.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)
2	Hose Clamp Pliers		Removing and installing hose clamps
3	Digital multimeter		Measuring current, voltage and resistance
4	Fuel pressure gauge		Measuring fuel system pressure
5	Trim clip removal tool		Removing clips

Item No.	Tool Description	Tool Diagram	Purpose/Use
6	Fuel Pump Locking Ring Removal Tool		Removing the Fuel Pump Locking Ring
7	Torque Wrench		Measuring torque during fastener tightening

3.4.3 Description and Operation

3.4.3.1 Warnings and Precautions

1. Smoking is strictly prohibited during fuel system work, and keep away from open flames. Ensure the work area is well-ventilated and equipped with appropriate fire extinguishing equipment.
2. After the engine is turned off, residual pressure remains in the fuel system. Before removing any element from the fuel system, release the fuel system pressure to prevent fuel from spraying.
3. During repairs, avoid contact between rubber or leather tools and parts with gasoline (petrol).
4. Before disconnecting any fuel line, clean the line itself and the surrounding area of dust, contaminants, and dirt.
5. Replace all cracked, scratched, or damaged fuel lines during repairs. Do not attempt to repair fuel lines.
6. When installing new fuel lines, do not use a hammer to directly strike the fuel line clamps, as this may damage the fuel lines and lead to leaks.
7. When connecting the fuel line quick-connect fitting, align the fitting axially and press it smoothly until you hear a click, indicating the fuel line is securely installed.
8. After repairs, ensure all fuel line connections are secure, with no signs of looseness.
9. After installation, ensure all fasteners are tightened to the specified torque.
10. To prevent accidental fire or explosion, do not place fuel into an open container.
11. Fuel vapour is highly flammable and can easily ignite from sparks, flames, or other open flame sources, potentially leading to fire risk, explosions, severe personal injury, and property damage. During operations, ensure that fuel and fuel vapour remain well away from any open flame sources.
12. High-pressure fuel in the lines can spray out, posing fire risk, burns, and fuel leakage hazards.
13. If fuel comes into contact with skin or eyes, it may cause skin irritation or eye redness and swelling. Immediately wash the affected area with large amounts of running water, and seek medical attention if necessary.
14. Once fuel catches fire, it spreads quickly, potentially causing severe burns, fatalities, and destruction of equipment and components, resulting in significant property loss. In such an event, immediately use the appropriate fire extinguisher. Do not use water to extinguish the fire.
15. Static electricity carried by the body can ignite fuel vapours, leading to fire risk or even an explosion, resulting in death or serious injury. Before working on the fuel system, ensure to discharge any static electricity by touching a metal part of the vehicle body.
16. Foreign objects entering the fuel passage can damage fuel supply and injector components. Be sure to prevent contamination of the fuel passage when removing or installing such components.

3.4.3.2 System Description

1. Function
   a. The fuel system serves the following functions:

- Store fuel and deliver it to the engine after filtration.
- Supply the appropriate amount of fuel to the engine based on varying operating conditions.

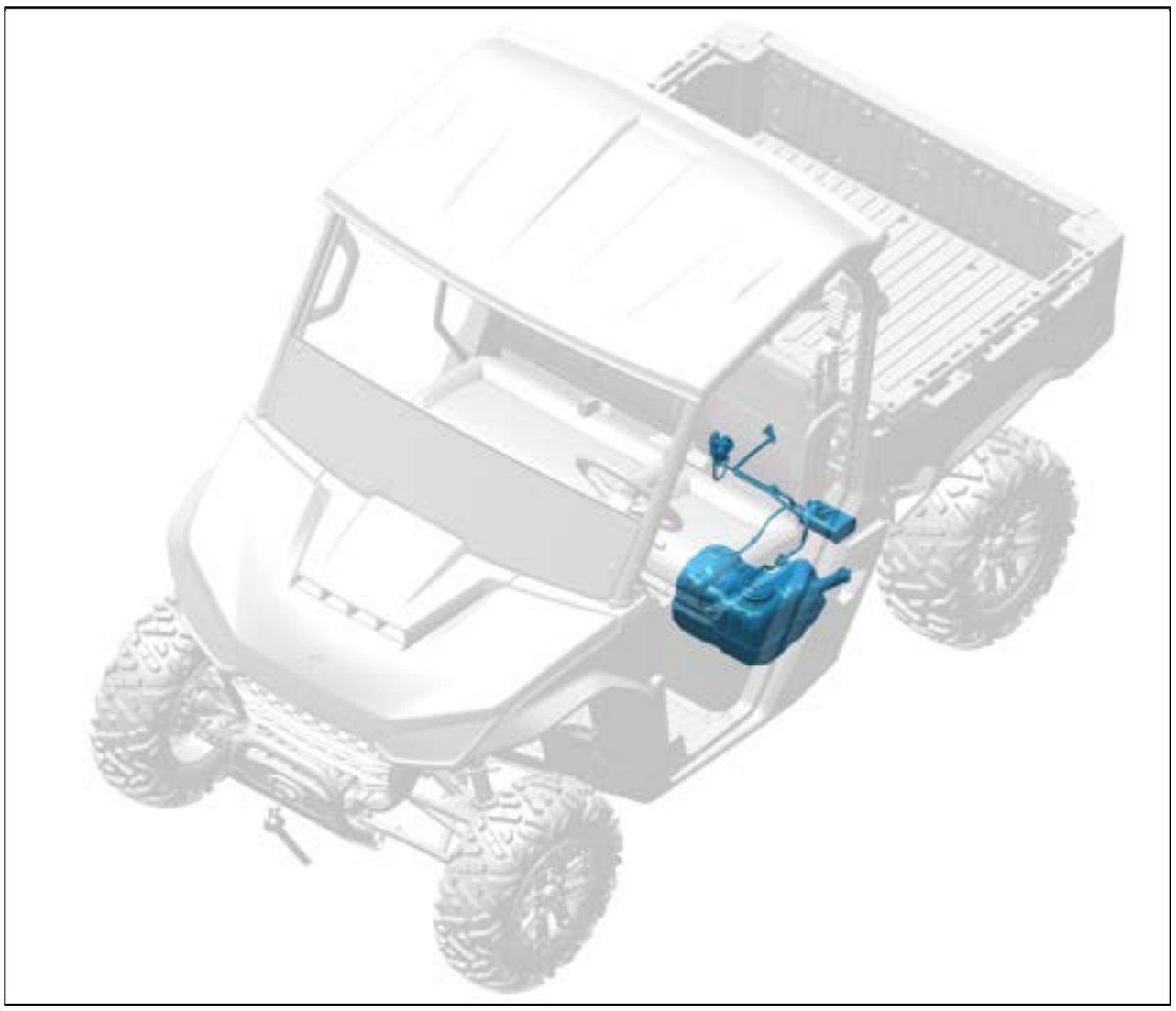
2. Components

a. The fuel system primarily consists of the fuel tank assembly, fuel pump assembly, fuel filter, fuel filler cap, and associated fuel lines.

3.4.4 Component Location and Exploded View

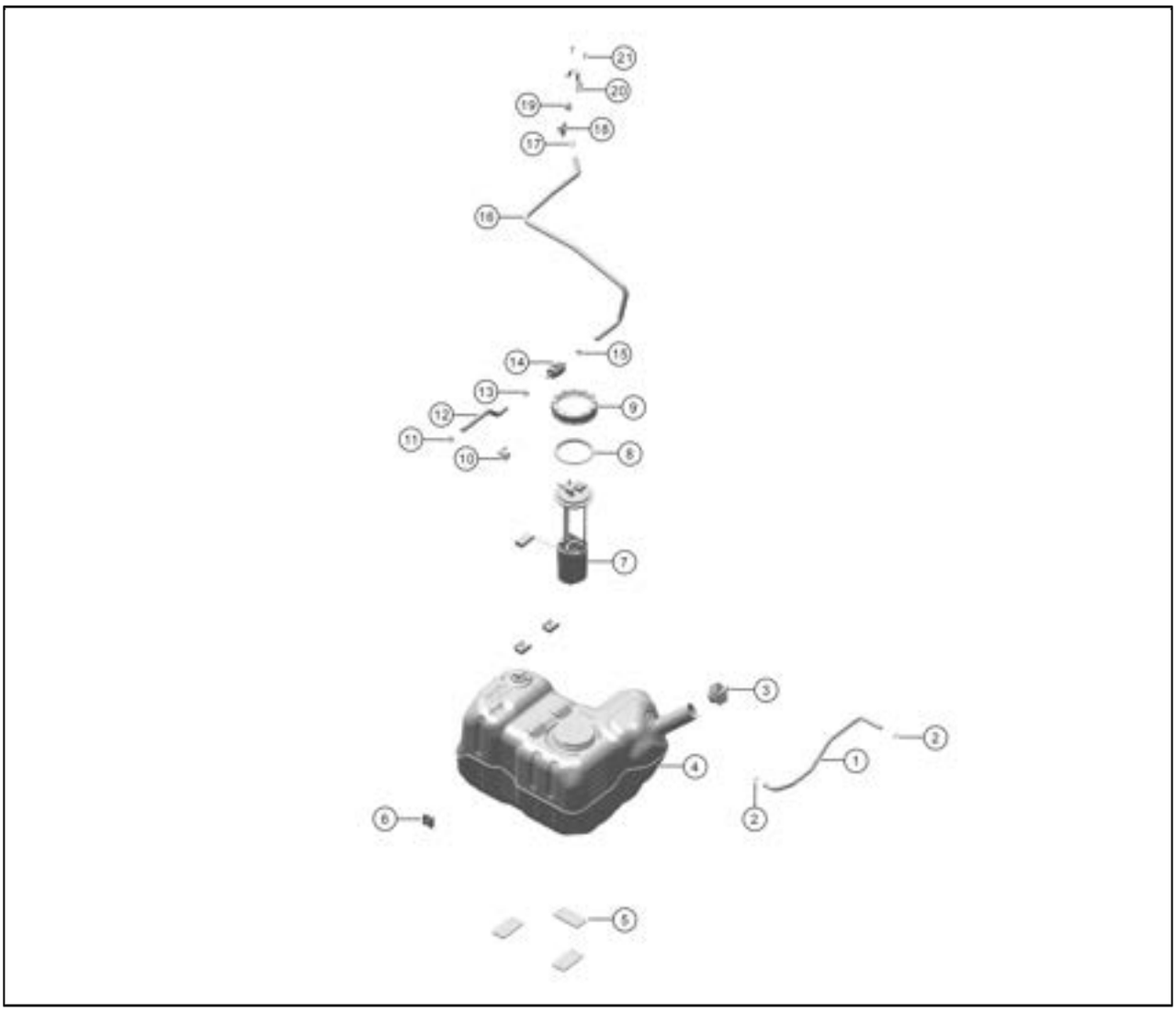
3.4.4.1 Component Location Diagram

Fuel System



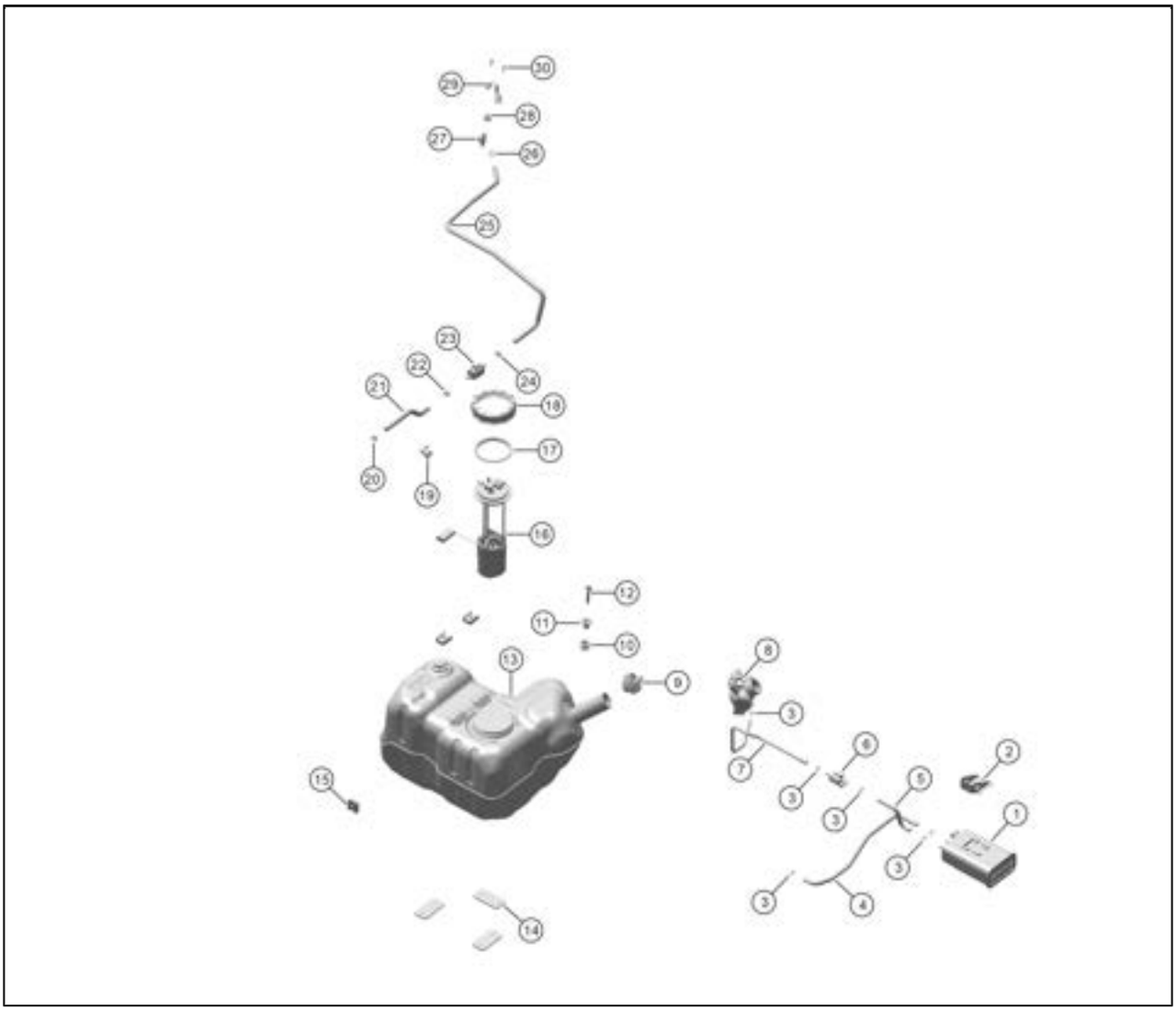
3.4.4.2 Exploded View Diagram

Fuel System



1	Breather/Adsorption Hose	8	Fuel Pump Sealing Ring (O-Ring)	15	Single-ear stepless clamp 16.5
2	Spring Band Hose Clip (13 mm)	9	Install the fuel pump cap.	16	High-Pressure Fuel Pipe, Engine Side
3	Fuel Filler Cap	10	9.49 Quick Connector (90-Degree)	17	Single-ear stepless clamp 16.5
4	Fuel Tank Assembly	11	Single-ear stepless clamp 16.5	18	Fuel Injector
5	Fuel Tank Heat/Protection Shield	12	High-Pressure Fuel Pipe (Fuel Pump End)	19	Fuel Injector Connection Pipe
6	Fuel Tank Upper Mounting Pad	13	Spring Band Hose Clip (13 mm)	20	Fuel injector retaining plate
7	Fuel Pump Assembly	14	Fuel filter assembly	21	Bolt M6×16

Fuel System (with EVAP Canister)



1	Charcoal Canister	11	T-bushing	21	High-Pressure Fuel Pipe (Fuel Pump End)
2	EVAP Canister Mounting Bracket	12	M8 × 35 Hex Flange Bolt	22	Spring Band Hose Clip (13 mm)
3	Spring Band Hose Clip (13 mm)	13	Fuel Tank Assembly	23	Fuel filter assembly
4	Breather/Adsorption Hose	14	Fuel Tank Heat/ Protection Shield	24	Single-ear stepless clamp 16.5
5	Solenoid Valve Inlet Pipe	15	Fuel Tank Upper Mounting Pad	25	High-Pressure Fuel Pipe, Engine Side
6	Charcoal Canister Solenoid Valve	16	Fuel Pump Assembly	26	Single-ear stepless clamp 16.5
7	Solenoid Valve Vent Hose	17	Fuel Pump Sealing Ring (O-Ring)	27	Fuel Injector
8	Throttle Body	18	Install the fuel pump	28	Fuel Injector Connection

			cap.		Pipe
9	Fuel Filler Cap	19	9.49 Quick Connector (90-Degree)	29	Fuel injector retaining plate
10	Fuel Tank Mounting Rubber Grommet	20	Single-ear stepless clamp 16.5	30	Bolt M6×16

3.4.5 General Fault Diagnosis and Operation

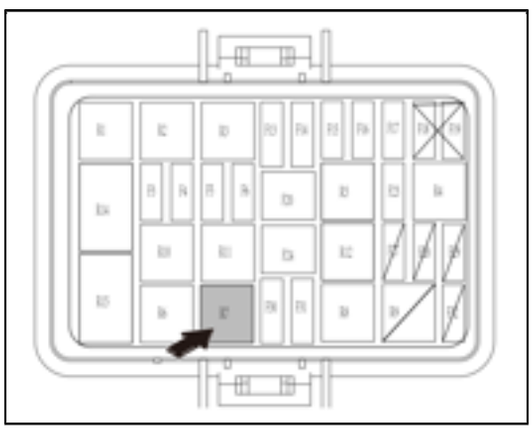
3.4.5.1 Fault Symptom List

Symptom(s)	Possible Causes	Recommended Repair Procedure
Fuel pump not working	1. Fuel pump relay damaged	Replace fuel pump relay.
	2. Fuel pump fuse damaged	Replace the fuel pump fuse.
	3. Fuel line blockage	Clear or replace the fuel line
	4. Fuel pump damaged	Replace the fuel pump.
	5. Engine ECU damaged	Replace the engine ECU with the same model
Fuel system pressure too high	Fuel return line blockage	Clear or replace the fuel line
Fuel system pressure too low	1. Fuel pump damaged	Replace the fuel pump.
	2. Fuel pump fuse poor contact or damaged	Replace the fuel pump fuse.
	3. Fuel pump relay poor contact or damaged	Replace fuel pump relay.
	4. Fuel line leakage	Replace or connect the fuel line
	5. Fuel filter clogged or damaged	Replace the fuel filter
Strong fuel smell	1. Fuel filler cap seal not tight	Reinstall or replace the fuel filler cap
	2. Fuel filter damaged	Replace the fuel filter
	3. Fuel filler ventilation hose damaged	Replace the ventilation hose
	4. Fuel line leakage	Replace damaged components or connect fuel line

3.4.6 Inspecting and adjusting

3.4.6.1 Relieving Fuel System Pressure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. Relieving Fuel System Pressure



a. Remove the fuel pump relay R7 from the fuse box.
b. Start the engine and allow it to idle until it stalls, then refit the fuel pump relay.

4. To install the front service cover, See: Front Service Cover.
5. To connect the negative battery, See: Battery Power Connection/Disconnection Procedure.

3.4.6.2 Inspecting the fuel system

1. Inspect the integrity of the plastic fuel tank and the entire vehicle's fuel lines, ensuring there are no fuel leaks or seepages. If any damage is found, replace the faulty fuel tank, lines, or seals.
2. Unscrew the fuel filler cap and check for any oil residue around the filler area. Also, inspect the filler cap sealant ring for aging or damage. If the residue is excessive or the sealant ring is ineffective, replace the filler cap and refueling hose.
3. Inspect the fuel filler cap for any deformation or cracks in the casing, and ensure the tether is not broken or loose. If damaged, replace the entire filler cap assembly.
4. Check the plastic fuel tank assembly retaining bolts for looseness. Tighten to the specified torque if necessary.
5. Inspect the plastic fuel tank assembly for signs of fuel leakage. If leaks are found, renew the fuel tank assembly.
6. Inspect the fuel line connections to ensure they are properly assembled. If not, reassemble them correctly.
7. Check the fuel lines and connectors for any damage. If damaged, replace them.
8. When refueling, the engine must be switched off, and the operation should be conducted in an outdoor or well-ventilated area.
9. If gasoline (petrol) comes into contact with skin or clothing, immediately wash the affected area with soapy water and change any contaminated clothing.

3.4.6.3 Inspecting fuel filter

1. Locate and inspect the fuel filter. If the filter has been removed, note the installation direction

indicated by the “OUT” marking on its surface.

2. If visible contaminants or debris are present inside the filter, replace it without delay.
3. Inspect the fuel line connections at both ends of the filter for leaks, cracks, ageing, or hardening. If leakage is evident, renew the sealing ring or fuel line.
4. Ensure the filter specification matches the original component. The use of alternative parts with incorrect flow or pressure ratings is strictly prohibited.
5. Depressurise the fuel system before removal/installation to avoid the risk of fire from high-pressure fuel spray.
6. After installation, start the engine and allow it to idle for 3 minutes. Recheck all connections for leaks, and verify smooth fuel delivery and normal acceleration.

3.4.7 Repair Procedure Guidance

3.4.7.1 Fuel Tank Assembly

WARNING:
• Whenever a petrol line is disconnected, the battery must be disconnected to prevent accidental operation of the fuel pump. • Fuel leakage may occur whenever any repair or inspection is carried out on the fuel system. Welding, smoking and naked flames are strictly prohibited in the area.

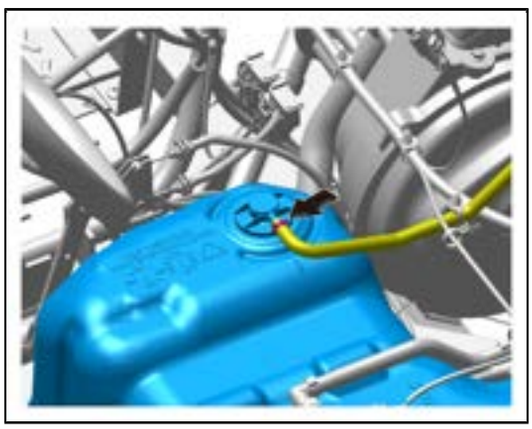
Removal Procedure

1. To relieve the fuel system pressure, See: Relieving Fuel System Pressure.
2. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
3. To remove the left half-door, See: Left Half Door.
4. To remove the driver's seat assembly, See: Driver's Seat Assembly.
5. To remove the passenger backrest assembly, See: Passenger Backrest Assembly.
6. To remove the passenger seat cushion assembly, See: Passenger Seat Cushion Assembly.
7. To remove the centre guide cover, See: Centre Guide Cover.
8. To remove the centre under-seat cover, See: Centre Under-Seat Cover.
9. To remove the battery assembly, See: Battery.
10. To remove the voltage regulator/rectifier, See: Voltage Regulator/Rectifier.
11. To remove the left inner roof bar cover, See: Left Inner Roof Bar Cover.
12. To remove the right inner roof bar cover, See: Right Inner Roof Bar Cover.
13. To remove the left roof bar side cover, See: Left Roof Bar Side Cover.
14. To remove the left side cover, rear section, See: left Side Cover, Rear Section.
15. To remove the ECU cover, See: ECU Cover.
16. To remove the ECU assembly, See: ECU Assembly.
17. To remove the seat belt buckle assembly, See: Seat Belt Buckle Assembly.
18. To remove the rear seat cushion guard, See: Rear Seat Cushion Guard.
19. To remove the under-seat panel, See: Under-Seat Panel.
20. To remove the seat cushion lower bracket welded assembly, See: Seat Cushion Lower Bracket

Welded Assembly.

21. To remove the fuel pump assembly, See: Fuel Pump Assembly.

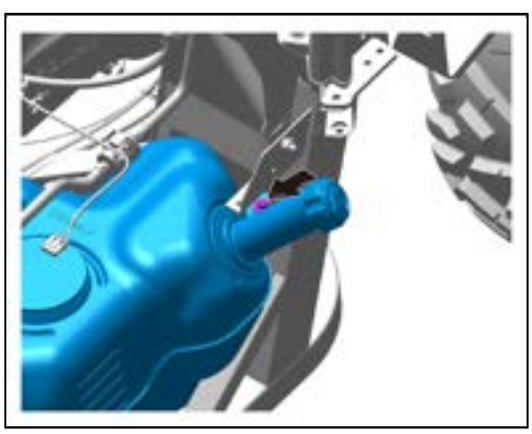
22. Removing the fuel tank assembly



a. Loosen the retaining clamp and disconnect the fuel hose.

CAUTION:

- Wrap the disconnected connector with a plastic bag or similar material to prevent damage and ingress of foreign matter.
- Fuel leakage may occur when removing any fuel system component. Wipe away any residual fuel with a cloth.



b. Remove the M6 × 30 fuel tank mounting bolts, then remove the fuel tank assembly.

Torque: 5.9~8.9 ft-lbs (8~12N·m).

NOTICE:

- Before removing the fuel tank assembly, disconnect the surrounding hoses and release the retaining clips. Make sure all connections are fully disconnected before removing the fuel tank assembly.

CAUTION:

- Wrap the disconnected connector with a plastic bag or similar material to prevent damage and ingress of foreign matter.
- Fuel leakage may occur when removing any fuel system component. Wipe away any residual fuel with a cloth.

Installation Procedure

1. Install the fuel tank assembly in the reverse order of removal.

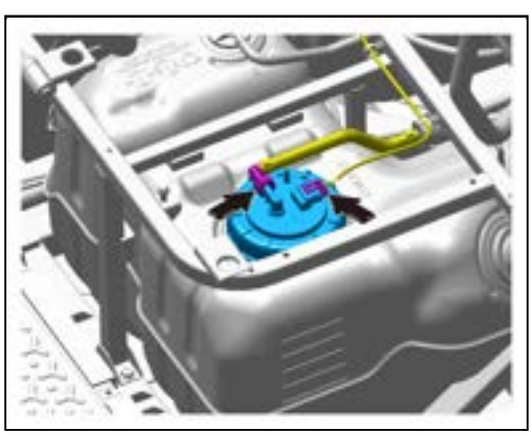
3.4.7.2 Fuel Pump Assembly

WARNING:

- Whenever a petrol line is disconnected, the battery must be disconnected to prevent accidental operation of the fuel pump.
- Fuel leakage may occur whenever any repair or inspection is carried out on the fuel system. Welding, smoking and naked flames are strictly prohibited in the area.

Removal Procedure

1. To relieve the fuel system pressure, See: Relieving Fuel System Pressure.
2. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
3. To remove the left half-door, See: Left Half Door.
4. To remove the driver's seat assembly, See: Driver's Seat Assembly.
5. To remove the passenger backrest assembly, See: Passenger Backrest Assembly.
6. To remove the passenger seat cushion assembly, See: Passenger Seat Cushion Assembly.
7. To remove the centre guide cover, See: Centre Guide Cover.
8. To remove the centre under-seat cover, See: Centre Under-Seat Cover.
9. To remove the left inner roof bar cover, See: Left Inner Roof Bar Cover.
10. To remove the right inner roof bar cover, See: Right Inner Roof Bar Cover.
11. To remove the left roof bar side cover, See: Left Roof Bar Side Cover.
12. To remove the left side cover, rear section, See: left Side Cover, Rear Section.
13. To remove the ECU cover, See: ECU Cover.
14. To remove the ECU assembly, See: ECU Assembly.
15. To remove the seat belt buckle assembly, See: Seat Belt Buckle Assembly.
16. To remove the rear seat cushion guard, See: Rear Seat Cushion Guard.
17. To remove the under-seat panel, See: Under-Seat Panel.
18. Removing the fuel pump assembly

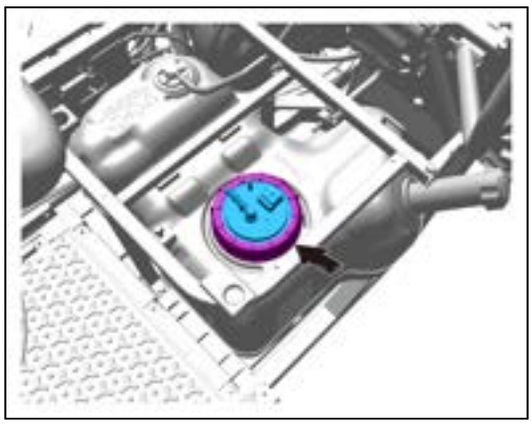


a. Press the locking tab on the fuel pump end high-pressure fuel pipe assembly and disconnect the assembly.

b. Disconnect the fuel pump assembly harness connector.

CAUTION:

- Wrap the disconnected quick connector with a plastic bag or similar material to prevent damage and ingress of foreign matter.



c. Using the appropriate tool, remove the fuel pump retaining ring, then remove the fuel pump assembly.

Torque: 55.3 ft-lbs(75N·m)

CAUTION:

- Fuel leakage may occur when removing any fuel system component. Wipe away any residual fuel with a cloth.
- After removing the fuel pump assembly, properly seal the fuel tank opening to prevent debris from entering the tank and damaging the fuel pump.



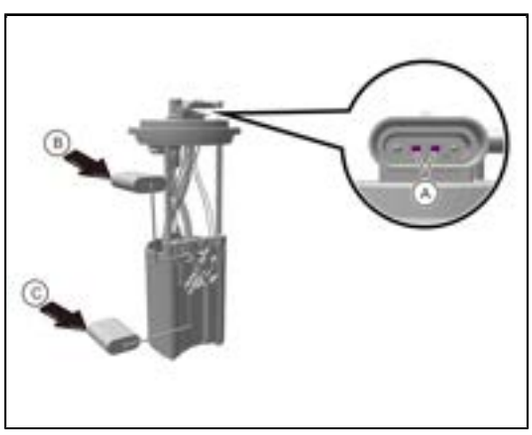
d. Remove the fuel pump sealing ring.

CAUTION:

- The seal is a single-use part and must be replaced with a new one after removal.

Inspection Procedure

1. Inspecting the fuel pump assembly



a. Move the float arm to verify free movement; the float assembly must return to its lower position freely. If not, replace the fuel pump assembly.

b. Test the fuel level sensor by connecting a multimeter to the 2 center pins of wiring harness connector A. The resistance should be 235 ± 5 Ω at the full position (B) and 40 ± 2 Ω at the empty position (C).

CAUTION:

- If the resistance reading is unstable, clean the resistor wiper contact with alcohol and retest. If the values remain out of specification, replace the fuel pump assembly.



c. Measure the fuel pump delivery pressure using a pressure gauge; with the power switched on, the pressure must be 400 kPa ± 5%.

CAUTION:

- **Before performing this test, the fuel pump assembly must be fully installed, and the system primed by switching on the ignition.**
- **If the fuel delivery pressure is out of specification, replace the fuel pump assembly.**

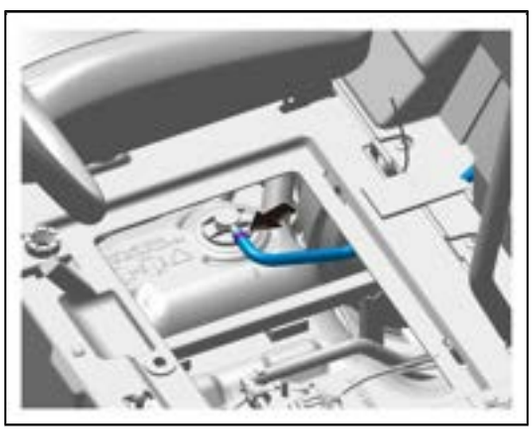
Installation Procedure

1. **Install the fuel pump assembly in the reverse order of removal, noting the following:**
   a. When fitting the quick connector, an audible click indicates that it is correctly engaged. If no click is heard, recheck the connection to prevent an accident.

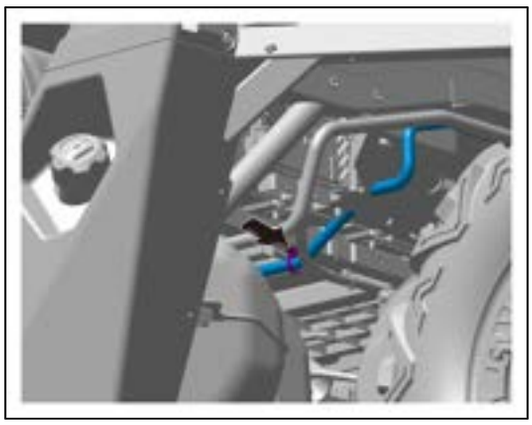
3.4.7.3 Breather Hose

Removal Procedure

1. **To disconnect the negative battery terminal,** See: Battery Power Connection/Disconnection Procedure.
2. **To remove the fuel tank guard,** See: Fuel Tank Guard.
3. **To remove the driver's seat assembly,** See: Driver's Seat Assembly.
4. **Removing the breather hose**



a. Loosen the breather hose clamp and disconnect the breather hose.



b. Release the retaining clips along the breather hose, cut the cable ties securing the wiring harness, and remove the breather hose.

NOTICE:

- **Cable ties on the harness are single-use and must be replaced after removal.**

Installation Procedure

1. Install the breather hose in the reverse order of removal.

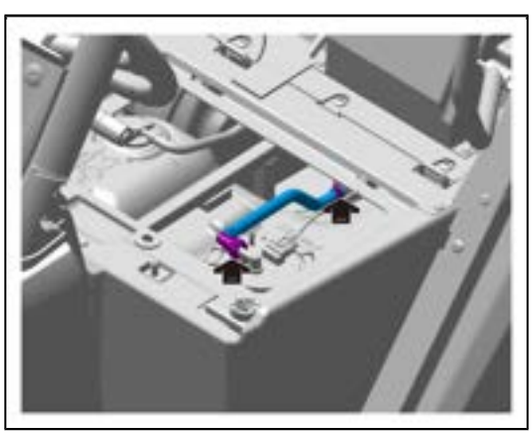
3.4.7.4 High-Pressure Fuel Pipe (Fuel Pump End)

WARNING:

- **Whenever a petrol line is disconnected, the battery must be disconnected to prevent accidental operation of the fuel pump.**
- **Fuel leakage may occur whenever any repair or inspection is carried out on the fuel system. Welding, smoking and naked flames are strictly prohibited in the area.**

Removal Procedure

1. To relieve the fuel system pressure, See: Relieving Fuel System Pressure.
2. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
3. To remove the driver's seat assembly, See: Driver's Seat Assembly.
4. Removing the fuel pump end high-pressure fuel pipe



a. Press quick connector locking tab and disconnect the fuel pump end high-pressure fuel line.

b. Loosen the clamp and disconnect the high-pressure fuel hose at the fuel pump end.

CAUTION:

- **Wrap the disconnected high-pressure fuel pipe with a plastic bag or similar material to prevent damage and ingress of foreign matter.**

Installation Procedure

1. Install the fuel pump end high-pressure fuel pipe in the reverse order of removal, noting the following:

   a. When installing the high-pressure fuel line, carefully inspect the line for damage, and replace if

damaged.

b. When installing the high-pressure fuel pipe, ensure that it is fully seated. If not, recheck the installation to prevent an accident.

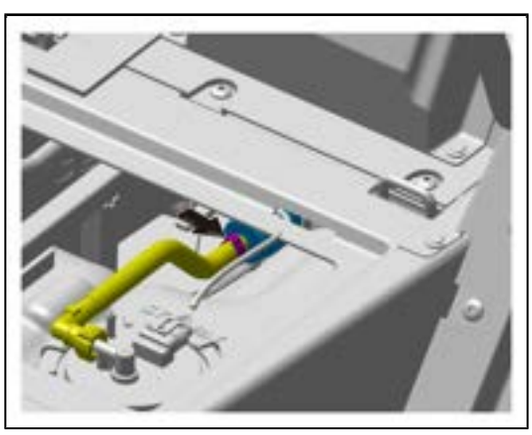
3.4.7.5 Fuel filter assembly

WARNING:

- Whenever a petrol line is disconnected, the battery must be disconnected to prevent accidental operation of the fuel pump.
- Fuel leakage may occur whenever any repair or inspection is carried out on the fuel system. Welding, smoking and naked flames are strictly prohibited in the area.

Removal Procedure

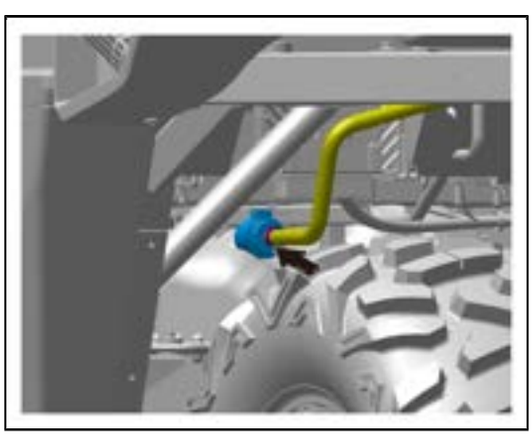
1. To relieve the fuel system pressure, See: Relieving Fuel System Pressure.
2. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
3. To remove the fuel tank guard, See: Fuel Tank Guard.
4. To remove the driver's seat assembly, See: Driver's Seat Assembly.
5. Removing the fuel filter assembly



a. Loosen the retaining clamp and disconnect the high-pressure fuel hose.

CAUTION:

- Wrap the disconnected high-pressure fuel pipe with a plastic bag or similar material to prevent damage and ingress of foreign matter.
- Fuel leakage may occur when removing any fuel system component. Wipe away any residual fuel with a cloth.
- The fuel filter uses a single-ear stepless clamp. To prevent fuel leakage after installation, always fit a new clamp during reassembly.



b. Loosen the retaining clamp, disconnect the high-pressure fuel hose, and remove the fuel filter assembly.

CAUTION:
• Wrap the disconnected high-pressure fuel pipe with a plastic bag or similar material to prevent damage and ingress of foreign matter. • Fuel leakage may occur when removing any fuel system component. Wipe away any residual fuel with a cloth. • The fuel filter uses a single-ear stepless clamp. To prevent fuel leakage after installation, always fit a new clamp during reassembly.

Installation Procedure

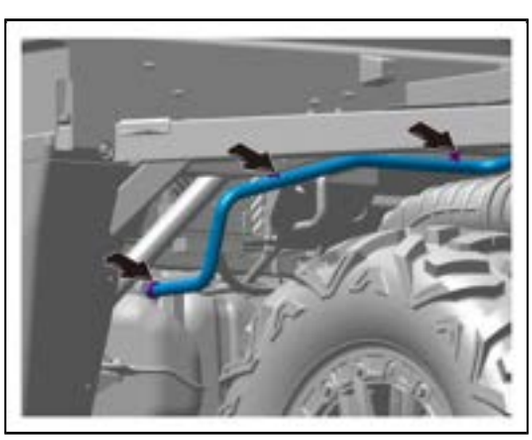
1. Install the fuel filter assembly by following the reverse of removal steps, and observe the following precautions:
   a. When installing the high-pressure fuel pipe, ensure that it is fully seated. If not, recheck the installation to prevent an accident.

3.4.7.6 High-Pressure Fuel Pipe, Engine Side

WARNING:
• Whenever a petrol line is disconnected, the battery must be disconnected to prevent accidental operation of the fuel pump. • Fuel leakage may occur whenever any repair or inspection is carried out on the fuel system. Welding, smoking and naked flames are strictly prohibited in the area.

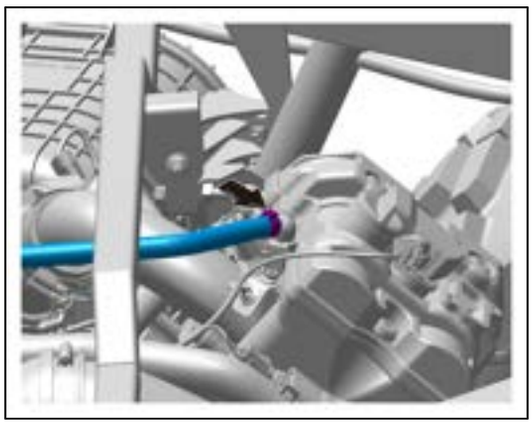
Removal Procedure

1. To relieve the fuel system pressure, See: Relieving Fuel System Pressure.
2. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
3. To remove the fuel tank guard, See: Fuel Tank Guard.
4. Removing the high-pressure fuel pipe at the engine end



a. Loosen the retaining clamp and release the 2 retaining clips securing the high-pressure fuel hose on the engine side.

CAUTION:
• The clamp is a single-ear stepless clamp; to prevent fuel leaks after installation, a new clamp must be installed. • Fuel leakage may occur when removing any fuel system component. Wipe away any residual fuel with a cloth.



b. Loosen the retaining clamp, release the wiring harness retaining clips along the engine-side high-pressure fuel hose, cut the cable ties securing the wiring harness, and remove the high-pressure fuel hose.

CAUTION:
• The clamp is a single-ear stepless clamp; to prevent fuel leaks after installation, a new clamp must be installed. • Fuel leakage may occur when removing any fuel system component. Wipe away any residual fuel with a cloth.

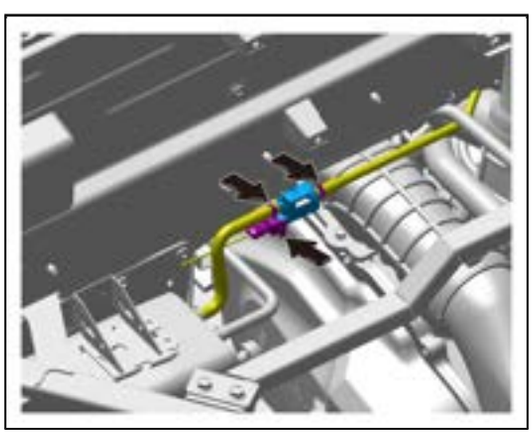
Installation Procedure

1. Install the engine-side high-pressure fuel line in the reverse order of removal.
   a. When installing the engine-side high-pressure fuel line, carefully inspect the line for damage and renew if necessary.
   b. Ensure the engine-side high-pressure fuel line is fully seated upon installation; if not, recheck the connection to prevent safety hazards.

3.4.7.7 Charcoal Canister Solenoid Valve

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. Removing the charcoal canister solenoid valve



a. Loosen the 2 fuel hose clamps and disconnect both fuel hoses.
b. Disconnect the EVAP canister solenoid valve wiring harness connector and remove the solenoid valve.

CAUTION:
• Wrap the disconnected lines with a plastic bag or similar material to prevent damage and contamination. • Fuel leakage may occur when removing any fuel system component. Wipe away any residual fuel with a cloth.

Installation Procedure

1. Install the charcoal canister solenoid valve by reversing the steps of removal.

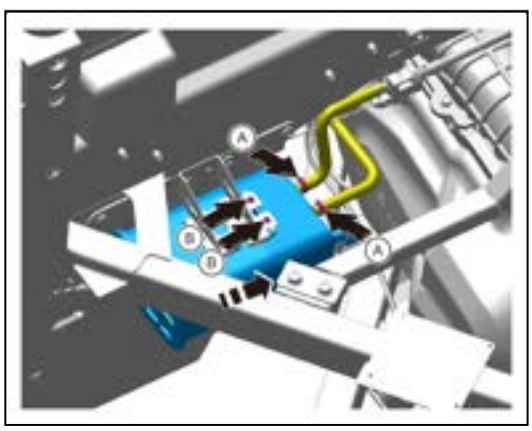
3.4.7.8 Charcoal Canister

WARNING:

- Whenever a petrol line is disconnected, the battery must be disconnected to prevent accidental operation of the fuel pump.
- Fuel leakage may occur whenever any repair or inspection is carried out on the fuel system. Welding, smoking and naked flames are strictly prohibited in the area.

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. Removing charcoal canister

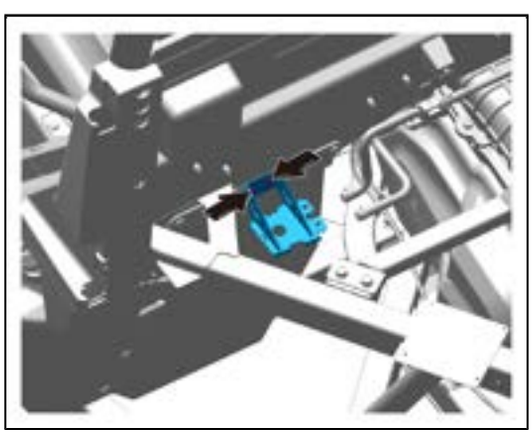


a. Loosen the 2 retaining clamps A and disconnect the 2 lines.

b. Remove the 2 locating bolts B. Move the EVAP canister in the direction of the arrow to disengage it, then remove it.

CAUTION:

- Wrap the disconnected lines with a plastic bag or similar material to prevent damage and contamination.
- Fuel leakage may occur when removing any fuel system component. Wipe away any residual fuel with a cloth.



c. Remove the 2 retaining bolts and remove the charcoal canister bracket.

Torque: 5.9~8.9 ft-lbs (8~12N·m).

Installation Procedure

1. Install the charcoal canister by reversing the steps of removal.

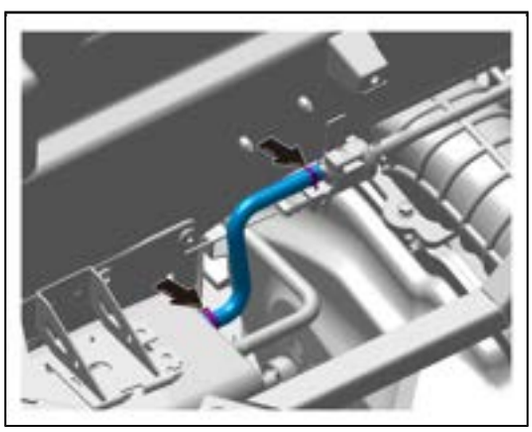
3.4.7.9 Solenoid Valve Inlet Pipe

WARNING:

- Whenever a petrol line is disconnected, the battery must be disconnected to prevent accidental operation of the fuel pump.
- Fuel leakage may occur whenever any repair or inspection is carried out on the fuel system. Welding, smoking and naked flames are strictly prohibited in the area.

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. Removing the solenoid valve inlet pipe



a. Loosen the 2 retaining clamp and remove the solenoid valve inlet pipe.

CAUTION:

- Wrap the disconnected lines with a plastic bag or similar material to prevent damage and contamination.
- Fuel leakage may occur when removing any fuel system component. Wipe away any residual fuel with a cloth.

Installation Procedure

1. Install the solenoid valve inlet pipe in the reverse order of removal.

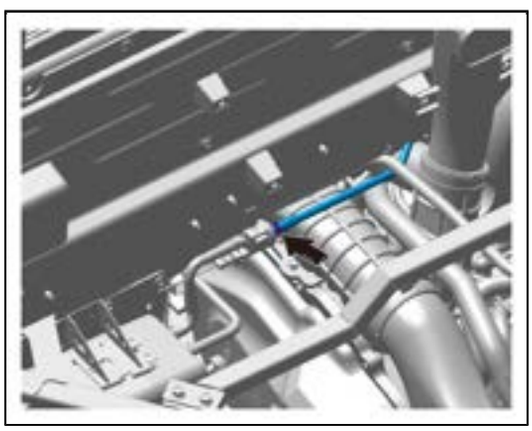
3.4.7.10 Solenoid Valve Vent Hose

WARNING:

- Whenever a petrol line is disconnected, the battery must be disconnected to prevent accidental operation of the fuel pump.
- Fuel leakage may occur whenever any repair or inspection is carried out on the fuel system. Welding, smoking and naked flames are strictly prohibited in the area.

Removal Procedure

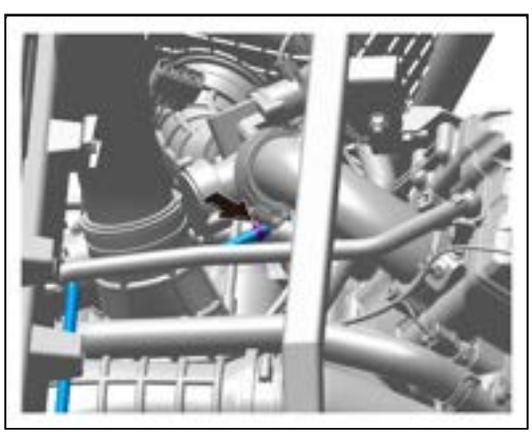
1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. Removing solenoid valve vent hose



a. Loosen the retaining clamp and disconnect the solenoid valve vent hose.

CAUTION:

- Wrap the disconnected lines with a plastic bag or similar material to prevent damage and contamination.
- Fuel leakage may occur when removing any fuel system component. Wipe away any residual fuel with a cloth.



b. Cut the cable ties and release the retaining clips along the routing of the solenoid valve vent hose.

c. Loosen the retaining clamp and remove solenoid valve vent hose.

CAUTION:

- Wrap the disconnected lines with a plastic bag or similar material to prevent damage and contamination.
- Fuel leakage may occur when removing any fuel system component. Wipe away any residual fuel with a cloth.

Installation Procedure

1. Install the solenoid valve vent hose in the reverse order of removal.

3.4.7.11 Breather/Adsorption Hose

WARNING:

- Whenever a petrol line is disconnected, the battery must be disconnected to prevent accidental operation of the fuel pump.
- Fuel leakage may occur whenever any repair or inspection is carried out on the fuel system. Welding, smoking and naked flames are strictly prohibited in the area.

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the driver's seat assembly, See: Driver's Seat Assembly.
3. Removing the EVAP pipe

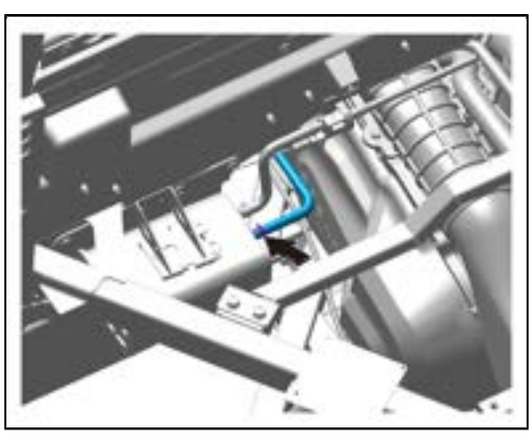


a. Loosen the retaining clamp, release the retaining clips along the EVAP pipe, and cut the cable ties.

b. Disconnect the canister purge hose.

NOTICE:

- Cable ties on the harness are single-use and must be replaced after removal.



c. Loosen the retaining clamp and remove the canister purge hose.

CAUTION:

- Inspect the EVAP pipe for signs of chafing, cracks, or damage. If any damage is found, replace the EVAP pipe.
- Wrap the disconnected fuel pipe connector with a plastic bag or similar material to prevent damage and ingress of foreign matter.

Installation Procedure

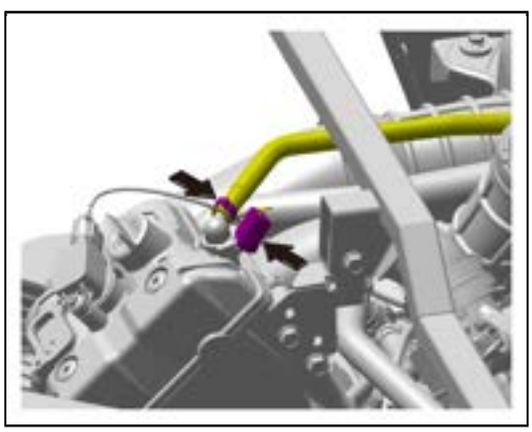
1. Install the breather hose in the reverse order of removal, paying attention to the following:
   a. Ensure the EVAP pipe is fully seated during installation. Recheck the connection to prevent hazardous leaks.

3.4.7.12 Fuel Injector

WARNING:
• Whenever a petrol line is disconnected, the battery must be disconnected to prevent accidental operation of the fuel pump. • Fuel leakage may occur whenever any repair or inspection is carried out on the fuel system. Welding, smoking and naked flames are strictly prohibited in the area.

Removal Procedure

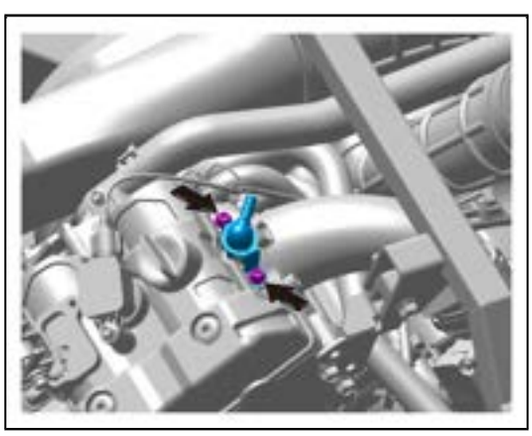
1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To relieve the fuel system pressure, See: Relieving Fuel System Pressure.
3. Removing the injector



a. Loosen the retaining clamp and disconnect the fuel hose.

b. Disconnect the fuel injector wiring harness connector.

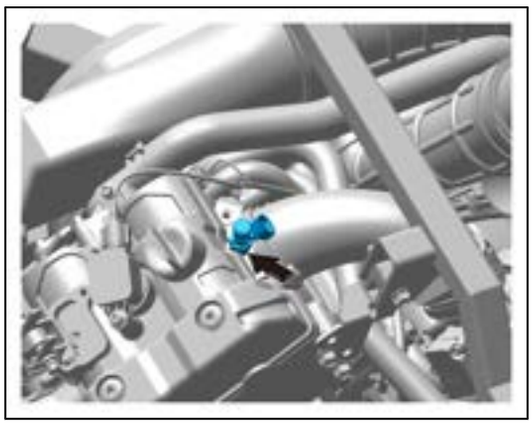
CAUTION:
• Wrap the disconnected lines with a plastic bag or similar material to prevent damage and contamination. • Fuel leakage may occur when removing any fuel system component. Wipe away any residual fuel with a cloth.



c. Remove the 2 fuel injector bracket mounting bolts, then remove the fuel rail and injector retaining plate.

Torque: 7.2 ft-lbs(9.8N·m)

CAUTION:
• Wrap the disconnected lines with a plastic bag or similar material to prevent damage and contamination. • Fuel leakage may occur when removing any fuel system component. Wipe away any residual fuel with a cloth.



d. Remove the fuel injector.

CAUTION:

- Wrap the disconnected lines with a plastic bag or similar material to prevent damage and contamination.
- Fuel leakage may occur when removing any fuel system component. Wipe away any residual fuel with a cloth.

Installation Procedure

1. Install the fuel injectors in the reverse order of removal.

3.5 Intake System

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3.5.6.1 Intake Pipe Assembly 347

3.5.6.2 Air Cleaner Element Assembly 348

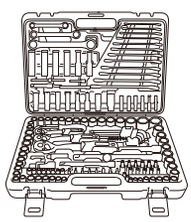
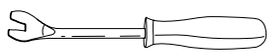
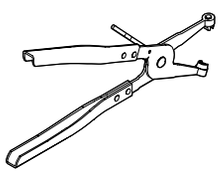
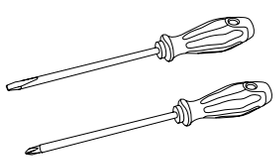
3.5.6.3 Air Cleaner Assembly 349

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3.5.1 Service Tools

3.5.1.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)
2	Trim clip removal tool		Removal and Installation of Push-in Clip
3	Hose Clamp Pliers		Removing and installing hose clamps
4	Screwdriver		Removing screws

3.5.2 Description and Operation

3.5.2.1 Warnings and Precautions

1. Before servicing or replacing intake system components, thoroughly inspect the target components and installation areas.
2. Regularly check the sealing performance of the connection between the intake ducting and air cleaner assembly. If leakage is detected, stop the engine immediately and retighten the components to the manufacturer's specified torque to prevent abnormal wear of engine cylinders, piston rings, and other precision components due to the ingress of intake contaminants.
3. When servicing or replacing the air cleaner element, park the vehicle in a clean, wind-free area to avoid the ingress of contaminants into the filter element or intake passage.
4. After disconnecting any intake system line or removing components, use dedicated protective plugs or clean protective cloths to seal the line ports and component connectors to prevent foreign objects, dust, and contaminants from entering the engine combustion chamber and intake passage, thus preventing accelerated internal component wear and prolonging engine service life.
5. After completing the repair work, check the reliability of the connections of all intake system lines and connectors to ensure that there is no looseness or displacement.
6. After assembly, check all fasteners for re-tightening to the specified torque values, ensuring that the actual torque values meet assembly requirements.

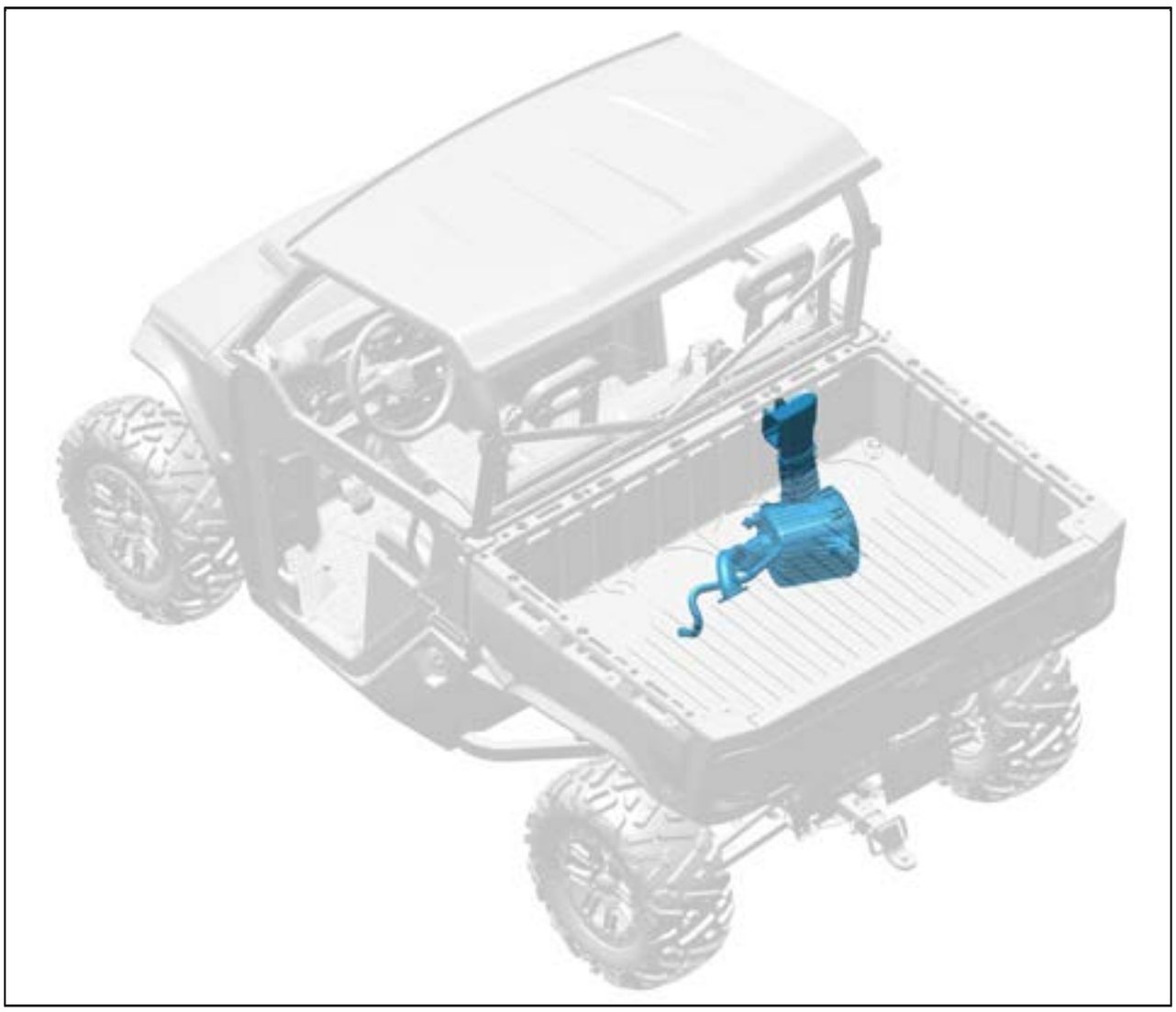
3.5.2.2 System Description

1. Function
   a. The functions of the intake system are as follows:
      - Filter out impurities, dust, and contaminants from the air, providing clean, dry, fresh, and stable airflow to the cylinders.
      - Supply the engine with a mixture of air and fuel at the appropriate concentration for operational conditions.
      - Distribute the air-fuel mixture or clean air evenly to each engine cylinder.
      - Reduce the airflow noise generated during the engine air intake process.
2. Components
   a. The air intake system consists of the intake pipe assembly, air cleaner element, air cleaner assembly, crankcase breather hose, intake pipe and related components.

3.5.3 Component Location and Exploded View

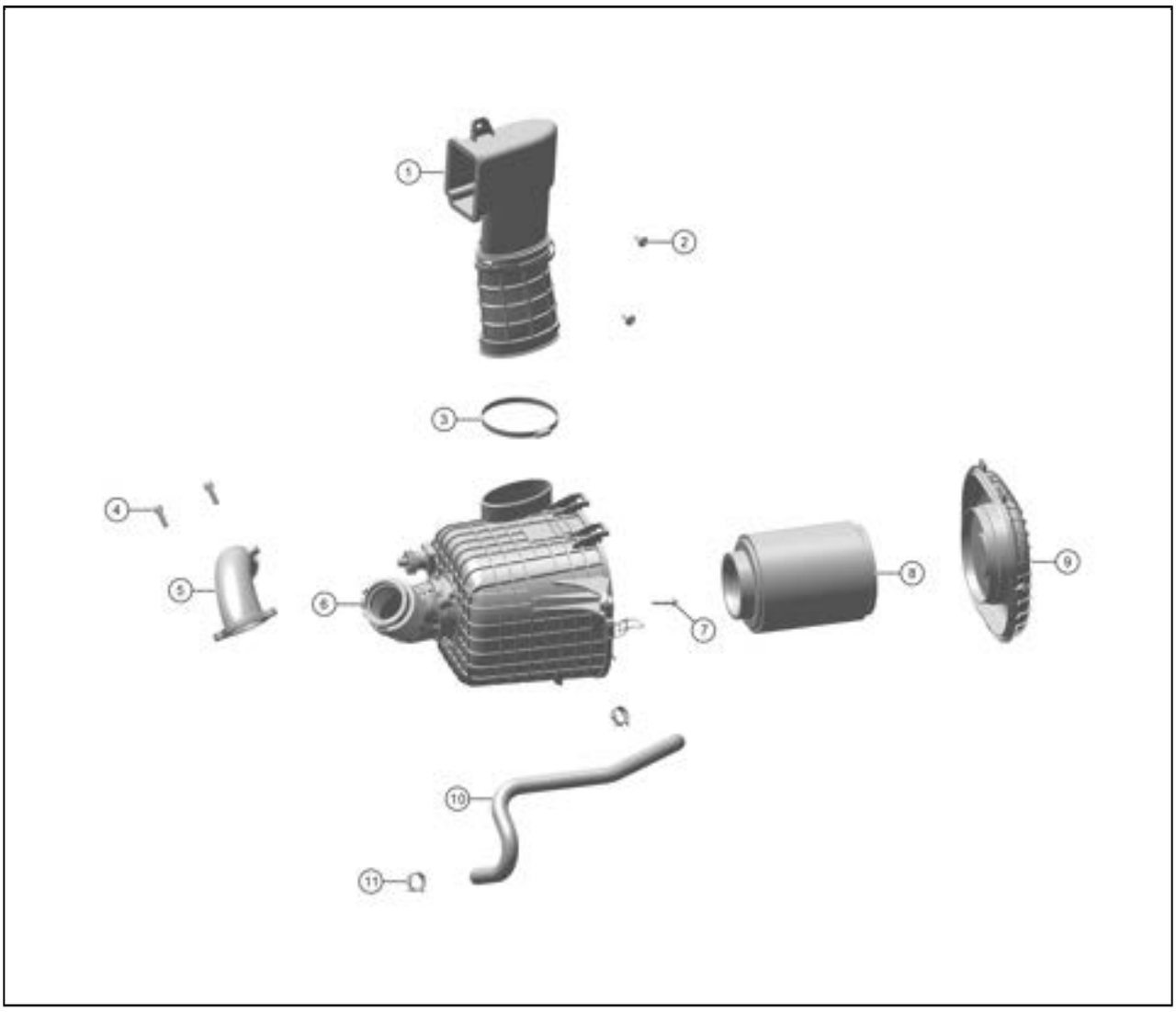
3.5.3.1 Component Location Diagram

Intake System



3.5.3.2 Exploded View Diagram

Intake System



1	Intake Pipe Assembly	7	Hex flange bolt
2	Large Pan Head Hex Socket Bolt	8	Air Cleaner Element Assembly
3	Type A worm drive hose clamp	9	Air Cleaner Assembly Front Cover
4	Hexagon Socket Head Cap Screw	10	Crankcase Breather Hose
5	Intake Manifold	11	Spring Band Hose Clamp
6	Air Cleaner Assembly		

3.5.4 General Fault Diagnosis and Operation

3.5.4.1 Fault Symptom List

Symptom(s)	Possible Causes	Recommended Repair Procedure
Engine idling unstable or acceleration lack of power	1. Intake duct or air cleaner assembly leakage, poor air flow	Clear the intake duct and replace with the same specification line if damaged. Repair the air cleaner assembly sealing structure, clean or replace the filter element.
Engine starts easily when cold, but hard to start when hot.	1. Intake duct or air cleaner assembly seal failure and leakage.	Repair the intake duct or air cleaner shell damage, replace the aging seal, and replace the assembly if necessary.
Excessive intake noise	1. Air filter line loose, damaged, or seal failure	Tighten the hose clamp, replace damaged lines and aging seals.
Intake system has engine oil	1. Crankcase ventilation line clogged or damaged	Clear the crankcase ventilation line and replace damaged lines.
Intake blockage	1. Foreign object blockage inside the intake duct	Disassemble the line to clear foreign objects inside, unblock and reassemble the vehicle, replace the line if deformed.
	2. Air filter element heavily clogged with dust	Clean the surface of the filter element, replace the air cleaner element if severely clogged.

3.5.5 Inspecting and adjusting

3.5.5.1 Inspecting air intake system

CAUTION:
• Before carrying out the inspection, ensure that the engine has fully cooled down to a cold condition. • Do not start the engine at any time during the inspection, to prevent burns from hot components or injury from moving components.

Inspecting the intake pipe assembly

1. Check that the intake pipe assembly is correctly installed. Reinstall it if it is not correctly installed.
2. Inspect the intake pipe assembly for cracks or other damage. Replace it if damaged.
3. Check the intake pipe assembly for blockage. Clean it if blocked.
4. Start the engine and check whether suction is present in the air intake system. If no suction is detected, repair the air intake system.

Inspecting the air cleaner assembly

1. Check the air cleaner housing for cracks or damage. Renew if necessary.
2. Check that the air cleaner assembly is securely installed. Tighten if necessary.

Inspecting the air cleaner element assembly

1. Check the air cleaner element assembly for dust accumulation. If present, use compressed air (max. 4 bar / 4 kg/cm^2) to blow out dirt from the inside of the main cleaner element.

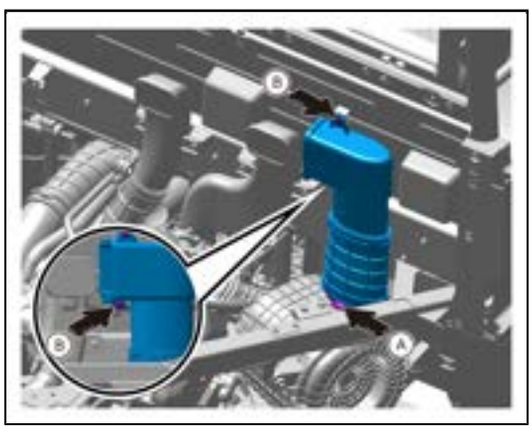
CAUTION:
• If heavily soiled, replace the air cleaner element assembly.

3.5.6 Repair Procedure Guidance

3.5.6.1 Intake Pipe Assembly

Removal Procedure

1. Removing the intake pipe assembly



a. Tilt the cargo box and loosen clamp A.

b. Remove the 2 bolts B(M6×16) securing the intake pipe assembly and remove the assembly.

Installation Procedure

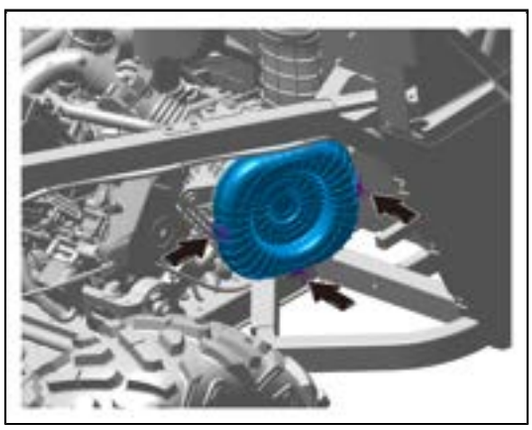
1. Install the intake pipe in the reverse order of removal, observing the following points:

   a. Before installation, check the intake pipe assembly for any damage. If damaged, replace it with a new one.

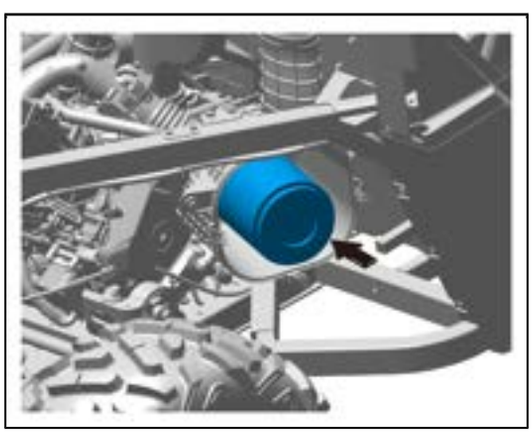
3.5.6.2 Air Cleaner Element Assembly

Removal Procedure

1. Removing the air cleaner element assembly



a. Unfasten the 3 retaining clips and remove the air cleaner assembly front cover.



b. Remove the air cleaner element assembly.

CAUTION:

- If heavily soiled, replace the air cleaner element assembly.
- Check the sealing surface of the cleaner element assembly for dirt. If soiled, replace the air cleaner element assembly and ensure it is properly seated.

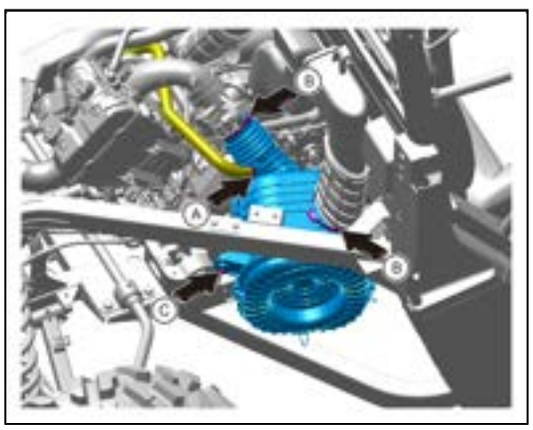
Installation Procedure

1. Install the air cleaner components in the reverse order of removal, observing the following points:
   a. Before installation, check that the inside of the air cleaner front cover and the filter element are clean and free from foreign matter.
   b. Clean the inside of the air cleaner duckbill outlet valve. Remove any accumulated mud, sand and debris to ensure unobstructed drainage.
   c. Ensure that the filter element is correctly seated in the air cleaner housing.

3.5.6.3 Air Cleaner Assembly

Removal Procedure

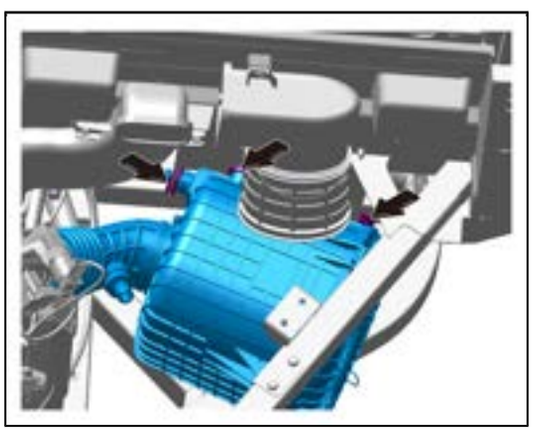
1. Removing the air cleaner assembly



a. Loosen clamp A and disconnect the crankcase breather hose from the air cleaner assembly.

b. Loosen the 2 clamps B.

c. Remove mounting bolt C from the air cleaner assembly.



d. Release the air cleaner assembly from the 3 rubber mounting grommets and remove it.

Installation Procedure

1. Install the air cleaner assembly in the reverse order of removal, and observe the following precautions:

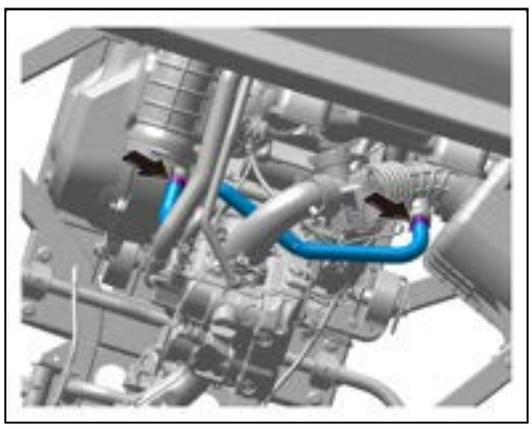
   a. Before installation, check that the inside of the air cleaner assembly, intake ducting and outlet line is clean and free from foreign matter.

   b. Check that the air cleaner assembly is correctly connected to the intake ducting and outlet line.

3.5.6.4 Crankcase Breather Hose

Removal Procedure

1. To remove the CVT air duct, See: CVT Air Duct.
2. Removing the crankcase breather hose



a. Loosen the 2 retaining clamps and remove the crankcase breather hose.

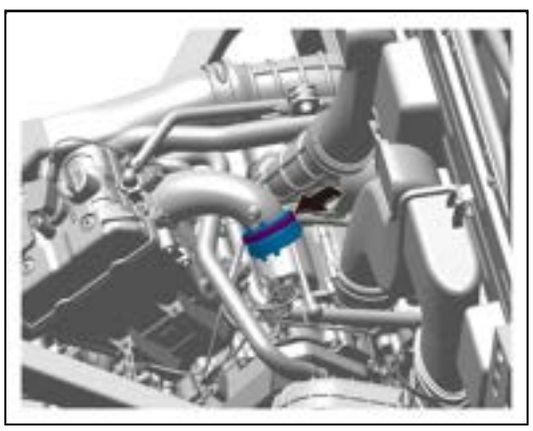
Installation Procedure

1. Install the crankcase breather hose in the reverse order of removal, paying attention to the following:
   a. Before installation, check the crankcase breather hose for any damage. If damaged, replace it with a new one.

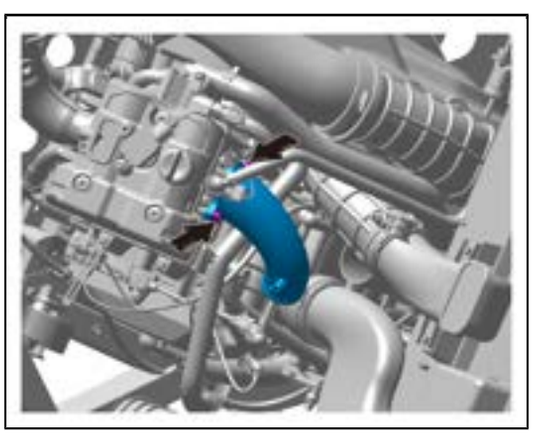
3.5.6.5 Intake Manifold

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the CVT air intake duct 2, See: CVT Intake Pipe 2.
3. To remove the throttle body, See: Throttle Body.
4. Removing the intake manifold



a. Loosen the retaining clamp and remove the intake manifold rubber coupling.



b. Remove the 2 M8 × 25 mounting screws, then remove the intake manifold.



c. Remove the O-ring.

Installation Procedure

1. **Install the intake manifold in the reverse order of removal, paying attention to the following:**
   a. Before installation, check the intake manifold for any damage. If damaged, replace it with a new one.

3.6 Exhaust System

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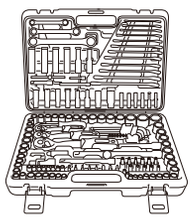
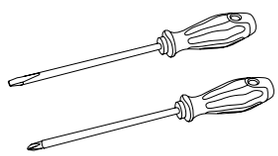
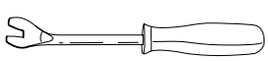
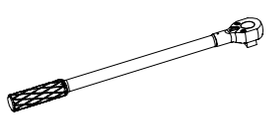
3.6.1 Specifications

3.6.1.1 Fastener Specifications

Item	Torque (N·m)	Torque (ft-lbs)
Silencer Body Assembly Mounting Bolt, M8 × 16	35~45	25.8~33.2
Exhaust Downpipe Assembly Mounting Nut, M8	23~27	17~20

3.6.2 Service Tools

3.6.2.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)
2	Screwdriver		Removing screws
3	Oxygen Sensor Socket		Removing and installing the oxygen sensor
4	Trim clip removal tool		Removing clips
5	Torque Wrench		Tightening bolts and nuts to the specified torque

3.6.3 Description and Operation

3.6.3.1 Warnings and Precautions

1. The exhaust system operates at very high temperatures during engine operation. Before carrying out any exhaust system work, the engine must be switched off and allowed to cool down to ambient temperature.
2. Remove any carbon, oil, or other deposits from the sealing surfaces of connectors. Ensure all connections are securely tightened to prevent exhaust leaks.
3. Exhaust gases contain highly toxic carbon monoxide, which can cause acute poisoning and, in severe cases, death. If a leak is found in the exhaust system, the engine must be stopped immediately and repairs must be made. Starting the engine in a confined space is strictly prohibited.
4. After removing the exhaust pipe gasket, it must be replaced with a new one. Do not reuse the old gasket.
5. When installing the rubber mounting blocks, ensure they are in a natural, relaxed state. Deformation, twisting, or excessive stretching is strictly prohibited.
6. Before removing or installing the rubber mounting blocks, a small amount of soapy water can be applied to the surface of the fixed shaft to act as a lubricant, reducing removal and installation resistance and preventing damage to the mounts.
7. After completing maintenance, check the reliability of all exhaust system lines and connections to ensure there is no looseness or misalignment.
8. After assembly, all fasteners must be re-tightened to the manufacturer's specified torque value to ensure compliance with technical requirements.
9. During routine maintenance, regularly check the integrity and sealing performance of the exhaust pipe. If leaks, cracks, or other faults are found, immediately tighten the connections or replace damaged components to prevent further damage.

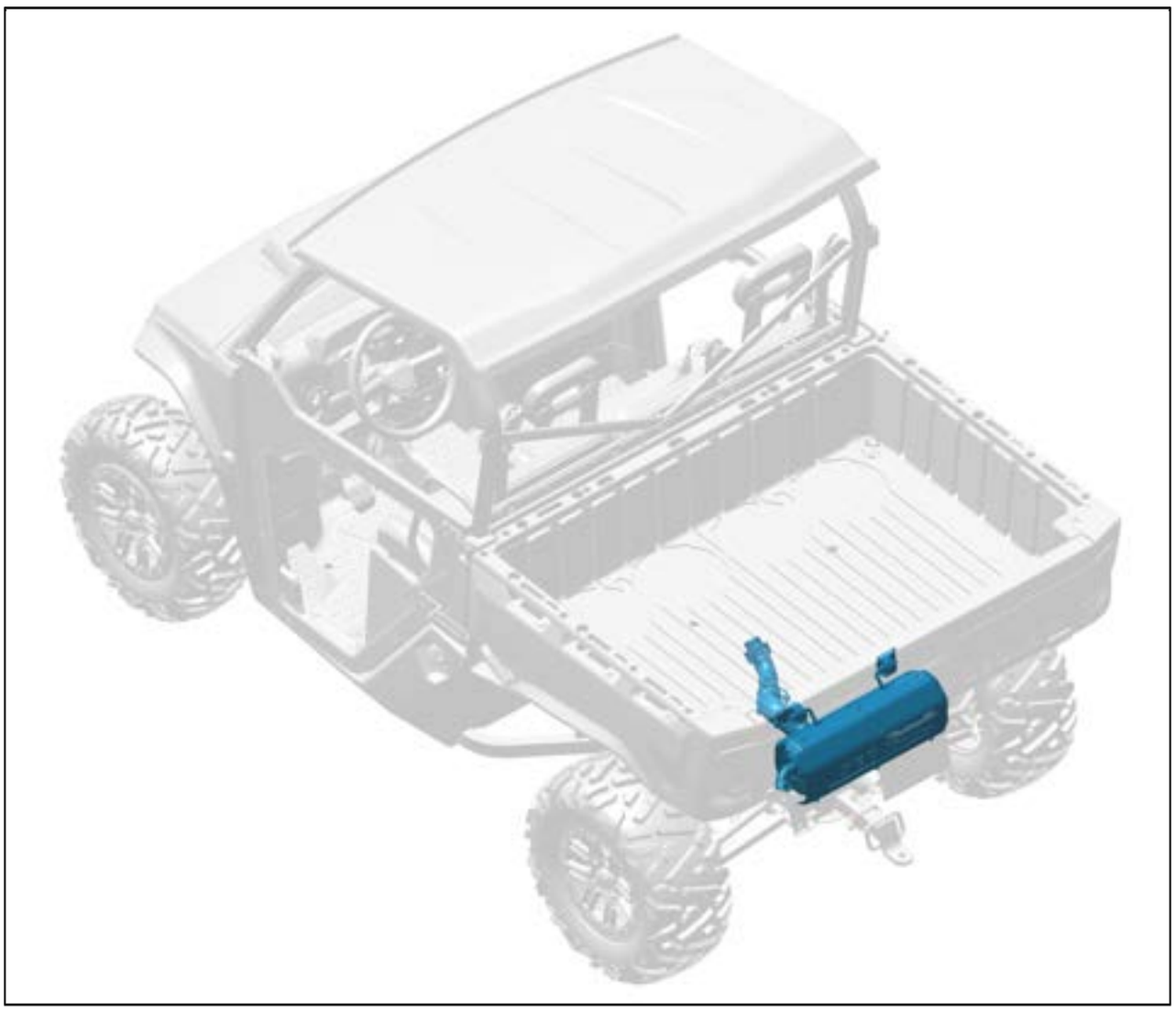
3.6.3.2 System Description

1. Function
   a. The function of the exhaust system is to expel the gases produced by the engine while reducing the pollution and noise of the expelled gases.
2. Components
   a. The exhaust system mainly consists of exhaust downpipe assembly, the silencer assembly, heat shields, and other components.

3.6.4 Component Location and Exploded View

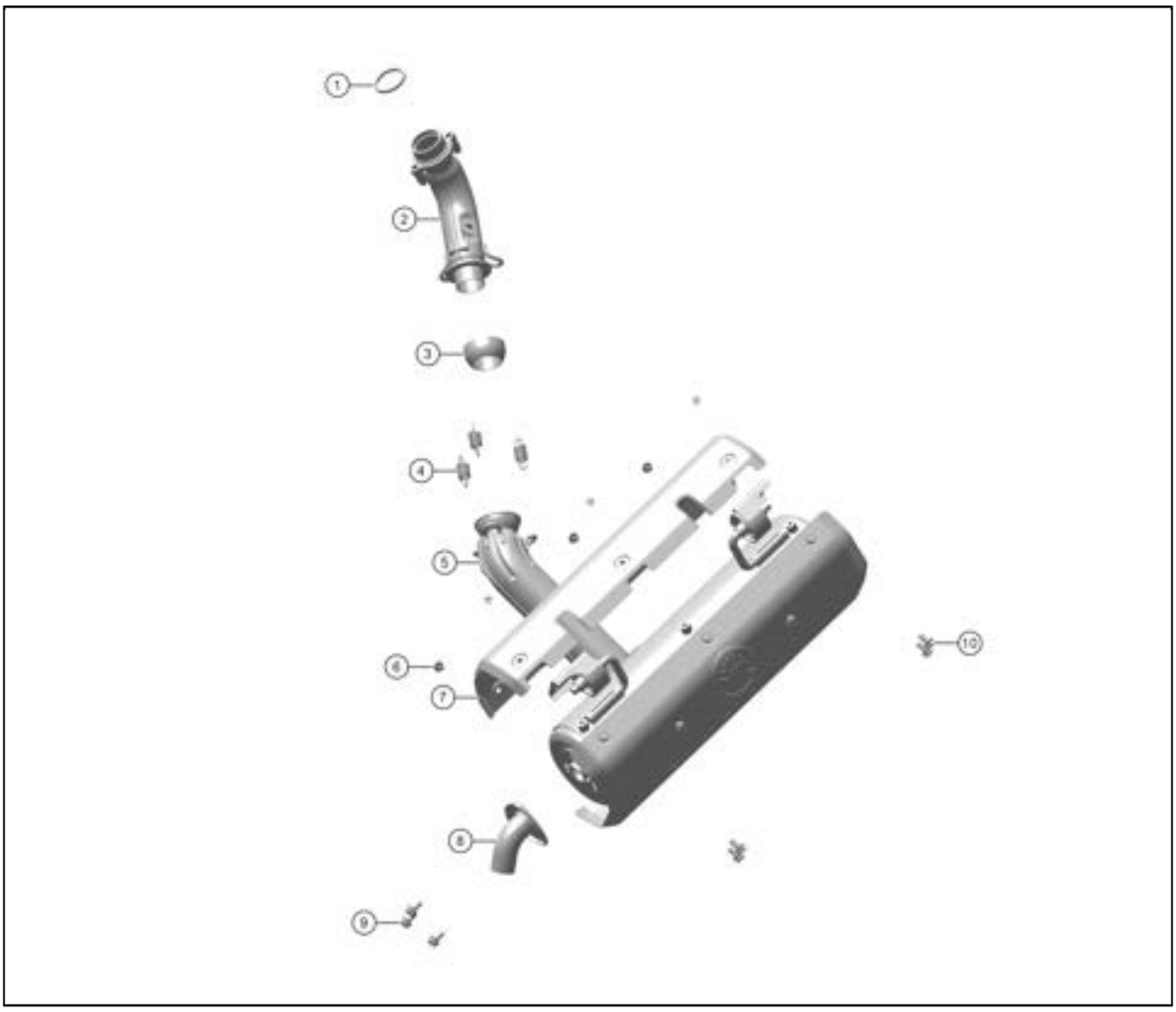
3.6.4.1 Component Location Diagram

Exhaust System



3.6.4.2 Exploded View Diagram

Exhaust System



1	Exhaust Port Gasket	6	Hex Head Bolt with Captive Washer
2	Exhaust Downpipe Assembly	7	Silencer Body Inner Heat Shield
3	Graphite Sealing Ring	8	Spark Arrester
4	Silencer spring	9	Retaining Bolt
5	Silencer Body Assembly	10	Hex flange bolt

3.6.5 General Fault Diagnosis and Operation

3.6.5.1 Fault Symptom List

Fault Symptom	Possible Causes	Recommended Repair Procedure
Insufficient power	1. Excessive dirt in the exhaust pipe or air leaks in the connections	Clean, inspect, or replace the exhaust pipe
	2. Exhaust pipe bending deformation causing excessive exhaust resistance	Correct the shape of the exhaust pipe, replace if severely deformed
	3. Exhaust pipe gasket aging, damage, or leaks	Replace the exhaust pipe gasket
Excessive exhaust noise	1. Damage to the silencer body assembly	Replace the silencer body assembly
	2. Poor sealing of exhaust pipe connections	Replace the gasket and tighten the connection bolts
Exhaust system making a "clicking" sound or producing vibration noise	1. Loose silencer rubber mounting blocks	Replace the rubber mounting ears
	2. Loose heat shield	Tighten the heat shield mounting nut

3.6.6 Inspecting and adjusting

3.6.6.1 Inspecting exhaust system

CAUTION:
• Before carrying out the inspection, ensure that the engine has fully cooled down to a cold condition. • Do not start the engine at any time during the inspection, to prevent burns from hot components or injury from moving components.

1. Check whether the exhaust pipe assembly is correctly installed; if not, reinstall it. Inspect the sealing condition of each line and connector of the exhaust system to confirm whether there are any exhaust leaks; if any leaks are found, repair or replace the damaged component.
2. Inspect the weld seam quality of the exhaust system's welded parts to check for cracks, cold welds, or other defects; if welding issues are present, re-weld and perform a leak test on the weld seams.
3. Check the flow condition and structural integrity of the exhaust pipe to confirm whether there is carbon buildup or structural deformation; if clogged, clean the carbon, and if deformation is severe, replace the line.
4. Inspect the fastening condition of the exhaust system mounting bolts to ensure there is no loosening or missing bolts; if loose, retighten to the specified torque, and if missing, replace with bolts of the same specification.
5. Inspect the appearance and assembly performance of each rubber hanger to check for damage, ageing cracks, or loss of elasticity; if any issues are found, replace with new parts and ensure proper installation.

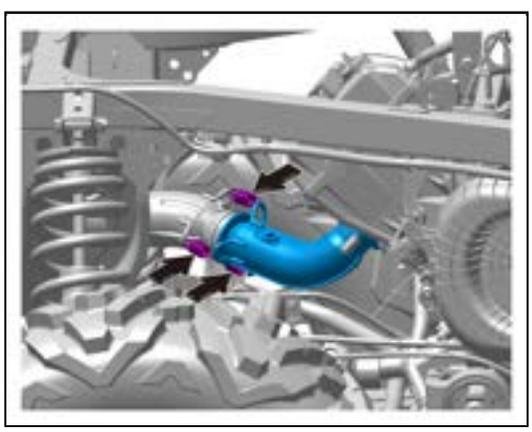
3.6.7 Repair Procedure Guidance

3.6.7.1 Exhaust Downpipe Assembly

WARNING:
• After the vehicle has been running for some time, the silencer temperature will be high. Wait for the engine to turn off and cool naturally before proceeding with inspection or repair to avoid burns.

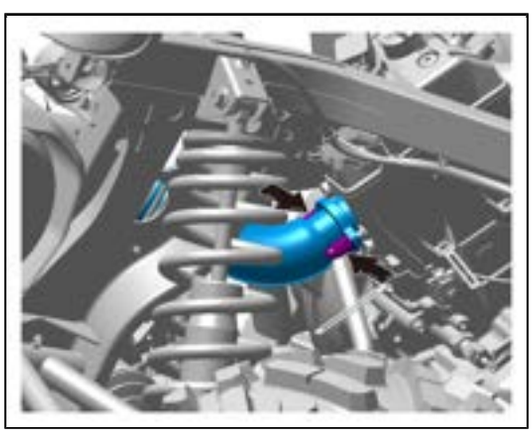
Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the oxygen sensor, See: Oxygen Sensor.
3. Removing the exhaust downpipe assembly



a. Tilt the cargo box and remove the 3 silencer tension springs from the exhaust downpipe assembly.

CAUTION:
• Use the appropriate tools to stretch the spring to prevent it from snapping back and causing injury or damage to the vehicle.



b. Remove the 2 mounting nut of the exhaust downpipe assembly and take it off.

Torque: 17–20 ft-lbs (23–27 N·m).



c. Remove the graphite sealing ring.

Installation Procedure

1. Install the exhaust downpipe assembly in reverse order of removal.

3.6.7.2 Inner Barrel Heat Shield

WARNING:

- After the vehicle has been running for some time, the silencer temperature will be high. Wait for the engine to turn off and cool naturally before proceeding with inspection or repair to avoid burns.

Removal Procedure

1. To remove the silencer assembly, See: Silencer Assembly.
2. Removing the inner barrel heat shield of the silencer body



a. Remove the 6 M6 × 12 mounting bolts securing the silencer body inner barrel heat shield, then remove the heat shield.

Installation Procedure

1. Install the inner barrel heat shield of the silencer body in the reverse order of removal.

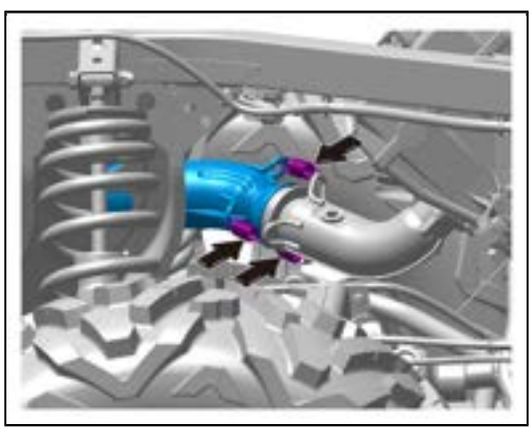
3.6.7.3 Silencer Body Assembly

WARNING:

- After the vehicle has been running for some time, the silencer temperature will be high. Wait for the engine to turn off and cool naturally before proceeding with inspection or repair to avoid burns.

Removal Procedure

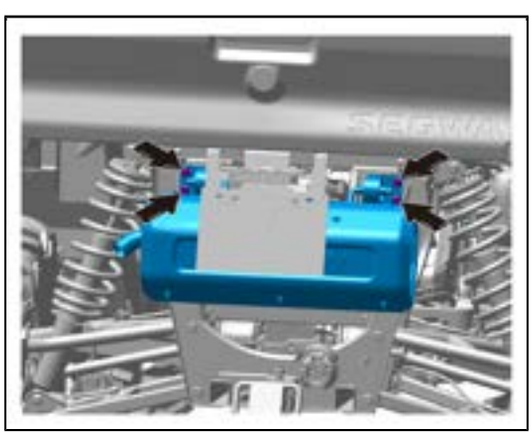
1. Removing the silencer body assembly



a. Tilt the cargo box and remove the 3 silencer tension springs.

CAUTION:

- Use the appropriate tools to stretch the spring to prevent it from snapping back and causing injury or damage to the vehicle.



b. Remove the 4 mounting nuts and M8 × 16 bolts securing the silencer body assembly, then remove the assembly.

Torque: 25.8–33.2 ft-lbs (35–45 N·m)

Installation Procedure

1. Install the silencer body assembly in reverse order of removal.

3.6.7.4 Spark Arrester

WARNING:

- After the vehicle has been running for some time, the silencer temperature will be high. Wait for the engine to turn off and cool naturally before proceeding with inspection or repair to avoid burns.
- To reduce fire risk, ensure that there are no combustible materials in the work area before performing any component removal.
- Safety goggles must be worn during this operation.

Removal Procedure

1. Removing the spark arrester



a. Remove the 3 mounting bolts and pads of the spark arrester and take it off.

NOTICE:

- If the gasket is damaged, it must be replaced with a new one, and only an OEM gasket should be used.

Installation Procedure

1. The exhaust pipe must be regularly cleared of accumulated carbon. The procedure is as follows:
   a. Start the engine and increase the rpm by about 20 times while covering the end of the silencer with a towel to create an instant exhaust system pressure.
   b. Wait for the engine exhaust pipe to cool down.
   c. Use a soft brush to remove carbon buildup from the spark arrester mesh.
2. Install the spark arrester in reverse order of removal.

3.7 Cooling System

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3.7.1 Specifications

3.7.1.1 Fastener Specifications

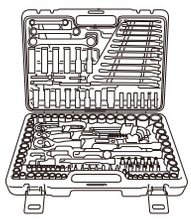
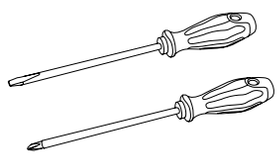
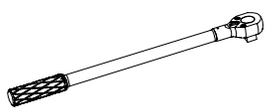
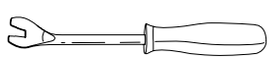
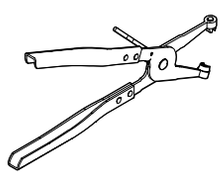
Item	Torque (N·m)	Torque (ft-lbs)
Cooling fan mounting hex flange bolt M6.	8~12	6~9
Expansion tank mounting hex flange bolt M6×16	8~12	6~9
Water pump assembly retaining bolt, M6	9.8	7.2
Thermostat cover retaining bolt M6×20	9.8	7.2
Thermostat	10	7.4

3.7.1.2 Specifications and Capacities

Item	Specifications
Type	Permanent antifreeze (soft water and ethylene glycol with corrosion and rust inhibitors for aluminium engines and radiators)
Colour	Green
Mixture ratio	50% soft water, 50% coolant
Total volume	4.8 litres (US quarts) (full coolant level in expansion tank, including radiator and engine)
Radiator cap pressure relief	93~123kPa(0.95~1.25kgf/cm^2, 14~18psi)
Thermostat opening temperature	74~87°C(165.2~188.6°F)
Thermostat full open travel	≥ 8 mm or Above 87 °C (188.6 °F)
Cooling valve closing temperature (reference)	74°C(165.2°F)

3.7.2 Service Tools

3.7.2.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)
2	Screwdriver		Removing screws
3	Torque Wrench		Tightening bolts and nuts to the specified torque
4	Trim clip removal tool		Removing clips
5	Hose Clamp Pliers		Removing and installing hose clamps

3.7.3 Description and Operation

3.7.3.1 Warnings and Precautions

1. Wait for the engine to cool before performing any work on the cooling system to avoid injury from hot coolant.
2. Never open the expansion tank filler cap when the engine is hot, as high-temperature coolant or steam may cause personal injury.
3. Drain the old coolant, clean the cooling system, and refill with new, quality coolant.
4. Replace any cracked, scratched, or damaged coolant lines during repairs; do not attempt to repair them.
5. Use a dedicated container to collect any residual coolant when disconnecting cooling system lines. Coolant is toxic; keep it away from children and pets, and dispose of it according to regulations.
6. Do not spill coolant onto the drive belt during work.
7. When removing the radiator, don't scratch or damage the surface fins.
8. When disconnecting cooling system lines, ensure that debris does not enter the lines, as this could damage the cooling system and engine. Use a blanking cap to seal the pipe ends to prevent contamination.
9. When installing new coolant lines, avoid using a hammer directly on the lines or hose clamps, as this may damage the lines and cause coolant leaks.
10. Ensure all hose connections are secure and that the hose clamps are properly installed when assembling the cooling system.
11. After repair, check that all cooling system line connections are secure and show no signs of loosening.
12. After installation, ensure all fasteners are tightened to the specified torque.
13. Different brands of coolant may have different formulations. Mixing them could cause chemical reactions between additives, leading to antifreeze failure.

3.7.3.2 System Description

1. Function
   a. When the engine is cold, its normal operating temperature is around 95°C. At this temperature, all engine components are in their ideal operating state. Prolonged failure to reach this temperature can increase engine wear.
   b. If the temperature is too low, incomplete combustion in the cylinder may occur, leading to severe carbon build-up.
2. Components
   a. The cooling system includes the radiator, expansion tank, hoses, coolant pump, electric cooling fan, and thermostat.

3.7.4 System Operating Principle

3.7.4.1 Introduction to Principles

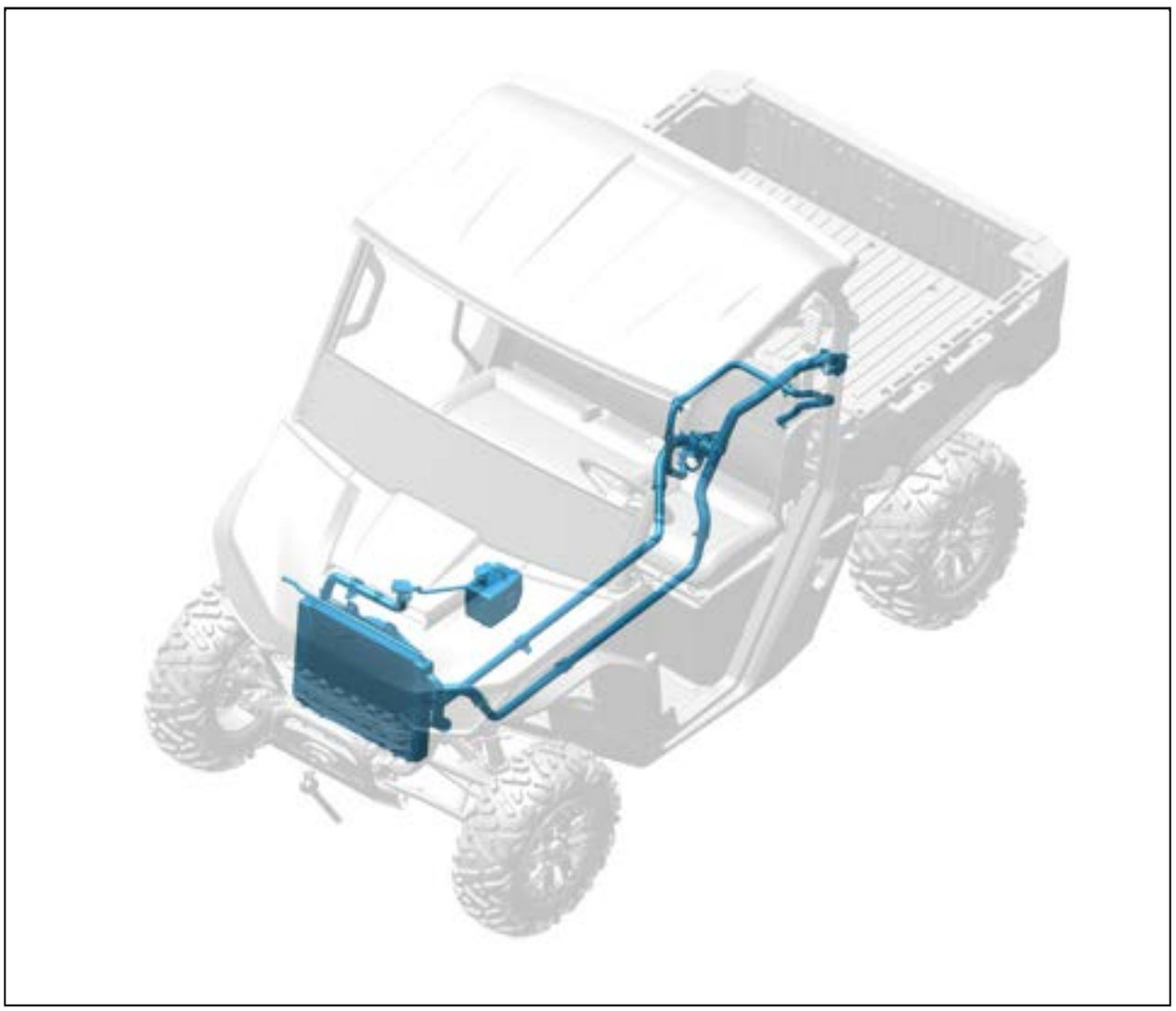
System Overview

1. Low temperature (valve closed)
    a. After engine cold start, when the coolant temperature is below the set value, the thermostat remains closed, and the coolant flows only in a small cycle within the engine, bypassing the radiator, to help the engine reach normal operating temperature quickly.
2. High temperature (valve open)
    a. When the coolant temperature reaches the opening temperature, the thermostat's internal sensing element expands, causing the valve to gradually open. The coolant then enters the radiator for a large cycle, helping to maintain a stable engine temperature through heat dissipation.

3.7.5 Component Location and Exploded View

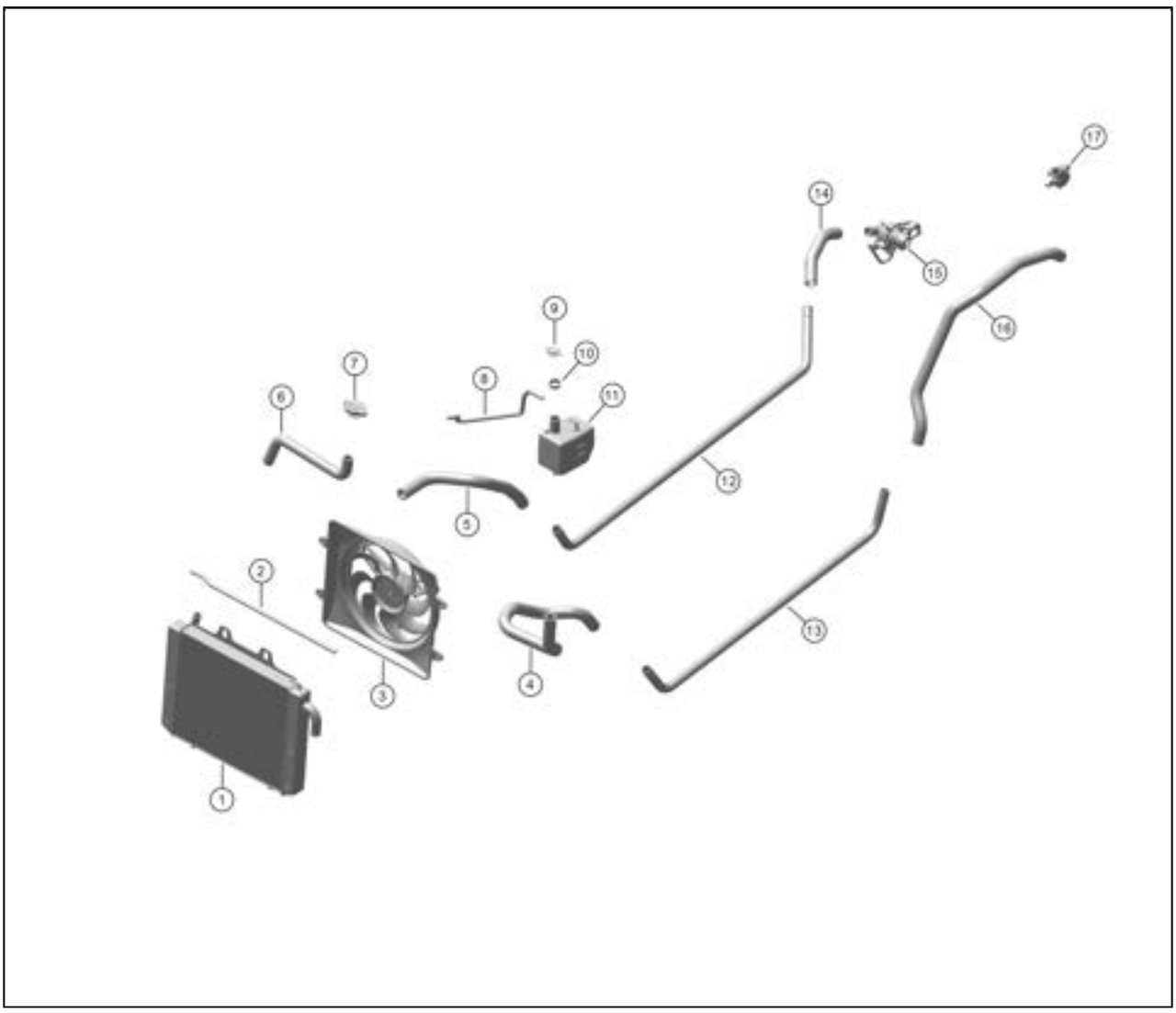
3.7.5.1 Component Location Diagram

Cooling System



3.7.5.2 Exploded View Diagram

Radiator



1	Engine Radiator Body	10	Expansion Tank Filler Plug
2	Radiator Vent Hose	11	Coolant Expansion Tank Body
3	Radiator Fan Assembly	12	Engine Coolant Inlet Aluminium Pipe
4	Radiator Inlet Hose	13	Engine Coolant Outlet Aluminium Pipe
5	Radiator Outlet Hose	14	Engine Coolant Inlet Hose
6	Coolant Filler Hose	15	Coolant Pump Assembly
7	Filler Neck Assembly	16	Engine Outlet Hose
8	Overflow Hose	17	Thermostat
9	Expansion Tank Cap		

3.7.6 General Fault Diagnosis and Operation

3.7.6.1 Fault Symptom List

Symptom(s)	Possible Causes	Recommended Repair Procedure
Engine Cooling Inefficiency or Failure	1. Coolant (Insufficient, Incorrect Specifications, Contaminated)	Add Appropriate Coolant
	2. Cooling Line (Blocked)	Repair or Replace Blocked Line
	3. Radiator (Blocked or Fins Deformed)	Repair or Replace Radiator
	4. Electric Cooling Fan (Damaged or Abnormally Bent)	Replace Electric Cooling Fan Assembly
	5. Thermostat (Faulty)	Replace Thermostat
	6. Cooling System (Air Present)	Bleed the Cooling System
	7. Cooling Coolant Pump (Faulty)	Perform Pressure Test on Cooling Coolant Pump and Replace if Necessary
Coolant Leak	1. Coolant Hose (Jubilee Clip Loose or Hose Split)	Inspect Cooling Line and Replace Damaged Components
	2. Coolant Pump (Poor Seal)	Replace Coolant Pump Seal
	3. Radiator Filler Cap (Poor Seal)	Replace Radiator Filler Cap
	4. Radiator Assembly (Cracked)	Inspect Radiator Assembly and Replace if Necessary
	5. Expansion Tank (Cracked)	Replace Expansion Tank
	6. Engine Gasket (Failed)	Replace Engine Gasket and Check if Fault is Resolved
Electric Cooling Fan Not Operating	1. Fuse, Relay (Faulty)	Replace Blown Fuse, Replace Damaged Relay
	2. Harness (Circuit Short or Open)	Repair or Replace Faulty Harness
	3. Electric Cooling Fan Motor (Faulty)	Replace Electric Cooling Fan Motor
	4. Thermostat (Faulty)	Replace Thermostat
	5. Engine ECU (Faulty)	Replace Engine ECU and Check if Fault is Resolved

3.7.7 Inspecting and adjusting

3.7.7.1 Checking the cooling system

Checking engine coolant level

WARNING:

- When the coolant is boiling, the cooling system is under high pressure. The expansion tank cap must not be opened at this time, as high-temperature coolant could be ejected, causing severe burns.
- When the engine and radiator are hot, high-pressure, high-temperature coolant remains in the system. The expansion tank cap must not be opened to prevent the ejection of hot coolant and potential burns.
- The boiling coolant and steam in the cooling system are under high pressure. Opening the expansion tank cap too soon before the system cools down can cause the high pressure to force coolant and steam to be ejected, resulting in severe burns.

1. After the engine has fully cooled to ambient temperature, perform a visual inspection of the coolant fluid level in the expansion tank. The normal fluid level should be between the "MAX" (upper limit) and "MIN" (lower limit) marks on the side of the tank.
2. After the engine has fully cooled to ambient temperature, if the coolant fluid level in the expansion tank is below the "MIN" mark, open the cap and add coolant that matches the manufacturer's specifications until the fluid level reaches the "MAX" mark. Once the refill is complete, Install the expansion tank water inlet plug and tighten the expansion tank cap to the specified position to prevent cooling system leaks or pressure abnormalities.

Checking for coolant leaks

WARNING:

- Wait for the engine to cool before performing any work on the cooling system to avoid injury from hot coolant.

1. Check the airtightness of the cooling system.
   a. Check engine coolant fluid level.
   b. Connect the cooling system pressure diagnostic tester and set it to 123kPa pressure. Then observe the pressure changes on the diagnostic tester and check for leaks at the line connectors and radiator core.

CAUTION:

- Standard pressure release value for radiator cap: 93-123 kPa
- The pressure within the radiator assembly should not exceed 123 kPa, as this may cause damage.
- Standard: At 123 kPa pressure, maintain pressure for 2 minutes with no pressure drop. Ensure no leaks at the line connectors or radiator core.

NOTICE:

- If the pressure drops, check the hose, radiator assembly, and coolant pump for leaks.
- If there are no external coolant leaks from the engine, check the radiator core, cylinder body, and cylinder head for leaks.

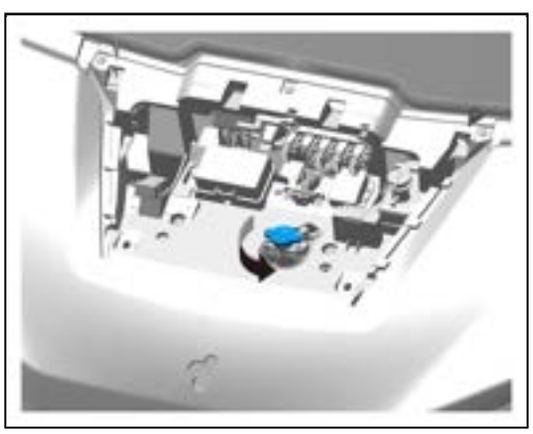
3.7.7.2 Coolant Draining and Filling

WARNING:

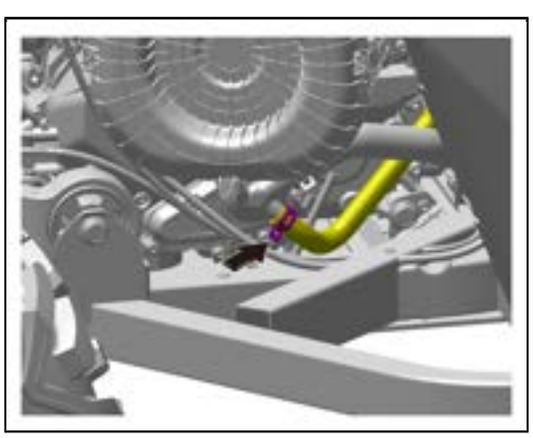
- After the vehicle has been running for a while, the coolant temperature will be very high. Wait for the engine to turn off and cool down naturally before performing checks or maintenance to avoid burns.

Coolant drainage

1. To remove the front service cover, See: Front Service Cover.
2. Coolant drainage



a. Turn the radiator cap in the direction of the arrow to remove it.



b. Place a recovery container under the hose to collect the coolant.

c. Loosen the hose clamp and disconnect the engine coolant inlet hose to drain all the coolant.

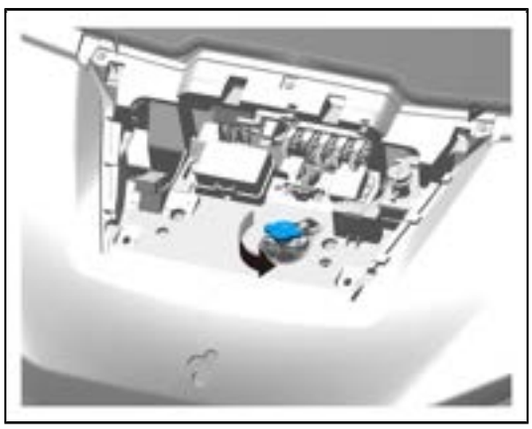
d. Start the engine to perform a second drainage until no coolant flows out.

e. After draining the coolant, reinstall the engine coolant inlet hose.

f. Install the radiator cap.

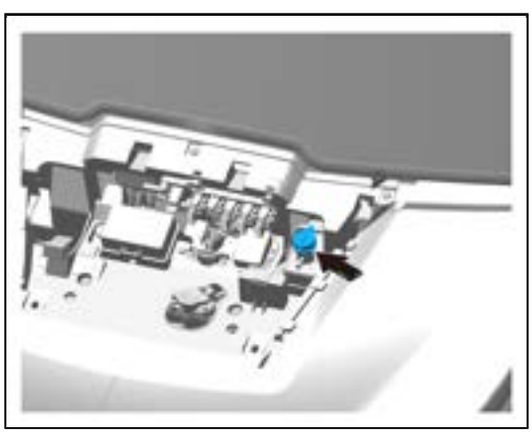
Coolant refilling

1. To remove the front service cover, See: Front Service Cover.
2. Coolant refilling

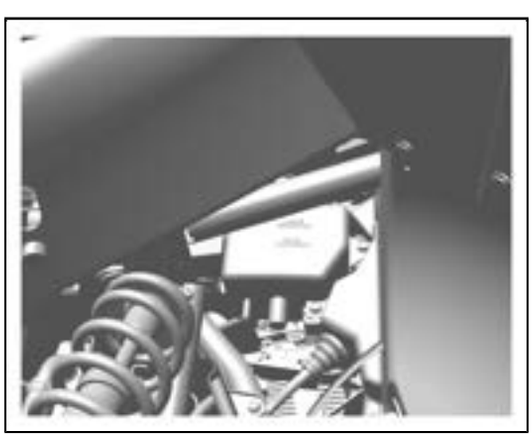


a. Turn the radiator cap in the direction of the arrow to open it, and top up the coolant until it is visible at the filler neck.

b. Install the radiator cap.



c. Open the expansion tank cap.



d. Add coolant that meets the specifications to the "MAX" position of the expansion tank.

e. With the vehicle idling, monitor the coolant level in the expansion tank. Add coolant as the level decreases.

f. Tighten the auxiliary water tank cover and run the engine at 2500-3000 rpm until the fan operates. Then return to idle for 1min, turn off the engine, and check if the coolant level drops after cooling. Repeat the process until the coolant level in the expansion tank no longer drops.

g. Install the expansion tank cap.

CAUTION:
• Coolant specification: Permanent antifreeze (green, 50% soft water, 50% coolant) • Coolant Capacity: 4,800 mL

3.7.7.3 Cooling System Bleeding Procedure

WARNING:

- Always wear safety goggles and suitable protective clothing when performing this procedure. Failure to comply may result in severe injury or death.

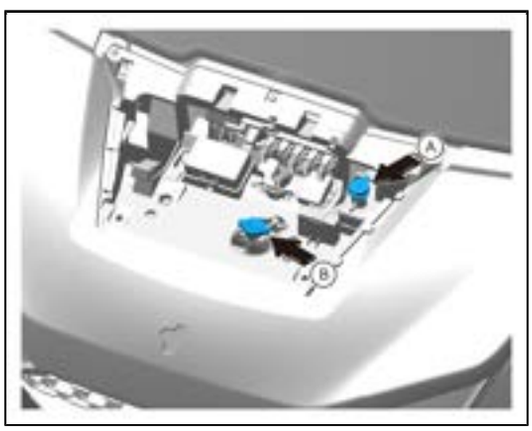
NOTICE:

- If the coolant level in the radiator is low or there is a leak in the system, the cooling system will not draw coolant from the expansion tank.

CAUTION:

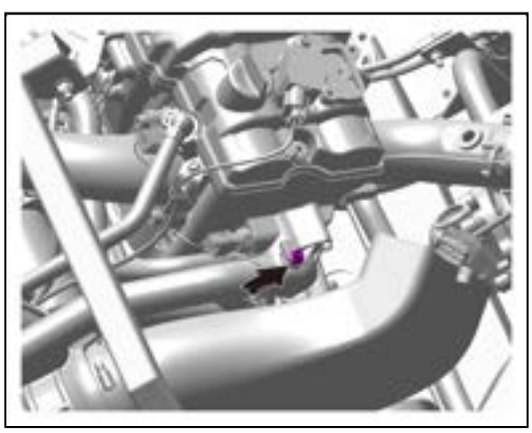
- Escaping steam can cause severe scalding. Never remove the pressure cap whilst the engine is warm or hot. Always allow the engine to cool down completely before removing the pressure cap.

1. To remove the front service cover, See: Front Service Cover.
2. Cooling System Bleeding Procedure



a. Remove expansion tank cap A and top up the coolant to the MAX mark.

b. Unscrew radiator filler cap B and top up with the specified amount of coolant.



c. Tilt the rear cargo box up, and loosen the bleed screw to allow any trapped air to escape from the cooling system. As soon as coolant flows out steadily, immediately refit and tighten the bleed screw.

d. Top up the coolant and securely refit the radiator filler cap.

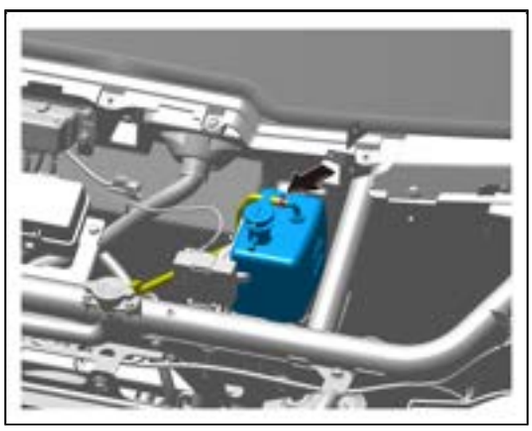
e. Start the engine and allow it to idle until the radiator cooling fan cycles on and off twice.

3.7.8 Repair Procedure Guidance

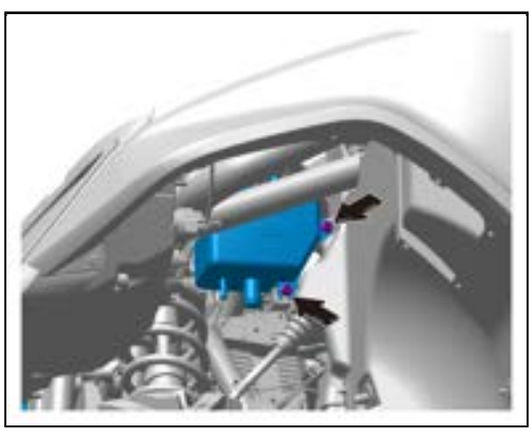
3.7.8.1 Coolant Expansion Tank Body

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To drain the coolant, See: Coolant Draining and Refilling.
3. To remove the front service cover, See: Front Service Cover.
4. To remove the headlamp cover, See: Headlamp Cover.
5. To remove the flasher unit, See: Flasher Unit.
6. To remove the front panel, See: Front Panel.
7. Removing the coolant expansion tank



a. Loosen the hose clamp and disconnect the overflow hose.



b. Remove the 2 expansion tank retaining bolts (M6×16) and remove the tank.

Torque: 6–9 ft-lbs (8–12 N·m).

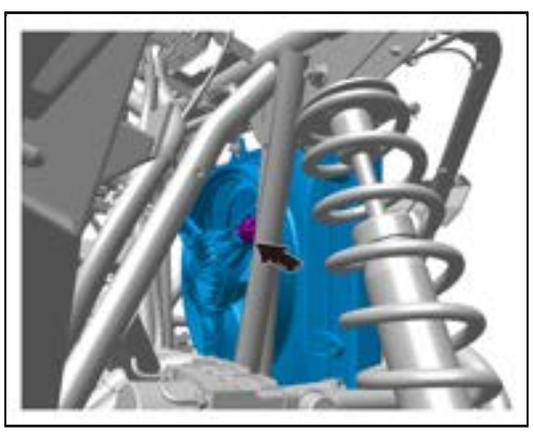
Installation Procedure

1. Install the expansion tank in the reverse order of removal, observing the following:
   a. After filling with coolant, bleed the cooling system following See: the standard bleeding procedure.

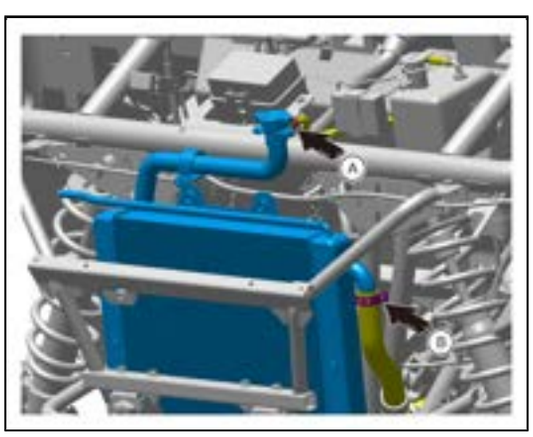
3.7.8.2 Engine Radiator Body

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To drain the coolant, See: Coolant Draining and Refilling.
3. To remove the front service cover, See: Front Service Cover.
4. To remove the headlamp cover, See: Headlamp Cover.
5. To remove the flasher unit, See: Flasher Unit.
6. To remove the front panel, See: Front Panel.
7. To remove the headlamp bezel assembly, See: Headlamp Bezel Assembly.
8. To remove the radiator bracket assembly, See: Radiator Bracket Assembly.
9. Removing the radiator

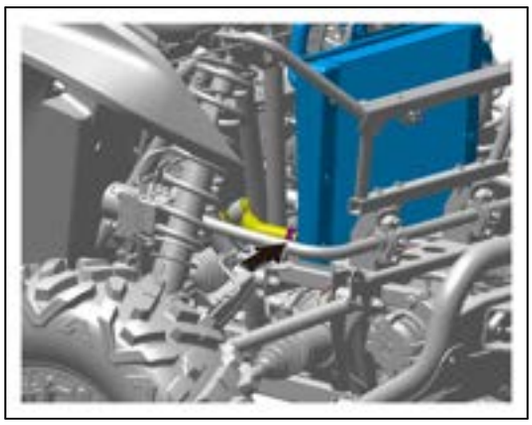


a. Disconnect the harness connector of the engine radiator assembly.

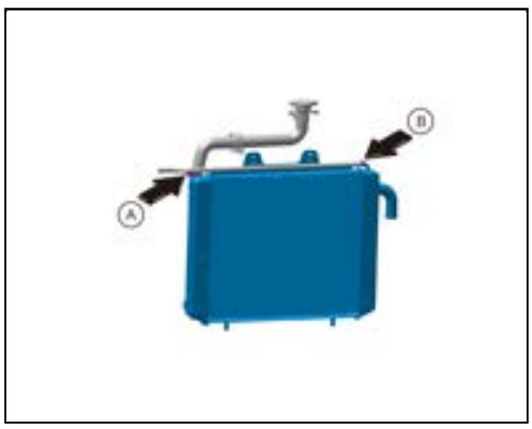


b. Loosen the hose clamp A and disconnect the overflow hose.

c. Loosen clamp B and disconnect the radiator inlet hose.



d. Loosen the clamp, disconnect the radiator outlet hose, and remove the radiator.



e. Loosen clamp A and disconnect the coolant filler hose.

f. Loosen clamp B and disconnect the radiator vent hose.

Installation Procedure

1. **Install the engine radiator body, following the reverse steps of removal, and observe the following points:**

   a. After filling with coolant, bleed the cooling system following See: the standard bleeding procedure.

3.7.8.3 Radiator Fan Assembly

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To drain the coolant, See: Coolant Draining and Refilling.
3. To remove the front service cover, See: Front Service Cover.
4. To remove the headlamp cover, See: Headlamp Cover.
5. To remove the flasher unit, See: Flasher Unit.
6. To remove the front panel, See: Front Panel.
7. To remove the headlamp bezel assembly, See: Headlamp Bezel Assembly.
8. To remove the radiator bracket assembly, See: Radiator Bracket Assembly.
9. To remove the radiator, See: Radiator.
10. Removing the radiator fan assembly



a. Remove the 4 M6 mounting bolts securing the radiator fan assembly, then remove the fan assembly.

Torque: 6–9 ft-lbs (8–12 N·m).

Installation Procedure

1. Install the radiator fan assembly in the reverse order of removal, paying attention to the following precautions:
   a. After filling with coolant, bleed the cooling system following See: the standard bleeding procedure.

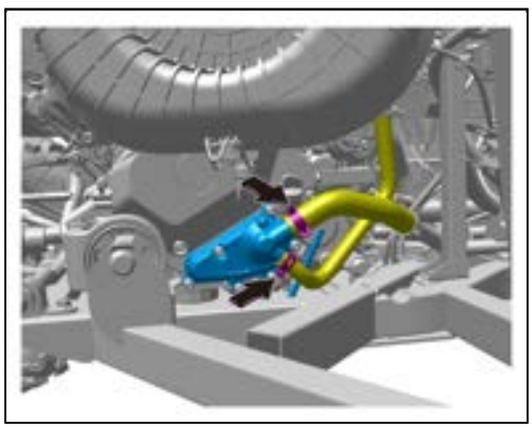
3.7.8.4 Coolant Pump Assembly

WARNING:

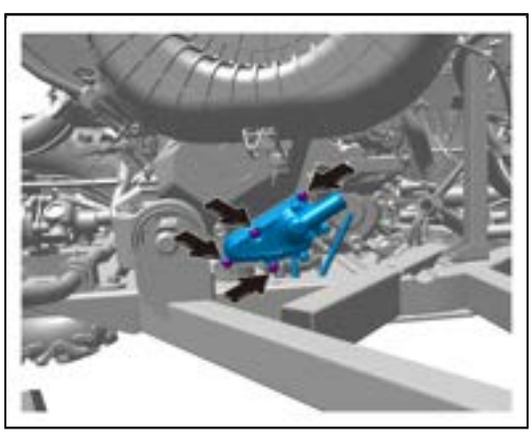
- After the vehicle has been running for a while, the coolant temperature will be very high. Wait for the engine to turn off and cool down naturally before performing checks or maintenance to avoid burns.

Removal Procedure

1. To drain the coolant, See: Coolant Draining and Refilling.
2. Removing the coolant pump assembly



a. Loosen the 2 hose clamps and disconnect the water inlet and outlet pipes of the coolant pump.

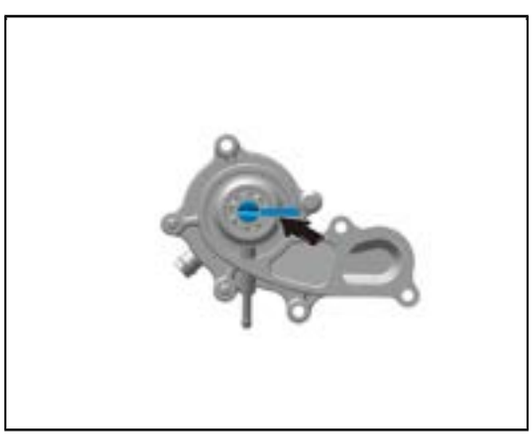


b. Remove the 4 mounting bolts M6 of the coolant pump assembly and remove the coolant pump.

Torque: 7.2 ft-lbs(9.8N·m)

CAUTION:

- The seal is a single-use part and must be replaced with a new one after removal.



c. Mark the coolant pump assembly with a marker for assembly alignment.

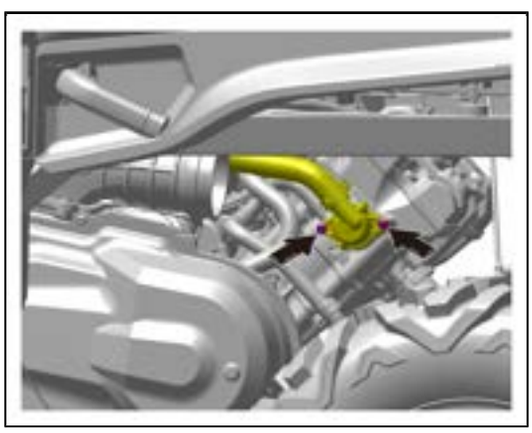
Installation Procedure

1. Install the coolant pump assembly in the reverse order of removal, noting the following:
   a. After filling with coolant, bleed the cooling system following See: the standard bleeding procedure.

3.7.8.5 Thermostat Assembly

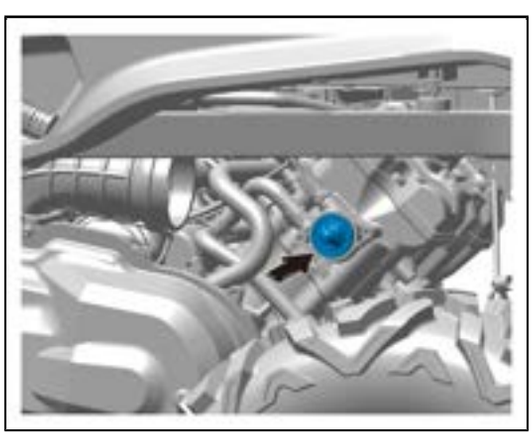
Removal Procedure

1. To drain the coolant, See: Coolant Draining and Refilling.
2. To remove the CVT air duct, See: CVT Air Duct.
3. Removing the thermostat assembly



a. Remove the 2 mounting bolts M6×20 of the thermostat cover and disconnect the cover.

Torque: 7.2 ft-lbs(9.8N·m)



b. Remove the thermostat.

NOTICE:
The thermostat acts as a poppet-style valve, allowing the coolant bypass circuit to operate until it reaches the opening temperature.

Torque: 7.4 ft-lbs (10 N·m)

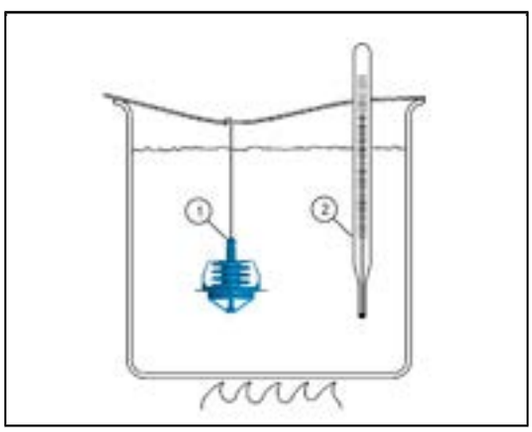
Inspection Procedure

1. Inspecting the thermostat assembly



a. Inspect the thermostat at room temperature.

b. Replace the thermostat if it is open.



c. To check the thermostat opening temperature, suspend the thermostat (1) and an accurate thermometer (2) in a container of water, ensuring their temperature-sensing parts are at the same height.

d. Gradually heat the water while stirring gently to ensure an even temperature.

e. Thermostat opening temperature: 74–87°C (165.2–188.6°F)

f. Replace the thermostat if the measurement is out of specification.

Installation Procedure

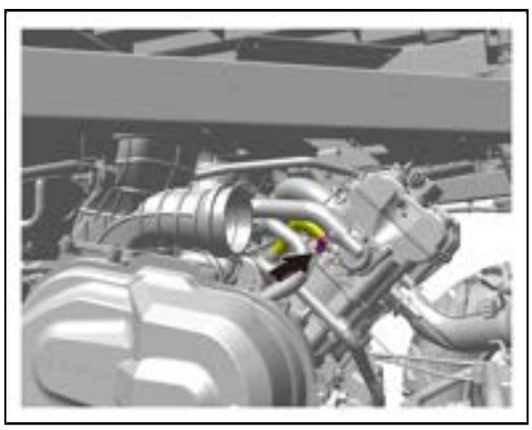
1. Install the thermostat assembly in the reverse order of removal, paying attention to the following precautions:

   a. After filling with coolant, bleed the cooling system following See: the standard bleeding procedure.

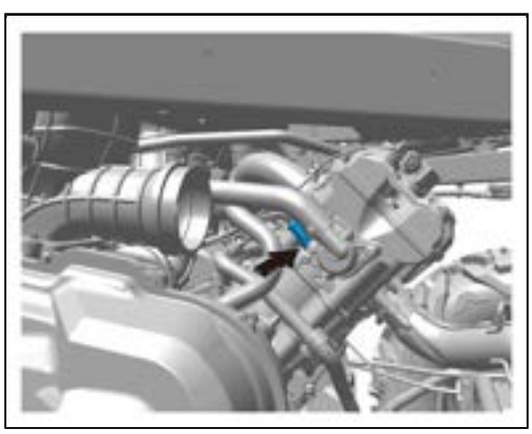
3.7.8.6 Coolant Hose Connector

Removal Procedure

1. To drain the coolant, See: Coolant Draining and Refilling.
2. To remove the CVT air duct, See: CVT Air Duct.
3. Removing the coolant hose connector



a. Loosen the hose clamp and disconnect the coolant hose.



b. Remove and detach the coolant hose connector.

Torque: 18.4 ± 1.5 ft-lbs (25 ± 2 N·m).

Installation Procedure

1. Install the coolant hose connector in the reverse order of removal, observing the following:
   a. After filling with coolant, bleed the cooling system following See: the standard bleeding procedure.

3.8 Lubrication System

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3.8.1 Specifications

3.8.1.1 Fastener Specifications

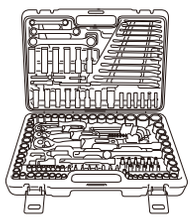
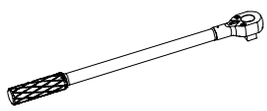
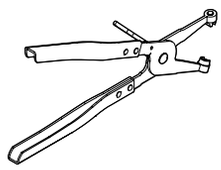
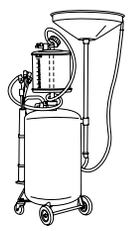
Item	Torque (N·m)	Torque (ft-lbs)
Oil Strainer Cover Retaining Bolt, M6 × 25	10	7.4
Engine drain plug M14	18	13
Oil Filter	18	13
Oil Pressure Relief Valve Cover Assembly Banjo Bolt, M8 × 30	10±2	7.4±1.5
Oil Pressure Relief Valve Cover Assembly Retaining Bolt, M6 × 25	12±2	8.9±1.5
Oil Pressure Relief Valve Assembly	20±2	14.8±1.5
Oil cooler mounting bolt M6×16	10	7.4
Oil pump cover mounting bolt	10±2	7.4±1.5

3.8.1.2 Specifications and Capacities

Item	Specifications
Viscosity grade	SAE 10W-40 / SJ or Higher
Oil fill capacity	2.2 L (without Replacing the Oil Filter) 2.4 L (with Oil Filter Replacement)
Engine oil pressure measurement (at operating temperature): measure the oil pressure at 4,500 r/min with the engine oil temperature at 110°C (230° F).	400 kPa (4.1 kgf/cm2, 58 psi)

3.8.2 Service Tools

3.8.2.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)
2	Torque Wrench		Tightening bolts and nuts to the specified torque
3	Oil Filter Wrench		Removing and installing the oil filter
4	Hose Clamp Pliers		Removing and installing hose clamps
5	Waste Oil Drainer		Recycle waste oil
6	Engine Oil Pressure Gauge		Measure oil pressure

3.8.3 Description and Operation

3.8.3.1 Warnings and Precautions

1. Wait for the engine to cool down completely before performing any lubrication system work.
2. Avoid spilling oil onto the drive belt during the procedure.
3. Collect the engine waste oil in a designated container to maintain a clean workshop.
4. After completing the lubrication system work, check for oil leaks and address any leaks promptly.

3.8.3.2 System Description

1. Function
   a. The purpose of the lubrication system is to:
      - Lubrication: The oil forms a lubricating film between moving parts, reducing friction, power loss, and wear.
      - Cooling: The oil's flow helps dissipate heat from engine parts, preventing excessive temperatures and damage.
      - Cleaning: The circulating oil carries away metal particles worn off during engine operation, dust from the air, and solid particles produced by fuel combustion, preventing abrasive wear.
      - Sealing: The oil's viscosity helps it adhere to moving parts, enhancing the sealing effect and reducing air leaks.
      - Rust prevention: The lubricating oil film adheres to metal surfaces, isolating air and water to prevent rust and corrosion.
      - Vibration damping: The oil absorbs vibrations between moving parts, reducing noise and extending the engine's service life.
2. Composition
   a. The lubrication system consists primarily of the engine oil, oil pump assembly, oil filter assembly, oil cooler assembly, oil pressure sensor and engine oil dipstick.

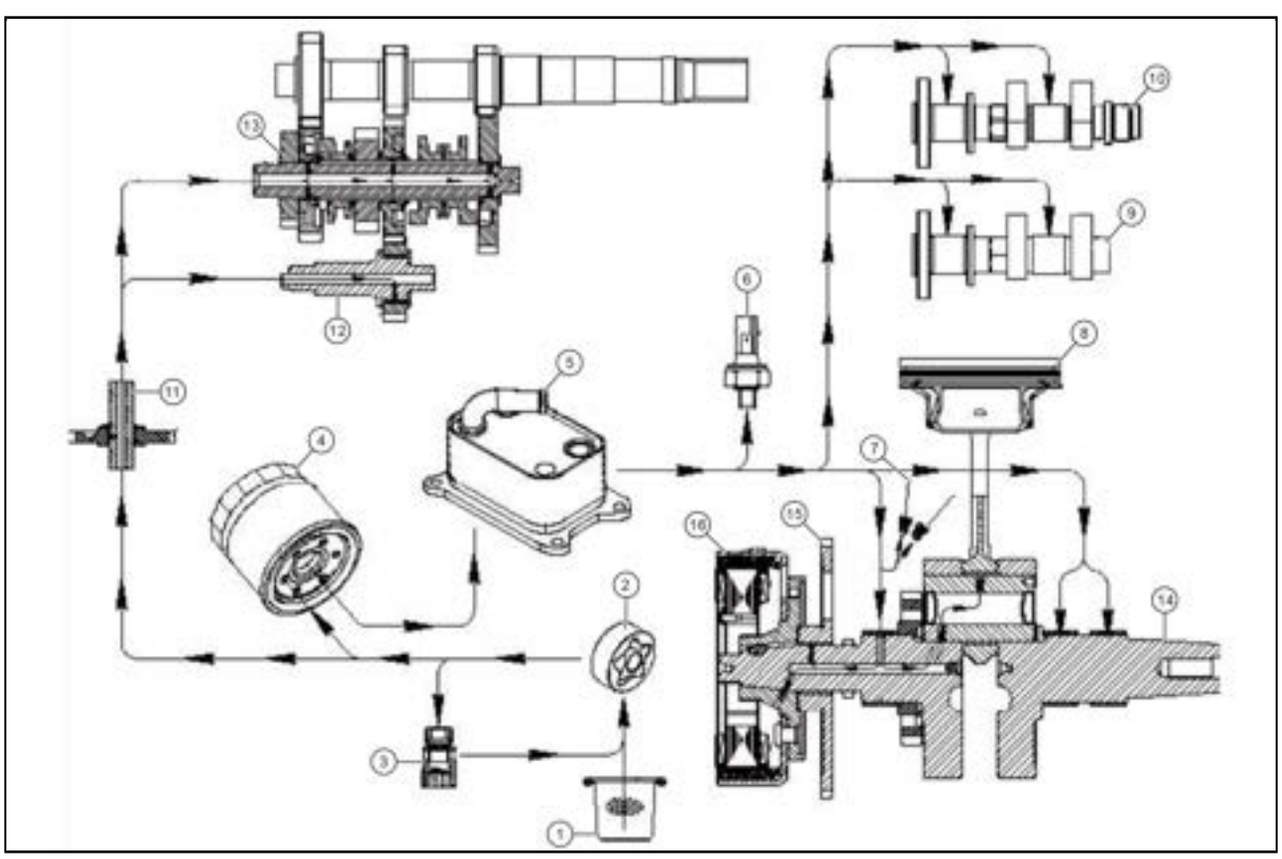
3.8.4 System Operating Principle

3.8.4.1 Introduction to Principles

System Overview

1. The engine oil is drawn through the oil filter into the oil pump, where it is pressurized and routed towards the oil filter. Another path is controlled by the pressure relief valve, which automatically relieves pressure if it becomes too high, thereby protecting the oil system.
2. The oil path leading to the oil filter passes through the oil cooler to reduce the oil temperature before entering the main engine oil passage, where the pressure is monitored by the oil pressure sensor, and then the oil is distributed through multiple routes.
   a. One oil passage supplies oil to the transmission countershaft assembly, starter one-way gear and other transmission components. After lubricating these components, the oil returns to the oil strainer cover.
   b. Another path delivers oil to the crankshaft bearings, from which the oil is routed through the crankshaft's slanted oil passages to the connecting rod bearings, then sprayed through the injectors to lubricate the piston, piston rings, cylinder walls, as well as the alternator stator and rotor.
   c. Another path enters the cylinder head, lubricating the camshaft journals through the bearing caps, then through the hollow oil passages to lubricate the camshaft journals and bearing caps before returning to the filter cover.

Lubricating Oil Flowchart

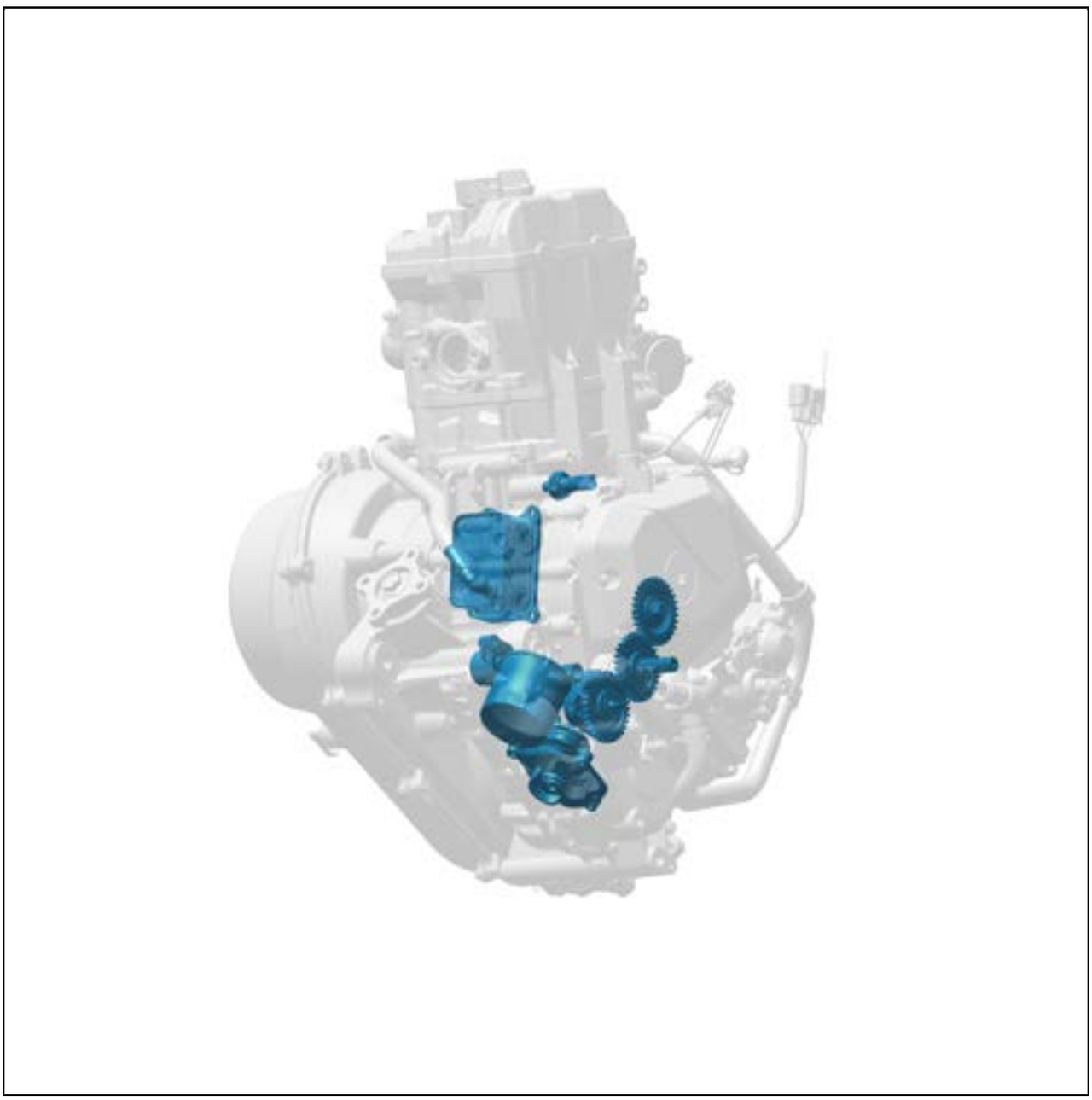


1	Oil Filter	7	Oil Jet	13	Transmission Countershaft Assembly
2	Oil Pump	8	Piston	14	Crankshaft
3	Pressure Relief Valve Assembly	9	Inlet Camshaft	15	Starter One-Way Gear
4	Oil Filter	10	Exhaust Camshaft	16	Alternator Stator and Rotor
5	Oil Cooler	11	Oil Pump Idler Gear		
6	Oil Pressure Sensor	12	Reverse Idler Gear		

3.8.5 Component Location and Exploded View

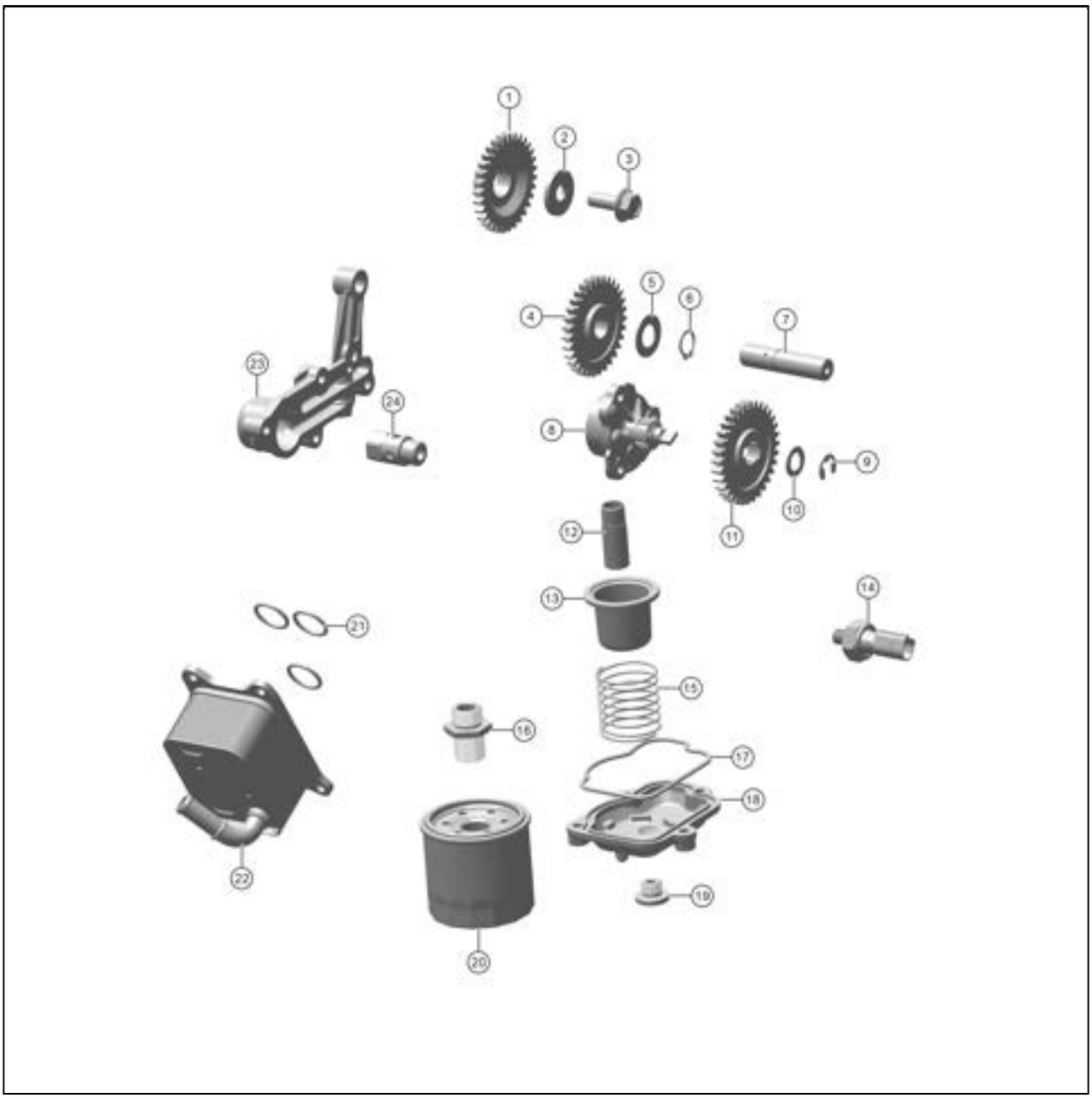
3.8.5.1 Component Location Diagram

Lubrication System



3.8.5.2 Exploded View Diagram

Lubrication System



1	Oil Pump Drive Gear	9	External Circlip	17	O-Ring Seal
2	Plain Washer	10	Washer	18	Strainer Cover
3	Oil pump drive gear retaining bolt	11	Oil Pump Driven Gear	19	Drain Plug
4	Oil Pump Idler Gear Assembly	12	Oil Pickup Pipe	20	Oil Filter
5	Washer	13	Oil Filter Screen	21	O-Ring Seal
6	External Circlip	14	Oil Pressure Sensor	22	Oil Cooler Filter Assembly

7	Oil Pump Idler Gear Shaft	15	Oil Strainer Spring	23	Oil Pressure Relief Valve Cover
8	Oil Pump	16	Oil filter adapter	24	Oil Pressure Relief Valve

3.8.6 General Fault Diagnosis and Operation

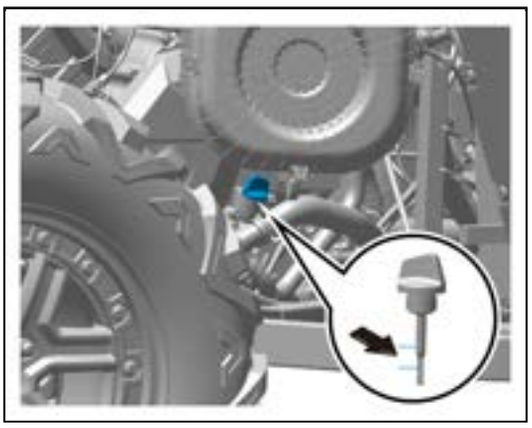
3.8.6.1 Fault Symptom List

Symptom(s)	Possible Causes	Recommended Repair Procedure
High Oil Consumption	1. Use of oil not meeting specifications	Replace with specified grade of oil
	2. Gasket or oil seal failure, oil leakage	Replace gasket or oil seal
	3. Piston rings or grooves worn	Replace piston rings or piston
	4. Piston rings stuck	Replace piston rings or piston
	5. Valve guide oil seal, valve guide, or valve stem worn	Replace oil seal, valve, or valve guide
	6. Cylinder wear	Repair cylinder bore
Oil does not reach the valve mechanism	1. Oil holes on the cylinder body and cylinder head are blocked	Clean or repair
	2. One-way valve blockage	Clean or repair
Low oil pressure	1. Use of oil not meeting specifications	Replace with specified grade of oil
	2. Safety valve stuck	Replace safety valve
	3. Oil pump filter blocked	Clean or replace oil strainer
	4. Oil pump pulley wear	Replace oil pump assembly
	5. Oil line cracked, leaking, or connector loose	Repair or replace
	6. Oil pump failure	Replace oil pump assembly
	7. Main bearing or connecting rod bearing excessively worn	Replace main bearing or connecting rod bearing
	8. Oil pressure switch failure	Repair or replace oil pressure switch

3.8.7 Inspecting and adjusting

3.8.7.1 Checking engine oil level

1. Checking the engine oil level



a. Park the vehicle on a level surface.

b. Ensure the vehicle is in a cold state.

c. Remove the dipstick, wipe it with a clean, lint-free cloth, reinsert it fully, and then withdraw it to check the oil level.

d. Check that the oil level is between the high and low marks on the oil dipstick. If the level is above or below the marks, add or drain engine oil as required.

3.8.7.2 Checking engine oil quality

1. Visual Inspection

   a. Withdraw the dipstick and hold it to the light to check if the engine oil is clear and transparent, and whether the dipstick markings are clearly visible. If the markings on the dipstick cannot be clearly seen through the engine oil, or if the oil contains visible particulate contamination, the oil is excessively contaminated and must be replaced immediately.

2. Smell Test

   a. Remove the engine oil dipstick and check the oil for any abnormal odour. The oil should have no strong odour, only a slight aroma. Any oil with a strong odour or unpleasant smell is considered degraded or of poor quality and should be replaced immediately.

CAUTION:
• If there is a noticeable fuel smell, it indicates fuel contamination in the oil, and the cause of the fuel leak should be investigated. • When smelling the oil, avoid placing your nose too close, and do not sniff for an extended period; a brief sniff is sufficient.

3. Feel Test

   a. Take a small amount of oil and rub it between your fingers. If the oil feels viscous and exhibits stringing, it indicates the oil is not degraded and can still be used. If not, it should be replaced.

CAUTION:
• After the test, wipe off the oil from your fingers immediately.

4. Pour Test

   a. Pour a small amount of oil from the oil pan into a container, then slowly pour it out from the container, observing its sheen and viscosity. If the oil maintains a thin and even flow, it indicates

there are no impurities. If not, it should be replaced.

b. If the oil shows distinct layering and there is water at the bottom, it indicates water contamination, and the cause of water ingress should be investigated.

5. Oil Drop Test

a. Drop a single drop of oil onto a piece of white paper. If the central black spot is large, dark brown, and uniform with minimal yellow ring, it indicates the oil is degraded and should be replaced. If the central black spot is small, lighter in colour, and the yellow ring is larger, the oil can still be used.

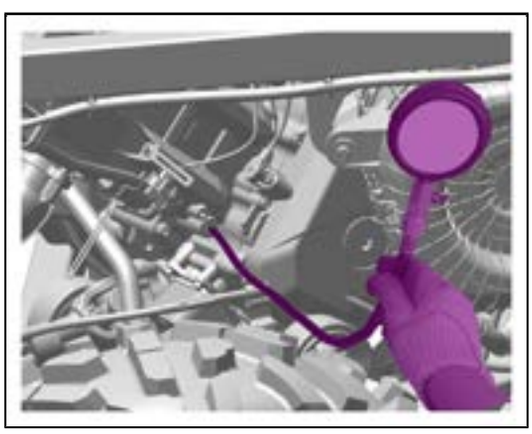
3.8.7.3 Checking engine oil pressure

CAUTION:

Before checking the oil pressure, the following items should be checked:

- **Oil level in the oil pan: If the level is low, top up to the high mark on the dipstick.**
- **Oil quality: If the oil has changed colour or is degraded, it should be replaced.**
- **Oil leaks: If any leaks are found, repair them.**

1. **To remove the oil pressure sensor,** See: Oil Pressure Sensor.
2. **Checking engine oil pressure**



a. Install the oil pressure gauge into the oil pressure sensor port and secure it.

b. Start the engine and warm it up to normal operating temperature. After warming, increase the engine speed to 3000 rpm and measure the oil pressure.

CAUTION:

- **Standard oil pressure: 400 kPa (4.1 kgf/cm², 58 psi) at 4,500 r/min, with the engine oil temperature at 110° C (230° F). If the oil pressure is significantly below the specified value, inspect the oil pressure relief valve, oil pump and crankshaft bearing shells for wear. If the oil pressure is significantly above the specified value, check the oil filter and other lubrication passages for blockage.**

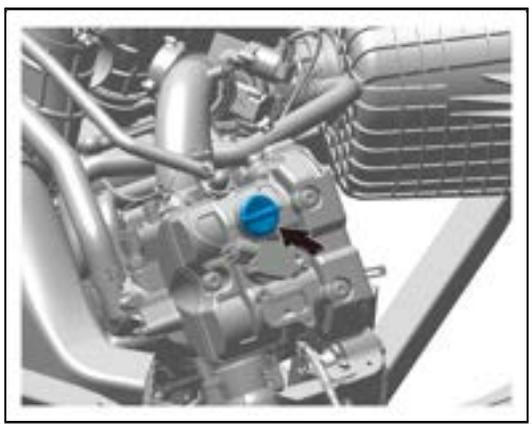
c. After checking the oil pressure, switch off the engine and remove the oil pressure gauge.

3. **To install the oil pressure sensor,** See: Oil Pressure Sensor.
4. **Start the engine and let it idle until normal operating temperature is reached. Perform a visual inspection of the oil pressure sensor body, wiring plug, and surrounding connections for any signs of oil leakage (avoid touching high-temperature components to prevent burns).**
5. **Switch off the engine and reconnect the harness terminal to the oil pressure sensor and oil**

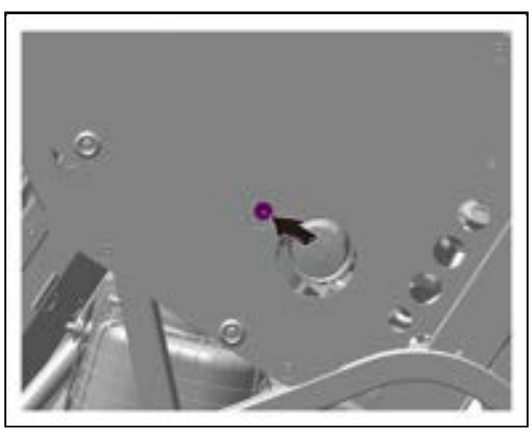
pump harness.

3.8.7.4 Draining Engine Oil

1. Draining Engine Oil



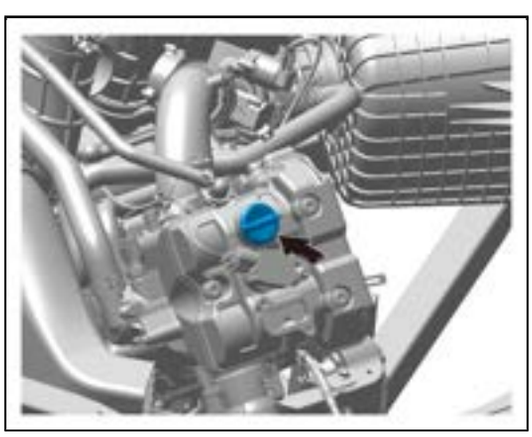
a. Tilt the cargo box and remove the engine fuel filler cap.



b. Remove the drain plug, drain, and collect the engine oil.

c. After the engine oil has drained, install and tighten the drain plug to the specified torque.

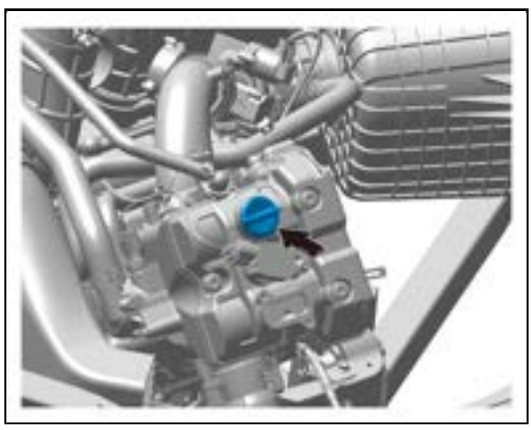
Torque: 13 ft-lbs (18 N·m)



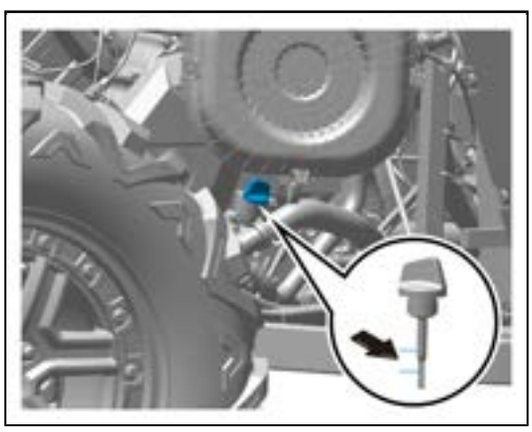
d. Install and tighten the engine fuel filler cap.

3.8.7.5 Refilling Engine Oil

1. Refilling Engine Oil



a. Tilt the cargo box and remove the engine fuel filler cap.



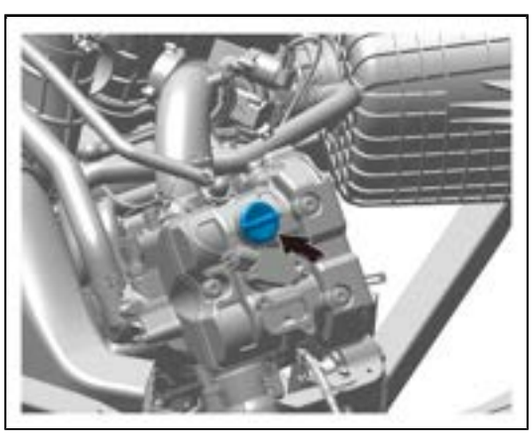
b. Top up the engine oil and check the fluid level.

2.2 L (without Replacing the Oil Filter)

2.4 L (without Replacing the Oil Filter)

CAUTION:

- Check that the oil level is between the high and low marks on the oil dipstick. If the level is above or below the marks, add or drain engine oil as required.



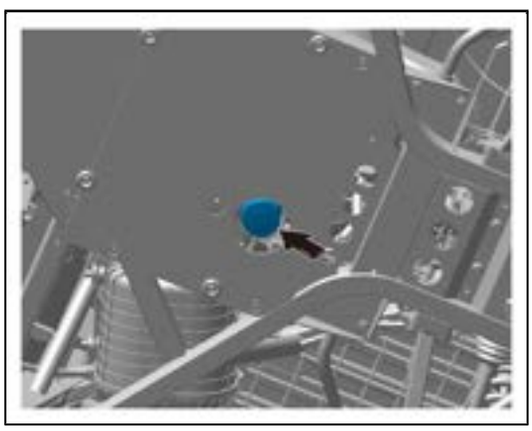
c. Install and tighten the engine fuel filler cap.

3.8.8 Repair Procedure Guidance

3.8.8.1 Oil Filter

Removal Procedure

1. To lift the vehicle, See: Vehicle Lifting and Lowering.
2. To drain engine oil, See: Draining Engine Oil.
3. Removing the oil filter



a. Use an oil filter wrench to loosen and remove the oil filter assembly

Torque: 13 ft-lbs (18 N·m)

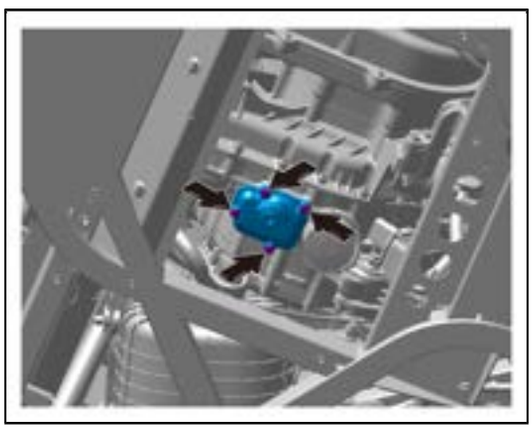
Installation Procedure

1. Install the oil filter by reversing the removal steps, observing the following precautions:
   a. Fit the oil filter assembly onto the oil cooler assembly and hand-tighten, then use an oil filter wrench to secure it.
   b. Exercise care when installing the oil filter to avoid damaging the threads.
   c. Before installation, apply engine oil to the oil filter assembly to facilitate fitting.
   d. To refill engine oil after installation, See: Refilling Engine Oil.

3.8.8.2 Oil Filter Screen

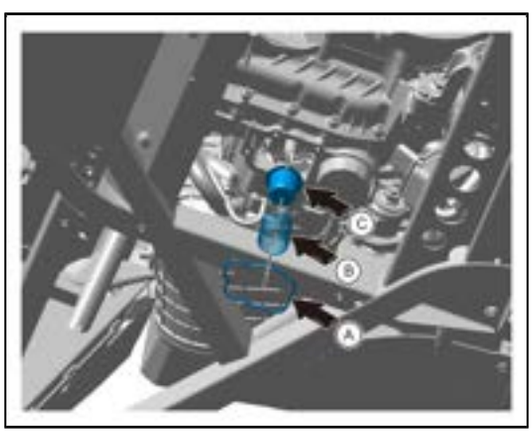
Removal Procedure

1. To lift the vehicle, See: Vehicle Lifting and Lowering.
2. To remove the rear skid plate, See: Rear Skid Plate.
3. To drain engine oil, See: Draining Engine Oil.
4. Removing the engine oil filter screen



a. Remove the 4 mounting bolts M6×25 and remove the strainer cover.

Torque: 7.4 ft-lbs (10 N·m)



b. Remove in sequence: A O-ring, B oil strainer spring, C engine oil filter screen.



c. Clean the oil filter screen and inspect for metal particles indicative of internal engine wear

d. Carefully check the strainer for damage, holes, broken wires, or missing gaskets Replace the strainer if damaged

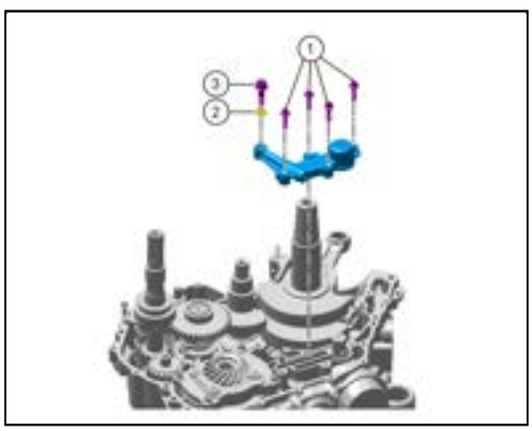
Installation Procedure

1. Install the engine oil filter screen by reversing the removal steps, observing the following precautions:
   a. To refill engine oil after installation, See: Refilling Engine Oil.
   b. Start the engine and check that there are no leaks around the strainer cover

3.8.8.3 Oil Pressure Relief Valve Assembly

Removal Procedure

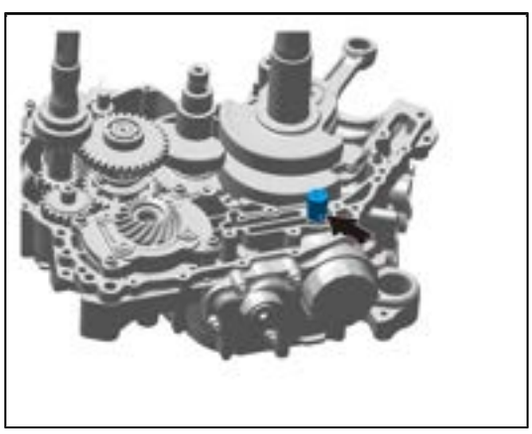
1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To drain the coolant, See: Coolant Draining and Refilling.
3. To drain the engine oil, See: Draining Engine Oil.
4. To remove the engine assembly, See: Engine Assembly.
5. To remove the coolant pump assembly, See: Coolant Pump Assembly.
6. To remove the left crankcase cover, See: Left Crankcase Cover.
7. To remove the magneto rotor, See: Magneto Rotor.
8. To remove the oil pump gear, See: Oil Pump Gear.
9. To remove the oil pump, See: Oil Pump.
10. To remove the crankcase and transmission, See: Crankcase and Transmission Assembly.
11. Removing the oil pressure relief valve assembly



a. Remove the M8 × 30 banjo bolt ①, washer ② and 4 M6 × 25 retaining bolts ③ from the oil pressure relief valve cover assembly, then remove the cover assembly.

Bolt 1 torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m)

Bolt 3 torque: 8.9 ± 1.5 ft-lbs (12 ± 2 N·m)



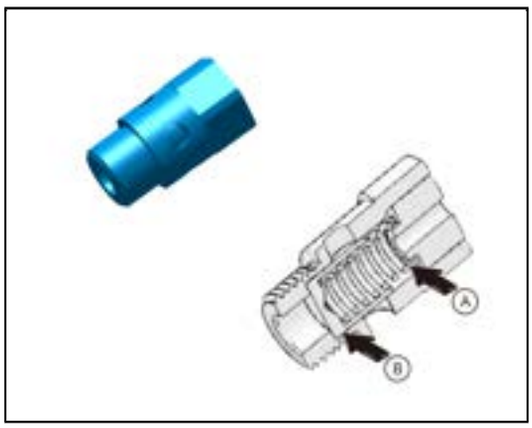
b. Remove the oil pressure relief valve assembly.

Torque: 14.8 ± 1.5 ft-lbs (20 ± 2 N·m).

NOTICE:
• Apply a medium-strength threadlocker to the threads before installing the oil pressure relief valve assembly.

Installation Procedure

1. Installation is the reverse of removal, noting the following points:



a. Before installing the oil pressure relief valve, use a metal rod to depress the internal valve to verify that valve A moves smoothly and returns to its original position under the tension of spring B.

b. If the valve binds, clean the relief valve using a high-flash-point solvent and blow out any debris with compressed air.

c. If the valve still does not move smoothly after cleaning, renew the oil pressure relief valve.

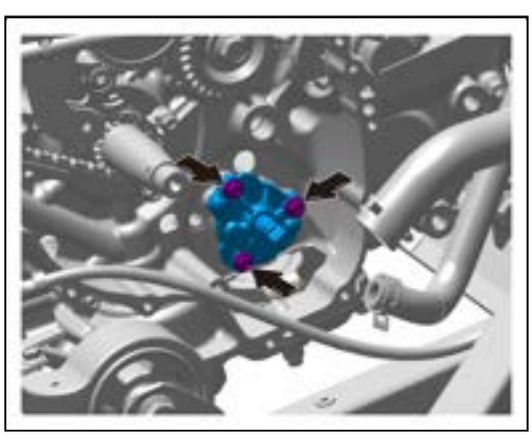
CAUTION:

- **The oil pressure relief valve cannot be disassembled; it must be checked as a complete assembly.**

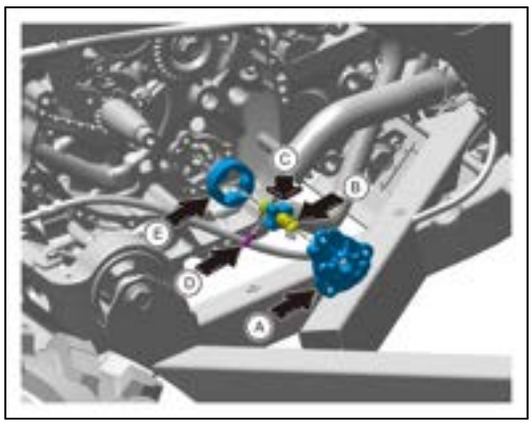
3.8.8.4 Oil Pump

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To drain the coolant, See: Coolant Draining and Refilling.
3. To drain the engine oil, See: Draining Engine Oil.
4. To remove the engine assembly, See: Engine Assembly.
5. To remove the coolant pump assembly, See: Coolant Pump Assembly.
6. To remove the left crankcase cover, See: Left Crankcase Cover.
7. To remove the oil pump gear, See: Oil Pump Gear.
8. Removing the oil pump



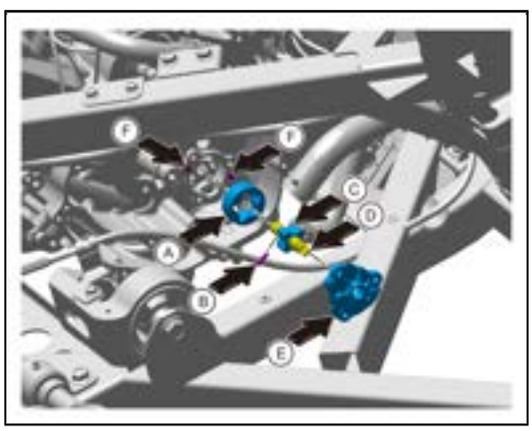
a. Remove the 3 oil pump cover mounting bolts.



b. Remove the oil pump cover A, oil pump shaft B, oil pump inner rotor C, needle roller D (P4 × 15.8) and oil pump outer rotor E, in that order.

Installation Procedure

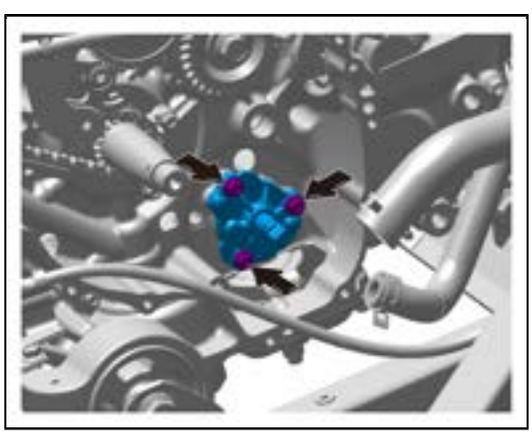
1. Installing the oil pump



a. Place the oil pump outer rotor A into the corresponding bore in the left crankcase assembly. Insert the P4×15.8 needle roller B into the lower hole of the inner rotor, then fit the inner rotor C on to the oil pump shaft D, ensuring that the needle roller is correctly seated in the inner rotor groove.

b. Install the oil pump shaft assembly into the oil pump outer rotor.

c. Apply an appropriate amount of engine oil to the oil pump outer rotor. Align the oil pump cover E with the 2 locating pins F and install it in position.



d. Install the 3 oil pump cover retaining bolts.

Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).

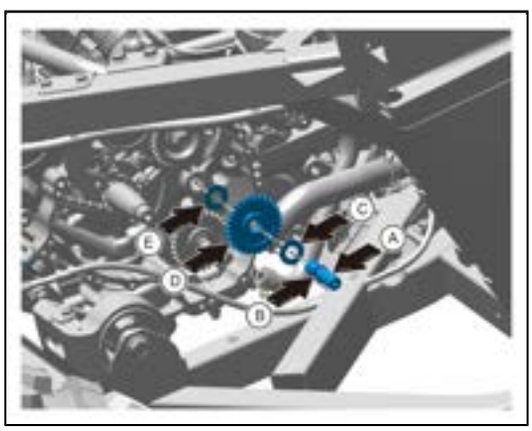
NOTICE:
• **After installation, rotate the oil pump driven gear and check that it turns freely without binding.**

2. To install the oil pump gear, See: Oil Pump Gear.
3. To install the left crankcase cover, See: Left Crankcase Cover.
4. To install the coolant pump assembly, See: Coolant Pump Assembly.
5. To install the engine assembly, See: Engine Assembly.
6. To refill engine with oil, See: Refilling Engine Oil.
7. To fill with coolant, See: Coolant Draining and Refilling.
8. To connect the negative battery, See: Battery Power Connection/Disconnection Procedure.
9. To bleed the cooling system, refer to See: Cooling System Bleeding Procedure.

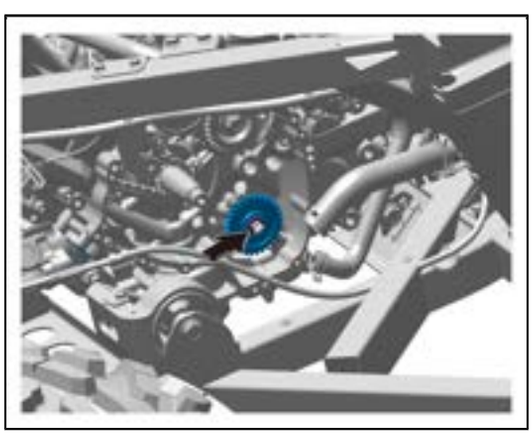
3.8.8.5 Oil Pump Gear

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To drain the coolant, See: Coolant Draining and Refilling.
3. To drain the engine oil, See: Draining Engine Oil.
4. To remove the engine assembly, See: Engine Assembly.
5. To remove the coolant pump assembly, See: Coolant Pump Assembly.
6. To remove the left crankcase cover, See: Left Crankcase Cover.
7. To remove the magneto rotor, See: Magneto Rotor.
8. Removing the oil pump and gear



a. Remove the oil pump idler gear shaft A, external circlip B, washer C (15 × 28 × 1), oil pump idler gear assembly D and washer E (15 × 28 × 1), in that order.



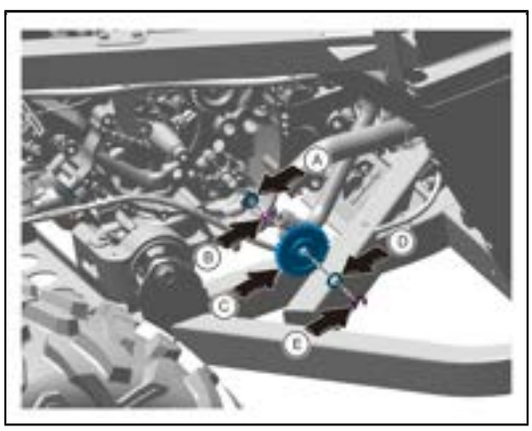
b. Using circlip pliers, remove the circlip, then remove the 12×20×1 plain washer and oil pump driven gear.



c. Remove the P4×15.8 needle roller and 12×20×1 plain washer.

Installation Procedure

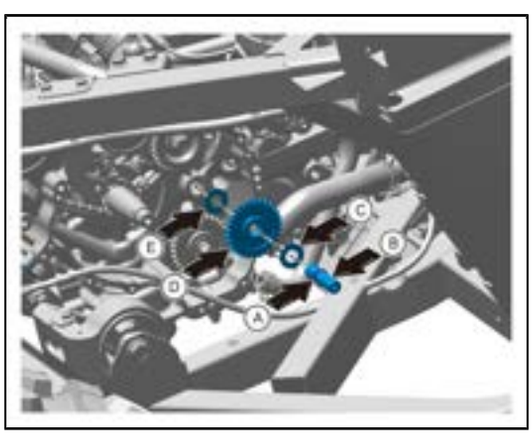
1. Installing the oil pump and gear



a. Fit the 12×20×1 plain washer A to the oil pump shaft. Insert the P4×15.8 needle roller B into the upper hole in the oil pump shaft, then install the oil pump driven gear C, ensuring that the needle roller is correctly seated in the bore of the driven gear. Fit the other 12×20×1 plain washer D, then use long-nose pliers to install the circlip E in the upper groove of the oil pump shaft. Rotate the oil pump driven gear and check that it turns freely without binding.

NOTICE:

- **Ensure that the marked side of the oil pump driven gear faces outwards.**
- **After installation, rotate the oil pump driven gear and check that it turns freely without binding.**



b. Using circlip pliers, install external circlip A in the groove of the oil pump idler gear shaft B.

c. Fit the 15×28×1 washer C, oil pump idler gear D and 15×28×1 washer E, in that order, to the shorter end of the oil pump idler gear shaft opposite the circlip.

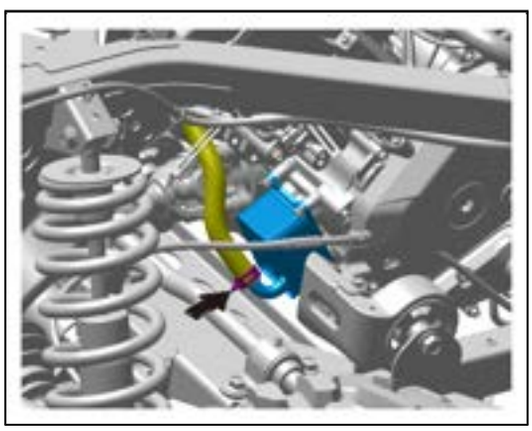
d. Install the assembled oil pump idler gear shaft into the corresponding bore in the crankcase, ensuring that the idler gear fully meshes with the oil pump driven gear and oil pump drive gear.

2. To install the magneto rotor, See: Magneto Rotor.
3. To install the left crankcase cover, See: Left Crankcase Cover.
4. To install the coolant pump assembly, See: Coolant Pump Assembly.
5. To install the engine assembly, See: Engine Assembly.
6. To refill engine with oil, See: Refilling Engine Oil.
7. To fill with coolant, See: Coolant Draining and Refilling.
8. To connect the negative battery, See: Battery Power Connection/Disconnection Procedure.
9. To bleed the cooling system, refer to See: Cooling System Bleeding Procedure.

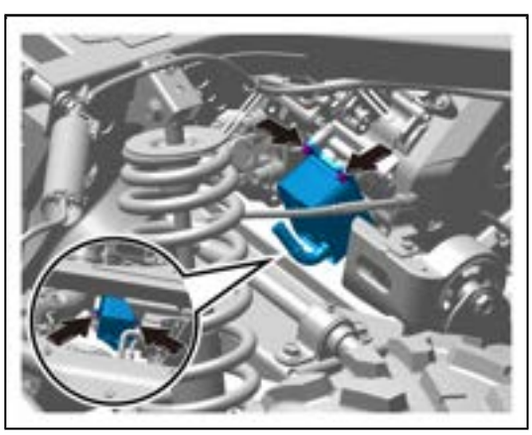
3.8.8.6 Oil Cooler Assembly

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To lift the vehicle, See: Vehicle Lifting and Lowering.
3. To remove the rear skid plate, See: Rear Skid Plate.
4. To drain the coolant, See: Coolant Draining and Refilling.
5. To drain engine oil, See: Draining Engine Oil.
6. Removing the oil cooler assembly

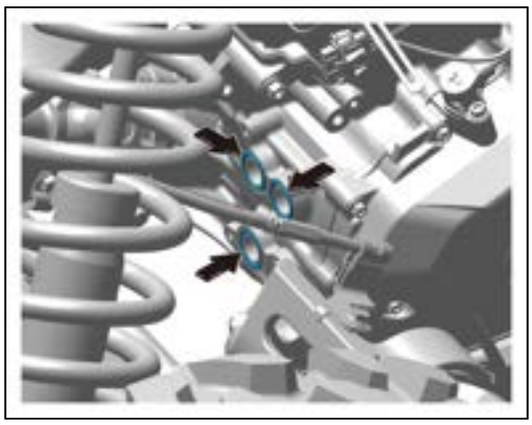


a. Loosen the hose clamp and disconnect the coolant hose from the engine oil cooler assembly.



b. Remove the 4 bolts M6×16 securing the oil cooler assembly and remove the assembly.

Torque: 7.4 ft-lbs (10 N·m)



c. Remove the three O-rings from the oil cooler assembly.

NOTICE:
• The O-ring is a single-use part; always replace it with a new one during assembly.

Installation Procedure

1. Install the oil cooler assembly by reversing the removal steps, observing the following precautions:
   a. To refill engine oil after installation, See: Refilling Engine Oil.
   b. To install the cooling system bleeding procedure, See: Cooling System Bleeding Procedure.
   c. Start the engine and check for leaks around the oil cooler assembly.

3.9 Starting and Charging System

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3.9.1 Specifications

3.9.1.1 Fastener Specifications

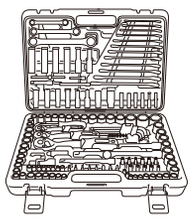
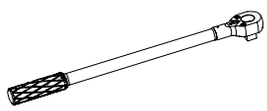
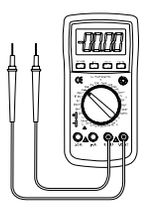
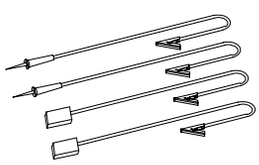
Item	Torque (N·m)	Torque (ft-lbs)
Stator Cover Plug	18	13
Bracket bolt (M6×16)	9.8	7.2
Stator Bolt M6×35	10	7
Rotor Nut M18×1.5	180	133
One-way Clutch Mounting Bolt M6×16	18	13
Starter Mounting Bolt M6×30	9.8	7.2
Left crankcase cover mounting bolt	9.8	7.2

3.9.1.2 Service Specifications

Item	Specifications
Alternator Type	Three-phase AC
Charging Voltage	14 ~15V
Alternator Output Voltage	36 ~ 54V 3000r/min(rpm)
Stator Coil Resistance	0.33~ 0.49 Ω

3.9.2 Service Tools

3.9.2.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)
2	Torque Wrench		Tightening bolts and nuts to the specified torque
3	Digital multimeter		Test the alternator and starter
4	Test Lead Set		Test the alternator and starter

3.9.2.2 Special Service Tools (SSTs) and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Magneto Rotor Puller		Removing the alternator rotor

3.9.3 Description and Operation

3.9.3.1 Warnings and Precautions

1. When removing or installing the starter or alternator on the vehicle, always disconnect the negative battery terminal first.
2. Do not overtighten the electrical terminals on the starter, as this may cause damage to the starter.
3. Do not operate the engine with a poorly connected battery, as this may damage the electrical system.
4. Once the alternator is running, use a test lamp or multimeter to check whether the alternator is generating electricity.

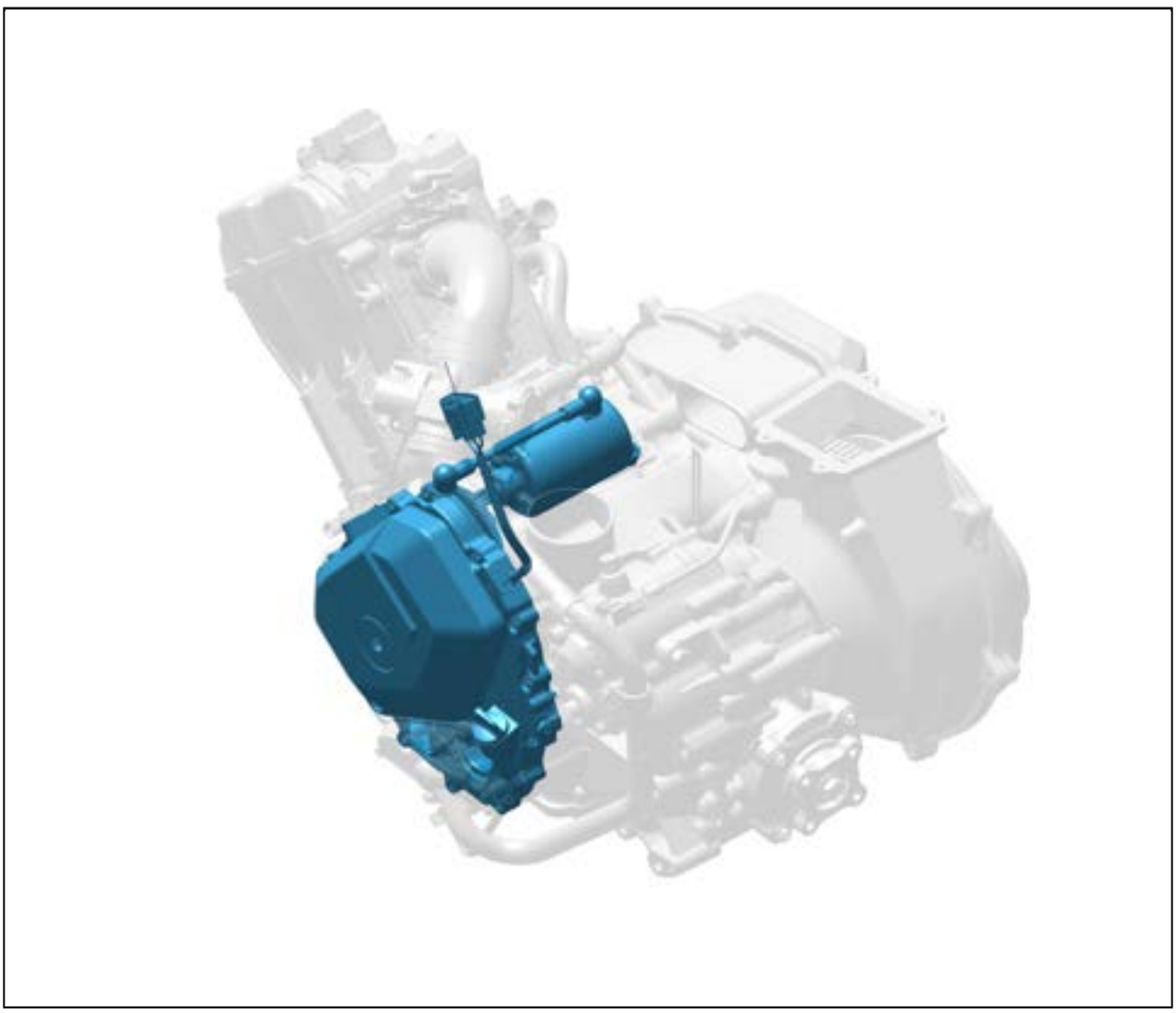
3.9.3.2 System Description

1. System Overview
   a. The starting system mainly comprises the battery, ignition switch, and starter motor circuits, all interconnected by wiring. With the vehicle powered, place the shift lever in Park (P), engage the parking brake, and press the engine start/stop switch. Power is supplied to the starter motor, which transmits the starting torque to the engine via the overrunning clutch to crank the engine.
   b. After the engine starts, the overrunning clutch automatically slips to prevent the starter from being damaged by high-speed reverse drive.
   c. The charging system typically consists of the alternator and battery assembly. The alternator output voltage is generally constant; as the electrical load increases, the alternator increases its speed to supply sufficient current to meet the higher demand.

3.9.4 Component Location and Exploded View

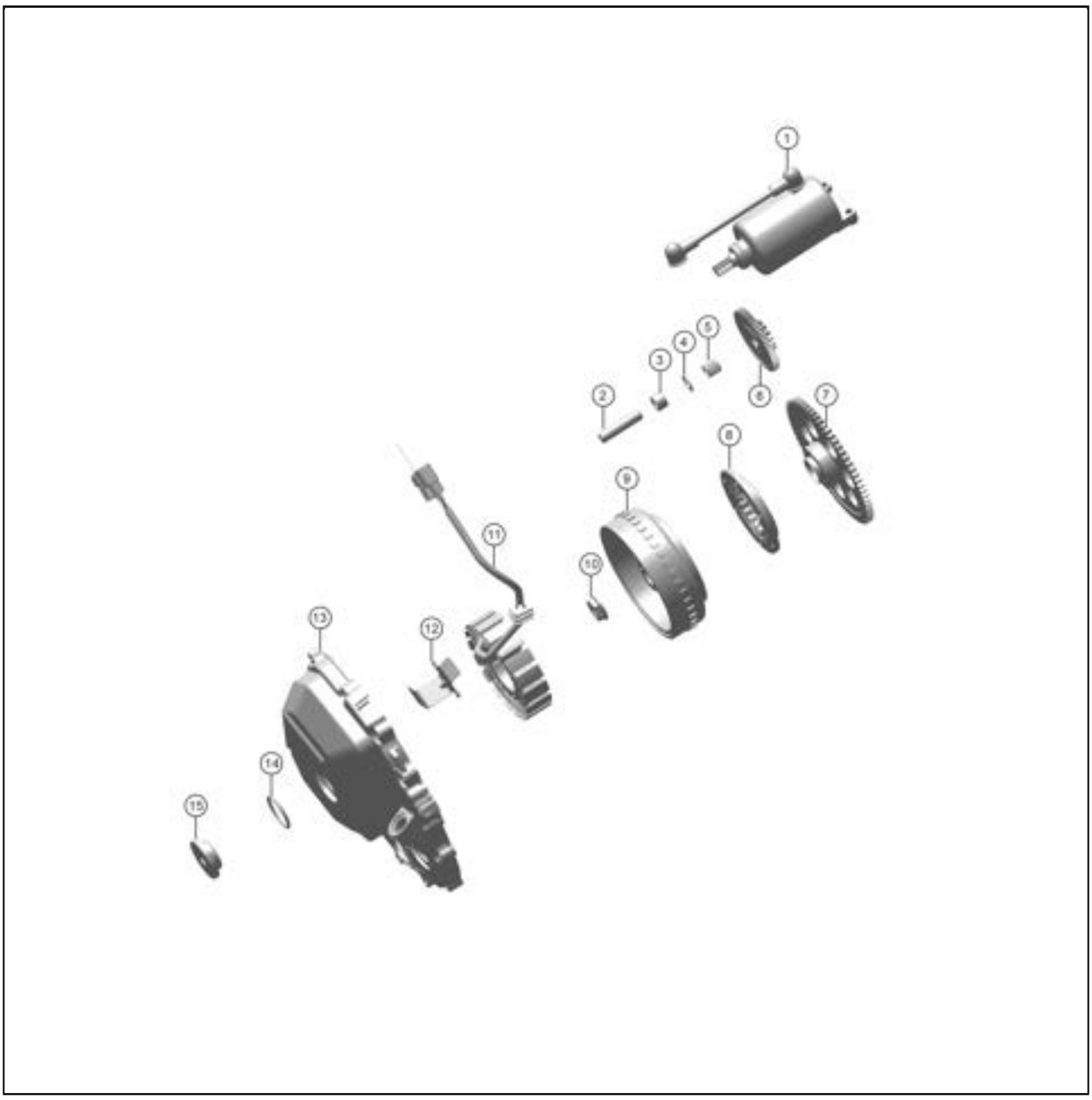
3.9.4.1 Component Location Diagram

Starting and Charging System



3.9.4.2 Exploded View Diagram

Starting and Charging System



1	Starter Motor	6	Compound Gear	11	Alternator Stator
2	Double Gear Shaft	7	Starter Driven Gear	12	Lead Clamp
3	Bush	8	Starter Overrunning Clutch	13	Left Crankcase Cover
4	Plain Washer	9	Alternator Rotor	14	O-Ring 35×3.5
5	Needle Roller	10	Rotor Nut M18×1.5	15	Inspection cover

3.9.5 General Fault Diagnosis and Operation

3.9.5.1 Fault Symptom List

Symptom(s)	Possible Causes	Recommended Repair Procedure
Starter Does Not Operate	1. Internal circuit of starter (open or short circuit)	Inspect the starter assembly
Starter motor is weak, engine fails to start	1. Insufficient battery capacity	Charge the battery according to specifications
	2. Poor wire connection	Tighten the wire connections
	3. Severe bearing wear	Replace the bearing
Engine has started, but the starter motor continues to run, producing a sharp noise	1. Starter motor armature shaft broken or bent	Immediately cut off power and replace the starter assembly
	2. Gear teeth seized	Immediately cut off power and repair the gear teeth
Alternator fails to generate electricity	1. Incorrect wiring, broken wiring, or poor contact	Inspect the circuit
	2. Rotor coil circuit open	Repair or replace the alternator system

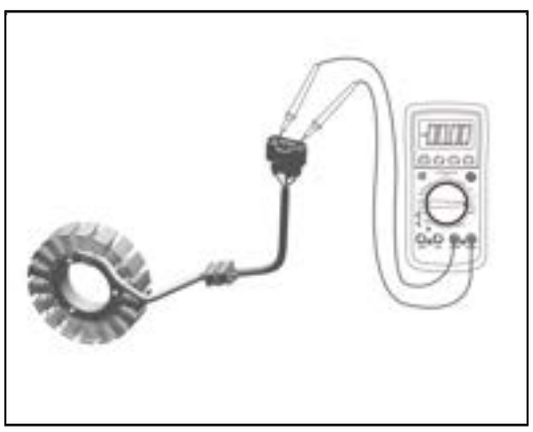
3.9.6 Inspecting and adjusting

3.9.6.1 Checking Alternator

There are three types of alternator faults: short circuit, open circuit, or rotor demagnetisation. A short circuit or an open circuit in a coil wire will result in low output or no output. Loss of rotor magnetism, which may be caused by dropping or impacting the alternator, exposure to nearby electromagnetic fields, or simply ageing, will result in low output.

Alternator Output Voltage

1. Inspecting procedure



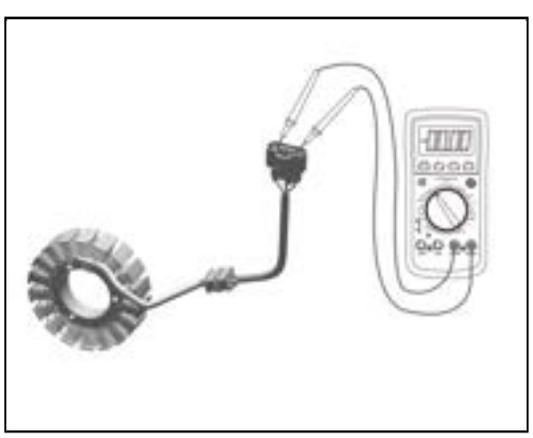
a. Disconnect the alternator connector.

b. Start the engine and measure the alternator output voltage three times using the multimeter in voltage mode.

Standard value: 36–54 V (at 3000 rpm)

Stator Coil Resistance Check

1. Inspecting procedure



a. Disconnect the alternator connector.

b. Measure the resistance of the alternator coil three times using the multimeter in resistance mode.

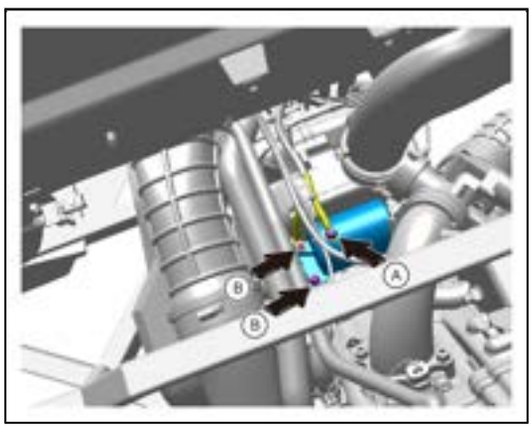
Standard value: 0.33–0.49 Ω

3.9.7 Repair Procedure Guidance

3.9.7.1 Starter Motor

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the CVT air intake duct 2, See: CVT Intake Pipe 2.
3. Remove CVT air intake duct connector 2, See: CVT Air Duct Connector 2.
4. Removing the starter motor



a. Remove the starter harness mounting nut A and disconnect the starter harness.

Torque: 3.6 ft-lbs(4.9N·m)

b. Remove the 2 starter mounting bolts B, disconnect the harness, and remove the starter.

Torque: 7.2 ft-lbs(9.8N·m)

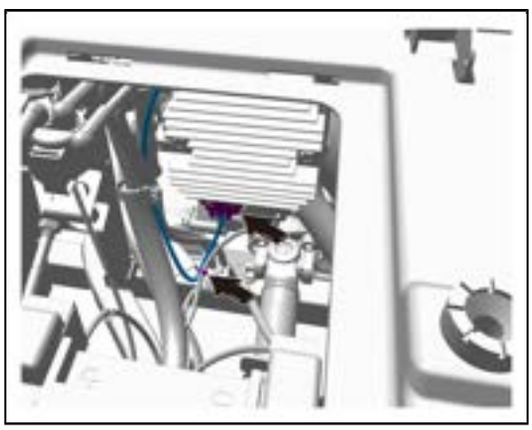
Installation Procedure

1. Install the starter motor in the reverse order of removal, observing the following points:
   a. Ensure the starter motor earthing point is clean before installation.
   b. Check the starter motor drive gear and apply a small amount of engine oil to the O-ring before installation.

3.9.7.2 Left Crankcase Cover Assembly

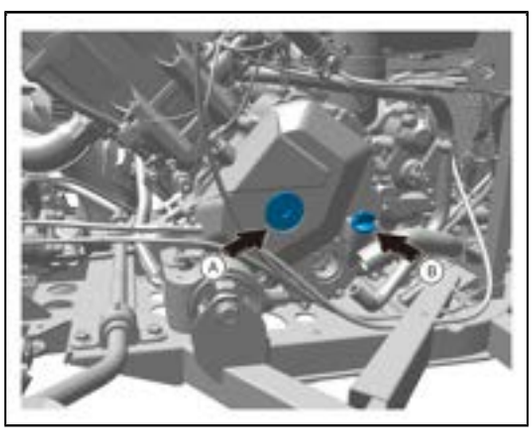
Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To drain the coolant, See: Coolant Draining and Refilling.
3. To remove the centre under-seat cover, See: Centre Under-Seat Cover.
4. To remove the air cleaner assembly, See: Air Cleaner Assembly.
5. To remove the crankshaft position (CKP) sensor, See: Crankshaft Position (CKP) Sensor.
6. To remove the coolant pump assembly, See: Coolant Pump Assembly.
7. Removing the left crankcase cover



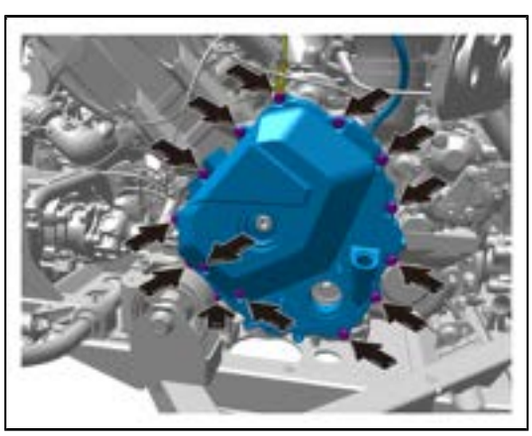
a. Disconnect the connector between the magneto stator assembly and the regulator/rectifier, release the harness retaining clips along the harness, and cut the harness cable ties.

NOTICE:
• Cable ties on the harness are single-use and must be replaced after removal.

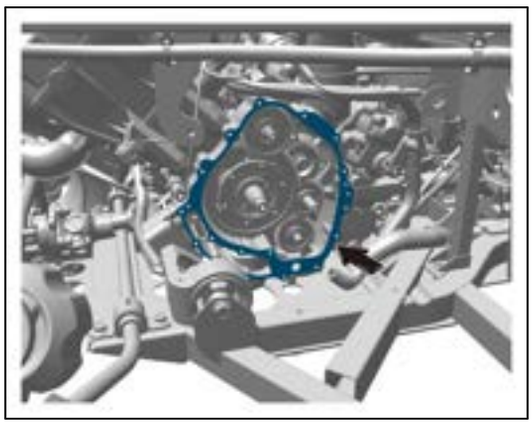


b. Remove the inspection cover A.

c. Remove the oil dipstick B.



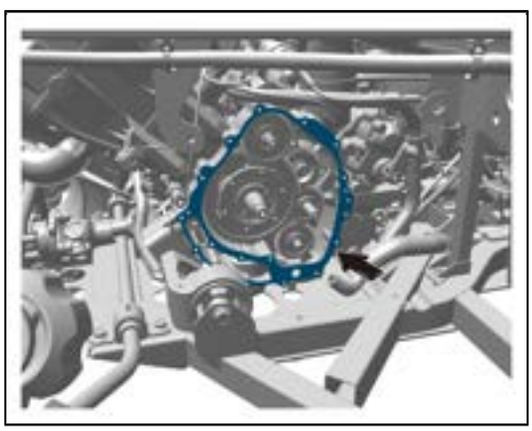
d. Remove the 14 mounting bolts of the left crankcase cover assembly and remove the harness bracket and cover assembly.



e. Remove the left crankcase cover gasket.

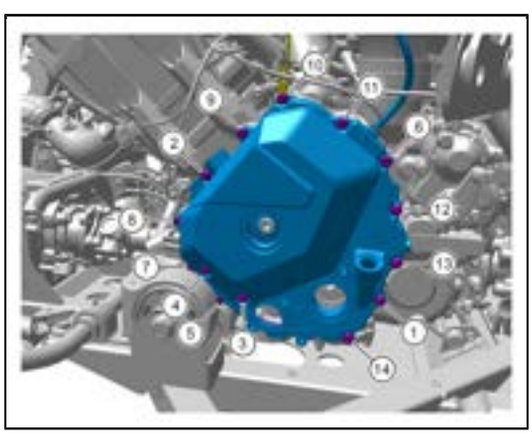
Installation Procedure

1. Installing the left crankcase cover assembly



a. Wipe the mating faces of the left crankcase cover and left crankcase with a lint-free cloth, then install the left crankcase cover gasket.

NOTICE:
• The gasket is single-use only and must be replaced with a new one during installation.



b. Apply a suitable sealant to the magneto wiring rubber sleeve on the left crankcase cover using a caulking gun. Install the left crankcase cover assembly onto the left crankcase and tighten the 14 mounting bolts in the sequence shown.

Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).

CAUTION:
• Do not omit the harness bracket.

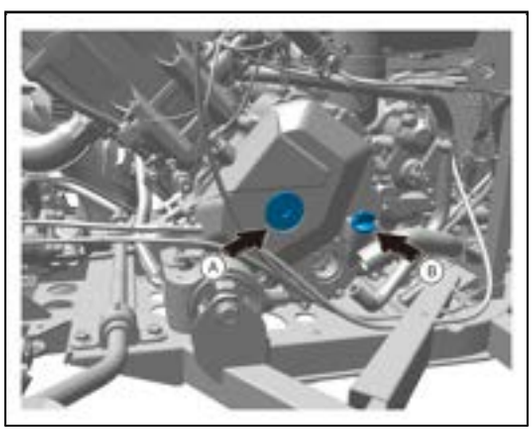


c. Install O-ring 18×3.5 on the oil dipstick.

d. Install O-ring 35×3.5 on the inspection cover.

NOTICE:

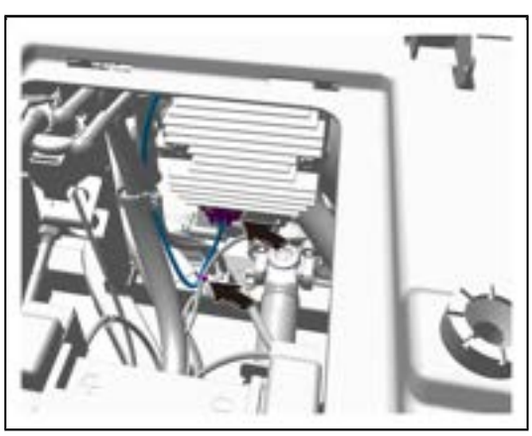
- **O-rings are single-use parts and must not be reused. Always install new O-rings.**
- **Apply grease to the O-ring before fitting.**



e. Apply a small amount of engine oil to the inspection cover O-ring, then install the inspection cover A on the left crankcase cover assembly.

Torque: 8.9 ± 1.5 ft-lbs (12 ± 2 N·m).

f. Apply a small amount of engine oil to the oil dipstick O-ring, then install the oil dipstick B in the left crankcase cover assembly.



g. Connect the connector between the magneto stator assembly and the regulator/rectifier.

h. Secure the body harness to the vehicle body using new cable ties.

NOTICE:

- **Cable ties on the harness are single-use and must be replaced after removal.**

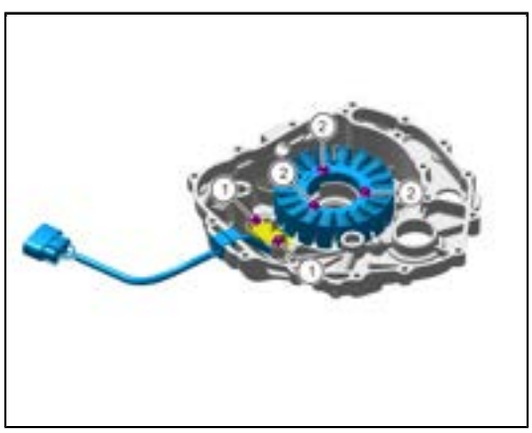
2. Install the remaining components in the reverse order of removal.

a. After filling with coolant, bleed the cooling system following See: the standard bleeding procedure.

3.9.7.3 Magneto Stator Assembly

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To drain the coolant, See: Coolant Draining and Refilling.
3. To remove the centre under-seat cover, See: Centre Under-Seat Cover.
4. To remove the air cleaner assembly, See: Air Cleaner Assembly.
5. To remove the crankshaft position (CKP) sensor, See: Crankshaft Position (CKP) Sensor.
6. To remove the coolant pump assembly, See: Coolant Pump Assembly.
7. To remove the left crankcase cover assembly, See: Left Crankcase Cover Assembly.
8. Removing the magneto stator

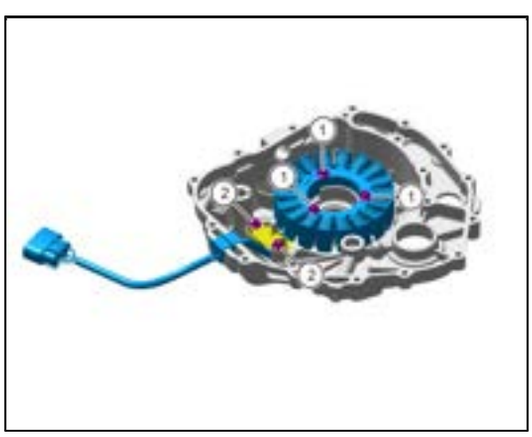


a. Remove the 2 mounting bolts ① from the magneto lead clamp and take off the magneto lead clamp.

b. Remove the 3 mounting bolts ② from the magneto stator assembly and remove the stator assembly.

Installation Procedure

1. Installing the magneto stator assembly



a. Install the magneto stator assembly onto the left crankcase cover assembly.

b. Apply a suitable threadlocker to the threads of the 3 mounting bolts on the stator assembly, then install and tighten the 3 bolts ①.

Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).

c. Press the stator assembly clips into the left crankcase cover slots first, then install the magneto lead clamp onto the crankcase cover assembly and tighten the 2 magneto lead clamp mounting bolt ②.

Torque: 7.4 ± 1.5 ft-lbs (10 ± 2 N·m).

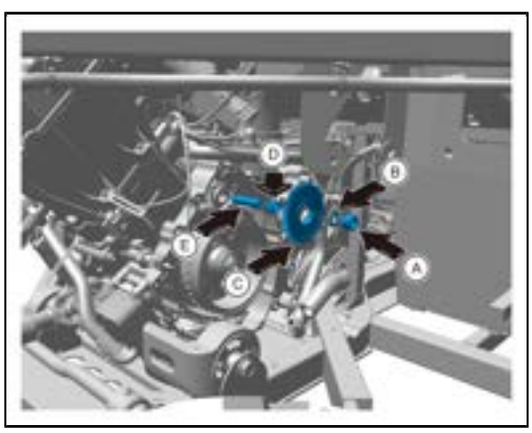
2. Install the remaining components in the reverse order of removal.

   a. After filling with coolant, bleed the cooling system following See: the standard bleeding procedure.

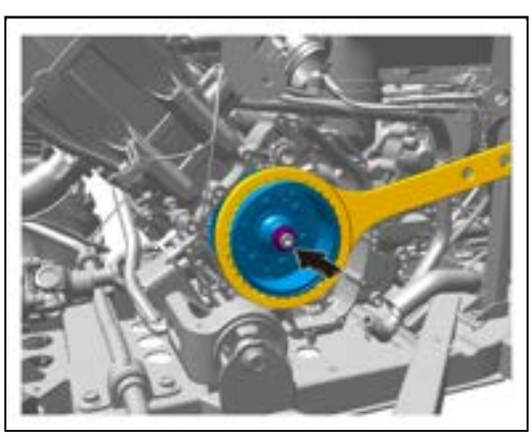
3.9.7.4 Magneto Rotor Assembly

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To drain the coolant, See: Coolant Draining and Refilling.
3. To remove the centre under-seat cover, See: Centre Under-Seat Cover.
4. To remove the air cleaner assembly, See: Air Cleaner Assembly.
5. To remove the crankshaft position (CKP) sensor, See: Crankshaft Position (CKP) Sensor.
6. To remove the coolant pump assembly, See: Coolant Pump Assembly.
7. To remove the left crankcase cover assembly, See: Left Crankcase Cover Assembly.
8. Removing magneto rotor assembly

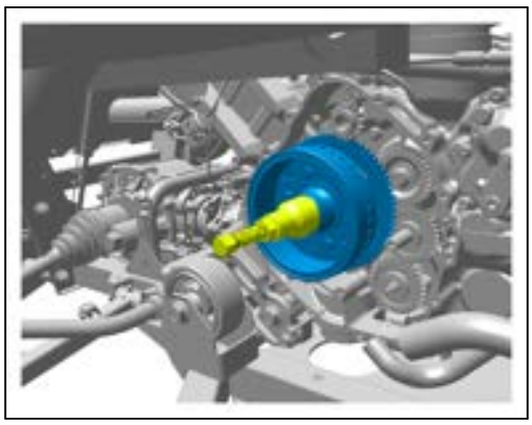


a. Remove bush A (12 × 18 × 12), plain washer B (12 × 20 × 1), compound gear assembly C, needle roller bearing D (K121616) and compound gear shaft E, in that order.



b. Remove the magneto rotor assembly mounting nut using the SST for the magneto rotor assembly.

SST: Magneto rotor holding tool



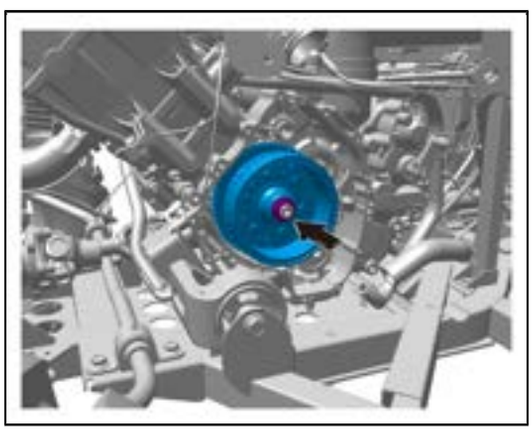
c. Pull out the magneto rotor assembly using the SST.

SST: Magneto rotor puller (E01GZ0010001)

CAUTION:
If the magneto rotor is difficult to remove, lightly tap the end of the puller while turning it. Do not strike the magneto rotor. Striking it may cause the magnets to lose their magnetism.

Installation Procedure

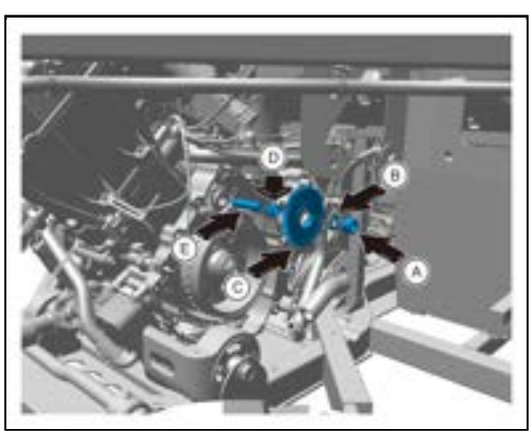
1. Installing the magneto rotor assembly



a. Align the slot in the magneto rotor assembly with the Woodruff key at the front end of the crankshaft, and install the rotor assembly on to the crankshaft. Apply a suitable threadlocker to the leading threads at the magneto end of the crankshaft, then install the retaining nut.

Torque: 132.8 ± 5.9 ft-lbs (180 ± 8 N·m).

CAUTION:
• **After installation, check that the starter driven gear assembly rotates clockwise only and does not rotate anticlockwise.**



b. Fit bush 12×18×12, plain washer 12×20×1, needle roller K121616 and the compound gear assembly to the compound gear shaft in that order.

c. Install the assembled compound gear shaft into the corresponding bore in the crankcase, ensuring that the compound gear assembly fully meshes with the starter driven gear assembly and the oil pump drive gear.

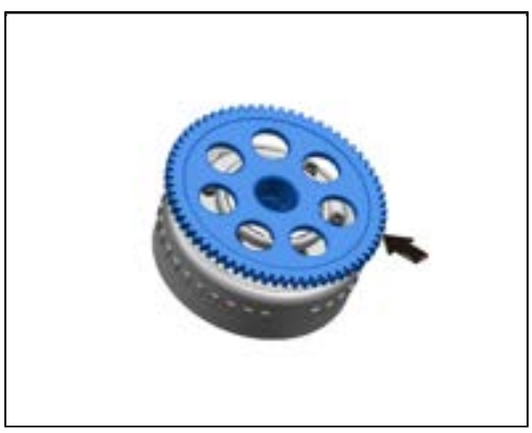
2. Install the remaining components in the reverse order of removal.

a. After filling with coolant, bleed the cooling system following See: the standard bleeding procedure.

3.9.7.5 Starter One-Way Clutch

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To drain the coolant, See: Coolant Draining and Refilling.
3. To remove the centre under-seat cover, See: Centre Under-Seat Cover.
4. To remove the air cleaner assembly, See: Air Cleaner Assembly.
5. To remove the crankshaft position (CKP) sensor, See: Crankshaft Position (CKP) Sensor.
6. To remove the coolant pump assembly, See: Coolant Pump Assembly.
7. To remove the left crankcase cover assembly, See: Left Crankcase Cover Assembly.
8. To remove the magneto rotor assembly, See: Magneto Rotor Assembly.
9. Removing the starter one-way clutch



a. Remove the starter driven gear assembly.



b. Remove the 6 mounting bolts of the starter one-way clutch and take off the clutch.

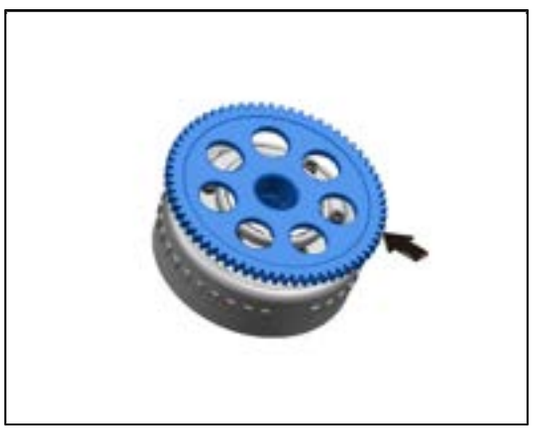
Installation Procedure

1. Installing the starter one-way clutch



a. Fit the starter one-way clutch onto the magneto rotor assembly and install the 6 mounting bolts in the sequence shown.

Torque: 13.3 ± 1.5 ft-lbs (18 ± 2 N·m).

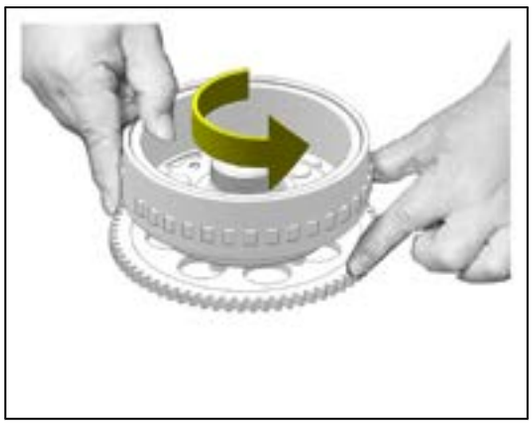


b. Install the starter driven gear assembly onto the magneto rotor assembly.

2. Inspecting starter one-way clutch



a. Inspect the starter one-way gear. Replace the one-way gear if worn or damaged.



b. Install the starter one-way gear into the overrunning clutch.

c. Turn the starter one-way clutch in the direction of the arrow. It should rotate smoothly without abnormal noise and lock firmly in the reverse direction, indicating normal starter one-way clutch operation.

3. **Install the remaining components in the reverse order of removal.**

   a. After filling with coolant, bleed the cooling system following See: the standard bleeding procedure.

3.10 CVT System

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3.10.1 Specifications

3.10.1.1 Fastener Specifications

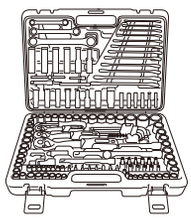
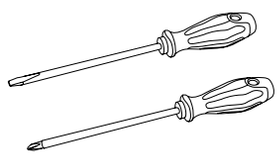
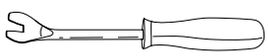
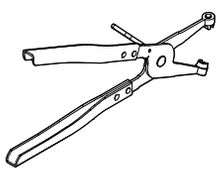
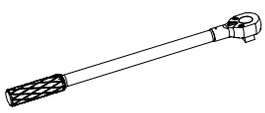
Item	Torque (N·m)	Torque (ft-lbs)
CVT Outer Cover Bolt, M6x20	12	8.8
CVT drive pulley bolt M12 × 1.25 × 142	80	59
CVT driven pulley bolt M10×1.25×45	75～85	55.3～62.7
CVT Inner Cover Bolt, M6x28	14	10.3
CVT Sound-Insulating Foam Hex Flange Bolt, M5 × 12	5	3.7
Air Guide Cross-Recessed Countersunk Screw, M5 × 16	5	3.7

3.10.1.2 Service Specifications

Item	Specifications
Transmission type	CVT
CVT Transmission Ratio	0.601～2.967

3.10.2 Service Tools

3.10.2.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)
2	Screwdriver		Removing screws
3	Trim clip removal tool		Removing clips
4	Hose Clamp Pliers		Removing and installing hose clamps
5	Torque Wrench		Tightening bolts and nuts to the specified torque

3.10.2.2 Special Service Tools (SSTs) and Equipment

Item No.	Tool Number	Tool Description	Tool Diagram	Purpose/Use
1	E01GZ0000008	CVT Drive Pulley Pushrod		Removing the drive pulley
2	E01-E200001-000-00	CVT driven pulley pushrod		Removing the driven pulley
3	\	CVT driven pulley removal tool		Removing the driven pulley
4	A10-R493101-000-00	CVT pulley holding tool		Hold the Drive Pulley Stationary.

3.10.3 Description and Operation

3.10.3.1 Warnings and Precautions

1. When inspecting the CVT system, park the vehicle on level, dry ground.
2. Bolts and nuts for all components must be tightened to the specified torque.
3. If any mounting bolt or nut is found to be damaged during servicing, replace it immediately.
4. Before driving, check the vehicle for safe operating condition and start the vehicle only after confirming that there are no safety hazards.
5. During inspection and repair, always follow the relevant instructions and standard procedures. Read the applicable instructions carefully before using workshop equipment and SST.

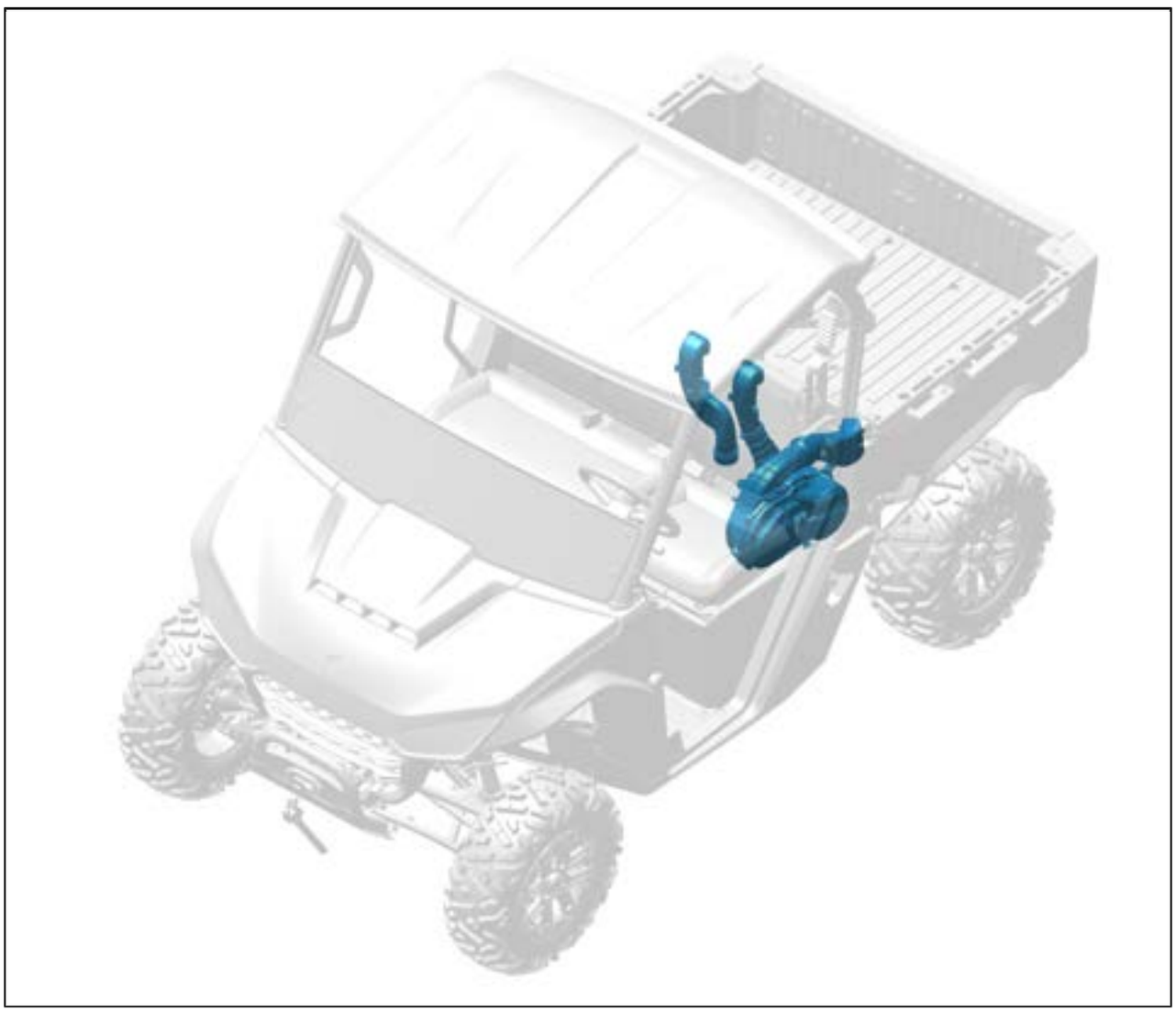
3.10.3.2 System Description

1. System Description
   a. This vehicle is equipped with a CVT automatic transmission with 2 forward ranges and one reverse range. Its primary design objective is to keep the engine operating within its optimum efficiency range by means of continuously variable ratios, thereby improving power delivery smoothness and driving comfort.
2. Components
   a. The CVT system consists of the drive pulley, driven pulley, drive belt and related components.

3.10.4 Component Location and Exploded View

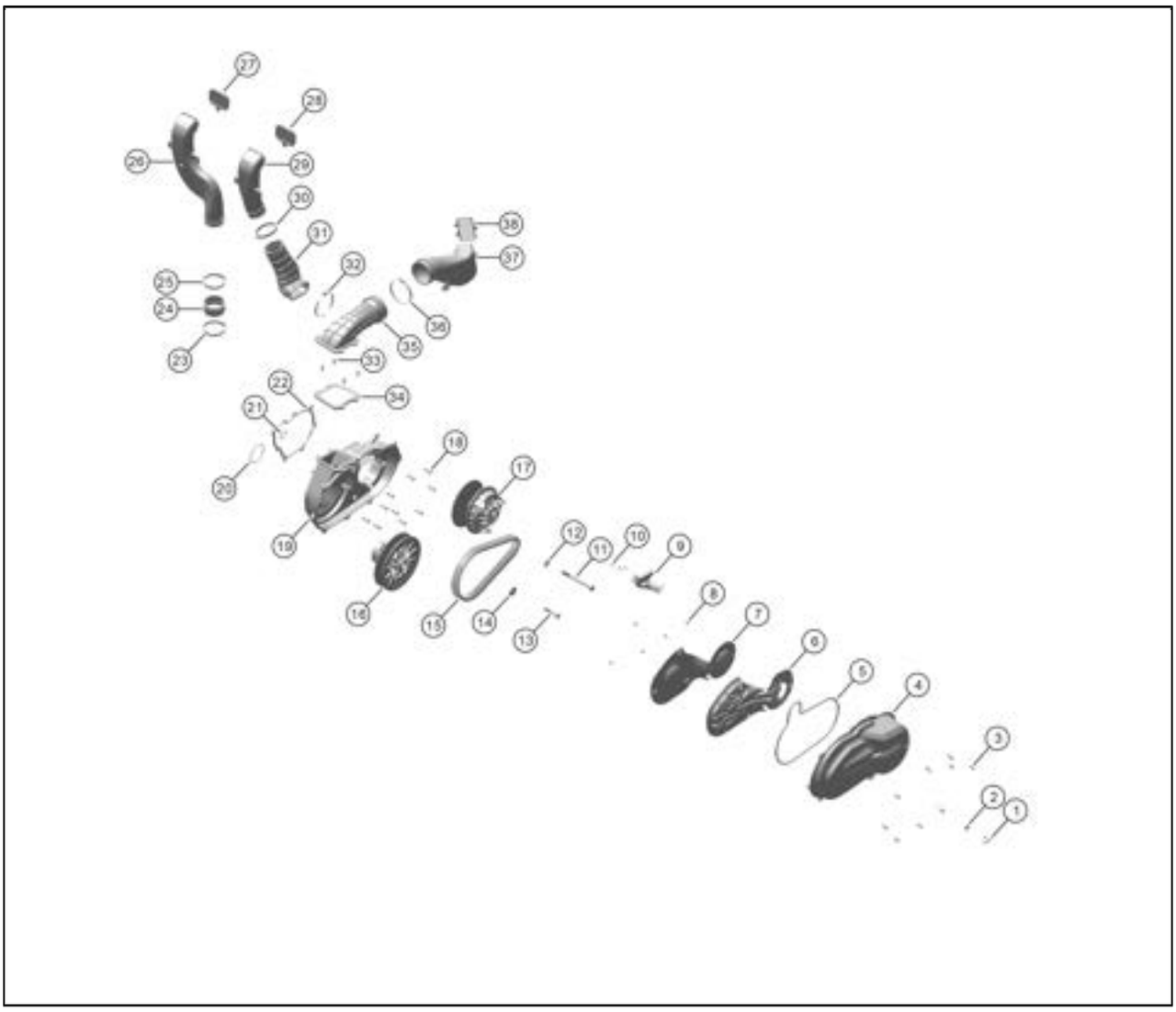
3.10.4.1 Component Location Diagram

CVT System



3.10.4.2 Exploded View Diagram

CVT System



1	Plug	14	Flanged Bush, 10.5 × 36 × 8	27	Air Inlet Grille
2	Core plug seal	15	CVT Drive Belt	28	Air Inlet Grille
3	Bolt M6×20	16	CVT Driven Pulley	29	CVT Intake Pipe 2
4	CVT Outer Cover (Noise-Reduction Type)	17	CVT Drive Pulley	30	Type A worm drive hose clamp 80
5	CVT outer cover gasket	18	Bolt M6X28	31	CVT Intake Pipe Connector 2
6	Sound-absorbing foam	19	CVT inner cover assembly	32	Type A worm drive hose clamp 100
7	Sound-absorbing foam retaining plate	20	O-ring seal	33	M6 × 16 Hex Flange Bolt

8	M5 × 12 Hex Flange Bolt	21	O-ring (30 × 3)	34	CVT Air Duct Connector Retaining Plate
9	Outer Cover Air Guide	22	CVT inner cover gasket I	35	CVT Air Duct Connector
10	Cross-Recessed Countersunk Screw, M5 × 16	23	Type A worm drive hose clamp 80	36	Type A worm drive hose clamp 110
11	CVT drive pulley bolt M12 × 1.25 × 142	24	CVT Intake Pipe Connector 1	37	CVT Air Duct
12	Flanged Bushing, 12x28x6	25	Type A worm drive hose clamp 80	38	Air Inlet Grille
13	CVT driven pulley bolt	26	CVT Intake Pipe 1		

3.10.5 Inspecting and adjusting

3.10.5.1 Checking the CVT system

1. Inspect the CVT air intake cleaner screen.



a. It is recommended that the CVT air intake cleaner screens are inspected regularly. Inspect them as follows: there are 2 CVT air intakes, both located in front of the rear container.

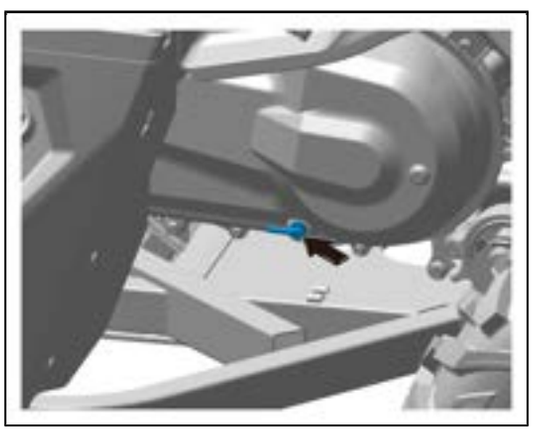
CAUTION:

- **Clean the CVT air outlet cleaner screen. Replace the air outlet cleaner screen if necessary.**

2. Dry the CVT.

CAUTION:

- **In some cases, water may accidentally enter the CVT system. Dry the system before operating the vehicle.**



a. Remove the clutch drain plug.

b. Allow the water to drain, then refit the drain plug.

c. Place the transmission in “P” and apply the parking brake lever.

d. Start the engine.

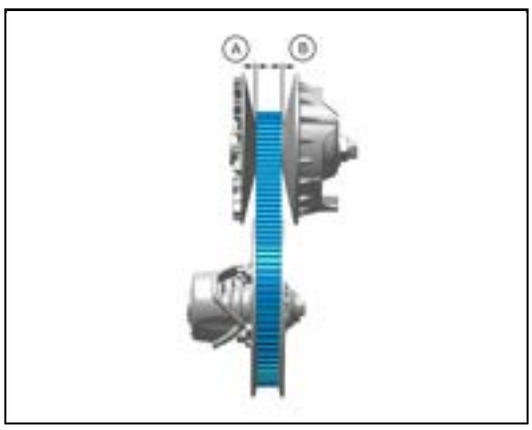
e. Vary the throttle opening for 10–15 seconds to expel moisture and air and to dry the belt and CVT. Do not hold the throttle fully open for more than 10 seconds.

f. Carry out a belt slip test. If the belt slips, repeat the procedure.

g. If the vehicle requires servicing, contact a Segway dealer for assistance.

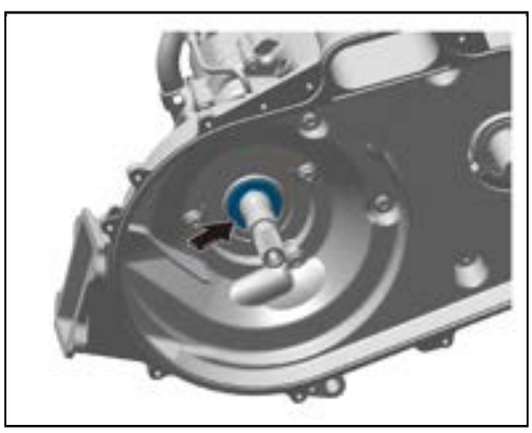
3.10.5.2 CVT Clearance Check and Adjustment

1. Inspecting the CVT clearance



a. Remove the CVT outer cover and check the clearance between the drive belt and the movable sheave.
   - Clearances A and B are visually confirmed.
   - Clearance A must be significantly smaller than clearance B.

2. CVT clearance adjustment



a. If the driven pulley is offset outwards, remove the driven pulley, remove the shim (s), reinstall the driven pulley, and recheck the clearance between the drive pulley and drive belt. After adjustment, clearance B must exist, and clearance A must be significantly smaller than clearance B (Gap inspection as shown in the above figure).

b. If the driven pulley is offset inwards, remove the driven pulley and add an shim. Refit the driven pulley and check that the clearance between the drive pulley and the drive belt is correct.

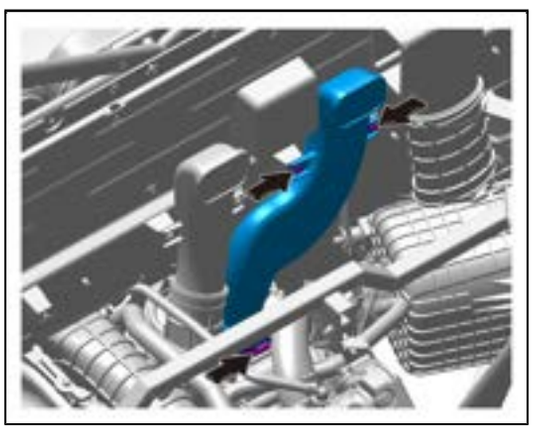
CAUTION:
• The drive pulley cannot be adjusted.

3.10.6 Repair Procedure Guidance

3.10.6.1 CVT Intake Pipe 1

Removal Procedure

1. Removing CVT air intake duct 1



a. Disconnect the oil hose and loosen the clamp securing CVT air intake duct 1.

b. Remove the 2 retaining bolts securing CVT air intake duct 1, then remove the duct.



c. Loosen the retaining clip on CVT air intake duct connector 1 and detach the connector 1.

Installation Procedure

1. Install CVT air intake duct 1 in the reverse order of removal, observing the following points:

   a. When installing the air duct, ensure it is fully seated and that all clips and connections are securely engaged. Improper connection, misalignment, or inadequate sealing may result in insufficient airflow, overheating, abnormal noise, or leaks, thereby impairing CVT cooling and operation.

3.10.6.2 CVT Intake Pipe Connector 1

Removal Procedure

1. To remove the CVT air intake duct 1, See: CVT Intake Pipe 1.
2. Removing CVT air intake duct connector 1



a. Loosen the retaining clip on CVT air intake duct connector 1 and detach the connector 1.

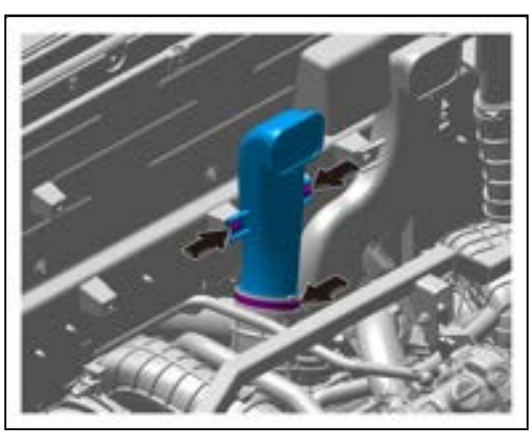
Installation Procedure

1. Install CVT air intake duct connector 1 in the reverse order of removal, noting the following:
   a. When installing the air duct, ensure it is fully seated and that all clips and connections are securely engaged. Improper connection, misalignment, or inadequate sealing may result in insufficient airflow, overheating, abnormal noise, or leaks, thereby impairing CVT cooling and operation.

3.10.6.3 CVT Intake Pipe 2

Removal Procedure

1. Removing CVT air intake duct 2



a. Loosen the clamp securing CVT air intake duct 2.

b. Remove the 2 retaining bolts securing CVT air intake duct 2, then remove the duct.

Installation Procedure

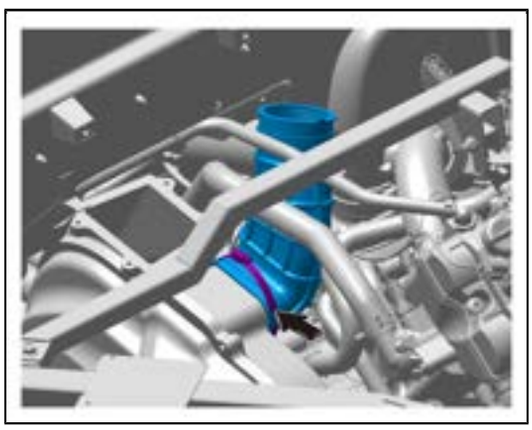
1. Install CVT air intake duct 2 in the reverse order of removal, observing the following points:
   a. When installing the air duct, ensure it is fully seated and that all clips and connections are securely engaged. Improper connection, misalignment, or inadequate sealing may result in insufficient airflow, overheating, abnormal noise, or leaks, thereby impairing CVT cooling and

operation.

3.10.6.4 CVT Intake Pipe Connector 2

Removal Procedure

1. To remove the CVT air duct, See: CVT Air Duct.
2. To remove the CVT air duct connector, See: CVT Air Duct Connector.
3. To remove the CVT air intake duct 2, See: CVT Intake Pipe 2.
4. Removing CVT air intake duct connector 2



a. Loosen the retaining clip on CVT air intake duct connector 2 and detach the connector.

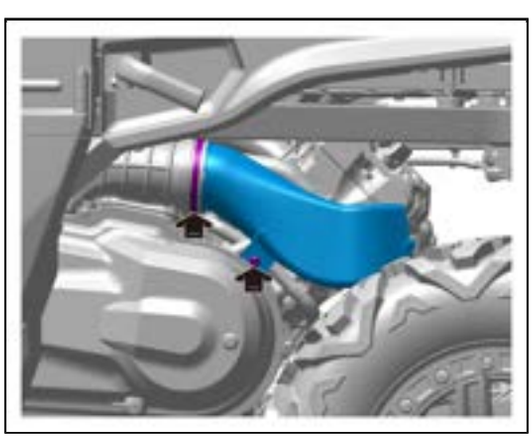
Installation Procedure

1. Install CVT air intake duct connector 2 in the reverse order of removal, noting the following:
   a. When installing the air duct, ensure it is fully seated and that all clips and connections are securely engaged. Improper connection, misalignment, or inadequate sealing may result in insufficient airflow, overheating, abnormal noise, or leaks, thereby impairing CVT cooling and operation.

3.10.6.5 CVT Air Duct

Removal Procedure

1. Removing the CVT air duct



a. Remove the CVT air duct retaining bolt.

b. Loosen the clamp securing the CVT air duct, then remove the duct.

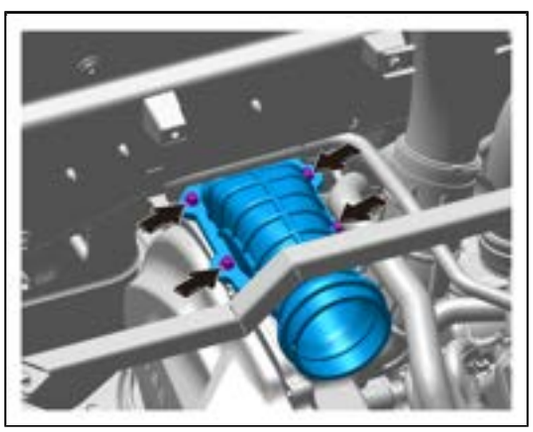
Installation Procedure

1. **Install the CVT air duct in the reverse order of removal, noting the following:**
   a. When installing the air duct, ensure it is fully seated and that all clips and connections are securely engaged. Improper connection, misalignment, or inadequate sealing may result in insufficient airflow, overheating, abnormal noise, or leaks, thereby impairing CVT cooling and operation.

3.10.6.6 CVT Air Duct Connector

Removal Procedure

1. **To remove the CVT air duct,** See: CVT Air Duct.
2. **Removing the CVT air duct connector**



a. Remove the 4 mounting bolts and remove the CVT air duct connector.

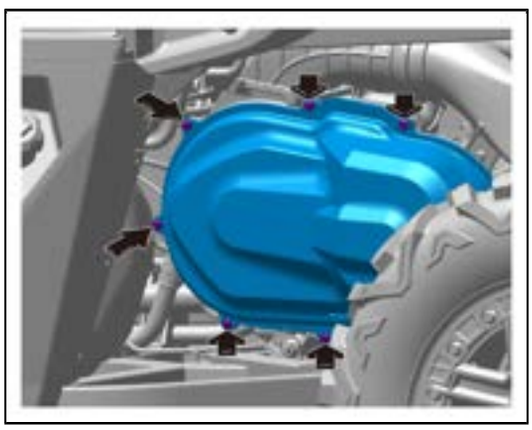
Installation Procedure

1. **Install the CVT air duct connector in the reverse order of removal, noting the following:**
   a. When installing the air duct, ensure it is fully seated and that all clips and connections are securely engaged. Improper connection, misalignment, or inadequate sealing may result in insufficient airflow, overheating, abnormal noise, or leaks, thereby impairing CVT cooling and operation.

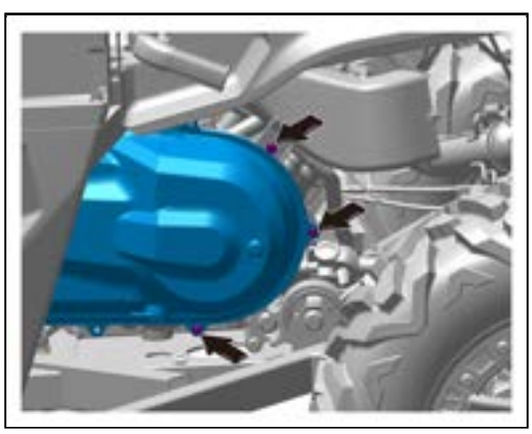
3.10.6.7 CVT Outer Cover

Removal Procedure

1. Removing the CVT outer cover



a. Remove the 6 CVT outer cover retaining bolts.

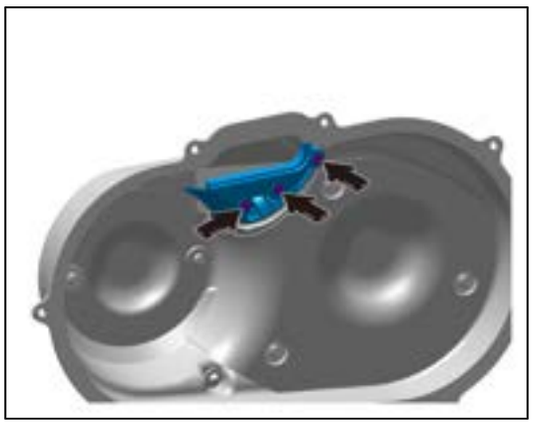


b. Remove the 3 CVT outer cover retaining bolts.

c. Remove the CVT Outer Cover.



d. Remove CVT outer cover gasket.



e. Remove the 3 screws securing the CVT outer cover air guide, then remove the air guide.



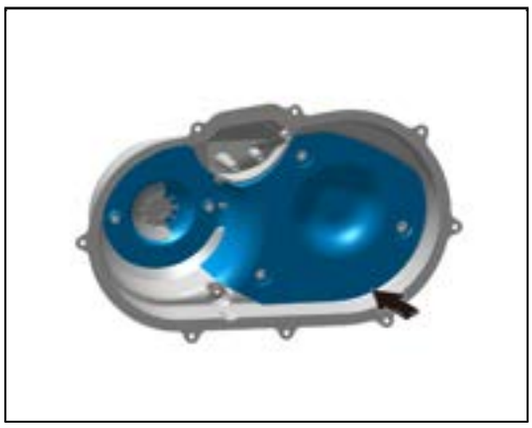
f. Remove the 5 screws securing the sound-absorbing foam retaining plate, then remove the retaining plate.



g. Remove the sound-absorbing foam.

Installation Procedure

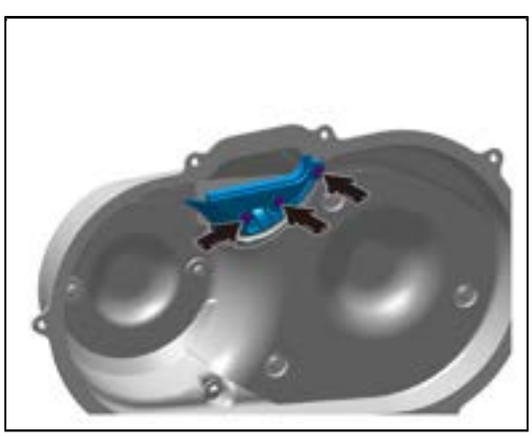
1. Installing the CVT outer cover



a. Install the sound-absorbing foam.



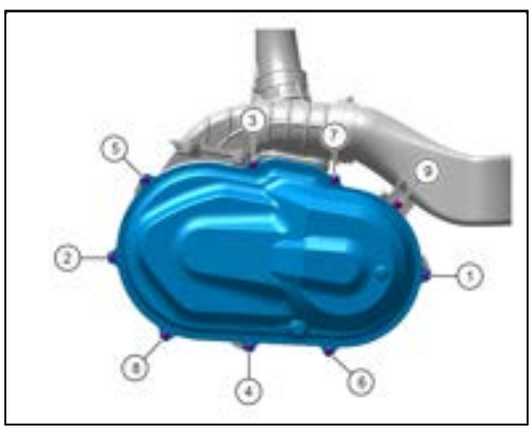
b. Install the sound-absorbing foam retaining plate and the 5 retaining screws.



c. Install the CVT outer cover air guide and the 3 retaining screws.



d. Install CVT outer cover gasket.



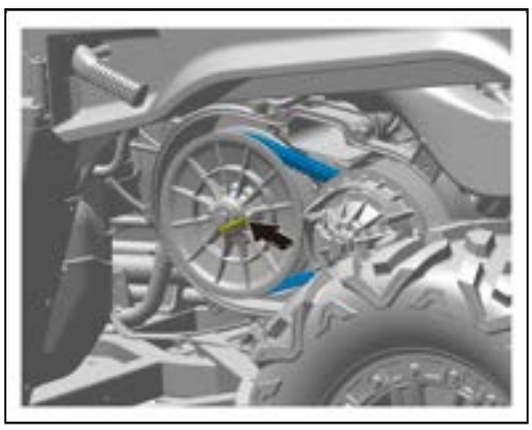
e. Install the CVT outer cover. Tighten the 9 retaining bolts in the sequence shown in the illustration.

Torque: 8.8 ft-lbs (12N·m).

3.10.6.8 CVT Drive Belt

Removal Procedure

1. To remove the CVT outer cover, See: CVT Outer Cover.
2. Removing CVT drive belt



a. Using the driven pulley pushrod, engage the hole in the driven pulley as shown to open the driven sheave, then remove the CVT drive belt.

SST: CVT driven pulley pushrod bolt (E01-E200001-000-00).

NOTICE:

- Before removing the drive belt, note the direction of the markings on the belt, such as the manufacturer's name and arrow marks, so that the belt can be refitted to the driven pulleys in its original direction of rotation.
- Clean the CVT compartment thoroughly and ensure that no swarf or other foreign matter remains.

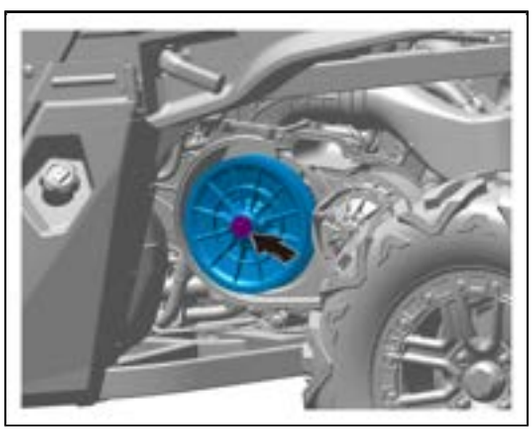
Installation Procedure

1. Install the CVT drive belt in the reverse order of removal.

3.10.6.9 CVT Driven Pulley

Removal Procedure

1. To remove the CVT outer cover, See: CVT Outer Cover.
2. To remove the CVT drive belt, See: CVT Drive Belt.
3. Removing the CVT driven pulley



a. Using the appropriate tool, hold the CVT driven pulley stationary. Remove the movable sheave retaining bolt by turning it anticlockwise, then remove the flanged bush (10.5 × 36 × 8) and the movable sheave.

Torque: 55.3~62.7 ft-lbs (75~85N·m).



b. Remove the CVT shim.

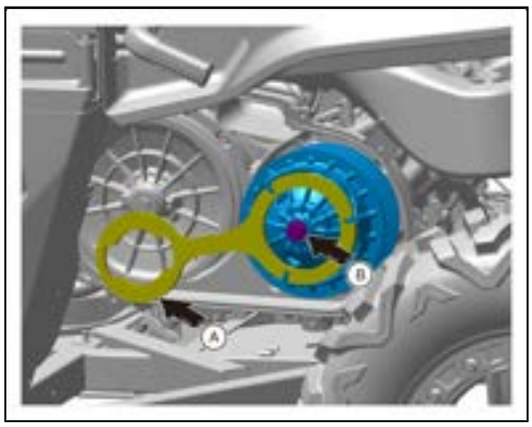
Installation Procedure

1. Install the CVT driven pulley in the reverse order of removal.

3.10.6.10 CVT Drive Pulley

Removal Procedure

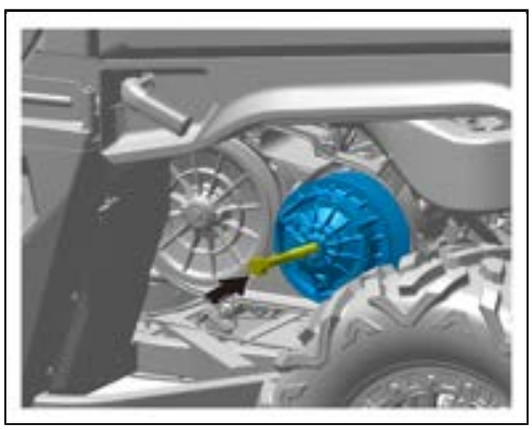
1. To remove the CVT outer cover, See: CVT Outer Cover.
2. To remove the CVT drive belt, See: CVT Drive Belt.
3. Removing the CVT drive pulley



a. Remove the CVT drive pulley bolt, M12 × 1.25 × 142, and the flanged bush, 12 × 28 × 6.

Torque: 59 ft-lbs (80N·m).

NOTICE:
• Caution: This bolt features a left (Left) thread. Turn clockwise to loosen and counter-clockwise to tighten. Do not apply standard right thread procedures to prevent thread damage.



b. Use the SST to detach and remove the drive pulley.

SST: CVT drive pulley pushrod (E01GZ0000008)

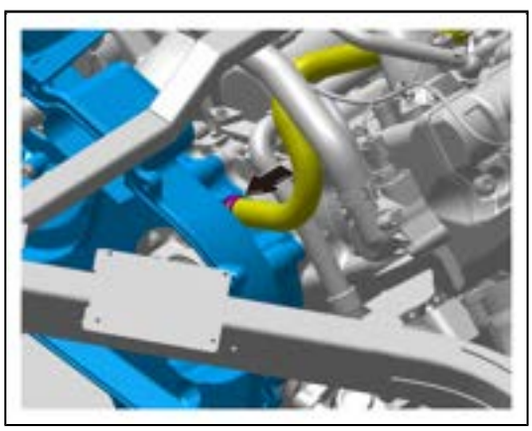
Installation Procedure

1. Install the CVT drive pulley in the reverse order of removal.

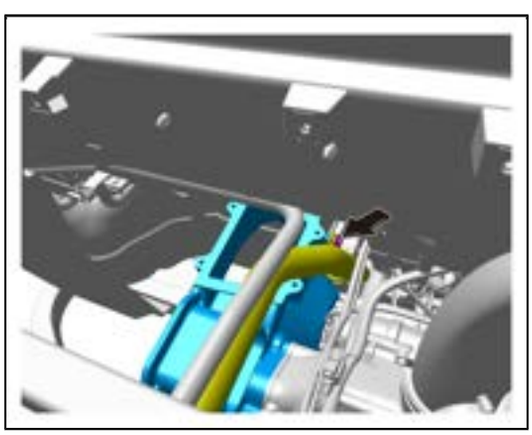
3.10.6.11 CVT inner cover assembly

Removal Procedure

1. To remove the CVT air duct, See: CVT Air Duct.
2. To remove the CVT air duct connector, See: CVT Air Duct Connector.
3. To remove the CVT air intake duct 2, See: CVT Intake Pipe 2.
4. Remove CVT air intake duct connector 2, See: CVT Air Duct Connector 2.
5. To remove the CVT outer cover, See: CVT Outer Cover.
6. To remove the CVT drive belt, See: CVT Drive Belt.
7. To remove the CVT driven pulley, See: CVT Driven Pulley.
8. To remove the CVT drive pulley, See: CVT Drive Pulley.
9. Removing the CVT inner cover assembly

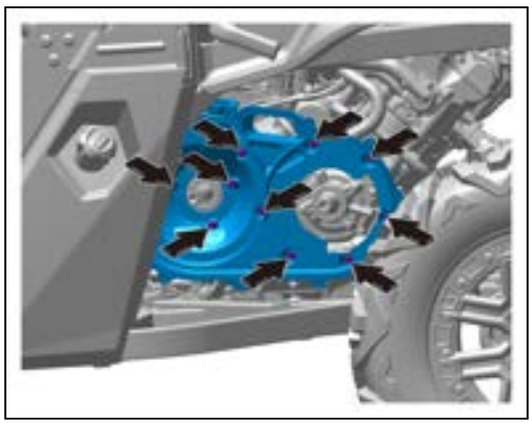


a. Release the retaining clamp and disconnect the crankcase breather hose.



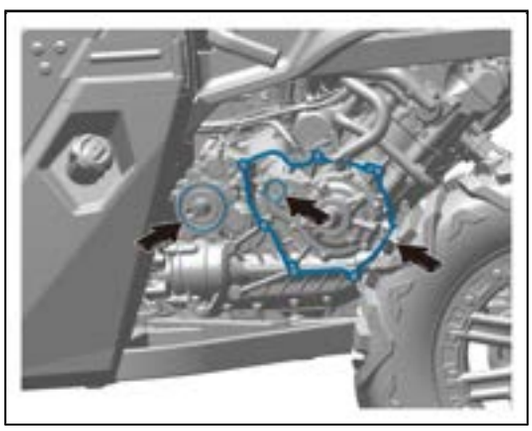
b. Remove the engine coolant outlet hose bracket retaining bolt.

c. Disconnect the engine coolant outlet hose together with its bracket.



d. Remove the 10 CVT inner cover retaining bolts.

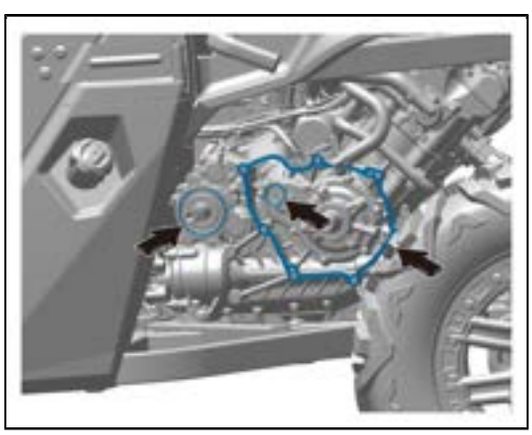
e. Remove the CVT inner cover assembly.



f. Remove the three CVT inner cover seals.

Installation Procedure

1. Installing the CVT inner cover assembly



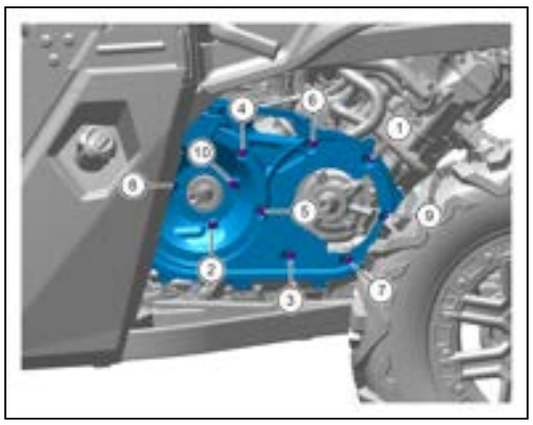
a. Install the 3 CVT inner cover seals.

NOTICE:

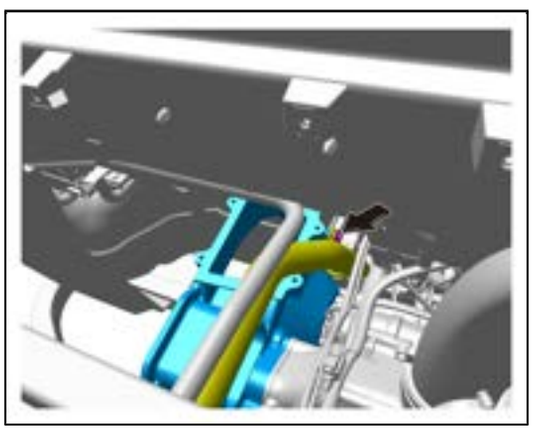
- The seal is a single-use part and must be replaced with a new one after removal.

CAUTION:

- Thoroughly clean the sealing face of the CVT inner cover assembly and remove all residue.

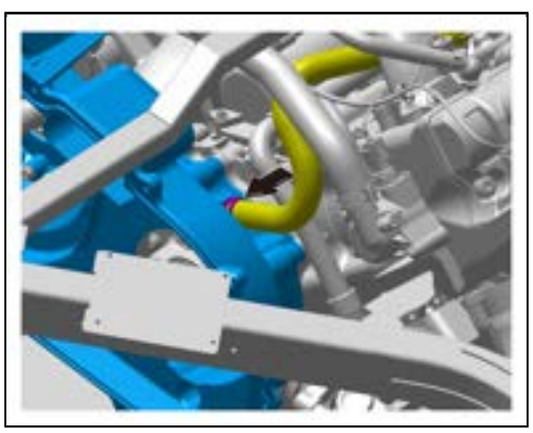


b. Install CVT inner cover assembly and tighten the 10 mounting bolts in the illustrated sequence.



c. Install the engine coolant outlet hose together with its bracket.

d. Install the engine coolant outlet hose bracket retaining bolt.



e. Connect the crankcase breather hose and secure it with the retaining clamp.

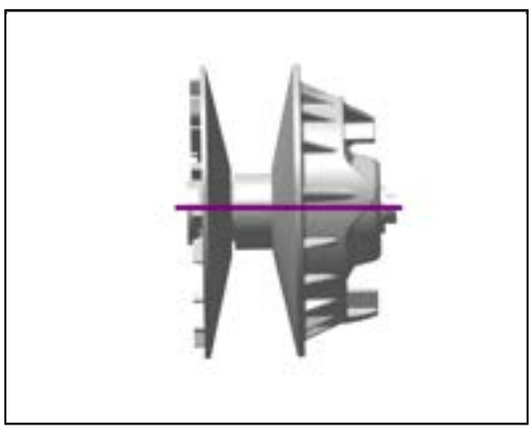
2. Install the CVT outer cover assembly in the reverse order of removal.

3.10.7 Disassembly and Reassembly

3.10.7.1 CVT Drive and Driven Pulleys – Disassembly and Reassembly

CVT Drive Pulley

1. To remove the CVT outer cover, See: CVT Outer Cover.
2. To remove the CVT drive belt, See: CVT Drive Belt.
3. To remove the CVT drive pulley, See: CVT Drive Pulley.
4. Drive pulley disassembly



a. Make match marks using a marker.

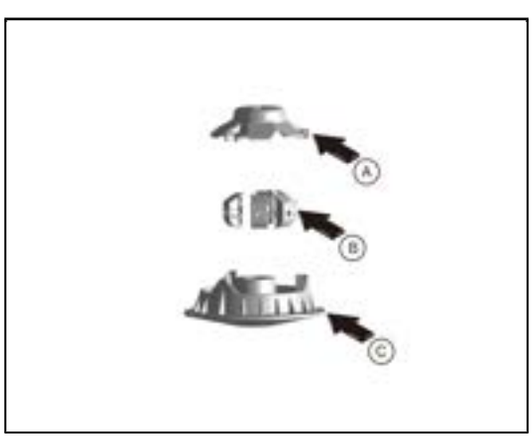
CAUTION:
• The match marks should include the entire drive pulley assembly.



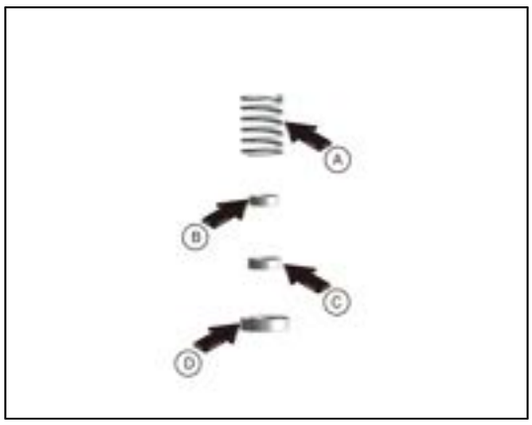
b. Use SST A to hold the drive pulley, and use a wrench to remove the retaining nut B.

SST: CVT pulley holding wrench (E01GZ0000011)

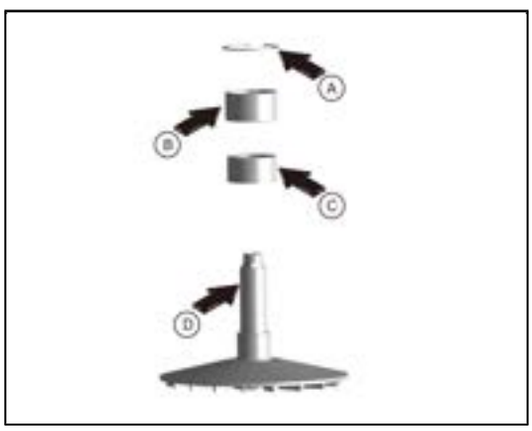
CAUTION:
• This operation requires two persons. • Ensure the drive pulley holding tool is securely fitted, and take care to prevent slipping.



c. Remove thrust plate assembly A, housing assembly B, and movable sheave C in sequence.

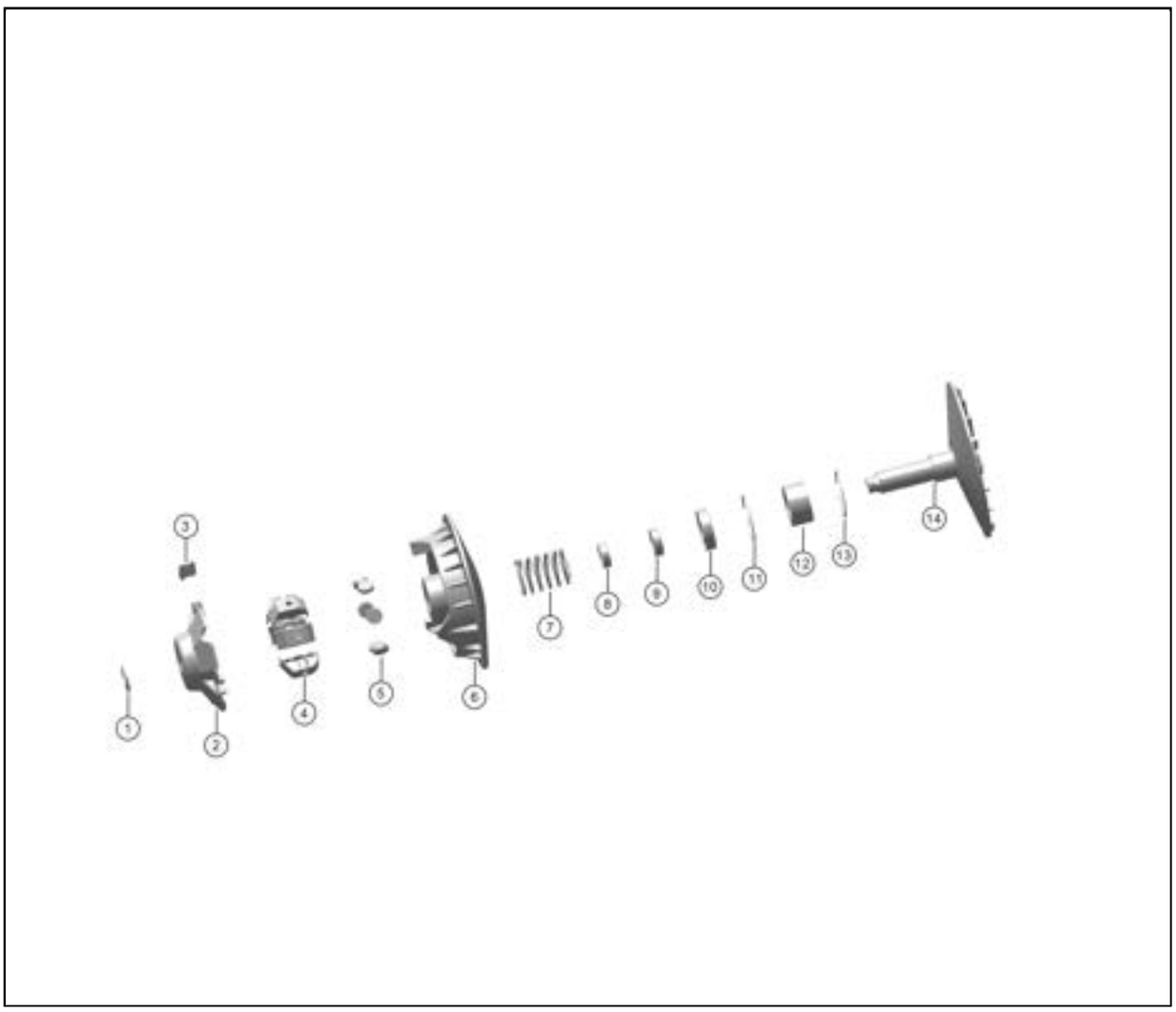


d. Remove spring A, speed limiter washer B, washer C, and spring seat D in sequence.



e. Remove bearing washer A, bearing outer race B, bearing outer race C, and fixed sheave D in sequence.

f. Disassemble as shown in the illustration below.



1	Nut	8	Speed limiter washer
2	Thrust plate	9	Washer
3	Slider.	10	Spring seat
4	Centrifugal weight housing.	11	Bearing washer
5	Centrifugal weight	12	Bearing
6	Movable sheave	13	Bearing washer
7	Spring	14	Fixed sheave

5. Drive pulley inspection



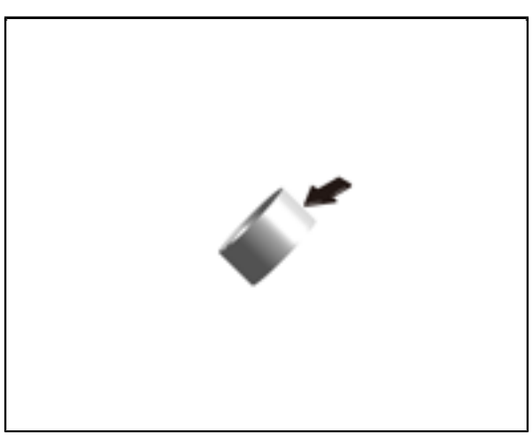
a. Use a 1 mm feeler gauge to measure the clearance between the guide bush and the thrust plate. If the clearance is greater than 1 mm, the guide bush must be replaced.

CAUTION:
• All 3 guide bushes must be replaced at the same time.



b. Check the housing for wear marks A.

CAUTION:
• Replace the housing if wear marks are evident. • The allowable wear limit B of the housing is less than 14 mm. • All 6 centrifugal weights must be replaced at the same time.



c. Inspect the bearing by performing a rotation test and visual inspection to confirm if there is any abnormal noise or binding. If present, the bearing must be replaced.

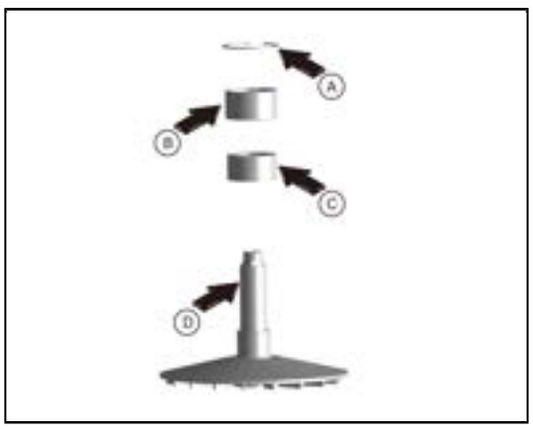


d. Wipe the bushing of the movable sheave with a microfiber towel or dry cloth.

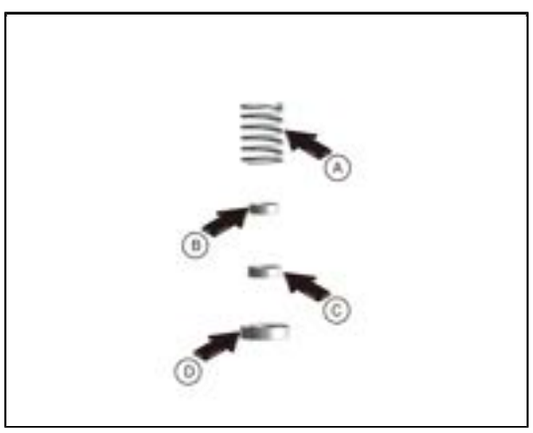
CAUTION:

- **Do not use acetone to clean the bushing.**

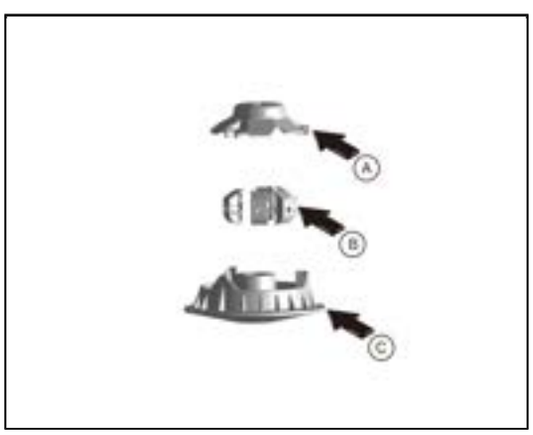
6. Drive pulley installation



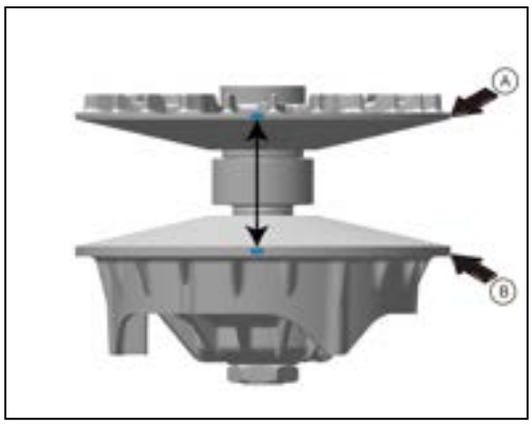
a. Install fixed sheave D, bearing outer race C, bearing outer race B, and bearing washer A in sequence.



b. Install spring seat D, washer C, speed limiter washer B, and spring A in sequence.



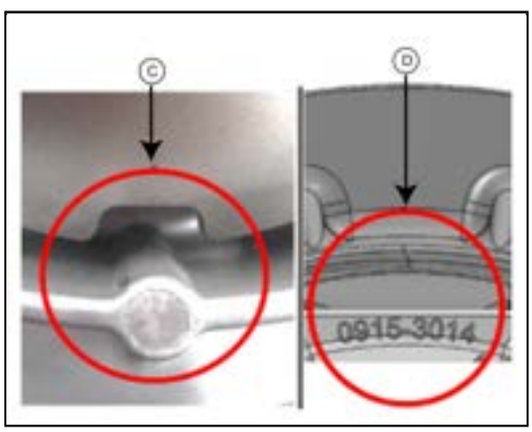
c. Install movable sheave C, housing assembly B, and thrust plate assembly A in sequence.



d. Rotate fixed sheave A and movable sheave B to align the 2 notches or square cutouts C on fixed sheave A and movable sheave B, or with the part number D on the bushing, to ensure the balance of the drive pulley.

CAUTION:

- **Ensure the drive pulley is correctly installed in place according to the assembly marks.**





e. Use SST A to hold the drive pulley, and tighten the retaining nut B with a torque wrench.

Torque: 132 ft-lbs (180N·m).

SST: CVT pulley holding wrench (E01GZ0000011)

CAUTION:

- **This operation requires two persons.**
- **Ensure the SST are securely installed and be careful of slipping.**

7. To install the CVT drive pulley, See: CVT Drive Pulley.
8. To install the CVT drive belt, See: CVT Drive Belt.
9. To install the CVT outer cover, See: CVT Outer Cover.

CVT Driven Pulley

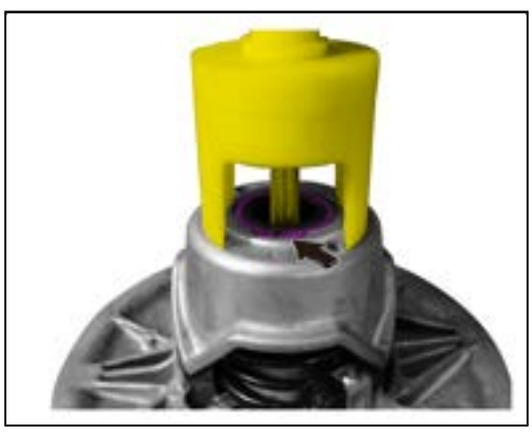
1. To remove the CVT outer cover, See: CVT Outer Cover.
2. To remove the CVT drive belt, See: CVT Drive Belt.
3. To remove the CVT driven pulley, See: CVT Driven Pulley.
4. Driven pulley disassembly



a. Install the driven pulley onto the SST as shown, screw the bar onto the threaded rod, and press down the spring seat (maximum 3~4 mm) to release the external circlip.

SST: CVT driven pulley disassembly tool (E01GZ0020001)

CAUTION:
• Apply match marks before disassembly.



b. Remove the external circlip using circlip pliers.



c. Slowly loosen the threaded rod upwards to release the spring tension.

CAUTION:
• Use the SST to keep the driven pulley compressed while disassembling the spring seat. • After removing the external circlip, unscrew the SST to slowly lift the spring seat off the driven pulley.

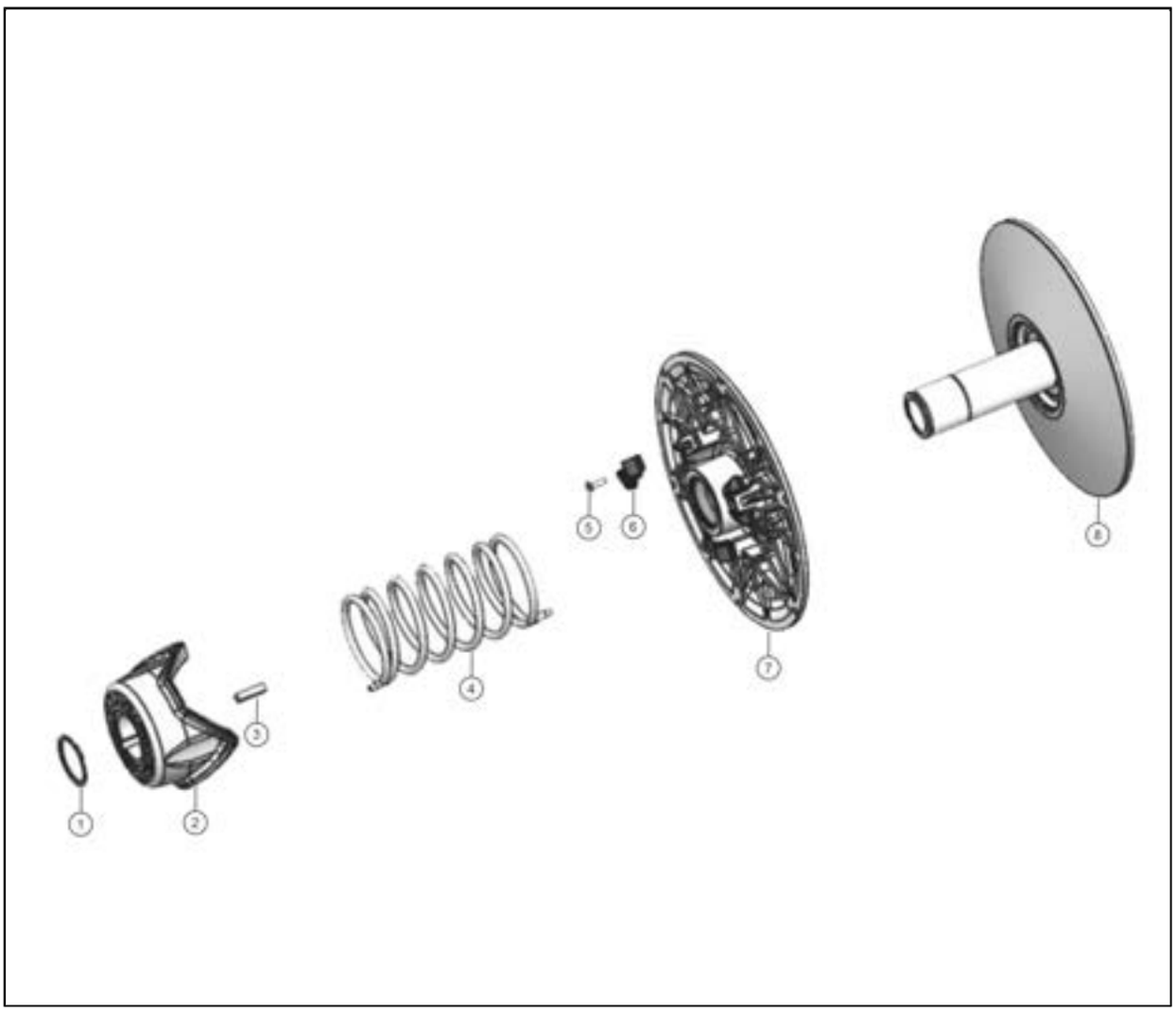


d. Remove torque cam A, key, spring B, movable sheave C, and fixed sheave D in order.



e. Remove the 3 retaining screws from the movable sheave and remove the 3 slide pieces.

f. Disassemble as shown in the illustration below.



1	Retaining ring	5	Screw
2	Torque cam	6	Slide Pieces
3	Key	7	Movable sheave
4	Spring	8	Fixed sheave

5. Driven pulley inspection



a. Check the spring for deformation and reduced free length.



b. Inspect the slide pieces for excessive wear.

CAUTION:
• All 3 slide pieces must be replaced as a set.

6. Driven pulley installation



a. Install the 3 slide pieces and tighten the 3 retaining screws on the movable sheave.



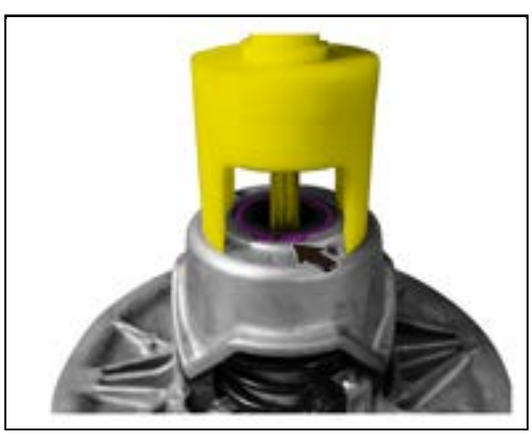
b. Assemble fixed sheave D, movable sheave C, spring B, torque cam A, and key in order.



c. Place the driven pulley on the SST, align the match marks, and slowly compress the spring.

SST: CVT driven pulley disassembly tool (E01GZ0020001)

CAUTION:
• Ensure the driven pulley is installed correctly according to the alignment marks.



d. Install the external circlip using snap ring pliers.

CAUTION:
• Ensure the external circlip is fully seated in its groove. • Inspect the external circlip for damage; replace with a new one if damaged.



e. Slowly loosen the threaded rod upwards to release spring tension, and remove the SST.

7. To install the CVT driven pulley, CVT Driven Pulley.
8. To install the CVT drive belt, See: CVT Drive Belt.
9. To install the CVT outer cover, See: CVT Outer Cover.

4.1 Front Axle Assembly

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4.1.1 Specifications

4.1.1.1 Fastener Specifications

Item	Torque (N·m)	Torque (ft-lbs)	Notes
Front Axle End Cover Hex Flange Bolt M8×25	24	17	\
Differential Cover Hex Flange Bolt M10×1.0×18	70	49	L
Breather union.	15	11.1	L
Round Nut M75 × 1.5 × 6-LH	70	49	\
Front Axle Shift Motor Mounting Bolt, M6 × 16	10	7	\
Filler Plug M14	18	13.3	O
Drain Plug Assembly M14	18	13.3	O
Selector Fork Hex Socket Flat Point Grub Screw M8×8	12	9	L
Front Axle Assembly Side Bolt M8×90	20～26	14.7～19	\
Front Axle Assembly Lower Mounting Bolt, M10 × 1.25 × 20	40～50	29.5～36.9	\
mounting bolt (M6×16)	10	7	\

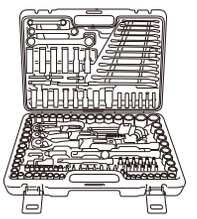
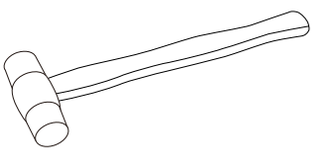
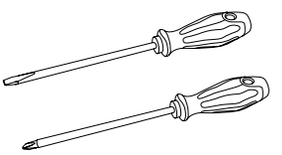
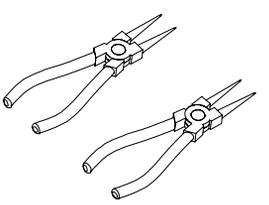
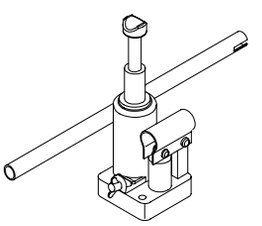
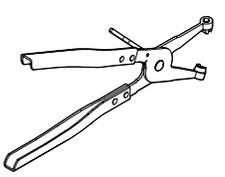
- G: Apply grease to oil seals and O-rings
- L: Apply thread-locking fluid
- O: Apply lubricating oil
- SS: Apply silicone sealant
- R: Replace component (single-use part)

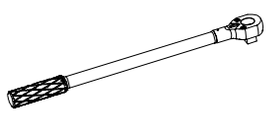
4.1.1.2 Service Specifications

Item	Specifications
Gear oil specification	SAE 80W-90GL-5
Gear oil capacity	260 ml (gear oil change only)
	280 ml (after overhaul/internal cleaning)
Filler location	Side
Drain location	Bottom
Bevel Gear Backlash	0.15～0.25 mm

4.1.2 Service Tools

4.1.2.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)
2	Rubber mallet		Rear axle assembly removal and installation
3	Screwdriver		Removing screws
4	Circlip Pliers		Removing and installing circlips
5	Jack		Lifting the Vehicle
6	Hose Clamp Pliers		Removing and installing hose clamps

Item No.	Tool Description	Tool Diagram	Purpose/Use
7	Oil seal puller		Removing the oil seal
8	Gear oil filling pump		Filling with gear oil
9	Torque Wrench		Tightening bolts and nuts to the specified torque

4.1.2.2 Special Service Tools (SSTs) and Equipment

Item No.	Tool Number	Tool Description	Tool Diagram	Purpose/Use
1	/	Input Shaft Oil Seal Installer		Installing the input shaft oil seal
2	/	Front Differential Housing Bearing Installer		Installing the front differential housing bearing
3	/	Input Shaft Gear Locknut Tool		Input Shaft Gear Locknut Removal/ Installation Tool

Item No.	Tool Number	Tool Description	Tool Diagram	Purpose/Use
4	/	Bearing Bush II Drift		Installing bearing bush II
5	/	Output Shaft Oil Seal		Output Shaft Oil Seal
6	/	Front Differential Housing Small Bearing Drift		Front Differential Housing Small Bearing Drift
7	/	Pinion Bearing Installer		Installing the pinion bearing
8	/	Front Axle Cover Bearing Installer		Installing the front axle cover bearing
9	/	Limit Bush Installer		Installing the limit bush

Item No.	Tool Number	Tool Description	Tool Diagram	Purpose/Use
10	/	Fixture Base		Casing Holding Fixture
11	/	Holding fixture		Cover Holding and Oil Seal Driver

4.1.3 Description and Operation

4.1.3.1 Warnings and Precautions

1. When inspecting the front axle, place the vehicle on level, dry ground.
2. Bolts and nuts for all components must be tightened to the specified torque.
3. If any mounting bolt or nut is found to be damaged during servicing, replace it immediately.
4. Before driving, check the vehicle for safe operating condition and start the vehicle only after confirming that there are no safety hazards.
5. Use only the specified gear oil. Do not mix with other types of oil or use substitute fluids, as this may affect front axle performance and durability.
6. After disassembling the front axle assembly, protect all parts to prevent contamination.
7. Operating the vehicle with insufficient, deteriorated or contaminated gear oil will cause accelerated wear and may result in front axle damage, an accident or personal injury.
8. Dispose of drained waste oil in accordance with local regulations.
9. If a part is specified as a single-use part, replace it with a new one after removal. Do not reuse it.
10. Failure to replace defective parts promptly may cause abnormal wear of other parts and increase the overall front axle temperature, thereby shortening its service life.
11. Do not disassemble the front axle unless an internal fault is suspected. Before disassembly, the operation should be carried out under the guidance of qualified personnel. Improper procedures will shorten the service life of the front axle and, in severe cases, may render it unserviceable.
12. Before carrying out inspection or repair work, ensure that personnel are wearing appropriate personal protective equipment, such as safety footwear, work gloves and safety goggles.
13. During inspection and repair, always follow the relevant instructions and standard procedures. Read the applicable instructions carefully before using workshop equipment and SST.

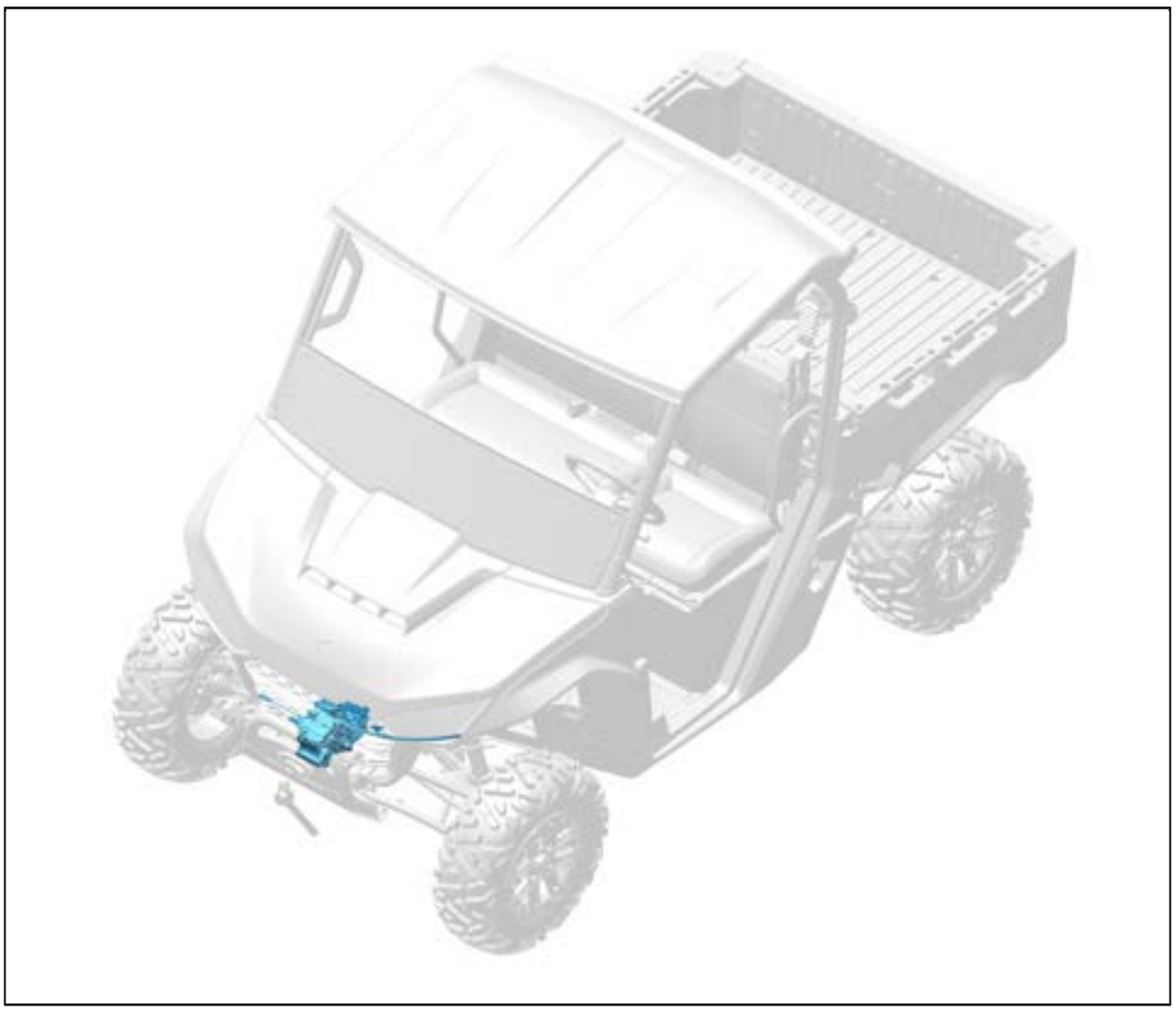
4.1.3.2 System Description

1. System description.
   a. Through the crown wheel and pinion assembly, the system accurately and efficiently reduces speed and increases torque, increases speed and reduces torque, changes the direction of drive, or distributes power.
   b. The differential allows the wheels on both sides to rotate at different speeds, ensuring that the inner and outer wheels turn at different speeds when cornering.
2. Composition
   a. Primarily consists of the front differential housing, front axle housing, front axle end cover, differential pinion gear gears, and the bevel gear set.

4.1.4 Component Location and Exploded View

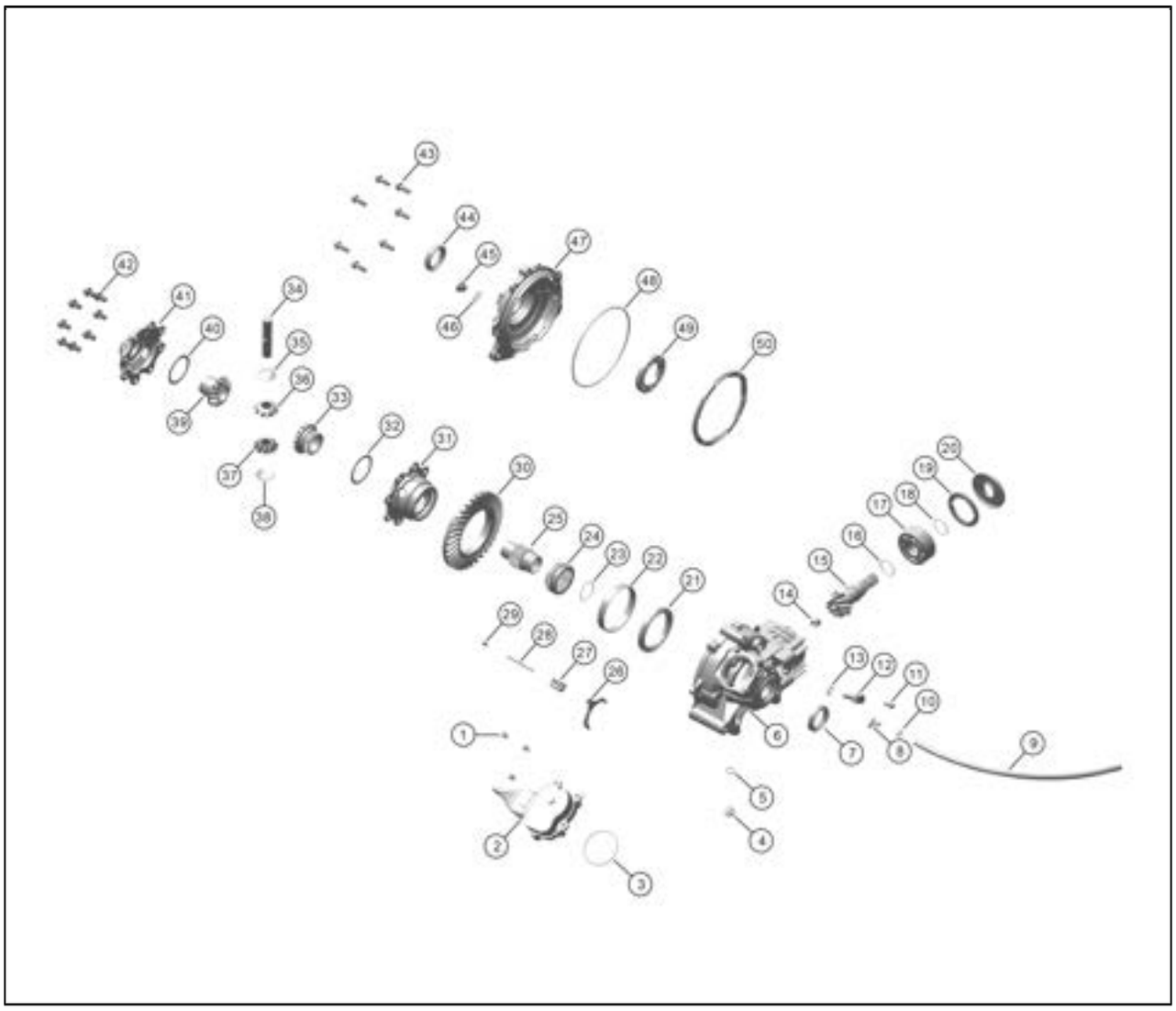
4.1.4.1 Component Location Diagram

Front Axle Assembly System



4.1.4.2 Exploded View Diagram

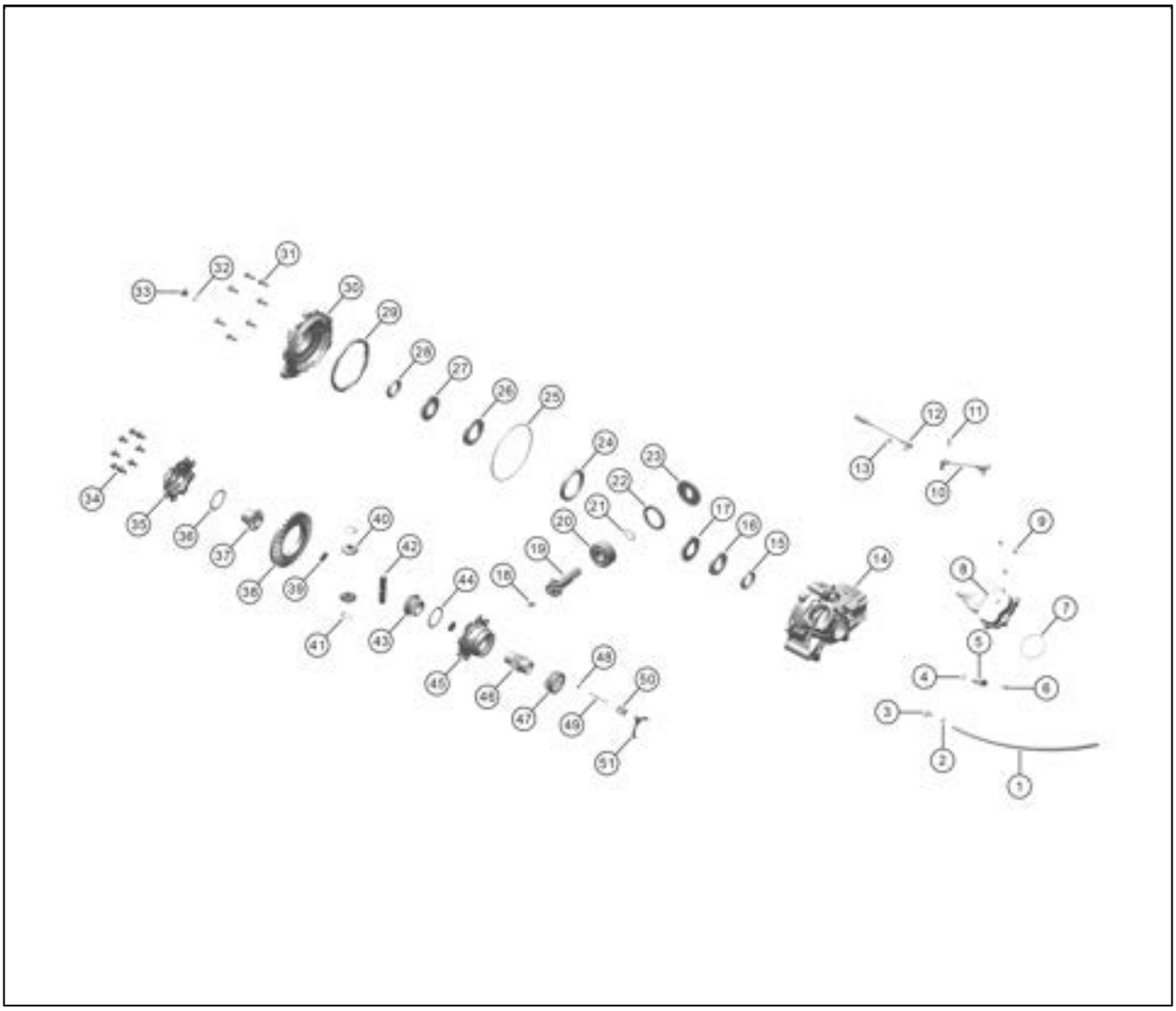
Front Axle Assembly (Models Without ABS)



1	Bolt M6×16	18	External Circlip 30	35	Pinion gear thrust washer
2	Front Axle Shift Motor Assembly	19	Round Nut M75 × 1.5 × 6-LH	36	Pinion gear
3	O-ring (67.9*2.2)	20	Oil Seal 30 × 45 × 6.5	37	Pinion gear
4	Plug Assembly M14	21	Deep-Groove Ball Bearing 16008	38	Pinion gear thrust washer
5	O-ring (13.8 × 2.5)	22	Bearing Bush I (φ97)	39	Differential Side Gear I Assembly
6	Front Axle Housing	23	Washer 40.2 × 50 × 3	40	Side gear thrust washer
7	Oil Seal 38 × 55 × 7	24	Coupling sleeve	41	Differential cover
8	Breather union.	25	Half-Shaft Output Sleeve Assembly	42	Hex Flange Bolt M10 × 1.0 × 18

9	Vent Hose	26	Selector Fork	43	M8 × 25 Hex Flange Bolt
10	Spring Band Hose Clip (11 mm)	27	Shift Rack	44	Oil Seal 38 × 55 × 7
11	Bolt M6×16	28	Selector Fork Shaft (5×65)	45	Threaded Plug M14
12	Vehicle speed sensor assembly	29	Hex Socket Flat Point Grub Screw M8×8	46	O-ring (13.8 × 2.5)
13	O-Ring 12×2	30	Input and output bevel gear assembly	47	Front axle end cover
14	Bearing Bush II (φ15)	31	Differential case	48	Rectangular gasket.
15	Input and output bevel gear assembly	32	Side gear thrust washer	49	Deep-Groove Ball Bearing 16010
16	Drive Bevel Gear Shim	33	Differential side gearII	50	Stop pad.
17	Double-Row Angular Contact Ball Bearing 3306	34	Differential pinion shaft V		

Front Axle Assembly (Models With ABS)



1	Vent Hose	18	Bearing Bush II (φ15)	35	Differential cover
2	Spring Band Hose Clip (11 mm)	19	Input and output bevel gear assembly	36	Side gear thrust washer
3	Right-angle breather union.	20	Double-Row Angular Contact Ball Bearing 3306	37	Differential side gear I
4	O-Ring 12×2	21	External Circlip φ30	38	Input and output bevel gear assembly
5	Vehicle speed sensor assembly	22	Round Nut M75 × 1.5 × 6-LH	39	Sealing Plug
6	Bolt M6×16	23	Oil Seal 30 × 78 × 7	40	Pinion gear
7	O-ring (67.9 × 2.2)	24	Deep-Groove Ball Bearing 61815	41	Pinion gear thrust washer
8	Front Axle Shift Motor Assembly	25	Rectangular gasket.	42	Differential pinion shaft V

9	Bolt M6×16	26	Deep-Groove Ball Bearing 16010	43	Differential side gear II
10	Wheel Speed Sensor (90°)	27	ABS Reluctor Ring II (φ74)	44	Side gear thrust washer
11	Bolt M6×16	28	Oil Seal 38 × 55 × 7	45	Differential case
12	Wheel Speed Sensor (90°)	29	Stop pad.	46	Half-Shaft Output Sleeve
13	Bolt M6×16	30	Front axle end cover	47	Coupling sleeve
14	Front Axle Assembly	31	M8 × 25 Hex Flange Bolt	48	Hex Socket Flat Point Grub Screw M8×8
15	Oil Seal 38 × 55 × 7	32	O-ring (13.8 × 2.5)	49	Selector Fork Shaft (5×65)
16	Deep-Groove Ball Bearing 16008	33	Threaded Plug M14	50	Shift Rack
17	ABS Reluctor Ring II (φ74)	34	Hex Flange Bolt M10 × 1.0 × 18	51	Selector Fork

4.1.5 General Fault Diagnosis and Operation

4.1.5.1 Fault Symptom List

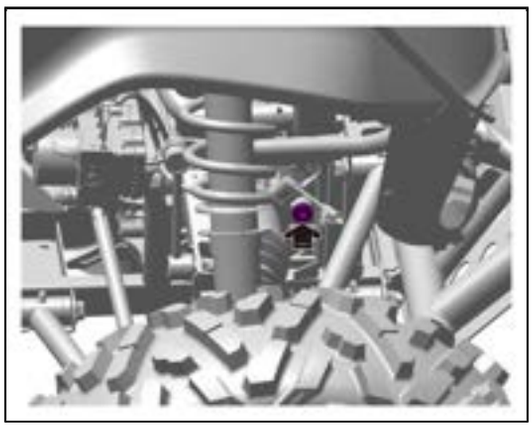
Use the table below to identify the cause of the fault. The numbers indicate the likelihood ranking of the cause. Inspect each component in order and replace as necessary.

Symptom(s)	Possible Causes	Recommended Repair Procedure
Abnormal Noise During Driving	1. Gear Oil (Insufficient)	Top Up Gear Oil to Correct Level
	2. Gear Oil (Incorrect Type)	Replace
	3. Differential Assembly (Damaged or Bearings at Both Ends Damaged)	Replace
	4. Differential Assembly (Excessive or Insufficient Clearance)	Adjust
	5. Crown Wheel and Pinion Assembly (Damaged or Excessively Worn)	Replace
Oil seepage or leakage during operation	1. Gear Oil (Excessive)	Drain Excess Gear Oil
	2. Vent Hose (Blocked)	Clear the Vent Hose
	3. Oil Seal (Damaged)	Replace
	4. Front Axle Assembly Mating Surface (Not Properly Sealed)	Apply Sealant and Reassemble
Front Axle Assembly Overheating	1. Gear Oil (Insufficient)	Top Up Gear Oil to Correct Level
	2. Crown Wheel and Pinion Assembly (Clearance Too Small)	Adjust
	3. Differential Assembly (Bearing Too Tight)	Adjust
	4. Oil Seal (Too Tight)	Adjust or Replace

4.1.6 Inspecting and adjusting

4.1.6.1 Checking the front axle assembly

1. Checking front axle gear oil level



a. Remove Oil Filler Plug and O-Ring. Check the distance from the gear oil surface to the filler neck. After inspection, replace with new Oil Filler Plug and O-Ring and tighten.

O-ring (13.8 × 2.5)

Torque: 11.8~14.8 ft-lbs (16~20N·m).

NOTICE:

- **Excessive or insufficient gear oil may cause system malfunction. Top up or drain gear oil as required.**

2. Routine Inspection of Front Axle Assembly

a. Rotate the input shaft; it should turn smoothly with uniform damping, no abnormal noise or binding. Pull the input shaft; no noticeable axial play or abnormal noise.

b. No oil leakage at Front Axle Assembly joints or oil seals.

c. Front Axle Housing free from damage; mounting holes have no deformation or cracks.

3. Inspect Front Axle Assembly After Disassembly

a. Gear teeth intact, no chipped teeth; tooth surfaces free from pitting, grooves, cracks, or deformation; surfaces bright with no burning or scoring.

WARNING:

- **Avoid disassembling the Front Axle Assembly if internal faults are uncertain.**
- **Disassembly should be guided by qualified personnel. Improper handling may reduce assembly lifespan or, in severe cases, render it scrap.**

b. Tapered Roller Bearings and Deep-Groove Ball Bearings: Inner and Outer Rings intact, no deformation.

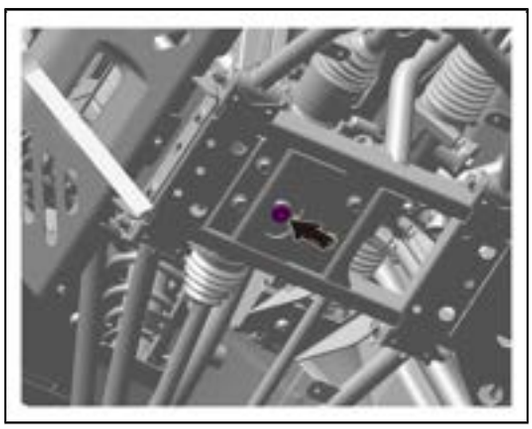
c. Bearing cages free from wear or deformation.

d. Bearing raceways free from scoring, grooves, deformation, or spalling.

e. Bearing rollers free from deformation, scoring, burning, or spalling.

4.1.6.2 Front Axle Gear Oil– Replacement

1. Front Axle Gear Oil– Replacement

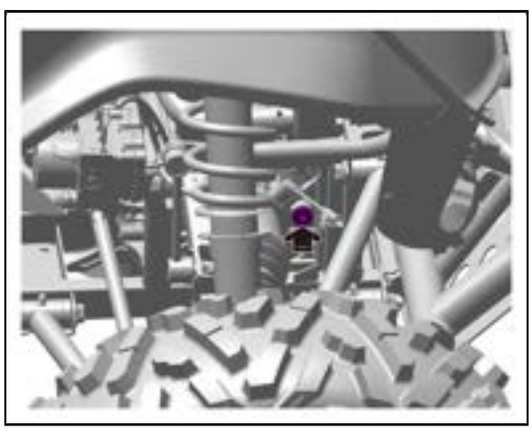


a. Park the vehicle on level ground and position a suitable container beneath the drain port to collect the oil.

b. Remove the drain plug and O-ring. Allow the old gear oil to drain for approximately 10 minutes. Once the flow reduces to drips, the draining is complete. Clean the area around the drain port, fit a new drain plug and O-ring, and tighten securely.

O-ring (13.8 × 2.5)

Torque: 11.8~14.8 ft-lbs (16~20N·m).



c. Remove the oil filler plug and O-ring, then top up with the specified quantity of gear oil through the filler port. After filling, fit a new oil filler plug and O-ring and tighten securely.

O-ring (13.8 × 2.5)

Specification: SAE 80W-90 GL-5

Capacity: 260ml

Torque: 11.8~14.8 ft-lbs (16~20N·m).

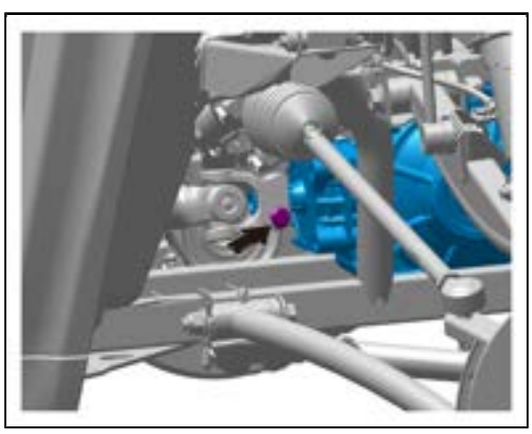
NOTICE:
• After filling, check for any gear oil leaks. • Dispose of drained waste oil in accordance with local regulations.

4.1.7 Repair Procedure Guidance

4.1.7.1 Front Axle Assembly

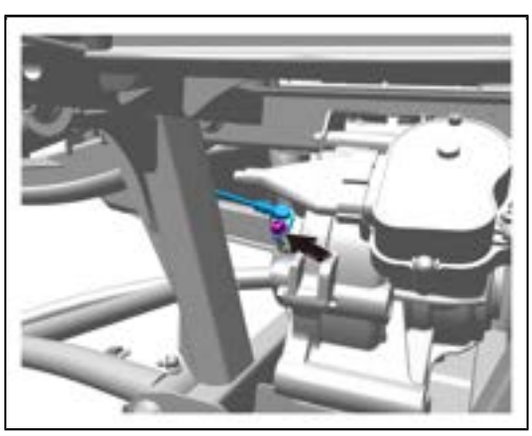
Removal procedure (method 1)

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the winch roller fairlead, See: Winch Roller Fairlead.
3. To remove the front bumper guard assembly, See: Front Bumper Guard Assembly.
4. To remove the front bumper welded assembly, See: Front Bumper Welded Assembly
5. To lift the vehicle, See: Vehicle Lifting and Lowering.
6. To remove the front wheel assembly, See: Wheel Assembly.
7. To drain front axle gear oil, See: Front Axle Gear Oil– Replacement.
8. To remove the wheel hub, See: Wheel Hub.
9. Remove front brake disc, See: Brake Disc.
10. To remove the front brake disc backplate, See: Front Brake Disc Backplate.
11. To remove the front steering knuckle, See: Front Steering Knuckle.
12. Remove front constant velocity (CV) drive shaft assembly, See: CV Axle Assembly.
13. Removing front axle assembly



a. Remove the M8 × 35 front axle assembly mounting bolt and spring washer.

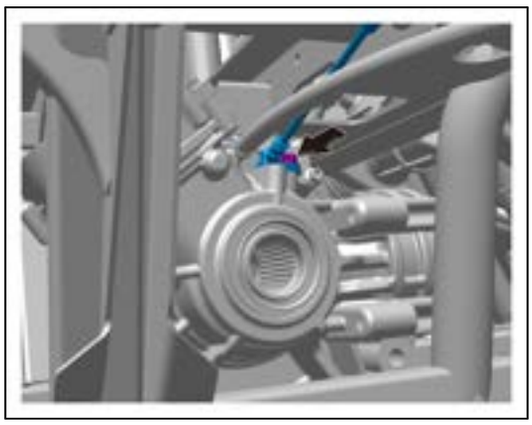
Torque: 25.8~29.5 ft-lbs (35~40 N·m).



b. Remove the ABS sensor mounting bolt (M6×16) and disconnect the sensor.

Torque: 7 ft-lbs (10 N·m)

CAUTION:
• This step applies only to front axles equipped with ABS.

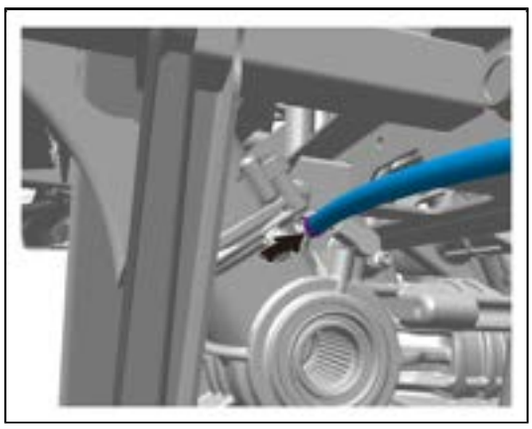


c. Remove the ABS sensor mounting bolt (M6×16) and disconnect the sensor.

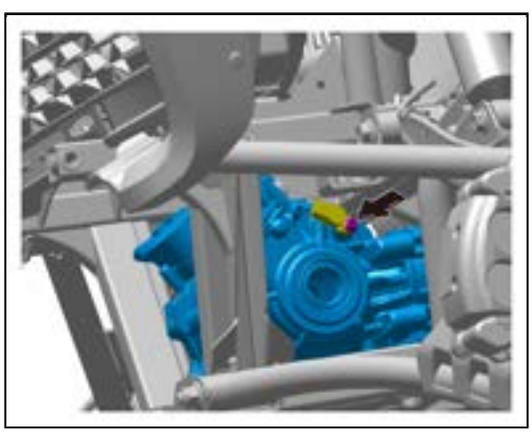
Torque: 7 ft-lbs (10 N·m)

CAUTION:

- **This step applies only to front axles equipped with ABS.**

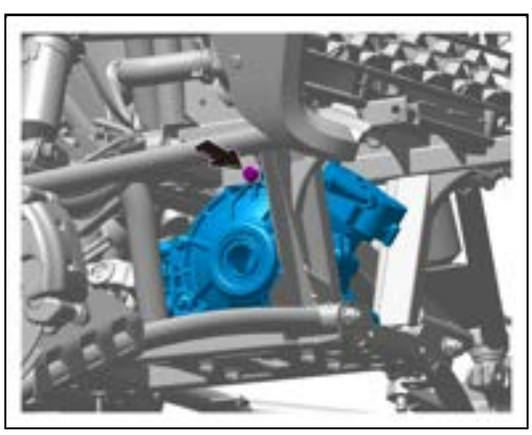


d. Release the breather hose retaining clamp and disconnect the breather hose.



e. Remove the vehicle speed sensor mounting bolt (M6×16) and disconnect the sensor.

Torque: 7 ft-lbs (10 N·m)

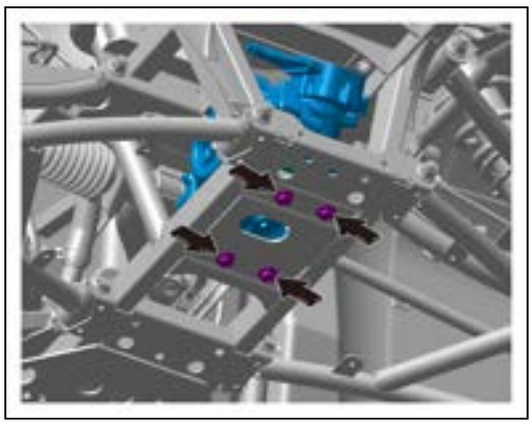


f. Remove the front axle assembly mounting bolts and nuts.

Torque: 14.7~19 ft-lbs (20~26N·m)

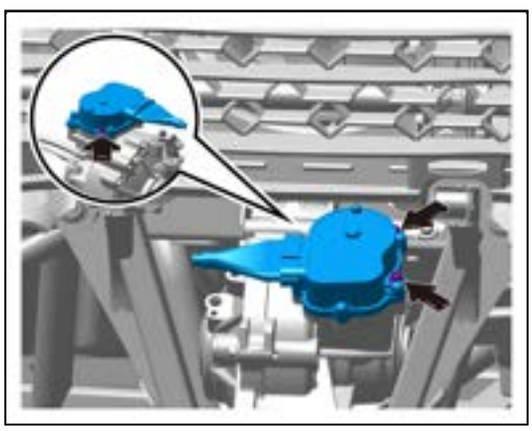
NOTICE:

- **M8 × 90 Hex Flange Bolt.**
- **Type 2 hex flange locknut with non-metallic insert M8.**



g. Remove the 4 front axle assembly mounting bolts (M10×1.25×20).

Torque: 29.5~36.9 ft-lbs (40~50N·m)

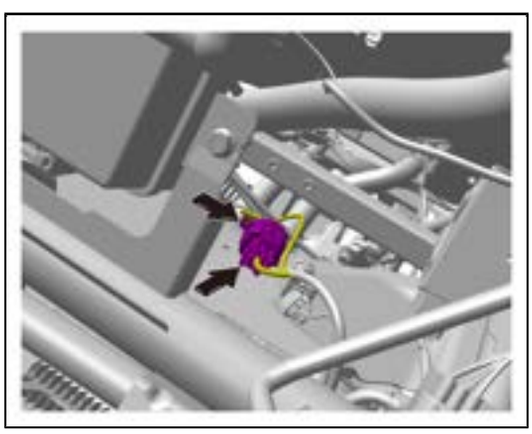


h. Remove the 3 front axle shift motor assembly mounting bolts (M6×16), then withdraw the front axle assembly.

Torque: 7 ft-lbs (10 N·m)

Removal procedure (method 2)

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. To remove the headlamp cover, See: Headlamp Cover.
4. To remove the flasher unit, See: Flasher Unit.
5. To remove the front panel, See: Front Panel.
6. To remove the winch roller fairlead, See: Winch Roller Fairlead.
7. To remove the front bumper guard assembly, See: Front Bumper Guard Assembly.
8. To remove the front bumper welded assembly, See: Front Bumper Welded Assembly
9. To lift the vehicle, See: Vehicle Lifting and Lowering.
10. To remove the front wheel assembly, See: Wheel Assembly.
11. To drain front axle gear oil, See: Front Axle Gear Oil– Replacement.
12. To remove the wheel hub, See: Wheel Hub.
13. Remove front brake disc, See: Brake Disc.
14. To remove the front brake disc backplate, See: Front Brake Disc Backplate.
15. To remove the front steering knuckle, See: Front Steering Knuckle.
16. Remove front constant velocity (CV) drive shaft assembly, See: CV Axle Assembly.
17. Removing front axle assembly



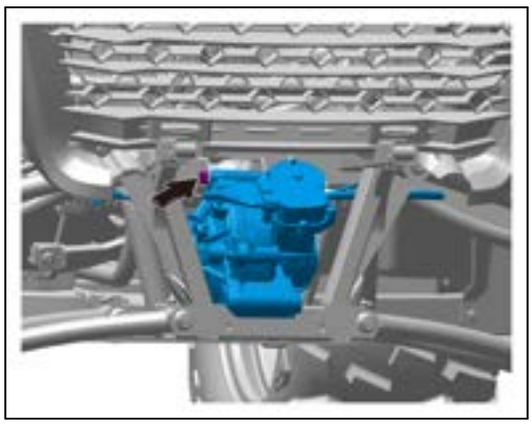
a. Release the retaining clips and cut the cable ties along the routing of the front axle wiring harness. Disconnect the 2 front axle assembly electrical connectors.

NOTICE:
• Cable ties on the harness are single-use and must be replaced after removal. • On models equipped with ABS, also disconnect the 2 ABS wheel speed sensor connectors.



b. Remove the M8 × 35 front axle assembly mounting bolt and spring washer.

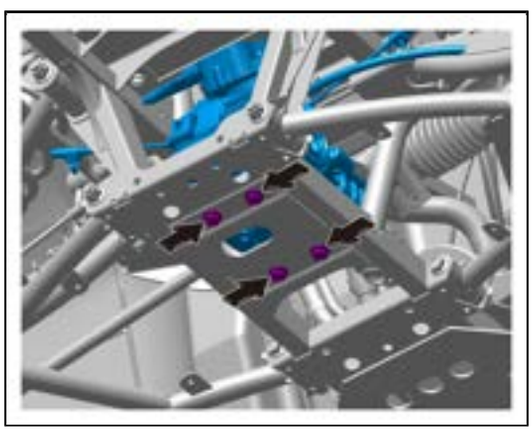
Torque: 25.8~29.5 ft-lbs (35~40 N·m).



c. Remove the front axle mounting nuts.

Torque: 14.7~19 ft-lbs (20~26N·m)

NOTICE:
• M8 × 90 Hex Flange Bolt. • Type 2 hex flange locknut with non-metallic insert M8.



d. Remove the 4 front axle assembly mounting bolts (M10×1.25×20) and withdraw the front axle assembly.

Torque: 29.5~36.9 ft-lbs (40~50N·m)

NOTICE:
• Release the retaining clips and cut the cable ties along the routing of the front axle breather hose. • Type 2 hex flange locknut with non-metallic insert M8.

Installation Procedure

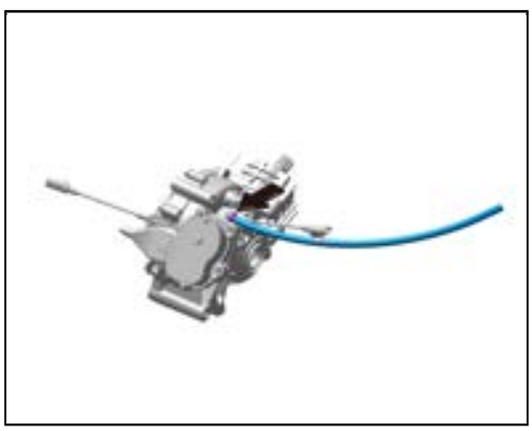
1. Install the front axle assembly by reversing the removal steps, observing the following points:
   a. Refill with front axle gear oil after installation. See: Front Axle Gear Oil– Replacement

4.1.8 Disassembly and Reassembly

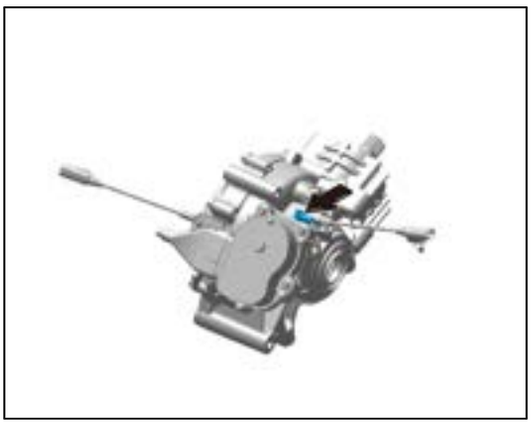
4.1.8.1 Front Axle Assembly – Disassembly and Reassembly

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. To remove the headlamp cover, See: Headlamp Cover.
4. To remove the flasher unit, See: Flasher Unit.
5. To remove the front panel, See: Front Panel.
6. To remove the winch roller fairlead, See: Winch Roller Fairlead.
7. To remove the front bumper guard assembly, See: Front Bumper Guard Assembly.
8. To remove the front bumper welded assembly, See: Front Bumper Welded Assembly
9. To lift the vehicle, See: Vehicle Lifting and Lowering.
10. To remove the front wheel assembly, See: Wheel Assembly.
11. To drain front axle gear oil, See: Front Axle Gear Oil– Replacement.
12. To remove the wheel hub, See: Wheel Hub.
13. Remove front brake disc, See: Brake Disc.
14. To remove the front brake disc backplate, See: Front Brake Disc Backplate.
15. To remove the front steering knuckle, See: Front Steering Knuckle.
16. Remove front constant velocity (CV) drive shaft assembly, See: CV Axle Assembly.
17. To remove the front axle assembly, See: Front Axle Assembly.
18. Removing the vent hose

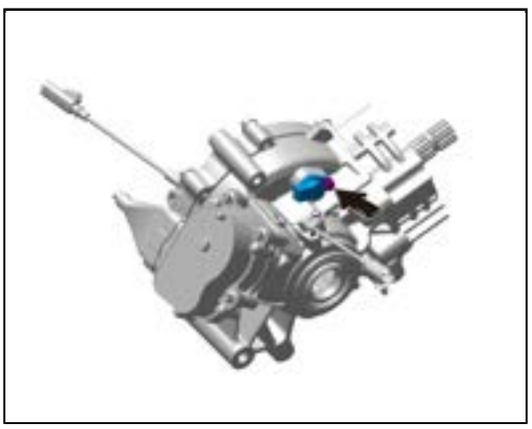


a. Release the hose clamp and disconnect the breather hose.



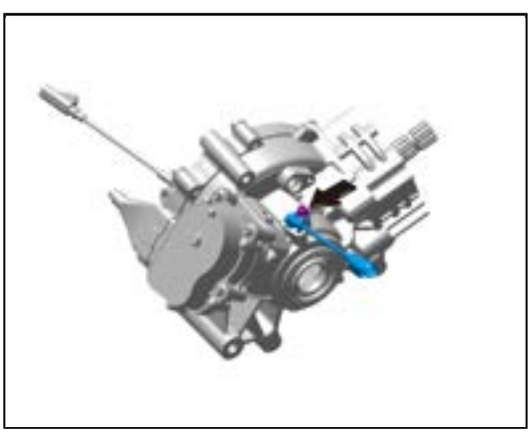
b. Remove the breather hose connector.

19.Removing the ABS and vehicle speed sensors



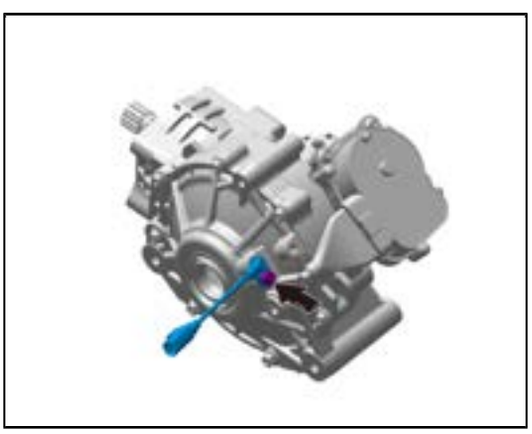
a. Remove the vehicle speed sensor mounting bolt (M6×16), then withdraw the vehicle speed sensor and its O-ring (12×2).

CAUTION:
• Note: The O-ring is a single-use part and must be replaced upon installation.



b. Remove the ABS sensor mounting bolt (M6×16), then withdraw the ABS sensor and its O-ring.

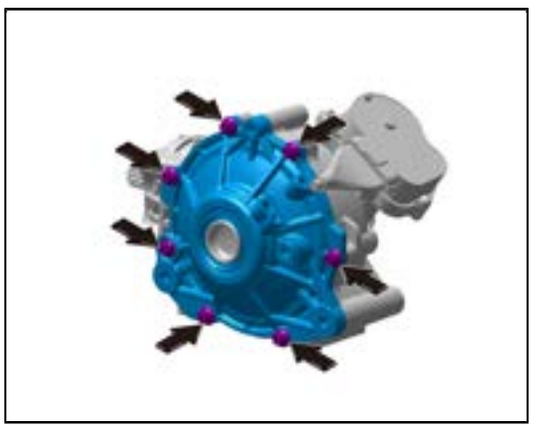
CAUTION:
• Note: The O-ring is a single-use part and must be replaced upon installation.



c. Remove the ABS sensor mounting bolt (M6×16), then withdraw the ABS sensor and its O-ring.

CAUTION:
• Note: The O-ring is a single-use part and must be replaced upon installation.

20.Removing the front axle end cover



a. Remove the 7 front axle end cover mounting bolts (M6×16).



b. Remove the rectangular gasket.



c. Remove the thrust washer.



d. Remove the 38 × 55 × 7 oil seal.

CAUTION:

- **Note: The oil seal is a single-use part and must be replaced upon installation.**



e. Remove the deep-groove ball bearing 16010.



f. Withdraw the deep-groove ball bearing 16010 A and the ABS reluctor ring II B.

NOTICE:

- **This step applies only to front axles equipped with ABS.**

21. Removing the differential



a. Removal of the differential assembly



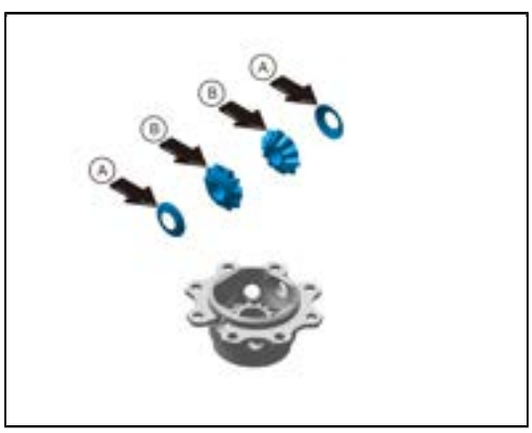
b. Remove the 8 mounting bolts (M10×1.0×18) and withdraw the bevel gear set.



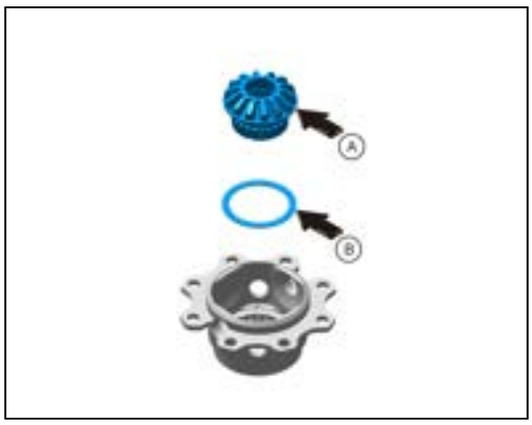
c. Remove the differential cover A, differential side gear thrust washer B, and differential side gear I C in sequence.



d. Remove the differential pinion gear shaft V.

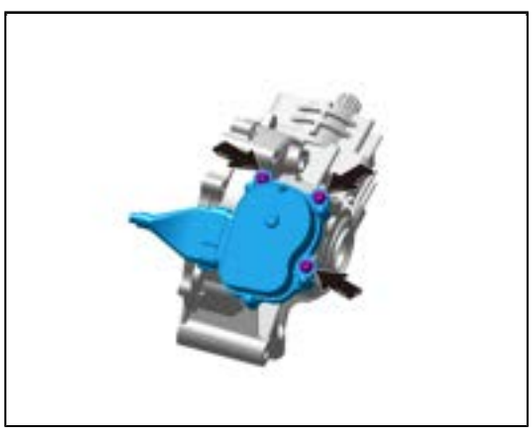


e. Remove the 2 differential pinion gear thrust washers A and the 2 differential pinion gear gears B in sequence.



f. Remove the differential side gear II A and the differential side gear thrust washer B.

22.Removing the front axle housing



a. Remove the 3 mounting bolts M6×16 securing the front axle shift motor assembly and take out the assembly.



b. Remove the O-ring seal (67.9×2.2).



c. Remove the selector fork securing screw (M8×8).



d. Remove the selector fork shaft A (5×65), then withdraw the shift rack and selector fork B.



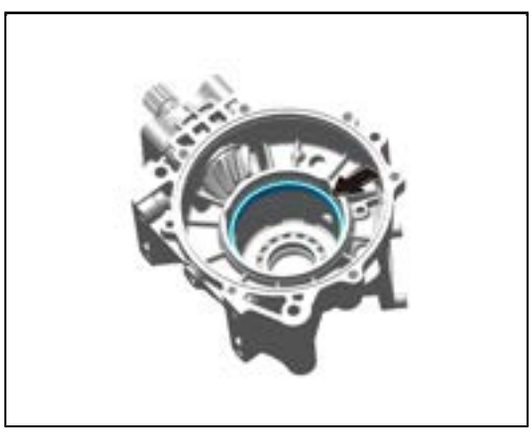
e. Remove the half-shaft output sleeve assembly A, engagement sleeve B, and washer C (40.2×50×3) in sequence.



f. Remove the half-shaft output sleeve A, engagement sleeve B, and ABS reluctor ring C in sequence.

NOTICE:

- **This step applies only to front axles equipped with ABS.**



g. Remove bearing bush I (φ97).



h. Remove the deep-groove ball bearing 61815.

NOTICE:

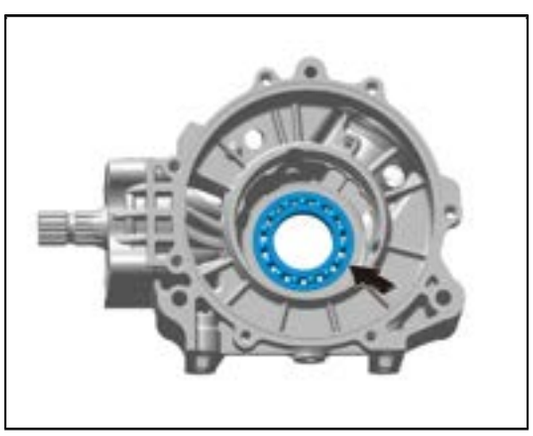
- This step applies only to front axles equipped with ABS.



i. Remove the 38 × 55 × 7 oil seal.

CAUTION:

- Note: The oil seal is a single-use part and must be replaced upon installation.



j. Remove the deep-groove ball bearing 16008.



k. Remove the 30 × 45 × 6.5 oil seal.

CAUTION:

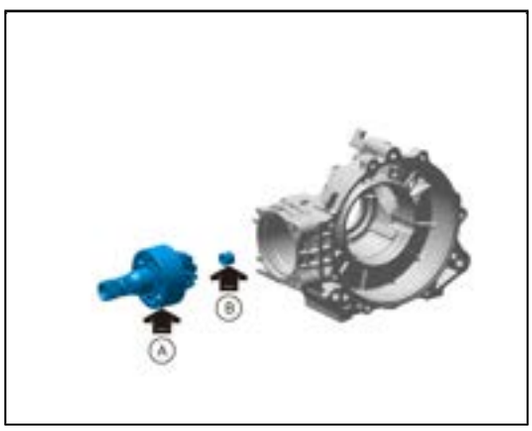
- Note: The oil seal is a single-use part and must be replaced upon installation.



l. Using SST A, remove the round nut B.

SST: Input shaft gear locknut tool

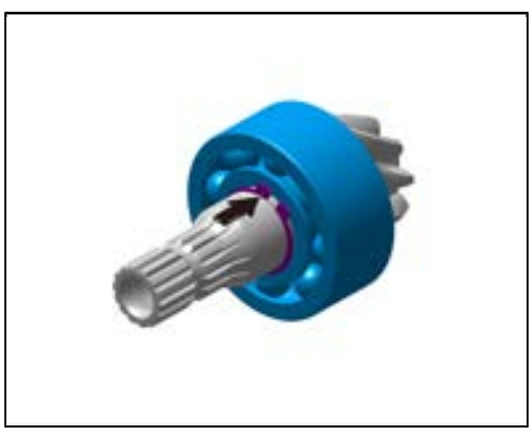
SST: Fixture base



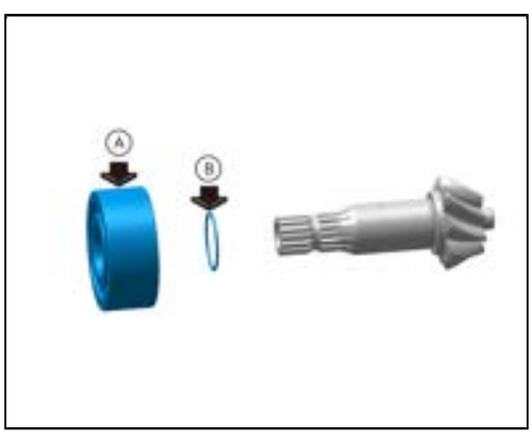
m. Withdraw the bevel gear set A.

n. Remove bearing bush II (φ15) B.

SST: Fixture base



o. Use circlip pliers to remove the external circlip (30).



p. Remove the double-row angular contact ball bearing 3306 A.

q. Remove the drive bevel gear shim B.

NOTICE:
• Drive bevel gear shims (0.3, 0.4, 0.5, 0.6, 0.7 mm).

Inspection and cleaning procedure

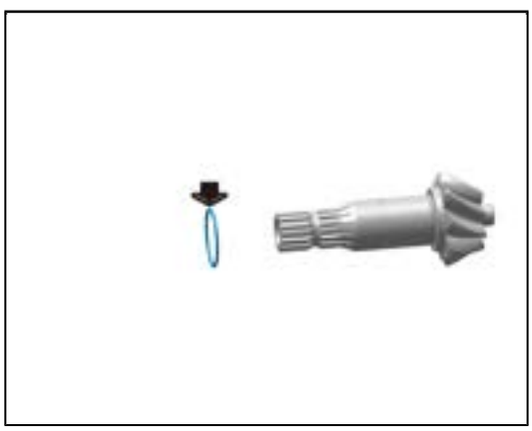
1. Inspecting and cleaning the housing

   a. Inspect the front differential housing and cover for damage or cracks. Replace with a new casing if necessary.

   b. Clean the front differential housing and cover, and remove any remaining debris using compressed air.

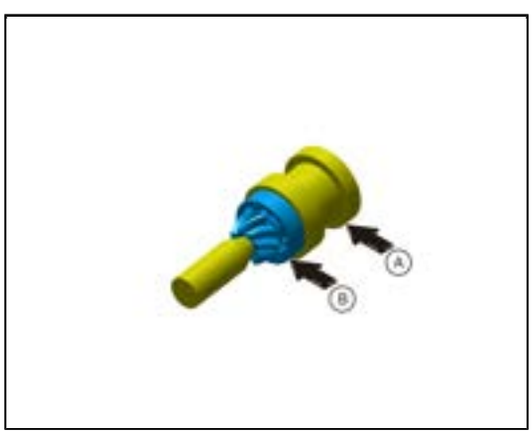
Installation Procedure

1. Installing the front axle housing



a. Install the drive bevel gear shim.

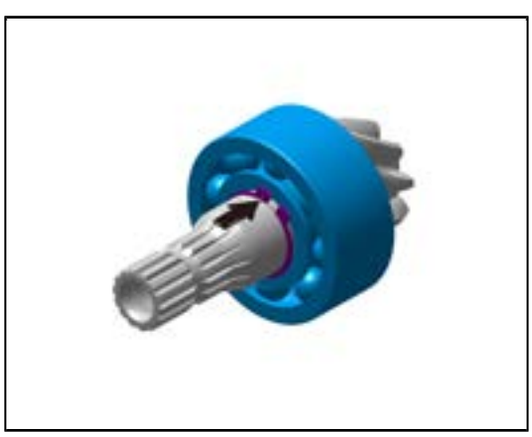
NOTICE:
• Drive bevel gear shims (0.3, 0.4, 0.5, 0.6, 0.7 mm).



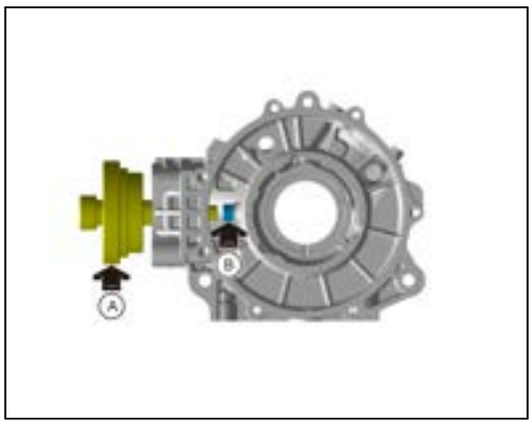
b. Install double-row angular contact ball bearing 3306 B using SST A.

SST: Drive pinion bearing installer

CAUTION:
• Check the bearing for damage or foreign matter, and clean it with kerosene. Rotate the bearing to check for binding. If binding or damage is found, renew the bearing.



c. Using circlip pliers, install the external circlip (30) into the bore.



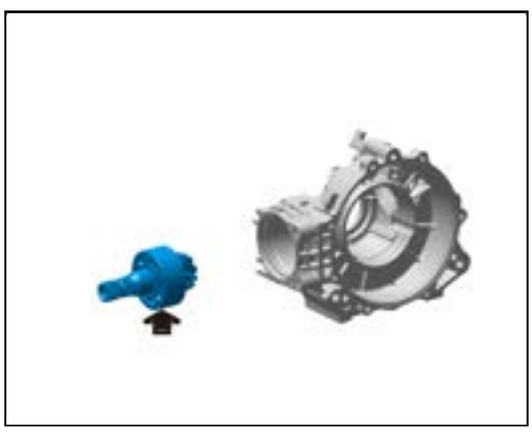
d. Install bearing bush II (φ15) B using SST A.

SST: Bearing bush II installer

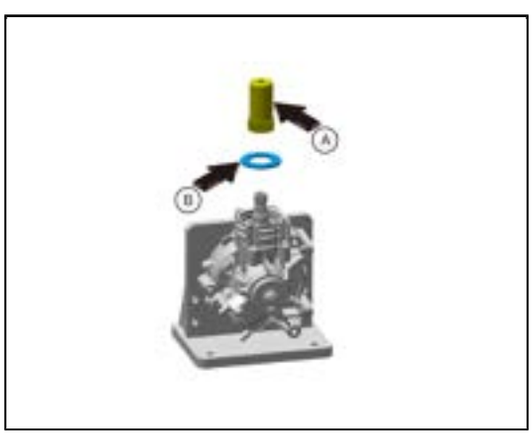
SST: Fixture base

CAUTION:

- Check the front axle housing and its mating surfaces for damage. If damaged, renew the front axle housing.



e. Install the bevel gear set.



f. Install round nut B using SST A.

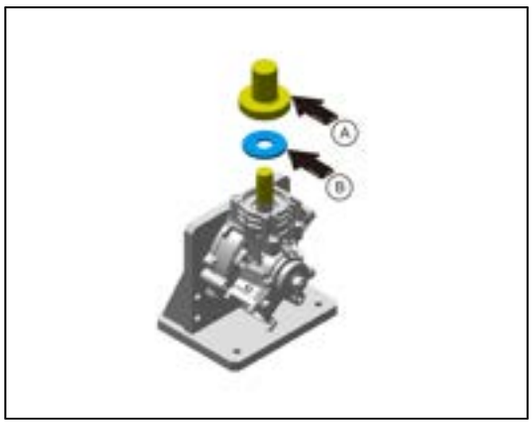
SST: Input shaft gear locknut tool

SST: Fixture base

Torque: 49 ft-lbs(70N·m)

CAUTION:

- Before installing the round nut, apply a continuous bead of thread-locking compound evenly around the threads.
- After installation, rotate the bevel gear assembly to ensure that it turns smoothly, without binding or abnormal noise.



g. Install the 30 × 78 × 7 oil seal B using the SST A.

SST: Input shaft oil seal installer

SST: Fixture base

NOTICE:

- Take care not to scratch or damage the oil seal during installation. A damaged seal will cause gear oil leakage, accelerating internal wear and ultimately leading to gearbox failure. Renew any damaged oil seals immediately.
- The oil seal is a single-use part. Always fit a new oil seal during installation.
- Apply grease to the lip of the oil seal during installation.



h. Use the SST A to install the B 16008 deep-groove ball bearing.

SST: Front axle housing small bearing installer

SST: Holding tool



i. Install bearing bush I (φ97) B using SST A.

SST: Front axle cover bearing installer

SST: Holding tool



j. Use the SST (A) to install the 61815 deep-groove ball bearing.

SST: Front axle cover bearing installer

SST: Holding tool

NOTICE:

- This step applies only to front axles equipped with ABS.



k. Install washer C (40.2×50×3), engagement sleeve B, and half-shaft output sleeve A in sequence.

CAUTION:

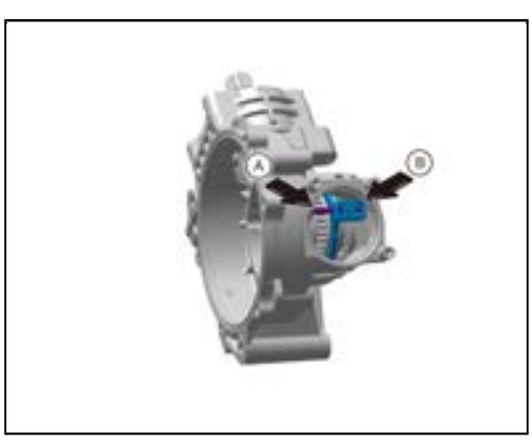
- Check the washer for damage. If damaged, renew the washer.
- Check the half-shaft output sleeve assembly for scoring, noticeable wear, or other defects. Renew the corresponding parts if necessary.



l. Install half-shaft output sleeve A, engagement sleeve B, and ABS reluctor ring C in sequence.

NOTICE:

- This step applies only to front axles equipped with ABS.
- Check the half-shaft output sleeve assembly for scoring, noticeable wear, or other defects. Renew the corresponding parts if necessary.

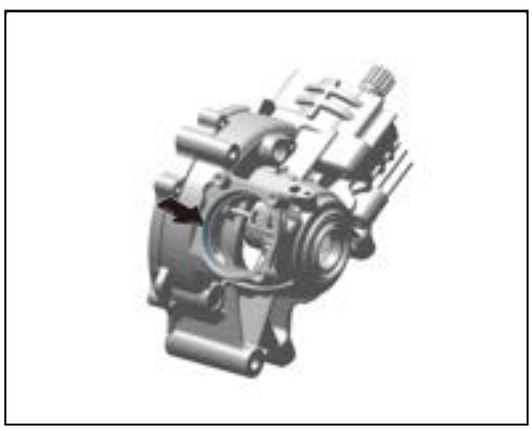


m. Install shift rack with selector fork B, then install selector fork shaft A (5×65).



n. Install the selector fork securing screw (M8×8).

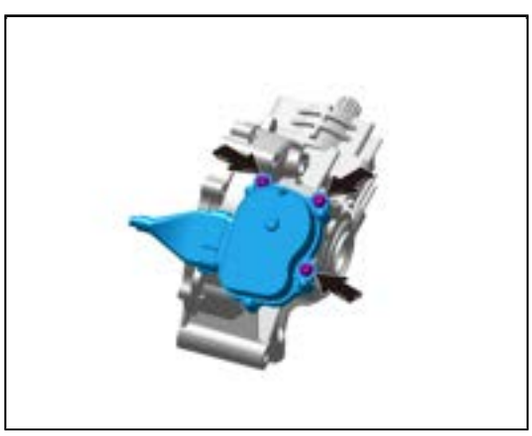
Torque: 9 ft-lbs(12N·m)



o. Install the new O-ring seal (67.9×2.2).

NOTICE:

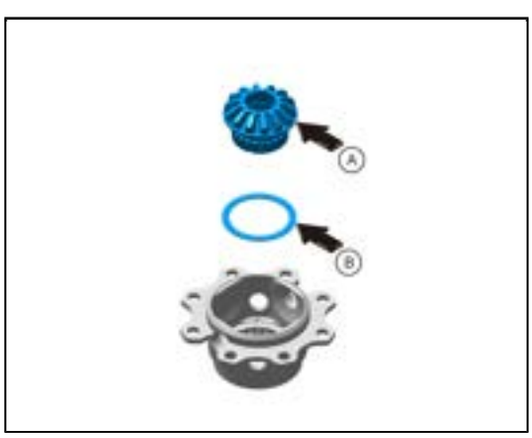
- O-rings are single-use parts and must not be reused. Always install new O-rings.
- Apply grease to the O-ring before installation.



p. Install the front axle shift motor assembly and tighten its 3 mounting bolts (M6×16).

Torque: 7 ft-lbs (10 N·m)

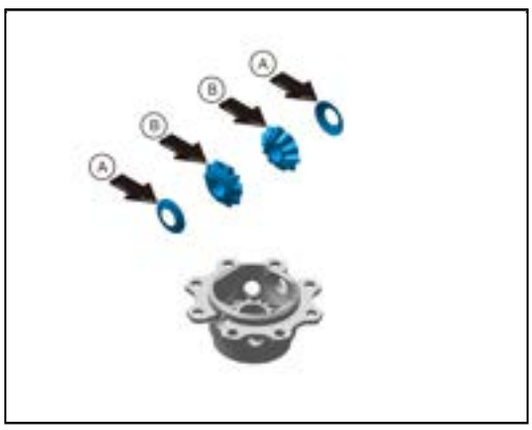
2. Installing the differential



a. Install differential side gear thrust washer B and differential side gear II A.

CAUTION:

- Check the side gear teeth surfaces for scoring, pitting, or other defects. Renew the corresponding parts if necessary.
- Check if the backlash between the differential pinion gear gears and side gears is within 0.10 mm - 0.20 mm.
- Select a suitable side gear thrust washer (0.8, 1.0, or 1.2 mm).



b. Install the 2 differential pinion gear thrust washers A and the 2 differential pinion gear gears B in sequence.

CAUTION:

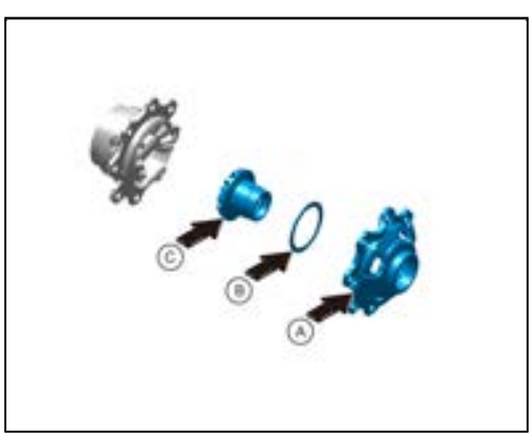
- Check the differential pinion gear gears for scoring, pitting, or other defects. Renew the corresponding parts if necessary.



c. Install differential pinion gear shaft V.

CAUTION:

- Check the surface of differential pinion gear shaft V for noticeable wear or other defects. Renew the corresponding parts if necessary.



d. Install differential side gear I C, differential side gear thrust washer B, and differential cover A in sequence.

CAUTION:

- Select a suitable side gear thrust washer (0.8, 1.0, or 1.2 mm).
- Check if the backlash between the differential pinion gear gears and side gears is within 0.10 mm - 0.20 mm.
- Check the surfaces of the differential side gears for noticeable wear or other defects. Renew the corresponding parts if necessary.

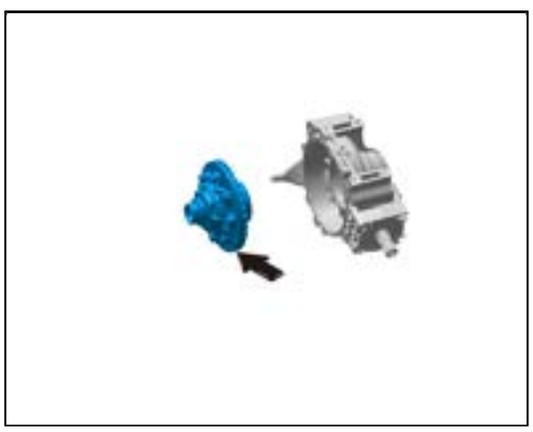


e. Install the bevel gear set and tighten its 8 mounting bolts (M10×1.0×18).

Torque: 49 ft-lbs(70N·m)

CAUTION:

- Before installing the bolts, apply a continuous bead of thread-locking compound evenly around the threads.



f. Install the differential assembly.

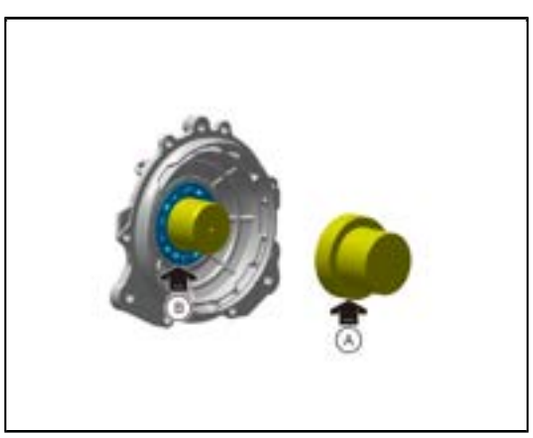
3. Installing the front axle end cover



a. Assemble deep-groove ball bearing 16010 A and ABS reluctor ring II B.

NOTICE:

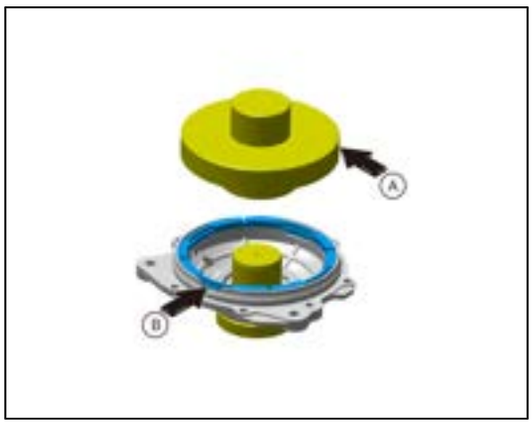
- This step applies only to front axles equipped with ABS.



b. Install deep-groove ball bearing 16010 B using SST A.

SST: Front axle cover bearing installer

SST: Holding tool



c. Install thrust washer B using SST A.

SST: Thrust washer installer

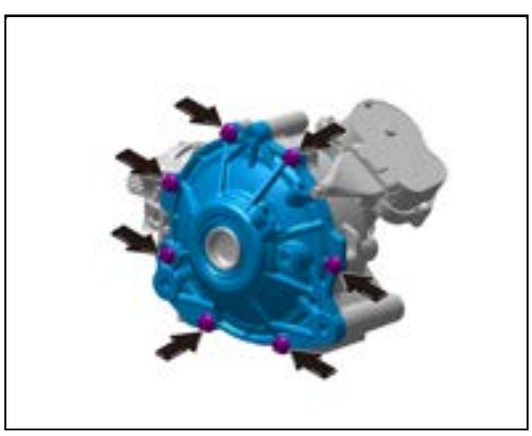
SST: Holding tool

CAUTION:

- Measure the thickness of the thrust washer. If the thickness is less than 6.85 mm, renew the washer.



d. Install a new rectangular gasket.



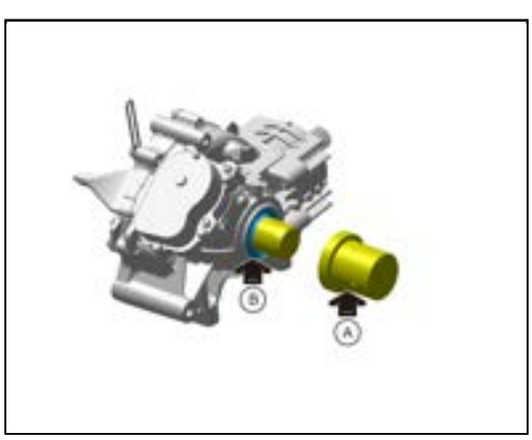
e. Install the front axle end cover and tighten its 7 mounting bolts (M8×25).

Torque: 17 ft-lbs(24N·m)

CAUTION:

- Check the front axle end cover and its mating surfaces for damage. If damaged, renew the front axle end cover.

4. Installing the output shaft oil seals on both sides

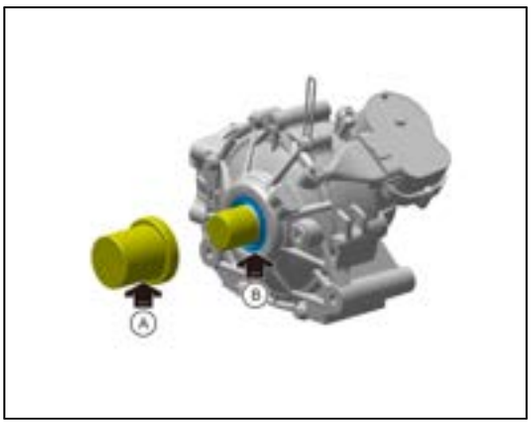


a. Install the new 38 × 55 × 7 oil seal using the SST.

SST: Output shaft oil seal installer

NOTICE:

- The oil seal is a single-use part. Always fit a new oil seal during installation.
- Apply grease to the lip of the oil seal during installation.



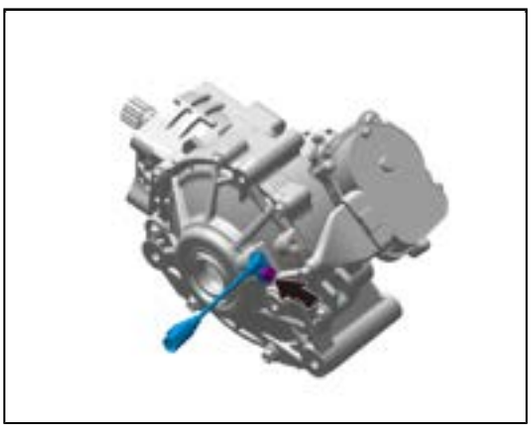
b. Install the new 38 × 55 × 7 oil seal using the SST.

SST: Output shaft oil seal installer

NOTICE:

- The oil seal is a single-use part. Always fit a new oil seal during installation.
- Apply grease to the lip of the oil seal during installation.

5. Installing the ABS sensor and vehicle speed sensor

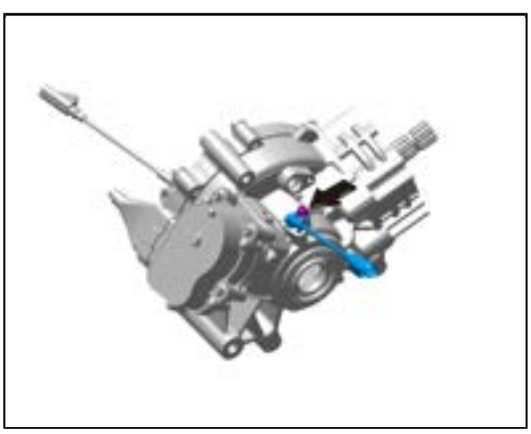


a. Install a new ABS sensor O-ring and tighten the ABS sensor mounting bolt (M6×16).

Torque: 7 ft-lbs (10 N·m)

CAUTION:

- Note: The O-ring is a single-use part and must be replaced upon installation.
- This step applies to ABS models only.

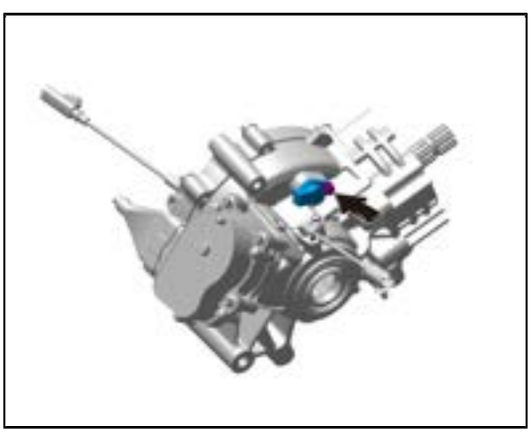


b. Install a new ABS sensor O-ring and tighten the ABS sensor mounting bolt (M6×16).

Torque: 7 ft-lbs (10 N·m)

CAUTION:

- Note: The O-ring is a single-use part and must be replaced upon installation.
- This step applies to ABS models only.



c. Install a new O-ring (12×2) and install the vehicle speed sensor.

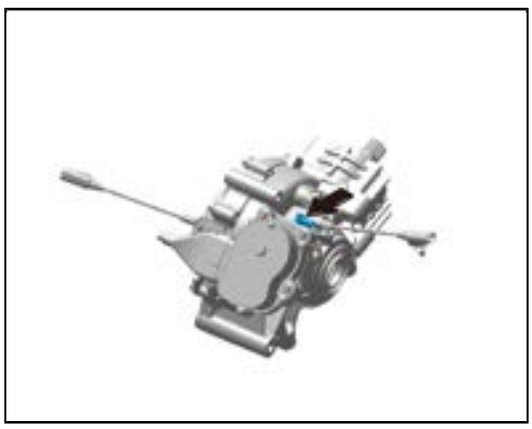
NOTICE:

- O-rings are single-use parts and must not be reused. Always install new O-rings.
- Apply grease to the O-ring before installation.

d. Install the vehicle speed sensor mounting bolt (M6×16).

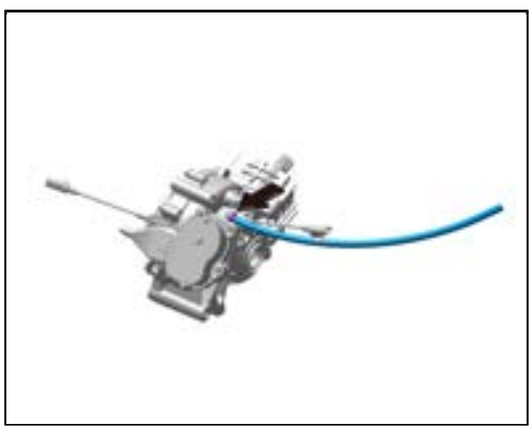
Torque: 7 ft-lbs (10 N·m)

6. Installing the breather line



a. Install the breather hose connector.

Torque: 11.1 ft-lbs(15N·m)



b. Install the breather hose and secure it with a retaining clip.

CAUTION:
• Check the breather hose for damage. If damaged, renew the breather hose.

7. To install the front axle assembly, See: Front Axle Assembly.
8. To install the front CV axle assembly, See: Front CV Axle Assembly.
9. To install the front steering knuckle, See: Front Steering Knuckle.
10. To install the front brake disc backplate, See: Front Brake Disc Backplate.
11. To install the brake disc, See: Brake Disc.
12. To install the wheel hub, See: Wheel Hub.
13. To fill/replace the front axle gear oil, refer to See: Front Axle Gear Oil- Replacement.
14. Fit the front wheel assembly, See: Wheel Assembly.
15. To lower the vehicle, See: Vehicle Lifting and Lowering.
16. To install the front bumper welded sub-assembly, See: Front Bumper Welded Sub-assembly.
17. To install the front bumper guard assembly, See: Front Bumper Guard Assembly.
18. To install the winch roller fairlead, See: Winch Roller Fairlead.
19. To install the front panel, See: Front Panel.
20. To install the direction indicator flasher, See: Direction Indicator Flasher.
21. To install the headlamp cover, See: Headlamp Cover.
22. To install the front service cover, See: Front Service Cover.
23. To connect the negative battery, See: Battery Power Connection/Disconnection Procedure.

5.1 Rear Axle Assembly

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5.1.1 Specifications

5.1.1.1 Fastener Specifications

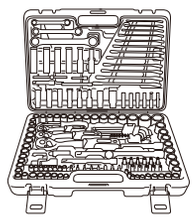
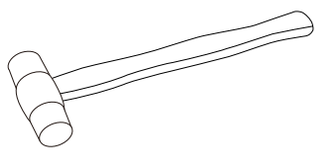
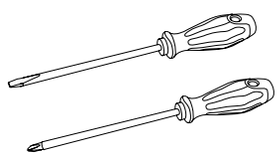
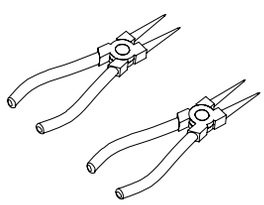
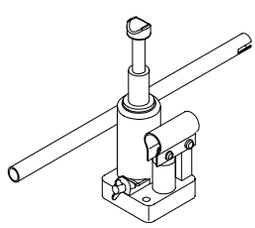
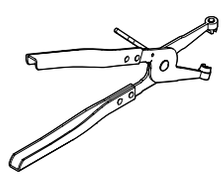
Item	Torque (N·m)	Torque (ft-lbs)
Rear Axle Assembly Mounting Bolt, M10 × 1.25 × 125	45	33.2
Rear Axle Assembly Mounting Bolt, M10 × 1.25 × 20	45	33.2
Rear axle housing cover mounting bolt M8×25	24	17
Propeller shaft flange mounting bolt M10×1.25×30	70	49
Filler plug M14	18	13
Drain plug M14	18	13
Drive pinion bearing housing mounting bolt M8×25	24	17
Solenoid valve assembly	35	25.8
Bevel gear assembly mounting bolt M10×1.25×30	70	49

5.1.1.2 Service Specifications

Item	Specifications
Gear oil specification	SAE 80W-90, API GL-5
Gear oil capacity	200 (without Differential); 240 (with Differential)
Filler location	Side
Drain location	Bottom
Bevel gear backlash	0.15~0.25 mm

5.1.2 Service Tools

5.1.2.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)
2	Rubber mallet		Rear axle assembly removal and installation
3	Screwdriver		Removing screws
4	Circlip Pliers		Removing and installing circlips
5	Jack		Lifting the Vehicle
6	Hose Clamp Pliers		Removing and installing hose clamps

Item No.	Tool Description	Tool Diagram	Purpose/Use
7	Oil seal puller		Removing the oil seal
8	Gear oil filling pump		Filling with gear oil

5.1.3 Description and Operation

5.1.3.1 Warnings and Precautions

1. When inspecting the rear axle assembly, ensure the vehicle is on level, dry ground.
2. Bolts and nuts for all components must be tightened to the specified torque.
3. If any mounting bolt or nut is found to be damaged during servicing, replace it immediately.
4. Before driving, check the vehicle for safe operating condition. Do not start the vehicle until it has been confirmed that no safety hazards are present.
5. Use only the specified gear oil. Do not mix with other types of oil or use substitute fluids, as this may affect transmission performance and durability.
6. After disassembling the rear axle assembly, protect all components to prevent contamination.
7. Operating the vehicle with insufficient, degraded, or contaminated gear oil may accelerate wear and cause damage to the rear axle assembly, accidents, or personal injury.
8. Dispose of drained waste oil in accordance with local regulations.
9. If a part is specified as a single-use part, replace it with a new one after removal. Do not reuse it.
10. Failure to replace defective components promptly may result in abnormal wear of other parts, increased temperature of the rear axle assembly, and reduced service life.
11. Avoid disassembling the rear axle assembly if internal faults are uncertain. Disassembly should only be carried out under professional supervision; improper procedures may reduce service life or render the assembly unserviceable.
12. Before carrying out inspection or repair work, ensure that personnel are wearing appropriate personal protective equipment, such as safety footwear, work gloves and safety goggles.
13. During inspection and repair, always follow the relevant instructions and standard procedures. Read the applicable instructions carefully before using workshop equipment and SST.

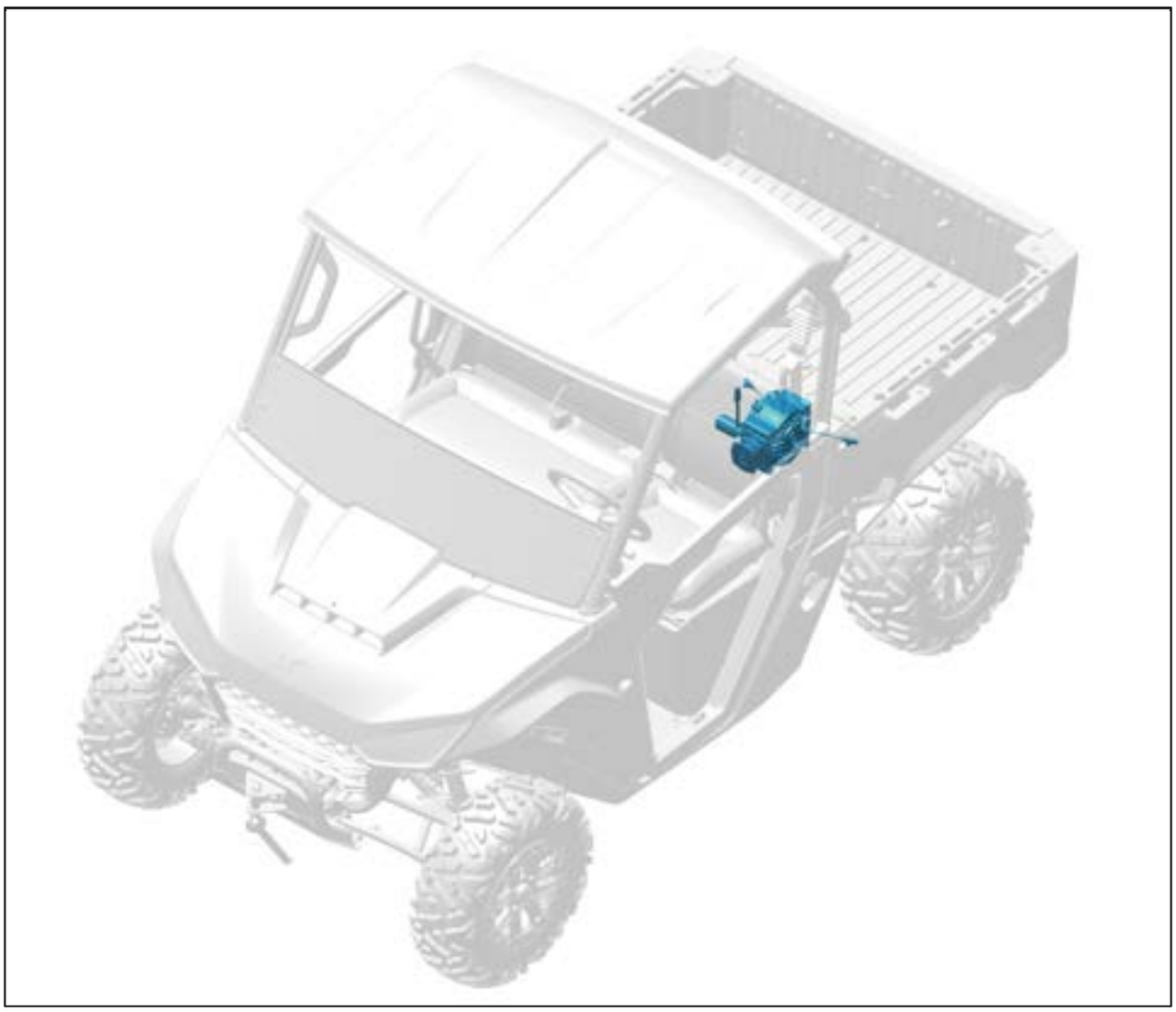
5.1.3.2 System Description

1. System Description
   a. With differential
      - Through the crown wheel and pinion assembly, the system accurately and efficiently reduces speed and increases torque, increases speed and reduces torque, changes the direction of drive, or distributes power.
   b. Without differential
      - The drive through the crown wheel and pinion assembly provides precise and efficient reduction and torque multiplication.
2. Components
   a. With differential
      - Comprises the rear axle housing, housing cover, bearing cover, crown wheel and pinion assembly, and differential components.
   b. Without differential
      - Comprises the rear axle housing, housing cover, bearing cover, and crown wheel and pinion assembly.

5.1.4 Component Location and Exploded View

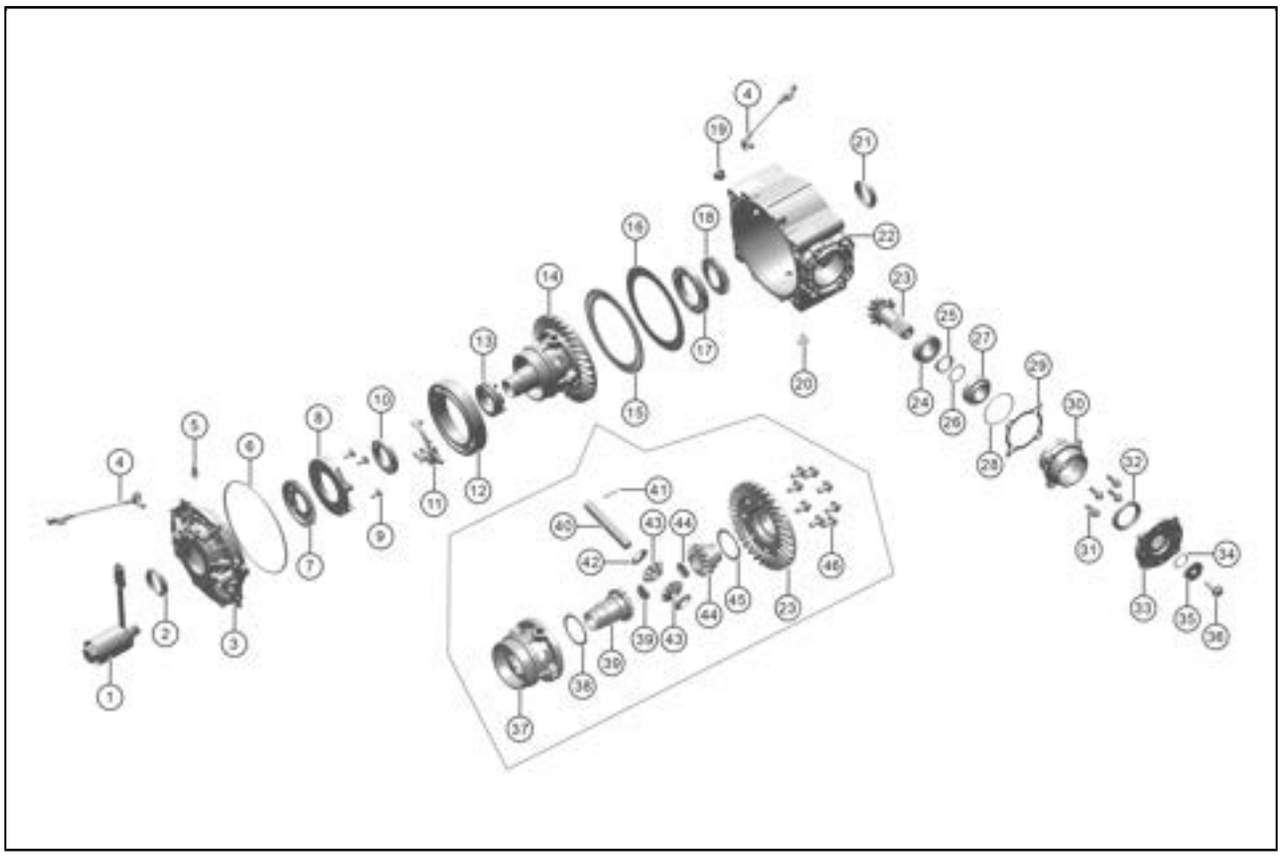
5.1.4.1 Component Location Diagram

Rear axle assembly system



5.1.4.2 Exploded View Diagram

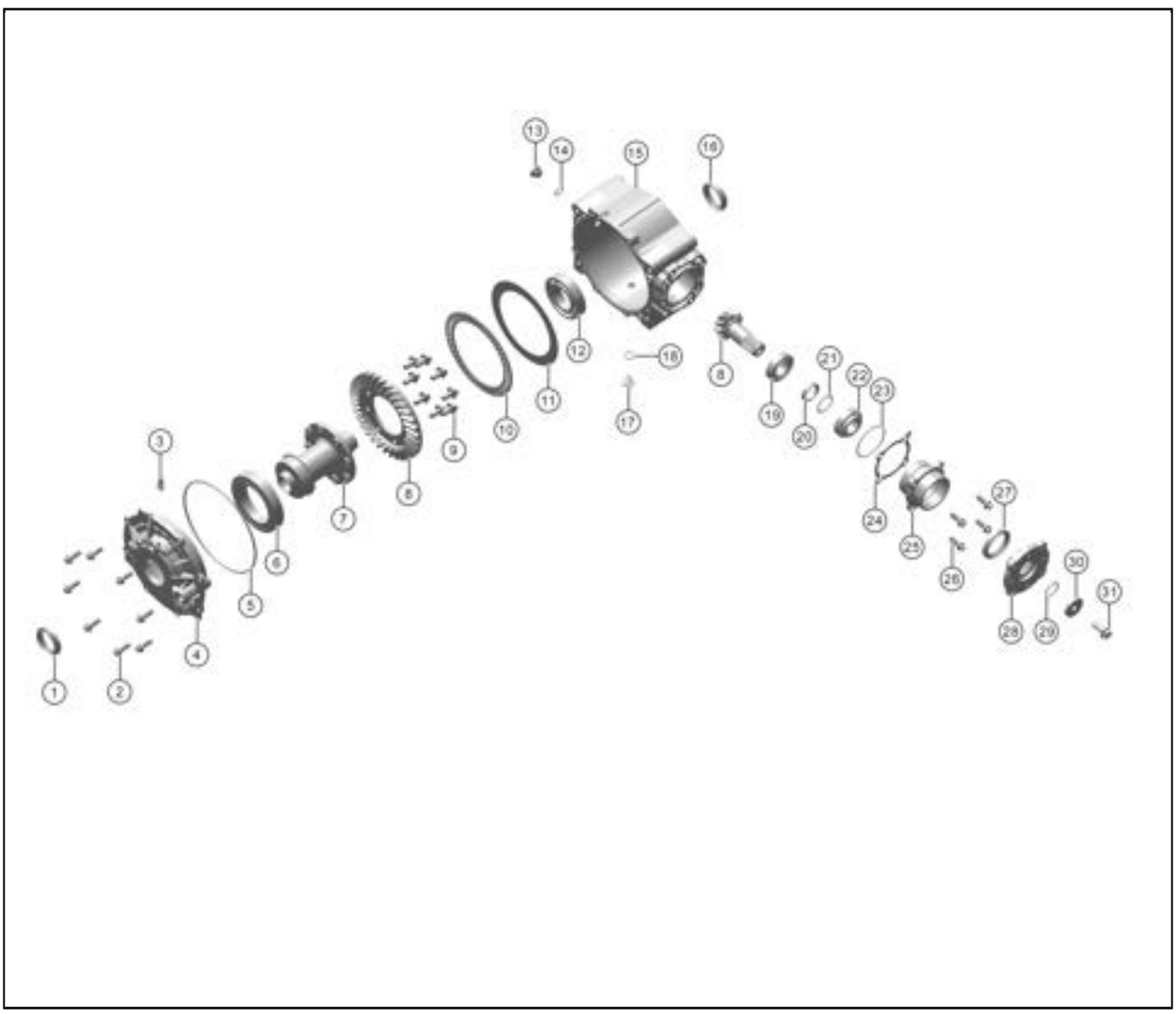
Rear Axle Assembly (ABS Version)



1	Solenoid valve assembly	17	Deep-Groove Ball Bearing 16012	33	Propeller Shaft Flange
2	Oil Seal 37 × 55 × 7	18	ABS signal gear (ABS only).	34	O-Ring Seal
3	Rear axle assembly end cover.	19	Oil filler plug M14	35	Plain Washer
4	Wheel Speed Sensor (WSS) (ABS Only)	20	Drain plug M14	36	Hex flange bolt M10
5	Breather union.	21	Oil Seal 37 × 55 × 7	37	Differential case
6	Rectangular gasket 180 × 185 × 3.	22	Rear axle casing.	38	Side gear thrust washer
7	ABS signal gear (ABS only).	23	Bevel gear assembly	39	Differential side gear I blanking cover assembly
8	Bearing housing	24	Tapered roller bearing 32006	40	Differential pinion shaft IV
9	Large Pan Head Hex Socket Bolt M6 × 16.	25	Bush	41	Retaining pin (5x28)
10	Deep-Groove Ball Bearing 16008	26	End float shim.	42	Pinion gear thrust washer

11	Selector Fork Assembly	27	Tapered roller bearing 33006	43	Pinion gear
12	Deep-Groove Ball Bearing 6019	28	O-Ring Seal	44	Differential side gear II blanking cover assembly
13	Coupling sleeve	29	Drive bevel gear shim	45	Side gear thrust washer
14	Drive and Driven Bevel Gear Assembly	30	Pinion bearing housing	46	Hex Flange Bolt M10 × 1.0 × 20
15	Thrust needle roller bearing AXK 130 × 170 × 5.	31	M8 × 25 Hex Flange Bolt		
16	Stop pad.	32	Oil Seal 44 × 60 × 7		

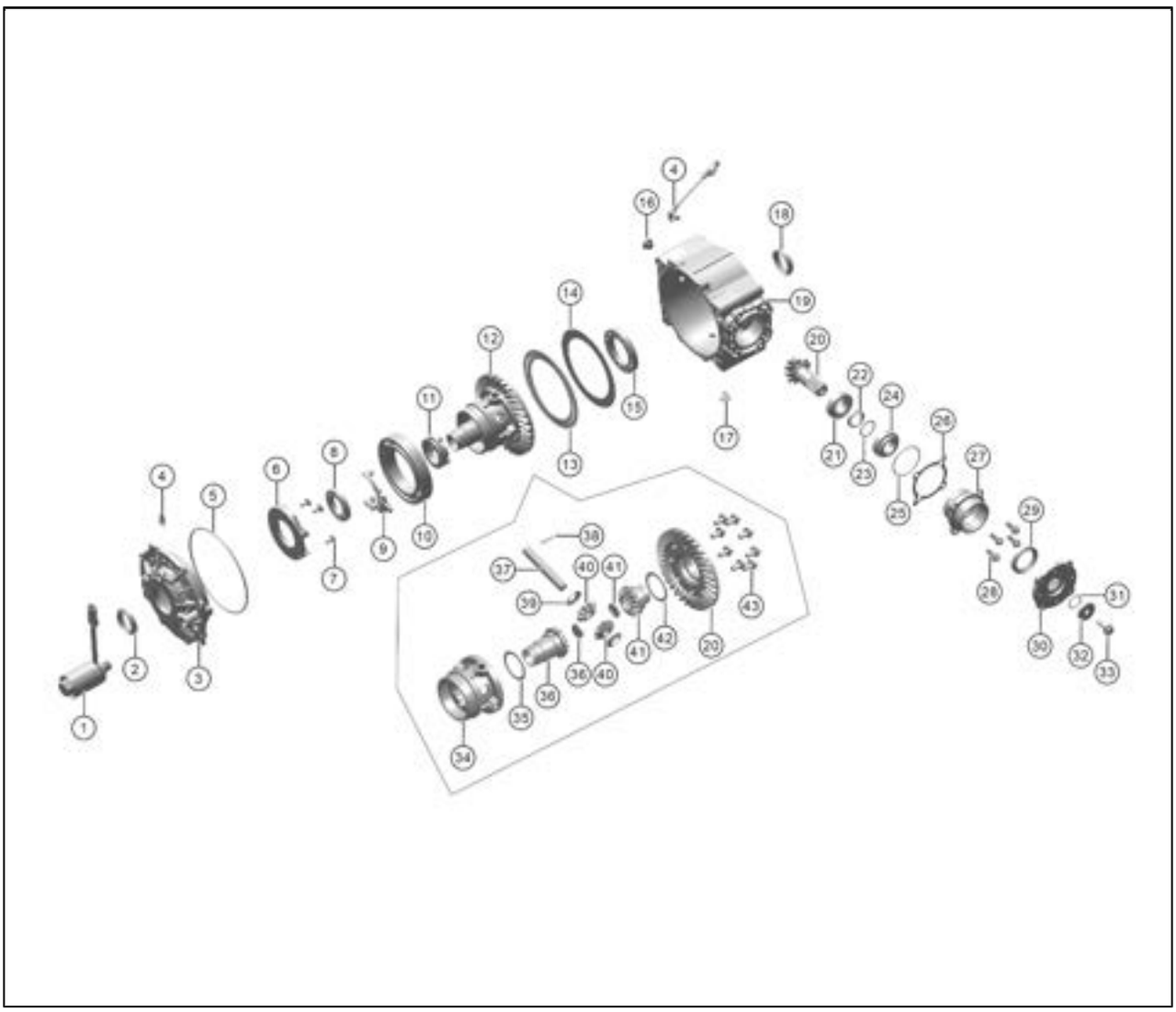
Rear axle assembly (non-differential model)



1	Oil Seal 37 × 55 × 7	12	Deep-Groove Ball Bearing 6209	23	O-Ring 61.5*2.65
2	M8 × 25 Hex Flange Bolt	13	Threaded Plug M14	24	Drive bevel gear shim

3	Breather union.	14	O-ring (13.8 × 2.5)	25	Pinion bearing housing
4	Rear axle assembly end cover.	15	Rear axle casing.	26	M8 × 25 Hex Flange Bolt
5	Rectangular gasket 180 × 185 × 3.	16	Oil Seal 37 × 55 × 7	27	Oil Seal 44 × 60 × 7
6	Deep-Groove Ball Bearing 6015-Z	17	Threaded Plug M14	28	Propeller Shaft Flange
7	Propeller shaft	18	O-ring (13.8 × 2.5)	29	O-Ring 25×2.65
8	Bevel gear assembly	19	Tapered roller bearing 32006	30	Plain Washer 10.5 × 39 × 6
9	Hex Flange Bolt M10 × 1.0 × 20	20	Bush	31	Hex Flange Bolt M10 × 1.25 × 30
10	Thrust Needle Roller Bearing, 130 × 170 × 5	21	End float shim.		
11	Stop pad.	22	Tapered roller bearing 33006		

Rear Axle Assembly (with Differential)



1	Solenoid valve assembly	16	Oil filler plug M14	31	O-Ring Seal
2	Oil Seal 37 × 55 × 7	17	Drain plug M14	32	Plain Washer
3	Rear axle assembly end cover.	18	Oil Seal 37 × 55 × 7	33	Hex flange bolt M10
4	Breather union.	19	Rear axle casing.	34	Differential case
5	Rectangular gasket 180 × 185 × 3.	20	Bevel gear assembly	35	Side gear thrust washer
6	Bearing housing	21	Tapered roller bearing 32006	36	Differential side gear I blanking cover assembly
7	Large Pan Head Hex Socket Bolt M6 × 16.	22	Bush	37	Differential pinion shaft IV
8	Deep-Groove Ball Bearing 16008	23	End float shim.	38	Retaining pin (5x28)
9	Selector Fork Assembly	24	Tapered roller bearing 33006	39	Pinion gear thrust washer

10	Deep-Groove Ball Bearing 6019	25	O-Ring Seal	40	Pinion gear
11	Coupling sleeve	26	Drive bevel gear shim	41	Differential side gear II blanking cover assembly
12	Drive and Driven Bevel Gear Assembly	27	Pinion bearing housing	42	Side gear thrust washer
13	Thrust needle roller bearing AXK 130 × 170 × 5.	28	M8 × 25 Hex Flange Bolt	43	Hex Flange Bolt M10 × 1.0 × 20
14	Stop pad.	29	Oil Seal 44 × 60 × 7		
15	Deep-Groove Ball Bearing 16012	30	Propeller Shaft Flange		

5.1.5 General Fault Diagnosis and Operation

5.1.5.1 Fault Symptom List

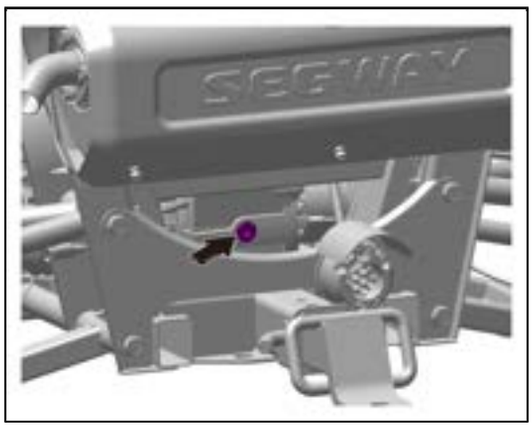
Use the table below to identify the cause of the fault. The numbers indicate the likelihood ranking of the cause. Inspect each component in order and replace as necessary.

Fault Symptom	Possible Causes	Recommended Repair Procedure
Abnormal Noise During Driving	1. Gear Oil (Insufficient)	Top Up Gear Oil to Correct Level
	2. Gear Oil (Incorrect Type)	Replace
	3. Differential assembly (damaged or bearings at both ends damaged) (with differential)	Replace
	4. Differential assembly (excessive or insufficient clearance) (with differential)	Adjust
	5. Crown Wheel and Pinion Assembly (Damaged or Excessively Worn)	Replace
Oil seepage or leakage during operation	1. Gear Oil (Excessive)	Drain Excess Gear Oil
	2. Vent Hose (Blocked)	Clear the Vent Hose
	3. Oil Seal (Damaged)	Replace
	4. Rear axle assembly mating surface (improperly sealed)	Apply Sealant and Reassemble
Rear axle assembly overheating	1. Gear Oil (Insufficient)	Top Up Gear Oil to Correct Level
	2. Crown Wheel and Pinion Assembly (Clearance Too Small)	Adjust
	3. Differential assembly (bearing too tight) (with differential)	Adjust
	4. Oil Seal (Too Tight)	Adjust or Replace

5.1.6 Inspecting and adjusting

5.1.6.1 Checking the rear axle assembly

1. Checking rear axle gear oil level



a. Remove Oil Filler Plug and O-Ring. Check the distance from the gear oil surface to the filler neck. After inspection, replace with new Oil Filler Plug and O-Ring and tighten.

Torque: 13.3 ft-lbs (18 N·m)

NOTICE:

- **Excessive or insufficient gear oil may cause system malfunction. Top up or drain gear oil as required.**
- **Depending on vehicle configuration, some models are equipped with an oil sight glass below the filler plug; the oil level can be visually checked directly through this sight glass.**

2. Routine inspection of the rear axle assembly

a. Rotate the input shaft; it should turn smoothly with uniform damping, no abnormal noise or binding. Pull the input shaft; no noticeable axial play or abnormal noise.

b. No oil leakage at rear axle assembly joints and oil seal locations.

c. Rear axle assembly housing is undamaged; mounting holes show no deformation or cracks.

3. Inspect rear axle assembly after disassembly

a. Gear teeth intact, no chipped teeth; tooth surfaces free from pitting, grooves, cracks, or deformation; surfaces bright with no burning or scoring.

WARNING:

- **Avoid disassembling the rear axle assembly if internal faults are uncertain.**
- **Disassembly should only be performed under professional guidance; improper procedures may reduce service life or render the assembly unserviceable.**

b. Tapered Roller Bearings and Deep-Groove Ball Bearings: Inner and Outer Rings intact, no deformation.

c. Bearing cages free from wear or deformation.

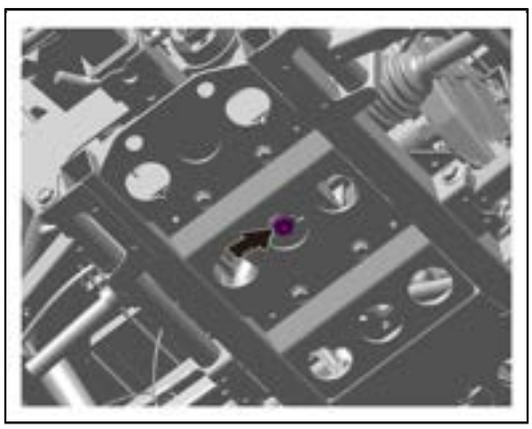
d. Bearing raceways free from scoring, grooves, deformation, or spalling.

e. Bearing rollers free from deformation, scoring, burning, or spalling.

f. Oil seal main lip should have a small curved or flat ring; radius or width ≤1.5 mm; wear should be smooth with no cracks.

5.1.6.2 Rear Axle Gear Oil – Replacement

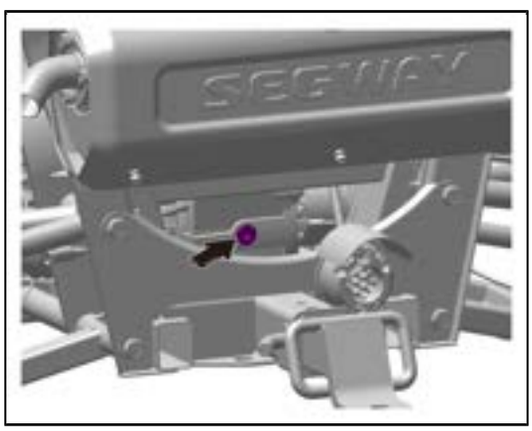
1. Rear Axle Gear Oil – Replacement



a. Park the vehicle on level ground and position a suitable container beneath the drain port to collect the oil.

b. Remove the drain plug and O-ring. Allow the old gear oil to drain for approximately 10 minutes. Once the flow reduces to drips, the draining is complete. Clean the area around the drain port, fit a new drain plug and O-ring, and tighten securely.

Torque: 13.3 ft-lbs (18 N·m)



c. Remove the oil filler plug and O-ring, then top up with the specified quantity of gear oil through the filler port. After filling, fit a new oil filler plug and O-ring and tighten securely.

Capacity: 240 ml (with differential) / 200 ml (without differential)

Torque: 13.3 ft-lbs (18 N·m)

NOTICE:

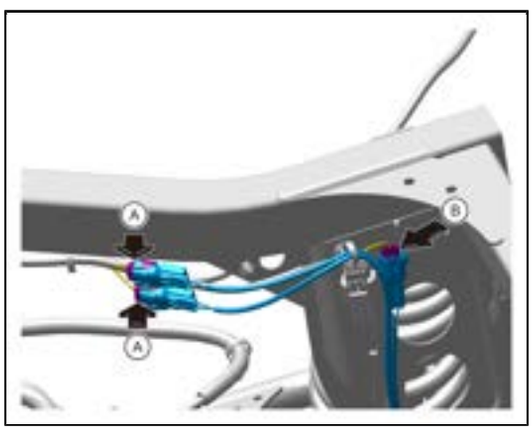
- After filling, check for any gear oil leaks.
- Dispose of drained waste oil in accordance with local regulations.

5.1.7 Repair Procedure Guidance

5.1.7.1 Rear Axle Assembly

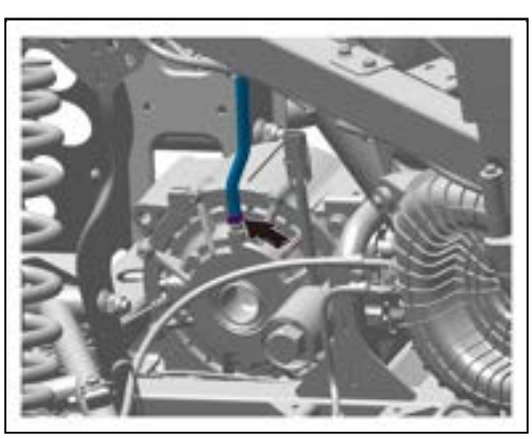
Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To lift the vehicle, See: Vehicle Lifting and Lowering.
3. To remove the rear wheel assembly, See: Wheel Assembly.
4. To drain the rear axle gear oil, See: Rear Axle Gear Oil – Replacement.
5. To remove the rear brake disc, See: Brake Disc.
6. To remove the rear hub carrier, See: Rear Hub Carrier.
7. To remove the rear CV drive shaft assembly, the See: Rear CV Axle Assembly.
8. To remove the rear propeller shaft assembly, See: Rear Propeller Shaft Assembly.
9. To remove the lower silencer mounting bracket assembly, See: Lower Silencer Mounting Bracket Assembly.
10. Removing the rear axle assembly

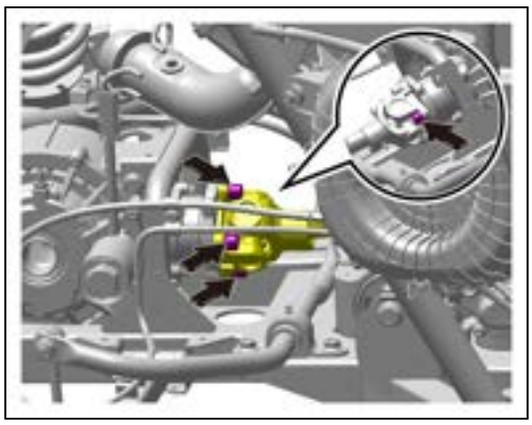


a. Disconnect the 2 wheel speed sensor connectors A and solenoid valve connector B, then cut the cable ties along the wiring harness routing.

NOTICE:
• Cable ties on the harness are single-use and must be replaced after removal. • Disconnect the applicable electrical connectors according to the vehicle configuration. • On ABS-equipped vehicles, also disconnect the 2 wheel speed sensor connectors. • On models equipped with a differential, disconnect the solenoid valve connector.

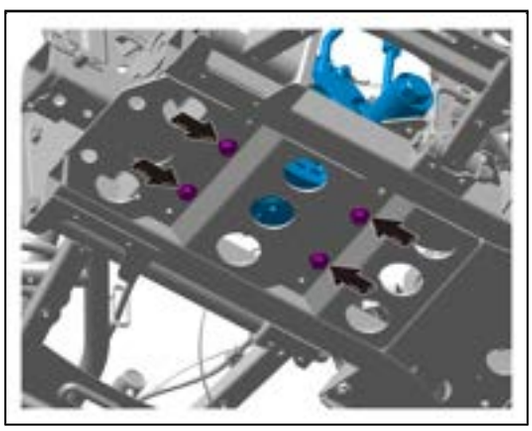


b. Release the spring-band hose clamp and disconnect the breather hose.



c. Remove the 4 M10 × 1.25 × 25 mounting bolts from the rear section of the rear propeller shaft, then disconnect the rear section of the shaft.

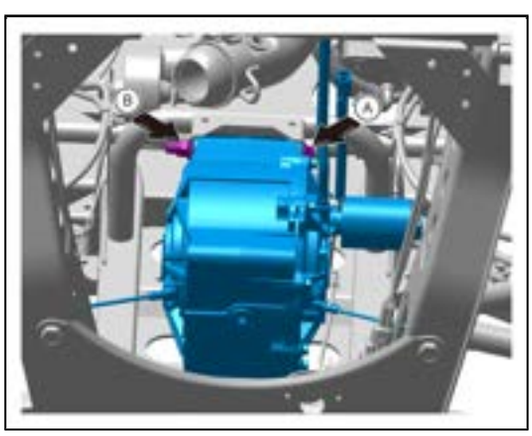
Torque: 51.6 ft-lbs(70N·m)



d. Remove the 4 M10 × 1.25 × 20 lower rear axle assembly mounting bolts.

Torque: 33.2 ft-lbs(45N·m)

NOTICE:
• The 4 lower rear axle assembly mounting bolts may be removed before supporting the vehicle.



e. Remove rear axle assembly mounting bolt A (M10 × 1.25 × 125) and mounting nut B, then remove the rear axle assembly.

Torque: 33.2 ft-lbs(45N·m)

Installation Procedure

1. **Install the rear axle assembly in the reverse order of removal, observing the following points:**
   a. After installation, fill with rear axle gear oil. See: Rear Axle Gear Oil – Replacement

5.1.8 Disassembly and Reassembly

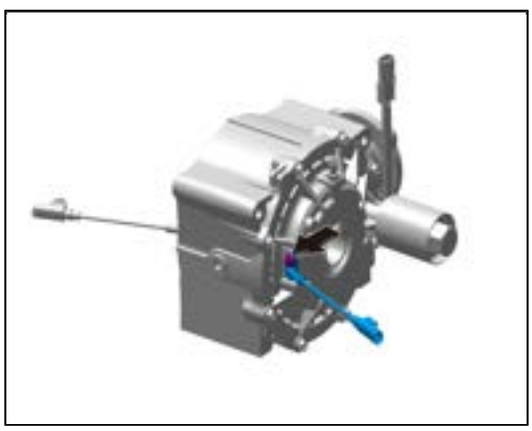
5.1.8.1 Rear Axle Assembly Disassembly and Reassembly (ABS Version with Differential)

Removal Procedure

CAUTION:

- Before removal, plug the output shaft opening with clean non-woven cloth, and use a cloth and compressed air to clean any dirt from the rear axle assembly.

1. Removing the ABS sensor and solenoid valve assembly



a. Remove the ABS sensor mounting screws and take out the ABS sensor.

NOTICE:

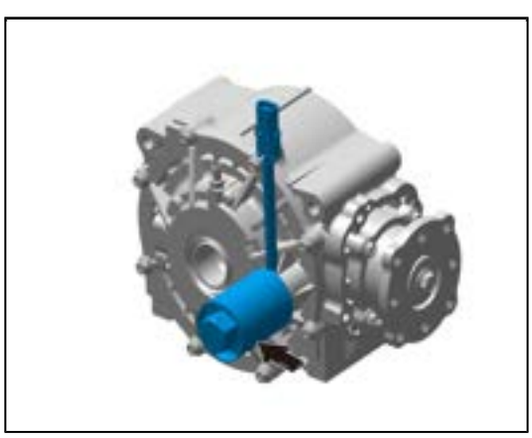
- This step is required only on axles fitted with ABS.



b. Remove the ABS sensor mounting screws and take out the ABS sensor.

NOTICE:

- This step is required only on axles fitted with ABS.



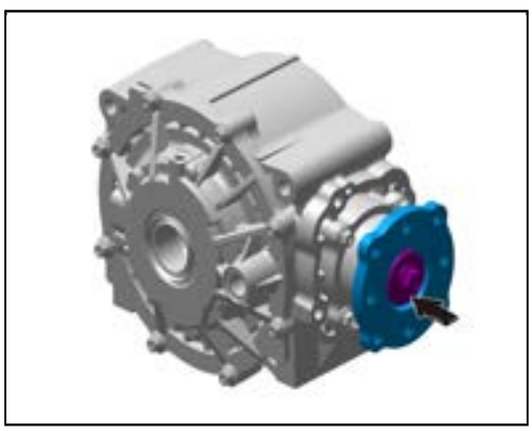
c. Remove and take out the solenoid valve assembly.

2. Remove the breather hose connector

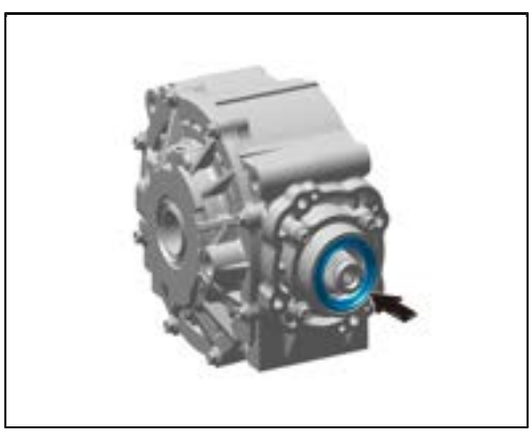


a. Remove the vent hose fitting.

3. Removing the bevel gear assembly



a. Remove the propeller shaft flange mounting bolts, then remove the flange.



b. Remove the 44 × 60 × 7 oil seal.



c. Remove the 4 mounting bolts from the pinion bearing housing, then remove the pinion bearing housing together with the bearing components.



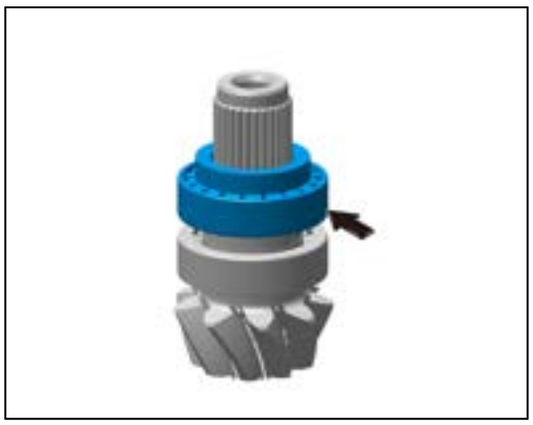
d. Remove the drive bevel gear shims (0.3, 0.4, 0.5, 0.6, 0.7).



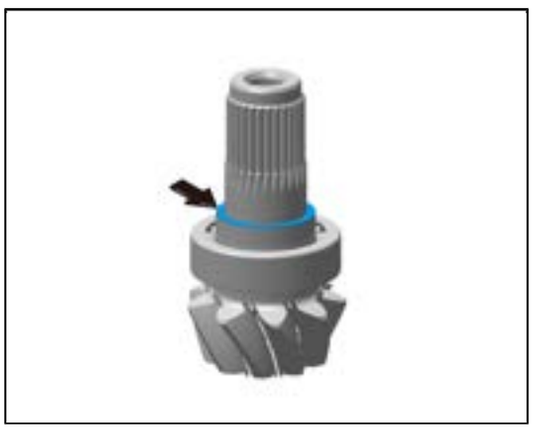
e. Remove the bevel gear assembly.



f. Remove the 61.5 × 2.65 O-ring.



g. Remove tapered roller bearing 33006.



h. Remove the clearance shims (0.3, 0.4, 0.5, 0.6, 0.7).

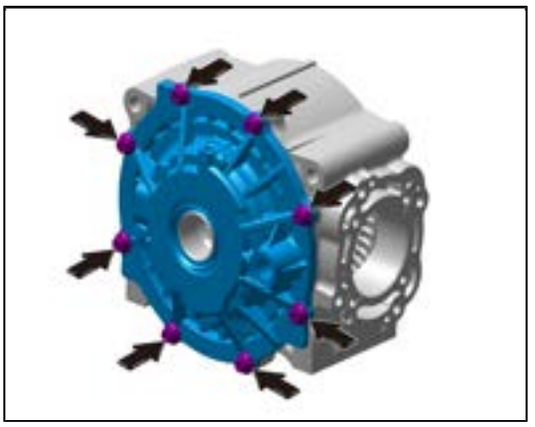


i. Remove the bush.



j. Remove tapered roller bearing 32006.

4. Removing the rear axle assembly end cover



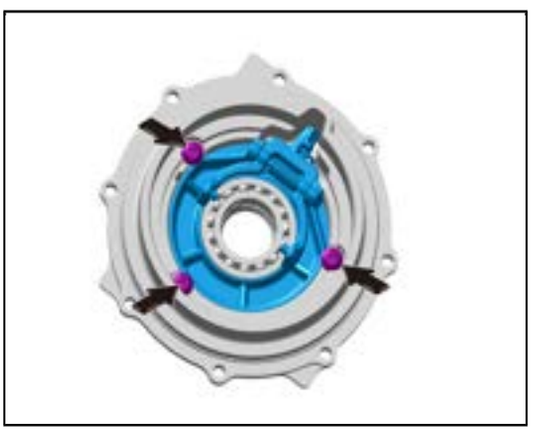
a. Remove the 8 mounting bolts from the rear axle assembly end cover, then remove the end cover together with its attached components.

CAUTION:

- **Do not lever the rear axle end cap from the housing during disassembly.**



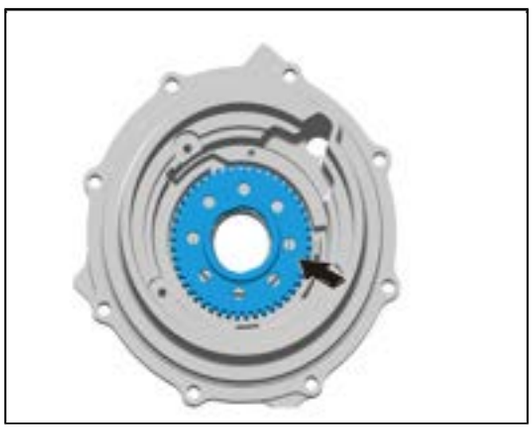
b. Remove the engagement sleeve.



c. Remove the 3 mounting bolts from the bearing housing, then remove the bearing housing and selector fork assembly.

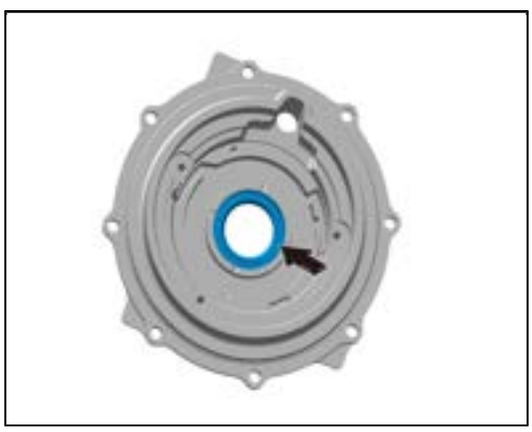


d. Remove deep-groove ball bearing 16008.



e. Remove the ABS sensor ring

NOTICE:
• This step applies only to axles equipped with ABS.



f. Remove the 37 × 55 × 7 oil seal.

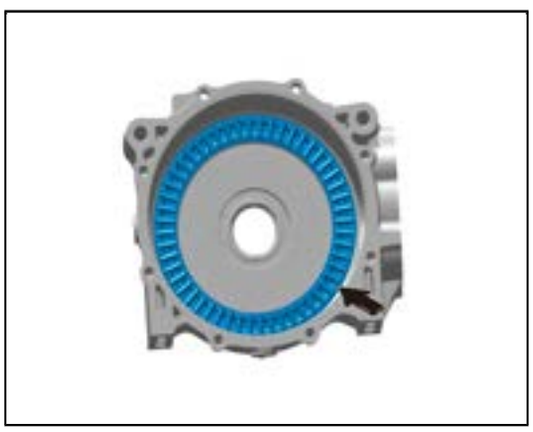


g. Remove the rectangular gasket, 180 × 185 × 3.

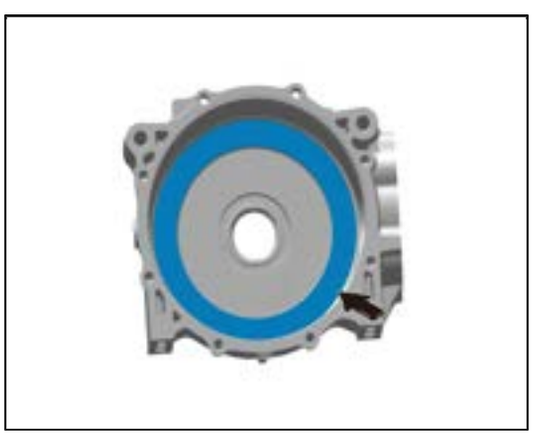
5. Removing the rear axle casing



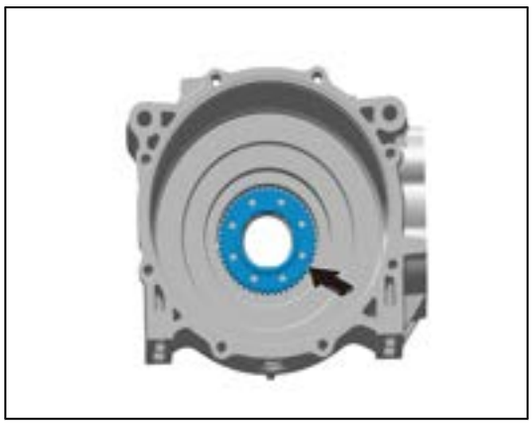
a. Remove the differential with its bearings.



b. Remove thrust needle roller bearing AXK 130 × 170 × 5.

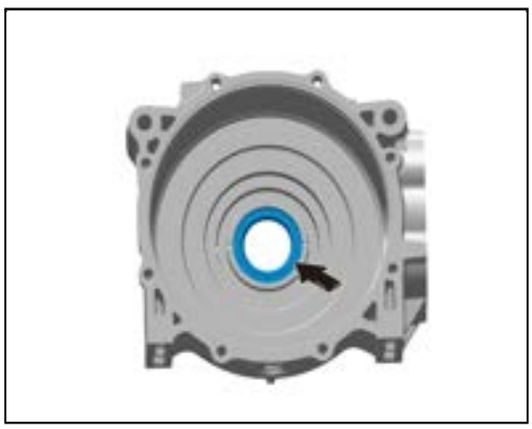


c. Remove the stop pad.



d. Remove and extract the ABS sensor ring.

NOTICE:
• This step applies only to axles equipped with ABS.



e. Remove the 37 × 55 × 7 oil seal.



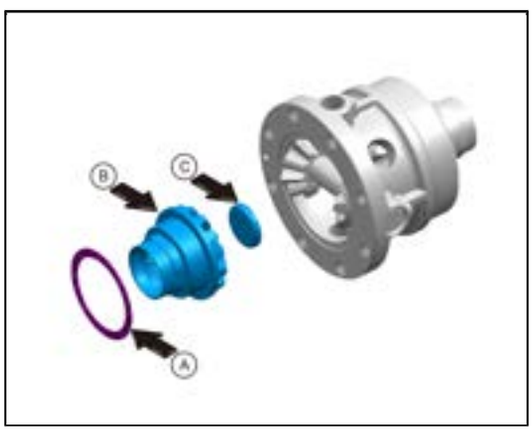
f. Remove the deep-groove ball bearing 60197.



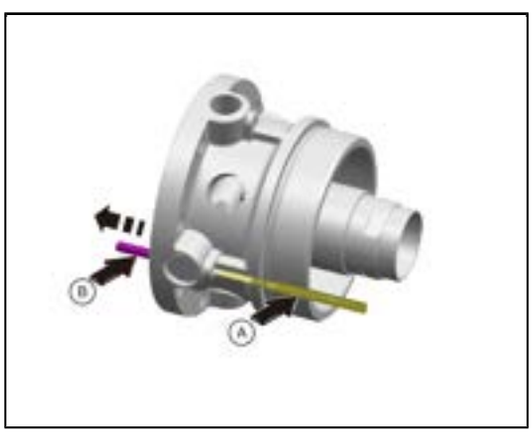
g. Remove the deep-groove ball bearing 16012.



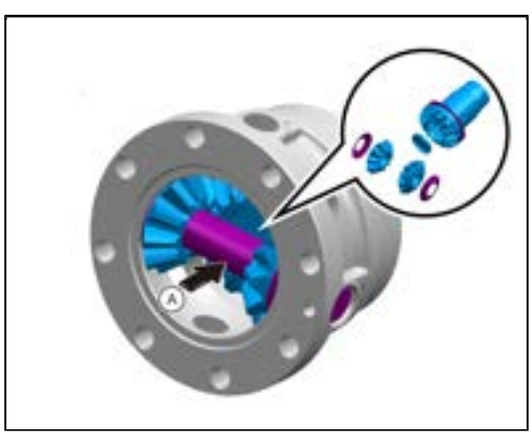
h. Remove the 8 mounting bolts (A) and remove the drive and driven bevel gear assembly (B).



i. Remove the differential side gear thrust washer (A), differential side gear II (B), and blanking cover assembly (C) in sequence.



j. Use a pin punch (A) to drive out the locking pin 5x28 (B).



k. Remove the differential pinion gear shaft (A) from the outside, releasing the axial retention of the internal components in the differential case.

l. Remove the pinion gears, pinion gear thrust washers, and differential side gear I blanking cover assembly from the differential case in sequence.

Inspection and cleaning procedure

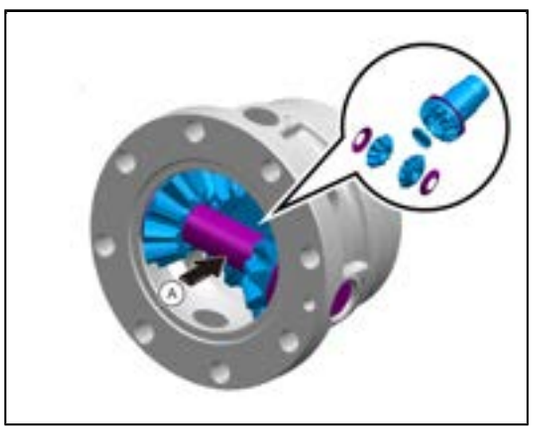
1. Inspecting and cleaning the housing

   a. Inspect the rear axle casing and end cap for damage or cracks. Replace with new parts if necessary.

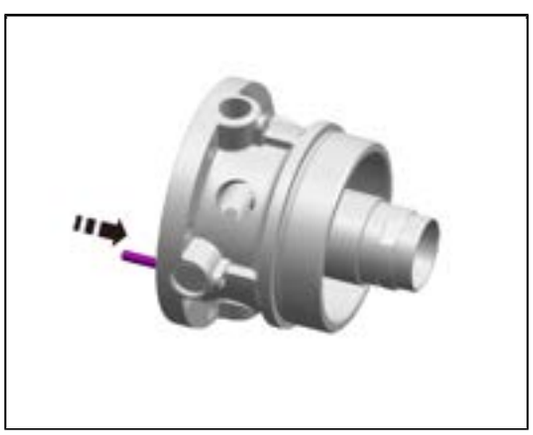
   b. Clean the rear axle casing and end cap, and remove any residual debris with compressed air.

Installation Procedure

1. Installing the differential and bearings

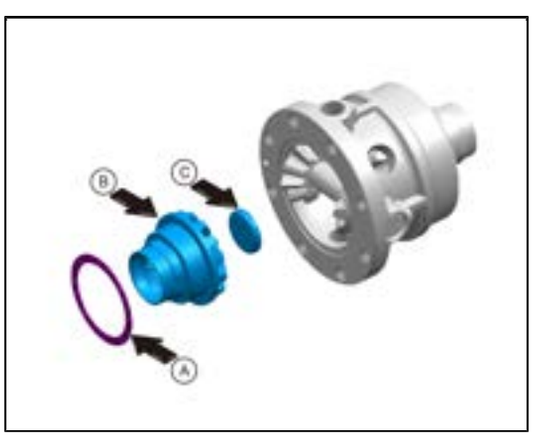


a. Place the pinion gear thrust washers, differential bevel pinions, and differential side gear I blanking cover assembly into the differential case, align them with the case shaft bores, and insert the differential pinion gear shaft (A).



b. Install the spring locking pin 5x28.

NOTICE:
• After assembly, manually rotate the differential bevel pinions to verify they turn smoothly without binding, and ensure the overall assembly has no excessive play.



c. Install the differential side gear II (B), blanking cover assembly (C), and differential side gear thrust washer (A) in order.



d. Install the drive and driven bevel gear assembly (B) onto the differential case, and install the 8 mounting bolts (A).

Torque: 49 ft-lbs(70N·m)

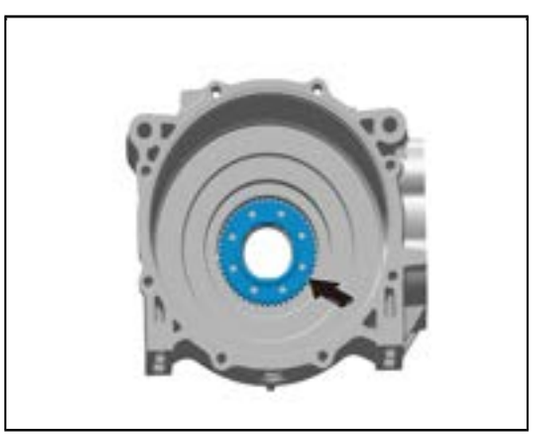


e. Using a press, fit deep-groove ball bearing 16012 onto the reducer.



f. Using a press, fit deep-groove ball bearing 60197 onto the reducer.

2. Installing the rear axle casing

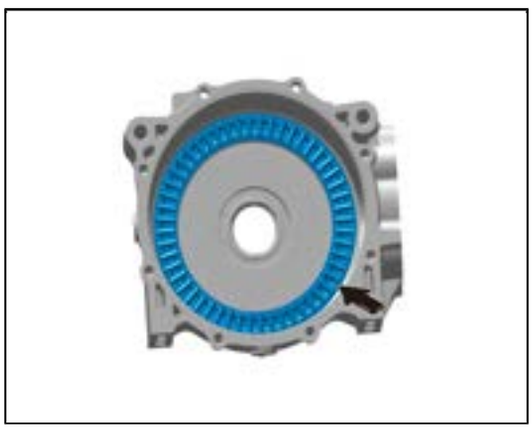


a. Install the ABS sensor ring in the rear axle casing.

NOTICE:
• This step applies only to axles equipped with ABS.



b. Install the stop pad in the rear axle casing.



c. Install thrust needle roller bearing AXK 130 × 170 × 5 in the rear axle casing.



d. Install the reduction gear and bearing assembly in the rear axle casing.

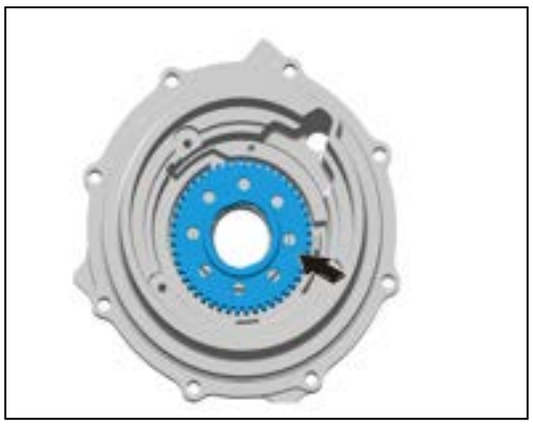
3. Fitting the rear axle assembly end cap



a. Fit the rectangular gasket, 180 × 185 × 3, to the rear axle assembly end cover.

NOTICE:

- **The seals are single-use parts and must not be reused. Always install new seals during assembly.**
- **When fitting the O-ring, apply a thin layer of grease.**

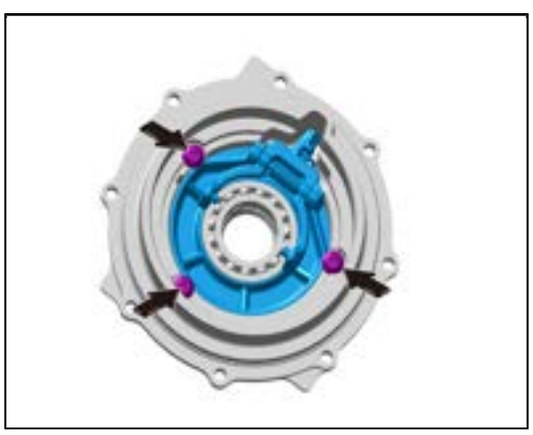


b. Install the ABS sensor ring in the rear axle assembly end cover.

NOTICE:
• This step applies only to axles equipped with ABS.



c. Install deep-groove ball bearing 16008 in the bearing housing.



d. Install the bearing housing together with the bearing assembly into the rear axle assembly end cover, then install and tighten the 3 mounting bolts.



e. Install the engagement sleeve.



f. Clean the mating surfaces of the rear axle casing and end cap, and apply a thin layer of silicone rubber sealant.

g. Fit the rear axle end cap with its components onto the rear axle housing.

h. Apply a uniform coat of threadlocker to the bolt threads, and install the 8 rear axle end cover mounting bolts.

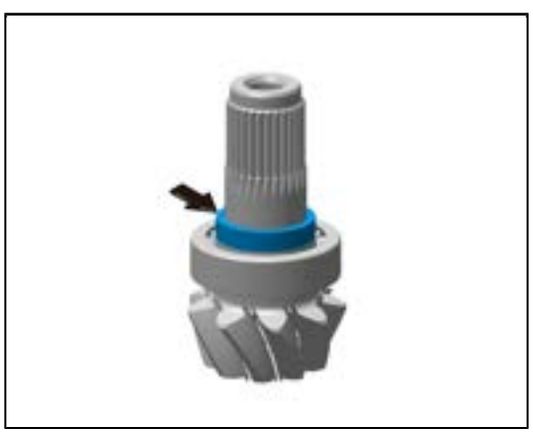
Torque: 18.5 ft-lbs(25N·m)

4. Installing the bevel gear assembly

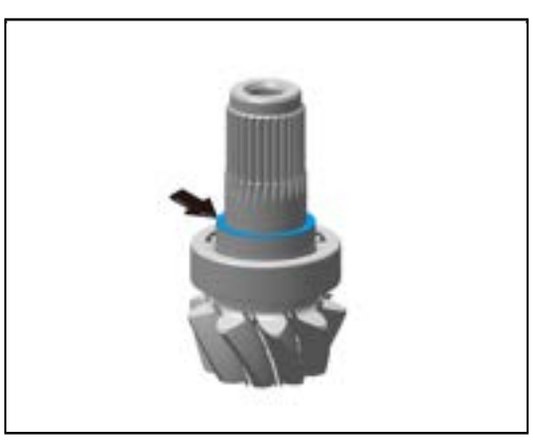


a. Clean the bevel gear assembly and place it on the assembly platform.

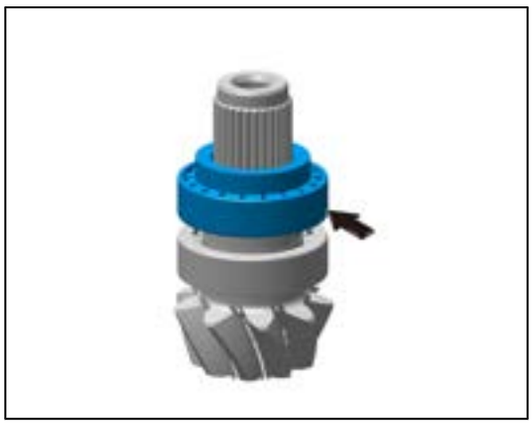
b. Using a press, fit tapered roller bearing 32006 onto the bevel gear assembly.



c. Install the bush.



d. Install the clearance shims (0.3, 0.4, 0.5, 0.6, 0.7).



e. Using a press, fit tapered roller bearing 33006 onto the bevel gear assembly.



f. Fit the 61.5 × 2.65 O-ring to the pinion bearing housing.

NOTICE:

- **The O-ring is a single-use part. Always replace with a new O-ring during installation.**
- **Apply a thin layer of grease to the O-ring seal before installation.**



g. Install the assembled bevel gear assembly to the pinion bearing housing.



h. Install the drive bevel gear shims (0.3, 0.4, 0.5, 0.6, 0.7).



i. Position the assembled pinion bearing housing at the mounting location, then install and tighten the 4 mounting bolts.

CAUTION:

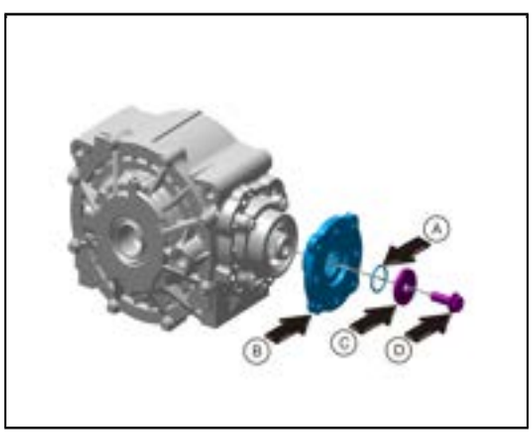
- **After installation, rotate the bevel gear assembly to ensure that it turns smoothly, without binding or abnormal noise.**



j. Install oil seal 44 × 60 × 7.

NOTICE:

- **The oil seal is a single-use part. Always fit a new oil seal during installation.**
- **When installing the oil seal, apply a light coating of grease to the seal lip.**



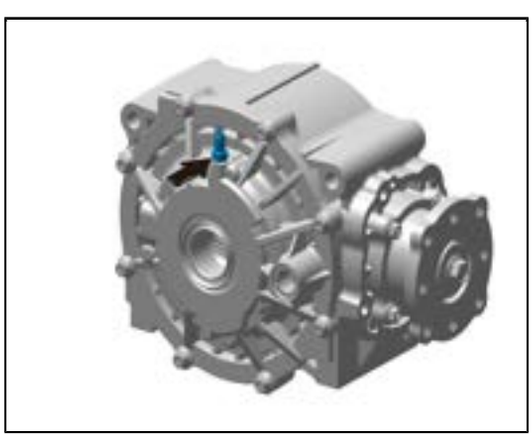
k. Fit the O-ring 25×2.65 A into the groove of Propeller Shaft Flange B.

l. Install plain washer C and mounting bolt D.

NOTICE:

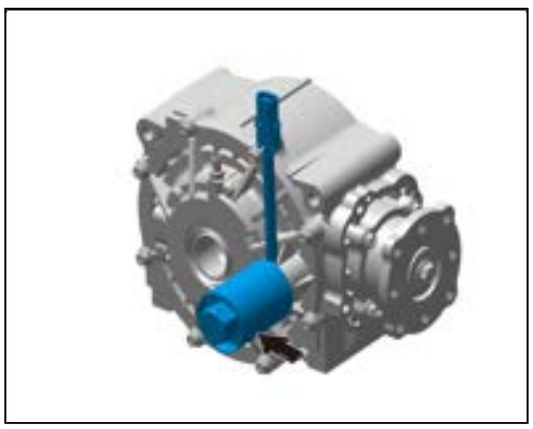
- **The O-ring is a single-use part. Always replace with a new O-ring during installation.**
- **When installing the oil seal O-ring, apply a thin layer of grease to the seal lip.**

5. **Install the breather hose connector**



a. Install the breather hose connector.

6. Installing the ABS sensor and solenoid valve assembly



a. Fit the solenoid valve assembly.

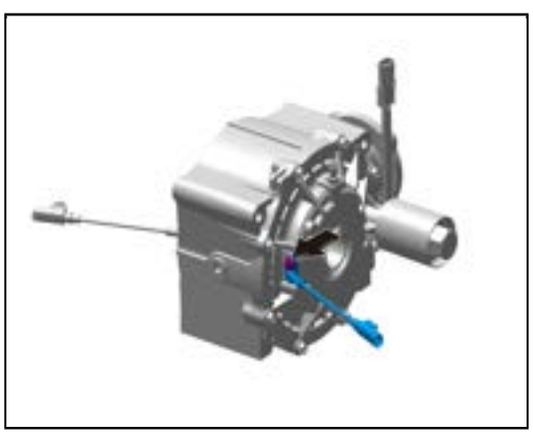


b. Clean the ABS sensor tip.

c. Insert the ABS sensor into the mounting hole and secure it with the mounting screw.

NOTICE:

- **This step applies only to axles equipped with ABS.**



d. Clean the ABS sensor tip.

e. Insert the ABS sensor into the mounting hole and secure it with the mounting screw.

NOTICE:

- **This step applies only to axles equipped with ABS.**



f. Install oil seal 37 × 55 × 7.

NOTICE:

- **The oil seal is a single-use part. Always fit a new oil seal during installation.**
- **When installing the oil seal, apply a light coating of grease to the seal lip.**



g. Install oil seal 37 × 55 × 7.

NOTICE:

- The oil seal is a single-use part. Always fit a new oil seal during installation.
- When installing the oil seal, apply a light coating of grease to the seal lip.

CAUTION:

- The assembled rear axle assembly is supplied without lubricating oil. Fill with lubricating oil after the rear axle assembly has been installed on the vehicle.

5.1.8.2 Disassembly and reassembly of the rear axle assembly (non-differential model)

Removal Procedure

CAUTION:

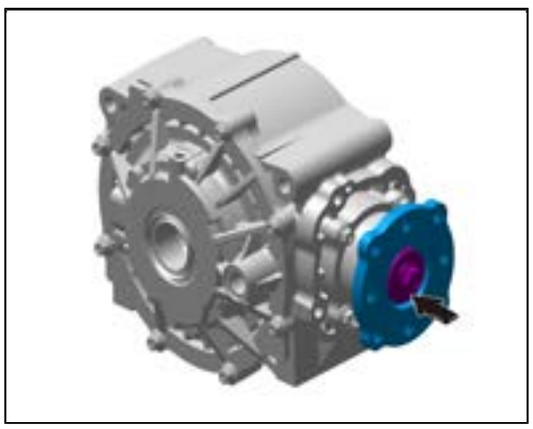
- Before removal, plug the output shaft opening with clean non-woven cloth, and use a cloth and compressed air to clean any dirt from the rear axle assembly.

1. Remove the breather hose connector



a. Remove the vent hose fitting.

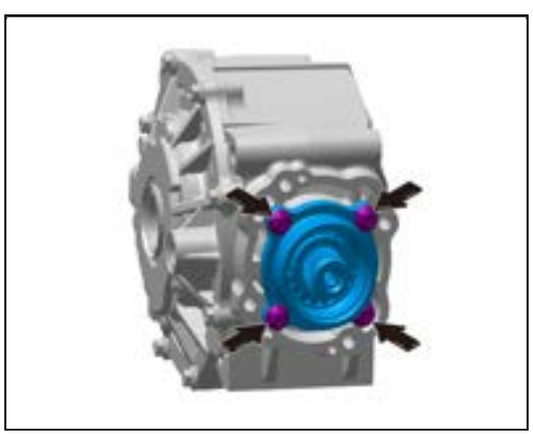
2. Removing the bevel gear assembly



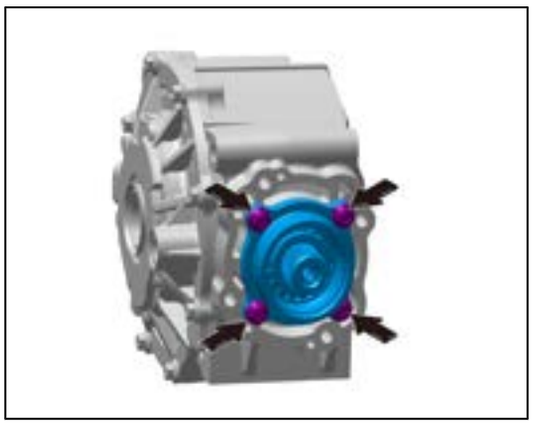
a. Remove the propeller shaft flange mounting bolts, then remove the flange.



b. Remove the 44 × 60 × 7 oil seal.



c. Remove the 4 mounting bolts from the pinion bearing housing, then remove the pinion bearing housing together with the bearing components.



d. Remove the 4 mounting bolts from the pinion bearing housing, then remove the pinion bearing housing together with the bearing components.



e. Remove the drive bevel gear shims (0.3, 0.4, 0.5, 0.6, 0.7).



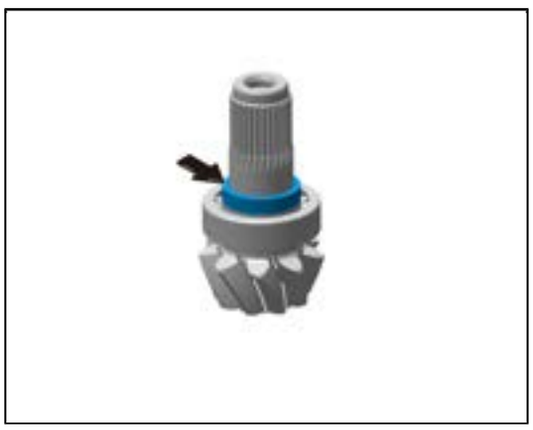
f. Remove the bevel gear assembly.



g. Remove the 61.5 × 2.65 O-ring.



h. Remove tapered roller bearing 33006.



i. Remove the bush.



j. Remove tapered roller bearing 32006.

3. Removing the rear axle assembly end cover



a. Remove the 8 mounting bolts from the rear axle assembly end cover, then remove the end cover together with its attached components.

CAUTION:
• Do not lever the rear axle end cap from the housing during disassembly.

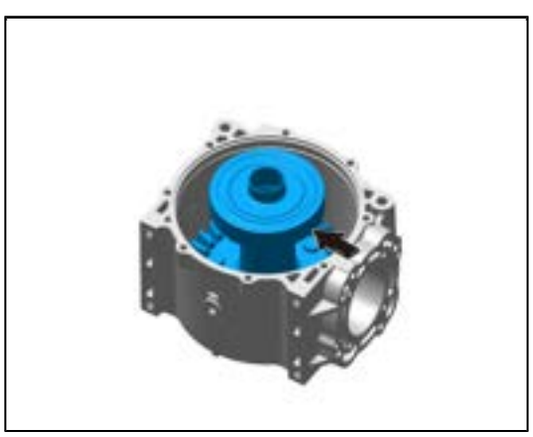


b. Remove the rectangular gasket, 180 × 185 × 3.



c. Remove the 37 × 55 × 7 oil seal.

4. Removing the rear axle casing



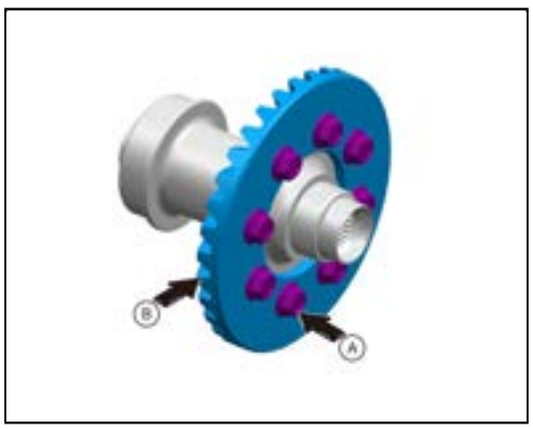
a. Remove the bevel gear assembly.



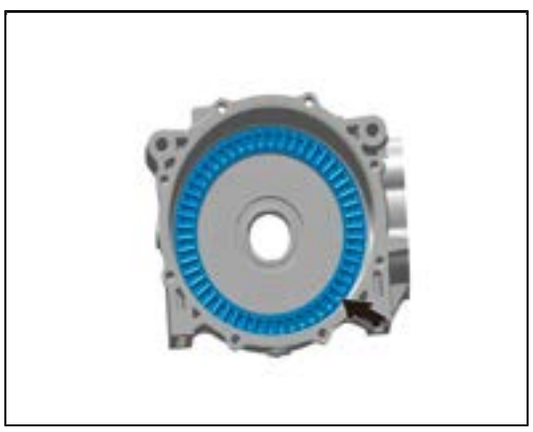
b. Remove the deep-groove ball bearing 6209.



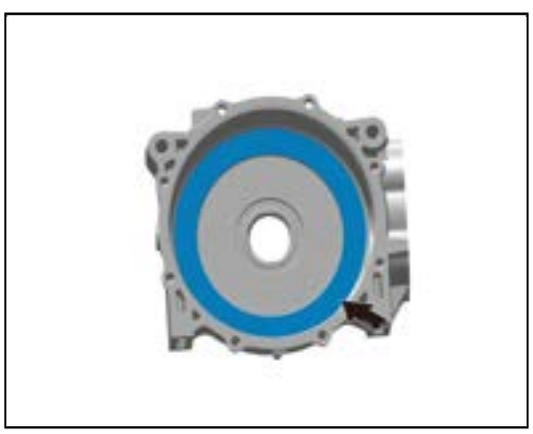
c. Turn over the bevel gear assembly, then remove deep-groove ball bearing 6015-Z.



d. Remove the 8 mounting bolts (A) and remove the drive and driven bevel gear assembly (B).



e. Remove thrust needle roller bearing AXK 130 × 170 × 5.



f. Remove the stop pad.



g. Remove the 37 × 55 × 7 oil seal.

Inspection and cleaning procedure

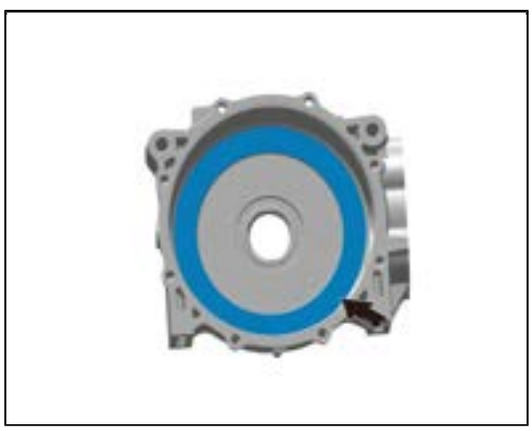
1. Inspecting and cleaning the housing

   a. Inspect the rear axle casing and end cap for damage or cracks. Replace with new parts if necessary.

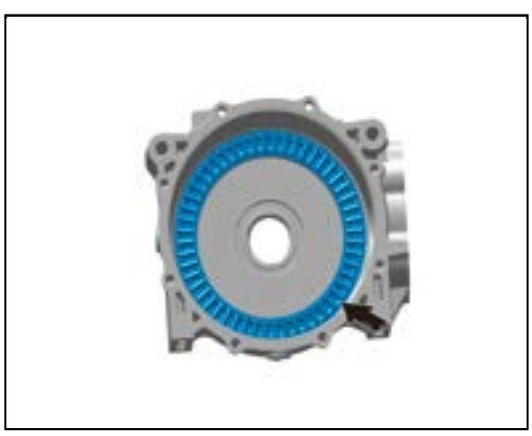
   b. Clean the rear axle casing and end cap, and remove any residual debris with compressed air.

Installation Procedure

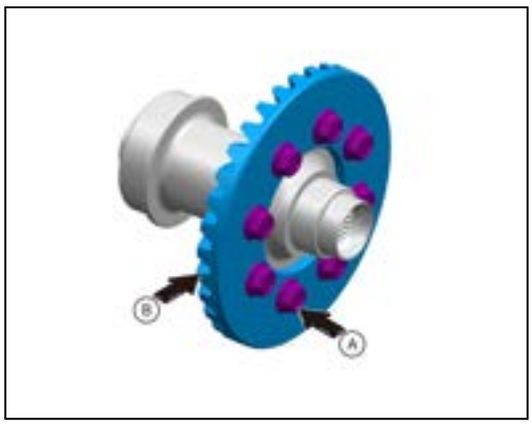
1. Installing the rear axle casing



a. Install the stop pad in the rear axle casing.



b. Install thrust needle roller bearing AXK 130 × 170 × 5 in the rear axle casing.



c. Install the drive and driven bevel gear assembly (B) onto the differential case, and install the 8 mounting bolts (A).

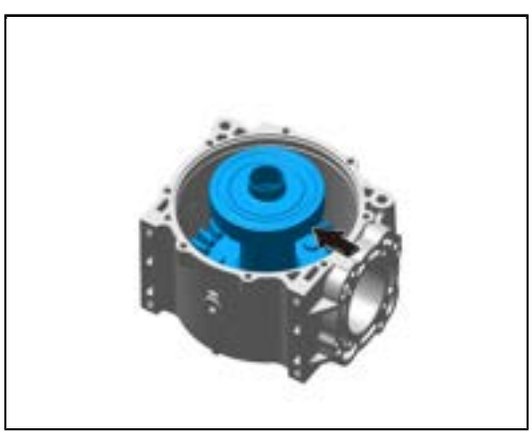
Torque: 49 ft-lbs(70N·m)



d. Use a press to fit the deep-groove ball bearing 6015-Z onto the drive and driven bevel gear assembly.



e. Flip the drive and driven bevel gear assembly onto the assembly platform and press-fit the deep-groove ball bearing 6209.



f. Install the drive and driven bevel gear assembly into the rear axle casing.

2. Fitting the rear axle assembly end cap



a. Fit the rectangular gasket, 180 × 185 × 3, to the rear axle assembly end cover.

NOTICE:

- **The seals are single-use parts and must not be reused. Always install new seals during assembly.**
- **When fitting the O-ring, apply a thin layer of grease.**



b. Clean the mating surfaces of the rear axle casing and end cap, and apply a thin layer of silicone rubber sealant.

c. Fit the rear axle end cap with its components onto the rear axle housing.

d. Apply a uniform coat of threadlocker to the bolt threads, and install the 8 rear axle end cover mounting bolts.

Torque: 18.5 ft-lbs(25N·m)

3. Installing the bevel gear assembly



a. Clean the bevel gear assembly and place it on the assembly platform.

b. Using a press, fit tapered roller bearing 32006 onto the bevel gear assembly.



c. Install the bush.



d. Install the clearance shims (0.3, 0.4, 0.5, 0.6, 0.7).



e. Using a press, fit tapered roller bearing 33006 onto the bevel gear assembly.



f. Fit the 61.5 × 2.65 O-ring to the pinion bearing housing.

NOTICE:

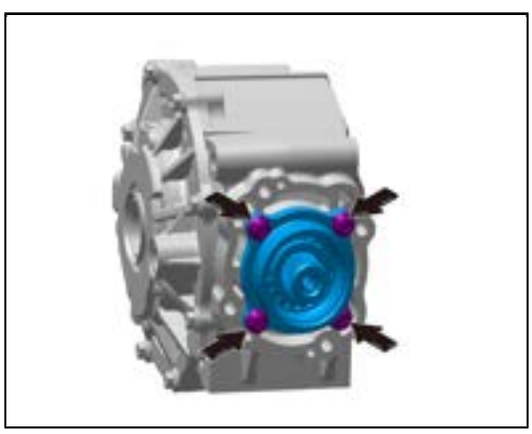
- **The O-ring is a single-use part. Always replace with a new O-ring during installation.**
- **Apply a thin layer of grease to the O-ring seal before installation.**



g. Install the assembled bevel gear assembly to the pinion bearing housing.



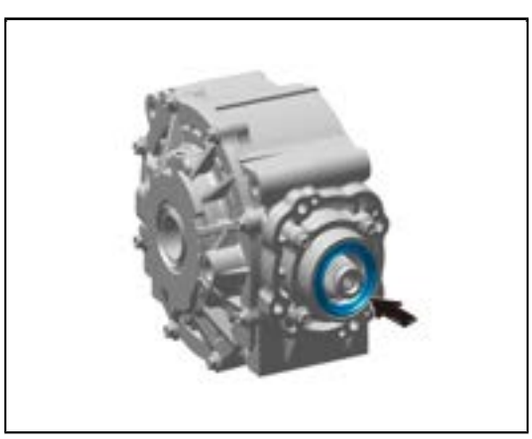
h. Install the drive bevel gear shims (0.3, 0.4, 0.5, 0.6, 0.7).



i. Position the assembled pinion bearing housing at the mounting location, then install and tighten the 4 mounting bolts.

CAUTION:

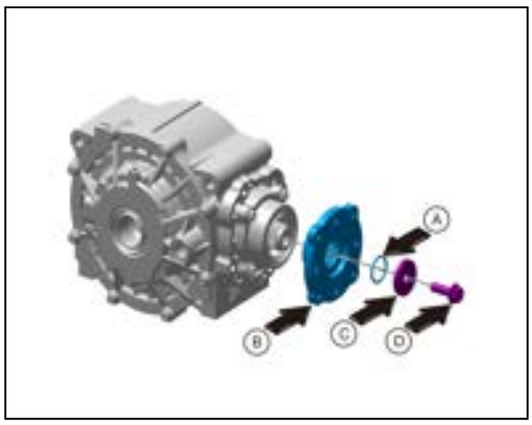
- **After installation, rotate the bevel gear assembly to ensure that it turns smoothly, without binding or abnormal noise.**



j. Install oil seal 44 × 60 × 7.

NOTICE:

- **The oil seal is a single-use part. Always fit a new oil seal during installation.**
- **When installing the oil seal, apply a light coating of grease to the seal lip.**

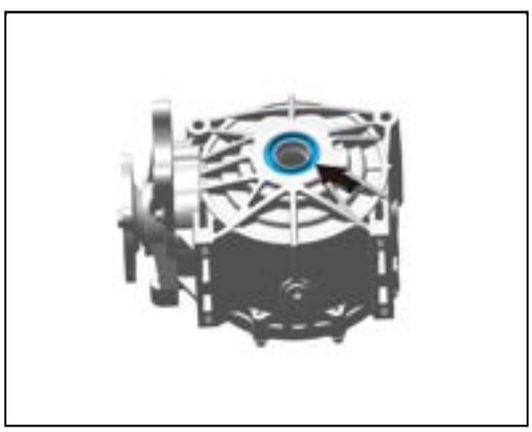


k. Fit the O-ring 25×2.65 A into the groove of Propeller Shaft Flange B.

l. Install plain washer C and mounting bolt D.

NOTICE:

- The O-ring is a single-use part. Always replace with a new O-ring during installation.
- When installing the oil seal O-ring, apply a thin layer of grease to the seal lip.



m. Install oil seal 37 × 55 × 7.

NOTICE:

- The oil seal is a single-use part. Always fit a new oil seal during installation.
- When installing the oil seal, apply a light coating of grease to the seal lip.



n. Install oil seal 37 × 55 × 7.

NOTICE:

- The oil seal is a single-use part. Always fit a new oil seal during installation.
- When installing the oil seal, apply a light coating of grease to the seal lip.

4. Install the breather hose connector



a. Install the breather hose connector.

CAUTION:
• The assembled rear axle assembly is supplied without lubricating oil. Fill with lubricating oil after the rear axle assembly has been installed on the vehicle.

6.1 Front Suspension

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6.1.1 Specifications

6.1.1.1 Fastener Specifications

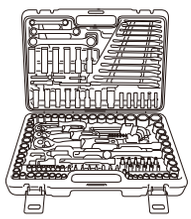
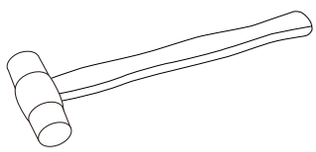
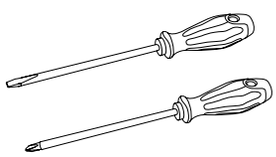
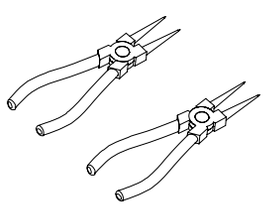
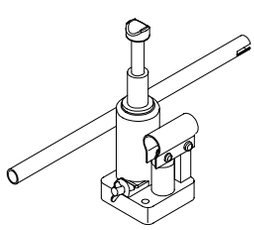
Item	Torque (N·m)	Torque (ft-lbs)
Front Shock Absorber Mounting Nut M10×1.25	70±5	51.6±3
Front Shock Absorber Mounting Bolt M10×1.25×55	70±5	51.6±3
Front Upper Control Arm Welded Assembly Mounting Bolt M12×1.25×90	115±5	84.8±3
Front Upper Control Arm Welded Assembly Mounting Bolt M12×1.25×95	115±5	84.8±3
Front Upper Control Arm Welded Assembly Mounting Nut M12×1.25	115±5	84.8±3
Front Lower Control Arm Welded Assembly Mounting Bolt M12×1.25×90	115±5	84.8±3
Front Lower Control Arm Welded Assembly Mounting Nut M12×1.25	115±5	84.8±3
Front Steering Knuckle Upper Mounting Bolt, M10 × 1.25 × 55	70±5	51.6±3
Front Steering Knuckle Lower Mounting Bolt, M10 × 1.25 × 45	70±5	51.6±3
Front Steering Knuckle Mounting Nut, M10 × 1.25	70±5	51.6±3
Anti-Roll Bar Mounting Bracket Mounting Bolt M8×30	23±3	17±2
Front Anti-Roll Bar Link Mounting Nut M10×1.25	45±5	34±3

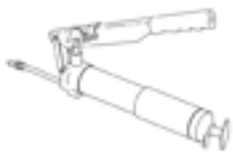
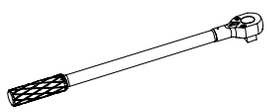
6.1.1.2 Service Specifications

Item	Specified Value	Specifications
Spring preload setting position for standard hydraulic damping shock absorber	Setting 3	Settings 1 to 5

6.1.2 Service Tools

6.1.2.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)
2	Rubber mallet		Front axle removal and installation
3	Screwdriver		Removing screws
4	Circlip Pliers		Removing and installing circlips
5	Jack		Lifting the Vehicle

Item No.	Tool Description	Tool Diagram	Purpose/Use
6	Grease gun		Apply grease.
7	Torque Wrench		Tightening bolts and nuts to the specified torque

6.1.3 Description and Operation

6.1.3.1 Warnings and Precautions

1. When inspecting the front suspension system, park the vehicle on a level, dry surface.
2. Bolts and nuts for all components must be tightened to the specified torque.
3. If any mounting bolt or nut is found to be damaged during servicing, replace it immediately.
4. Before driving, check the vehicle for safe operating condition and start the vehicle only after confirming that there are no safety hazards.
5. After dismantling the front suspension system, take suitable protective measures to prevent the parts from becoming contaminated.
6. Before carrying out service work, ensure that the operator is wearing the appropriate protective equipment, such as safety footwear, work gloves and safety goggles, to ensure personal safety.
7. During inspection and repair, always follow the relevant instructions and standard procedures. Read the applicable instructions carefully before using workshop equipment and SST.

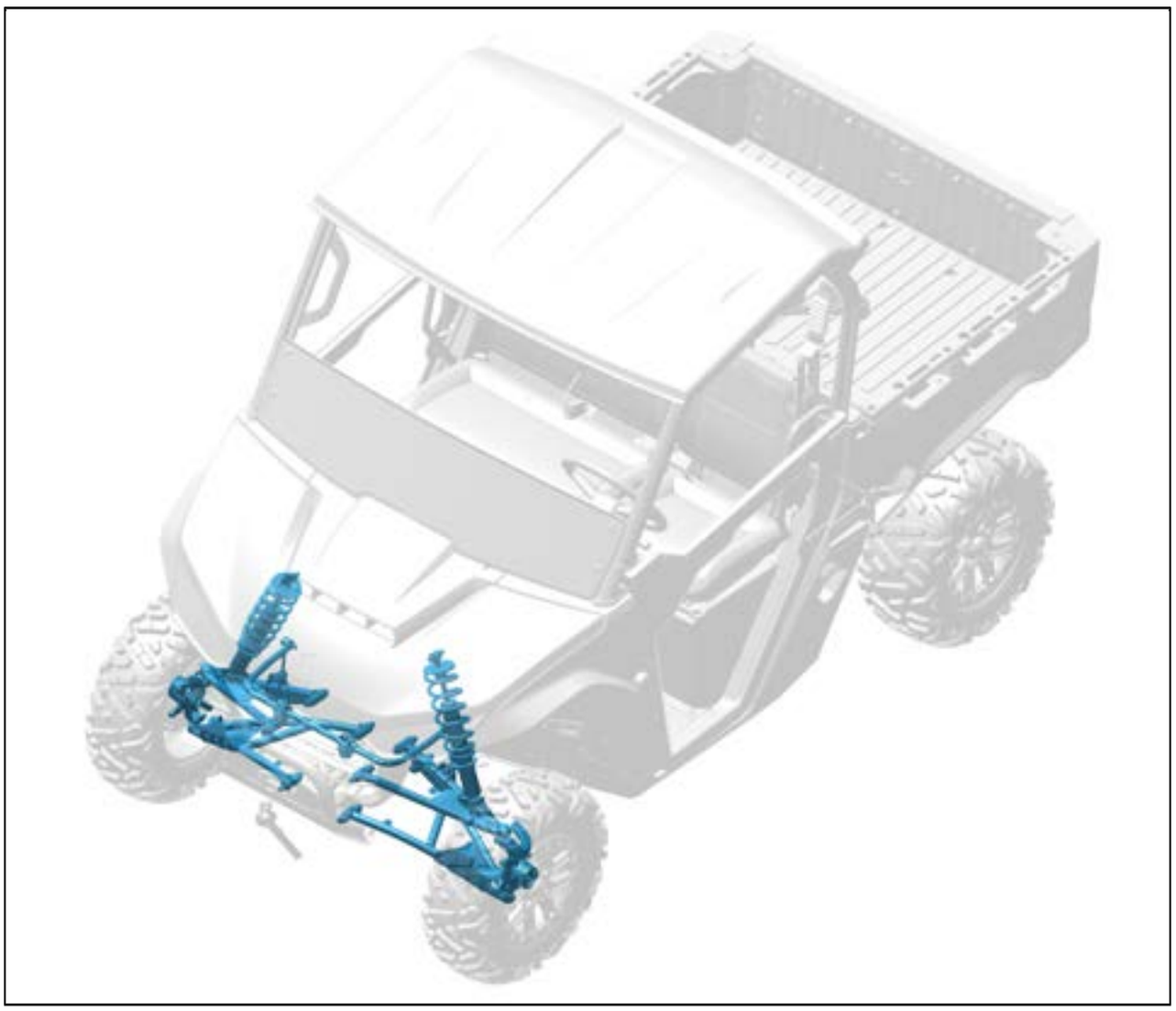
6.1.3.2 System Description

1. System Description
   a. The vehicle suspension is the force-transmitting system between the vehicle frame and the wheels. It cushions impact loads from the road acting on the frame or body, reduces body vibration caused by these loads, and ensures driving stability, driving comfort and safety.
   b. It transmits the driving force and braking force generated by friction between the road surface and the wheels to the vehicle frame and body.
   c. It supports the body and maintains the correct geometric relationship between the body and the wheels.
2. Components
   a. The assembly mainly consists of the front steering knuckle, front upper control arm welded assembly, control arm guard, front lower control arm welded assembly, front anti-roll bar assembly, front anti-roll bar link assembly and front shock absorber assembly.

6.1.4 Component Location and Exploded View

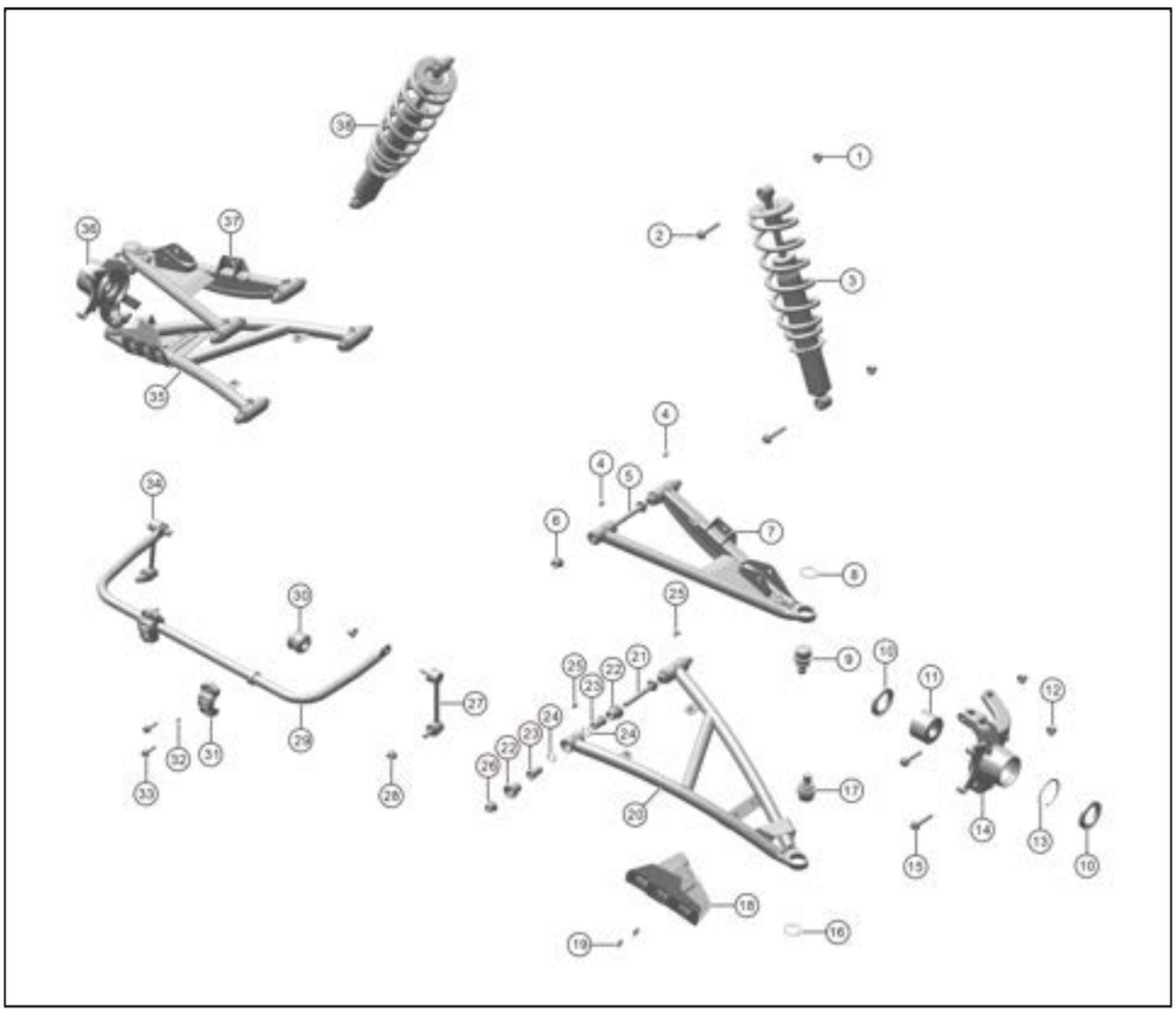
6.1.4.1 Component Location Diagram

Front suspension system



6.1.4.2 Exploded View Diagram

Front suspension system



1	Hex Flange Lock Nut	14	Front Left Steering Knuckle	27	Front Left Anti-Roll Bar Link
2	Hex flange bolt	15	Hex flange bolt	28	Hex Flange Lock Nut
3	Front Left Shock Absorber Assembly	16	External Circlip	29	Front Anti-roll Bar Assembly
4	90° Angled Grease Nipple	17	Kingpin Assembly	30	Front anti-roll bar bump stop
5	Hex flange bolt	18	Front Left Lower Control Arm Guard	31	Front Anti-Roll Bar Mounting Bracket
6	Hex Flange Lock Nut	19	Large Pan Head Hex Socket Bolt	32	Straight Grease Nipple
7	Front Left Upper Control Arm	20	Front Left Lower Control Arm Welded	33	Hex flange bolt

	Welded Assembly		Assembly		
8	External Circlip	21	Hex flange bolt	34	Front Right Anti-Roll Bar Link
9	Kingpin Assembly	22	Control Arm Damper Bushes	35	Front Right Lower Control Arm Welded Assembly
10	Halfshaft Oil Seal	23	Control Arm T-Bush I	36	Front Right Steering Knuckle
11	Wheel Hub Bearing	24	O-Ring Seal	37	Front Right Upper Control Arm Welded Assembly
12	Hex Flange Lock Nut	25	90° Grease Nipple	38	Front Right Shock Absorber Assembly
13	Internal Circlip	26	Hex Flange Lock Nut		

6.1.5 General Fault Diagnosis and Operation

6.1.5.1 Fault Symptom List

Symptom(s)	Possible Causes	Recommended Repair Procedure
Body sagging / leaning	1. Tyre pressure incorrect	Adjust the tyre pressure as required
	2. Vehicle overloaded	Reduce the load
	3. Front shock absorber assembly damaged	Replace
	4. Front Anti-Roll Bar Assembly (Damaged)	Replace
Abnormal noise from the suspension	1. Suspension components (bolts or nuts loose)	Tighten the bolts and nuts
	2. Front shock absorber assembly (bolts or nuts loose or damaged)	Tighten the bolts and nuts, or replace as necessary
	3. Front Anti-Roll Bar Drop Link (Damaged)	Replace
	4. Front Anti-Roll Bar Assembly (Damaged)	Replace

6.1.6 Inspecting and adjusting

6.1.6.1 Checking suspension system

Checking suspension system

1. General Inspection
   a. Check all connecting bushes for ageing or damage.
   b. Check all connecting bolts and nuts for looseness.
   c. Check all connecting components for deformation or cracks.
2. Inspecting the front anti-roll bar assembly
   a. Move the front anti-roll bar assembly by hand and check for excessive play.

NOTICE:
• If excessive play is present in the front anti-roll bar assembly, the anti-roll bar bushes are worn and must be replaced.

3. Checking the ball joint and kingpin
   a. Insert a pry bar between the ball joint and the steering knuckle assembly, then lever it up and down.

NOTICE:
• If the ball joint is securely fitted, the ball joint connection is normal. • If there is relative movement between the ball joint and the steering knuckle assembly, replace the tie-rod assembly.

   b. Insert a pry bar between the kingpin assembly and the steering knuckle assembly, then lever it up and down.

NOTICE:
• If the kingpin assembly is securely fitted, the kingpin assembly connection is normal. • If there is relative movement between the kingpin assembly and the steering knuckle assembly, replace the kingpin assembly.

4. Front Anti-roll Bar Assembly Maintenance



a. Lubricate the front anti-roll bar assembly at the specified intervals to ensure correct operation.

NOTICE:

- **Ensure that the front anti-roll bar assembly is dry before lubrication.**

5. Front Upper Control Arm Welded Assembly Maintenance



a. Apply grease to the front upper control arm welded assembly regularly to ensure proper operation.

NOTICE:

- **Ensure the front upper control arm welded assembly is clean and dry before applying grease.**

6. Front Lower Control Arm Welded Assembly Maintenance



a. Apply grease to the front lower control arm welded assembly regularly to ensure proper operation.

NOTICE:

- **Ensure the front lower control arm welded assembly is clean and dry before applying grease.**

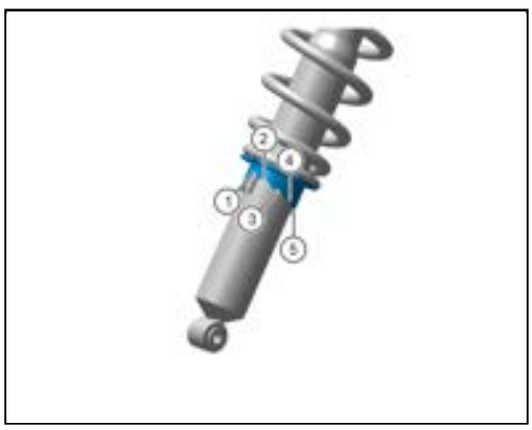
6.1.6.2 Checking front shock absorber assembly

1. **Checking front shock absorber assembly**

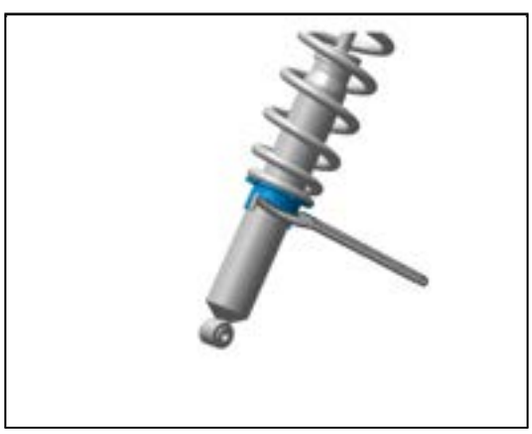
   a. As the front shock absorber assembly is a sealed unit, only an external inspection is required. If one shock absorber is found to be damaged, both shock absorbers must be replaced at the same time; otherwise, this may result in poor high-speed stability or reduced overall driving comfort.

   b. Check the upper and lower mountings, spacer ring, spherical bearing assembly and oil seal; replace with new parts if damaged.

2. **Hydraulic shock absorber adjustment**



a. The hydraulic damper has 5 adjustment positions for different loads or driving conditions.
   - Position 1: for light loads or level terrain.
   - Position 2: standard setting.
   - Positions 3 to 5: for heavier loads.



b. Use a C-spanner to adjust the spring preload.

CAUTION:

- **When adjusting the shock absorbers, always set the left and right units to the same position. Adjust one position at a time, either upwards or downwards. Do not attempt to make large adjustments at once, as this may damage the shock absorbers.**

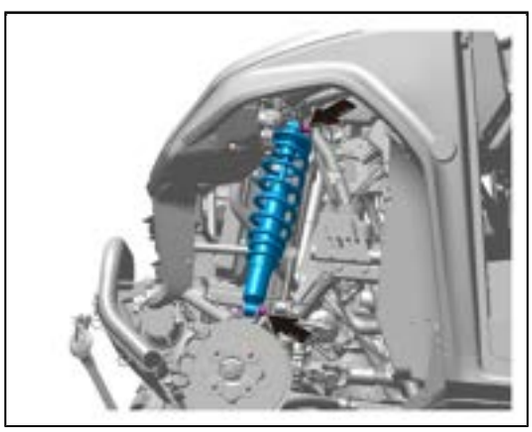
6.1.7 Repair Procedure Guidance

6.1.7.1 Front Shock Absorber Assembly

NOTICE:
• This manual describes removal and installation using the front left shock absorber assembly as an example. For the front right shock absorber assembly, refer to the procedure for the left side.

Removal Procedure

1. To lift the vehicle, See: Vehicle Lifting and Lowering.
2. To remove the front wheel assembly, See: Wheel Assembly.
3. To remove the headlamp cover, See: Headlamp Cover.
4. Removing the front shock absorber assembly



a. Remove the 2 front shock absorber retaining bolts (M10 × 1.25 × 55) and nuts (M10 × 1.25).

b. Remove the front shock absorber assembly.

Torque: 51.6 ± 3 ft-lbs (70 ± 5 N·m).

Installation Procedure

1. Install the front shock absorber assembly in the reverse order of removal, paying attention to the following points:

   a. Before installation, inspect the shock absorber and adjust it to the appropriate operating condition. See: Checking front shock absorber assembly

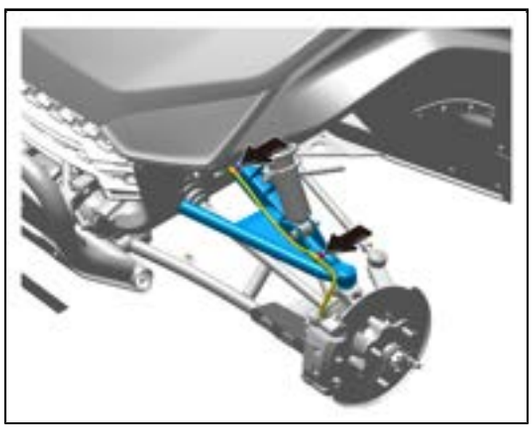
CAUTION:
• After installation, carry out a road test to confirm normal chassis operation.

6.1.7.2 Front Upper Control Arm Welded Assembly

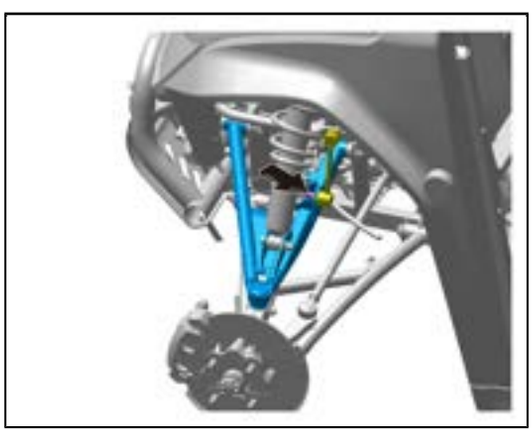
NOTICE:
• This manual describes removal and installation using the front left upper control arm welded assembly as an example. For the front right upper control arm welded assembly, refer to the procedure for the left side.

Removal Procedure

1. To lift the vehicle, See: Vehicle Lifting and Lowering.
2. To remove the front wheel assembly, See: Wheel Assembly.
3. Removing front upper control arm welded assembly

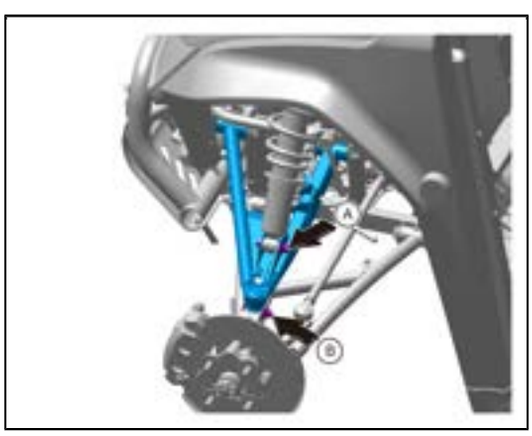


a. Remove the 2 bolts securing the brake pipe.



b. Remove the front anti-roll bar link mounting nut (M10×1.25) and disconnect the drop link from the front upper control arm welded assembly.

Torque: 34 ± 3 ft-lbs (45 ± 5 N·m).

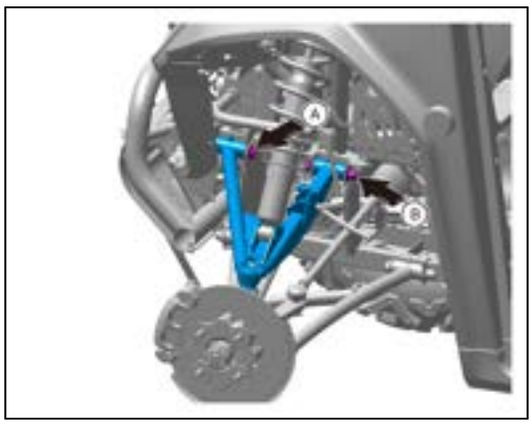


c. Remove front shock absorber retaining bolt A (M10 × 1.25 × 55) and nut A (M10 × 1.25).

Torque: 51.6 ± 3 ft-lbs (70 ± 5 N·m).

d. Remove steering knuckle retaining bolt B (M10 × 1.25 × 55) and nut B (M10 × 1.25), then disconnect the front upper control arm welded assembly from the steering knuckle.

Torque: 51.6 ± 3 ft-lbs (70 ± 5 N·m).

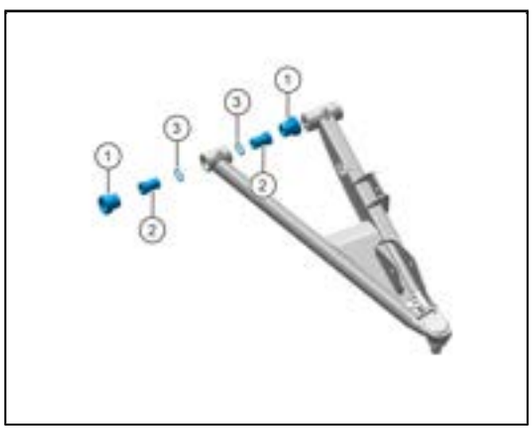


e. Remove front upper control arm welded assembly retaining bolt A (M12 × 1.25 × 90) and nut A (M12 × 1.25).

Torque: 84.8 ± 3 ft-lbs (115 ± 5 N·m).

f. Remove front upper control arm welded assembly retaining bolt B (M12 × 1.25 × 95) and nut B (M12 × 1.25), then remove the front upper control arm welded assembly together with its attachments.

Torque: 84.8 ± 3 ft-lbs (115 ± 5 N·m).



g. Remove the following components separately:

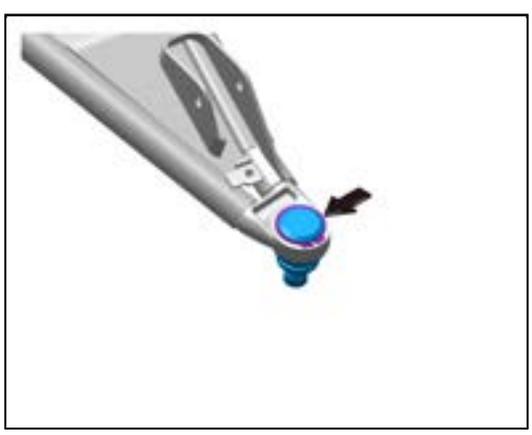
①: Control arm damper bush

②: Control Arm T-Bush I

③: O-Ring

NOTICE:

- **Disassembly of the left rubber bush of the front upper control arm welded assembly is described as an example. For the right side, refer to the procedure for the left side.**
- **The O-ring is a single-use part; always replace it with a new one during assembly.**



h. Remove the external circlip from the upper kingpin assembly, then use a press to press out the upper kingpin assembly.



i. Remove the 2 straight grease nipples, then remove the front upper control arm welded assembly.

Installation Procedure

1. Install the front upper control arm welded assembly in the reverse order of removal, paying attention to the following points:

   a. When refitting the control arm bush, apply grease evenly to the mating surfaces.

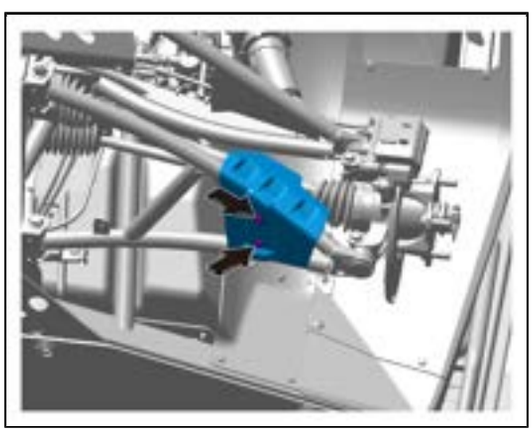
CAUTION:
• After installation, carry out a road test to confirm normal chassis operation.

6.1.7.3 Front Lower Control Arm Welded Assembly

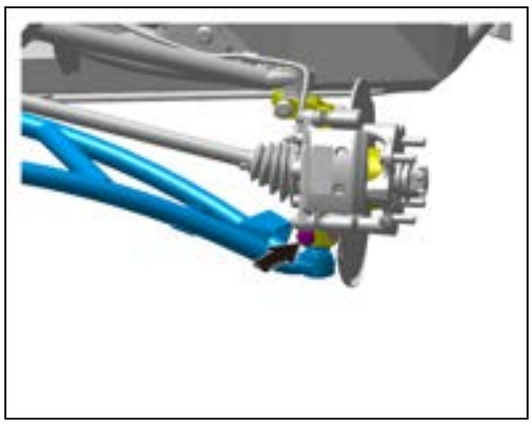
NOTICE:
• This manual describes removal and installation using the front left lower control arm welded assembly as an example. For the front right lower control arm welded assembly, refer to the procedure for the left side.

Removal Procedure

1. To lift the vehicle, See: Vehicle Lifting and Lowering.
2. To remove the front wheel assembly, See: Wheel Assembly.
3. Removing front lower control arm welded assembly

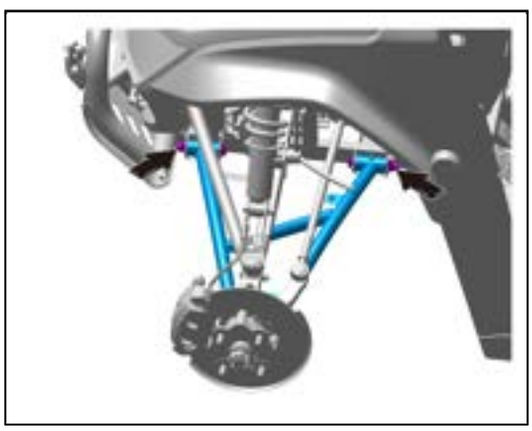


a. Remove the 2 mounting bolts from the front control arm guard, then remove the front control arm guard.



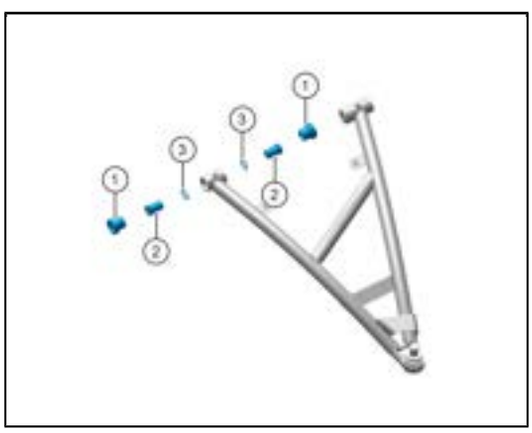
b. Remove the steering knuckle retaining bolt (M10 × 1.25 × 45) and nut (M10 × 1.25), then disconnect the front lower control arm welded assembly from the front steering knuckle.

Torque: 51.6 ± 3 ft-lbs (70 ± 5 N·m).



c. Remove the mounting bolts (M12×1.25×90) and nuts (M12×1.25) on both sides of the front lower control arm welded assembly, then remove the front lower control arm welded assembly along with its attachments.

Torque: 84.8 ± 3 ft-lbs (115 ± 5 N·m).



d. Remove the following components separately:

①: Control arm damper bush

②: Control Arm T-Bush I

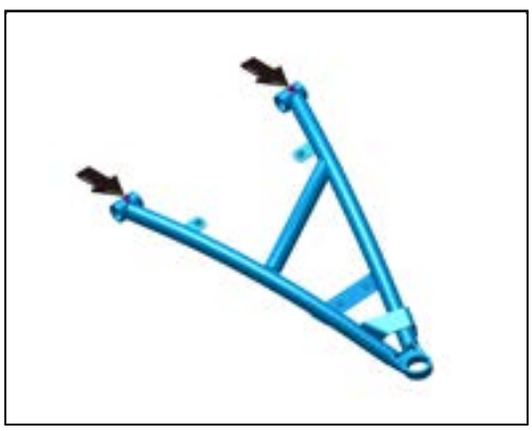
③: O-Ring

NOTICE:

- **Disassembly of the left rubber bush of the front lower control arm welded assembly is described as an example. For the right side, refer to the procedure for the left side.**
- **The O-ring is a single-use part; always replace it with a new one during assembly.**



e. Remove the external circlip from the lower kingpin assembly, then use a press to press out the lower kingpin assembly.



f. Remove the 2 straight grease nipples, then remove the front lower control arm welded assembly.

Installation Procedure

1. Install the front lower control arm welded assembly in the reverse order of removal, paying attention to the following points:

   a. When refitting the control arm bush, apply grease evenly to the mating surfaces.

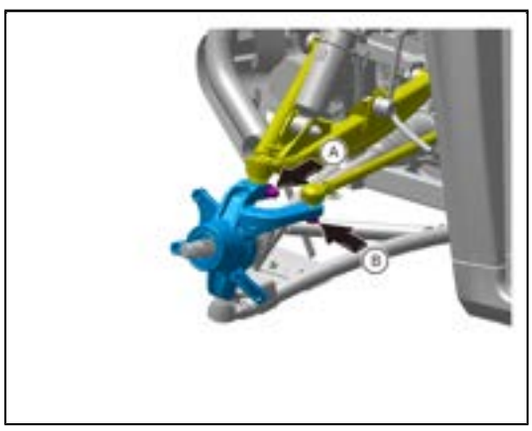
CAUTION:
• After installation, carry out a road test to confirm normal chassis operation.

6.1.7.4 Front Steering Knuckle

NOTICE:
• This manual describes removal and installation using the left steering knuckle as an example. For the right front steering knuckle, refer to the procedure for the left front side.

Removal Procedure

1. To lift the vehicle, See: Vehicle Lifting and Lowering.
2. To remove the front wheel assembly, See: Wheel Assembly.
3. To remove the wheel hub, See: Wheel Hub.
4. Remove front brake disc, See: Brake Disc.
5. To remove the front brake disc backplate, See: Front Brake Disc Backplate.
6. Removing the front steering knuckle

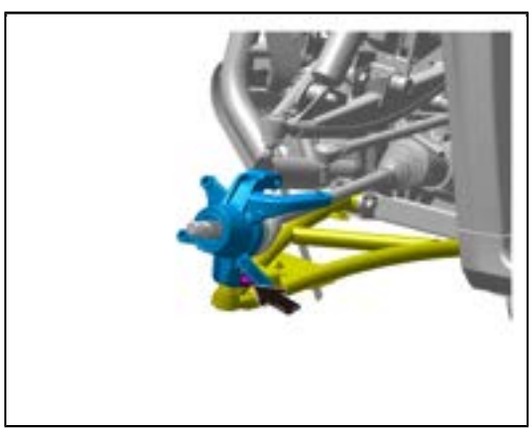


a. Remove front steering knuckle retaining bolt A (M10 × 1.25 × 55) and nut A (M10 × 1.25), then disconnect the front upper control arm welded assembly from the front steering knuckle.

Torque: 51.6 ± 3 ft-lbs (70 ± 5 N·m).

b. Remove the split pin and M10x1.25 castellated nut B to disconnect the track rod end from the front steering knuckle.

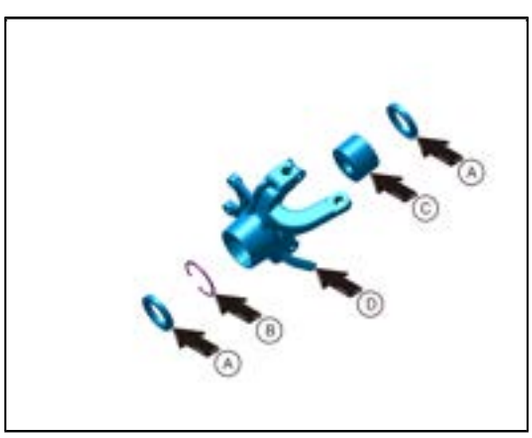
Torque: 34 ± 3 ft-lbs (45 ± 5 N·m).



c. Remove the front steering knuckle retaining bolt (M10 × 1.25 × 45) and nut (M10 × 1.25), then disconnect the front lower control arm welded assembly from the front steering knuckle.

Torque: 51.6 ± 3 ft-lbs (70 ± 5 N·m).

d. Remove the front steering knuckle assembly.



e. Remove the 2 halfshaft oil seals A.

f. Remove the internal circlip B from the lower wheel hub bearing bore, then use a press to press out the lower wheel hub bearing C.

g. Remove front steering knuckle D.

Installation Procedure

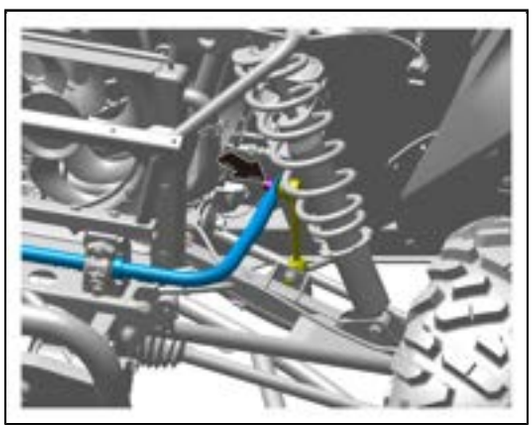
1. Install the front steering knuckle in the reverse order of removal.
   a. Check the front wheel toe after installation. See: Checking front wheel toe

CAUTION:
• After installation, carry out a road test to confirm normal chassis operation.

6.1.7.5 Front Anti-roll Bar Assembly

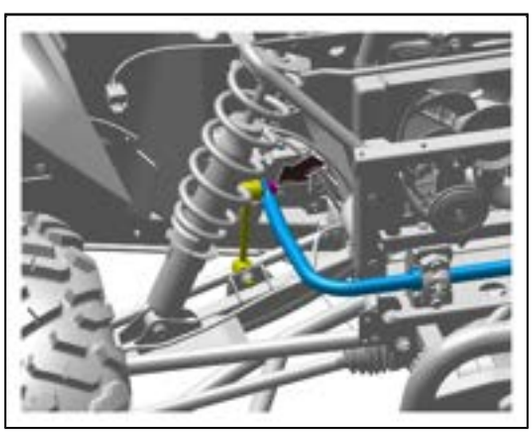
Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. To remove the headlamp cover, See: Headlamp Cover.
4. To remove the flasher unit, See: Flasher Unit.
5. To remove the front panel, See: Front Panel.
6. To remove the headlamp bezel assembly, See: Headlamp Bezel Assembly.
7. Removing the front anti-roll bar assembly



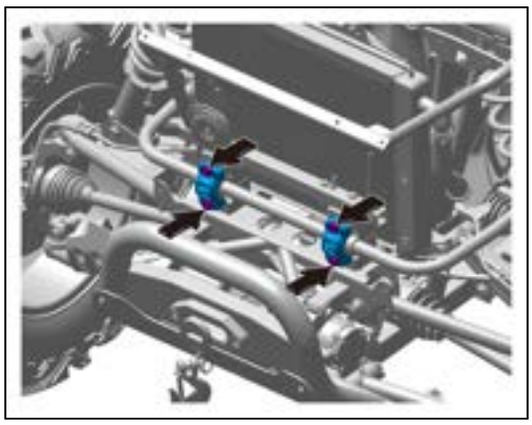
a. Remove the M10x1.25 mounting nut from the left front anti-roll bar link.

Torque: 34 ± 3 ft-lbs (45 ± 5 N·m).



b. Remove the M10x1.25 mounting nut from the right front anti-roll bar link.

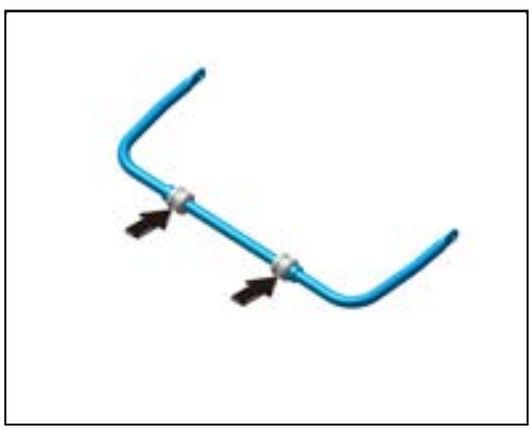
Torque: 34 ± 3 ft-lbs (45 ± 5 N·m).



c. Remove the 4 M8x30 bolts securing the anti-roll bar mounting brackets, then remove the brackets and attachments.

Torque: 17 ± 2 ft-lbs (23 ± 3 N·m).

d. Remove the front anti-roll bar assembly together with its attachments.



e. Remove the left- and right front anti-roll bar cushions, then remove the front anti-roll bar assembly.

Installation Procedure

1. Install the front anti-roll bar assembly in the reverse order of removal.

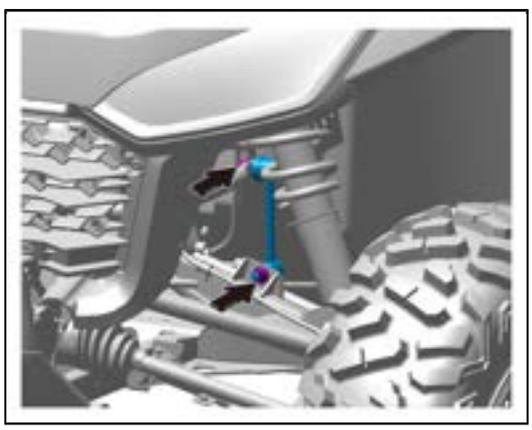
CAUTION:
• After installation, carry out a road test to confirm normal chassis operation.

6.1.7.6 Front Anti-Roll Bar Link

NOTICE:
• This manual illustrates the removal and refitting of the left front anti-roll bar link; the procedure for the right link is identical.

Removal Procedure

1. Removing the front anti-roll bar link



a. Remove the 2 M10x1.25 mounting nuts, then remove the front anti-roll bar link.

Torque: 34 ± 3 ft-lbs (45 ± 5 N·m).

Installation Procedure

1. Install the front anti-roll bar link in the reverse order of removal.

CAUTION:
• After installation, carry out a road test to confirm normal chassis operation.

6.2 Rear Suspension

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6.2.1 Specifications

6.2.1.1 Fastener Specifications

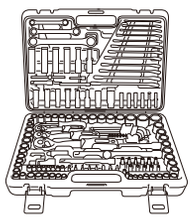
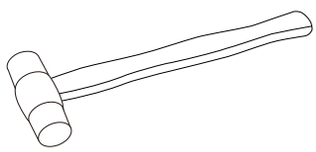
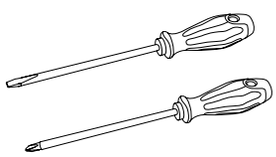
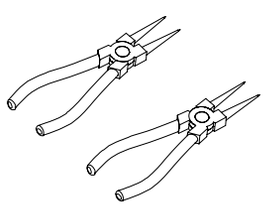
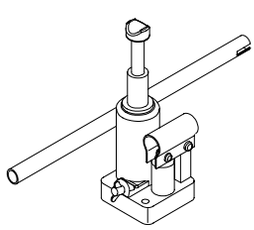
Item	Torque (N·m)	Torque (ft-lbs)
Rear Shock Absorber Mounting Nut M10x1.25	70±5	51.6±3
Rear Shock Absorber Mounting Bolt M10x1.25x55	70±5	51.6±3
Rear Upper Control Arm Mounting Bolt M12x1.25x145	115±5	84.8±3
Rear Upper Control Arm Mounting Bolt M12x1.25x120	115±5	84.8±3
Rear Upper Control Arm Mounting Nut M12x1.25	115±5	84.8±3
Rear Lower Control Arm Mounting Bolt M12x1.25x90	115±5	84.8±3
Rear Lower Control Arm Mounting Bolt M12x1.25x120	115±5	84.8±3
Rear Lower Control Arm Mounting Nut M12x1.25	115±5	84.8±3
Rear Hub Carrier Mounting Bolt M12x1.25x170	115±5	84.8±3
Rear Hub Carrier Mounting Nut M12x1.25	115±5	84.8±3
Anti-roll Bar Clamp Retaining Bolt, M10 × 1.25 × 20	23±3	17±2
Rear Anti-roll Bar Link Assembly Retaining Nut, M10 × 1.25	70±5	51.6±3

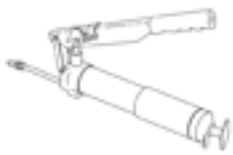
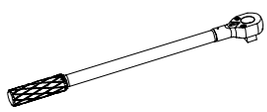
6.2.1.2 Service Specifications

Item	Specified Value	Specifications
Spring preload setting position for standard hydraulic damping shock absorber	Setting 3	Settings 1 to 5

6.2.2 Service Tools

6.2.2.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)
2	Rubber mallet		Front axle removal and installation
3	Screwdriver		Removing screws
4	Circlip Pliers		Removing and installing circlips
5	Jack		Lifting the Vehicle

Item No.	Tool Description	Tool Diagram	Purpose/Use
6	Grease gun		Apply grease.
7	Torque Wrench		Tightening bolts and nuts to the specified torque

6.2.3 Description and Operation

6.2.3.1 Warnings and Precautions

1. When inspecting the rear suspension system, place the vehicle on level, dry ground.
2. Bolts and nuts for all components must be tightened to the specified torque.
3. If any mounting bolt or nut is found to be damaged during servicing, replace it immediately.
4. Before driving, check the vehicle for safe operating condition and start the vehicle only after confirming that there are no safety hazards.
5. After dismantling the rear suspension system, ensure that all components are properly protected to prevent contamination.
6. Before carrying out inspection or repair work, ensure that personnel are wearing appropriate personal protective equipment, such as safety footwear, work gloves and safety goggles.
7. During inspection and repair, always follow the relevant instructions and standard procedures. Read the applicable instructions carefully before using workshop equipment and SST.

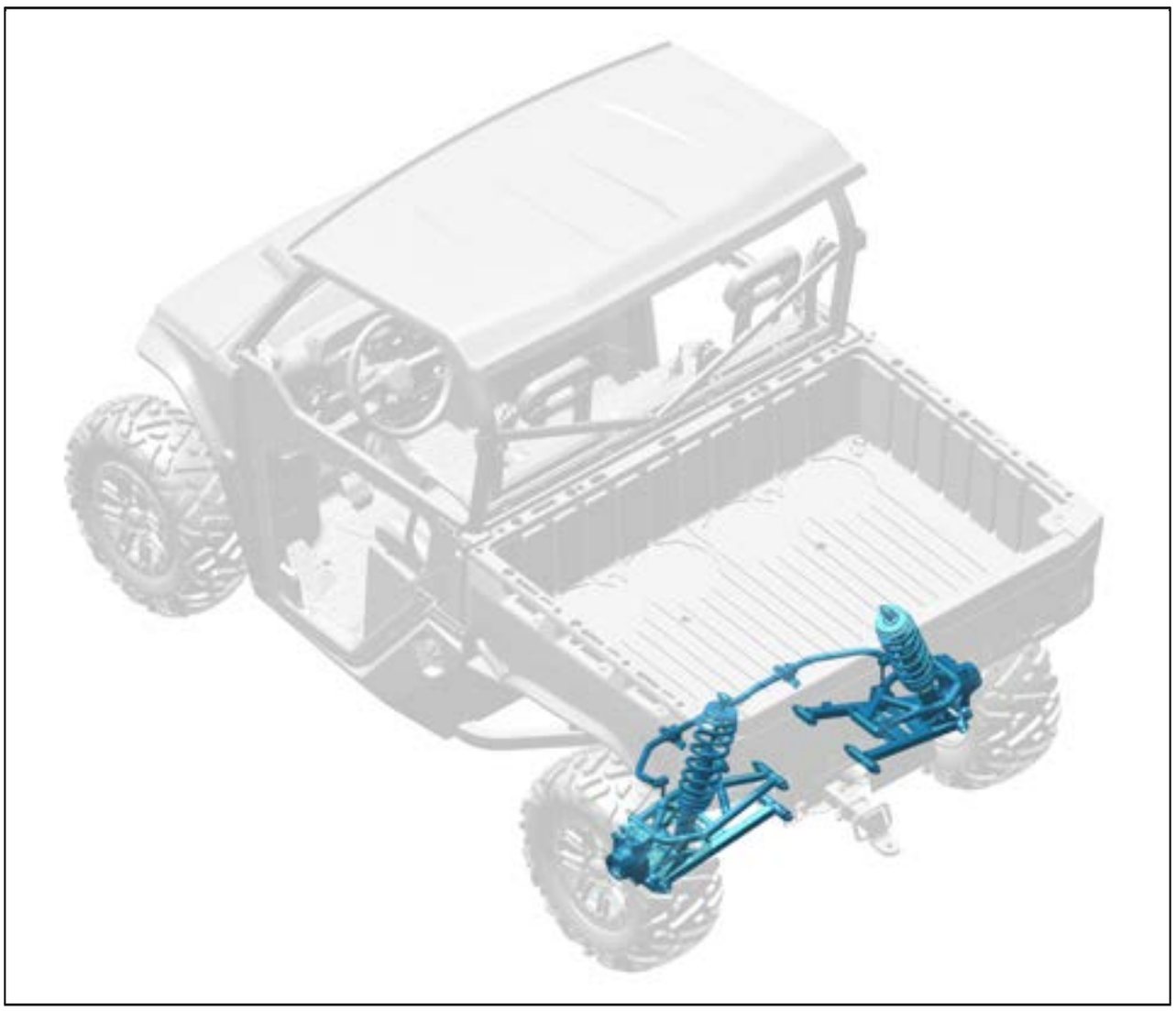
6.2.3.2 System Description

1. System Description
   a. The vehicle suspension is the force-transmitting system between the vehicle frame and the wheels. It cushions impact loads from the road acting on the frame or body, reduces body vibration caused by these loads, and ensures driving stability, driving comfort and safety.
   b. It transmits the driving force and braking force generated by friction between the road surface and the wheels to the vehicle frame and body.
   c. It supports the body and maintains the correct geometric relationship between the body and the wheels.
2. Components
   a. The assembly mainly consists of the rear axle carriers, rear upper control arm welded assemblies, rear lower control arm welded assemblies, rear anti-roll bar link assemblies, rear stabiliser bar assembly and rear shock absorber assemblies.

6.2.4 Component Location and Exploded View

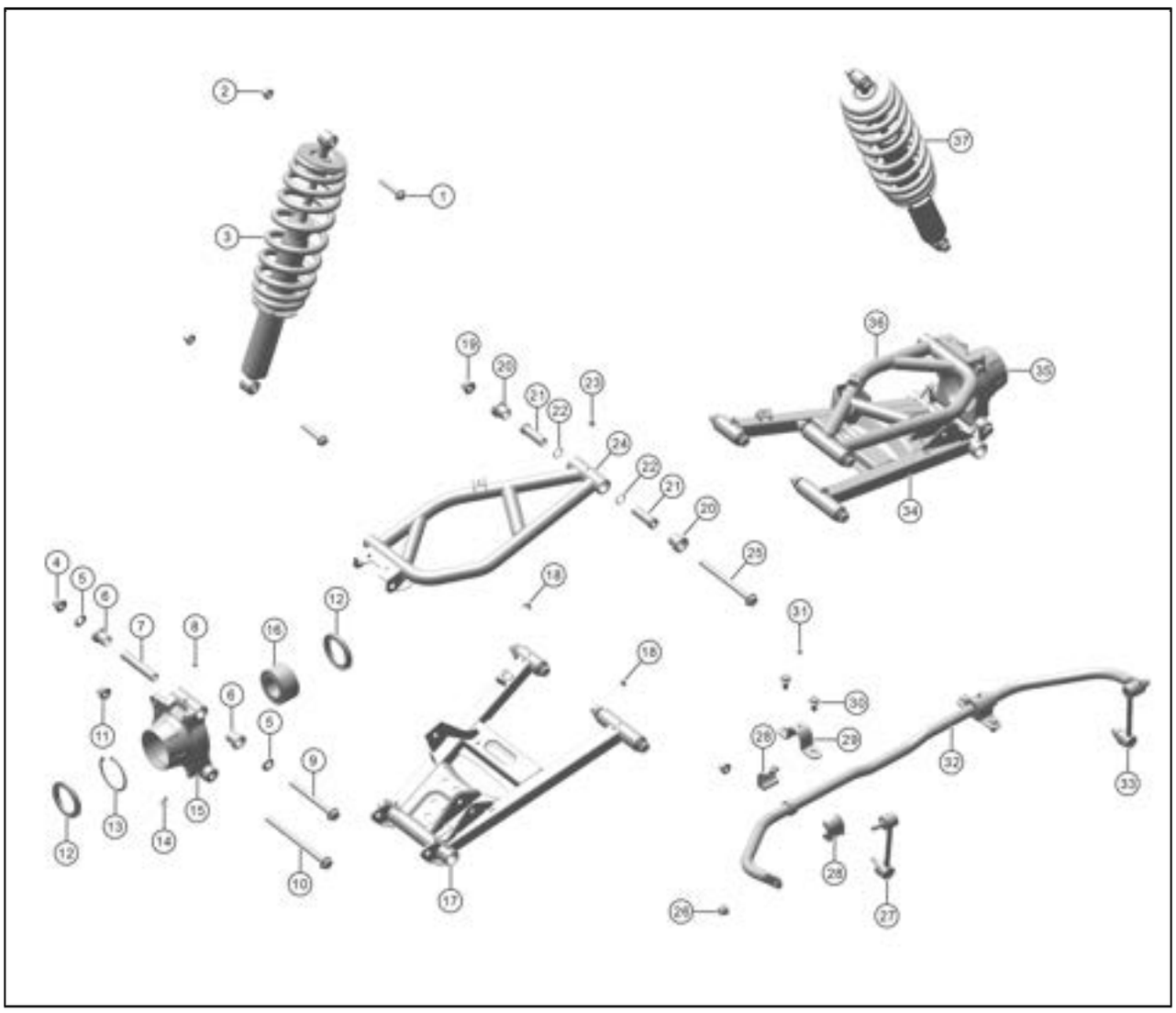
6.2.4.1 Component Location Diagram

Rear suspension system



6.2.4.2 Exploded View Diagram

Rear suspension system



1	Hex flange bolt	14	90° Grease Nipple	27	Left Rear Anti-Roll Bar Link Assembly
2	Hex Flange Lock Nut	15	Rear Left Hub Carrier	28	Anti-roll Bar Bush
3	Rear Left Shock Absorber Assembly	16	Wheel Hub Bearing	29	Anti-roll Bar Clamp
4	Hex Flange Lock Nut	17	Rear Left Lower Control Arm Welded Assembly	30	Hex flange bolt
5	Control Arm Dust Cover	18	90° Grease Nipple	31	Straight Grease Nipple
6	Control Arm Damper Bushes	19	Hex Flange Lock Nut	32	Rear Anti-Roll Bar Assembly

7	Rear Control Arm Sleeve Tube	20	Control Arm Damper Bushes	33	Right Rear Anti-Roll Bar Link Assembly
8	Straight Grease Nipple	21	Control Arm T-Bush II	34	Rear Right Lower Control Arm Welded Assembly
9	Hex flange bolt	22	O-Ring Seal	35	Rear Right Hub Carrier
10	Hex flange bolt	23	90° Grease Nipple	36	Rear Right Upper Control Arm Welded Assembly
11	Hex Flange Lock Nut	24	Rear Left Upper Control Arm Welded Assembly	37	Rear Right Shock Absorber Assembly
12	Halfshaft Oil Seal	25	Hex flange bolt		
13	Internal Circlip	26	Hex Flange Lock Nut		

6.2.5 General Fault Diagnosis and Operation

6.2.5.1 Fault Symptom List

Symptom(s)	Possible Causes	Recommended Repair Procedure
Body sagging / leaning	1. Tyre pressure incorrect	Adjust the tyre pressure as required
	2. Vehicle overloaded	Reduce the load
	3. Rear shock absorber assembly (damaged)	Replace
	4. Rear anti-roll bar assembly (damaged)	Replace
Abnormal noise from the suspension	1. Suspension components (bolts or nuts loose)	Tighten the bolts and nuts
	2. Rear shock absorber assembly (bolts or nuts loose or damaged)	Tighten the bolts and nuts, or replace as necessary
	3. Rear anti-roll bar link (damaged)	Replace
	4. Rear anti-roll bar assembly (damaged)	Replace

6.2.6 Inspecting and adjusting

6.2.6.1 Checking suspension system

Checking suspension system

1. General Inspection
   a. Check all connecting bushes for ageing or damage.
   b. Check all connecting bolts and nuts for looseness.
   c. Check all connecting components for deformation or cracks.
2. Inspecting the rear anti-roll bar assembly
   a. Lubricate the rear anti-roll bar assembly regularly to ensure correct operation.

NOTICE:
• If the rear anti-roll bar assembly is loose, the bushes are worn or aged and must be replaced.

3. Rear anti-roll bar assembly maintenance



a. Lubricate the rear anti-roll bar assembly regularly to ensure correct operation.

NOTICE:
• Ensure the rear anti-roll bar assembly is dry before lubrication.

4. Rear Upper Control Arm Welded Assembly Maintenance



a. Lubricate the rear upper control arm regularly to ensure optimal operation.

NOTICE:
• Ensure the rear upper control arm is completely dry prior to lubrication.

5. Rear Lower Control Arm Welded Assembly Maintenance

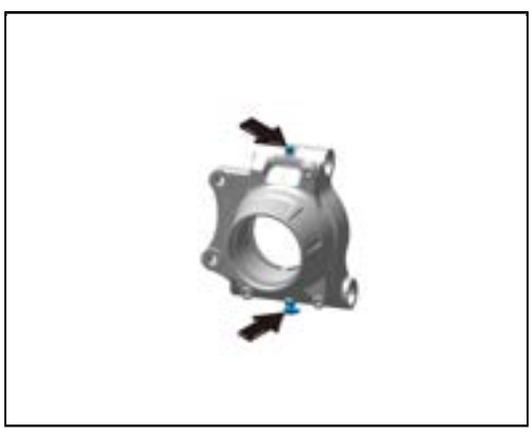


a. Lubricate the rear lower control arm regularly to ensure optimal operation.

NOTICE:

- Ensure the rear lower control arm is completely dry prior to lubrication.

6. Rear Hub Carrier Maintenance



a. Lubricate the rear hub carrier regularly to ensure optimal operation.

NOTICE:

- Ensure the rear hub carrier is completely dry prior to lubrication.

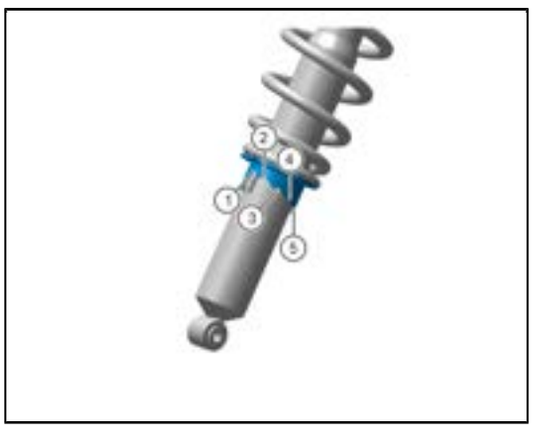
6.2.6.2 Checking rear shock absorber assembly

1. **Checking rear shock absorber assembly**

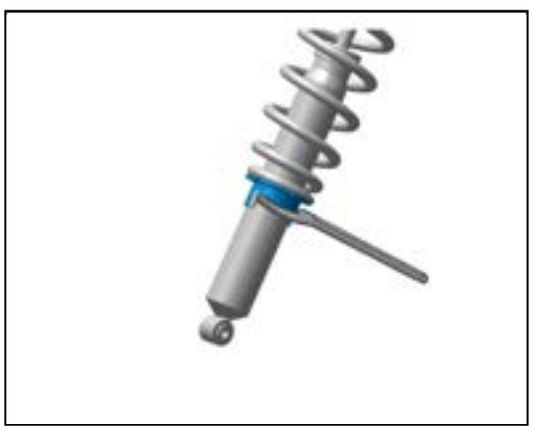
   a. As the rear shock absorber assembly is a sealed unit, only an external inspection is required. If one shock absorber is found to be damaged, both shock absorbers must be replaced as a pair; otherwise, vehicle stability at high speed and overall driving comfort may be adversely affected.

   b. Check the upper and lower mountings, spacer ring, spherical bearing assembly and oil seal; replace with new parts if damaged.

2. **Hydraulic shock absorber adjustment**



a. The hydraulic damper has 5 adjustment positions for different loads or driving conditions.
   - Position 1: for light loads or level terrain.
   - Position 2: standard setting.
   - Positions 3 to 5: for heavier loads.



b. Use a C-spanner to adjust the spring preload.

CAUTION:

- **When adjusting the shock absorbers, always set the left and right units to the same position. Adjust one position at a time, either upwards or downwards. Do not attempt to make large adjustments at once, as this may damage the shock absorbers.**

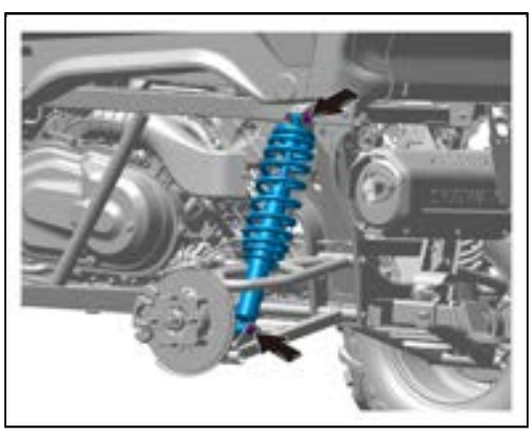
6.2.7 Repair Procedure Guidance

6.2.7.1 Rear Shock Absorber Assembly

NOTICE:
• This manual describes removal and installation using the left rear shock absorber assembly as an example. The right rear shock absorber assembly may be serviced in the same way.

Removal Procedure

1. To lift the vehicle, See: Vehicle Lifting and Lowering.
2. To remove the rear wheel assembly, See: Wheel Assembly.
3. Removing the rear shock absorber assembly



a. Remove the 2 rear shock absorber retaining bolts (M10 × 1.25 × 55) and nuts (M10 × 1.25), then remove the rear shock absorber assembly.

Torque: 51.6 ± 3 ft-lbs (70 ± 5 N·m).

Installation Procedure

1. Install the rear shock absorber assembly in the reverse order of removal, noting the following:
   a. After installation, inspect the shock absorber and adjust it to the appropriate operating condition. See: Checking rear shock absorber assembly

CAUTION:
• After installation, carry out a road test to confirm normal chassis operation.

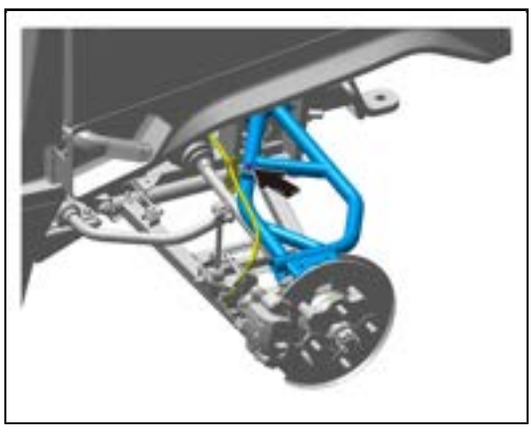
6.2.7.2 Rear Upper Control Arm Welded Assembly

NOTICE:

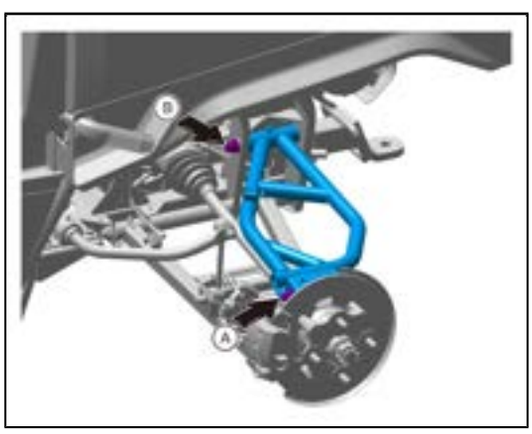
- This manual describes removal and installation using the left rear upper control arm welded assembly as an example. The right rear upper control arm welded assembly may be serviced in the same way.

Removal Procedure

1. To lift the vehicle, See: Vehicle Lifting and Lowering.
2. To remove the rear wheel assembly, See: Wheel Assembly.
3. Removing rear upper control arm welded assembly



a. Remove the brake cable mounting bolts.

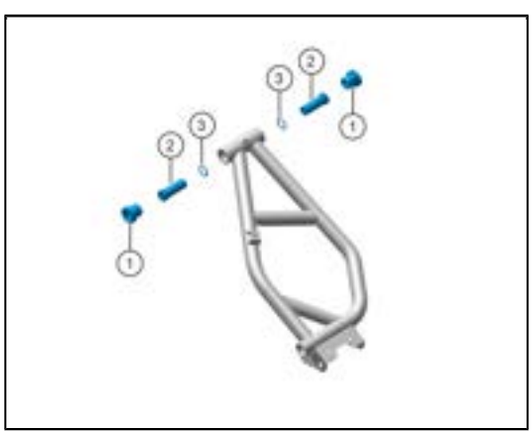


b. Remove rear upper control arm welded assembly retaining bolt A (M12 × 1.25 × 120) and nut A (M12 × 1.25).

Torque: 84.8 ± 3 ft-lbs (115 ± 5 N·m).

c. Remove rear upper control arm welded assembly retaining bolt B (M12 × 1.25 × 145) and nut B (M12 × 1.25), then remove the rear upper control arm welded assembly together with its attachments.

Torque: 84.8 ± 3 ft-lbs (115 ± 5 N·m).



d. Remove the following components separately:

①: Control arm damper bush

②: Control Arm T-Bush II

③: O-Ring

Torque: 43 ± 3 ft-lbs (60 ± 5 N·m).

NOTICE:

- The O-ring is a single-use part; always replace it with a new one during assembly.



e. Remove the straight grease nipples, then remove the rear upper control arm.

Installation Procedure

1. **Install the rear upper control arm welded assembly in the reverse order of removal, noting the following:**

   a. When refitting the control arm bush, apply grease evenly to the mating surfaces.

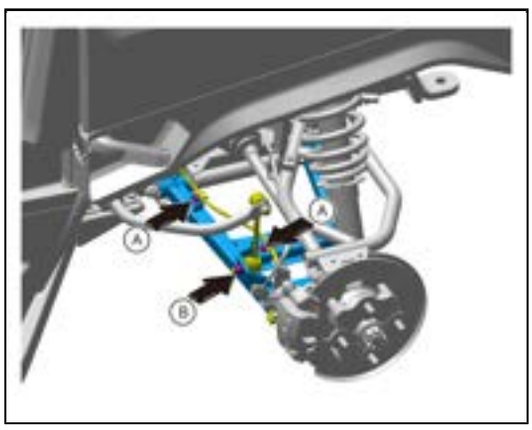
CAUTION:
• After installation, carry out a road test to confirm normal chassis operation.

6.2.7.3 Rear Lower Control Arm Welded Assembly

NOTICE:
• This manual describes removal and installation using the left rear lower control arm welded assembly as an example. The right rear lower control arm welded assembly may be serviced in the same way.

Removal Procedure

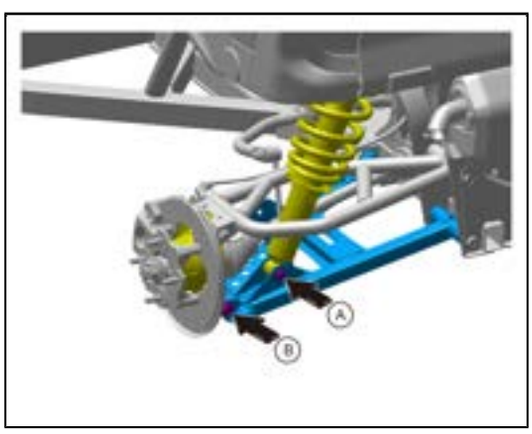
1. To lift the vehicle, See: Vehicle Lifting and Lowering.
2. To remove the rear wheel assembly, See: Wheel Assembly.
3. Removing rear lower control arm welded assembly



a. Remove the 2 bolts A securing the brake pipe.

b. Remove the M12x1.25 nut B to disconnect the anti-roll bar link from the upper control arm.

Torque: 51.6 ± 3 ft-lbs (70 ± 5 N·m).

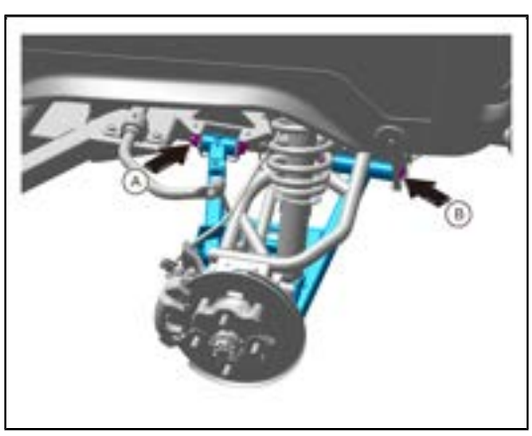


c. Remove rear shock absorber retaining nut A (M10 × 1.25) and bolt A (M10 × 1.25 × 55).

Torque: 51.6 ± 3 ft-lbs (70 ± 5 N·m).

d. Remove rear hub carrier retaining nut B (M12 × 1.25) and bolt B (M12 × 1.25 × 170), then disconnect the rear lower control arm welded assembly from the rear hub carrier.

Torque: 84.8 ± 3 ft-lbs (115 ± 5 N·m).

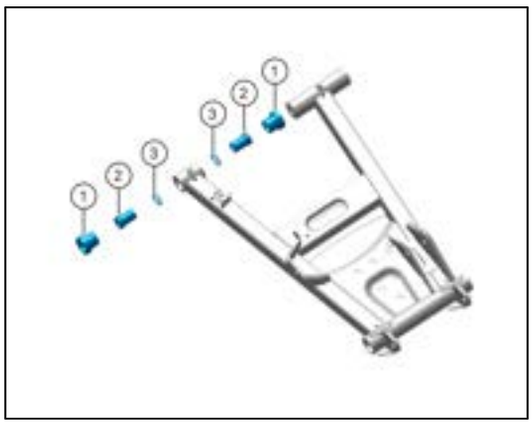


e. Remove rear lower control arm welded assembly retaining bolt A (M12 × 1.25 × 90) and nut A (M12 × 1.25), then remove the rear lower control arm welded assembly together with its attachments.

Torque: 84.8 ± 3 ft-lbs (115 ± 5 N·m).

f. Remove rear lower control arm welded assembly retaining nut B (M12 × 1.25) and bolt B (M12 × 1.25 × 145), then remove the rear lower control arm welded assembly together with its attachments.

Torque: 84.8 ± 3 ft-lbs (115 ± 5 N·m).



g. Remove the following components separately:

①: Control arm damper bush

②: Control Arm T-Bush I

③: O-Ring

NOTICE:

- **Disassembly of the left rear lower control arm welded assembly rubber bush is used as the example; the right side may be referred to in the same way.**
- **The O-ring is a single-use part; always replace it with a new one during assembly.**



h. Remove the 2 straight grease nipples, then remove the rear lower control arm welded assembly.

Installation Procedure

1. **Install the rear lower control arm welded assembly in the reverse order of removal, noting the following:**

   a. When refitting the control arm bush, apply grease evenly to the mating surfaces.

CAUTION:

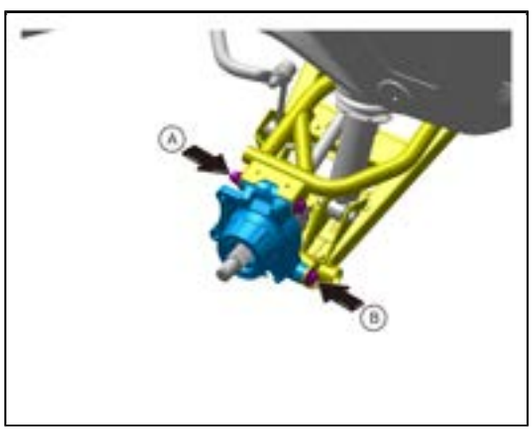
- **After installation, carry out a road test to confirm normal chassis operation.**

6.2.7.4 Rear Hub Carrier

NOTICE:
• This manual describes removal and installation using the left rear hub carrier as an example. The right rear hub carrier may be serviced in the same way.

Removal Procedure

1. To lift the vehicle, See: Vehicle Lifting and Lowering.
2. To remove the rear wheel assembly, See: Wheel Assembly.
3. To remove the wheel hub, See: Wheel Hub.
4. To remove brake disc, See: Brake Disc.
5. To remove the rear brake disc backplate, See: Rear Brake Disc Backplate.
6. Removing the rear hub carrier

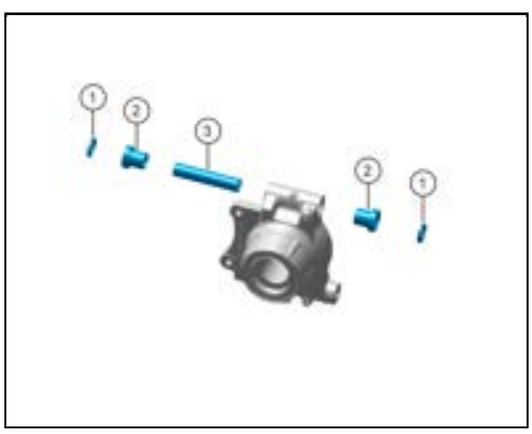


a. Remove the M12x1.25x120 mounting bolt and M12x1.25 nut A to disconnect the rear upper control arm from the rear hub carrier.

Torque: 84.8 ± 3 ft-lbs (115 ± 5 N·m).

b. Remove rear hub carrier retaining nut B (M12 × 1.25) and bolt B (M12 × 1.25 × 170), then disconnect the rear lower control arm welded assembly from the rear hub carrier.

Torque: 84.8 ± 3 ft-lbs (115 ± 5 N·m).



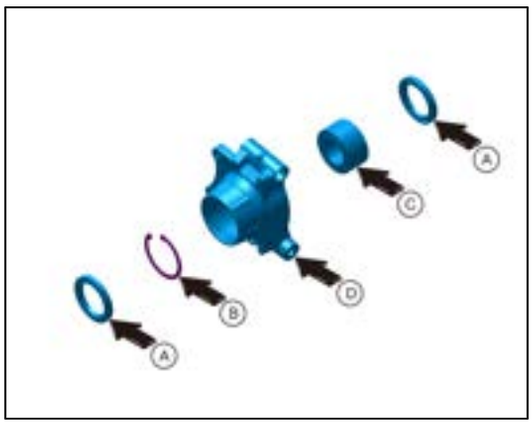
c. Remove the following components separately:

①: Control Arm Dust Cover

②: Control Arm Damper Bush II

③: Rear Control Arm Bush Sleeve I

NOTICE:
• Disassembly of the upper inner sleeve of the rear hub carrier is used as the example; the lower side may be referred to in the same way.



d. Remove the 2 halfshaft oil seals A.

e. Remove the internal circlip B from the lower wheel hub bearing bore, then use a press to press out the lower wheel hub bearing C.

f. Remove rear hub carrier D.

NOTICE:

- **The oil seal is a single-use part. Always install a new oil seal after removal.**



g. Remove the 2 straight grease nipples, then remove the rear hub carrier.

Installation Procedure

1. Install the rear hub carrier bracket in the reverse order of removal.

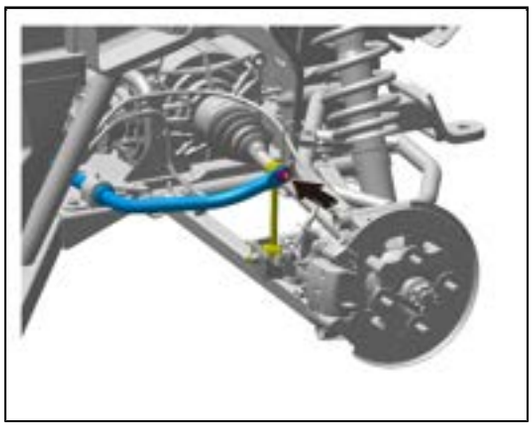
CAUTION:

- **After installation, carry out a road test to confirm normal chassis operation.**

6.2.7.5 Rear Anti-Roll Bar Assembly

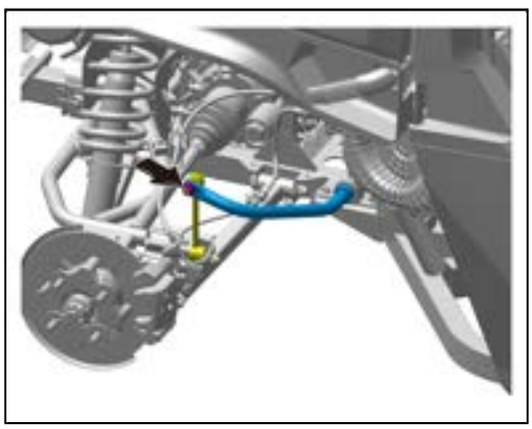
Removal Procedure

1. To lift the vehicle, See: Vehicle Lifting and Lowering.
2. To remove the rear wheel assembly, See: Wheel Assembly.
3. Removing the rear anti-roll bar assembly



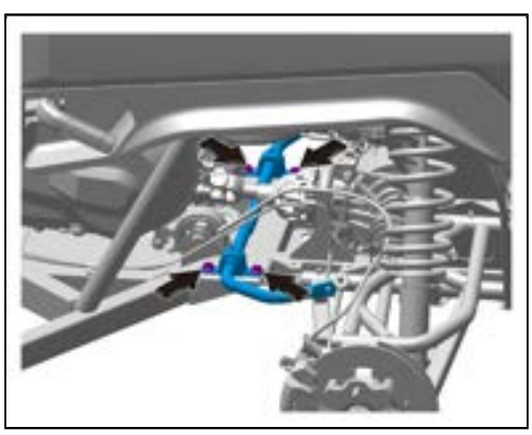
a. Remove the left rear anti-roll bar link assembly retaining nut (M12 × 1.25), then disconnect the link assembly from the rear anti-roll bar assembly.

Torque: 51.6 ± 3 ft-lbs (70 ± 5 N·m).



b. Remove the right rear anti-roll bar link assembly retaining nut (M12 × 1.25), then disconnect the link assembly from the rear anti-roll bar assembly.

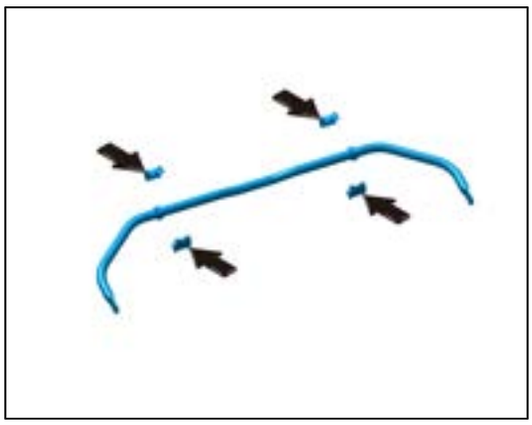
Torque: 51.6 ± 3 ft-lbs (70 ± 5 N·m).



c. Remove the 4 anti-roll bar clamp retaining bolts (M10 × 1.25 × 20), then remove the anti-roll bar clamps.

Torque: 17 ± 2 ft-lbs (23 ± 3 N·m).

d. Remove the rear anti-roll bar assembly together with its attachments.



e. Remove the 4 anti-roll bar bushes.

f. Remove the rear anti-roll bar assembly.

Installation Procedure

1. Install the rear anti-roll bar assembly in the reverse order of removal.

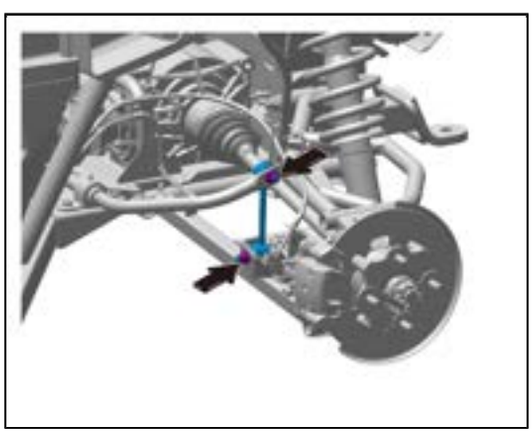
CAUTION:
• After installation, carry out a road test to confirm normal chassis operation.

6.2.7.6 Rear Anti-roll Bar Link Assembly

NOTICE:
• This manual illustrates the removal and refitting of the left rear anti-roll bar link; the procedure for the right rear link is identical.

Removal Procedure

1. Removing the rear anti-roll bar link assembly



a. Remove the 2 rear anti-roll bar link assembly retaining nuts (M10 × 1.25), then remove the rear anti-roll bar link assembly.

Torque: 51.6 ± 3 ft-lbs (70 ± 5 N·m).

Installation Procedure

1. Install the rear anti-roll bar link in the reverse order of removal.

CAUTION:
• After installation, carry out a road test to confirm normal chassis operation.

6.3 Wheels and Tyres

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6.3.1 Specifications

6.3.1.1 Fastener Specifications

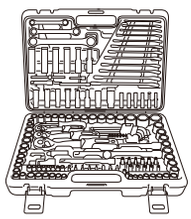
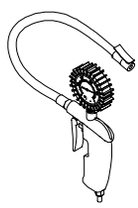
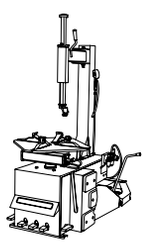
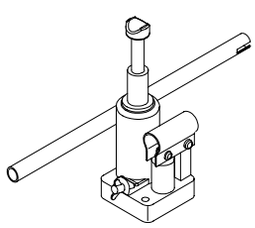
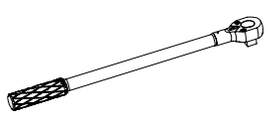
Item	Torque (N·m)	Torque (ft-lbs)
Wheel Nut	110±10	81.1±7.4
Wheel hub securing screw	35~40	25.8~29.5
Beadlock Mounting Bolt	22~25	16.2~18.4

6.3.1.2 Service Specifications

<table>
<tr><th colspan="2">Item</th><th colspan="3">Specifications</th></tr>
<tr><td rowspan="2">Tyre Specifications</td><td>Front</td><td>27×9.00-14(NHS)
27×9.00R14(NHS)
30×10.00R14 (NHS)</td><td>27×9.00-14 74J
27×9.00R14 74J
30×10.00R14 86G</td><td>27×9.00-1474J
27×9.00R14 74J</td></tr>
<tr><td>Rear</td><td>27×11.00-14(NHS)
27×11.00R14(NHS)
30×10.00R14 (NHS)</td><td>27×11.00-1481J
27×11.00R14 81J
30×10.00R14 86G</td><td>27×11.00-1481J
27×11.00R14 81J</td></tr>
<tr><td rowspan="2">Wheel Rim Specification</td><td>Front</td><td colspan="3">Aluminium or Steel Wheel (AT14 × 6.5)</td></tr>
<tr><td>Rear</td><td colspan="3">Aluminium or Steel Wheel (AT14 × 7.0)</td></tr>
<tr><td rowspan="2">Tyre Pressure</td><td>Front</td><td colspan="3">70±10kPa（10PSI）</td></tr>
<tr><td>Rear</td><td colspan="3">110±10kPa (16PSI)</td></tr>
</table>

6.3.2 Service Tools

6.3.2.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)
2	Tyre Pressure Gauge		Checking tyre pressure
3	Tyre Changer		Tyre Removal and Installation
4	Valve Core Tool		Valve Core Removal and Installation
5	Jack		Raising the Vehicle
6	Torque Wrench		Tightening bolts and nuts to the specified torque

6.3.3 Description and Operation

6.3.3.1 Warnings and Precautions

1. Precautions for Tyre Assembly Removal and Installation

CAUTION:
• When removing or installing the wheel, do not grip the rim with your fingers, to avoid trapping or injuring them.

2. Precautions for Tyre Rotation

CAUTION:
• Tyres should be rotated periodically according to driving conditions and habits.

3. Precautions for Wheel Servicing

CAUTION:
• Do not apply engine oil or lubricant to the wheel nuts. • Regularly wash mud and debris from the tyres to prevent wheel imbalance and subsequent tyre damage at high speeds.

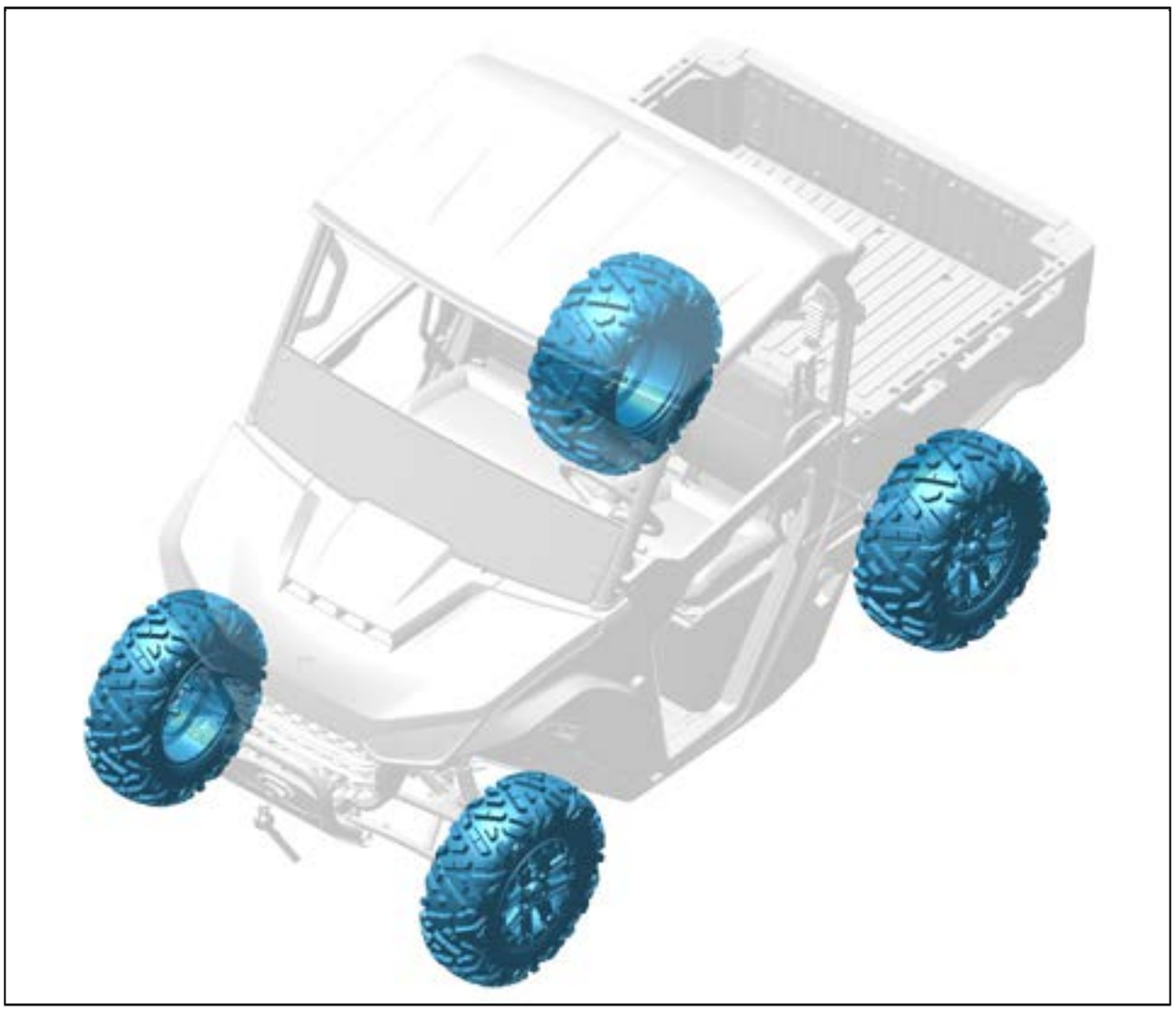
6.3.3.2 System Description

1. Function
   a. The tyre is in direct contact with the road surface and is one of the vehicle's key components. Its functions are as follows:
      • To absorb shocks encountered while the vehicle is in motion, ensuring good driving comfort and smooth running.
      • To maintain good adhesion between the tyre and the road surface, thereby improving traction, braking performance and off-road capability.
      • To support the weight of the vehicle.
2. Components
   a. The wheel mainly consists of the tyre, rim and valve stem.

6.3.4 Component Location and Exploded View

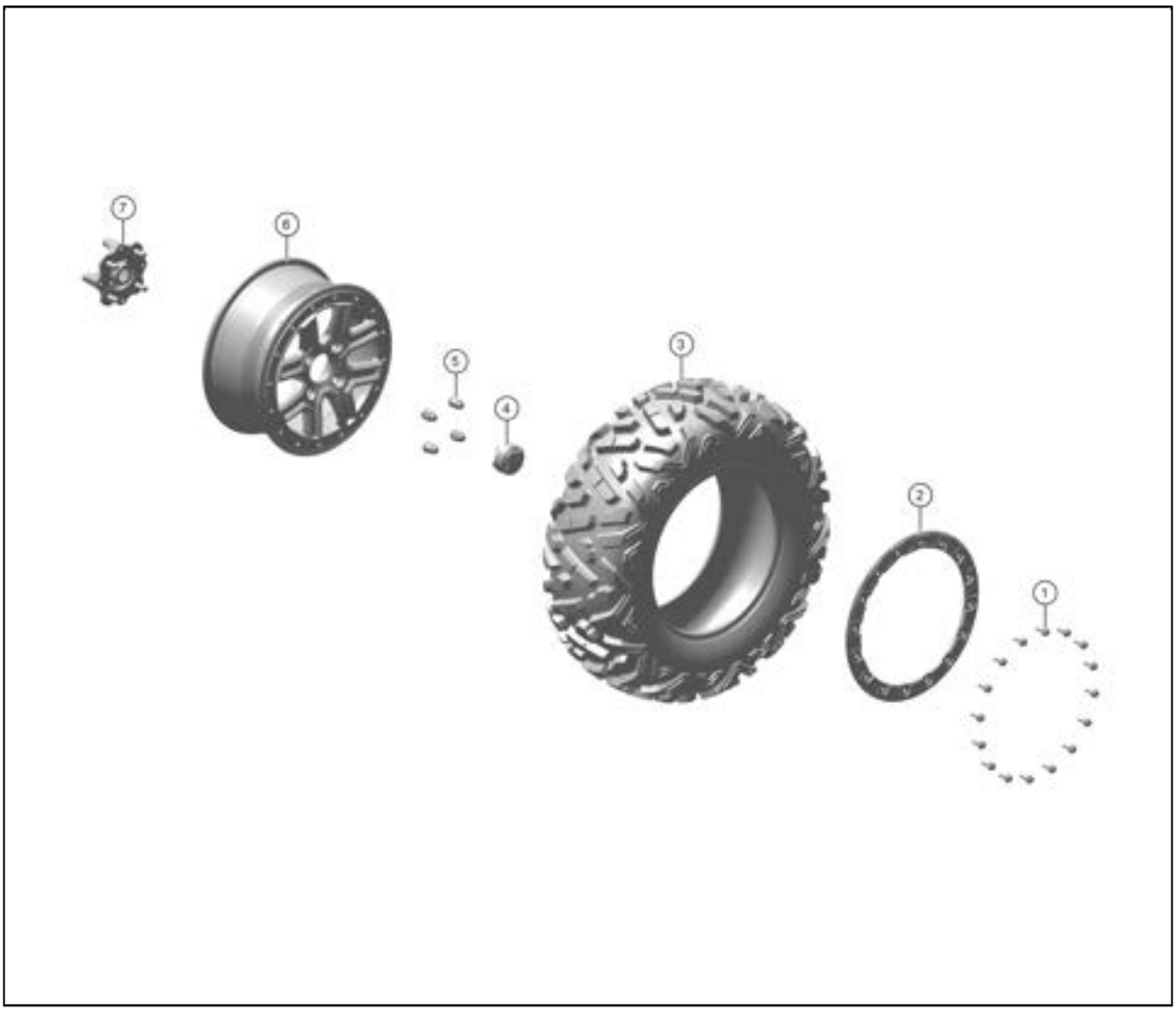
6.3.4.1 Component Location Diagram

Wheel Assembly



6.3.4.2 Exploded View Diagram

Wheel Assembly



1	Beadlock ring mounting bolt.	5	Rim Retaining Nut
2	Beadlock ring.	6	Rim
3	Tyre	7	Wheel Hub
4	Rim cover assembly		

6.3.5 General Fault Diagnosis and Operation

6.3.5.1 Fault Symptom List

Symptom(s)	Possible Causes	Recommended Repair Procedure
Tyre Wear	1. Driver (poor driving habits)	Correct Poor Driving Habits
	2. Incorrect tyre pressure	Adjust tyre pressures to the specified values
	3. Fault in the suspension system	Repair or replace
	4. Tyre specifications do not match	Replace with tyres of matching specification.
	5. Worn wheel hub bearing	Renew Wheel Bearing
	6. Wheel distorted or unbalanced	Renew Wheel

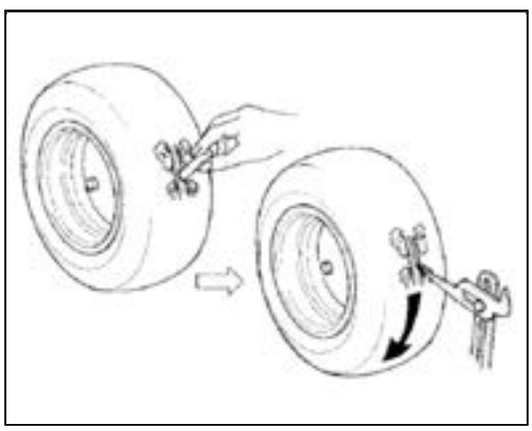
6.3.6 Inspecting and adjusting

6.3.6.1 Checking wheels and tyres

1. Checking wheels and tyres

   a. Check the tyre pressure against the specification and adjust if necessary. Refer to See: Service Specifications.

NOTICE:
• Inspect the tyre only when it has cooled down. • A correct cold tyre inflation pressure reading can be obtained only when the vehicle has been parked for at least 3 hours, or has been driven for no more than 1.5 km. • Check the tyre pressure using a tyre pressure gauge. • It is normal for tyre pressure to rise after driving. Do not reduce the tyre pressure.



   b. Check the tread depth. Inspect the tyre shoulder to locate the tyre wear indicator mark "T.W.I". Follow the triangular marking to the corresponding raised tread wear indicator in the tread grooves. Replace the tyre as soon as the tread has worn down to the indicator level; otherwise, a blowout may occur due to insufficient tyre strength.

WARNING:
• Driving with worn tyres increases the risk of skidding and may result in loss of vehicle control, causing an accident. • Replace the tyre without fail when the tread wear reaches the service limit.

   c. Check the wheel nut torque.

      Torque: 81.1 ± 7.4 ft-lbs (110 ± 10 N·m).

   d. Check the valve stem for air leaks using soapy water.

NOTICE:
• Remove the valve cap. Apply a suitable amount of soapy water to each valve stem and check for air leakage. Replace the valve stem if leakage is found.

   e. Check the tyre for cracks or damage. Replace if necessary.

   f. Check the tyre surface for nails, stones or other foreign matter. Remove any foreign matter found.

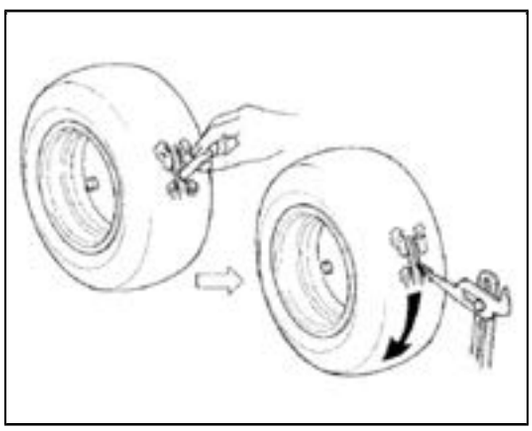
   g. Check the tyre for abnormal wear; if any is found, determine the cause of the fault.

NOTICE:

- Insufficient tyre pressure will cause rapid shoulder wear, excessive tyre flexing and increased rolling resistance.
- Excessive tyre pressure will cause rapid wear at the centre of the tread and reduce the tyre's cushioning effect.
- Feathered tyre wear indicates excessive or insufficient front wheel toe setting.
- One-sided wear (camber issue).

6.3.6.2 Checking front wheel toe

1. Checking front wheel toe



a. Apply a thick chalk or paint line near the centre of each front tyre.

b. While rotating the wheel, use a scriber to make a small reference mark near the centre of the chalk coating.

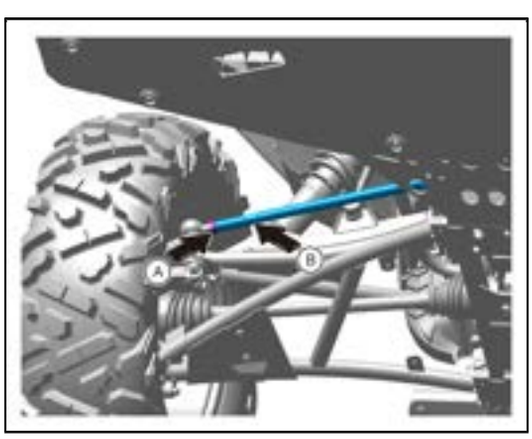
c. Lower the vehicle so that the front wheels are resting on the ground, then centre and secure the steering wheel.

d. At axle height, measure the distance between the scribed lines at the front and rear of the front tyres.

e. Subtract the front measurement from the rear measurement to obtain the toe value. If the toe is not within the specified range, adjust the toe accordingly.

Front toe-in: 4–10 mm (0.16–0.39 in)

2. Adjust the front wheel toe.



a. To adjust front toe-in: With the steering wheel centred and secured, use an open-ended spanner

to slacken the track rod locknut A. Turn the adjuster rod B to achieve the specified toe-in, then tighten locknut A. Ensure toe-in is distributed equally between both wheels.

Torque: 33.2 ± 3.7 ft-lbs (45 ± 5 N·m).

WARNING:
• Ensure the exposed thread length is equal on both ends of the track rod; unequal threads may cause premature failure of the track rod ends.

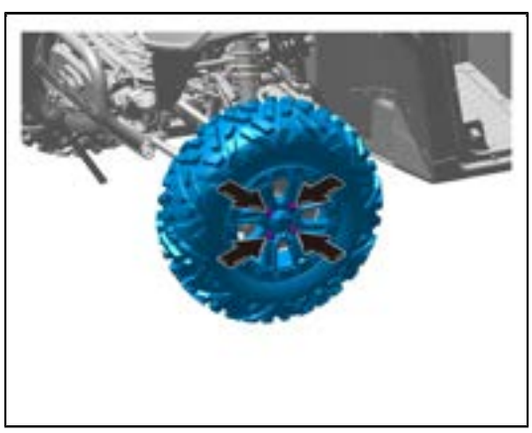
6.3.7 Repair Procedure Guidance

6.3.7.1 Wheel Assembly

NOTICE:
• This manual uses removal and installation of the left front wheel assembly as an example. Removal and installation of the right front, right rear and left rear wheel assemblies may be carried out with reference to the left front procedure.

Removal Procedure

1. Removing the wheel assembly



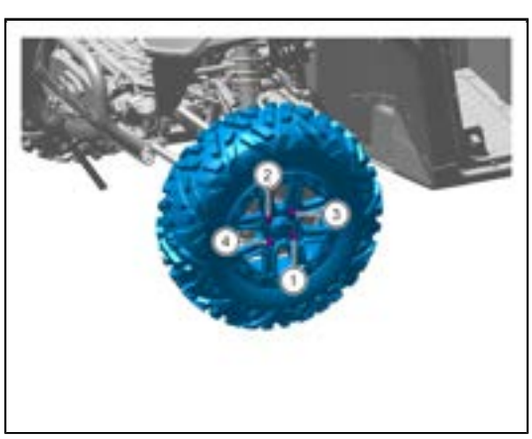
a. Loosen the 4 wheel assembly mounting nuts.

b. Lift the vehicle with a stand or jack until the wheel can rotate freely.

c. Remove the 4 wheel assembly mounting nuts and take off the wheel assembly.

Installation Procedure

1. Install the wheel assembly in the reverse order of removal, observing the following points.



a. Remove all rust, dust and contaminants from the mounting surfaces of the wheel, wheel hub and brake disc.

b. Fit the wheel assembly and pre-tighten the 4 wheel nuts.

c. Lower the vehicle and tighten the wheel nuts in the sequence shown in the illustration.

Torque: 81.1 ± 7.4 ft-lbs (110 ± 10 N·m).

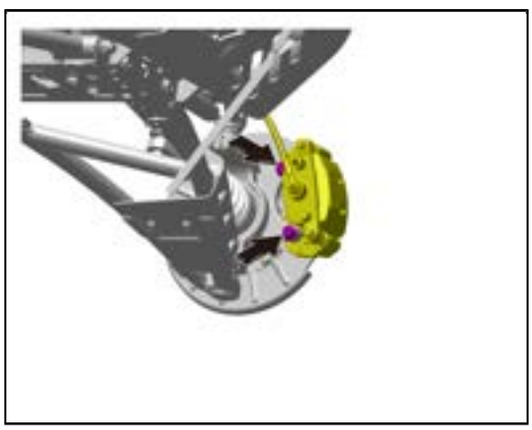
6.3.7.2 Wheel Hub

NOTICE:

- This manual uses removal and installation of the left front wheel hub as an example. Removal and installation of the other wheel hubs may be carried out with reference to this procedure.

Removal Procedure

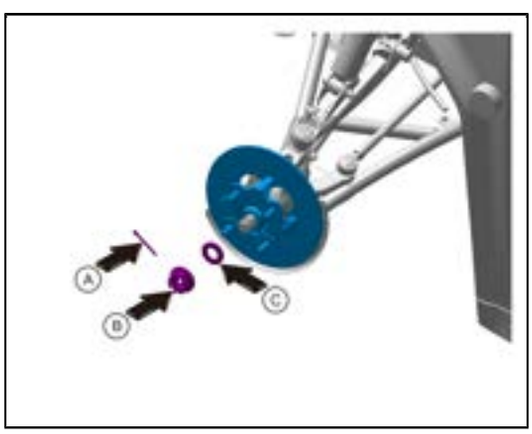
1. To lift the vehicle, See: Vehicle Lifting and Lowering.
2. To remove the wheel assembly, See: Wheel Assembly.
3. Removing the wheel hub



a. Remove the 2 M10x1.25x25 bolts securing the front brake caliper, and suspend the caliper clear of the brake hose.

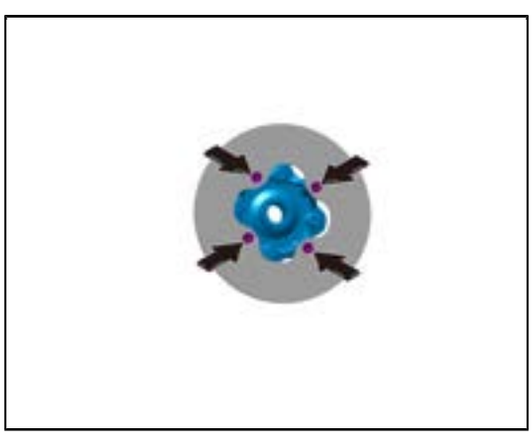
CAUTION:

- When suspending the front brake assembly, do not allow the front brake hose to be overstretched, otherwise it may be damaged.



b. Remove split pin A, castellated nut B (M24 × 2) and wheel hub washer C, then remove the wheel hub together with the front brake disc.

Torque: 206.5~236 ft-lbs (280~320N·m).



c. Remove the 4 mounting screws securing the front wheel hub to the front brake disc, then remove the front wheel hub.

Torque: 25.8~29.5 ft-lbs (35~40N·m).

Installation Procedure

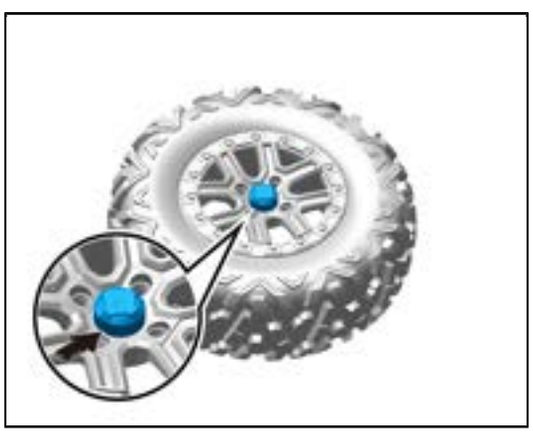
1. Install the wheel hub in the reverse order of removal.

CAUTION:
• Before driving the vehicle, lightly depress the brake pedal several times to ensure the brake pads are properly seated against the mounting face, so as to reduce free travel during the initial brake application.

6.3.7.3 Tyre

Removal Procedure

1. To lift the vehicle, See: Vehicle Lifting and Lowering.
2. To remove the wheel assembly, See: Wheel Assembly.
3. Removing the tyre



a. Pry open the groove in the cover assembly and remove the cover assembly.



b. Remove the 16 beadlock ring mounting bolts, then remove the beadlock ring.



c. Lubricate the tyre beads and rim flanges on both sides of the wheel with soapy water solution or clean water.

NOTICE:

- **Lubrication will help the tyre slip off the rim flanges.**

CAUTION:

- **Do not use engine oil or petroleum distillates to lubricate the tyre beads and rim flanges, as this will damage the tyre.**

d. Use a suitable tyre removal and fitting machine to remove the tyre from the rim.

CAUTION:

- **The tyre is a tight fit on the rim and must not be removed by hand.**
- **Whenever the tyre is replaced, the valve stem must also be replaced. Do not reuse the valve stem.**

Installation Procedure

1. **Fitting the tyre**

a. Use a suitable tyre removal and fitting machine to fit the tyre.



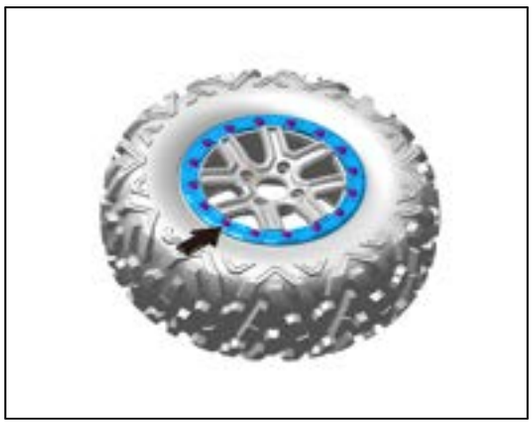
b. Support the rim on a suitable stand to prevent the tyre from slipping off.

CAUTION:

- **Always replace the valve stem when replacing a tyre. Do not reuse it.**

c. Apply tyre fitting lubricant to the inner tyre bead and rim on the side opposite the bead-retaining ring, ensuring that the tyre seats correctly during inflation; then fit the inner tyre bead onto the rim.

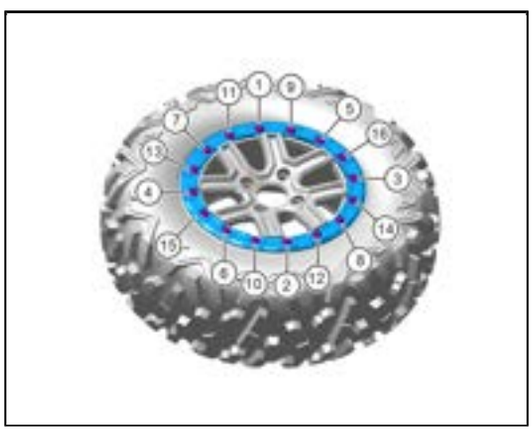
d. Position the outer tyre bead between the shoulder of the inner bead-retaining ring and the centre of the tyre.



e. Install the 16 beadlock ring mounting bolts.

WARNING:

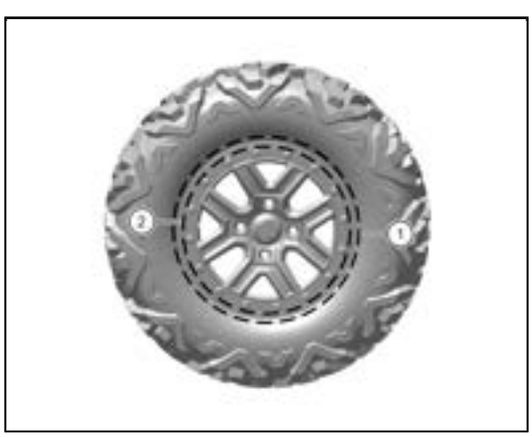
- **Do not use an impact wrench to install the beadlock ring mounting bolts. Using an impact wrench may cause the bolts to slip or shear.**



f. Tighten the 16 beadlock ring mounting bolts in 3 stages, following the sequence shown in the illustration.

g. First stage: hand-tighten diagonally in sequence.

h. Second stage: using a torque wrench, tighten the beadlock ring fastening bolts in a criss-cross sequence as shown in the left illustration.



i. Check that the rim line ① on both sides is parallel to the beadlock ring edge/rim flange ②, and that the circumferential clearance is uniform.

j. If the rim line is not parallel to the beadlock ring edge/rim flange, or if the circumferential clearance is uneven, deflate the tyre, lubricate the sealing surface again, and then re-inflate the tyre.

k. Final stage: using a torque wrench, tighten the 16 beadlock ring mounting bolts clockwise in sequence.

Torque: 16.2–18.4 ft-lbs (22–25 N·m)

CAUTION:

- **Every 450 km of vehicle operation, check the beadlock ring mounting bolts and retighten them.**

l. Inflate the tyre until the tyre beads seat securely on the rim.

Front Tyre pressure (kPa/psi): 70/10

Rear Tyre pressure (kPa/psi): 110/16

WARNING:

- **Apply soapy water solution around the tyre bead area, then check for bubbles.**

m. Check the tyre for air leaks.

NOTICE:
• Do not inflate the tyre above the maximum specified pressure. Over-inflation may cause the tyre to burst, resulting in serious injury or death.

n. Deflate the tyre to the specified pressure.

NOTICE:
• Check the tyre pressure with a pressure gauge.

o. Before fitting the wheel assembly, wipe off any soap and water solution from the tyre and dry the tyre thoroughly.

WARNING:
• Do not operate the vehicle while soap and water solution remains around the rim, otherwise the tyre may separate and create a hazardous condition.

2. Fit the wheel assembly, See: Wheel Assembly.
3. To lower the vehicle, See: Vehicle Lifting and Lowering.

6.4 Drivetrain

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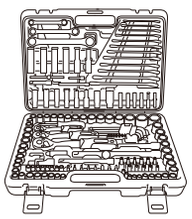
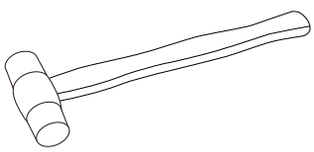
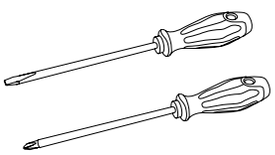
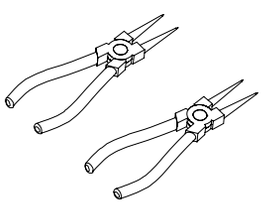
6.4.1 Specifications

6.4.1.1 Fastener Specifications

Item	Torque (N·m)	Torque (ft-lbs)
Front Propeller Shaft Front Section Mounting Bolt M8x35	35~40	25.8~29.5
Front Propeller Shaft Assembly Retaining Bolt M10 × 1.25 × 25	70±5	51.6±3
Rear Propeller Shaft Assembly Retaining Bolt M10 × 1.25 × 25	70±5	51.6±3

6.4.2 Service Tools

6.4.2.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)
2	Rubber mallet		Front axle removal and installation
3	Screwdriver		Removing screws
4	Circlip Pliers		Removing and installing circlips

6.4.3 Description and Operation

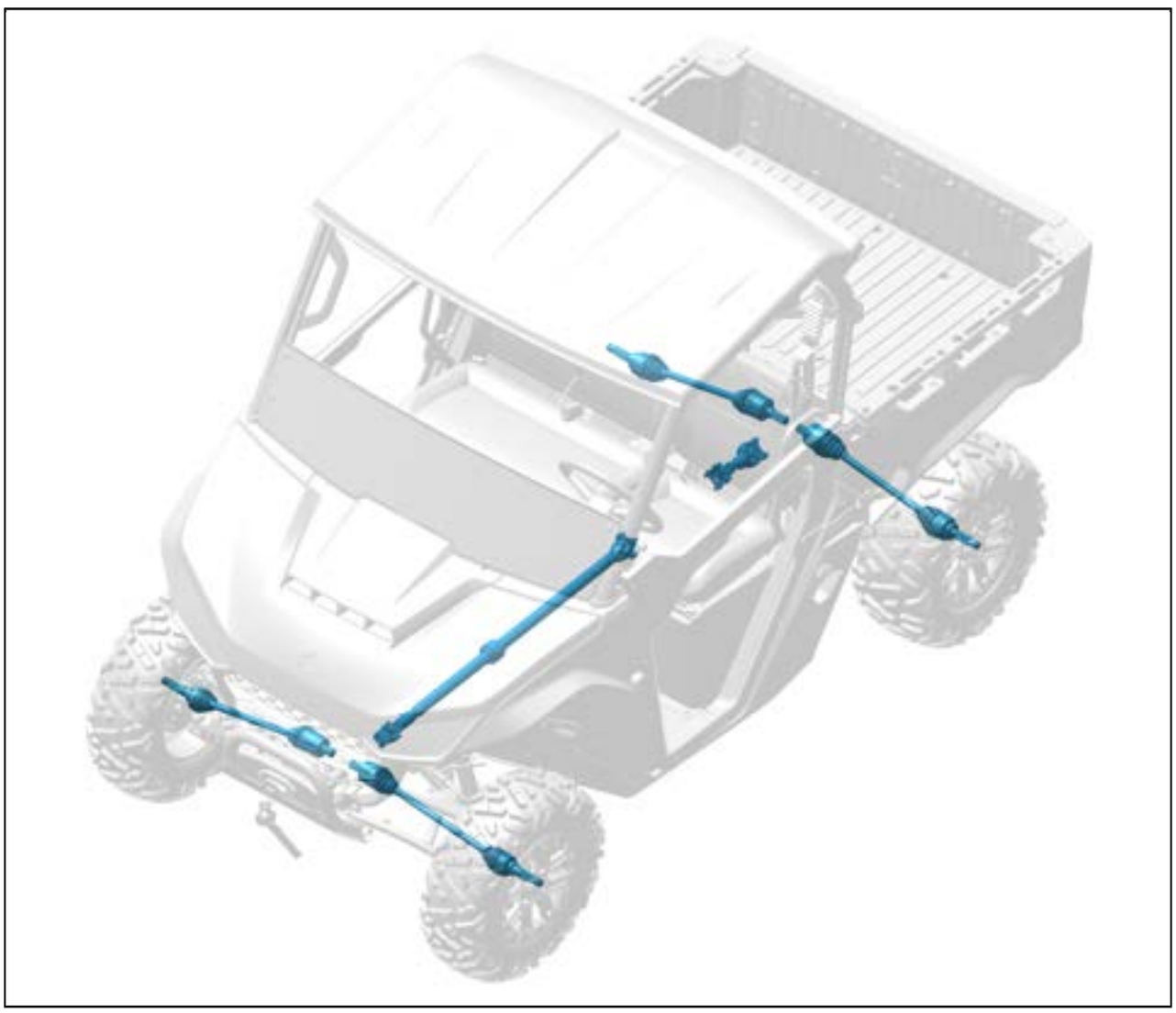
6.4.3.1 Warnings and Precautions

1. During routine maintenance, inspect the propeller shaft regularly for scratches and check whether it is fouling any other components.
2. Single-use parts removed during disassembly must not be reused.
3. Before disassembling and reassembling the drive shaft, clean the surfaces of the components.
4. Keep the working environment clean during service operations to prevent foreign matter from entering the components.
5. Disassembled components (except rubber components) should be cleaned with a suitable cleaning agent, then blow-dried or wiped clean with paper towel or a cloth.

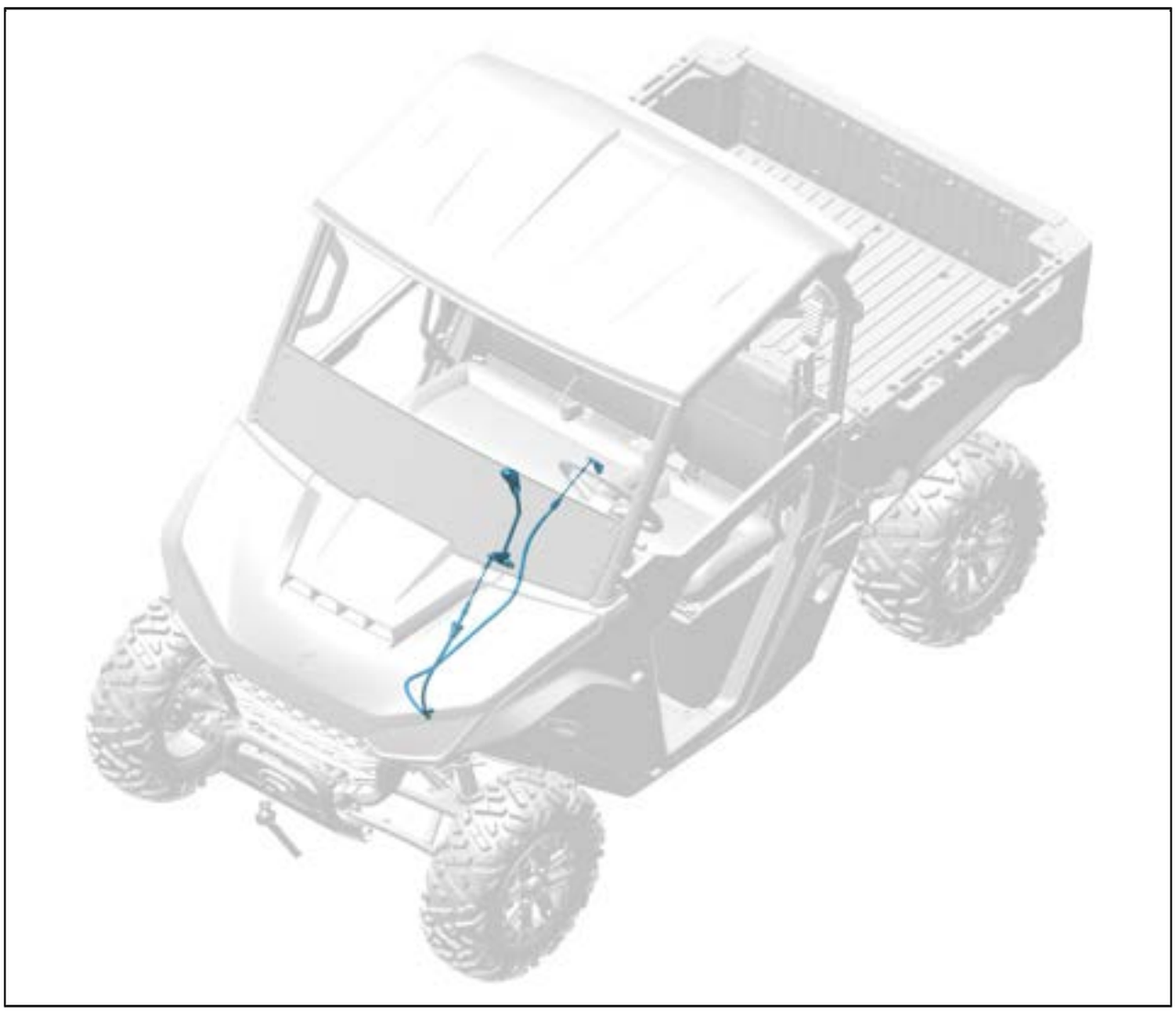
6.4.4 Component Location and Exploded View

6.4.4.1 Component Location Diagram

Drivetrain

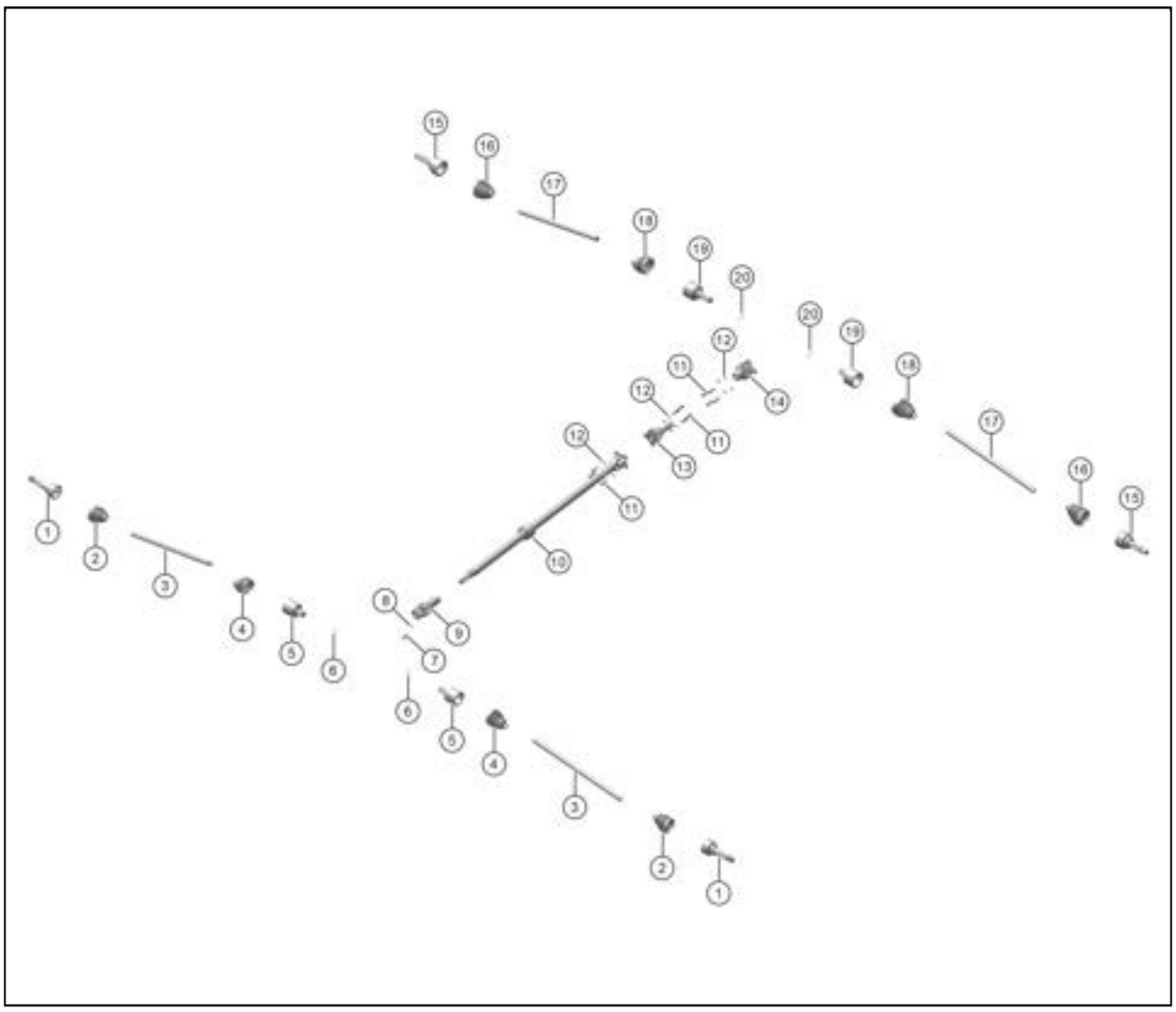


Shift Mechanism



6.4.4.2 Exploded View Diagram

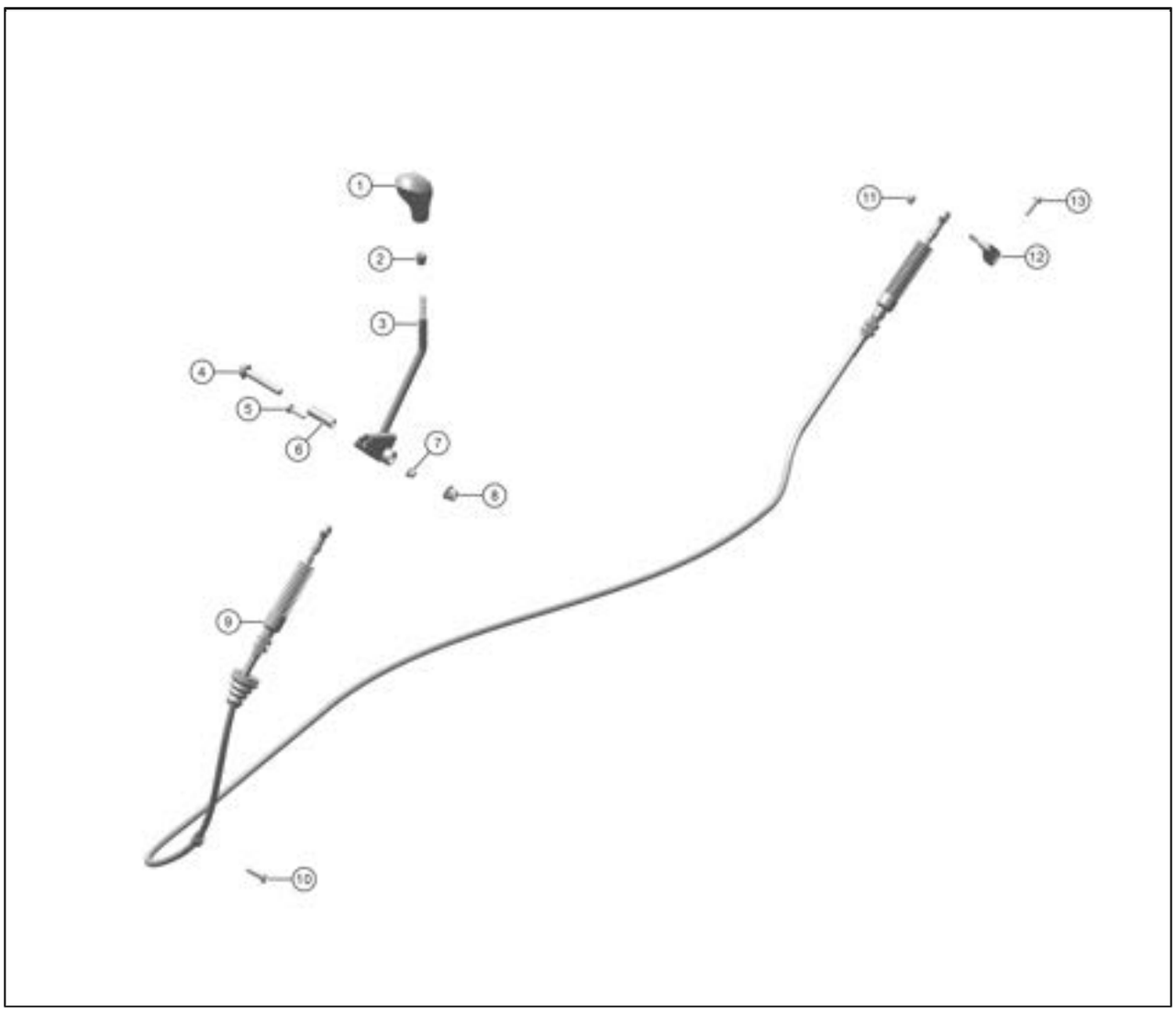
Drivetrain



1	Outer CV Joint Shaft Assembly	11	Hexagon Socket Head Cap Screw
2	Outer CV Joint Boot Assembly	12	Spring washers
3	Intermediate Shaft	13	Rear Propeller Shaft Front Section Assembly
4	Inner CV Joint Boot Assembly	14	Rear propeller shaft rear section assembly
5	Inner CV Joint Shaft Assembly	15	Outer CV Joint Shaft Assembly
6	Inner CV Joint Circlip	16	Outer CV Joint Boot Assembly
7	Special Steering Arm Bolt	17	Intermediate Shaft
8	Spring washers	18	Inner CV Joint Boot Assembly

9	Front Propeller Shaft Front Section Assembly	19	Inner CV Joint Shaft Assembly
10	Front Propeller Shaft Rear Section Assembly	20	Inner CV Joint Circlip

Shift Mechanism



1	Shift Lever Assembly	8	Hex Flange Lock Nut
2	Lock Nut	9	Shift Cable Assembly
3	Shift Lever Assembly	10	Hex flange bolt
4	Hex flange bolt	11	Hex Flange Lock Nut
5	Hex flange bolt	12	Shift Arm Assembly
6	Shift Shaft Bushing	13	Hex flange bolt
7	Hex Flange Lock Nut		

6.4.5 General Fault Diagnosis and Operation

6.4.5.1 Fault Symptom List

Symptom(s)	Possible Causes	Recommended Repair Procedure
Abnormal noise from the drive shaft while the vehicle is in motion	1. Drive shaft damaged	Replace
	2. Drive shaft dust boot damaged	Replace
	3. Propeller shaft intermediate shaft excessively worn	Replace
	4. Universal joint damaged	Replace
Shudder or vibration at high speed	1. Propeller shaft intermediate shaft excessively worn	Replace
	2. Universal joint damaged	Replace
Excessive noise	1. Drive shaft damaged, worn or bent	Replace
	2. Wheel hub splines worn	Replace
	3. Drive shaft splines worn	Replace
	4. Drive shaft insufficiently lubricated	Add lubricating oil
	5. Wheel hub retaining nut loose	Tighten the retaining nut

6.4.6 Inspecting and adjusting

6.4.6.1 Inspecting the drive shaft

1. Inspecting the drive shaft
   a. Check the drive shaft dust boot for cracks, ageing or any other damage.
   b. Check the drive shaft dust boot hose clamp for damage or looseness.
   c. Check the universal joint for excessive wear, looseness or binding.

NOTICE:
• Keep the drive shaft level during inspection. • If any of the above abnormalities are found during inspection, the drive shaft must be dismantled and the damaged parts replaced.

6.4.6.2 Inspecting the propeller shaft

1. Inspecting the propeller shaft
   a. Check the propeller shaft splines for wear or other damage.
   b. Check the propeller shaft mounting bolts and retaining ring for looseness or damage.
   c. Check the propeller shaft for deformation or bending.
   d. Check whether the propeller shaft grease is insufficient.
2. Propeller Shaft Maintenance



a. If the grease in the propeller shaft is found to be insufficient during inspection, or after every 800 km of vehicle operation, add grease through the grease nipple using a grease gun.

6.4.6.3 Checking and adjusting the shift cable

1. **Inspect the shift cable. Adjustment may be necessary if any of the following occur:**
   a. No gear position displayed on the instrument cluster.
   b. Gearbox noise during deceleration.
   c. Unable to engage gears.
   d. Excessive gear backlash (causing noise).
   e. Gear selector moves out of the required range.
2. **Adjusting the Shift Cable**



a. To adjust the shift cable, loosen locking nut B and pull the cable out of the bracket to adjust locking nut A.

NOTICE:
• **This procedure may require several attempts to achieve proper adjustment.**

b. Start the engine and shift through all gears to ensure the shift cable is correctly adjusted. If gearbox noise persists, the gearbox must be inspected.

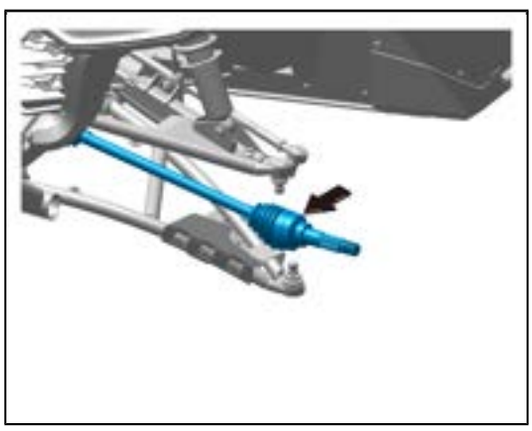
6.4.7 Repair Procedure Guidance

6.4.7.1 Front CV Axle Assembly

NOTICE:
• This manual uses the removal and installation of the front left CV axle assembly as an example. Removal and installation of the front right CV axle assembly may be carried out in the same manner.

Removal Procedure

1. To lift the vehicle, See: Vehicle Lifting and Lowering.
2. To remove the front wheel assembly, See: Wheel Assembly.
3. To remove the wheel hub, See: Wheel Hub.
4. Remove front brake disc, See: Brake Disc.
5. To remove the front brake disc backplate, See: Front Brake Disc Backplate.
6. To remove the front steering knuckle, See: Front Steering Knuckle.
7. Removing the front CV axle assembly



a. Hold the intermediate shaft, keep the inboard end of the drive shaft level, and pull the front CV axle assembly outwards.

Installation Procedure

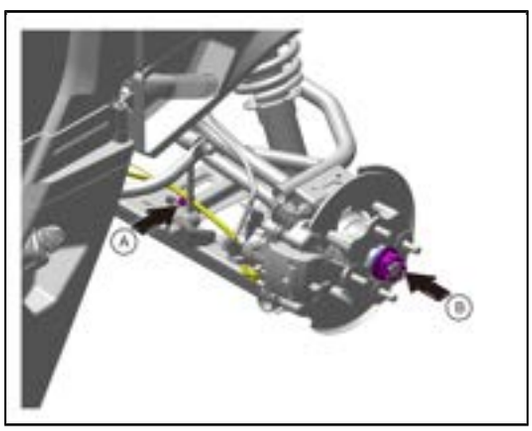
1. Install the front CV axle assembly in the reverse order of removal, observing the following points:
   a. Before installation, apply anti-seize compound to the splines.
   b. During installation, align the drive shaft splines with the differential splines and push inwards horizontally. If necessary, tap the outboard end of the drive shaft with a rubber mallet.

6.4.7.2 Rear CV Axle Assembly

NOTICE:
• This manual uses the removal and installation of the rear left CV axle assembly as an example. Removal and installation of the rear right CV axle assembly may be carried out in the same manner.

Removal Procedure

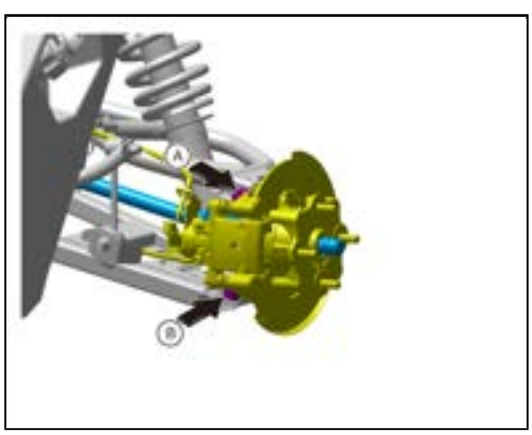
1. To lift the vehicle, See: Vehicle Lifting and Lowering.
2. To remove the rear wheel assembly, See: Wheel Assembly.
3. Removing the rear CV axle assembly



a. Remove the rear brake hose mounting bolt A.

b. Remove the split pin, castellated nut B (M24×2), and wheel hub mounting washer.

Torque: 206.5~236 ft-lbs (280~320N·m).



c. Remove the rear upper control arm mounting bolt M12x1.25x120 and nut A M12x1.25.

Torque: 84.8 ± 3 ft-lbs (115 ± 5 N·m).

d. Remove the rear hub carrier retaining bolt (M12×1.25×170) and nut B (M12×1.25).

Torque: 84.8 ± 3 ft-lbs (115 ± 5 N·m).

e. Disconnect and move the rear hub carrier and its attachments aside, then remove the rear CV axle assembly.

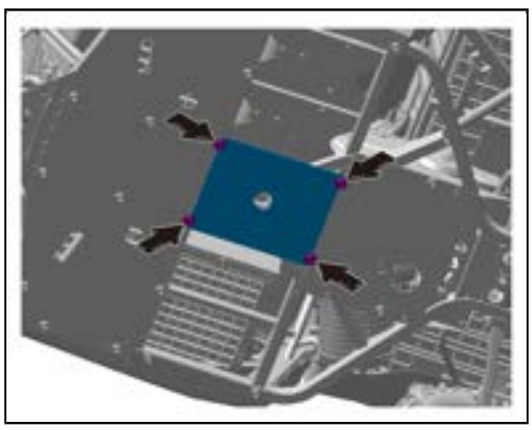
Installation Procedure

1. Install the rear CV axle assembly in the reverse order of removal, observing the following points:
   a. Before installation, apply anti-seize compound to the splines.
   b. During installation, align the drive shaft splines with the differential splines and push inwards horizontally. If necessary, tap the outboard end of the drive shaft with a rubber mallet.

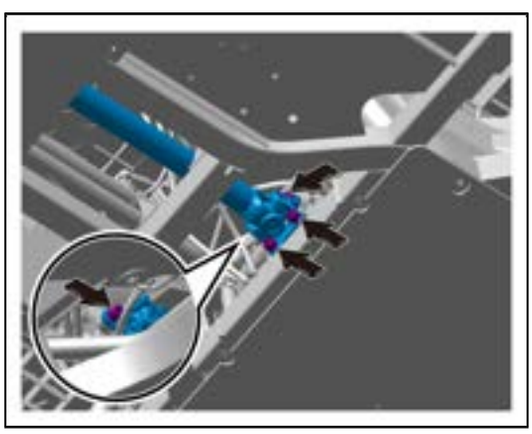
6.4.7.3 Front Propeller Shaft Assembly

Removal Procedure

1. To lift the vehicle, See: Vehicle Lifting and Lowering.
2. To remove the centre guide cover, See: Centre Guide Cover.
3. To remove the front wheel assembly, See: Wheel Assembly.
4. Removing the front propeller shaft assembly



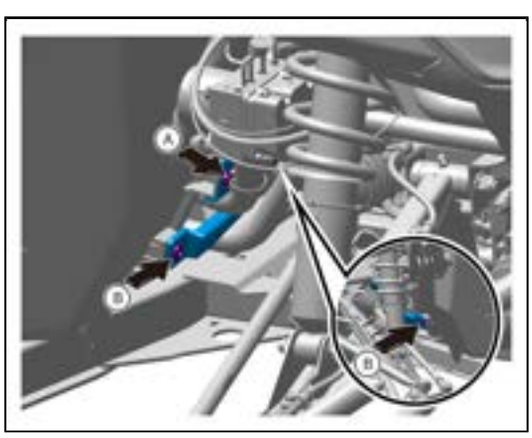
a. Remove the 4 bolts securing the centre skid plate, then remove the centre skid plate.



b. Remove the 4 M10 × 1.25 × 25 retaining bolts and spring washers from the front propeller shaft assembly.

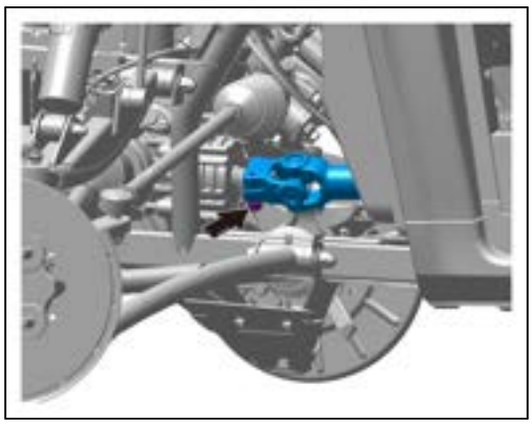
Torque: 51.6 ± 3 ft-lbs (70 ± 5 N·m).

c. Push the front propshaft assembly until it disengages from the splined shaft.



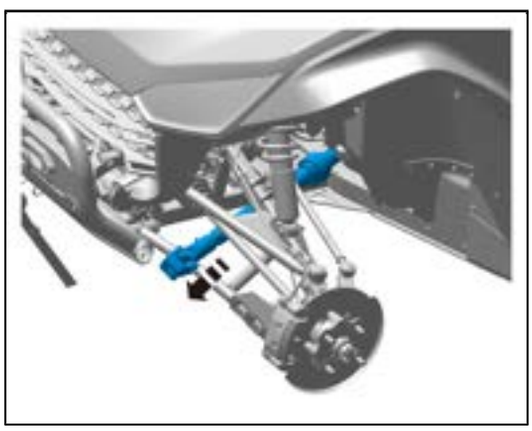
d. Remove retaining clip A from the front shift cable bracket.

e. Remove the 2 M10 × 20 retaining bolts B from the front shift cable bracket, then remove the bracket.



f. Remove the M8 × 35 retaining bolt and spring washer from the front propeller shaft assembly.

Torque: 25.8~29.5 ft-lbs (35~40N·m).



g. Withdraw the front propeller shaft assembly in the direction of the arrow and remove it.

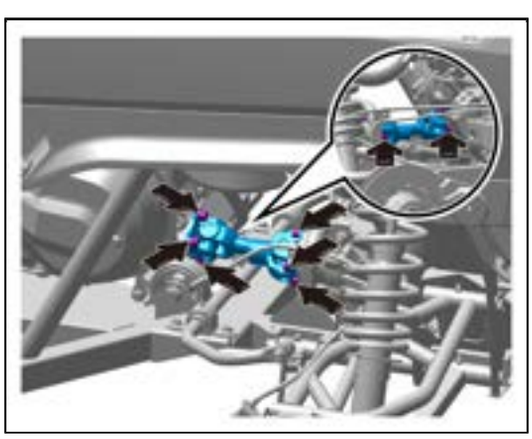
Installation Procedure

1. **Install the front propeller shaft assembly in the reverse order of removal, paying attention to the following points:**
   a. When installing the front propeller shaft assembly, apply an even coat of grease to the gear engagement area.

6.4.7.4 Rear Propeller Shaft Assembly

Removal Procedure

1. **To lift the vehicle,** See: Vehicle Lifting and Lowering.
2. **To remove the rear wheel assembly,** See: Wheel Assembly.
3. **Removing the rear propeller shaft assembly**



a. Remove the 8 M10 × 1.25 × 25 retaining bolts and spring washers from the rear propeller shaft assembly.

Torque: 51.6 ± 3 ft-lbs (70 ± 5 N·m).

b. Remove the rear propeller shaft assembly.

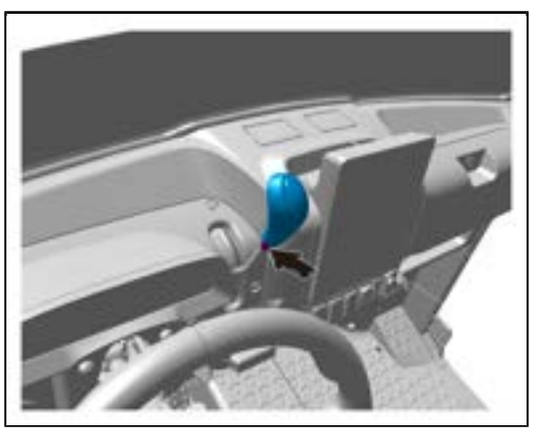
Installation Procedure

1. Install the rear propeller shaft assembly in the reverse order of removal, noting the following:
    a. Apply an even coat of grease to the splines of the front and rear propshaft sections prior to installation.

6.4.7.5 Shift Lever Assembly

Removal Procedure

1. Removing the shift lever assembly



a. Loosen the shift lever assembly retaining nut, rotate anti-clockwise, and remove the shift lever assembly.

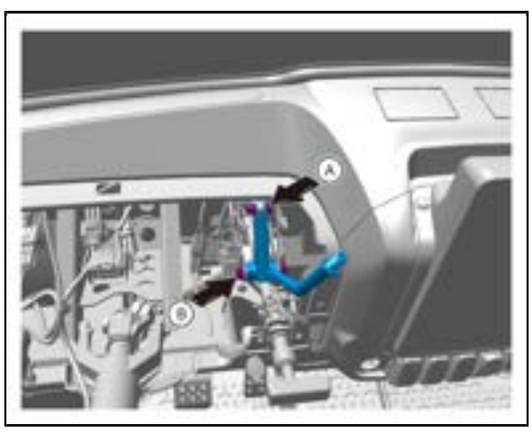
Installation Procedure

1. Reinstall the shift lever assembly following the reverse of the removal steps.

6.4.7.6 Shift Lever Assembly

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the shift lever assembly, See: Shift Lever Assembly.
3. To remove the front service cover, See: Front Service Cover.
4. To remove the instrument cover, See: Instrument Cover.
5. Removing the shift lever assembly



a. Remove retaining nut and bolt A from the shift lever assembly.

b. Remove retaining bolt and nut B from the shift lever assembly, then remove the shift lever assembly and shift shaft bush.

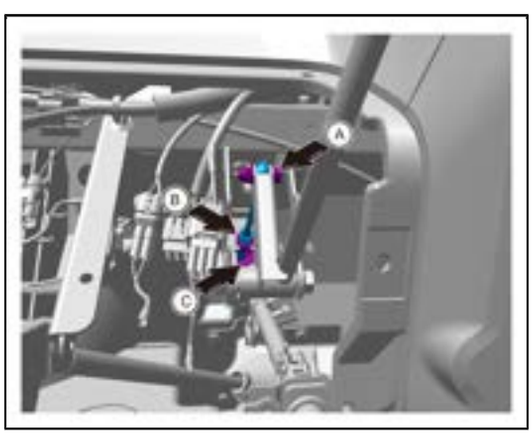
Installation Procedure

1. Install the shift lever assembly in the reverse order of removal, observing the following:
   a. After installation, perform shift operations to verify smooth shifting.

6.4.7.7 Shift Cable Assembly

Removal Procedure

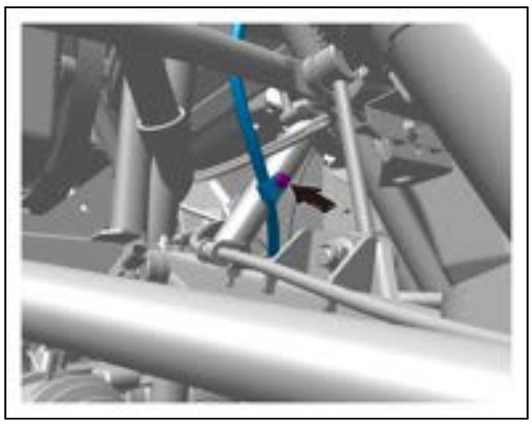
1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the left half-door, See: Left Half Door.
3. To remove the shift lever assembly, See: Shift Lever Assembly.
4. To remove the front service cover, See: Front Service Cover.
5. To remove the instrument cover, See: Instrument Cover.
6. To remove the driver's seat assembly, See: Driver's Seat Assembly.
7. To remove the passenger backrest assembly, See: Passenger Backrest Assembly.
8. To remove the passenger seat cushion assembly, See: Passenger Seat Cushion Assembly.
9. To remove the centre under-seat cover, See: Centre Under-Seat Cover.
10. To remove the left inner roof bar cover, See: Left Inner Roof Bar Cover.
11. To remove the right inner roof bar cover, See: Right Inner Roof Bar Cover.
12. To remove the left roof bar side cover, See: Left Roof Bar Side Cover.
13. To remove the left side cover, rear section, See: left Side Cover, Rear Section.
14. To remove the ECU cover, See: ECU Cover.
15. To remove the ECU assembly, See: ECU Assembly.
16. To remove the seat belt buckle assembly, See: Seat Belt Buckle Assembly.
17. To remove the rear seat cushion guard, See: Rear Seat Cushion Guard.
18. To remove the centre guide cover, See: Centre Guide Cover.
19. To remove the under-seat panel, See: Under-Seat Panel.
20. Removing the shift cable assembly



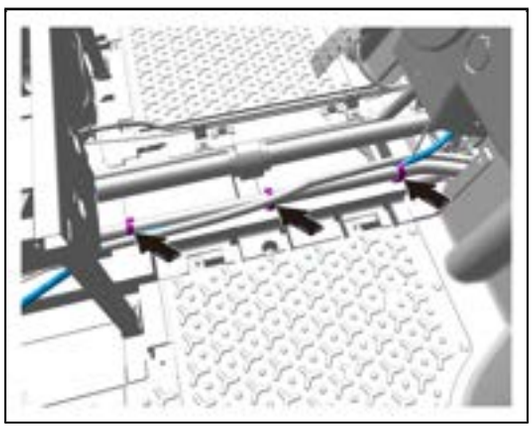
a. Remove retaining bolt and nut A from the shift lever assembly.

b. Loosen the 2 retaining nuts B of the shift cable assembly.

c. Pull the waterproof sleeve C of the shift cable assembly outward from the frame.

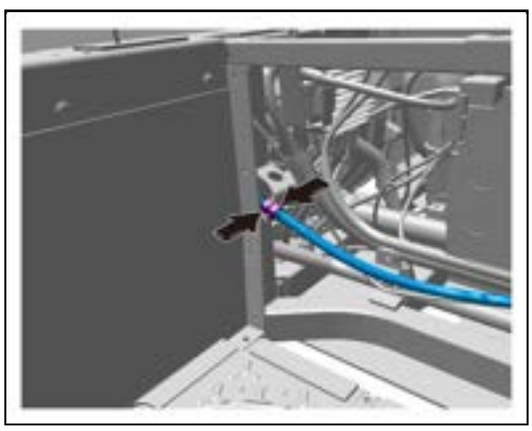


d. Remove the shift cable assembly retaining bolt.



e. Remove the 3 cable ties securing the shift cable assembly.

NOTICE:
• **Cable ties on the harness are single-use and must be replaced after removal.**



f. Loosen the 2 retaining nuts of the shift cable assembly.



g. Remove the retaining nuts of the shift cable assembly and take out the shift cable assembly.

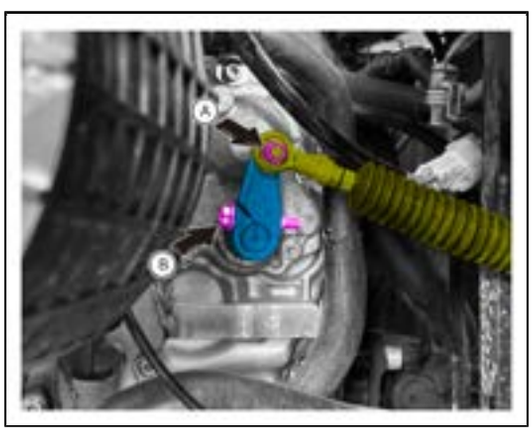
Installation Procedure

1. Install the shift cable assembly in the reverse order of removal.
   a. To install the shift cable inspection and adjustment, See: Shift Cable Inspection And Adjustment.

6.4.7.8 Shift Arm Assembly

Removal Procedure

1. Removing the control arm assembly



a. Remove retaining nut A from the control arm assembly and disconnect the shift cable assembly.
b. Remove retaining bolt B from the control arm assembly, then remove the control arm assembly.

Installation Procedure

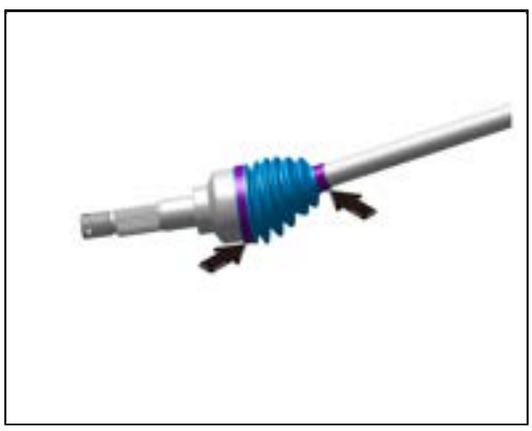
1. Install the control arm assembly in the reverse order of removal.
   a. After installation, perform shift operations to verify smooth shifting.

6.4.8 Disassembly and Reassembly

6.4.8.1 CV Axle Assembly – Disassembly and Reassembly

Removal Procedure

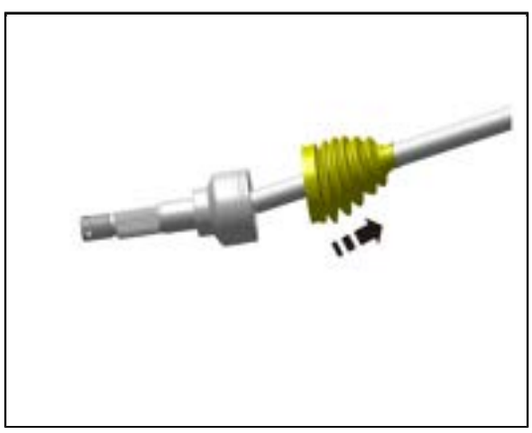
1. To lift the vehicle, See: Vehicle Lifting and Lowering.
2. To remove the front wheel assembly, See: Wheel Assembly.
3. To remove the wheel hub, See: Wheel Hub.
4. Remove front brake disc, See: Brake Disc.
5. To remove the front brake disc backplate, See: Front Brake Disc Backplate.
6. To remove the front steering knuckle, See: Front Steering Knuckle.
7. Remove front constant velocity (CV) drive shaft assembly, See: CV Axle Assembly.
8. Dismantling the CV axle assembly



a. Using hose clamp pliers, compress the clamp. Then, insert a small screwdriver under the tail end of the clamp, pry it upwards while releasing the pliers, and remove the clamps from both ends of the drive shaft.

CAUTION:

- **The drive shaft is a precision component. Cleanliness must be maintained during removal and installation. Do not use a hammer or sharp tools for removal or installation, otherwise the performance and service life of the drive shaft may be affected.**



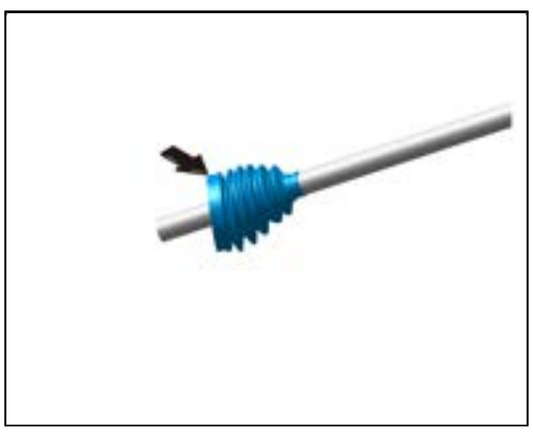
b. Slide the dust boot along the intermediate shaft to a suitable position, and clean the grease from inside the dust boot and from the universal joint.



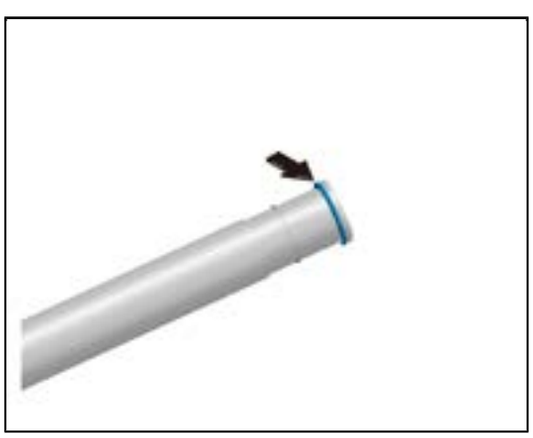
c. Remove the universal joint.

CAUTION:

- When removing the universal joint, pay attention to the position of the dust boot to avoid damaging it.



d. Remove the dust boot.



e. Remove the circlip.

Installation Procedure

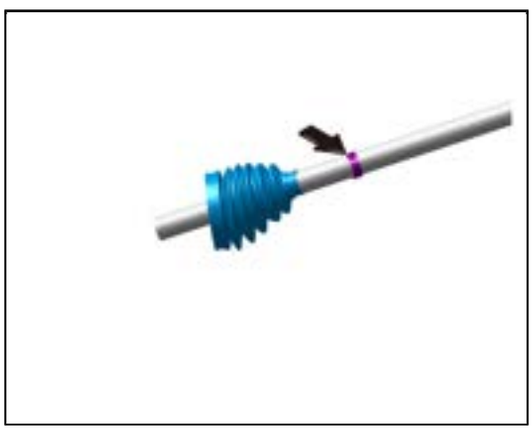
1. Reassembly of the CV axle assembly



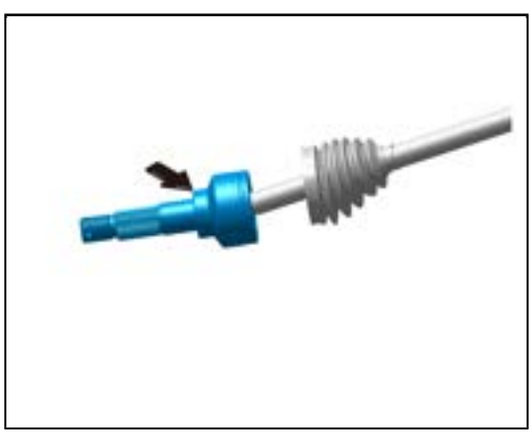
a. Fit the circlip to the intermediate shaft.

NOTICE:

- **The circlip is a single-use part and must be renewed during installation.**



b. Fit the small hose clamp and the dust boot onto the intermediate shaft in sequence.



c. Pack the universal joint and the inside of the dust boot with grease.

d. Align the splines of the intermediate shaft, then position and fit the universal joint onto the intermediate shaft.

CAUTION:

- **If only the grease is to be replaced, thoroughly remove the old grease. Do not mix new grease with old grease.**
- **Use only the specified grade of grease. Do not use any other grade of grease.**



e. Adjust the position of the dust boot, ensuring that it is correctly seated in the groove of the intermediate shaft, then tighten the small hose clamp.

f. While lifting one end of the dust boot, pull the universal joint back and forth until the sound of air escaping can be heard. After venting is complete, leave the universal joint in the mid-position and tighten the large hose clamp.

NOTICE:
• Wipe off any excess grease.

2. To install the front CV axle assembly, See: Front CV Axle Assembly.
3. To install the front steering knuckle, See: Front Steering Knuckle.
4. To install the front brake disc backplate, See: Front Brake Disc Backplate.
5. To install the brake disc, See: Brake Disc.
6. To install the wheel hub, See: Wheel Hub.
7. Fit the front wheel assembly, See: Wheel Assembly.

6.5 Steering System

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6.5.1 Specifications

6.5.1.1 Fastener Specifications

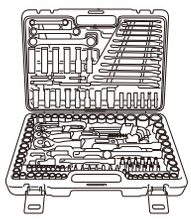
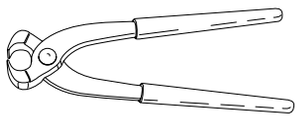
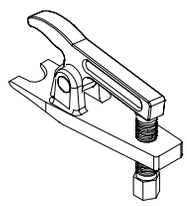
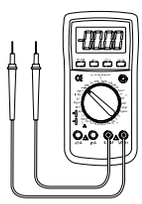
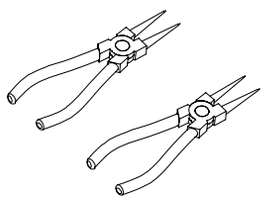
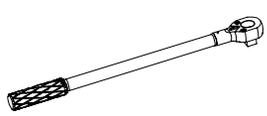
Item	Torque (N·m)	Torque (ft-lbs)
Steering Wheel Retaining Nut (M14×1.5)	70±5	51.6±3
Steering Rack Assembly Retaining Bolt (M10×1.25×95)	60±5	44.3±3.7
EPS Lower Connecting Sleeve Retaining Bolt (M8×30)	23±3	17±2.2
Tie rod assembly retaining nut (M12)	70±5	51.6±3
Steering Tie-Rod Retaining Nut (Steering Gear Installation)	110	81

6.5.1.2 Service Specifications

Item	Specifications
Steering lock type	Steering shaft locked by mechanical pin

6.5.2 Service Tools

6.5.2.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)
2	Single-ear stepless hose clip pliers		Fitting the hose clamp to the steering rack bellows
3	Ball joint separator		Removing the ball joint
4	Digital multimeter		Measuring current, voltage and resistance
5	Circlip Pliers		Removing and installing circlips
6	Torque Wrench		Tightening bolts and nuts to the specified torque

6.5.3 Description and Operation

6.5.3.1 Warnings and Precautions

1. When carrying out a steering system inspection, place the vehicle on level, dry ground.
2. The bolts of all steering system components must be tightened to the specified torque.
3. Regularly inspect steering system components for signs of abnormal impact damage. Any damaged components must be replaced promptly.
4. Disconnect the negative battery terminal before carrying out steering system service work.
5. If any locking bolt or nut is found to be damaged during servicing, it must be replaced.
6. If abnormal noise, heavy steering, or steering binding occurs while driving, stop the vehicle immediately for inspection and repair. Contact the dealer if necessary.
7. Do not weld the steering column module or any rod components of the system under any circumstances.

6.5.3.2 System Description

1. System Description
   a. In the rack-assist EPS steering system, the motor acts directly on the steering gear, giving a compact structure and high transmission efficiency. The motor provides steering assistance directly, improving steering responsiveness and driving comfort.
2. Components
   a. The steering system mainly consists of the steering wheel, gas strut assembly, steering column, EPS motor, EPS control module, tie rod assembly, and steering rack assembly.

6.5.4 System Operating Principle

6.5.4.1 Introduction to Principles

1. Basic Principles

   a. The torque sensor is connected to the steering shaft (pinion shaft). When the steering shaft rotates, the torque sensor begins to operate, converting the relative angular displacement between the input shaft and output shaft, generated by the torsion bar, into an electrical signal which is sent to the ECU.

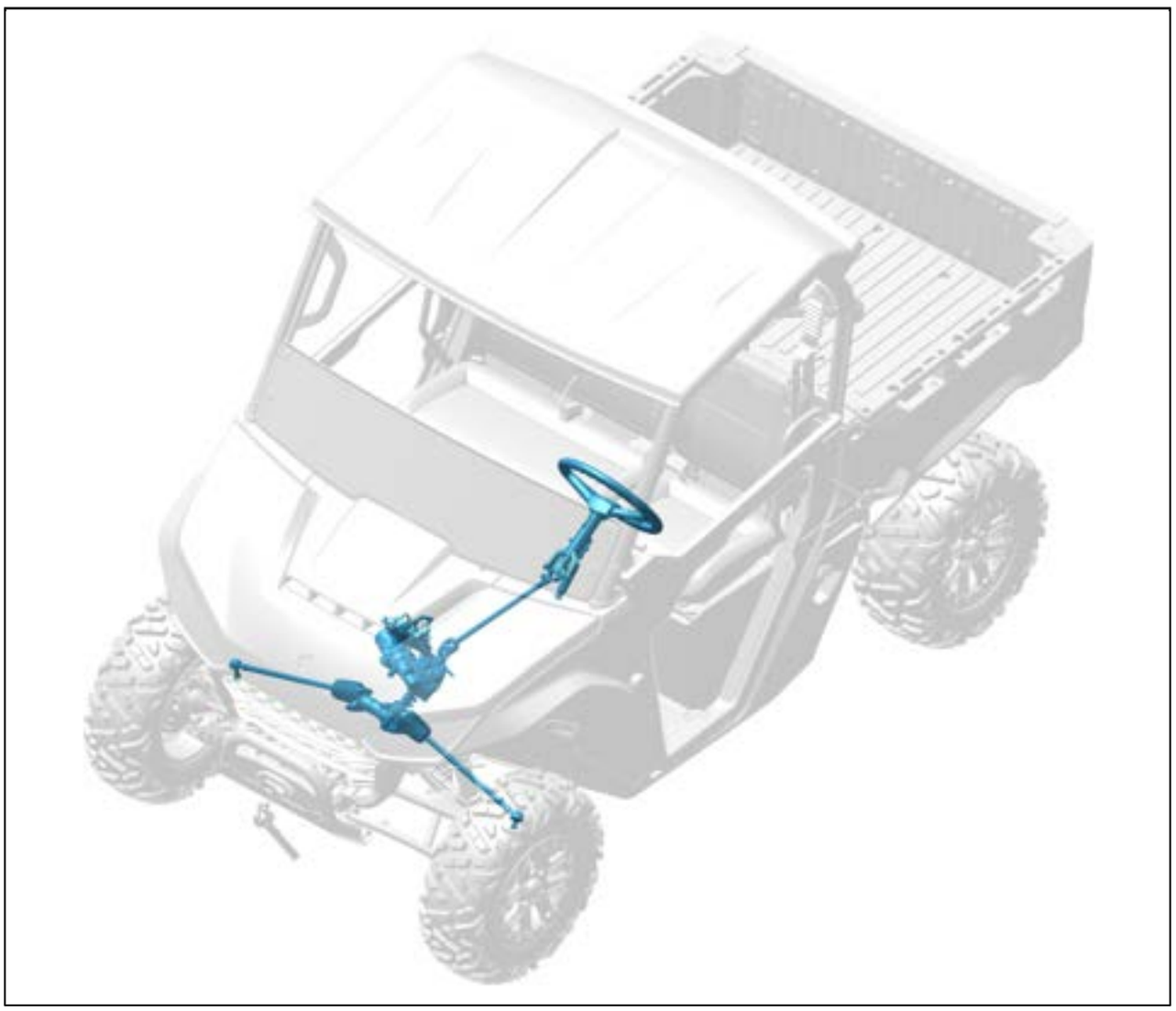
   b. The ECU determines the direction of rotation of the electric motor and the level of assist current according to the vehicle speed signal and the torque sensor signal, thereby providing real-time control of the power steering assistance.

   c. At the same time, the output of the electric motor varies in accordance with vehicle speed, ensuring light and responsive steering at low speeds (high assistance), and stable, reliable steering at high speeds (reduced or appropriately controlled assistance).

6.5.5 Component Location and Exploded View

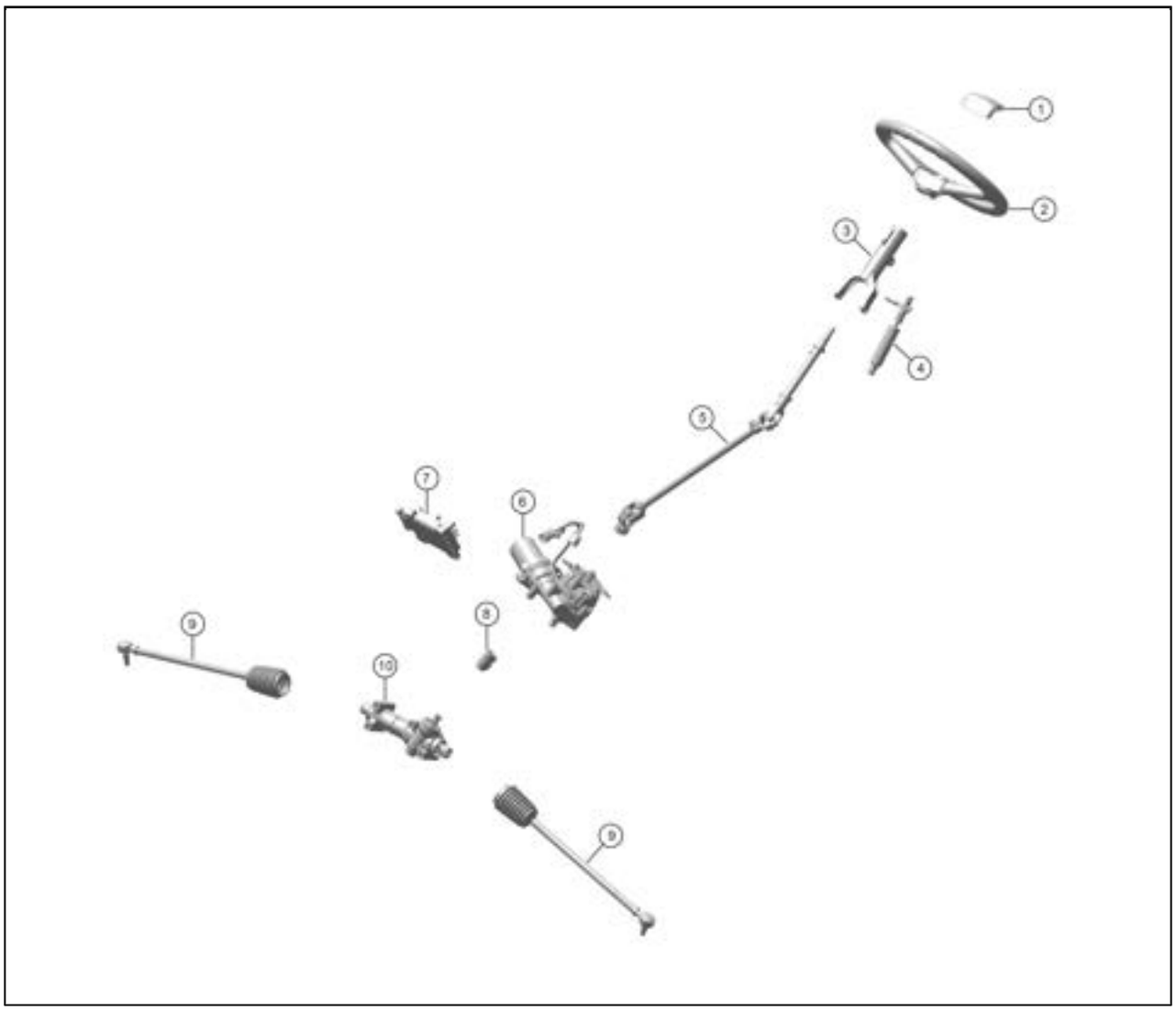
6.5.5.1 Component Location Diagram

Steering System



6.5.5.2 Exploded View Diagram

Steering System



1	Steering Wheel Centre Cover	6	EPS Motor
2	Steering Wheel	7	EPS Control Unit
3	Steering Column	8	EPS Lower Connecting Sleeve
4	Gas Strut Assembly	9	Steering Tie Rod Assembly
5	Steering Universal Joint Assembly	10	Steering Rack Assembly

6.5.6 General Fault Diagnosis and Operation

6.5.6.1 Fault Symptom List

Symptom(s)	Possible Causes	Recommended Repair Procedure
Heavy Steering	1. Steering column bearing (damaged)	Replace the steering column
	2. Steering column bearing (insufficient lubrication)	Lubricate the steering column bearing
	3. Universal joint spider bearing (insufficient lubrication)	Lubricate the universal joint spider bearing
	4. Universal joint spider bearing (damaged)	Replace the steering shaft
Excessive free play	1. Locking bolt (loose)	Tighten the locking bolt
	2. Excessive wear of steering shaft splines	Replace the steering shaft
	3. Universal joint spider (damaged)	Replace the steering shaft
	4. Ball joint (worn)	Replace the ball joint
Abnormal steering noise or steering binding	1. Steering column bearing (damaged)	Replace the steering column
	2. Steering column bearing (insufficient lubrication)	Lubricate the steering column bearing
	3. Steering shaft sliding joint (insufficient lubrication)	Lubricate the sliding joint
Steering shimmy, steering wheel vibration	1. Excessive play in the steering driveshaft universal joint spider bearing	Repair or replace the steering shaft
	2. Suspension (fatigued and lost elasticity)	Repair or replace front suspension components
	3. Front wheel alignment angle(s) out of specification	Adjust the wheel alignment
	4. Shock absorber (failed)	Replace the shock absorber
	5. Vehicle frame (deformed)	Realign the vehicle frame
Vehicle will not track straight and consistently pulls to one side	1. Tyre pressures unequal	Adjust the tyre pressures
	2. Steering knuckle (loose or worn)	Replace the steering knuckle.
	3. Steering column (loose or worn).	Tighten any loose bolts and replace any worn components.
	4. Steering shaft (universal joint loose or worn).	Tighten any loose bolts and replace any worn components.

Symptom(s)	Possible Causes	Recommended Repair Procedure
	5. Steering gear (loose or damaged).	Tighten any loose bolts or replace the steering gear.
Poor Steering Self-Centring	1. Tyre (under-inflated).	Adjust the tyre pressures
	2. Steering column (bent).	Replace
	3. Steering shaft (deformed).	Replace
	4. Steering gear (damaged).	Replace
Excessive Steering Wheel Free Play	1. Steering Wheel Splines Worn	Replace
	2. Steering shaft (universal joint worn).	Replace
	3. Steering gear track rod ball joint (worn)	Replace
	4. Steering gear (loose or damaged).	Replace

6.5.7 DTC Diagnosis and Procedure

6.5.7.1 DTC List

DTC List

DTC	Fault Description	Fault level.	Possible Causes	Recommended Repair Procedure
E0001	Torque centre position not written.	3	Steering angle calibration not carried out.	See: DTC Diagnosis: E0001, E0002
			EPS controller internal fault.	
E0002	Rotor angle end position not written.	1	Steering angle calibration not carried out.	
			EPS controller internal fault.	
E0003	Memory read/ write fault.	1	EPS controller fault.	See: DTC Diagnosis: E0003
E0004	Main torque sensor circuit open.	1	Main torque sensor harness fault.	See: DTC Diagnosis: E0004, E0005
			Main torque sensor malfunction.	
			EPS controller fault.	
E0005	Main torque sensor output abnormal.	1	Main torque sensor harness fault.	
			Main torque sensor malfunction.	
			EPS controller fault.	
E0006	Sub torque sensor circuit open.	1	Sub torque sensor harness fault.	See: DTC Diagnosis: E0006, E0007
			Sub torque sensor malfunction.	
			EPS controller fault.	
E0007	Sub torque sensor output abnormal.	1	Sub torque sensor harness fault.	
			Sub torque sensor malfunction.	
			EPS controller fault.	
E0008	Excessive deviation between main and sub torque signals.	1	Torque sensor harness fault.	See: DTC Diagnosis: E0008, E0009
			Torque sensor malfunction.	
			EPS controller fault.	

DTC	Fault Description	Fault level.	Possible Causes	Recommended Repair Procedure
E0009	Excessive deviation between primary torque before and after amplification	1	Torque sensor harness fault. Torque sensor malfunction. EPS controller fault.	
E0010	No motor assistance.	1	EPS controller harness fault. EPS controller fault.	See: DTC Diagnosis: E0010
E0011	Overcurrent.	1	EPS controller fault.	See: DTC Diagnosis: E0011
E012	Bus current abnormal.	1	Power supply circuit fault. EPS controller fault.	See: DTC Diagnosis: E0012
E0013	CAN communica-tion abnormal.	2	CAN circuit fault. EPS controller fault.	See: DTC Diagnosis: E0013
E0014	Rotor angle signal jump (abnormal output).	1	Motor rotor sensor harness fault. Motor rotor sensor malfunction. EPS ECU fault.	See: DTC Diagnosis: E0014, E0015
E0015	Rotor angle sensor circuit open.	1	Motor rotor sensor harness fault. Motor rotor sensor malfunction. EPS ECU fault.	
E0016	Power module fault.	1	EPS controller fault.	See: DTC Diagnosis: E0016
E0017	Phase A current abnormal.	1	EPS controller fault.	See: DTC Diagnosis: E0017, E0018
E0018	Phase C current abnormal.	1	EPS controller fault.	
E0019	Steering wheel angle minor gear signal abnormal.	2	EPS controller fault.	See: DTC Diagnosis: E0019, E0020, E0021
E0020	Steering wheel angle	2	EPS controller fault.	

DTC	Fault Description	Fault level.	Possible Causes	Recommended Repair Procedure
	intermediate gear signal abnormal.			
E0021	Steering wheel angle signal jump.	2	EPS controller fault.	
E0022	Steering wheel angle value out of range.	2	Steering angle not calibrated / calibration failed.	See：DTC Diagnosis: E0022, E0023
			Mechanical fault in the steering system.	
			Torsion angle sensor harness fault.	
			Torsion angle sensor malfunction.	
			EPS controller harness fault.	
			EPS controller fault.	
E0023	Steering wheel angle not centred.	2	Steering angle not calibrated / calibration failed.	
			Mechanical fault in the steering system.	
			Torsion angle sensor harness fault.	
			Torsion angle sensor malfunction.	
			EPS controller harness fault.	
			EPS controller fault.	
E0024	Abnormal motor terminal voltage	1	EPS controller fault.	See：DTC Diagnosis: E0024

6.5.7.2 DTC Diagnosis: E0001, E0002

DTC Description

DTC	Fault Description	Possible Causes
E0001	Torque centre position not written.	Steering angle calibration not carried out.
		EPS controller internal fault.
E0002	Rotor angle end position not written.	Steering angle calibration not carried out.
		EPS controller internal fault.

Diagnostic Procedure

Step 1	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No

If diagnosed as an intermittent fault, check the relevant connector for looseness, damage, and the wiring harness terminal for corrosion.

Yes

Step 2	Perform the steering angle calibration again.

a. Ensure that the tyre pressures and battery voltage are within specification.
b. Connect the diagnostic tester and start the vehicle.
c. Perform the "steering angle calibration" in accordance with the diagnostic tester procedure.
d. Is the result normal?

Yes

Fault rectified.

No

Step 3	Checking the EPS control unit

a. Replace the EPS control unit with a new one.
b. Restore the vehicle and clear all module DTCs.
c. After performing the steering angle calibration,

carry out a road test and perform a functional check.

d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.5.7.3 DTC Diagnosis: E0003

DTC Description

DTC	Fault Description	Possible Causes
E0003	Memory read/write fault.	EPS controller fault.

Diagnostic Procedure

Step 1	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No — If diagnosed as an intermittent fault, check the relevant connector for looseness, damage, and the wiring harness terminal for corrosion.

Yes

Step 2	Checking the EPS control unit

a. Replace the EPS control unit with a new one.
b. Restore the vehicle and clear all module DTCs.
c. After performing the steering angle calibration, carry out a road test and perform a functional check.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.5.7.4 DTC Diagnosis: E0004, E0005

DTC Description

DTC	Fault Description	Possible Causes
E0004	Main torque sensor circuit open.	Main torque sensor harness fault.
		Main torque sensor malfunction.
		EPS controller fault.
E0005	Main torque sensor output abnormal.	Main torque sensor harness fault.
		Main torque sensor malfunction.
		EPS controller fault.

Diagnostic Procedure

Step 1	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No — If diagnosed as an intermittent fault, check the relevant connector for looseness, damage, and the wiring harness terminal for corrosion.

Yes

Step 2	Checking the live data

a. Connect the diagnostic tester and start the vehicle.
b. Enter “Electric Power Steering (EPS)”, select “Read Live Data”, choose “Main Torque”, click “Display”, turn the steering wheel, and read the live data.
c. Is the result normal?

Yes — Fault rectified.

No

Step 3	Checking the EPS control unit

a. Replace the EPS control unit with a new one.
b. Restore the vehicle and clear all module DTCs.
c. After performing the steering angle calibration, carry out a road test and perform a functional check.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.5.7.5 DTC Diagnosis: E0006, E0007

DTC Description

DTC	Fault Description	Possible Causes
E0006	Sub torque sensor circuit open.	Sub torque sensor harness fault.
		Sub torque sensor malfunction.
		EPS controller fault.
E0007	Secondary Torque Sensor Output Fault	Sub torque sensor harness fault.
		Sub torque sensor malfunction.
		EPS controller fault.

Diagnostic Procedure

Step 1	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No — If diagnosed as an intermittent fault, check the relevant connector for looseness, damage, and the wiring harness terminal for corrosion.

Yes

Step 2	Checking the live data

a. Connect the diagnostic tester and start the vehicle.
b. Enter "Electric Power Steering (EPS)", select "Read Live Data", choose "Secondary Torque", click "Display", turn the steering wheel, and read the live data.
c. Is the result normal?

Yes → Fault rectified.

No

Step 3	Checking the EPS control unit

a. Replace the EPS control unit with a new one.
b. Restore the vehicle and clear all module DTCs.
c. After performing the steering angle calibration, carry out a road test and perform a functional check.
d. Is the result normal?

Yes → Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.5.7.6 DTC Diagnosis: E0008, E0009

DTC Description

DTC	Fault Description	Possible Causes
E0008	Excessive deviation between main and sub torque signals.	Torque sensor harness fault.
		Torque sensor malfunction.
		EPS controller fault.
E0009	Excessive deviation between primary	Torque sensor harness fault.

DTC	Fault Description	Possible Causes
	torque before and after amplification	Torque sensor malfunction.
		EPS controller fault.

Diagnostic Procedure

Step 1	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No

If diagnosed as an intermittent fault, check the relevant connector for looseness, damage, and the wiring harness terminal for corrosion.

Yes

Step 2	Checking the live data

a. Connect the diagnostic tester and start the vehicle.
b. Enter “Electric Power Steering (EPS)”, select “Read Live Data”, choose “Main Torque” / “Secondary Torque”, click “Display”, turn the steering wheel, and read the live data.
c. Is the result normal?

Yes

Fault rectified.

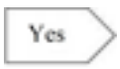
No

Step 3	Checking the EPS control unit

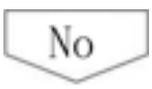
a. Replace the EPS control unit with a new one.
b. Reassemble the vehicle, clear the DTCs from all modules, then carry out a road test and perform a functional check.
c. After performing the steering angle calibration, carry out a road test and perform a functional

check.

d. Is the result normal?



Fault rectified.



Recheck according to the above Diagnostic Procedure.

6.5.7.7 DTC Diagnosis: E0010

DTC Description

DTC	Fault Description	Possible Causes
E0010	No motor assistance.	EPS controller harness fault.
		EPS controller fault.

Diagnostic Procedure

Step 1	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

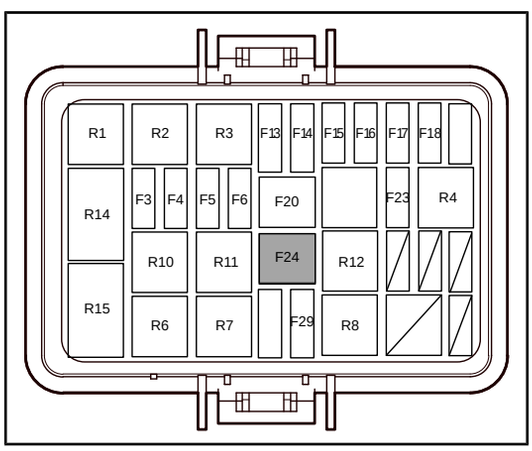
No

If diagnosed as an intermittent fault, check the relevant connector for looseness, damage, and the wiring harness terminal for corrosion.

Yes

Step 2	Inspecting the fuse

a. Switch the vehicle power "OFF" and disconnect the battery earthing cable.
b. Remove the fuse F24 (40A) from the fuse box.



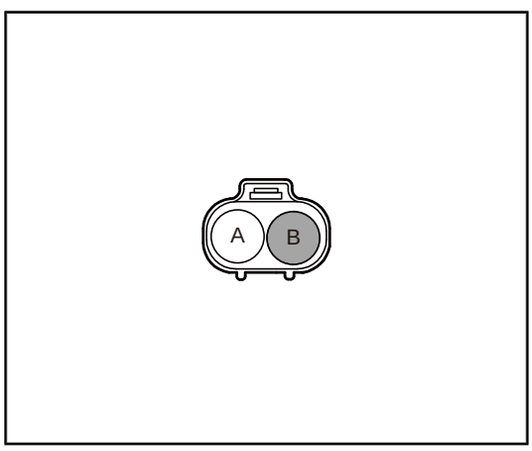
c. Check if the fuse is blown.

Yes — Replace with a fuse of the same specification.

No

Step 3	Checking the EPS control unit power supply voltage

a. Switch the vehicle power "OFF" and disconnect the battery earthing cable.
b. Disconnect EPS control unit connector B034.
c. Connect the battery earth cable and start the vehicle.
d. Using a digital multimeter, measure the voltage between terminal B of B034 and earth.
Voltage value:



Terminal number	Terminal number	Standard value
B034(B)	Earth	11~14V

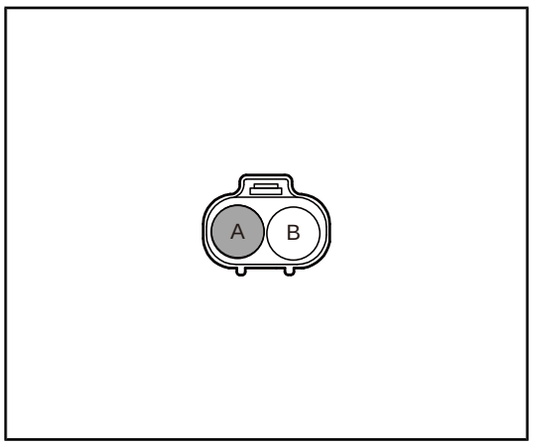
e. Is the result normal?

No — Repair or replace the EPS control unit power supply harness.

Yes

Step 4	Checking the EPS control unit earth

a. Switch the vehicle power "OFF" and disconnect the battery earthing cable.
b. Disconnect EPS control unit connector B034.
c. Using a digital multimeter, measure the resistance between terminal A of EPS control unit connector



B034 and earth.

Resistance value:

Terminal number	Terminal number	Standard value
B034(A)	Earth	< 1Ω

d. Is the result normal?

No — Repair or replace the EPS control unit earth strap harness.

Yes

Step 5	Checking the EPS control unit

a. Replace the EPS control unit with a new one.
b. Restore the vehicle and clear all module DTCs.
c. After performing the steering angle calibration, carry out a road test and perform a functional check.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.5.7.8 DTC Diagnosis: E0011

DTC Description

DTC	Fault Description	Possible Causes
E0011	Overcurrent.	EPS controller fault.

Diagnostic Procedure

Step 1	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No

If diagnosed as an intermittent fault, check the relevant connector for looseness, damage, and the wiring harness terminal for corrosion.

Yes

Step 2	Checking the EPS module

a. Replace the EPS control unit with a new one.
b. Restore the vehicle and clear all module DTCs.
c. After performing the steering angle calibration, carry out a road test and perform a functional check.
d. Is the result normal?

Yes

Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.5.7.9 DTC Diagnosis: E0012

DTC Description

DTC	Fault Description	Possible Causes
E0012	Bus current abnormal.	Power supply circuit fault.
		EPS controller fault.

Diagnostic Procedure

Step 1	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

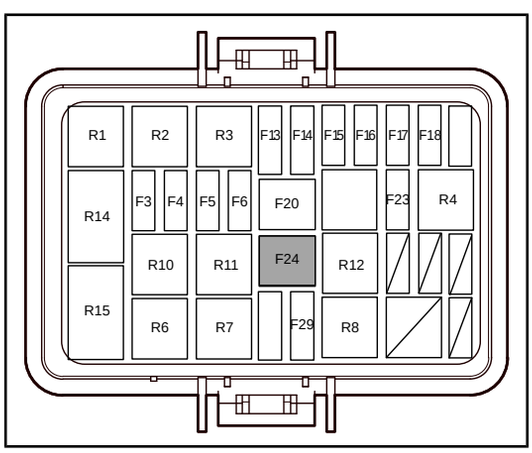
No

If diagnosed as an intermittent fault, check the relevant connector for looseness, damage, and the wiring harness terminal for corrosion.

Yes

Step 2	Inspecting the fuse

a. Switch the vehicle power “OFF” and disconnect the battery earthing cable.
b. Remove the fuse F24 (40A) from the fuse box.



c. Is the fuse blown?

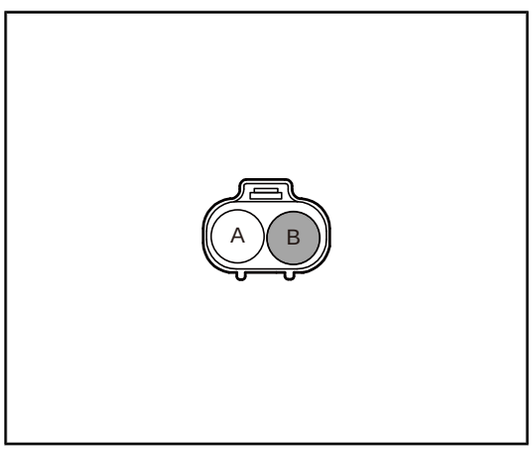
Yes

Replace with a fuse of the same specification.

No

Step 3	Checking the EPS control unit power supply voltage

a. Switch the vehicle power "OFF" and disconnect the battery earthing cable.
b. Disconnect EPS control unit connector B034.
c. Connect the battery earth cable and start the vehicle.
d. Using a digital multimeter, measure the voltage between terminal B of B034 and earth.
Voltage value:



Terminal number	Terminal number	Standard value
B034(B)	Earth	11~14V

e. Is the result normal?

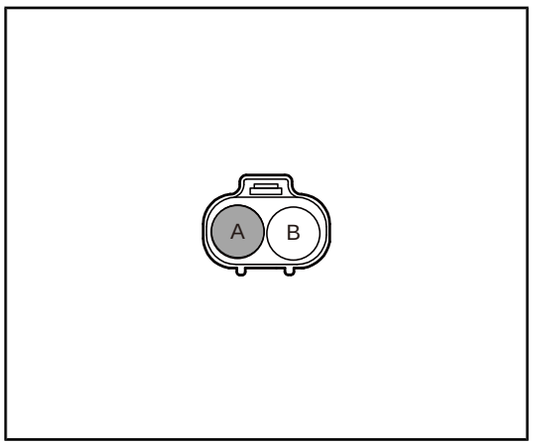
No

Repair or replace the EPS control unit power supply harness.

Yes

Step 4	Checking the EPS control unit earth

a. Switch the vehicle power "OFF" and disconnect the battery earthing cable.
b. Disconnect EPS control unit connector B034.
c. Using a digital multimeter, measure the resistance between terminal A of EPS control unit connector



B034 and earth.

Resistance value:

Terminal number	Terminal number	Standard value
B034(A)	Earth	< 1Ω

d. Is the result normal?

No — Repair or replace the EPS control unit earth strap harness.

Yes

Step 5	Checking the EPS control unit

a. Replace the EPS control unit with a new one.
b. Restore the vehicle and clear all module DTCs.
c. After performing the steering angle calibration, carry out a road test and perform a functional check.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.5.7.10 DTC Diagnosis: E0013

DTC Description

DTC	Fault Description	Possible Causes
E0013	CAN communication abnormal.	CAN circuit fault.
		EPS controller fault.

Diagnostic Procedure

Step 1	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No

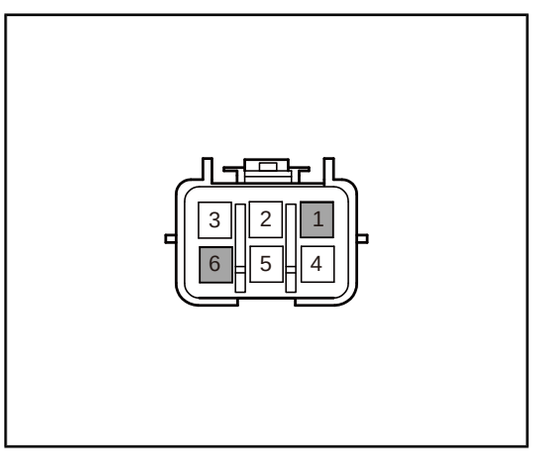
If diagnosed as an intermittent fault, check the relevant connector for looseness, damage, and the wiring harness terminal for corrosion.

Yes

Step 2	Checking the voltage of the EPS control unit CAN line

a. Switch the vehicle power supply OFF, then disconnect the battery earth cable.
b. Disconnect EPS control unit connector B035.
c. Connect the battery earth cable and start the vehicle.
d. Using a digital multimeter, measure the voltage between each of terminals 6 and 1 of EPS control unit connector B035 and earth.

Voltage value:



Terminal number	Terminal number	Standard value
B035(6)	Earth	Approximately 2.6 V
B035(1)	Earth	Approximately 2.4 V

e. Is the result normal?

No — Repair or replace the EPS control unit PCAN harness.

Yes

Step 3	Checking the EPS control unit

a. Replace the EPS control unit with a new one.
b. Restore the vehicle and clear all module DTCs.
c. After performing the steering angle calibration, carry out a road test and perform a functional check.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.5.7.11 DTC Diagnosis: E0014, E0015

DTC Description

DTC	Fault Description	Possible Causes
E0014	Rotor angle signal jump (abnormal output).	Motor rotor sensor harness fault.
		Motor rotor sensor malfunction.
		EPS ECU fault.
E0015	Rotor angle sensor circuit open.	Motor rotor sensor harness fault.
		Motor rotor sensor malfunction.
		EPS ECU fault.

Diagnostic Procedure

Step 1	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No

Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

Step 2	Checking the EPS control unit

a. Replace the EPS control unit with a new one.
b. Restore the vehicle and clear all module DTCs.
c. After performing the steering angle calibration, carry out a road test and perform a functional check.
d. Is the result normal?

Yes

Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.5.7.12 DTC Diagnosis: E0016

DTC Description

DTC	Fault Description	Possible Causes
E0016	Power module fault.	EPS controller fault.

Diagnostic Procedure

Step 1	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No

Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

Step 2	Checking the EPS control unit

a. Replace the EPS control unit with a new one.
b. Restore the vehicle and clear all module DTCs.
c. After performing the steering angle calibration, carry out a road test and perform a functional check.
d. Is the result normal?

Yes → Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.5.7.13 DTC Diagnosis: E0017, E0018

DTC Description

DTC	Fault Description	Possible Causes
E0017	Phase A current abnormal.	EPS controller fault.
E0018	Phase C current abnormal.	EPS controller fault.

Diagnostic Procedure

Step 1	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No → Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

Step 2	Checking the EPS control unit

a. Replace the EPS control unit with a new one.
b. Restore the vehicle and clear all module DTCs.
c. After performing the steering angle calibration, carry out a road test and perform a functional check.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.5.7.14 DTC Diagnosis: E0019, E0020, E0021

DTC Description

DTC	Fault Description	Possible Causes
E0019	Steering wheel angle minor gear signal abnormal.	EPS controller fault.
E0020	Steering wheel angle intermediate gear signal abnormal.	EPS controller fault.
E0021	Steering wheel angle signal jump.	EPS controller fault.

Diagnostic Procedure

Step 1	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No — Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

Step 2	Checking the EPS control unit

a. Replace the EPS control unit with a new one.
b. Restore the vehicle and clear all module DTCs.
c. After performing the steering angle calibration, carry out a road test and perform a functional check.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.5.7.15 DTC Diagnosis: E0022, E0023

DTC Description

DTC	Fault Description	Possible Causes
E0022	Steering wheel angle value out of range.	Steering angle not calibrated / calibration failed.
		Mechanical fault in the steering system.
		Torsion angle sensor harness fault.
		Torsion angle sensor malfunction.
		EPS controller harness fault.
		EPS controller fault.
E0023	Steering wheel angle not centred.	Steering angle not calibrated / calibration failed.
		Mechanical fault in the steering system.
		Torsion angle sensor harness fault.
		Torsion angle sensor malfunction.
		EPS controller harness fault.
		EPS controller fault.

Diagnostic Procedure

Step 1	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No — Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

Step 2	Perform the steering angle calibration again.

a. Ensure that the tyre pressures and battery voltage are within specification.
b. Connect the diagnostic tester and start the vehicle.
c. Perform the "steering angle calibration" in

accordance with the diagnostic tester procedure.
d. Is the result normal?

Yes → Fault rectified.

No

Step 3	Checking the mechanical components of the steering system

a. Raise the vehicle and check the steering system for any obvious interference, deformation or looseness.
b. Is the result normal?

No → Rectify the relevant fault.

Yes

Step 4	Checking the EPS control unit

a. Replace the EPS control unit with a new one.
b. Restore the vehicle and clear all module DTCs.
c. After performing the steering angle calibration, carry out a road test and perform a functional check.
d. Is the result normal?

Yes → Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.5.7.16 DTC Diagnosis: E0024

DTC Description

DTC	Fault Description	Possible Causes
E0024	Abnormal motor terminal voltage	EPS controller fault.

Diagnostic Procedure

Step 1	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No — Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

Yes

Step 2	Checking the EPS control unit

a. Replace the EPS control unit with a new one.
b. Restore the vehicle and clear all module DTCs.
c. After performing the steering angle calibration, carry out a road test and perform a functional check.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.5.8 Inspecting and adjusting

6.5.8.1 Inspecting the steering system

Inspecting the steering system

1. Inspecting the steering system
   a. Check the tie-rod ball joint for excessive wear. If the clearance is excessive, replace the tie-rod assembly.
   b. Check the steering rack gaiter for damage; if damaged, replace the tie rod assembly.
   c. Check the steering system components for any loose fasteners.
   d. Check all connecting components for deformation or cracks.
2. Steering Wheel Centring
   a. Check that the wheel alignment is within specifications.
   b. Park the vehicle pointing straight ahead. Ensure the steering wheel is centred or that the vehicle is driving in a straight line, then check the steering wheel alignment.

NOTICE:
• If the steering wheel is not centred, perform the necessary adjustments.

3. Precautions after replacing steering system components
   a. Replace any worn or damaged steering components. The steering should move freely throughout its full range, without binding. Check the routing of all cables, hoses and wiring, ensuring that the steering mechanism is not restricted.

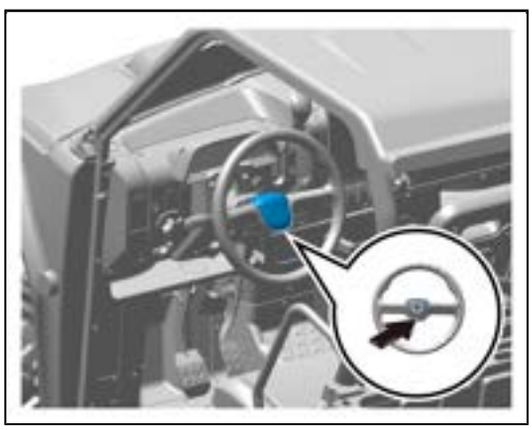
NOTICE:
• When replacing steering components, check the toe setting.

6.5.9 Repair Procedure Guidance

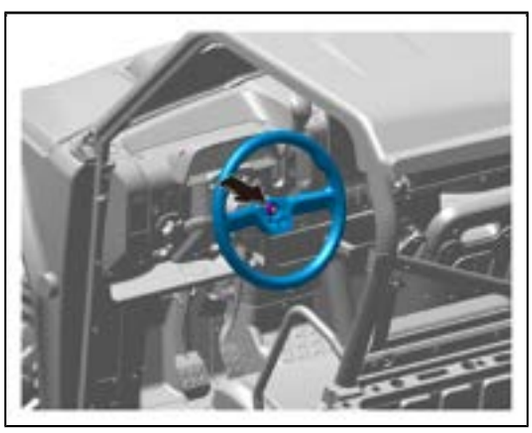
6.5.9.1 Steering Wheel

Removal Procedure

1. Removing the steering wheel



a. Remove the steering wheel emblem cover retaining screws, then remove the cover.



b. Loosen the steering wheel retaining nut (M14×1.5), rock the steering wheel to disengage it from the splines, then remove both the steering wheel and the nut.

Torque: 51.6 ± 3 ft-lbs (70 ± 5 N·m).

Installation Procedure

1. Install the disc in the reverse order of removal, noting the following:
   a. Check if the steering wheel is centred. See： Inspecting the steering system

6.5.9.2 Gas Strut Assembly

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the instrument cover, See: Instrument Cover.
3. Removing gas strut assembly



a. Remove the 2 gas strut assembly retaining bolts, and remove the gas strut assembly.

WARNING:
• WARNING: The gas strut contains high-pressure gas. Do not incinerate or dismantle it, as this may cause an explosion.

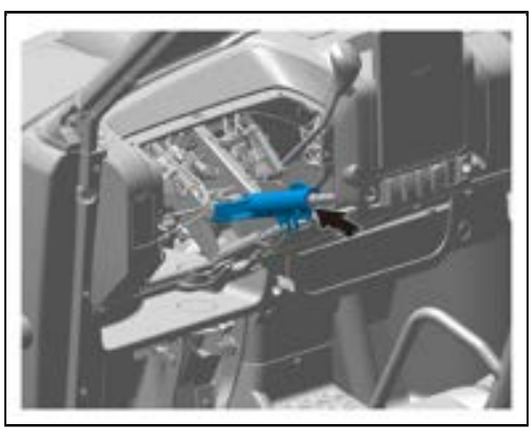
Installation Procedure

1. Install the gas strut assembly in the reverse order of removal.

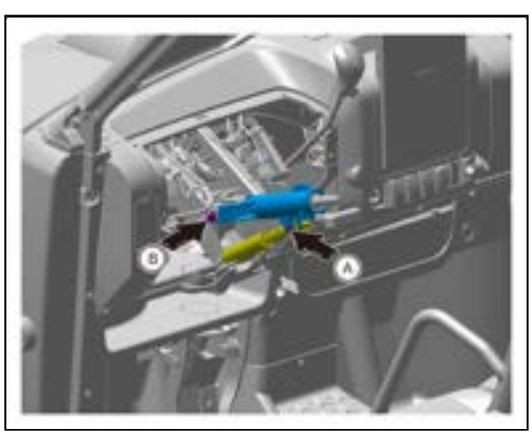
6.5.9.3 Steering Column

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the instrument cover, See: Instrument Cover.
3. To remove the steering wheel, See: Steering Wheel.
4. To remove the combination switch, See: Combination Switch.
5. Removing the steering column



a. Remove the external circlip.

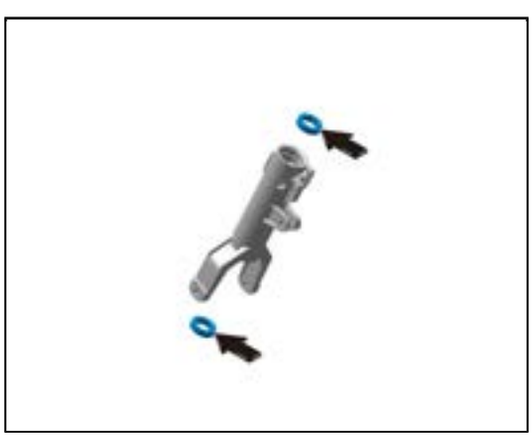


b. Remove the gas strut assembly retaining bolt A (M6).

Torque: 7.4 ft-lbs (10 N·m)

c. Remove the steering column retaining bolt B (M8), and remove the steering column.

Torque: 18.4 ft-lbs(25N·m)



d. Secure the steering column in a vice. Insert a suitable drift or pry bar into the column and knock out the bearings from both ends.

Installation Procedure

1. Install the steering column assembly in the reverse order of removal, noting the following points:
   a. Prior to installation, ensure the bearings are free of scratches or corrosion, and that the bearings and bores are perfectly clean. Once pressed in, the bearings must rotate smoothly by hand.
   b. Use a shop press to install the bearings at both ends.

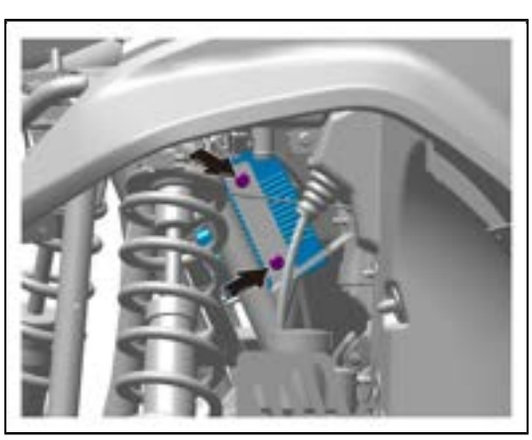
6.5.9.4 EPS Control Unit

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To drain the coolant, See: Coolant Draining and Refilling.
3. To remove the front service cover, See: Front Service Cover.
4. To remove the headlamp cover, See: Headlamp Cover.
5. To remove the flasher unit, See: Flasher Unit.
6. To remove the front panel, See: Front Panel.
7. To remove the headlamp bezel assembly, See: Headlamp Bezel Assembly.
8. To remove the horn, See: Horn.
9. To remove the front bracket welded assembly, See: Front Bracket Welded Assembly.
10. To remove the engine radiator, See: Engine Radiator.
11. To remove the radiator rear baffle, See: Radiator Rear Baffle.
12. Removing the EPS control unit



a. Disconnect the 4 EPS control unit wiring harness connectors.



b. Remove the 2 EPS control unit retaining bolts (M6×12).

c. Remove the EPS control unit.

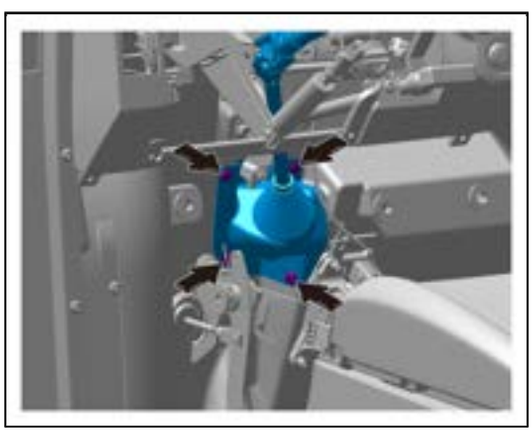
Installation Procedure

1. Install the EPS control unit in the reverse order of removal.

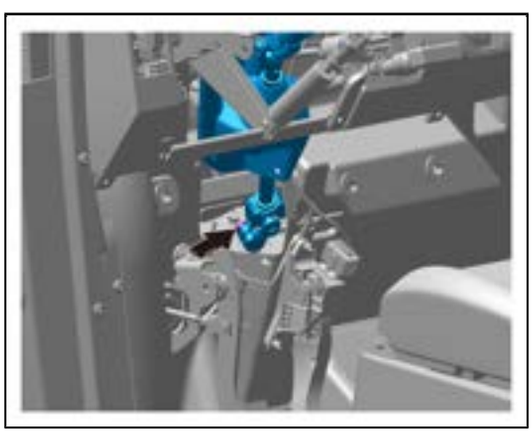
6.5.9.5 EPS Steering Universal Joint Assembly

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. To remove the instrument cover, See: Instrument Cover.
4. To remove the lower centre console storage compartment, See: Lower Centre Console Storage Compartment.
5. To remove the steering wheel, See: Steering Wheel.
6. To remove the combination switch, See: Combination Switch.
7. To remove the steering column, See: Steering Column.
8. Removing the EPS steering universal joint assembly



a. Remove the 4 retaining clips from the EPS steering universal joint assembly.



b. Remove the EPS steering universal joint assembly retaining bolt (M8×25), then remove the EPS assembly along with the spring washer.

Installation Procedure

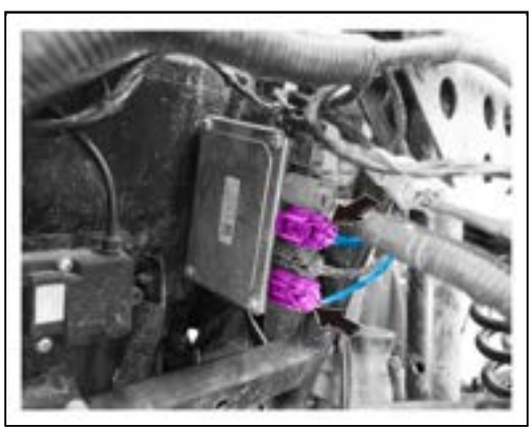
1. Install the EPS steering universal joint assembly in the reverse order of removal, observing the following precautions:
   a. During installation, ensure both front wheels are pointing straight ahead. After installation, verify the steering operates smoothly without binding.

b. Check the front wheel toe after installation. See: Checking front wheel toe

6.5.9.6 EPS Motor

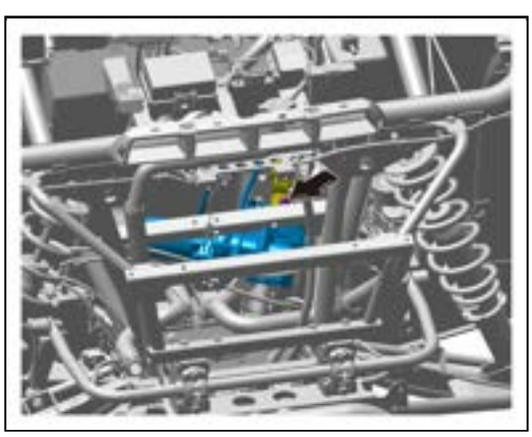
Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To drain the coolant, See: Coolant Draining and Refilling.
3. To remove the front service cover, See: Front Service Cover.
4. To remove the headlamp cover, See: Headlamp Cover.
5. To remove the flasher unit, See: Flasher Unit.
6. To remove the front panel, See: Front Panel.
7. To remove the headlamp bezel assembly, See: Headlamp Bezel Assembly.
8. To remove the horn, See: Horn.
9. To remove the front bracket welded assembly, See: Front Bracket Welded Assembly.
10. To remove the engine radiator, See: Engine Radiator.
11. To remove the radiator rear baffle, See: Radiator Rear Baffle.
12. Removing EPS motor



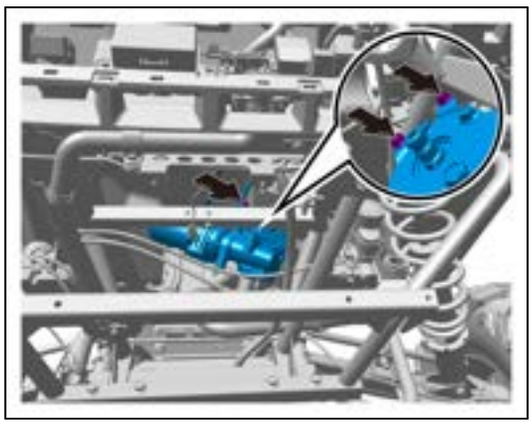
a. Disconnect the 2 EPS motor wiring harness connectors and cut the securing cable ties.

NOTICE:
• The harness retaining cable tie is a single-use part and must be replaced with a new one after removal.



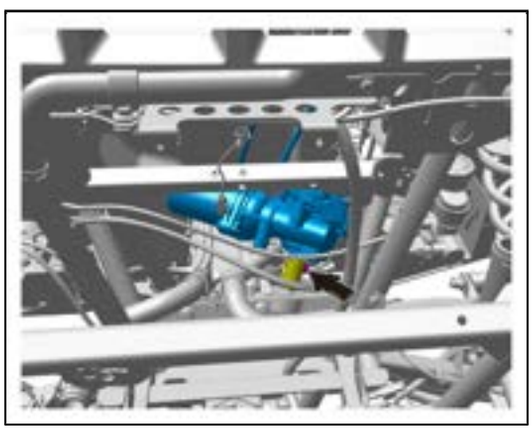
b. Remove the steering column assembly mounting bolt(M8×30).

c. Separate the steering column from the EPS motor.



d. Remove the 3 EPS motor retaining bolts (M8×16).

Torque: 17 ± 2.2 ft-lbs (23 ± 3 N·m).



e. Remove the EPS lower connecting sleeve retaining bolt (M8×30).

Torque: 17 ± 2.2 ft-lbs (23 ± 3 N·m).

f. Remove the EPS motor.

CAUTION:
• CAUTION: Discharge any static electricity before removing the EPS motor.

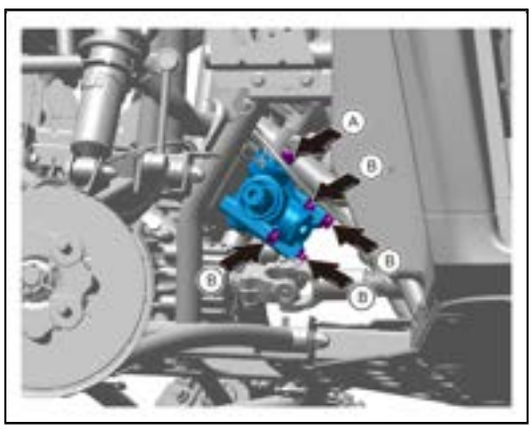
Installation Procedure

1. **Install the EPS motor in the reverse order of removal, observing the following points:**
   a. When installing the EPS assembly, ensure that both front wheels are pointing straight ahead, and do not turn the steering shaft during installation.
   b. Check the front wheel toe after installation. See: Checking front wheel toe

6.5.9.7 Steering Rack Assembly

Removal Procedure

1. To lift the vehicle, See: Vehicle Lifting and Lowering.
2. To remove the front wheel assembly, See: Wheel Assembly.
3. To remove the tie-rod assembly, See: Tie-Rod Assembly.
4. Removing steering rack assembly



a. Remove the EPS lower connecting sleeve retaining bolt A (M8×30).

Torque: 17 ± 2.2 ft-lbs (23 ± 3 N·m).

b. Remove the 4 steering rack assembly retaining bolts B (M10×1.25×95), and remove the steering rack assembly.

Torque: 44.3 ± 3.7 ft-lbs (60 ± 5 N·m).

Installation Procedure

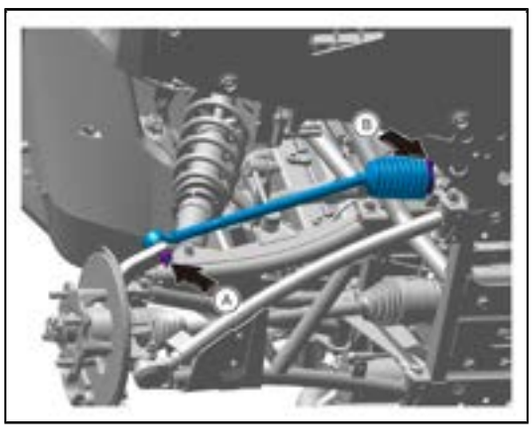
1. Install the steering column assembly in the reverse order of removal, noting the following points:
   a. Check that the left and right tie rods are of equal length; if not, adjust them accordingly.
   b. To install the checking front wheel toe, See: Checking Front Wheel Toe.

6.5.9.8 Tie-Rod Assembly

NOTICE:
• This section describes the removal and installation of the left tie-rod assembly as an example. Removal and installation of the right tie-rod assembly may be carried out in the same manner.

Removal Procedure

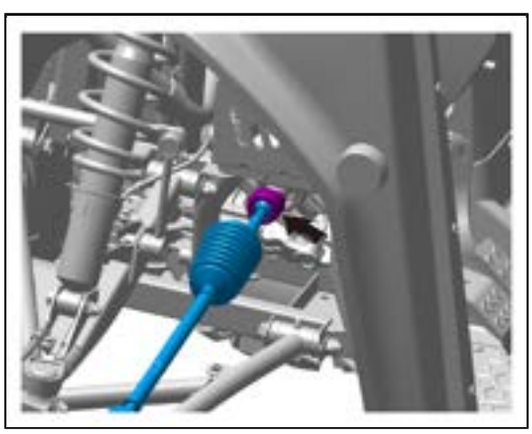
1. To lift the vehicle, See: Vehicle Lifting and Lowering.
2. To remove the wheel assembly, See: Wheel Assembly.
3. Removing tie-rod assembly



a. Remove the split pin and retaining nut A (M12) from the tie rod assembly.

Torque: 51.6 ± 3 ft-lbs (70 ± 5 N·m).

b. Loosen clamp B and detach the tie rod gaiter.



c. Remove the steering tie-rod locknut, then remove the steering tie-rod assembly.

Torque: 81 ft-lbs(110N·m)

Installation Procedure

1. Install the tie-rod assembly in the reverse order of removal, observing the following points:
   a. Check that the left and right tie rods are of equal length; if not, adjust them accordingly.
   b. To install the checking front wheel toe, See: Checking Front Wheel Toe.

6.6 Brake System

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6.6.1 Specifications

6.6.1.1 Fastener Specifications

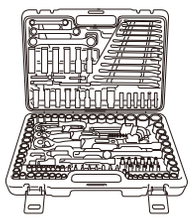
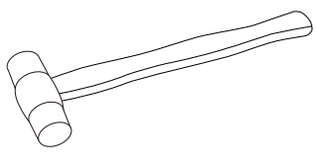
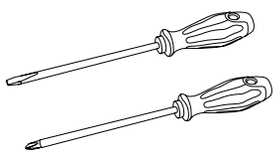
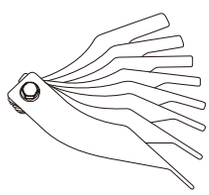
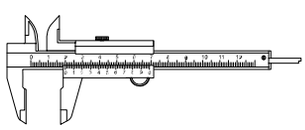
Item	Torque (N·m)	Torque (ft-lbs)
Front Brake Assembly Retaining Bolt (M10×1.25×25)	45±5	33.2±3.7
Front Brake Line Retaining Bolt	25	18
Slotted nut, M24 × 2	300±20	221.3±14.8
Brake Disc Retaining Screw	28～32	20.64～23.6
Rear Brake Caliper Retaining Bolt (M10×1.25×25)	45±5	33.2±3.7
Rear Brake Line Retaining Bolt	25	18

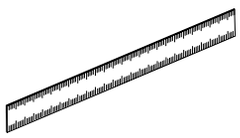
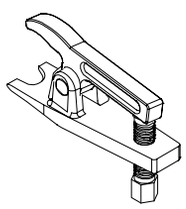
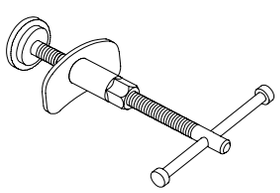
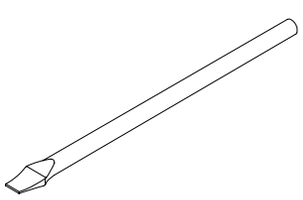
6.6.1.2 Service Specifications

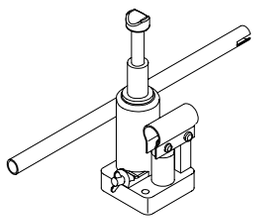
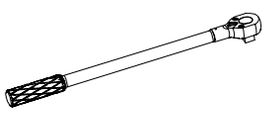
Item		Specifications
Brake Fluid Type		DOT4
Brake Pad Thickness (mm)	Standard value (mm)	5.0
	Service Limit (mm)	1.5
Brake Disc Thickness (mm)	Standard value (mm)	5.0
	Service Limit (mm)	4.0
Brake Disc Run-out (mm)	Standard value (mm)	0.08
	Service Limit (mm)	0.1

6.6.2 Service Tools

6.6.2.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)
2	Rubber mallet		Front axle removal and installation
3	Screwdriver		Removing screws
4	Dial Indicator		Measure brake disc run-out
5	Brake pad thickness gauge		Measure brake pad thickness
6	Vernier Caliper		Measure brake disc and pad thickness

Item No.	Tool Description	Tool Diagram	Purpose/Use
7	Steel rule		Measure pedal free play and the length.
8	Bleeding bottle		Bleeding the Brake System
9	Ball joint separator		Removing the ball joint
10	Brake caliper piston resetting tool		Reset the brake caliper piston
11	Pry bar		Levering tool

Item No.	Tool Description	Tool Diagram	Purpose/Use
12	Jack		Raising the Vehicle
13	Torque Wrench		Tightening bolts and nuts to the specified torque

6.6.3 Description and Operation

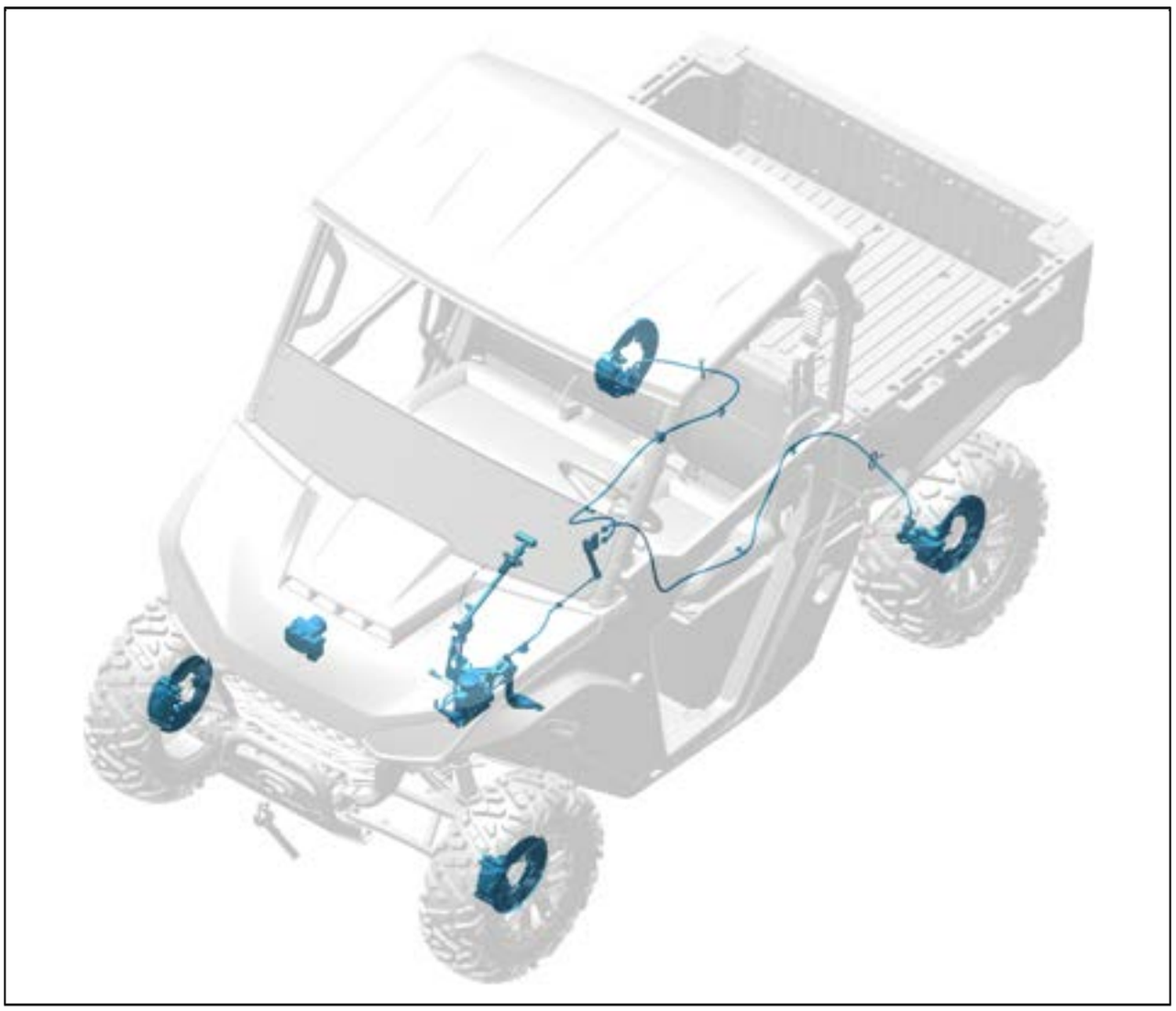
6.6.3.1 Warnings and Precautions

1. Precautions during servicing
   a. Brake fluid is highly corrosive. When servicing the brake system, avoid contact with the skin and painted body surfaces. If accidental contact occurs, rinse immediately with plenty of clean water.
   b. During servicing, prevent oil or grease from contaminating the brake pads and brake disc. If contamination occurs, clean thoroughly with emery cloth.
   c. When removing the brake caliper piston, do not depress the brake pedal, otherwise the piston may be forced out and the piston dust boot may be damaged.
   d. During servicing, thoroughly clean the brake wheel cylinder and brake pads to minimise damage caused by airborne particles and other contaminants.
   e. When servicing the brake caliper, wash all brake caliper parts in clean brake fluid.
   f. Do not re-use drained brake fluid. Collected brake fluid must be stored in a dedicated sealed container.
   g. During bleeding, check the brake fluid level in the reservoir and top up promptly if the level falls below the MIN mark.
   h. After topping up the brake fluid and completing the bleeding procedure, check the brake system for leaks. Rectify any leaks immediately to ensure safe vehicle operation.
   i. If any components require replacement during servicing, use only genuine parts. The left and right brake assemblies must be replaced with identical genuine parts.
2. Other precautions
   a. Braking performance has a direct and significant effect on driving safety. The brake system must therefore be kept in good working order at all times, and any faults must be rectified without delay.
   b. Inspect and maintain the brake system at regular intervals to eliminate potential safety hazards.
   c. Do not mix brake fluids of different specifications.
   d. Do not use any liquid other than brake fluid, otherwise components of the hydraulic brake system may be damaged.

6.6.4 Component Location and Exploded View

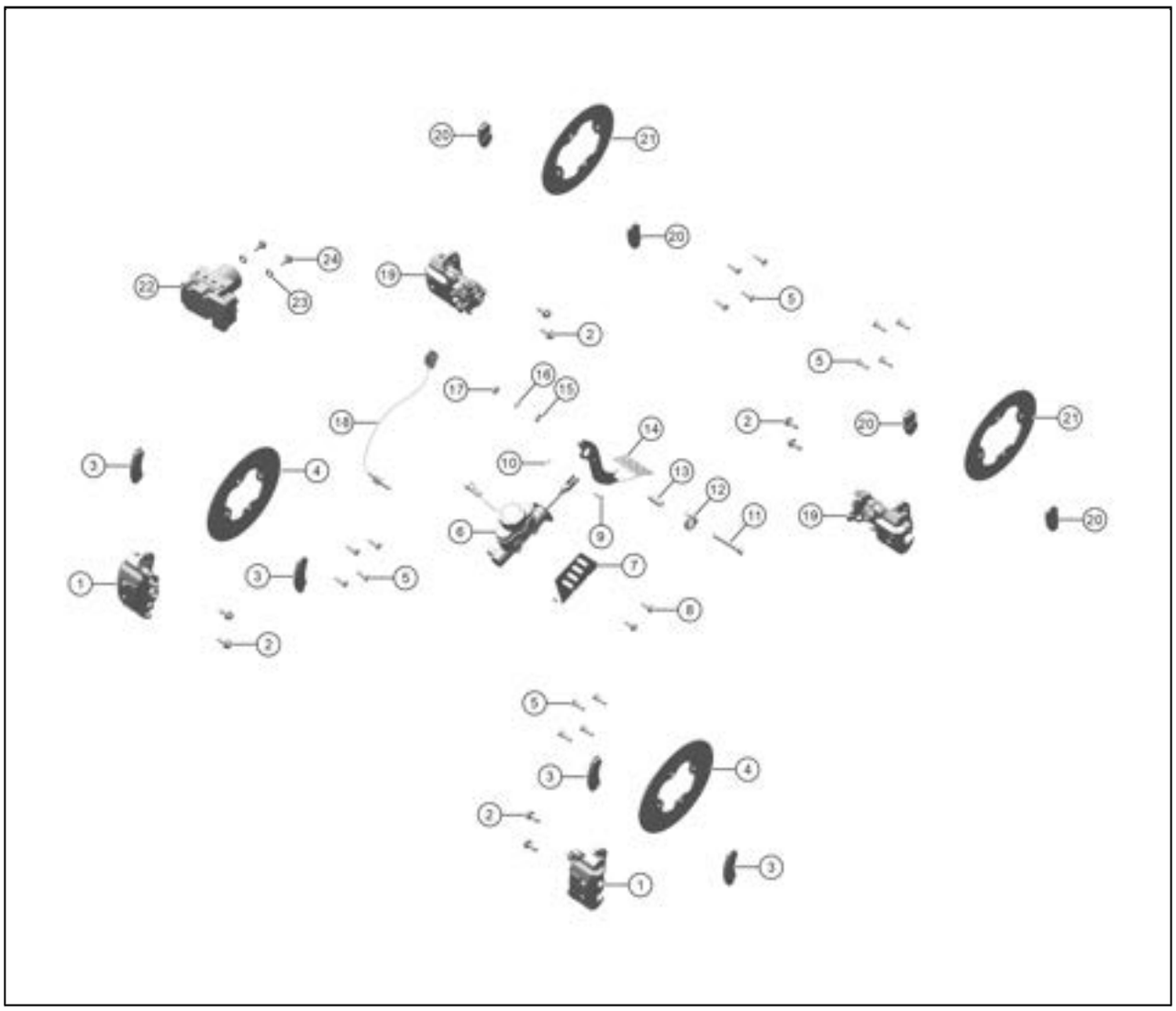
6.6.4.1 Component Location Diagram

Brake System



6.6.4.2 Exploded View Diagram

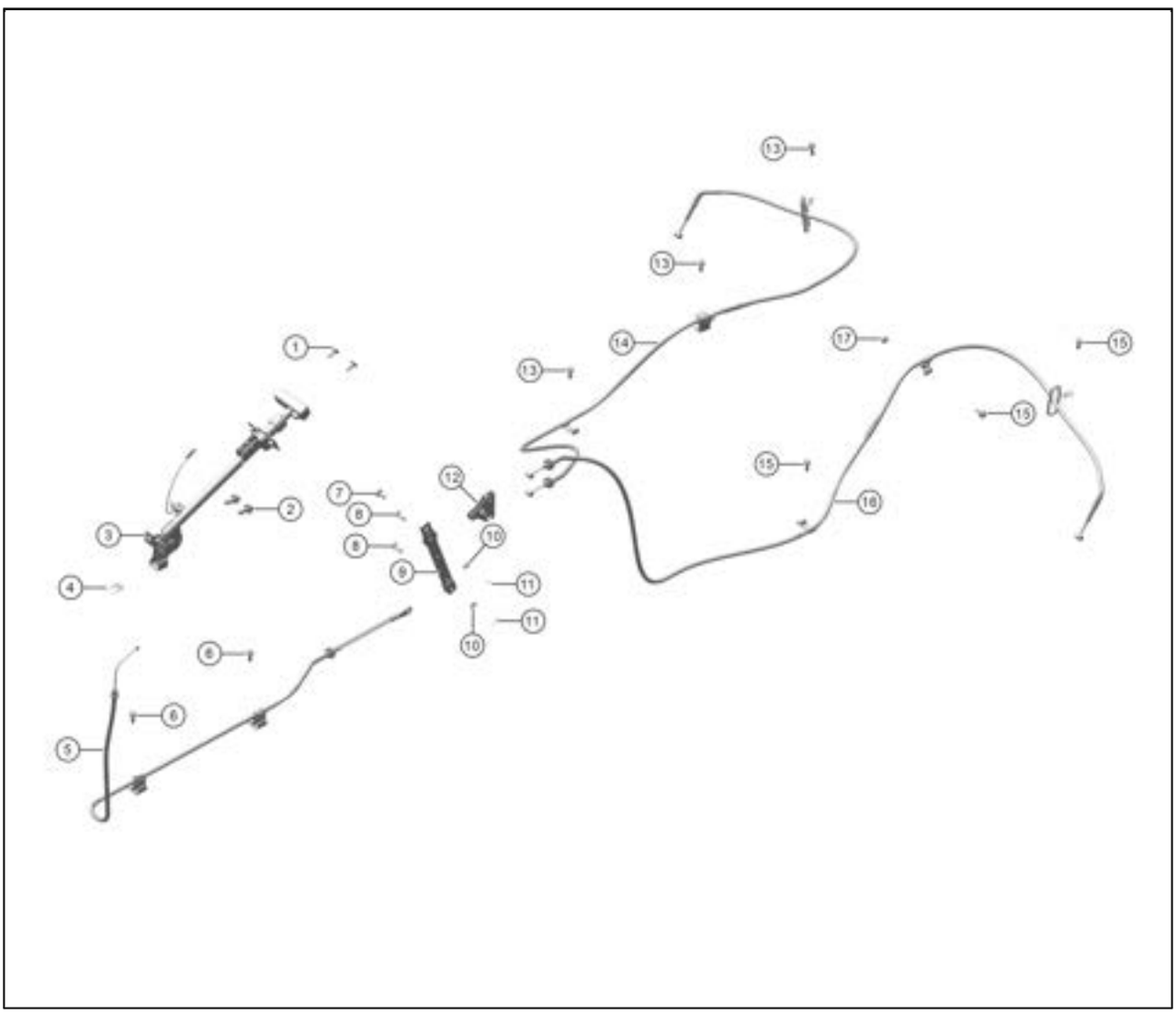
Service Brakes



1	Front brake	9	Split Pin	17	Hex Nut
2	Hex flange bolt	10	Pivot Pin	18	Hydraulic Pressure Switch
3	Front brake pad	11	Hexagon Socket Head Cap Screw	19	Rear brake
4	Front brake disc	12	Rear Brake Pedal Return Spring	20	Rear brake pad
5	Front Brake Disc Retaining Bolt	13	Inner Sleeve	21	Rear brake disc
6	Foot Brake Master Cylinder Assembly	14	Brake Pedal Welded Assembly	22	ABS Actuator Assembly

7	Brake Master Cylinder Guard	15	Plain Washer	23	Plain Washer
8	Hex flange bolt	16	Spring washers	24	Bolt

Brake control mechanism



1	Large Pan Head Hex Socket Bolt	10	Plain Washer
2	Hex flange bolt	11	Split Pin
3	Handbrake Lever Assembly	12	Parking Brake Cable Equalizer
4	E-Clip	13	Hex flange bolt
5	Parking Brake Cable Assembly, Front Section	14	Parking Brake Cable Assembly, Right Section
6	Hex flange bolt	15	Hex flange bolt
7	M6 Shoulder Bolt	16	Parking Brake Cable Assembly, Left Section

8	Clevis Pin	17	Hex Flange Nut
9	Parking Brake Operating Lever Assembly		

6.6.5 General Fault Diagnosis and Operation

6.6.5.1 Fault Symptom List

Symptom(s)	Possible Causes	Recommended Repair Procedure
Poor braking performance	1. Air in the brake system	Bleeding the Brake System
	2. Brake pipe union loose	Tighten the brake pipe union
	3. Brake lines blocked or leaking	Clear or replace
	4. Brake master cylinder damaged	Replace
	5. Brake pads excessively worn, surface hardened or contaminated with oil	Clean or replace
	6. Excessive brake pedal travel	Adjust the brake pedal travel
	7. Insufficient brake fluid	Top up the brake fluid
	8. Brake or wheel cylinder piston seized or excessively worn	Inspect, repair or replace
	9. Brake disc excessively worn or severely distorted	Replace
Brake drag	1. Brake lines blocked or fluid return restricted	Clear or replace
	2. Brake pads excessively worn, surface hardened or contaminated with oil	Clean or replace
	3. Brake pedal travel: no pedal free play	Adjust the brake pedal travel
	4. Brake or wheel cylinder piston does not return correctly	Inspect, repair or replace
	5. Brake disc excessively worn, severely distorted or contaminated	Clean or replace
Abnormal noise during braking	1. Brake caliper slide pins poorly lubricated	Lubricate the slide pins
	2. Brake pads excessively worn	Replace
	3. Brake caliper, suspension system or bushes loose	Inspect and repair
	4. Excessive brake disc thickness variation	Replace
Abnormal brake disc overheating	1. Brake pedal travel too small	Replace and adjust the brake pedal travel
	2. Brake pads incorrectly fitted	Refit correctly
	3. Brake master cylinder or brake caliper piston sticking	Inspect, repair or replace

6.6.6 DTC Diagnosis and Procedure

6.6.6.1 Fault code list (Hydraulic brake system equipped with ABS)

DTC List

DTC	Fault Description	Possible Causes	Recommended Repair Procedure
A0001	ECU operating power supply: voltage too high	Alternator failure	See: DTC Diagnosis: A0001
		Battery voltage too high fault	
		ABS module fault	
A0002	ECU operating power supply: voltage too low	Battery voltage too low	See: DTC Diagnosis: A0002
		ECU harness	
		ABS module fault	
A0003	Left front wheel speed sensor circuit — open or short	Left front wheel speed sensor malfunction	See: DTC Diagnosis: A0003, A0004, A0005
		Left front wheel speed sensor circuit fault	
		ABS module fault	
A0004	Left front wheel speed sensor signal unstable / out of range / intermittent fault	Left front wheel speed sensor malfunction	
		Left front wheel speed sensor circuit fault	
		Left front wheel speed sensor installation fault	
		Left front wheel speed sensor probe obstruction fault	
		ABS module fault	
A0005	Left front wheel speed sensor no signal	Left front wheel speed sensor malfunction	
		Left front wheel speed sensor circuit fault	
		Left front wheel speed sensor installation fault	
		Left front wheel speed sensor probe obstruction fault	
		ABS module fault	
A0006	Right front wheel speed sensor circuit —	Right front wheel speed sensor malfunction	See: DTC Diagnosis: A0006, A0007, A0008

DTC	Fault Description	Possible Causes	Recommended Repair Procedure
	open or short	Right front wheel speed sensor circuit fault	
		ABS module fault	
A0007	Right front wheel speed sensor signal unstable / out of range / intermittent fault	Right front wheel speed sensor malfunction	
		Right front wheel speed sensor circuit fault	
		Right front wheel speed sensor installation fault	
		Right front wheel speed sensor probe obstruction fault	
		ABS module fault	
A0008	Right front wheel speed sensor no signal	Right front wheel speed sensor malfunction	
		Right front wheel speed sensor circuit fault	
		Right front wheel speed sensor installation fault	
		Right front wheel speed sensor probe obstruction fault	
		ABS module fault	
A0009	Left rear wheel speed sensor circuit — open or short	Left rear wheel speed sensor malfunction	See： DTC Diagnosis: A0009, A0010, A0011
		Left rear wheel speed sensor circuit fault	
		ABS module fault	
A0010	Left rear wheel speed sensor signal unstable / out of range / intermittent fault	Left rear wheel speed sensor malfunction	
		Left rear wheel speed sensor circuit fault	
		Left rear wheel speed sensor installation fault	
		Left rear wheel speed sensor probe obstruction fault	
		ABS module fault	
A0011	Left rear wheel speed sensor no signal	Left rear wheel speed sensor malfunction	

DTC	Fault Description	Possible Causes	Recommended Repair Procedure
		Left rear wheel speed sensor circuit fault	
		Left rear wheel speed sensor installation fault	
		Left rear wheel speed sensor probe obstruction fault	
		ABS module fault	
A0012	Right rear wheel speed sensor circuit — open or short	Right rear wheel speed sensor malfunction	See: DTC Diagnosis: A0012, A0013, A0014
		Right rear wheel speed sensor circuit fault	
		ABS module fault	
A0013	Right rear wheel speed sensor signal unstable / out of range / intermittent fault	Right rear wheel speed sensor malfunction	
		Right rear wheel speed sensor circuit fault	
		Right rear wheel speed sensor installation fault	
		Right rear wheel speed sensor probe obstruction fault	
		ABS module fault	
A0014	Right rear wheel speed sensor no signal	Right rear wheel speed sensor malfunction	
		Right rear wheel speed sensor circuit fault	
		Right rear wheel speed sensor installation fault	
		Right rear wheel speed sensor probe obstruction fault	
		ABS module fault	
A0015	Wheel speed sensor (WSS) – incorrect frequency, incorrect tooth count, or tyre mismatch	Wheel speed sensor malfunction	See: DTC Diagnosis: A0015
		ABS reluctor ring fault	
		Tyre size fault	
A0016	Valve relay fault	Fuse fault	See: DTC Diagnosis: A0016
		ABS control module	

DTC	Fault Description	Possible Causes	Recommended Repair Procedure
		assembly fault	
A0017	Left front inlet valve fault	ABS control module assembly	See: DTC Diagnosis: A0017, A0018
A0018	Left front outlet valve fault	ABS control module assembly	
A0019	Right front inlet valve fault	ABS control module assembly	See: DTC Diagnosis: A0019, A0020
A0020	Right front outlet valve fault	ABS control module assembly	
A0021	Left rear inlet valve fault	ABS control module assembly	See: DTC Diagnosis: A0021, A0022
A0022	Left rear inlet valve fault	ABS control module assembly	
A0023	Right rear inlet valve fault	ABS control module assembly	See: DTC Diagnosis: A0023, A0024
A0024	Right rear inlet valve fault	ABS control module assembly	
A0025	Valve fault (overheating, overcurrent, circuit short to earth, signal error, hardware fault)	Fault caused by overheating during manual air bleeding	See: DTC Diagnosis: A0025
		ABS module fault	
A0026	Motor fault	ABS module power supply fault	See: DTC Diagnosis: A0026
		ABS module fault	
A0027	ECU fault (hardware / microcontroller fault)	ABS control module assembly	See: DTC Diagnosis: A0027, A0028, A0029, A0031, A0032
A0028	ECU hardware fault	ABS control module assembly	
A0029	ECU fault (standard software fault)	ABS control module assembly	
A0031	ABS control abnormal fault	ABS control module assembly	
A0032	Variant coding error – parameter not set	ABS control module assembly	
A0030	CAN bus OFF	CAN bus fault	See: DTC Diagnosis: A0030
		ABS module fault	

6.6.6.2 DTC Diagnosis: A0001

DTC Description

DTC	Fault Description	Possible Causes
A0001	ECU operating power supply: voltage too high	Alternator failure
		Battery voltage too high fault
		ABS module fault

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No — Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

Yes — Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

No

Step 3	Inspecting the battery

a. Switch the vehicle power "OFF" and disconnect the battery earthing cable.
b. Use a digital multimeter to measure the voltage between the positive and negative terminals of the battery.
Voltage value:

Terminal number	Terminal number	Standard value
Positive terminal of the battery.	Negative terminal of the battery.	11 ~ 14V

c. Is the result normal?

No → Repair or replace the battery.

Yes

Step 4	Inspecting the alternator

a. Connect the battery earth cable and start the engine.
b. Use a digital multimeter to measure the voltage between the alternator B+ terminal and earth.
Voltage value:

Terminal number	Terminal number	Standard value
Alternator (+).	Earth	11 ~ 14V

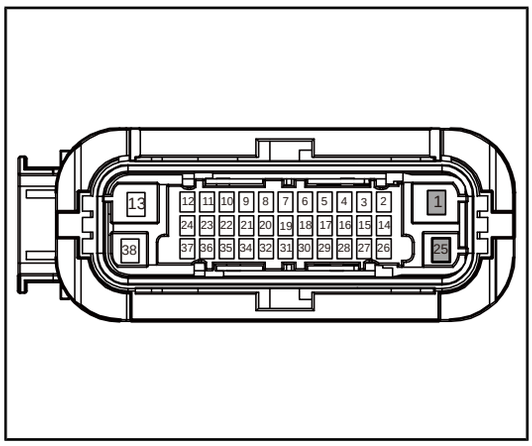
c. Is the result normal?

No → Repair or replace the alternator.

Yes

Step 5	Inspecting the ABS module power supply

a. Switch the vehicle power “OFF” and disconnect the battery earthing cable.
b. Disconnect the ECU connector B030.
c. Connect the battery earth cable and start the vehicle.
d. Use a digital multimeter to measure the voltage between terminal 1 of the ECU connector B030 and



earth.

Voltage value:

Terminal number	Terminal number	Standard value
B030(25)	Earth	11 ~ 14V
B030(1)	Earth	11 ~ 14V

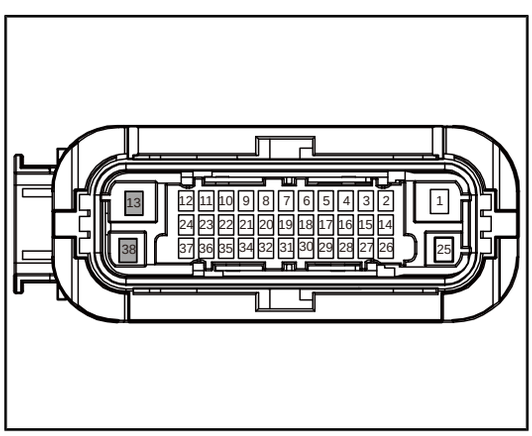
e. Is the result normal?

No — Repair or replace the ABS module power supply harness.

Yes

Step 6	Inspecting ABS module earthing

a. Switch the vehicle power "OFF" and disconnect the battery earthing cable.
b. Disconnect the ECU connector B030.
c. Connect the battery earth cable and start the vehicle.
d. Use a digital multimeter to measure the resistance between terminal 13 and 38 of the ECU connector B030 and earth.



Resistance value:

Terminal number	Terminal number	Standard value
B030(13)	Earth	< 1Ω
B030(38)	Earth	< 1Ω

e. Is the result normal?

No → Repair or replace the ABS module earth strap.

Yes

Step 7	Checking the ABS module

a. Replace with a new ABS module.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check via test drive.
d. Is the result normal?

Yes → Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.6.6.3 DTC Diagnosis: A0002

DTC Description

DTC	Fault Description	Possible Causes
A0002	ECU operating power supply: voltage too low	Battery voltage too low
		ECU harness
		ABS module fault

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No — Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

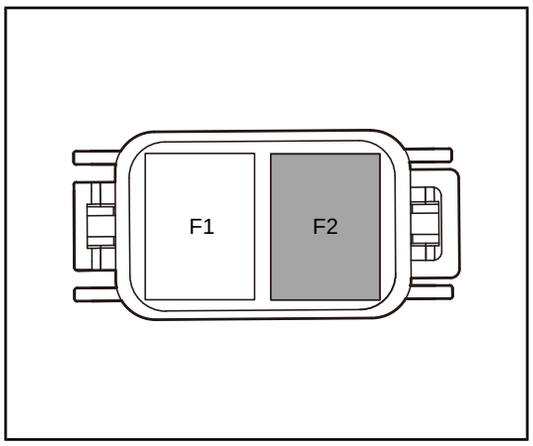
Yes — Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

No

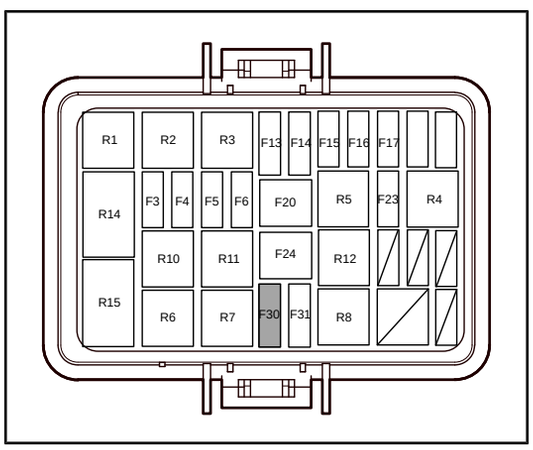
Step 3	Inspecting the fuse

a. Switch the vehicle power “OFF” and disconnect the battery earthing cable.
b. Remove the fuse F2 (40A) from the two-way fuse

box.



c. Remove the fuse F30 (25A) from the fuse box.



d. Check if the fuse is blown.

Yes — Replace with a fuse of the same specification.

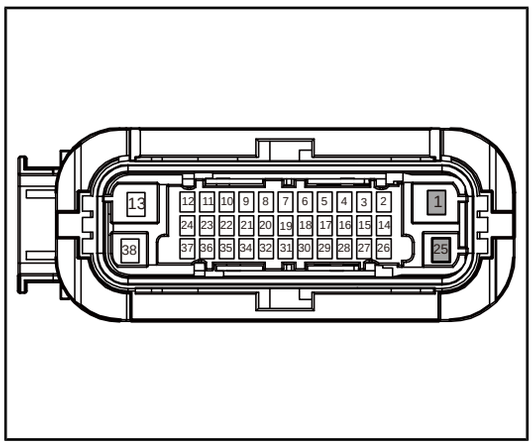
No

Step 4	Inspecting the ABS module power supply

a. Switch the vehicle power "OFF" and disconnect the battery earthing cable.
b. Disconnect ABS module connector B030.
c. Connect the battery earth cable and start the vehicle.
d. Using a digital multimeter, measure the voltage between each of terminals 25 and 1 of ABS module

connector B030 and earth.

Voltage value:



Terminal number	Terminal number	Standard value
B030(25)	Earth	11 ~ 14V
B030(1)	Earth	11 ~ 14V

e. Is the result normal?

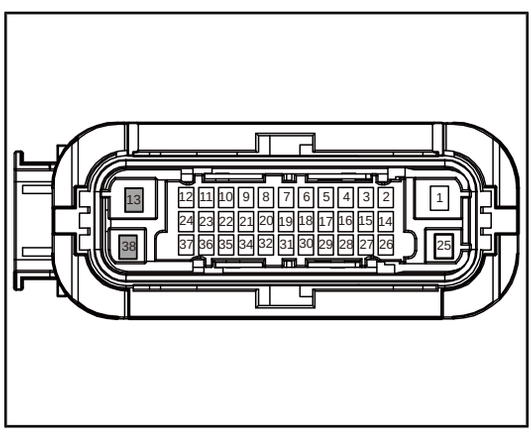
No — Repair or replace the ABS module power supply harness.

Yes

Step 5	Inspecting ABS module earthing

a. Switch the vehicle power “OFF” and disconnect the battery earthing cable.
b. Disconnect ABS module connector B030.
c. Connect the battery earth cable and start the vehicle.
d. Measure the resistance between terminals 13 and 38 of ABS module connector B030 and earth using a digital multimeter.

Resistance value:



Terminal number	Terminal number	Standard value
B030(13)	Earth	< 1Ω
B030(38)	Earth	< 1Ω

e. Is the result normal?

No — Repair or replace the ABS module earth strap.

Yes

Step 6	Checking the ABS module

a. Replace with a new ABS module.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check via test drive.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.6.6.4 DTC Diagnosis: A0003, A0004, A0005

DTC Description

DTC	Fault Description	Possible Causes
A0003	Left front wheel speed sensor circuit — open or short	Left front wheel speed sensor malfunction
		Left front wheel speed sensor circuit fault
		ABS module fault
A0004	Left front wheel speed sensor signal unstable / out of range / intermittent fault	Left front wheel speed sensor malfunction
		Left front wheel speed sensor circuit fault
		Left front wheel speed sensor installation fault
		Left front wheel speed sensor probe obstruction fault
		ABS module fault
A0005	Left front wheel speed sensor no signal	Left front wheel speed sensor malfunction
		Left front wheel speed sensor circuit fault
		Left front wheel speed sensor installation fault

DTC	Fault Description	Possible Causes
		Left front wheel speed sensor probe obstruction fault
		ABS module fault

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No → Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

Yes → Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

No

Step 3	Checking left front wheel speed sensor

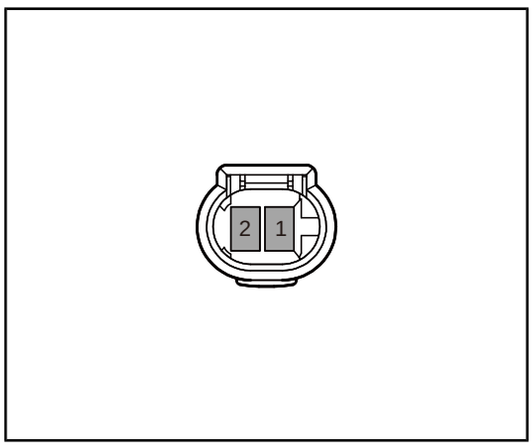
a. Turn the vehicle power "OFF".
b. Disconnect left front wheel speed sensor connector B031.
c. Check the left front wheel speed sensor.
d. Is the result normal?

No → Replace the left front wheel speed sensor.

Yes

Step 4	Checking left front wheel speed sensor power supply

a. With the vehicle power switched "OFF", disconnect left front wheel speed sensor connector B031.
b. Turn the vehicle power "ON".
c. Using a digital multimeter, measure the voltage between terminals 2 and 1 of left front wheel speed sensor connector B031.
Voltage value:



Terminal number	Terminal number	Standard value
B031（2）	B031（1）	11~14V

d. Is the result normal?

No — Repair or replace the left front wheel speed sensor harness.

Yes

Step 5	Checking left front wheel speed sensor installation

a. Check whether the left front wheel speed sensor mounting bolt is loose.
b. Is the result normal?

No — Eliminate any related faults.

Yes

Step 6	Checking left front wheel speed sensor probe

a. Check the left front wheel speed sensor tip for iron filings or other foreign matter.
b. Is the result normal?

No — Eliminate any related faults.

Yes

Step 7	ABS module fault

a. Replace with a new ABS module.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check via test drive.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.6.6.5 DTC Diagnosis: A0006, A0007, A0008

DTC Description

DTC	Fault Description	Possible Causes
A0006	Right front wheel speed sensor circuit — open or short	Right front wheel speed sensor malfunction
		Right front wheel speed sensor circuit fault
		ABS module fault
A0007	Right front wheel speed sensor signal unstable / out of range / intermittent fault	Right front wheel speed sensor malfunction
		Right front wheel speed sensor circuit fault
		Right front wheel speed sensor installation fault
		Right front wheel speed sensor probe obstruction fault
		ABS module fault
A0008	Right front wheel speed sensor no signal	Right front wheel speed sensor malfunction
		Right front wheel speed sensor circuit fault
		Right front wheel speed sensor installation fault
		Right front wheel speed sensor probe obstruction fault
		ABS module fault

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No — Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

Yes — Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

No

Step 3	Checking the right front wheel speed sensor

a. Turn the vehicle power "OFF".
b. Disconnect right front wheel speed sensor connector B032.
c. Check the right front wheel speed sensor.
d. Is the result normal?

No — Replace the right front wheel speed sensor.

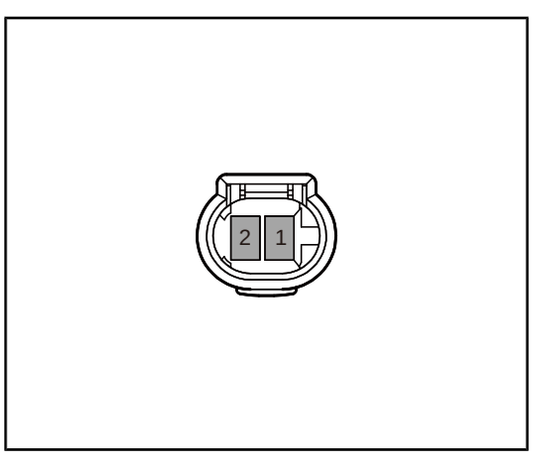
Yes

Step 4	Checking right front wheel speed sensor power supply

a. With the vehicle power switched "OFF", disconnect right front wheel speed sensor connector B032.
b. Turn the vehicle power "ON".
c. Using a digital multimeter, measure the voltage between terminals 2 and 1 of right front wheel speed sensor connector B032.

Voltage value:

Terminal number	Terminal number	Standard value
B032（2）	B032（1）	11~14V



d. Is the result normal?

No → Repair or replace the right front wheel speed sensor harness.

Yes

Step 5	Checking right front wheel speed sensor installation

a. Check whether the right front wheel speed sensor mounting bolt is loose.
b. Is the result normal?

No → Eliminate any related faults.

Yes

Step 6	Checking right front wheel speed sensor probe

a. Check the right front wheel speed sensor tip for iron filings or other foreign matter.
b. Is the result normal?

No → Eliminate any related faults.

Yes

Step 7	ABS module fault

a. Replace with a new ABS module.
b. Restore the vehicle and clear all module DTCs.
c. Carry out a road test and perform a functional check.
d. Is the result normal?

Yes → Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.6.6.6 DTC Diagnosis: A0009, A0010, A0011

DTC Description

DTC	Fault Description	Possible Causes
A0009	Left rear wheel speed sensor circuit — open or short	Left rear wheel speed sensor malfunction
		Left rear wheel speed sensor circuit fault
		ABS module fault
A0010	Left rear wheel speed sensor signal unstable / out of range / intermittent fault	Left rear wheel speed sensor malfunction
		Left rear wheel speed sensor circuit fault
		Left rear wheel speed sensor installation fault
		Left rear wheel speed sensor probe obstruction fault
		ABS module fault
A0011	Left rear wheel speed sensor no signal	Left rear wheel speed sensor malfunction
		Left rear wheel speed sensor circuit fault
		Left rear wheel speed sensor installation fault
		Left rear wheel speed sensor probe obstruction fault
		ABS module fault

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No — Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

Yes → Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

No

Step 3	Checking left rear wheel speed sensor

a. Turn the vehicle power "OFF".
b. Disconnect left rear wheel speed sensor connector B051.
c. Check the left rear wheel speed sensor.
d. Is the result normal?

No → Replace the left rear wheel speed sensor.

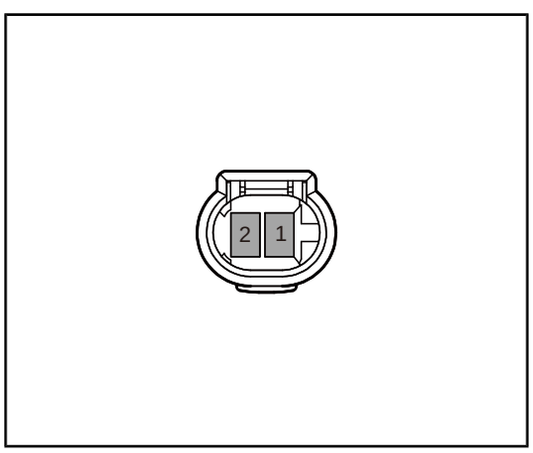
Yes

Step 4	Checking left rear wheel speed sensor power supply

a. With the vehicle power switched "OFF", disconnect left rear wheel speed sensor connector B051.
b. Turn the vehicle power "ON".
c. Using a digital multimeter, measure the voltage between terminals 2 and 1 of left rear wheel speed sensor connector B051.

Voltage value:

Terminal number	Terminal number	Standard value
B051（2）	B051（1）	11~14V



d. Is the result normal?

No → Repair or replace the left rear wheel speed sensor harness.

Yes

Step 5	Checking left rear wheel speed sensor installation

a. Check whether the left rear wheel speed sensor mounting bolt is loose.
b. Is the result normal?

No → Eliminate any related faults.

Yes

Step 6	Checking left rear wheel speed sensor probe

a. Check the left rear wheel speed sensor tip for iron filings or other foreign matter.
b. Is the result normal?

No → Eliminate any related faults.

Yes

Step 7	ABS module fault

a. Replace with a new ABS module.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check via test drive.
d. Is the result normal?

Yes → Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.6.6.7 DTC Diagnosis: A0012, A0013, A0014

DTC Description

DTC	Fault Description	Possible Causes
A0012	Right rear wheel speed sensor circuit — open or short	Right rear wheel speed sensor malfunction
		Right rear wheel speed sensor circuit fault
		ABS module fault
A0013	Right rear wheel speed sensor signal unstable / out of range / intermittent fault	Right rear wheel speed sensor malfunction
		Right rear wheel speed sensor circuit fault
		Right rear wheel speed sensor installation fault
		Right rear wheel speed sensor probe obstruction fault
		ABS module fault
A0014	Right rear wheel speed sensor no signal	Right rear wheel speed sensor malfunction
		Right rear wheel speed sensor circuit fault
		Right rear wheel speed sensor installation fault
		Right rear wheel speed sensor probe obstruction fault
		ABS module fault

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No — Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

Yes — Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

No

Step 3	Checking the right rear wheel speed sensor

a. Turn the vehicle power "OFF".
b. Disconnect the right rear wheel speed sensor connector B052.
c. Check the right rear wheel speed sensor.
d. Is the result normal?

No — Replace the right rear wheel speed sensor.

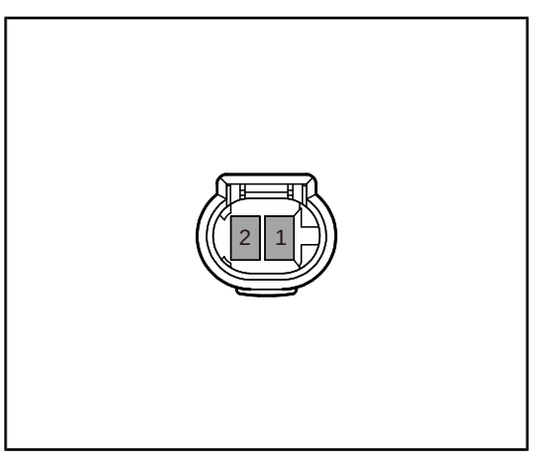
Yes

Step 4	Checking the right rear wheel speed sensor power supply

a. Switch off the vehicle power, then disconnect the right rear wheel speed sensor connector B052.
b. Turn the vehicle power "ON".
c. Use a digital multimeter to measure the voltage between terminal 2 and terminal 1 of the right rear wheel speed sensor connector B052.

Voltage value:

Terminal number	Terminal number	Standard value
B052（2）	B052（1）	11~14V



d. Is the result normal?

No → Repair or replace the right rear wheel speed sensor harness.

Yes

Step 5	Checking the installation of the right rear wheel speed sensor

a. Check whether the mounting bolt of the right rear wheel speed sensor is loose.
b. Is the result normal?

No → Eliminate any related faults.

Yes

Step 6	Checking the right rear wheel speed sensor probe

a. Check the right rear wheel speed sensor probe for metal shavings and foreign objects.
b. Is the result normal?

No → Eliminate any related faults.

Yes

Step 7	ABS module fault

a. Replace with a new ABS module.
b. Restore the vehicle and clear all module DTCs.
c. After performing ABS calibration, conduct a functional check during a test drive.
d. Is the result normal?

Yes → Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.6.6.8 DTC Diagnosis: A0015

DTC Description

DTC	Fault Description	Possible Causes
A0015	Wheel speed sensor (WSS) – incorrect frequency, incorrect tooth count, or tyre mismatch	Wheel speed sensor malfunction
		ABS reluctor ring fault
		Tyre size fault

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No → Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

Yes → Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

No

Step 3	Checking wheel speed sensor (WSS)

a. Turn the vehicle power "OFF".
b. Disconnect the corresponding wheel speed sensor (WSS) connector.
c. Use a digital multimeter to measure the resistance between the 2 pins of the wheel speed sensor (WSS) connector.
d. Is the result normal?

No → Replace the wheel speed sensor (WSS).

Yes

Step 4	Checking the ABS reluctor ring

a. Check that the number of teeth on the ABS reluctor ring is correct.
b. Is the result normal?

No → Replace the speed ring.

Yes

Step 5	Inspecting tyre

a. Check whether the tyre is installed according to specifications.
b. Is the result normal?

No → Eliminate any related faults.

Yes

Step 6	Checking the ABS module

a. Replace with a new ABS module.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check via test drive.
d. Is the result normal?

Yes → Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.6.6.9 DTC Diagnosis: A0017, A0018

DTC Description

DTC	Fault Description	Possible Causes
A0017	Left front inlet valve fault	ABS control module assembly
A0018	Left front outlet valve fault	ABS control module assembly

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No → Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

Yes → Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

No

Step 3	Checking the ABS module

a. Replace with a new ABS module.
b. Restore the vehicle and clear all module DTCs.
c. After performing ABS calibration, conduct a functional check during a test drive.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.6.6.10 DTC Diagnosis: A0019, A0020

DTC Description

DTC	Fault Description	Possible Causes
A0019	Right front inlet valve fault	ABS control module assembly
A0020	Right front outlet valve fault	ABS control module assembly

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No — Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

Yes — Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

No

Step 3	Checking the ABS module

a. Replace with a new ABS module.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check via test drive.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.6.6.11 DTC Diagnosis: A0021, A0022

DTC Description

DTC	Fault Description	Possible Causes
A0021	Left rear inlet valve fault	ABS control module assembly
A0022	Left rear inlet valve fault	ABS control module assembly

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No — Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

Yes — Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

No

Step 3	Checking the ABS module

a. Replace with a new ABS module.
b. Restore the vehicle and clear all module DTCs.
c. After performing ABS calibration, conduct a functional check during a test drive.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.6.6.12 DTC Diagnosis: A0023, A0024

DTC Description

DTC	Fault Description	Possible Causes
A0023	Left rear inlet valve fault	ABS control module assembly
A0024	Left rear inlet valve fault	ABS control module assembly

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel

displays normal battery voltage.
b. Is the result normal?

No → Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

Yes → Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

No

Step 3	Checking the ABS module

a. Replace with a new ABS module.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check via test drive.
d. Is the result normal?

Yes → Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.6.6.13 DTC Diagnosis: A0025

DTC Description

DTC	Fault Description	Possible Causes
A0025	Valve fault (overheating, overcurrent, circuit short to earth, signal error, hardware fault)	Fault caused by overheating during manual air bleeding
		ABS module fault

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No → Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

Yes → If diagnosed as an intermittent fault, check the relevant connector for looseness, damage, and the wiring harness terminal for corrosion.

No

Step 3	Checking the ABS module status

a. Verify whether the vehicle has excessive manual air bleeding time using a diagnostic tester.
b. Check if any issues are present.

Yes → Stop this work for at least 5-10 minutes before proceeding to the next cycle.

No

Step 4	Checking the ABS module

a. Replace with a new ABS module.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check via test drive.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.6.6.14 DTC Diagnosis: A0026

DTC Description

DTC	Fault Description	Possible Causes
A0026	Motor fault	ABS module power supply fault
		ABS module fault

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No — Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

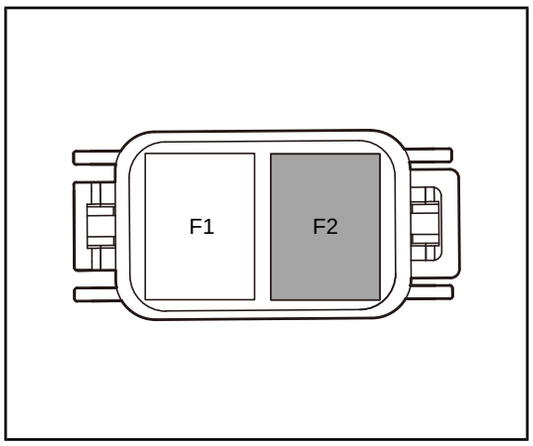
No — If diagnosed as an intermittent fault, check the relevant connector for looseness, damage, and the wiring harness terminal for corrosion.

Yes

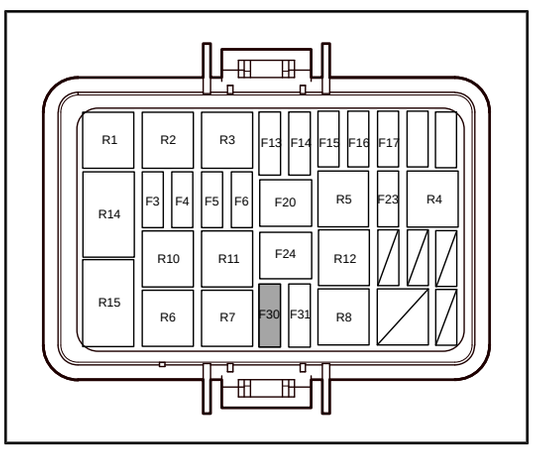
Step 3	Checking the ABS module fuse

a. Switch the vehicle power “OFF” and disconnect the battery earthing cable.
b. Remove the fuse F2 (40A) from the two-way fuse

box.



c. Remove the fuse F30 (25A) from the fuse box.



d. Check if the fuse is blown.

Yes — Replace with a fuse of the same specification.

No

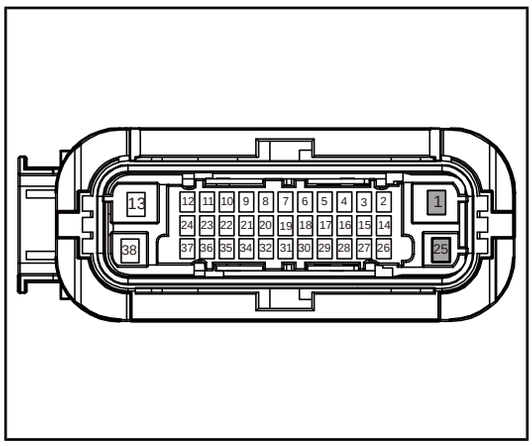
Step 4	Inspecting the ABS module power supply

a. Switch the vehicle power "OFF" and disconnect the battery earthing cable.
b. Disconnect ABS module connector B030.
c. Connect the battery earth cable and start the vehicle.
d. Using a digital multimeter, measure the voltage between each of terminals 25 and 1 of ABS module

connector B030 and earth.

Voltage value:

Terminal number	Terminal number	Standard value
B030(25)	Earth	11 ~ 14V
B030(1)	Earth	11 ~ 14V



e. Is the result normal?

No

Repair or replace the ABS module power supply harness.

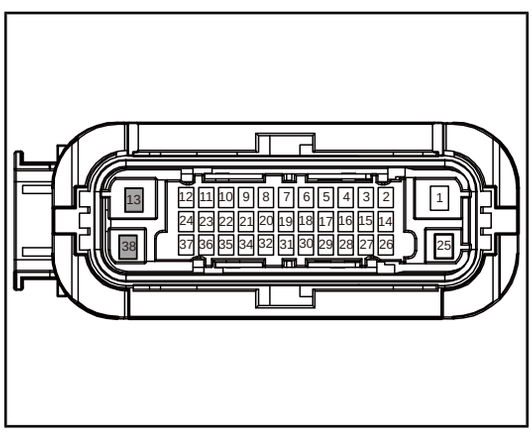
Yes

Step 5	Inspecting ABS module earthing

a. Switch the vehicle power “OFF” and disconnect the battery earthing cable.
b. Disconnect ABS module connector B030.
c. Connect the battery earth cable and start the vehicle.
d. Measure the resistance between terminals 13 and 38 of ABS module connector B030 and earth using a digital multimeter.

Resistance value:

Terminal number	Terminal number	Standard value
B030(13)	Earth	< 1Ω
B030(38)	Earth	< 1Ω



e. Is the result normal?

No → Repair or replace the ABS module earth strap.

Yes

Step 6	Checking the ABS module

a. Replace with a new ABS module.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check via test drive.
d. Is the result normal?

Yes → Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.6.6.15 DTC Diagnosis: A0027, A0028, A0029, A0031, A0032

DTC Description

DTC	Fault Description	Possible Causes
A0027	ECU fault (hardware / microcontroller fault)	ABS control module assembly
A0028	ECU hardware fault	ABS control module assembly
A0029	ECU fault (standard software fault)	ABS control module assembly
A0031	ABS control abnormal fault	ABS control module assembly
A0032	Variant coding error – parameter not set	ABS control module assembly

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel

displays normal battery voltage.

b. Is the result normal?

No → Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

Yes → Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

No

Step 3	Checking the ABS module

a. Replace with a new ABS module.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check via test drive.
d. Is the result normal?

Yes → Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.6.6.16 DTC Diagnosis: A0030

DTC Description

DTC	Fault Description	Possible Causes
A0030	CAN bus OFF	CAN bus fault
		ABS module fault

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No — Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

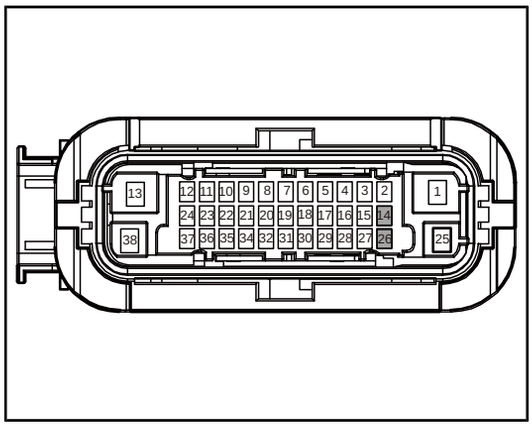
Yes — Diagnosed as an intermittent fault, check the relevant connector for looseness, damage, or corrosion on the harness terminal.

No

Step 3	Checking the CAN line voltage of the ABS module

a. Switch the vehicle power supply OFF, then disconnect the battery earth cable.
b. Disconnect the ABS control module assembly connector B030.
c. Connect the battery earth cable and start the vehicle.
d. Using a digital multimeter, measure the voltage between each of terminals 26 and 14 of the ABS

control module assembly connector B030 and earth.



Voltage value:

Terminal number	Terminal number	Standard value
B030（26）	Earth	Approximately 2.6 V
B030（14）	Earth	Approximately 2.4 V

e. Is the result normal?

No — Repair or replace the ABS control module CAN circuit.

Yes

Step 4	Checking the ABS module

a. Replace with a new ABS module.
b. Restore the vehicle and clear all module DTCs.
c. After performing ABS calibration, conduct a functional check during a test drive.
d. Is the result normal?

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

6.6.6.17 DTC Diagnosis: A0016

DTC Description

DTC	Fault Description	Possible Causes
A0016	Valve relay fault	Fuse fault
		ABS control module assembly fault

Diagnostic Procedure

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No → Check the battery and alternator.

Yes

Step 2	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

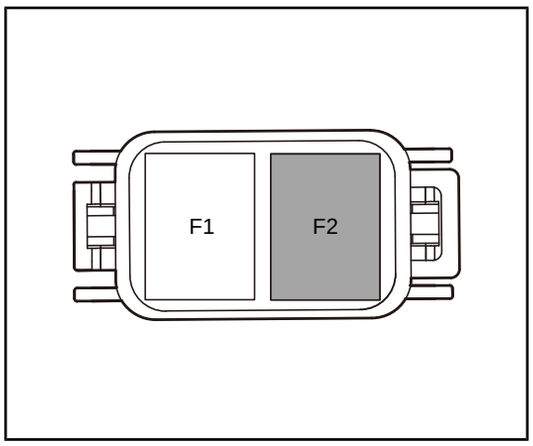
No → If diagnosed as an intermittent fault, check the relevant connector for looseness, damage, and the wiring harness terminal for corrosion.

Yes

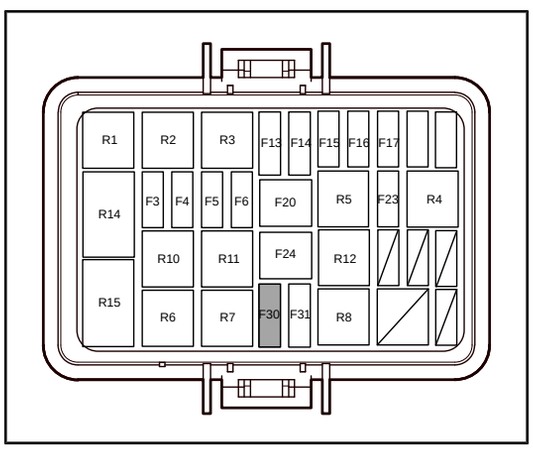
Step 3	Checking the ABS control module assembly fuse

a. Switch the vehicle power “OFF” and disconnect the battery earthing cable.
b. Remove the fuse F2 (40A) from the two-way fuse

box.



c. Remove the fuse F30 (25A) from the fuse box.



d. Check if the fuse is blown.

No — Replace with a fuse of the same specification.

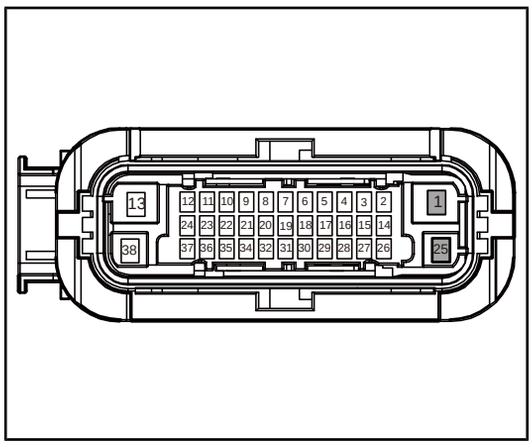
Yes

Step 4	Checking the power supply of the ABS control module

a. Switch the vehicle power “OFF” and disconnect the battery earthing cable.
b. Disconnect ABS module connector B030.
c. Connect the battery earth cable and start the vehicle.
d. Using a digital multimeter, measure the voltage between each of terminals 25 and 1 of ABS module

connector B030 and earth.

Voltage value:



Terminal number	Terminal number	Standard value
B030(25)	Earth	11 ~ 14V
B030(1)	Earth	11 ~ 14V

e. Is the result normal?

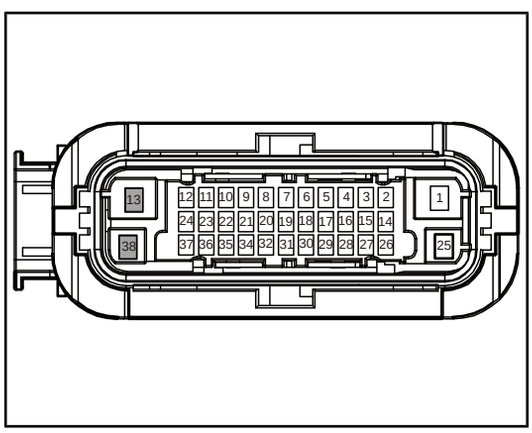
No — Repair or replace the ABS module power supply harness.

Yes

Step 5	Inspecting ABS module earthing

a. Switch the vehicle power “OFF” and disconnect the battery earthing cable.
b. Disconnect ABS module connector B030.
c. Connect the battery earth cable and start the vehicle.
d. Measure the resistance between terminals 13 and 38 of ABS module connector B030 and earth using a digital multimeter.

Resistance value:



Terminal number	Terminal number	Standard value
B030(13)	Earth	< 1Ω
B030(38)	Earth	< 1Ω

e. Is the result normal?

No → Repair or replace the ABS module earth strap.

Yes

Step 6	Checking the ABS control module assembly

a. Replace with a new ABS module.
b. Restore the vehicle and clear all module DTCs.
c. Perform a functional check via test drive.
d. Is the result normal?

Yes → Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

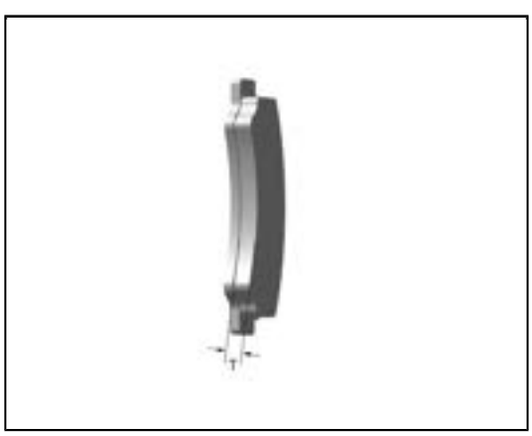
6.6.7 Inspecting and adjusting

6.6.7.1 Inspecting the brake system

1. **Check the operational condition of the brake system.**
   a. Conduct a road test to check for brake noise; if present, carry out repairs.
   b. Conduct a road test to check for brake pull; if detected, carry out repairs.
   c. Conduct a road test to check for heavy, soft, or insufficient braking; if observed, carry out repairs.
   d. Conduct a road test to check for brake drag; if present, carry out repairs.
2. **Inspect components of the brake system.**
   a. Check the brake system for visible mechanical damage; if found, carry out repairs.
   b. Inspect the brake system for signs of impact deformation; if detected, carry out repairs.
   c. Check the brake system for loose fasteners such as bolts; if found, carry out repairs.
   d. Inspect brake lines for fluid leaks; if present, carry out repairs.
   e. Check brake lines for cracks or damage; if found, carry out repairs.
   f. Check for air in the brake lines; if present, perform brake system bleeding.

6.6.7.2 Inspecting the disc brake

1. **Checking the operational condition of the disc brakes**
   a. Inspect brakes for cracks, wear, or other damage; replace if necessary.
   b. Check the brake piston dust boot for cracks, damage, ageing, or other defects; replace if necessary.
   c. Inspect around the brake piston dust boot and brake pads for fluid leakage; replace brake components if leakage is found.
   d. Check that the brake piston operates smoothly with full travel; if sticking or difficult to reset, replace the brake.
2. **Inspecting brake pads**
   a. Check brake pads for rust, oil, or debris; clean or replace as necessary.
   b. Inspect brake pads for cracks, damage, or other defects; replace if necessary.
   c. Check the brake pad guide plates for looseness; replace if required.



   d. Measure brake pad thickness; replace if below wear limit.

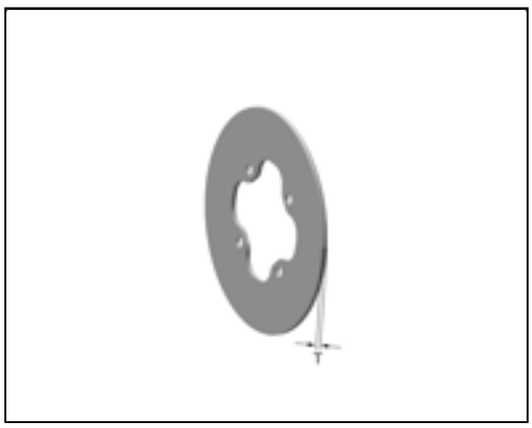
   Standard front/rear brake pad thickness: 5.0 mm

   Minimum allowable front/rear brake pad thickness: 1.5 mm

3. Inspecting brake discs

a. Check brake discs for rust, oil, or debris; clean or replace as necessary.

b. Inspect brake discs for cracks, damage, or other defects; replace if necessary.



c. Measure brake disc thickness; replace if below wear limit.

Standard front/rear brake disc thickness: 5.0 mm

Minimum front/rear brake disc thickness: 4.0 mm

d. Use a dial indicator to measure disc run-out 10 mm from the edge.

Brake disc runout standard value: 0.08 mm

Brake disc runout limit: 0.1mm

NOTICE:

- If maximum disc run-out exceeds limit, check bearings and wheel hub; if they are normal, replace the brake disc.

6.6.7.3 Checking brake fluid level

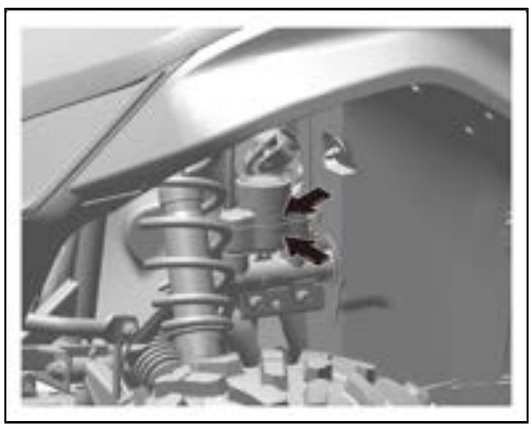
NOTICE:

- If the fluid level drops excessively within a short period, check the brake system for leaks.

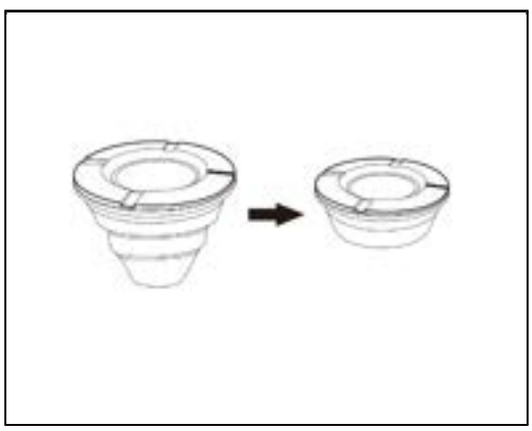
CAUTION:

- Brake fluid may damage plastic components and painted surfaces. Exercise care when topping up.
- If brake fluid comes into contact with the skin or eyes, rinse immediately with plenty of clean water. If discomfort persists, seek medical attention at once.

1. Checking brake fluid level



a. Park the vehicle on level ground and check that the brake fluid level in the reservoir is between the "MAX" and "MIN" marks. If not, add fluid to the correct level.



b. After topping up or replacing the brake fluid, check whether the reservoir diaphragm under the cap is in the extended position. If the diaphragm is extended, reset it. If the diaphragm is not reset, brake fluid may overflow from the reservoir when the cap is tightened.

c. Start the vehicle and check whether the brake system warning light goes out. If it remains on, inspect the hydraulic pressure switch for faults.

6.6.7.4 Checking the hydraulic pressure switch

1. Checking hydraulic pressure switch operation

a. With the ignition switch in the "OFF" position, disconnect the hydraulic pressure switch connector.

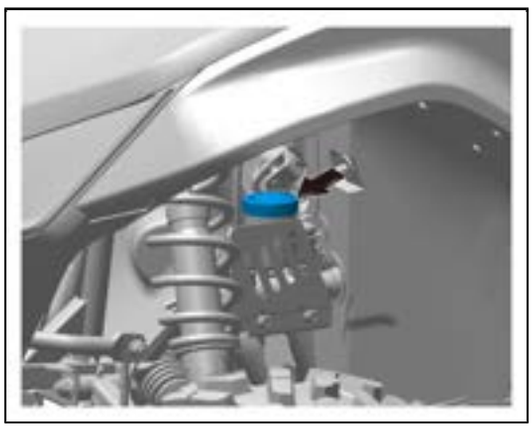
b. With the ignition switch in the "ON" position, completely drain the brake fluid from the reservoir.

c. Using a digital multimeter, check that there is continuity between the 2 terminals of the hydraulic pressure switch.

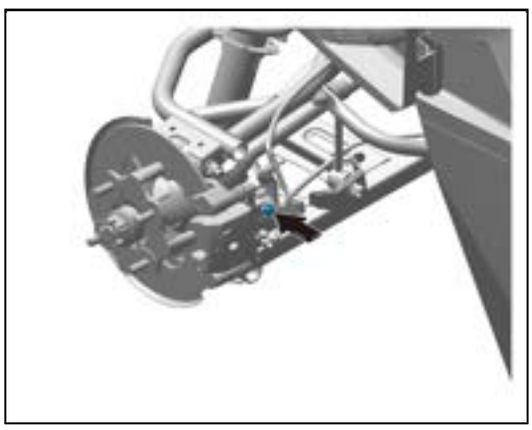
d. Fill the reservoir with brake fluid up to the "MAX" mark, then use a digital multimeter to check that there is no continuity between the 2 terminals of the hydraulic pressure switch.

6.6.7.5 Drain Brake Fluid

1. Drain Brake Fluid



a. Remove the brake fluid reservoir cap.



b. Open the bleed screw cap, fit a transparent hose to the brake bleed screw, and place the other end in a container.

c. Loosen the bleed screw and pump the brake pedal repeatedly until no more brake fluid flows out.

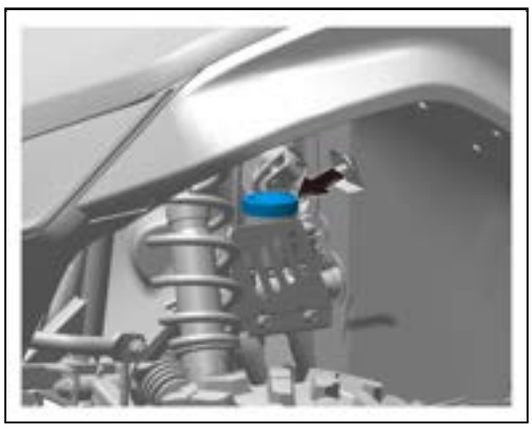
d. Refit the bleed screw cap and the brake fluid reservoir cap.

CAUTION:

- Carry out this procedure on each wheel, draining the rear wheel brake fluid first and then the front wheel brake fluid, to ensure that all old brake fluid is completely removed.
- Brake fluid may damage plastic components and painted surfaces. Exercise care when topping up.
- If brake fluid comes into contact with the skin or eyes, rinse immediately with plenty of clean water. If discomfort persists, seek medical attention at once.

6.6.7.6 Add Brake Fluid

1. Add Brake Fluid



a. Remove the brake fluid reservoir cap and add the specified brake fluid to the reservoir.

Brake fluid specification: DOT4

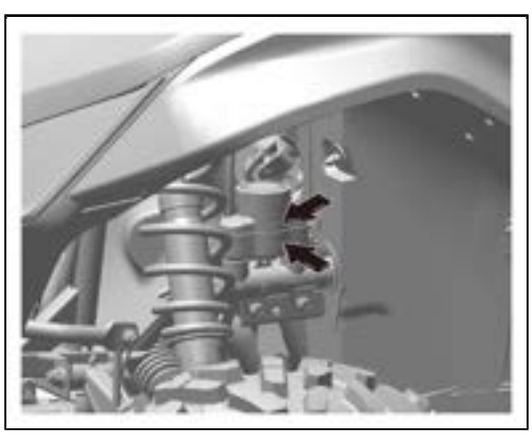
CAUTION:

- Please add the specified brake fluid and do not mix with fluid from other models.
- Brake fluid may damage plastic components and painted surfaces. Exercise care when topping up.
- If brake fluid comes into contact with the skin or eyes, rinse immediately with plenty of clean water. If discomfort persists, seek medical attention at once.

b. After adding fluid, the brake system must be bled. See: Bleeding the Brake System

6.6.7.7 Bleeding the Brake System

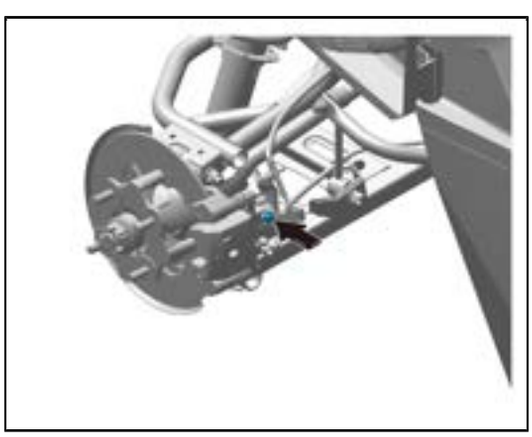
1. Bleeding the Brake System



a. Check that the brake fluid level in the reservoir is between the "MAX" (maximum) and "MIN" (minimum) marks.

NOTICE:

- During the bleeding process, ensure that the fluid level remains within the normal marks. If the level drops too low, continue adding brake fluid.



b. Start with the caliper farthest from the master cylinder, clean the area around the bleed screw, then remove the bleed screw cover and attach a transparent hose to the brake bleed screw, placing the other end into a container.

c. Pump the brake pedal several times until pressure increases, maintain the pedal in the depressed state, use a flare nut spanner to loosen the bleed screw until fluid flows out. When no more bubbles appear, tighten the bleed screw.

d. Repeat the above process until no more bubbles emerge from the hose.

CAUTION:
• Perform this operation on each wheel, starting with the caliper farthest from the master cylinder. • Do not reuse brake fluid drained from the system. Dispose of the waste fluid according to local regulations.

e. Perform the same procedure on the other wheels using the same method.

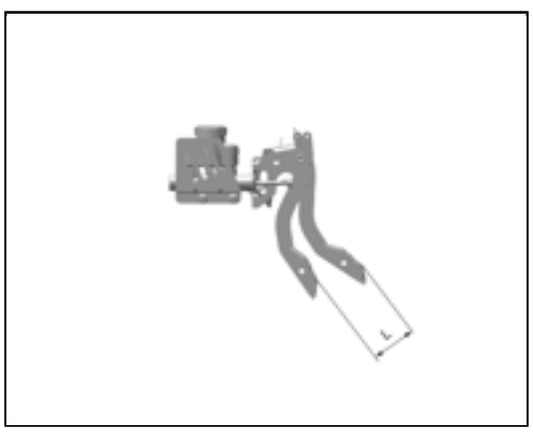
f. Check the brake pedal for softness; if they feel soft, repeat the bleeding steps.

g. After bleeding, check the brake fluid level. See: Checking brake fluid level

h. Before the vehicle is put into use, perform a low-speed brake test to ensure the braking force is normal.

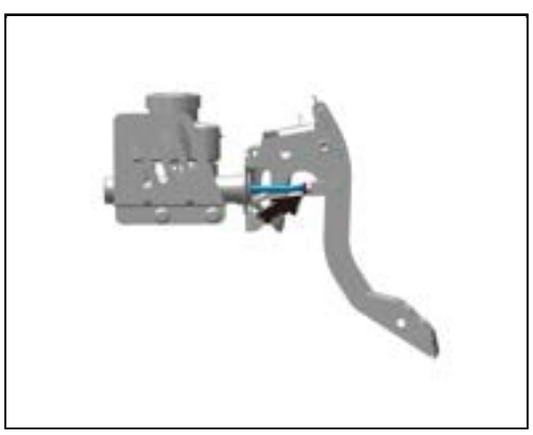
6.6.7.8 Brake Pedal Free Play Check and Adjustment

1. Checking brake pedal free play



a. Press the brake pedal by hand until it becomes firmer, then measure the brake pedal free play L. If it exceeds the specified value, adjust it.

2. Adjust brake pedal free play.



a. Loosen the round nut, rotate the pushrod to adjust its length, thereby setting the brake pedal to the correct free play, then tighten the round nut after adjustment.

6.6.8 Repair Procedure Guidance

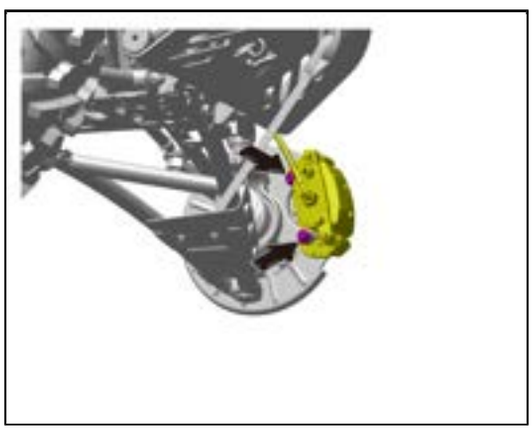
6.6.8.1 Brake Disc

NOTICE:

- This manual provides an example of the disassembly and installation of the left front brake disc; the disassembly and installation of other brake discs can be referred to from this section.

Removal Procedure

1. To lift the vehicle, See: Vehicle Lifting and Lowering.
2. To remove the wheel assembly, See: Wheel Assembly.
3. Disassembling the brake disc

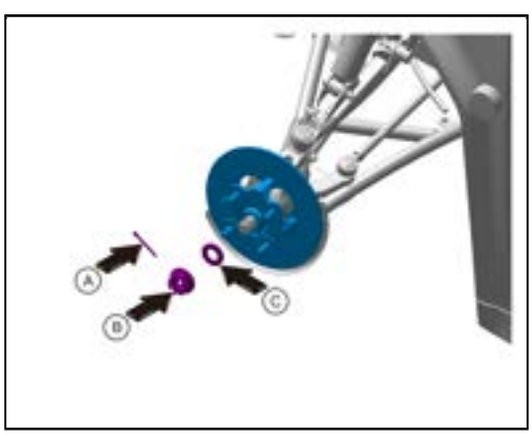


a. Remove the 2 M10x1.25x25 bolts securing the front brake caliper, and suspend the caliper clear of the brake hose.

Torque: 33.2 ± 3.7 ft-lbs (45 ± 5 N·m).

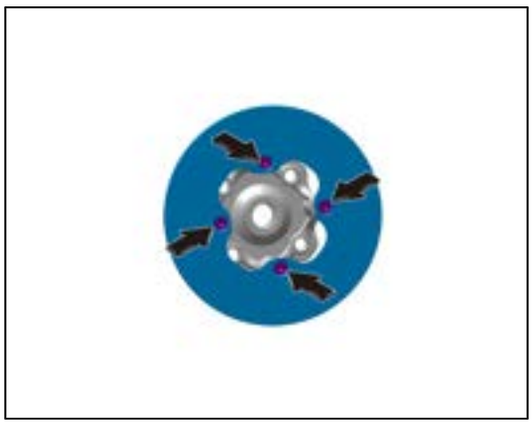
CAUTION:

- When suspending the front brake assembly, do not allow the front brake hose to be overstretched, otherwise it may be damaged.



b. Remove split pin A, castellated nut B (M24 × 2) and wheel hub washer C, then remove the wheel hub assembly together with the brake disc assembly.

Torque: 221.3 ± 14.8 ft-lbs (300 ± 20 N·m).



c. Remove the 4 mounting screws securing the rear brake disc, then remove the brake disc.

Torque: 20.64~23.6 ft-lbs (28~32N·m).

Installation Procedure

1. Install the brake disc in the reverse order of removal.

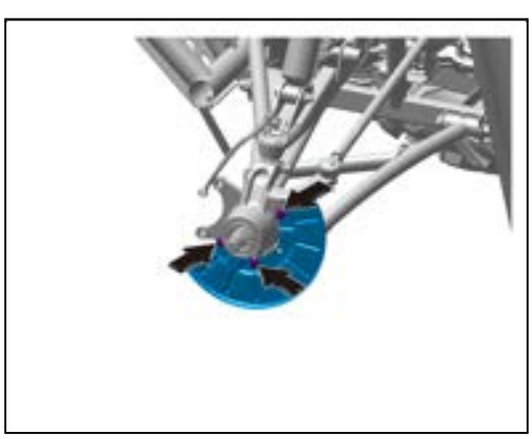
CAUTION:
• Before driving the vehicle, lightly depress the brake pedal several times to ensure the brake pads are properly seated against the brake disc, so as to reduce free travel during the initial brake application. • After completing the above procedure, carry out a road test to verify braking performance.

6.6.8.2 Front Brake Disc Dust Shield

NOTICE:
• This manual illustrates the removal and refitting of the left front brake disc dust shield. The procedure for the right side is identical.

Removal Procedure

1. To lift the vehicle, See: Vehicle Lifting and Lowering.
2. To remove the wheel assembly, See: Wheel Assembly.
3. Remove front brake disc, See: Brake Disc.
4. Removing the front brake disc dust shield



a. Remove the 3 retaining screws and detach the front brake disc dust shield.

Installation Procedure

1. Install the front brake disc fender, following the reverse order of disassembly.

CAUTION:

- Before driving the vehicle, lightly depress the brake pedal several times to ensure the brake pads are properly seated against the brake disc, so as to reduce free travel during the initial brake application.
- After completing the above procedure, carry out a road test to verify braking performance.

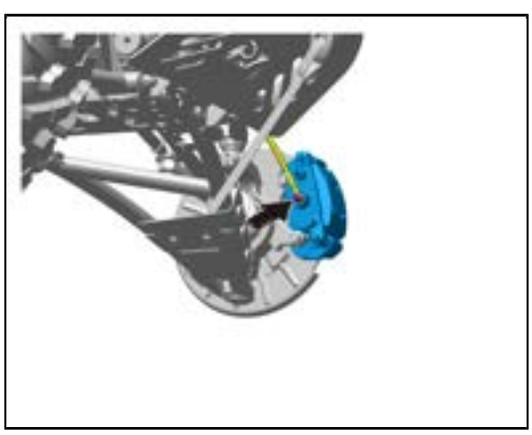
6.6.8.3 Front Brake Assembly

NOTICE:

- This manual uses removal and installation of the left front brake assembly as an example. Removal and installation of the right front brake assembly may be carried out with reference to the left side.

Removal Procedure

1. To drain the brake fluid, See: Drain Brake Fluid.
2. To lift the vehicle, See: Vehicle Lifting and Lowering.
3. To remove the wheel assembly, See: Wheel Assembly.
4. Removing the front brake assembly



a. Remove the bolt securing the front brake pipe, then disconnect the front brake pipe.

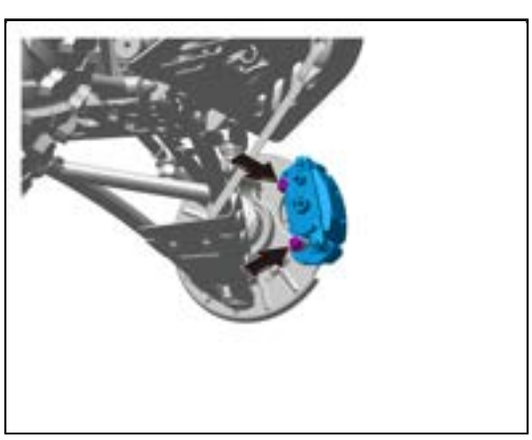
Torque: 18 ft-lbs(25N·m)

WARNING:

- Wipe off any spilt brake fluid immediately.

CAUTION:

- After disconnecting the line, plug the connection immediately to prevent the ingress of foreign matter and leakage of brake fluid.



b. Remove the 2 mounting bolts (M10×1.25×25) and detach the front brake assembly.

Torque: 33 ft-lbs(45N·m)

Installation Procedure

1. Install the front brake assembly in the reverse order of removal, paying attention to the following points:
   a. Renew the front brake pipe sealing washers.
   b. Refill with brake fluid after installation is complete. See: Add Brake Fluid
   c. Bleed the brake system. See: Bleeding the Brake System
   d. Before driving the vehicle, lightly depress the brake pedal several times to ensure the brake pads are properly seated against the brake disc, so as to reduce free travel during the initial brake application.
   e. After completing the above procedure, carry out a road test to verify braking performance.

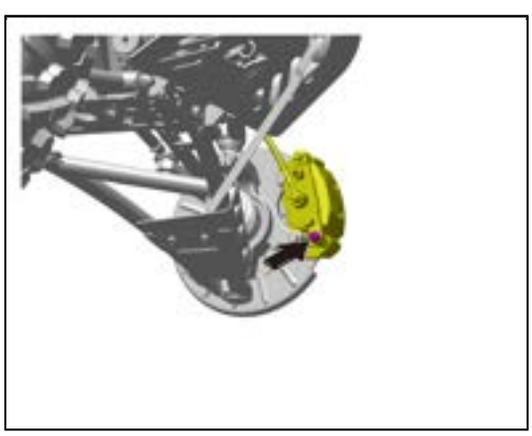
6.6.8.4 Front Brake Pad Set

NOTICE:

- This manual provides an example of the disassembly and installation of the left front brake pad set; the disassembly and installation of the right assembly can be referred to from the left side.

Removal Procedure

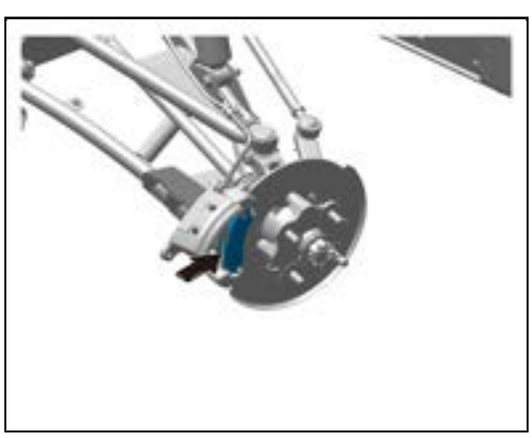
1. To lift the vehicle, See: Vehicle Lifting and Lowering.
2. To remove the wheel assembly, See: Wheel Assembly.
3. Disassembling the front brake pad set



a. Remove the lower mounting bolt of the front brake caliper, and flip the caliper upwards.

NOTICE:

- While removing the bolt, use a spanner to secure the sliding sleeve to prevent it from turning with the bolt.
- Be cautious when using a spanner to secure the sliding sleeve to avoid damaging it.



b. Remove the front brake pad set.

Installation Procedure

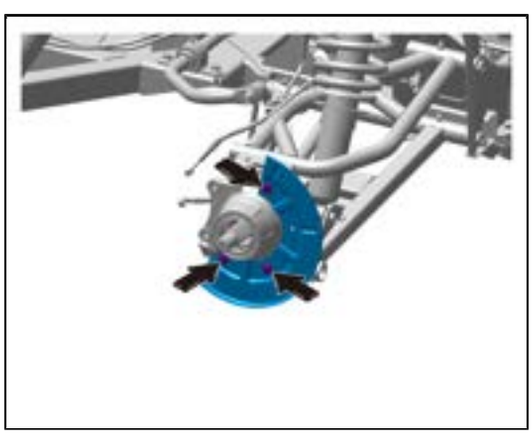
1. Install the front brake pad set, following the reverse order of disassembly, and observe the following precautions:
   a. Use the piston reset tool to reset the piston to facilitate the installation of the front brake pad set.
   b. After installation, push the front brake pad set to check that it returns to its proper position. If it does not return properly, reinstall or replace the front brake pad set until it is properly positioned.
   c. Before driving the vehicle, lightly depress the brake pedal several times to ensure the brake pads are properly seated against the brake disc, so as to reduce free travel during the initial brake application.
   d. After completing the above procedure, carry out a road test to verify braking performance.

6.6.8.5 Rear Brake Disc Dust Shield

NOTICE:
• This manual illustrates the removal and refitting of the left rear brake disc dust shield. The procedure for the right side is identical.

Removal Procedure

1. To lift the vehicle, See: Vehicle Lifting and Lowering.
2. To remove the wheel assembly, See: Wheel Assembly.
3. To remove the rear brake disc, See: Brake Disc.
4. Removing the rear brake disc dust shield



a. Remove the 3 retaining screws and detach the rear brake disc dust shield.

Installation Procedure

1. Install the rear brake disc fender in the reverse order of removal.

CAUTION:
• Before driving the vehicle, lightly depress the brake pedal several times to ensure the brake pads are properly seated against the brake disc, so as to reduce free travel during the initial brake application. • After completing the above procedure, carry out a road test to verify braking performance.

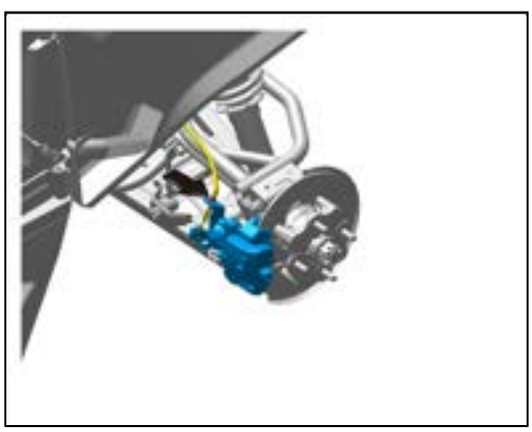
6.6.8.6 Rear Brake Assembly

NOTICE:

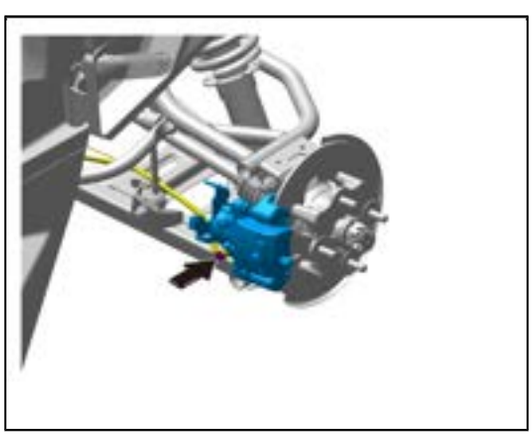
- This manual uses removal and installation of the left rear brake assembly as an example. Removal and installation of the right rear brake assembly may be carried out with reference to the left side.

Removal Procedure

1. To drain the brake fluid, See: Drain Brake Fluid.
2. To lift the vehicle, See: Vehicle Lifting and Lowering.
3. To remove the wheel assembly, See: Wheel Assembly.
4. Removing the rear brake assembly



a. Loosen the parking brake cable nut and remove the parking brake cable assembly from the brake.



b. Remove the bolt securing the rear brake pipe, then disconnect the rear brake pipe.

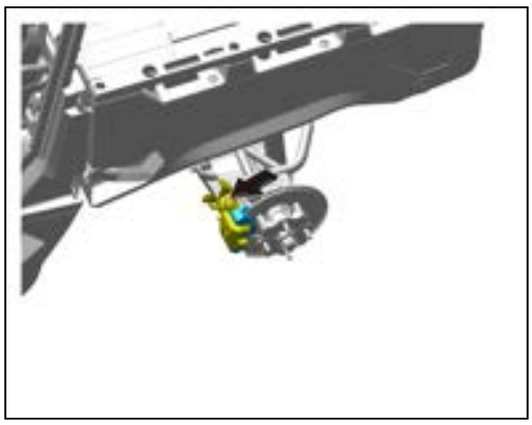
Torque: 18 ft-lbs(25N·m)

WARNING:

- Wipe off any spilt brake fluid immediately.

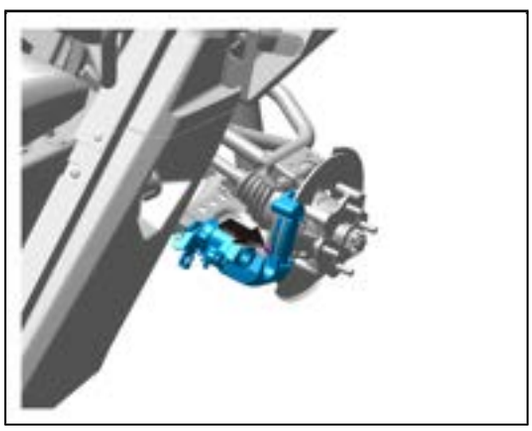
CAUTION:

- After disconnecting the line, plug the connection immediately to prevent the ingress of foreign matter and leakage of brake fluid.



c. Remove the rear brake caliper mounting bolts (M10×1.25×25) and swing the brake caliper downwards.

Torque: 33.2 ± 3.7 ft-lbs (45 ± 5 N·m).



d. Remove the rear brake assembly mounting bolts (M10×1.25×25) and detach the rear brake assembly.

Torque: 33.2 ± 3.7 ft-lbs (45 ± 5 N·m).

Installation Procedure

1. **Install the rear brake assembly in the reverse order of removal, paying attention to the following points:**
   a. Renew the rear brake pipe sealing washers.
   b. Refill with brake fluid after installation is complete. See: Add Brake Fluid
   c. Bleed the brake system. See: Bleeding the Brake System
   d. Before driving the vehicle, lightly depress the brake pedal several times to ensure the brake pads are properly seated against the brake disc, so as to reduce free travel during the initial brake application.
   e. After completing the above procedure, carry out a road test to verify braking performance.

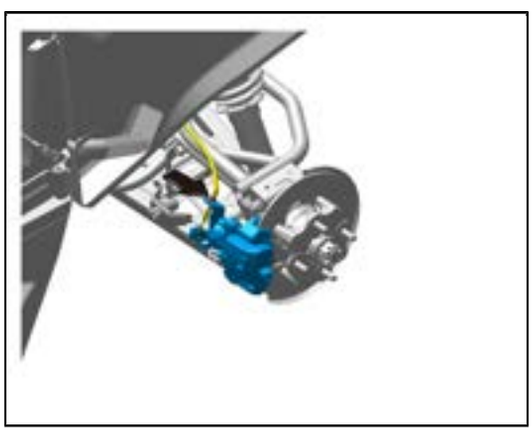
6.6.8.7 Rear Brake Pad Set

NOTICE:

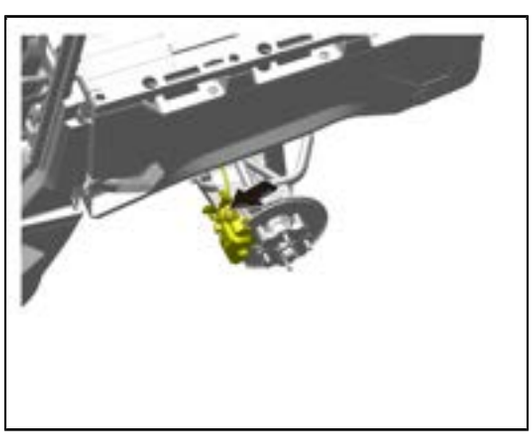
- This manual provides an example of the disassembly and installation of the left rear brake pad set; the disassembly and installation of the right set can be referred to from the left side.

Removal Procedure

1. To lift the vehicle, See: Vehicle Lifting and Lowering.
2. To remove the wheel assembly, See: Wheel Assembly.
3. Disassembling the rear brake pad set



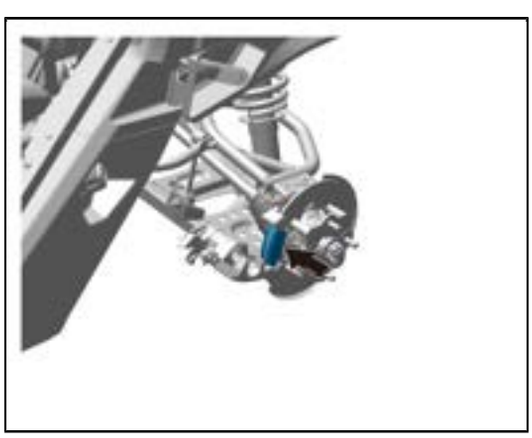
a. Loosen the parking brake cable nut and remove the parking brake cable assembly from the brake.



b. Remove the upper mounting bolt of the rear brake caliper, and flip the caliper downwards.

NOTICE:

- While removing the bolt, use a spanner to secure the sliding sleeve to prevent it from turning with the bolt.
- Be cautious when using a spanner to secure the sliding sleeve to avoid damaging it.



c. Remove the rear brake pad set.

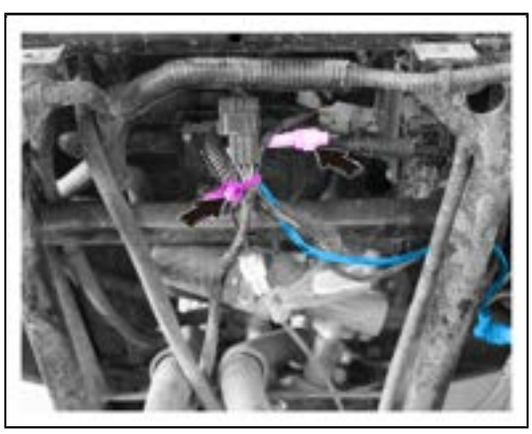
Installation Procedure

1. Install the rear brake pad set, following the reverse order of disassembly, and observe the following precautions:
   a. Use the piston reset tool to reset the piston to facilitate the installation of the rear brake pad set.
   b. After installation, push the rear brake pad set to check that it returns to its proper position. If it does not return properly, reinstall or replace the rear brake pad set until it is properly positioned.
   c. Before driving the vehicle, lightly depress the brake pedal several times to ensure the brake pads are properly seated against the brake disc, so as to reduce free travel during the initial brake application.
   d. After completing the above procedure, carry out a road test to verify braking performance.

6.6.8.8 Hydraulic Pressure Switch

Removal Procedure

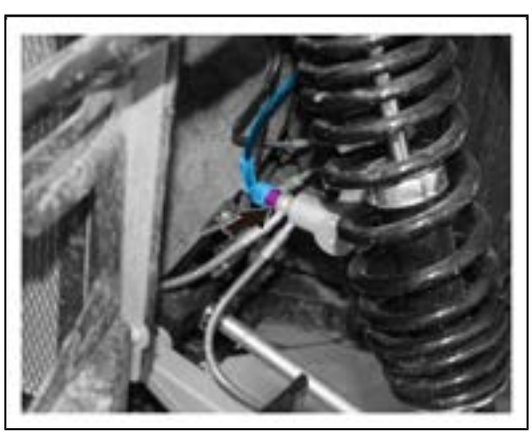
1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To drain the brake fluid, See: Drain Brake Fluid.
3. To remove the front service cover, See: Front Service Cover.
4. To remove the headlamp cover, See: Headlamp Cover.
5. To remove the flasher unit, See: Flasher Unit.
6. To remove the front panel, See: Front Panel.
7. Removing the hydraulic pressure switch



a. Disconnect the hydraulic pressure switch wiring harness connector and cut the cable ties along the wiring harness.

NOTICE:

- Cable ties on the harness are single-use and must be replaced after removal.



b. Remove the hydraulic pressure switch mounting nut, then remove the hydraulic pressure switch.

CAUTION:

- After disconnecting the line, plug the connection immediately to prevent the ingress of foreign matter.

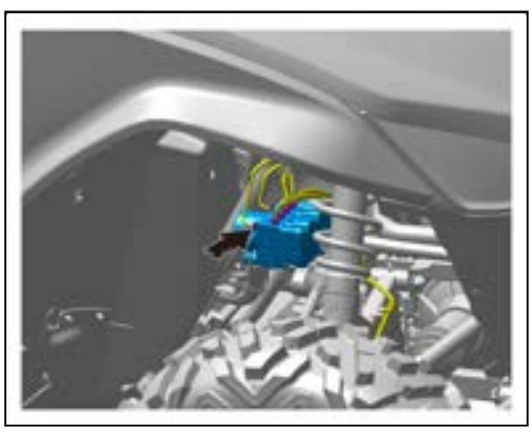
Installation Procedure

1. Install the hydraulic pressure switch in the reverse order of removal, paying attention to the following points:
   a. Refill with brake fluid after installation is complete. See: Add Brake Fluid
   b. Bleed the brake system. See: Bleeding the Brake System

6.6.8.9 ABS Actuator Assembly

Removal Procedure

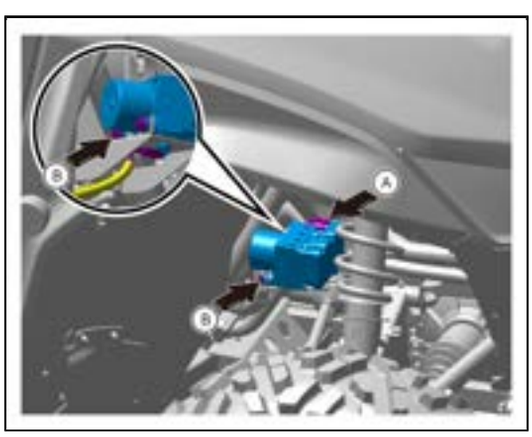
1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To drain the brake fluid, See: Drain Brake Fluid.
3. Removing the ABS actuator assembly



a. Loosen the 6 brake pipe union nuts and disconnect the 6 brake pipes.

CAUTION:

- After removing any oil pipes, seal the unions to prevent blockage or leakage of the oil lines.



b. Disconnect the ABS actuator assembly wiring harness connector A.

c. Loosen the 2 mounting bolts B and remove the ABS actuator assembly.

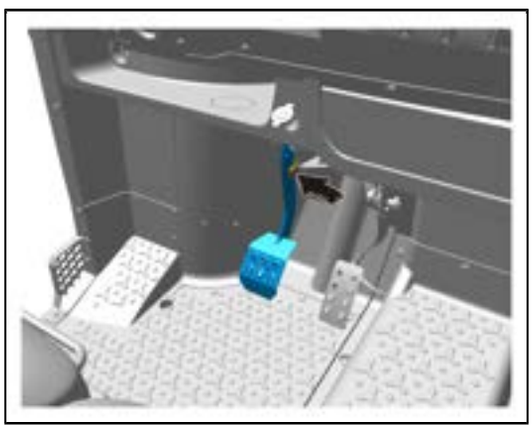
Installation Procedure

1. Install the ABS actuator assembly in the reverse order of removal, paying attention to the following points:
   a. Refill with brake fluid after installation is complete. See: Add Brake Fluid
   b. Bleed the brake system. See: Bleeding the Brake System

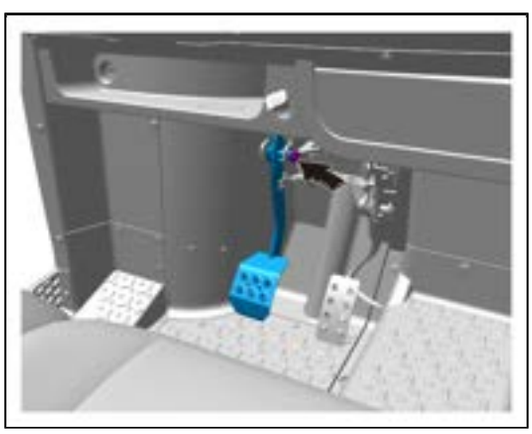
6.6.8.10 Brake Pedal Welded Assembly

Removal Procedure

1. Removing the brake pedal welded assembly



a. Remove the split pin, then withdraw the locking pin.



b. Remove the retaining screws and nuts from the brake pedal welded assembly.

c. Remove the nylon bush, inner bush tube, plain washer, and spring washer in sequence.

d. Remove the brake pedal welded assembly along with the brake pedal return spring.



e. Detach the brake pedal return spring and remove the brake pedal welded assembly.

Installation Procedure

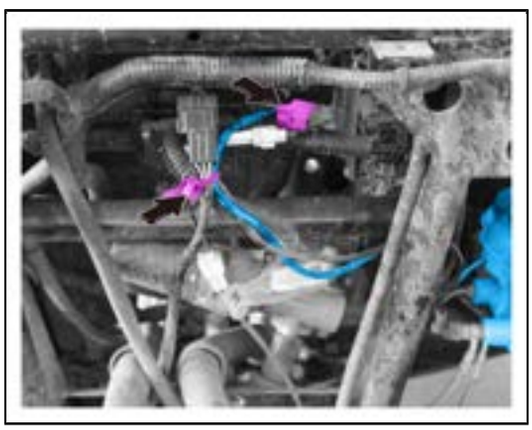
1. Install the brake pedal welded assembly in the reverse order of removal, paying attention to the following points:

   a. After installation, check the brake pedal free play. If the brake pedal free play is not within the specified range, adjust it accordingly. See: Inspecting the brake system

6.6.8.11 Foot Brake Master Cylinder Assembly

Removal Procedure

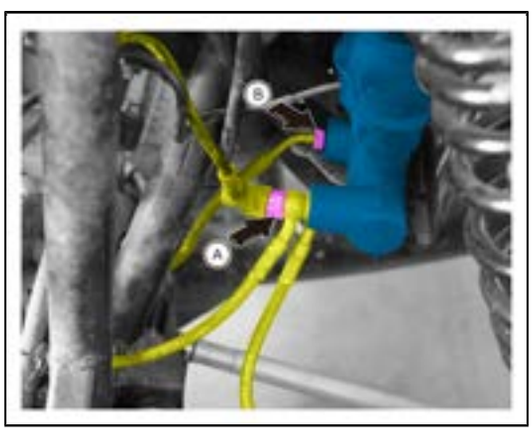
1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To drain the brake fluid, See: Drain Brake Fluid.
3. To remove the front service cover, See: Front Service Cover.
4. To remove the headlamp cover, See: Headlamp Cover.
5. To remove the flasher unit, See: Flasher Unit.
6. To remove the front panel, See: Front Panel.
7. Removing the foot brake master cylinder assembly



a. Disconnect the foot brake master cylinder wiring harness connector and cut the cable ties.

NOTICE:

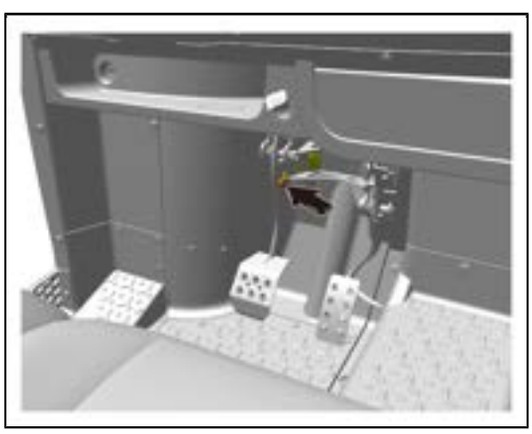
- Cable ties on the harness are single-use and must be replaced after removal.



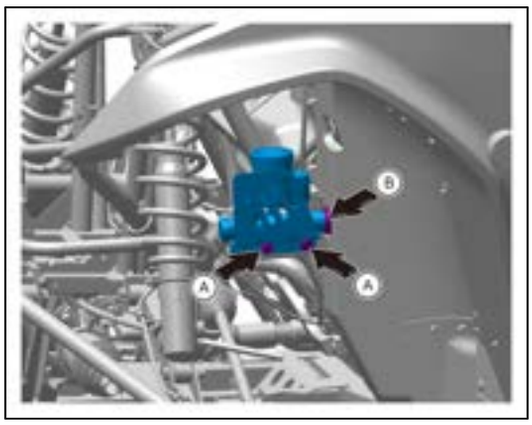
b. Remove the 2 brake pipe mounting bolts, then disconnect the brake pipe.

CAUTION:

- After disconnecting the line, plug the connection immediately to prevent the ingress of foreign matter.



c. Remove the split pin, then withdraw the locking pin.



d. Remove the 2 mounting bolts A (M8×25) from the foot brake master cylinder assembly.

e. Detach the rubber boot B from the foot brake master cylinder and remove the assembly.

Installation Procedure

1. **Install the foot brake master cylinder assembly in the reverse order of removal, paying attention to the following points:**

   a. Refill with brake fluid after installation is complete. See: Add Brake Fluid

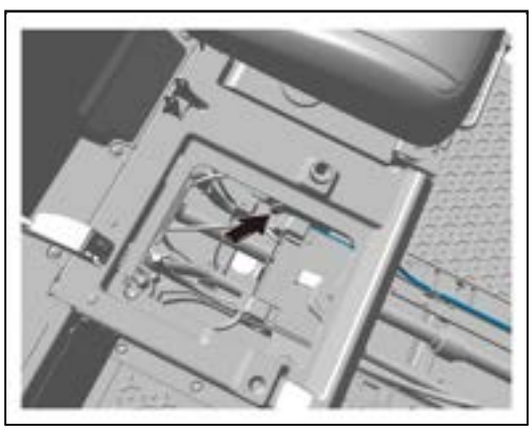
   b. Bleed the brake system. See: Bleeding the Brake System

   c. Check the brake pedal free play. If the brake pedal free play is not within the specified range, adjust it accordingly. See: Inspecting the brake system

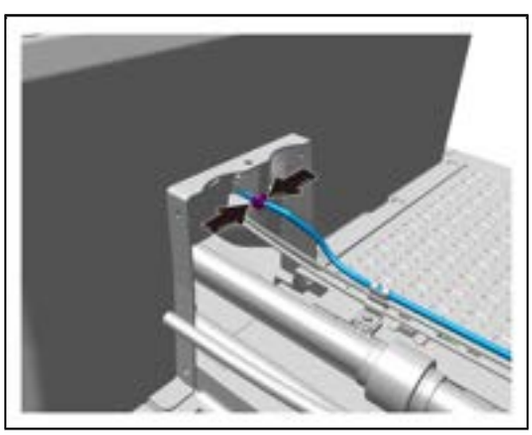
6.6.8.12 Parking Brake Cable Assembly, Front Section

Removal Procedure

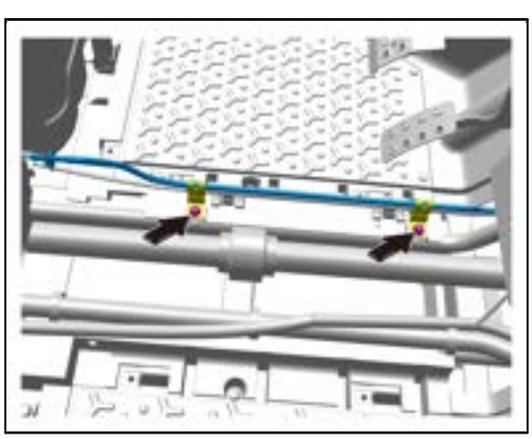
1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the driver's seat assembly, See: Driver's Seat Assembly.
3. To remove the centre guide cover, See: Centre Guide Cover.
4. To remove the centre under-seat cover, See: Centre Under-Seat Cover.
5. To remove the instrument cover, See: Instrument Cover.
6. Removing the front section of the parking brake cable assembly



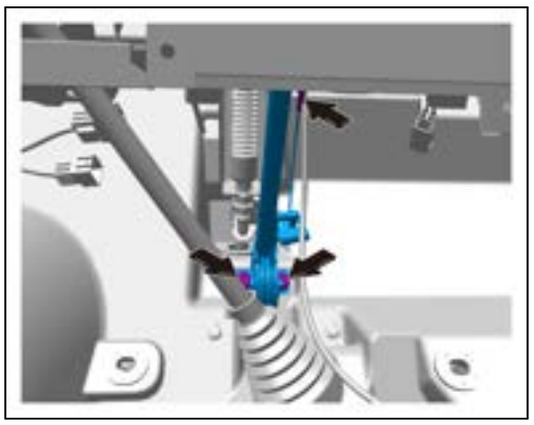
a. Remove the split pin and clevis pin from the front section of the parking brake cable assembly.



b. Remove the 2 mounting nuts and detach the front section of the parking brake cable assembly.

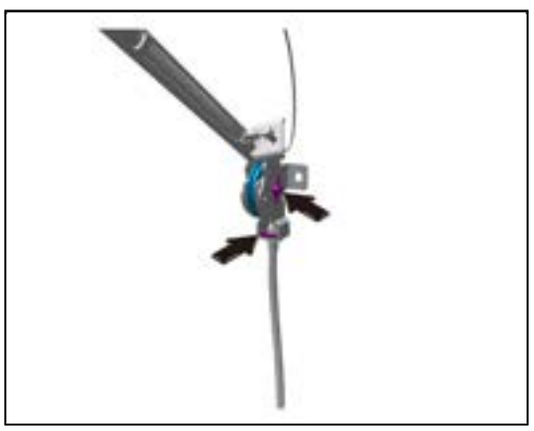


c. Remove the 2 mounting bolts from the front section of the parking brake cable assembly.



d. Disconnect the handbrake assembly wiring harness connector.

e. Remove the 2 mounting bolts from the handbrake assembly, and extract the handbrake assembly together with the front section of the parking brake cable.



f. Remove the split pin and clevis pin.

g. Remove the E-clip and extract the roller.



h. Remove the front section of the parking brake cable assembly.

Installation Procedure

1. **Install the front section of the parking brake cable assembly in the reverse order of removal, observing the following:**

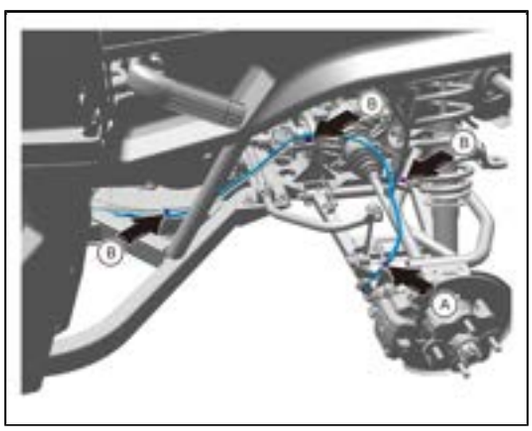
   a. After completing the above procedure, check the braking performance.

6.6.8.13 Parking Brake Cable Assembly, Left Section

NOTICE:
• This manual illustrates the removal and refitting of the left section of the parking brake cable assembly. The procedure for the right section is identical.

Removal Procedure

1. To lift the vehicle, See: Vehicle Lifting and Lowering.
2. To remove the rear wheel assembly, See: Wheel Assembly.
3. To remove the centre under-seat cover, See: Centre Under-Seat Cover.
4. Removing the left section of the parking brake cable assembly



a. Remove mounting nut A from the left section of the parking brake cable assembly, and detach it from the rear brake assembly.

b. Remove the 3 mounting bolts B from the left section of the parking brake cable assembly.



c. Remove the 2 mounting nuts, then detach and remove the left section of the parking brake cable assembly.

Installation Procedure

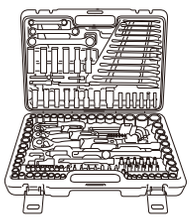
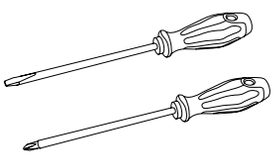
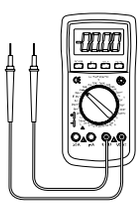
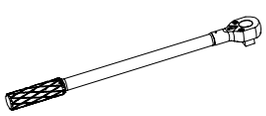
1. Install the left section of the parking brake cable assembly in the reverse order of removal, observing the following:
   a. After completing the above procedure, carry out a road test to verify braking performance.

6.7 Winch System

6.7.1 Service Tools.....754
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6.7.1 Service Tools

6.7.1.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)
2	Screwdriver		Removing screws
3	Digital multimeter		Measuring current, voltage and resistance
4	Torque Wrench		Tightening bolts and nuts to the specified torque

6.7.2 Description and Operation

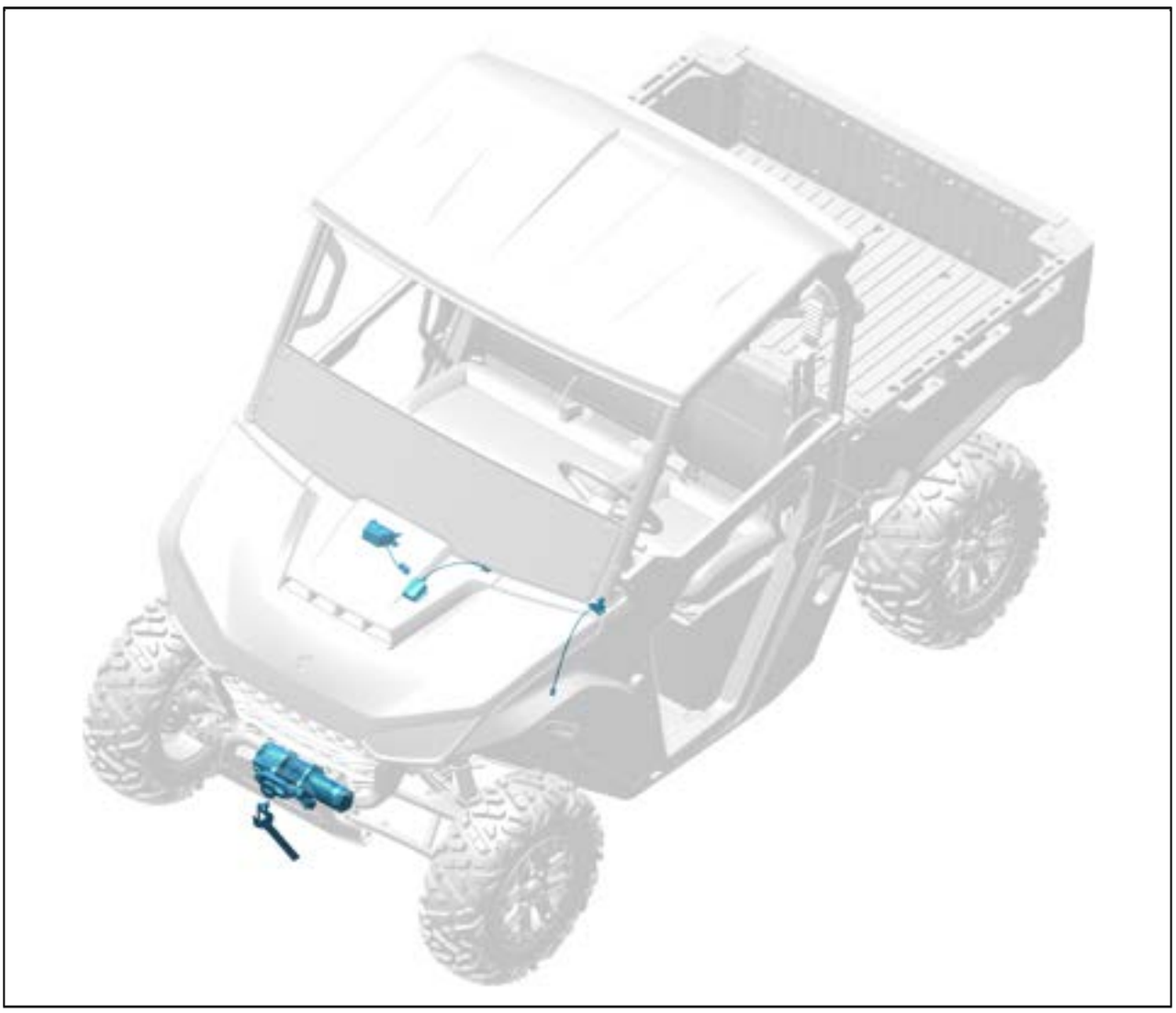
6.7.2.1 Warnings and Precautions

1. Under no circumstances should anyone stand in line with the cable, or to either side of it, when it is under load.
2. Do not hook the winch hook directly onto the anchor point. A shackle must be used to make a proper connection. Ensure that the anchor point is sufficiently strong (use a tree strap for trees and a designated recovery point for another vehicle).
3. The winch draws a very high current during operation. Only genuine winch components, or parts of equivalent or higher specification, must be used for the power cables, relay (solenoid) and connectors. The use of ordinary electrical wire may easily result in overheating and melting, creating a risk of fire.

6.7.3 Component Location and Exploded View

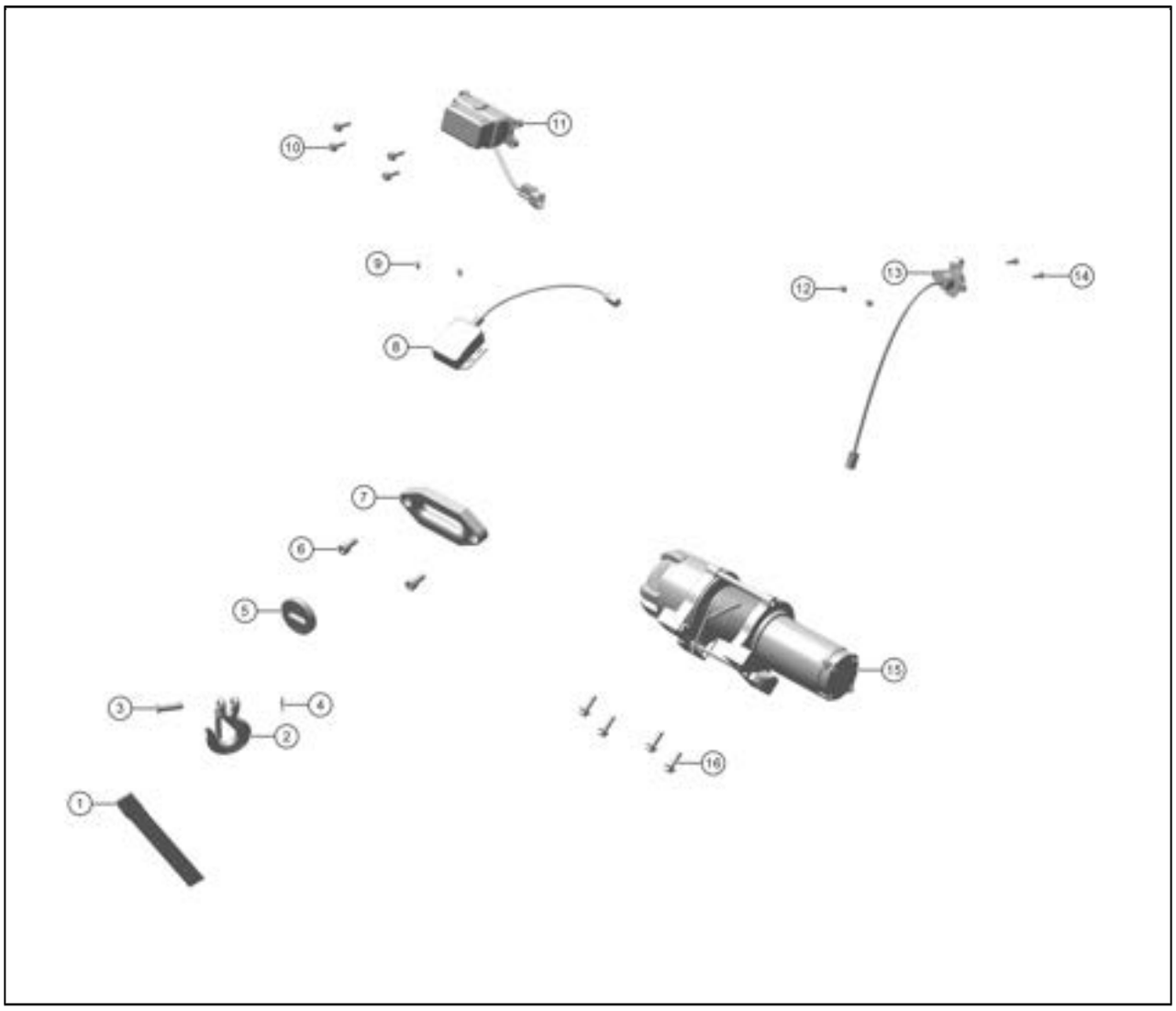
6.7.3.1 Component Location Diagram

Winch System



6.7.3.2 Exploded View Diagram

Winch System



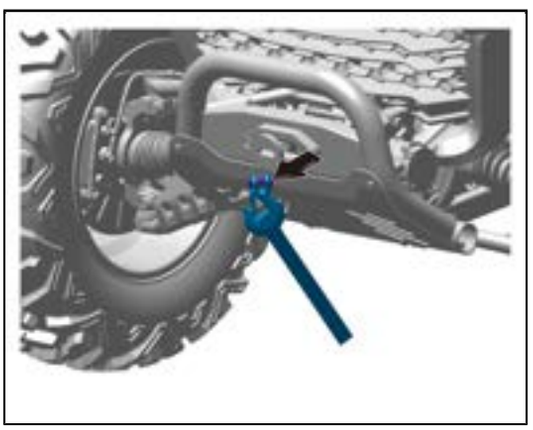
1	Winch strap	9	Screw
2	Winch hook	10	Hex flange bolt
3	Clevis Pin	11	Winch Contactor
4	Locking Pin	12	Nut
5	Winch rubber pad	13	Winch Switch Socket
6	Hex flange bolt	14	Bolt
7	Winch roller fairlead	15	Winch Motor
8	Winch Wireless Control Module	16	Hex flange bolt

6.7.4 Repair Procedure Guidance

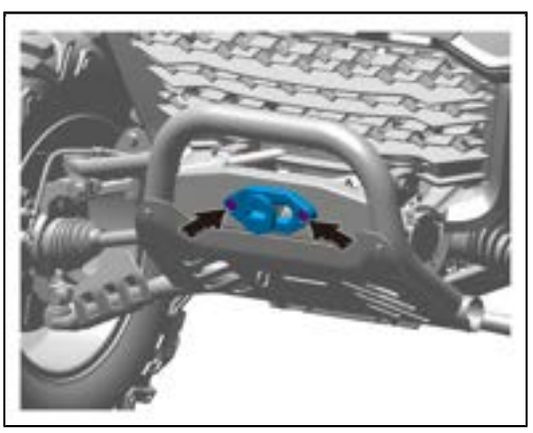
6.7.4.1 Winch roller fairlead

Removal Procedure

1. Removing the winch roller fairlead



a. Remove the locking pin, pull out the clevis pin, and detach the winch hook.



b. Remove the winch rubber pad.

c. Remove the 2 mounting bolts and detach the winch roller fairlead.

Installation Procedure

1. Install the winch roller fairlead in the reverse order of removal.

6.7.4.2 Winch Motor

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front bumper guard assembly, See: Front Bumper Guard Assembly.
3. To remove the front bumper welded assembly, See: Front Bumper Welded Assembly
4. To remove the winch roller fairlead, See: Winch Roller Fairlead.
5. Removing the winch motor



a. Remove the 4 bolts securing the winch motor, then remove the winch motor.

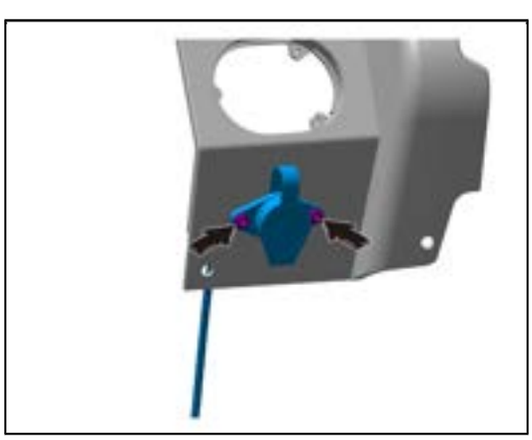
Installation Procedure

1. Install the winch motor in the reverse order of removal.

6.7.4.3 Winch Switch Socket

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. To remove the instrument cover, See: Instrument Cover.
4. Removing the winch switch socket



a. Remove the 2 retaining screws and detach the winch switch socket.

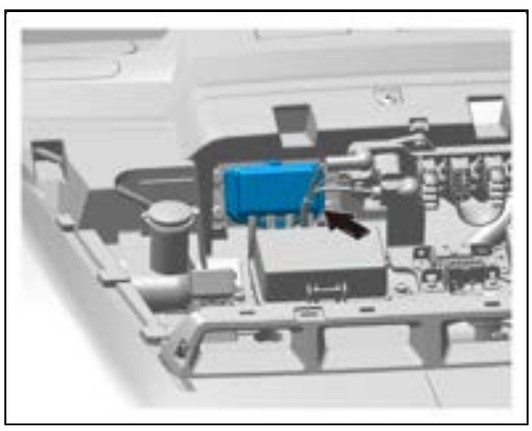
Installation Procedure

1. Install the winch switch socket in the reverse order of removal, noting the following points:
   a. After installation, reconnect the negative battery terminal and check that the winch switch socket operates correctly.

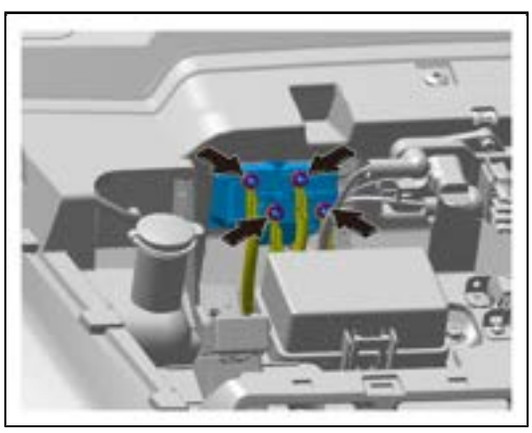
6.7.4.4 Winch Contactor

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. Removing the winch contactor



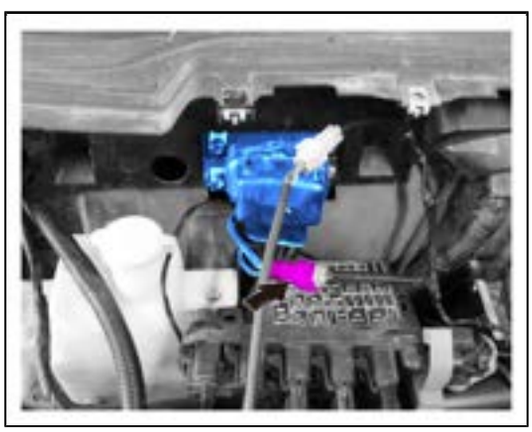
a. Open the protective cover for the winch contactor.



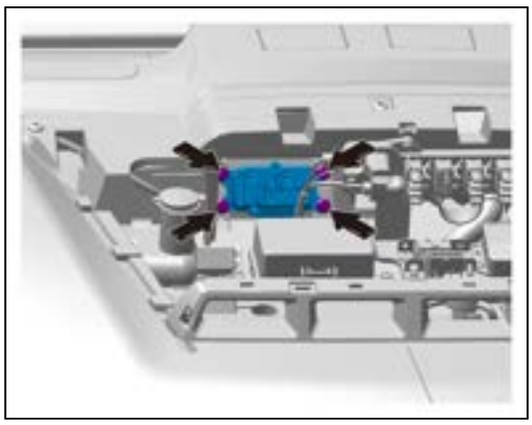
b. Remove the 4 mounting nuts from the winch contactor and detach the winch contactor harness.

CAUTION:

- **Before removal, note the installation positions of the harnesses to prevent incorrect reconnection and possible component damage during installation.**



c. Disconnect the connectors from the winch contactor.



d. Remove the 4 mounting bolts(M6×25)securing the winch contactor, then remove the winch contactor.

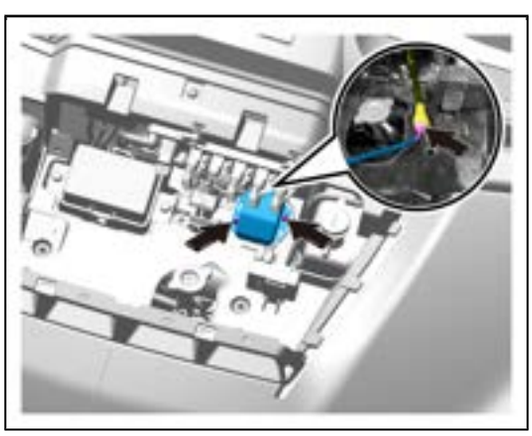
Installation Procedure

1. **Install the winch contactor in the reverse order of removal, paying attention to the following points:**
   a. After installation, reconnect the negative battery terminal and check that the winch switch operates correctly.

6.7.4.5 Winch Wireless Control Module

Removal Procedure

1. **To disconnect the negative battery terminal,** See: Battery Power Connection/Disconnection Procedure.
2. **To remove the front service cover,** See: Front Service Cover.
3. **Removing the winch wireless control module**



a. Remove the 2 retaining screws from the winch wireless control module.

b. Disconnect the connector and detach the winch wireless control module.

Installation Procedure

1. **Install the winch wireless control module in the reverse order of removal, observing the following:**
   a. After installation, reconnect the negative battery terminal and check that the winch switch operates correctly.

7.1 Lighting System

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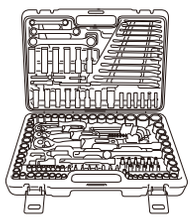
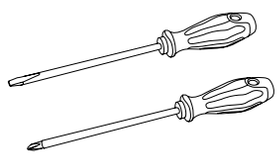
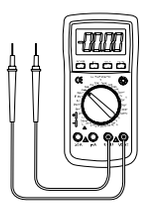
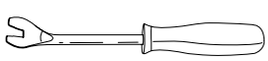
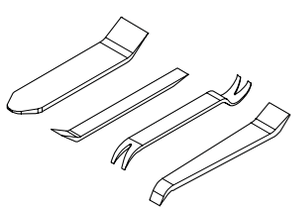
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7.1.1 Service Tools

7.1.1.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)
2	Screwdriver		Removing screws
3	Digital multimeter		Measuring current, voltage and resistance
4	Trim clip removal tool		Removing clips
5	Interior trim removal lever		Removing the plastic trim component

7.1.2 Description and Operation

7.1.2.1 Warnings and Precautions

1. Before modifying any vehicle lamp, make sure you understand and comply with all applicable local laws and regulations. Illegal modifications, such as excessive colour temperature, excessive brightness, or glare caused by the absence of projector lenses, may result in annual inspection failure, fines, or even full liability in the event of a road traffic accident.
2. Clean the headlamp lenses regularly to maintain light transmission. Clouded bezels will scatter the light, reduce efficiency, and increase glare.

7.1.3 System Operating Principle

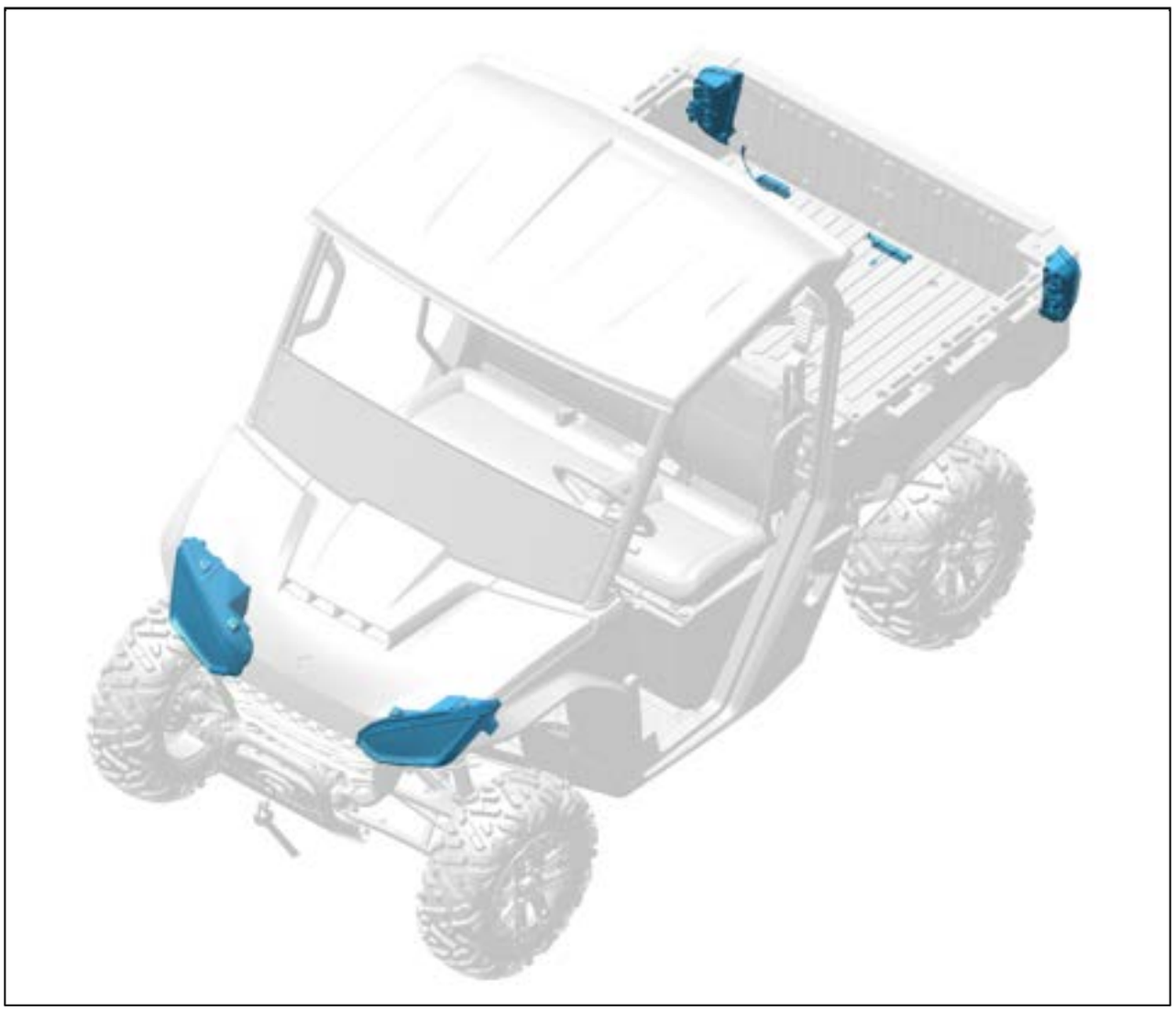
7.1.3.1 Introduction to Principles

1. **The lighting system is controlled directly by the relevant switches.**
2. **The control logic is as follows:**
   a. With the vehicle powered on, move the headlamp switch to the dipped/main beam position; the corresponding circuit will close and the headlamps will illuminate.
   b. With the vehicle powered on, operate the direction indicator switch; the corresponding circuit will close and supply power to the direction indicator on the selected side.
   c. With the vehicle powered on, when the brakes are applied, the brake switch supplies power to illuminate the stop lamp.

7.1.4 Component Location and Exploded View

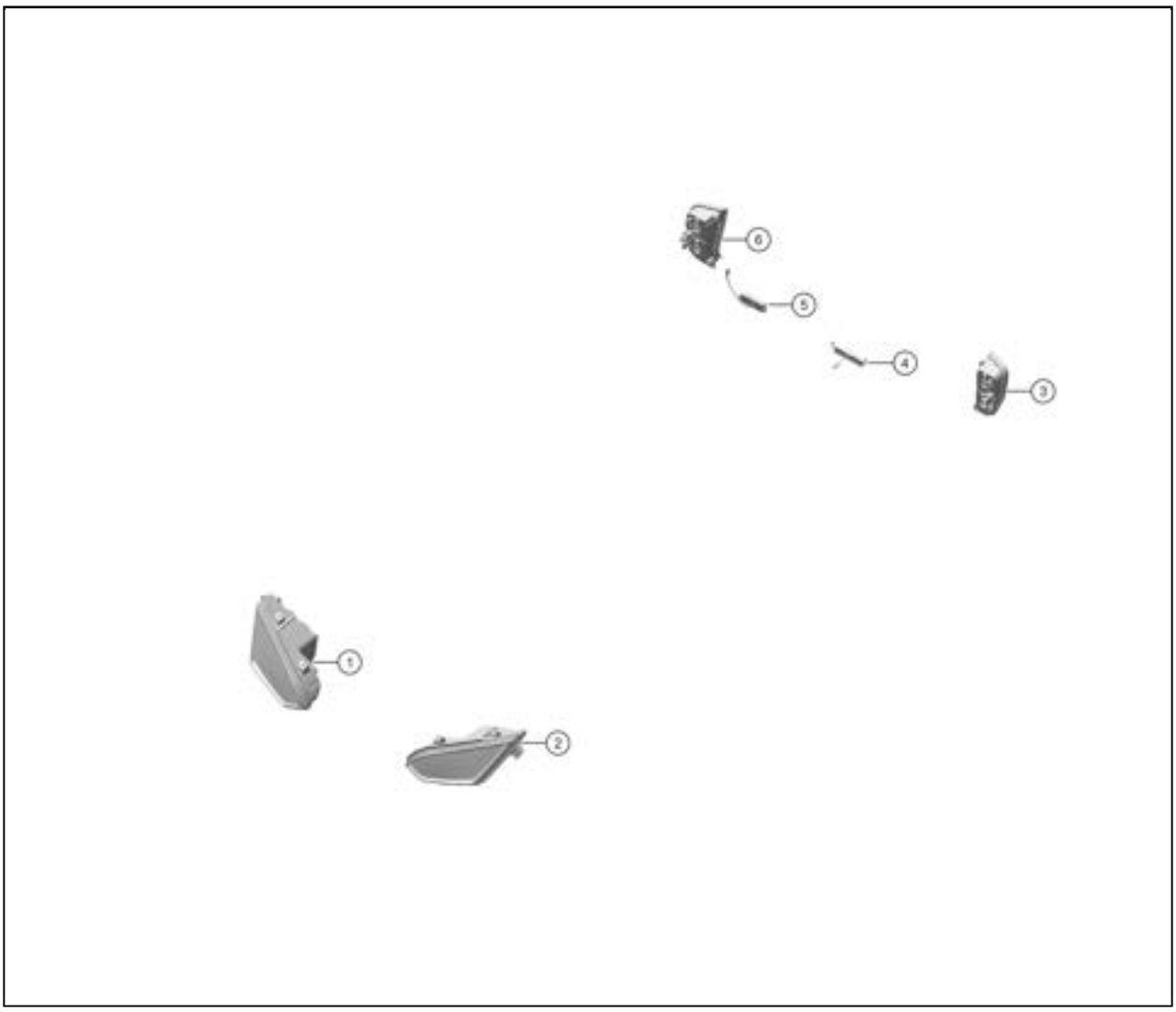
7.1.4.1 Component Location Diagram

Lighting System



7.1.4.2 Exploded View Diagram

Lighting System

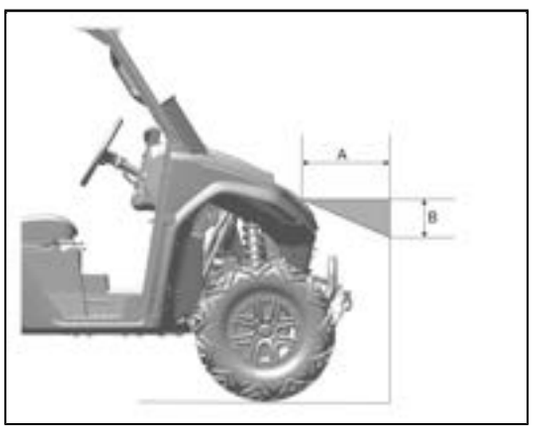


1	Right Headlamp	4	Rear Number Plate Lamp
2	Left Headlamp	5	Reversing Lamp
3	Left Tail Lamp	6	Right Tail Lamp

7.1.5 Inspecting and adjusting

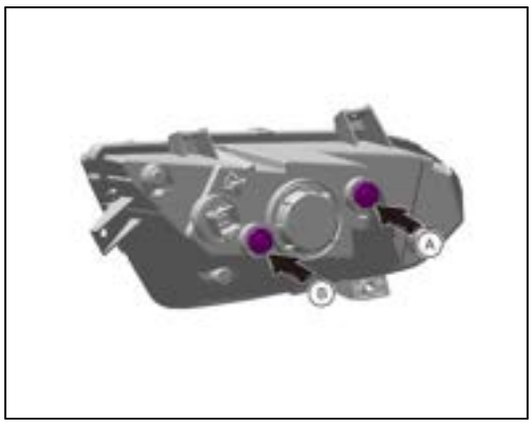
7.1.5.1 Adjusting the Headlamp Aim

1. **Preparation before adjustment**
   a. Ensure there is no deformation around the headlamp assembly.
   b. Park the vehicle on level ground.
   c. Ensure that the tyre pressures are within the specified range.
   d. The driver must be seated on the vehicle, and the vehicle must be in running order (fuel tank full).
2. **Checking the beam pattern of the headlamp**
   a. Position the vehicle so that the face of the combination headlamp is 10 m from screen A. The screen may be a curtain or a flat wall.
   b. Measure the distance from the floor to the centre of the headlamp, and mark the wall at the same height.
   c. Start the engine, then turn the headlamp switch to main beam.



   d. Observe the headlamp beam pattern on the aiming screen/wall. The most intense part of the headlamp beam should be 24 cm (B) below the wall mark. This must be measured with the driver seated.

NOTICE:
• **Wherever possible, have the adjustment carried out by an authorised Segway dealer.**



e. Using a cross-head screwdriver, turn adjusting screw A to adjust the headlamp beam vertically.

NOTICE:

- **To raise the headlamp beam, turn the beam adjusting screw anticlockwise.**
- **To lower the headlamp beam, turn the beam adjusting screw clockwise.**

f. Using a cross-head screwdriver, turn adjusting screw B in the position shown to adjust the headlamp beam horizontally.

NOTICE:

- **To move the headlamp beam to the left, turn the beam adjusting screw anticlockwise.**
- **To move the headlamp beam to the right, turn the beam adjusting screw clockwise.**

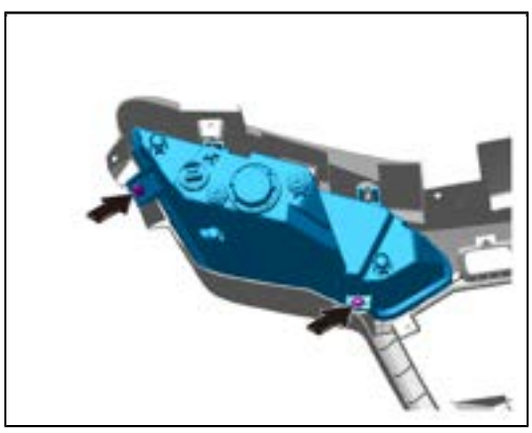
7.1.6 Repair Procedure Guidance

7.1.6.1 Headlamp

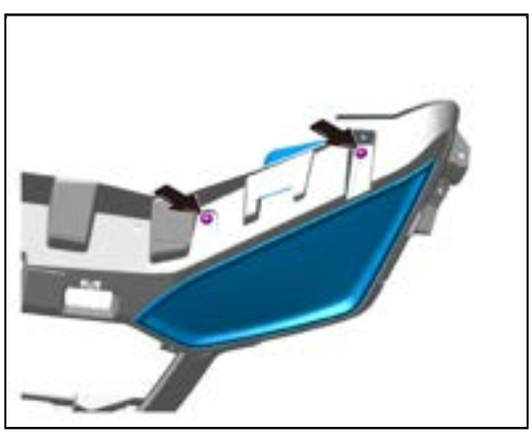
NOTICE:
• This section uses the removal and installation of the left headlamp as an example. Removal and installation of the right headlamp may be carried out in the same manner.

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. To remove the headlamp cover, See: Headlamp Cover.
4. To remove the flasher unit, See: Flasher Unit.
5. To remove the front panel, See: Front Panel.
6. To remove the headlamp bezel assembly, See: Headlamp Bezel Assembly.
7. Removing the headlamp



a. Remove the 2 headlamp mounting bolts.



b. Remove the 2 headlamp mounting bolts and detach the headlamp assembly.



c. Turn the headlamp bulb retaining nut A clockwise, then extract the headlamp bulb.

CAUTION:

- Headlamp bulb type: H4
- Lamps are available in LED and halogen variants (verify based on the actual vehicle).
- If the LED main or dipped beam is faulty, the entire headlamp assembly must be replaced.
- If the halogen main or dipped beam is faulty, the bulb can be replaced with one of the identical type.
- If other light sources are faulty, the entire headlamp assembly must be replaced.

Installation Procedure

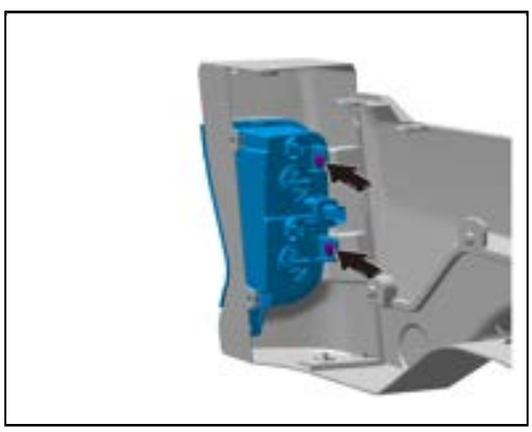
1. Install the headlamp in the reverse order of removal.

7.1.6.2 Tail Lamp

NOTICE:
• This manual uses the left rear lamp as an example for removal and installation. Removal and installation of the right rear lamp are carried out in the same manner.

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the cargo box retaining strip, See: Cargo Box Retaining Strip.
3. To remove the cargo box guard assembly, See: Cargo Box Guard Assembly.
4. Removing the tail lamp



a. Remove the 2 tail lamp mounting bolts and detach the tail lamp.



b. Turn the tail lamp bulb retaining nut A clockwise, then extract the tail lamp bulb B.

c. Turn the direction indicator bulb retaining nut C clockwise, then extract the direction indicator bulb D.

CAUTION:
• Tail lamp bulb type: P21/5W • Direction indicator bulb type: RY10W • Lamps are available in LED and halogen variants (verify based on the actual vehicle). • If the LED tail lamp light source is faulty, the entire tail lamp assembly must be replaced. • If the halogen tail lamp light source is faulty, the bulb can be replaced with one of the identical type.

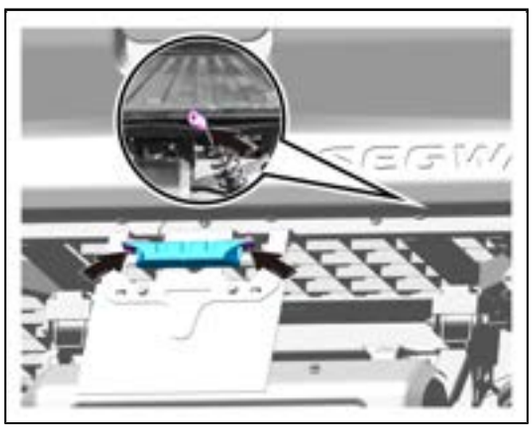
Installation Procedure

1. Install the rear lamp in the reverse order of removal.

7.1.6.3 Rear Number Plate Lamp

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. Removing rear number plate lamp



a. Disconnect harness connector from the rear number plate lamp.

b. Remove the rear number plate lamp 2 mounting bolts and detach the lamp.

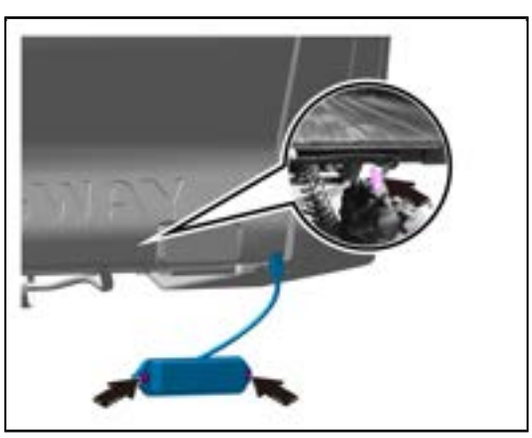
Installation Procedure

1. Install the rear number plate lamp in the reverse order of removal.

7.1.6.4 Reversing Lamp

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. Removing the reversing lamp



a. Disconnect the reversing lamp wiring harness connector.

b. Remove the 2 reversing lamp mounting bolts and detach the lamp.

Installation Procedure

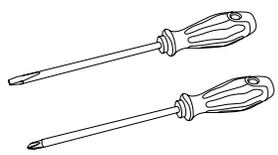
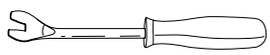
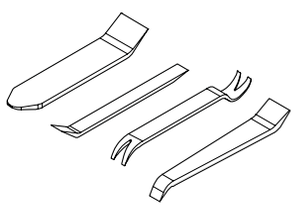
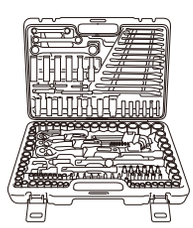
1. Install the reversing lamp in the reverse order of removal.

7.2 Display and Human-Machine Interaction

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7.2.1 Service Tools

7.2.1.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Screwdriver		Removing screws
2	Trim clip removal tool		Removing clips
3	Interior trim removal lever		Removing the plastic trim component
4	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)

7.2.2 Description and Operation

7.2.2.1 Warnings and Precautions

1. Disconnect the vehicle power supply prior to commencing work to prevent short circuits and component damage.
2. Grasp the connector body when plugging or unplugging; pulling on the wiring harness is strictly prohibited.
3. Identify the positions of all connectors and mark them appropriately to prevent incorrect connections.
4. Inspect pins and retaining clips for deformation or damage; replace promptly if any anomalies are found.
5. Damaged wiring harness sheaths and waterproof rubber seals must be replaced to ensure watertight integrity.

7.2.2.2 System Description

1. T-BOX Function
   a. It is primarily responsible for communication between the in-vehicle network and external networks (such as the mobile app and back-end server), enabling various remote control functions and data upload.
2. Instrument Cluster Function
   a. Primarily responsible for displaying real-time vehicle operating data such as road speed, engine speed, fuel level, and coolant temperature, whilst simultaneously providing fault and warning indications to allow the driver to intuitively monitor the vehicle status.
3. Centre Display Function
   a. Primarily responsible for presenting audio-visual entertainment, navigation, vehicle settings, and reversing camera imagery, facilitating human-machine interaction and operating in-car multimedia and various on-board functions.
4. Instrument Cluster Control Module Function
   a. Primarily responsible for receiving and processing various vehicle signals, driving the instrument cluster to display data, triggering warning lamps and audible chimes, and managing the operation of all instrument functions.

7.2.3 System Operating Principle

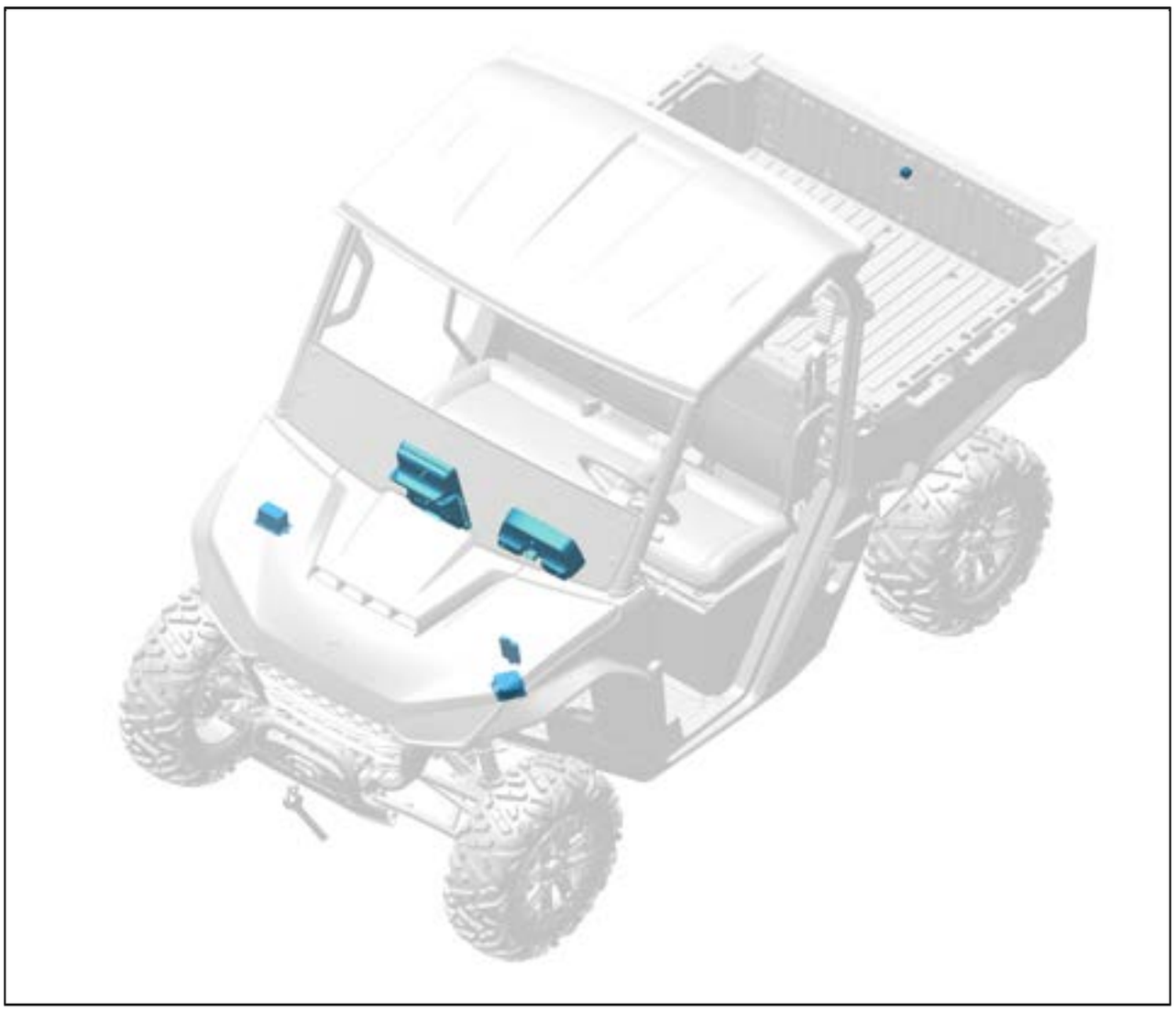
7.2.3.1 Introduction to Principles

1. T-BOX Basic Principles
    a. By means of mobile network technology and CAN communication, supplemented by Bluetooth and positioning technology, it provides various remote control functions, data upload and real-time positioning.
2. Instrument Cluster Control Module Basic Principles
    a. Receives signals from the vehicle CAN network and various sensors, processes them, and outputs drive signals to control the instrument display, warning lamps, and prompt devices.
3. Centre Display Basic Principles
    a. Receives system signals from the instrument cluster control module, processes audio-visual, navigation, and vehicle setting data, presenting them visually and responding to touch operations.
4. Instrument Cluster Basic Principles
    a. Receives electrical signals transmitted by the instrument cluster control module and converts data such as road speed, engine speed, and vehicle condition into images, digits, and indicators for intuitive display.

7.2.4 Component Location and Exploded View

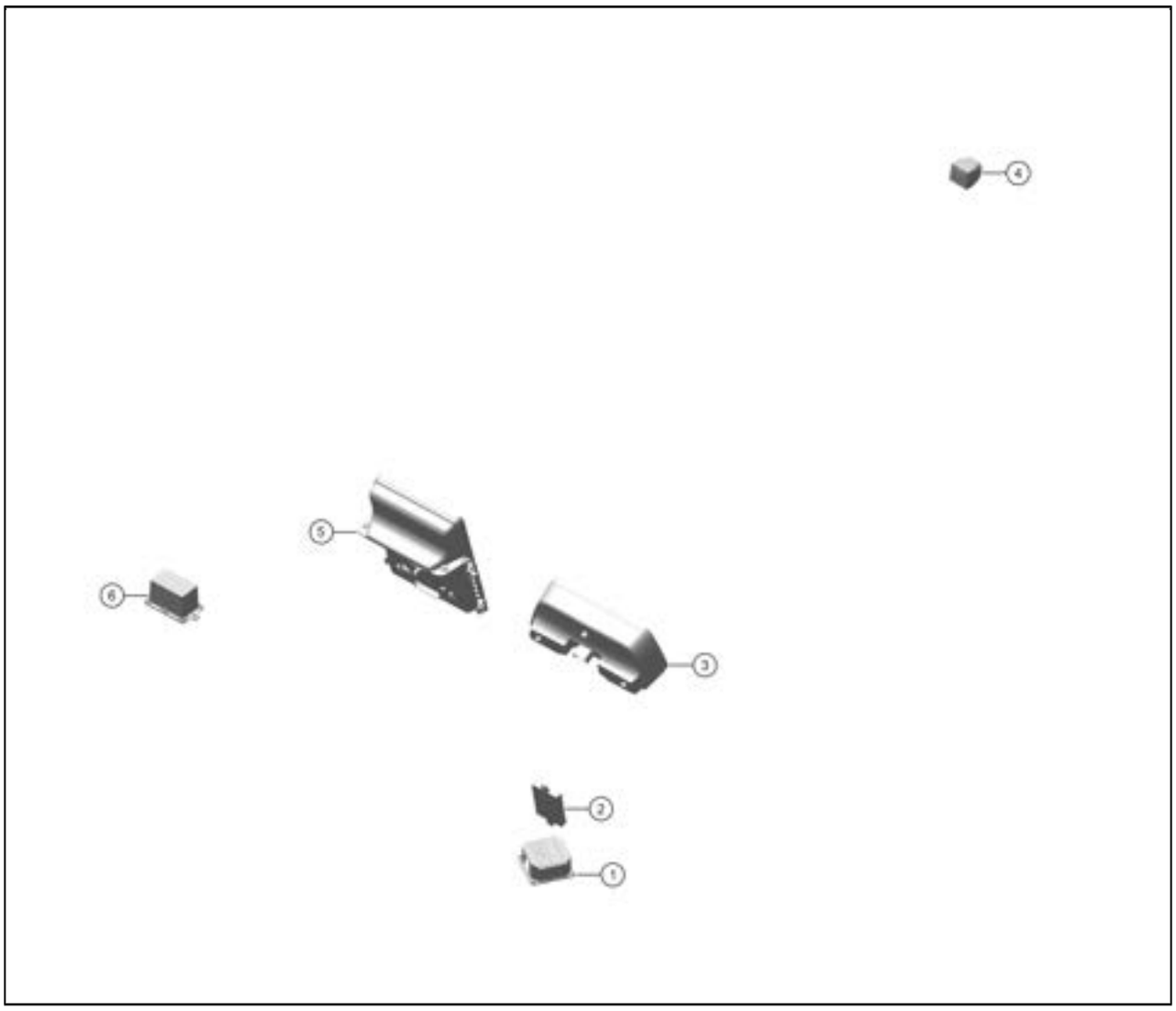
7.2.4.1 Component Location Diagram

Display and Human-Machine Interaction System



7.2.4.2 Exploded View Diagram

Display and Human-Machine Interaction System



1	T-BOX	4	Reversing Camera
2	Instrument Cluster Control Module	5	Centre Display
3	Instrument Cluster	6	Aerial Assembly

7.2.5 General Fault Diagnosis and Operation

7.2.5.1 Fault Symptom List

Instrument Cluster

Symptom(s)	Recommended Repair Procedure
Engine speed not displayed or displayed abnormally	Check the CAN-H and CAN-L wiring harnesses; if unresolved, check the ECU and the crankshaft position sensor.
Speedometer does not display	Check the vehicle speed sensor and wiring harness connectors; if unresolved, replace the instrument cluster.
Fuel level not displayed or displayed abnormally	Check the CAN-H and CAN-L wiring harnesses. Check the fuel level circuit against the electrical schematic diagram. Check the fuel level sensor on the fuel pump. If unresolved, replace the instrument cluster or instrument cluster control module.
Coolant temperature does not display	Check the CAN-H and CAN-L wiring harnesses. Check the coolant temperature sensor and associated wiring. If unresolved, replace the ECU or the instrument cluster.
Time display is inaccurate	Inspecting the TBOX
Odometer does not advance or displays incorrectly	Inspecting vehicle speed sensor
Voltage is too low	Check whether the battery is functioning normally
Engine operating time do not advance	Check if the rev counter (tachometer) is operating. If not, check the ECU and refer to the inspection items for "Engine speed not displayed".

Centre Display

Symptom(s)	Recommended Repair Procedure
Ignition switched on, but screen remains blank	• Check if the centre console fuses and circuits are intact, referring to the electrical schematic diagram. • Check if the centre console connectors are loose. • Check if the centre console power supply voltage is normal; the screen will go blank if the voltage is ≤ 7V or ≥ 18V.
Map fails to load	• Check if offline maps for the current location have been downloaded in advance. • If offline maps have not been downloaded, check if the centre console is connected to Wi-Fi.
Map fails to display the current vehicle position in real-time	• Check if signals are present at PIN 12 and PIN 19 of the centre console. • If signals are present, replace the T-BOX.

Symptom(s)	Recommended Repair Procedure
Radio fails to tune into stations	Check if the radio antenna connection is loose.
With normal radio or music function, no sound is audible from the external speakers or Bluetooth headset.	• **Check if the external playback equipment is functioning normally.** • **Reconnect the external playback equipment via Bluetooth.**

T-BOX

Symptom(s)	Recommended Repair Procedure
When fault code T0001 appears on the instrument cluster	Replace the T-BOX
When fault code T0002 appears on the instrument cluster	
When fault code T0003 appears on the instrument cluster	
When fault code T0004 appears on the instrument cluster	
When fault code T0005 appears on the instrument cluster	Check if signals are present at PIN 9 and PIN 14.
When fault code T0006 appears on the instrument cluster	Check for a Signal at Pins 4 and 5.
When fault code T0007 appears on the instrument cluster	Replace the T-BOX after verifying that the relevant circuits are intact.

7.2.5.2 Mobile App Cannot Communicate with T-BOX

Step 1	General Inspection

a. Start the vehicle and verify if the instrument panel displays normal battery voltage.
b. Is the result normal?

No — Check the battery and alternator.

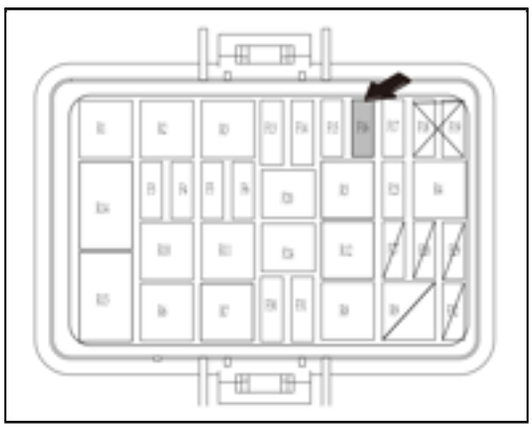
Yes

Step 2	Inspecting the fuse

a. Switch the vehicle power “OFF” and disconnect the

battery earthing cable.

b. Remove the fuse F16 (10A) from the fuse box.



c. Check if the fuse is blown.

Yes — Replace with a fuse of the same specification.

No

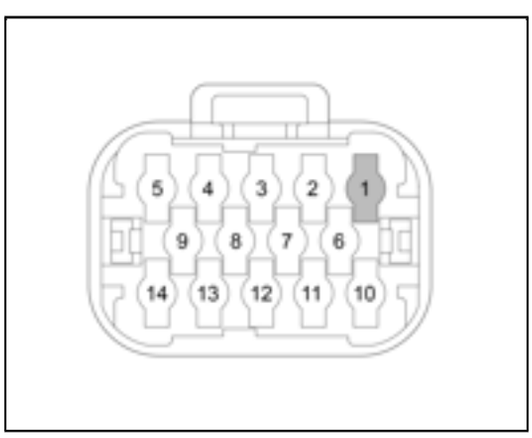
Step 3	Checking T-BOX earth

a. Switch the vehicle power “OFF” and disconnect the battery earthing cable.

b. Disconnect the T-BOX connector.

c. Using a digital multimeter, measure the resistance between terminal 1 of the T-BOX connector and earth.

Resistance value:



Terminal number	Terminal number	Standard value
1	Earth	< 1Ω

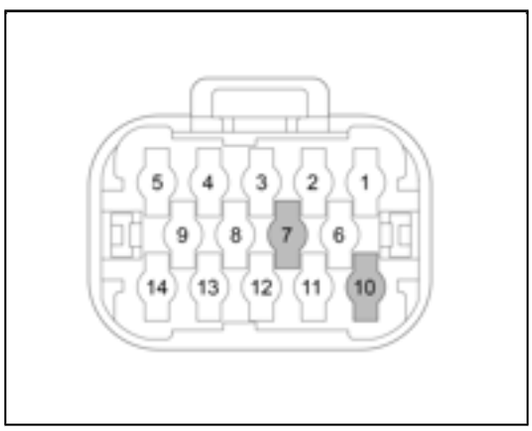
d. Is the result normal?

No — Repair or replace the T-BOX earth lead.

Yes

Step 4	Checking T-BOX power supply voltage

a. Switch the vehicle power "OFF" and disconnect the battery earthing cable.
b. Disconnect the T-BOX connector.
c. Connect the battery earth cable and start the vehicle.
d. Using a digital multimeter, measure the voltage between terminal 7 and earth, and between terminal 10 and earth.
Voltage value:



Terminal number	Terminal number	Standard value
7	Earth	11~14V
10	Earth	11~14V

e. Is the result normal?

No — Repair or replace the T-BOX power supply harness.

Yes

Step 5	Checking T-BOX

a. Renew the T-BOX with a new unit.
b. Road test the vehicle and check whether the result is normal.

Yes — Fault rectified.

No

Recheck according to the above Diagnostic Procedure.

7.2.6 DTC Diagnosis and Procedure

7.2.6.1 DTC List

DTC List

DTC	Fault Description	Fault level.	Possible Causes	Recommended Repair Procedure
T0001	GPS module fault	2	T-BOX module circuit fault	See: DTC Diagnosis: T0001, T0002, T0003, T0004
			T-BOX module fault	
T0002	4G module fault	2	T-BOX module circuit fault	
			T-BOX module fault	
T0003	Bluetooth control module fault	2	T-BOX module circuit fault	
			T-BOX module fault	
T0004	Sensor fault	2	T-BOX module circuit fault	
			T-BOX module fault	
T0005	Powertrain CAN fault	2	CAN harness failure	See: DTC Diagnosis: T0005, T0006
			T-BOX module fault	
T0006	Body CAN fault	2	CAN harness failure	
			T-BOX module fault	

7.2.6.2 DTC Diagnosis: T0001, T0002, T0003, T0004

DTC Description

DTC	Fault Description	Possible Causes
T0001	GPS module fault	T-BOX module circuit fault
		T-BOX module fault
T0002	4G module fault	T-BOX module circuit fault
		T-BOX module fault
T0003	Bluetooth control module fault	T-BOX module circuit fault
		T-BOX module fault
T0004	Sensor fault	T-BOX module circuit fault
		T-BOX module fault

Diagnostic Procedure

Step 1	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

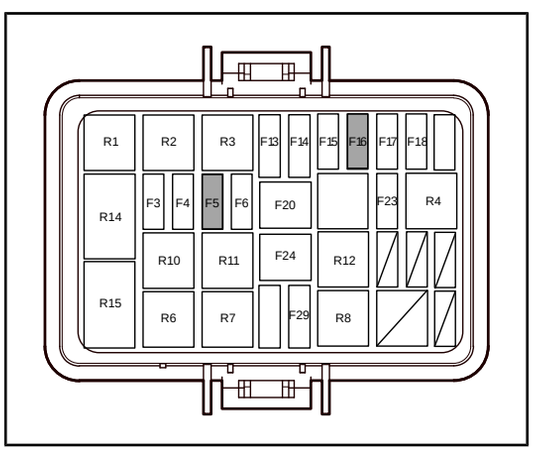
No

If diagnosed as an intermittent fault, check the relevant connector for looseness, damage, and the wiring harness terminal for corrosion.

Yes

Step 2	Inspecting the fuse

a. Switch off the vehicle power and disconnect the battery earth cable.
b. Remove the fuse F16 (10 A) and fuse F5 (15 A) from the fuse box.



c. Check if the fuse is blown.

Yes

Replace with a fuse of the same specification.

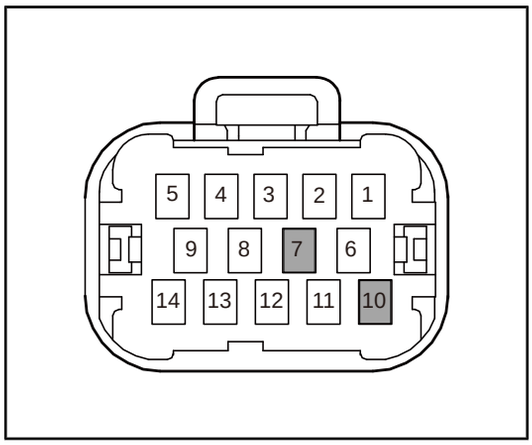
No

Step 3	Checking T-BOX module power supply voltage

a. Switch the vehicle power supply OFF, then disconnect the battery earth cable.
b. Disconnect T-BOX harness connector B039.
c. Connect the battery earth cable and start the vehicle.
d. Using a digital multimeter, measure the voltage

between each of terminals 7 and 10 of T-BOX module connector B039 and earth.

Voltage value:



Terminal number	Terminal number	Standard value
B039(7)	Earth	11~14V
B039(10)	Earth	11~14V

e. Is the result normal?

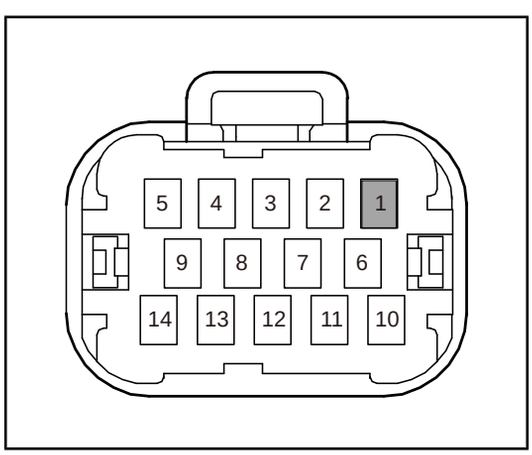
No — Repair or replace the T-BOX module power supply harness.

Yes

Step 4	Checking T-BOX module earth

a. Switch the vehicle power supply OFF, then disconnect the battery earth cable.
b. Disconnect T-BOX harness connector B039.
c. Using a digital multimeter, measure the resistance between terminal 1 of T-BOX harness connector B039 and earth.

Resistance value:



Terminal number	Terminal number	Standard value
B039(1)	Earth	< 1Ω

d. Is the result normal?

No → Repair or replace the T-BOX module earth lead.

Yes

Step 5	Checking T-BOX assembly

a. Renew the T-BOX assembly with a new unit.
b. Restore the vehicle and clear all module DTCs.
c. Verify T-BOX assembly operation.
d. Check if the DTC exists.

Recheck according to the above Diagnostic Procedure.

7.2.6.3 DTC Diagnosis: T0005, T0006

DTC Description

DTC	Fault Description	Possible Causes
T0005	Powertrain CAN fault	CAN harness failure
		T-BOX module fault
T0006	Body CAN fault	CAN harness failure
		T-BOX module fault

Diagnostic Procedure

Step 1	Retrieve DTC

a. Read and clear the DTC.
b. Perform a functional check during a test drive.
c. Check if the DTC exists.

No → If diagnosed as an intermittent fault, check the relevant connector for looseness, damage, and the wiring harness terminal for corrosion.

Yes

Step 2	Checking T-BOX module CAN line voltage

a. Switch the vehicle power supply OFF, then

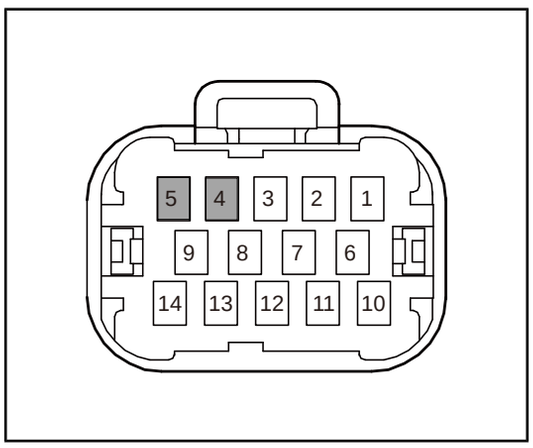
disconnect the battery earth cable.

b. Disconnect T-BOX harness connector B039.

c. Connect the battery earth cable and start the vehicle.

d. Using a digital multimeter, measure the voltage between each of terminals 4 and 5 of T-BOX module connector B039 and earth.

Voltage value:



Terminal number	Terminal number	Standard value
B039(4)	Earth	Approximately 2.6 V
B039(5)	Earth	Approximately 2.4 V

e. Is the result normal?

No → Repair or replace the T-BOX module CAN harness.

Yes

Step 3	Checking T-BOX assembly

a. Renew the T-BOX assembly with a new unit.

b. Restore the vehicle and clear all module DTCs.

c. Verify T-BOX assembly communication.

d. Is the result normal?

Yes → Fault rectified.

No

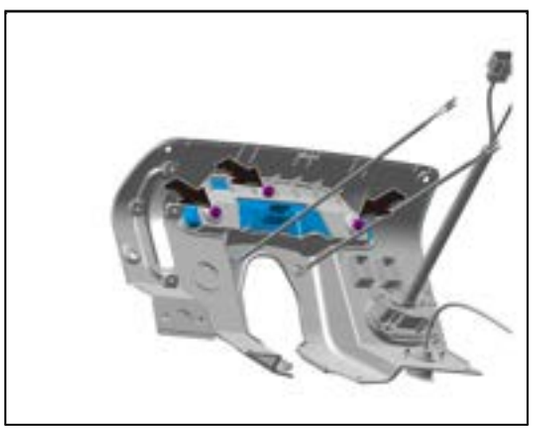
Recheck according to the above Diagnostic Procedure.

7.2.7 Repair Procedure Guidance

7.2.7.1 Instrument Cluster

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. To remove the instrument cover, See: Instrument Cover.
4. Removing the instrument cluster



a. Remove the 3 instrument cluster mounting bolts and detach the instrument cluster.

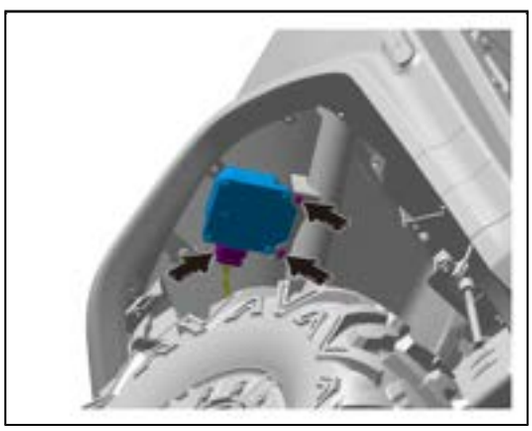
Installation Procedure

1. Install the instrument cluster in the reverse order of removal.

7.2.7.2 T-BOX

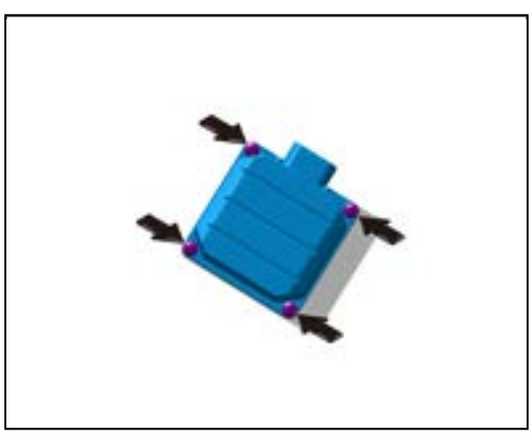
Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the headlamp cover, See: Headlamp Cover.
3. Removing T-BOX



a. Remove the 2 T-BOX mounting bolts.

b. Disconnect the T-BOX wiring harness connector and detach the T-BOX along with its bracket.



c. Remove the 4 T-BOX securing screws and detach the T-BOX.

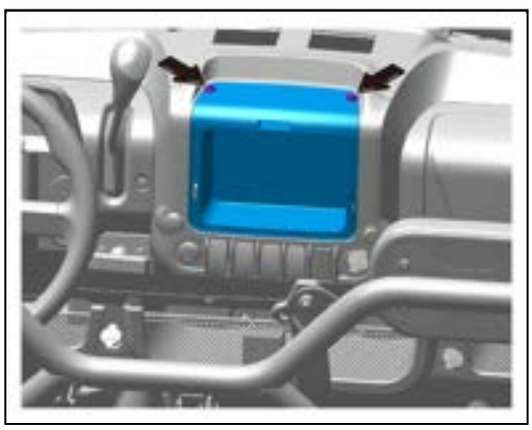
Installation Procedure

1. Install the T-BOX in the reverse order of removal.

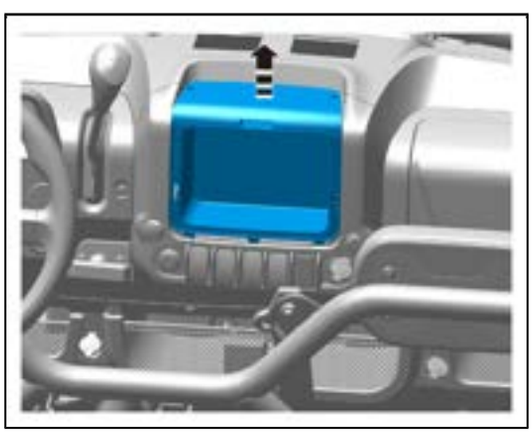
7.2.7.3 Centre Display

Removal procedure (configuration 1)

1. Removing the centre storage compartment



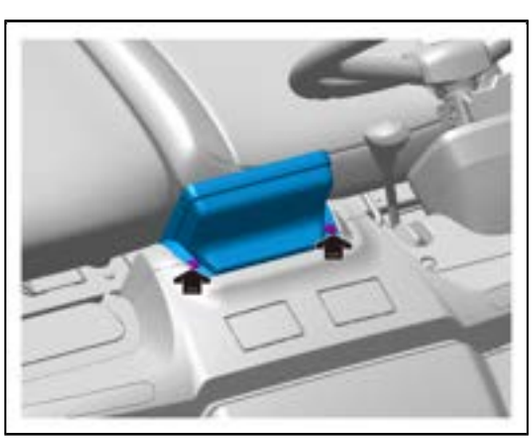
a. Prise out the 2 retaining clips of the centre storage compartment.



b. Lift the centre storage compartment upwards to remove it.

Removal procedure (configuration 2)

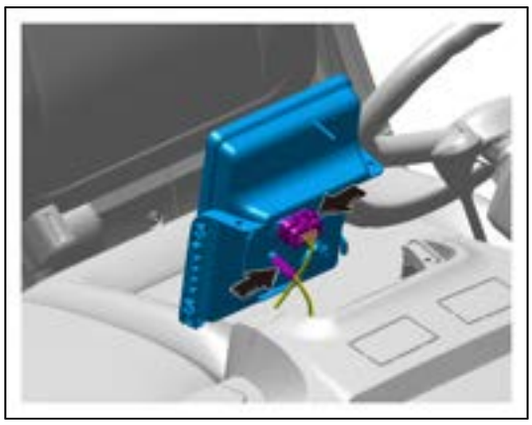
1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. Removing the centre display



a. Release the 2 retaining clips of the centre display and detach it upwards.

CAUTION:

- Do not pull the centre display completely off, as the wiring harness is still connected to the rear.



b. Disconnect the 2 wiring harness connectors from the centre display and remove the display.

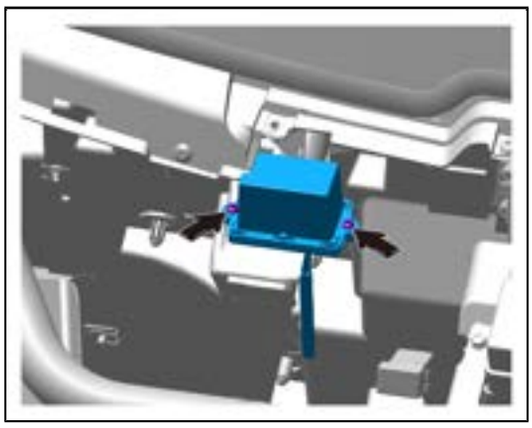
Installation Procedure

1. Install the centre display in the reverse order of removal.

7.2.7.4 Aerial Assembly

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. To remove the headlamp cover, See: Headlamp Cover.
4. To remove the flasher unit, See: Flasher Unit.
5. To remove the front panel, See: Front Panel.
6. To remove the centre display, See: Centre Display.
7. Removing the aerial assembly



a. Remove the 2 retaining bolts of the aerial assembly, release the wiring harness retaining clips along the harness, and cut the cable ties.

NOTICE:
• Cable ties on the harness are single-use and must be replaced after removal.

b. Remove the aerial assembly.

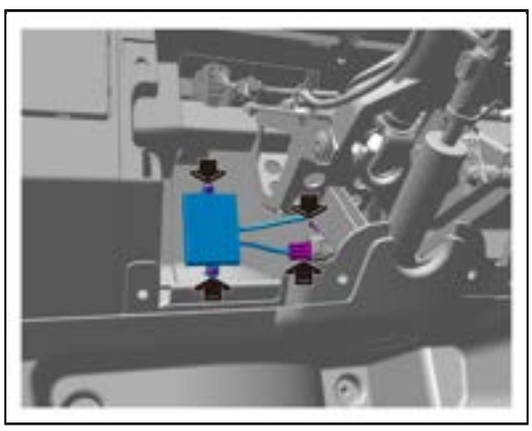
Installation Procedure

1. Install the aerial assembly in the reverse order of removal.

7.2.7.5 Instrument Cluster Control Module

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. To remove the instrument cover, See: Instrument Cover.
4. Removing the instrument cluster control module



a. Disconnect the 2 wiring harness connectors from the instrument cluster control module.

b. Remove the 2 retaining screws of the instrument cluster control module and remove the module.

Installation Procedure

1. Install the instrument cluster control module in the reverse order of removal.

7.3 Switch and Accessory System

7.3.1 Service Tools 796

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7.3.3.3 Ignition Switch 801

7.3.3.4 Direction Indicator Flasher 802

7.3.3.5 Starter Button 802

7.3.3.6 Engine Stop Switch 803

7.3.3.7 12 V Power Outlet 804

7.3.3.8 USB Power Outlet 805

7.3.3.9 Buzzer 805

7.3.3.10 Regulator/Rectifier 806

7.3.3.11 Horn 806

7.3.3.12 2WD/4WD Selector Switch 807

7.3.3.13 Combination Switch 807

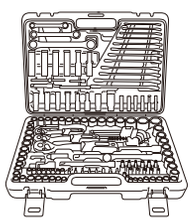
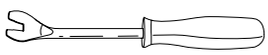
7.3.3.14 Trailer Power Socket 808

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7.3.1 Service Tools

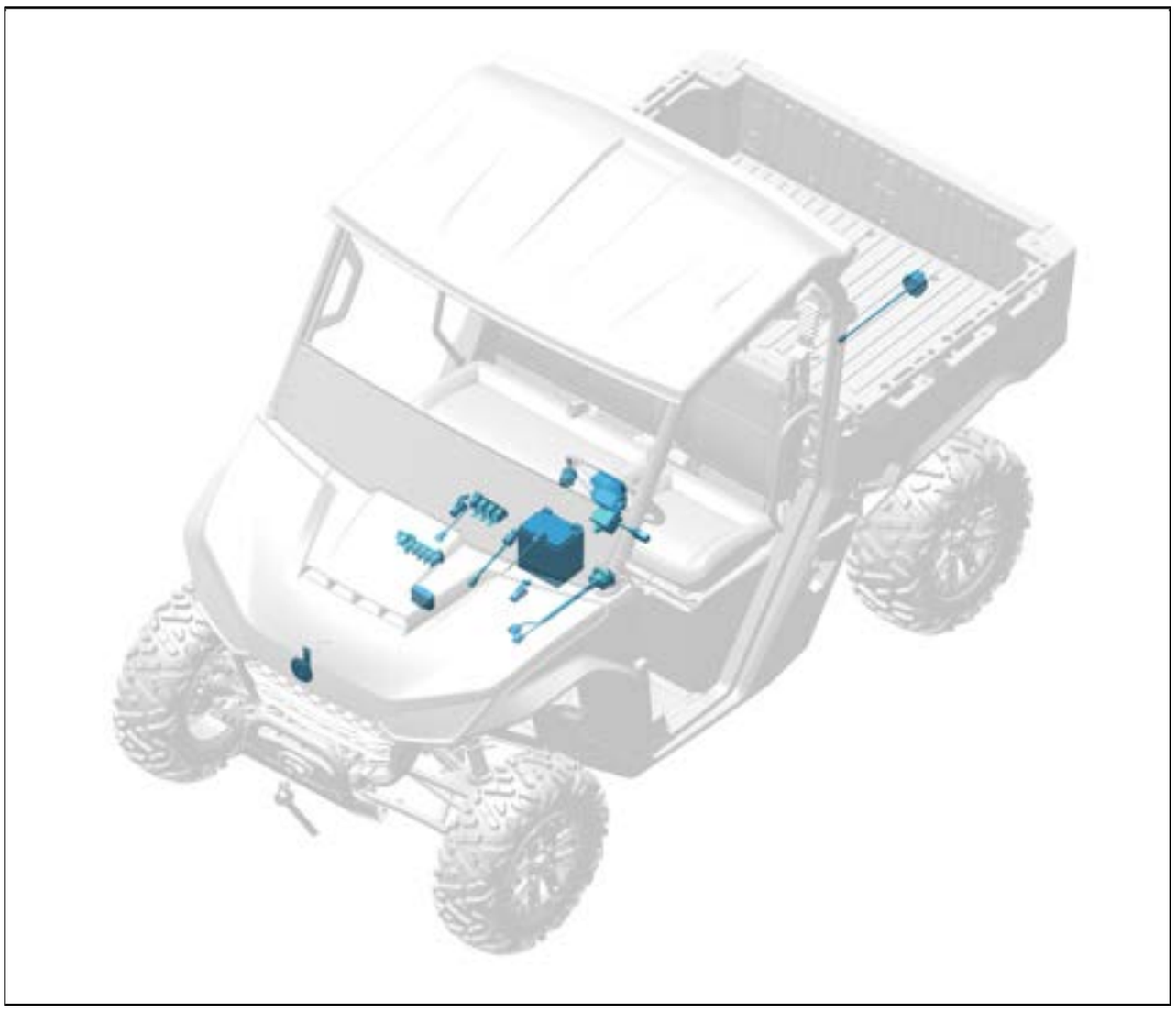
7.3.1.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)
2	Trim clip removal tool		Removing clips

7.3.2 Component Location and Exploded View

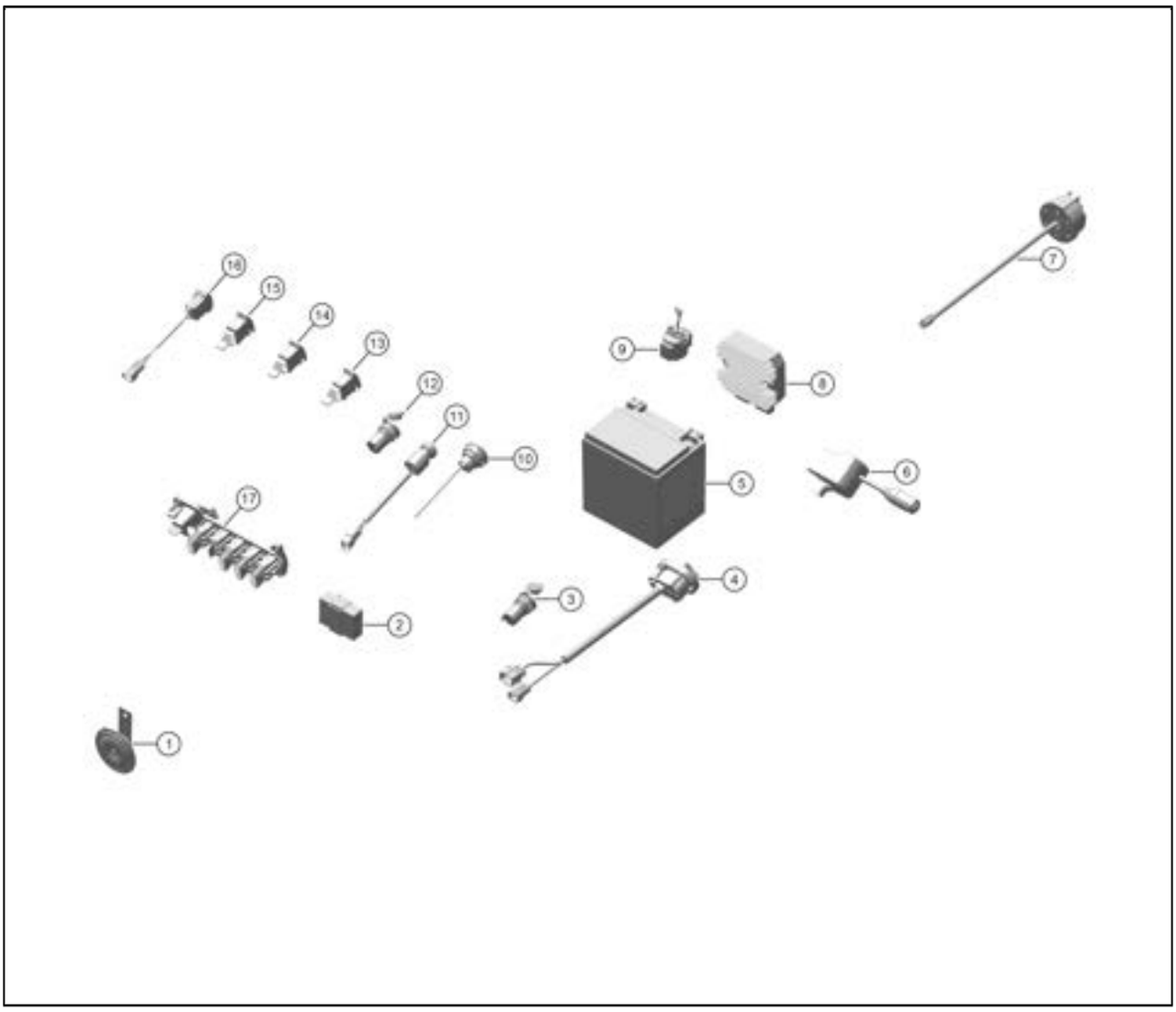
7.3.2.1 Component Location Diagram

Switch and Accessory System



7.3.2.2 Exploded View Diagram

Switch and Accessory System



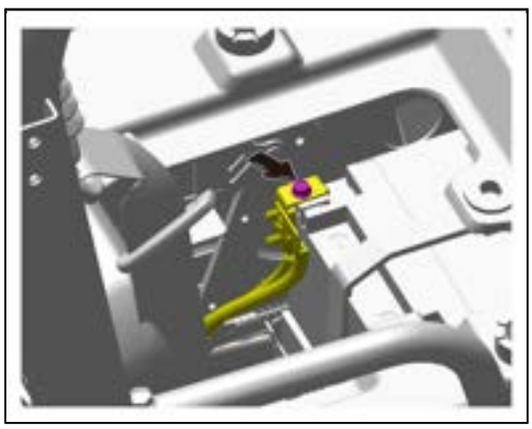
1	Horn	10	Starter Button
2	Direction Indicator Flasher	11	Ignition Switch
3	12 V Power Outlet	12	USB Power Outlet
4	2WD/4WD Selector Switch (Differential)	13	Engine Stop Switch
5	Battery	14	Hazard Warning Switch
6	Combination Switch	15	Boost Switch
7	Trailer Power Socket	16	ABS Speed Control Switch
8	Regulator/Rectifier	17	PDU
9	Starter Relay		

7.3.3 Repair Procedure Guidance

7.3.3.1 Battery Power Connection/Disconnection Procedure

Removal Procedure

1. To remove the centre under-seat cover, See: Centre Under-Seat Cover.
2. Battery power-off procedure



a. Pull back the rubber protective sleeve from the negative battery terminal. Remove the negative battery cable retaining bolt and position the negative battery cable aside.

CAUTION:

- Do not place tools on the battery, as this may cause a short circuit.
- After disconnecting the negative battery terminal cable, wrap the negative cable terminal with insulating material to prevent accidental contact.

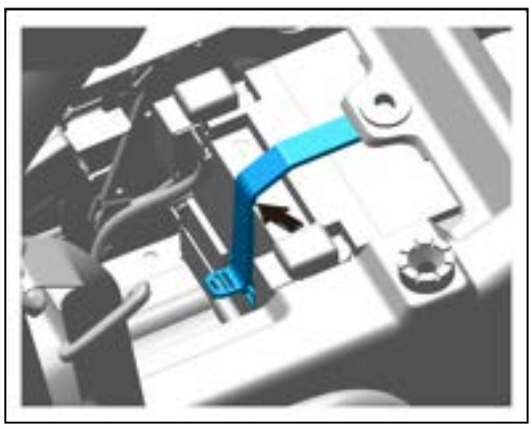
Installation Procedure

1. Battery power-on procedure: install in the reverse order of removal.

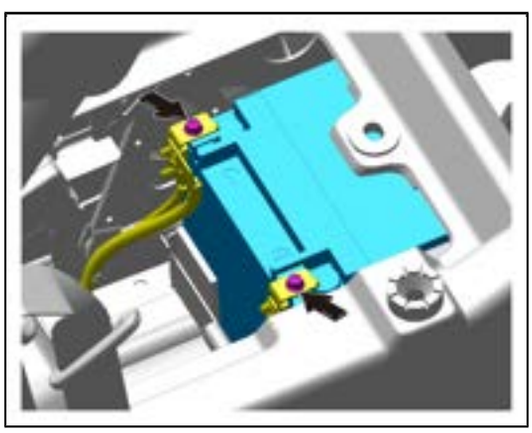
7.3.3.2 Battery

Removal Procedure

1. To remove the centre under-seat cover, See: Centre Under-Seat Cover.
2. Removing the battery



a. Release the clips at both ends of the battery retaining strap, then remove the strap.



b. Pull back the protective rubber caps from the positive and negative battery terminals, remove the 2 terminal post mounting bolts, then remove the battery.

Battery model: GHD32HL-BS

CAUTION:

- This is a gel battery and does not require electrolyte top-up.
- Do not place tools on the battery, as this may cause a short circuit.
- When removing the battery, always disconnect the negative battery terminal cable first, then disconnect the positive battery cable.

Installation Procedure

1. Install the battery in the reverse order of removal.

CAUTION:

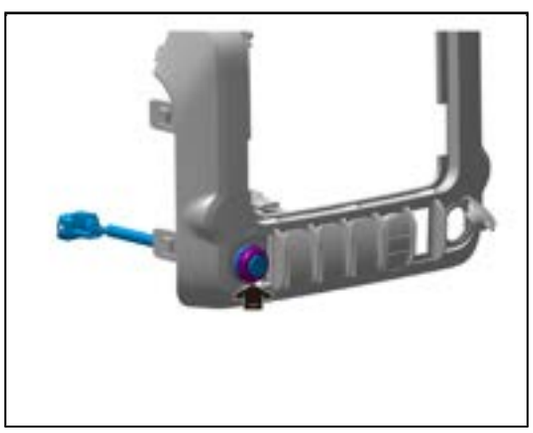
- Apply a thin layer of dielectric grease to the positive and negative terminals to prevent corrosion.
- When connecting the battery cables, connect the positive battery cable first, then connect the negative battery terminal cable.

7.3.3.3 Ignition Switch

NOTICE:
• This manual uses the removal and installation of the ignition lock cylinder as an example. Refer to this section for the removal and installation of the UTV lock assembly (US specification without starter function).

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the centre display, See: Centre Display.
3. To remove the switch panel, See: Switch Panel.
4. Removing the ignition switch (UTV lock set assembly)



a. Use the SST to remove the ignition lock cylinder.

SST: Ignition lock cylinder removal/installation tool

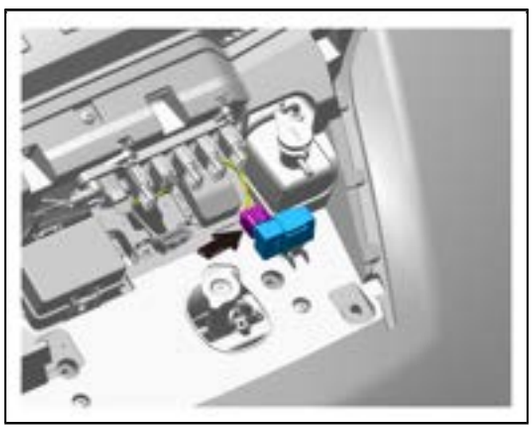
Installation Procedure

1. Install the ignition lock cylinder in the reverse order of removal.

7.3.3.4 Direction Indicator Flasher

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. Removing the flasher unit



a. Disconnect the harness connector from the flasher unit, then remove the flasher unit.

CAUTION:

- If the vehicle's direction indicators fail to flash or flash abnormally (normal flashing frequency is 85 flashes/minute).
- In the event of a bulb failure (damaged front or rear direction indicator on one side), the flashing frequency increases to 120 flashes/minute.

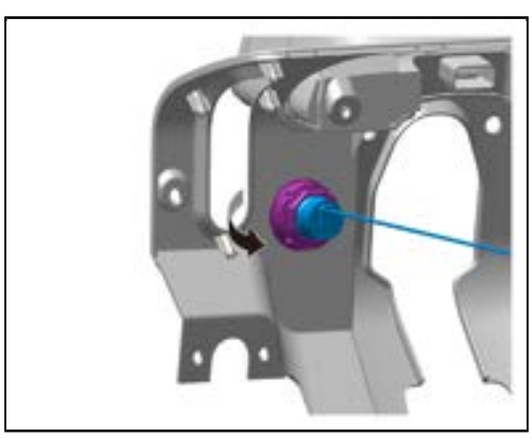
Installation Procedure

1. Install the flasher unit in the reverse order of removal.

7.3.3.5 Starter Button

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. To remove the instrument cover, See: Instrument Cover.
4. Removing the start button switch



a. Remove the start button switch in the direction of the arrow.

Installation Procedure

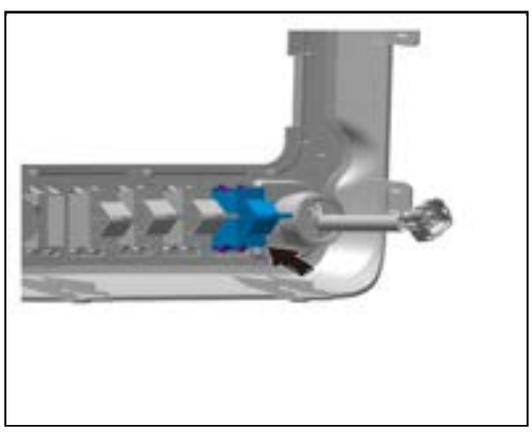
1. Install the start button switch in the reverse order of removal.

7.3.3.6 Engine Stop Switch

NOTICE:
• The following procedure uses the engine stop switch as an example. The same procedure applies to the override switch, ABS speed control switch and hazard switch.

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the centre display, See: Centre Display.
3. To remove the switch panel, See: Switch Panel.
4. Removing the engine stop switch



a. Release the 4 retaining clips on the engine stop switch and remove the switch.

Installation Procedure

1. Install the engine stop switch in the reverse order of removal.

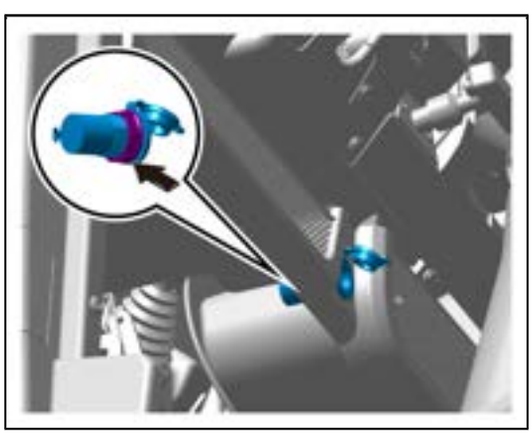
7.3.3.7 12 V Power Outlet

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the centre display, See: Centre Display.
3. Removing the 12 V power outlet



a. Disconnect the harness connector from the 12 V power outlet.



b. Remove the retaining nut of the 12V power socket and remove the socket.

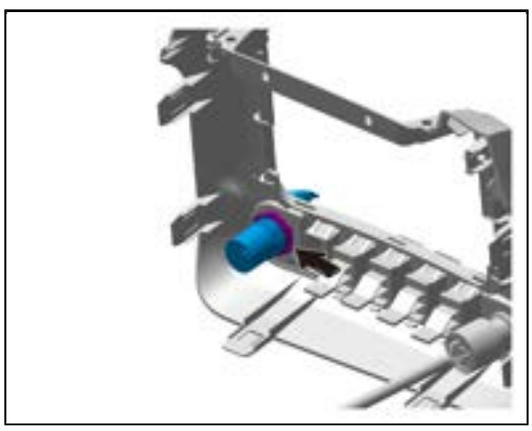
Installation Procedure

1. Install the 12 V power outlet in the reverse order of removal.

7.3.3.8 USB Power Outlet

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the centre display, See: Centre Display.
3. To remove the switch panel, See: Switch Panel.
4. Removing the USB power outlet



a. Remove the retaining nut of the USB port and remove the port.

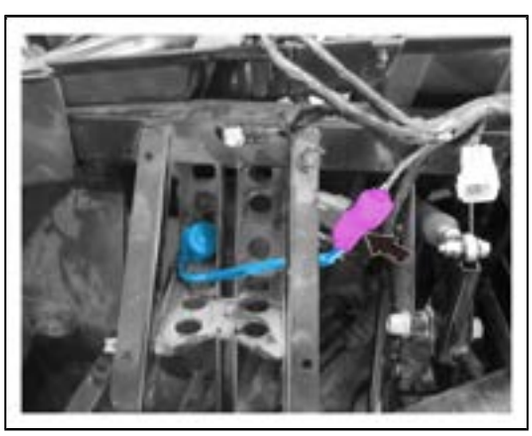
Installation Procedure

1. Install the USB power outlet in the reverse order of removal.

7.3.3.9 Buzzer

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. To remove the instrument cover, See: Instrument Cover.
4. Removing the buzzer



a. Disconnect the buzzer wiring harness connector, release the wiring harness retaining clips along the harness, and cut the cable ties.

NOTICE:
• Cable ties on the harness are single-use and must be replaced after removal.

b. Remove the buzzer.

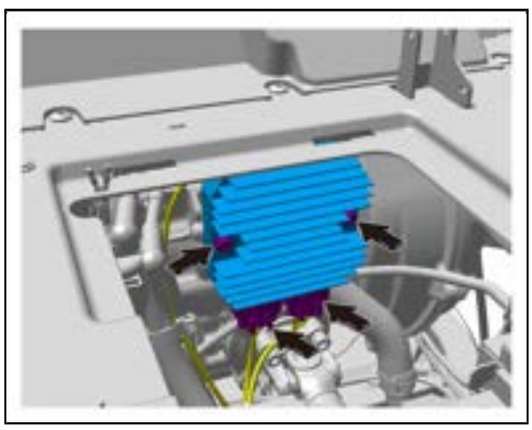
Installation Procedure

1. Install the buzzer in the reverse order of removal.

7.3.3.10 Regulator/Rectifier

Removal Procedure

1. To remove the centre under-seat cover, See: Centre Under-Seat Cover.
2. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
3. Removing the regulator/rectifier



a. Disconnect the 2 harness connectors from the regulator/rectifier.

b. Remove the 2 mounting bolts from the regulator/ rectifier, then remove the regulator/rectifier.

Installation Procedure

1. Install the regulator/rectifier in the reverse order of removal.

7.3.3.11 Horn

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. To remove the headlamp cover, See: Headlamp Cover.
4. To remove the flasher unit, See: Flasher Unit.
5. To remove the front panel, See: Front Panel.
6. To remove the headlamp bezel assembly, See: Headlamp Bezel Assembly.
7. Removing horn



a. Disconnect the 2 wiring harness connectors from the horn.

b. Remove the horn mounting bolt and take off the horn.

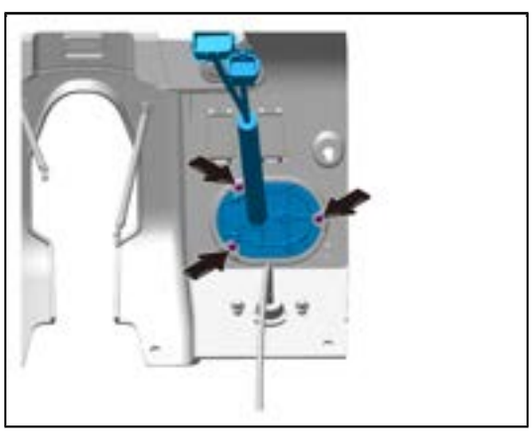
Installation Procedure

1. Install the horn in the reverse order of removal.

7.3.3.12 2WD/4WD Selector Switch

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. To remove the instrument cover, See: Instrument Cover.
4. Removing the 2WD/4WD selector switch



a. Remove the 3 retaining screws of the 2WD/4WD selector switch and remove the switch.

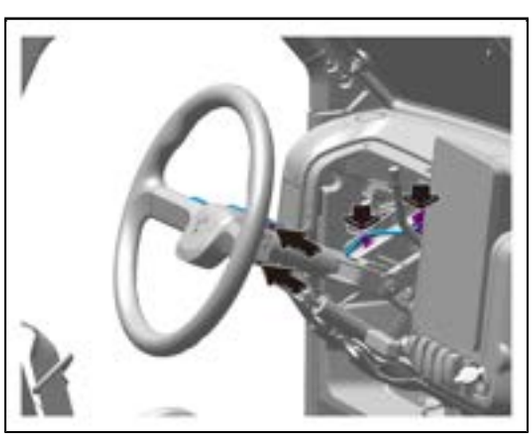
Installation Procedure

1. Install the 2WD/4WD selector switch in the reverse order of removal.

7.3.3.13 Combination Switch

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. To remove the instrument cover, See: Instrument Cover.
4. Removing the combination switch



a. Disconnect the combination switch wiring harness connector and release the combination switch retaining clip (B).

b. Remove the 2 retaining screws of the combination switch and remove the switch.

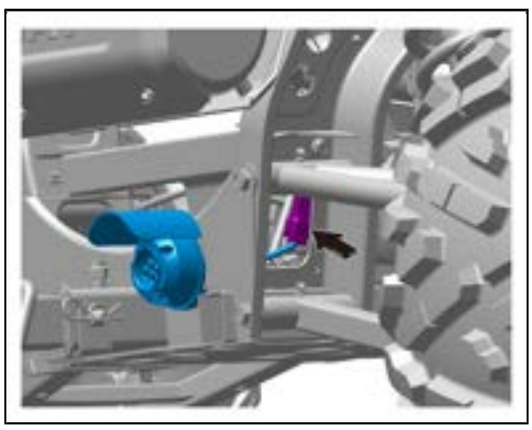
Installation Procedure

1. Install the combination switch in the reverse order of removal.

7.3.3.14 Trailer Power Socket

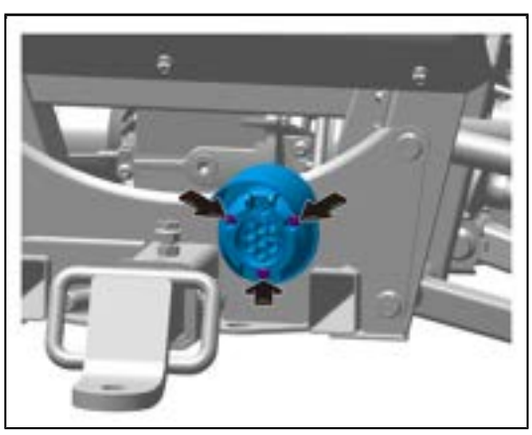
Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. Removing the trailer power socket



a. Release the harness retaining clips along the harness, cut the harness cable ties, and disconnect the harness connector from the trailer power socket.

NOTICE:
• Cable ties on the harness are single-use and must be replaced after removal.



b. Remove the 3 mounting bolts from the trailer power socket, then remove the trailer power socket.

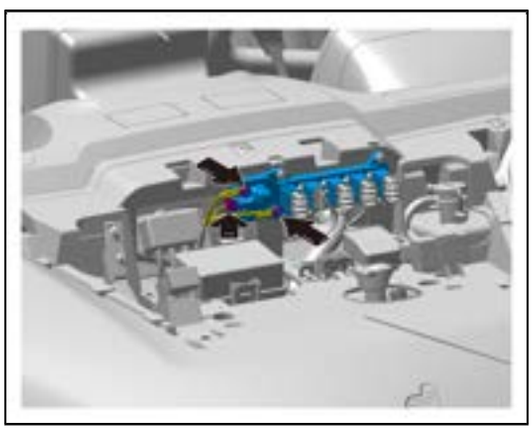
Installation Procedure

1. Install the trailer power socket in the reverse order of removal.

7.3.3.15 PDU

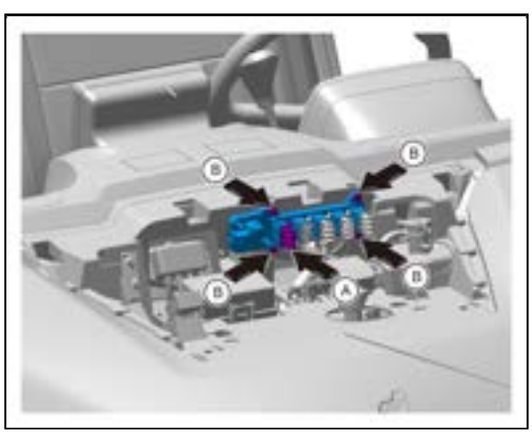
Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. Removing the PDU



a. Detach the 3 rubber boots from the PDU terminals.

b. Disconnect the PDU wiring harness connector, remove the 2 retaining nuts, and detach the wiring harness.



c. Disconnect the PDU wiring harness connector (A).

NOTICE:
• This manual uses one wiring harness connector as an example; other configurations can be handled similarly.

d. Remove the 4 retaining bolts (B) of the PDU and remove the module.

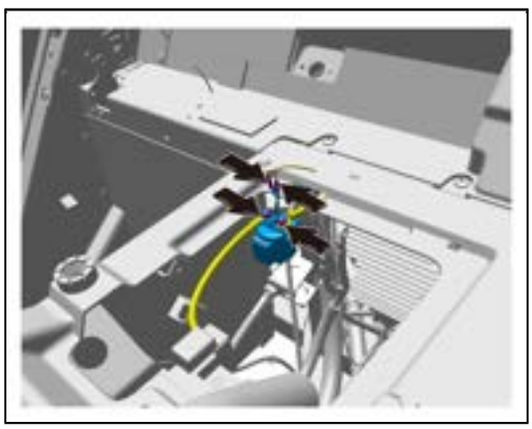
Installation Procedure

1. Install the PDU in the reverse order of removal.

7.3.3.16 Starter Relay

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the centre under-seat cover, See: Centre Under-Seat Cover.
3. Removing the starter relay



a. Disconnect the 2 wiring harness connectors from the starter relay.

b. Remove the rubber covers, then remove the 2 mounting nuts and take off the starter relay.

Installation Procedure

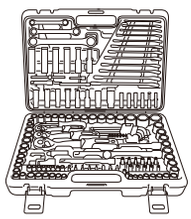
1. Install the starter relay by reversing the removal steps.

8.1 Door and Accessory Assemblies

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8.1.1 Service Tools

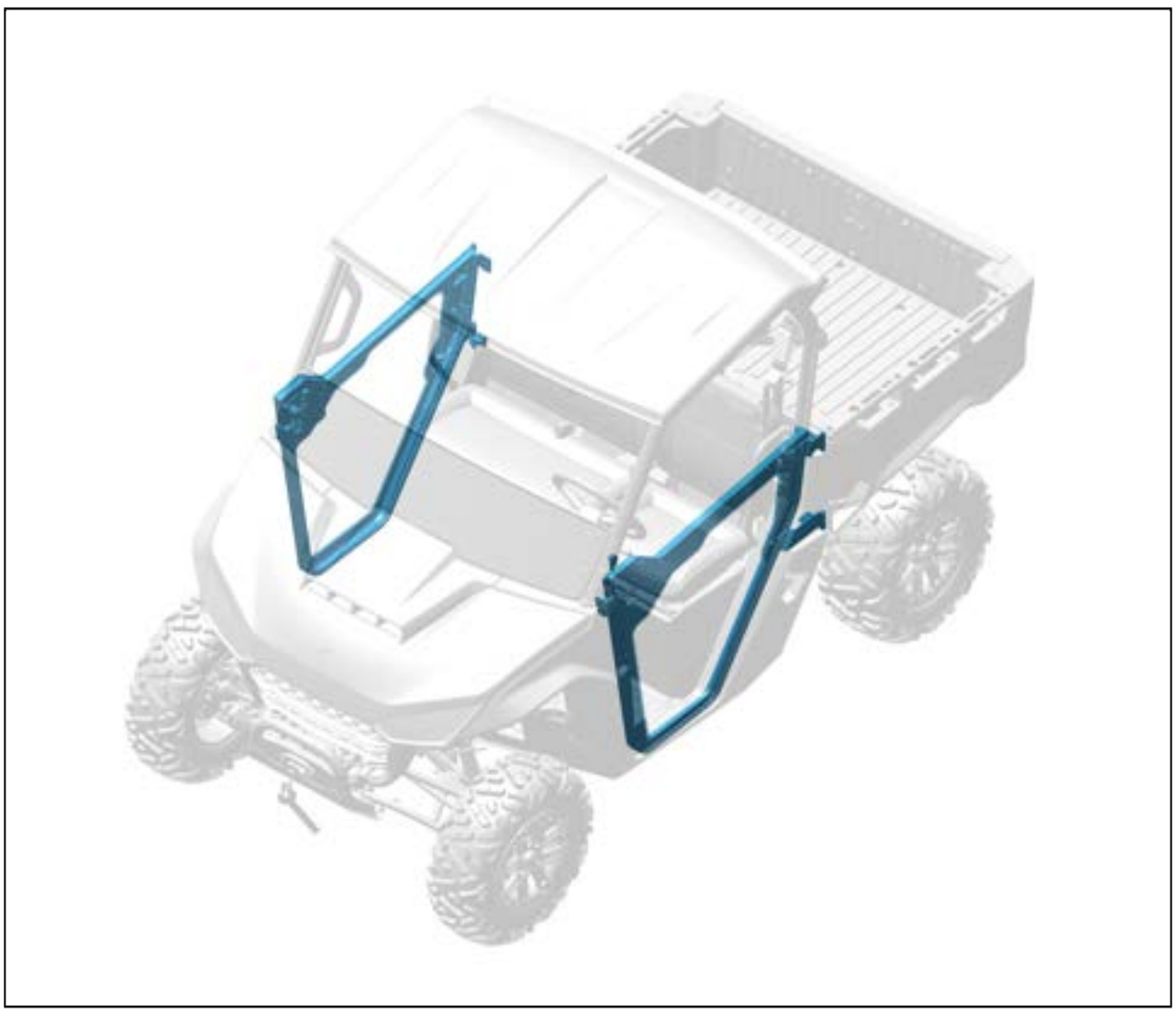
8.1.1.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)

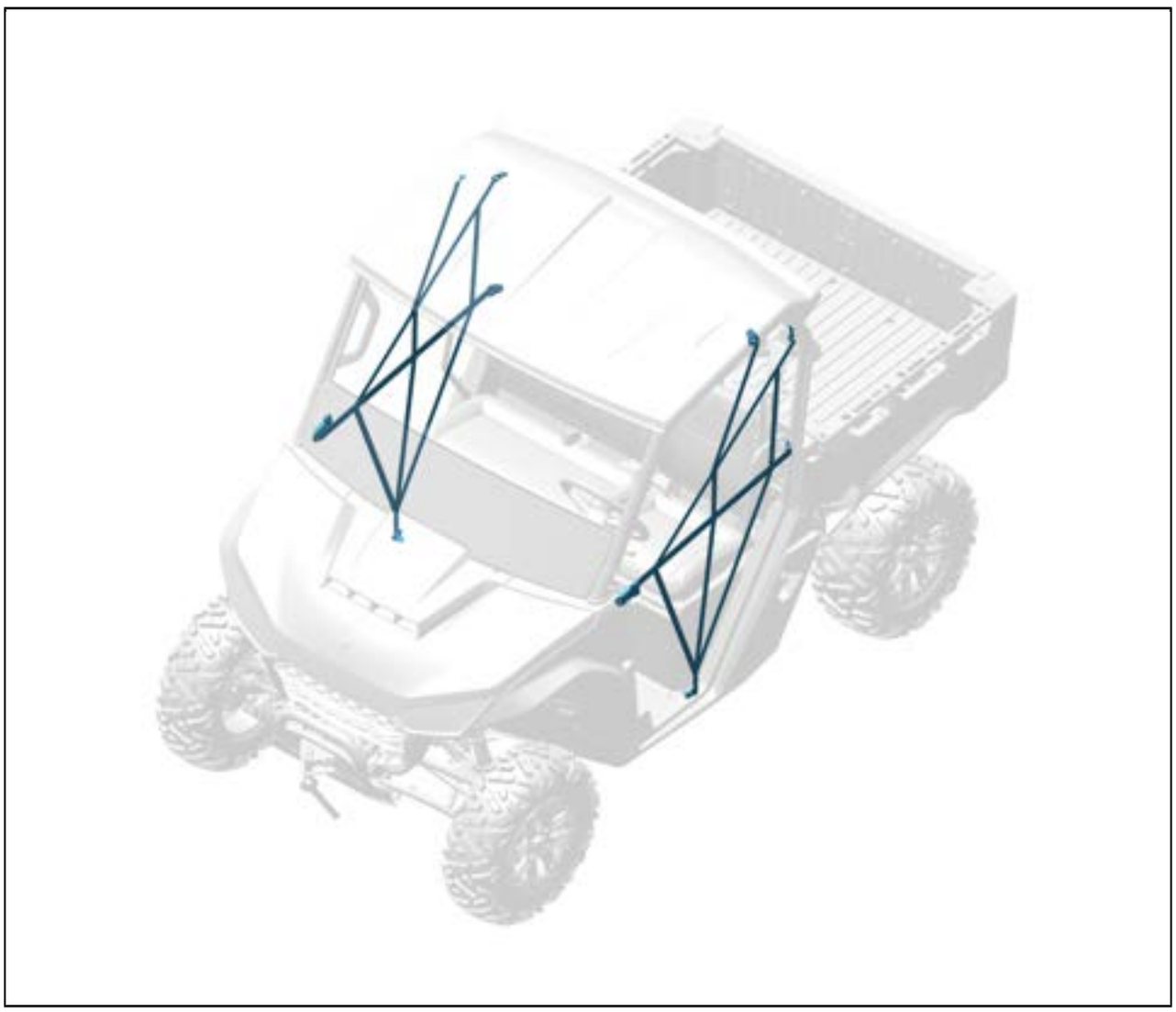
8.1.2 Component Location and Exploded View

8.1.2.1 Component Location Diagram

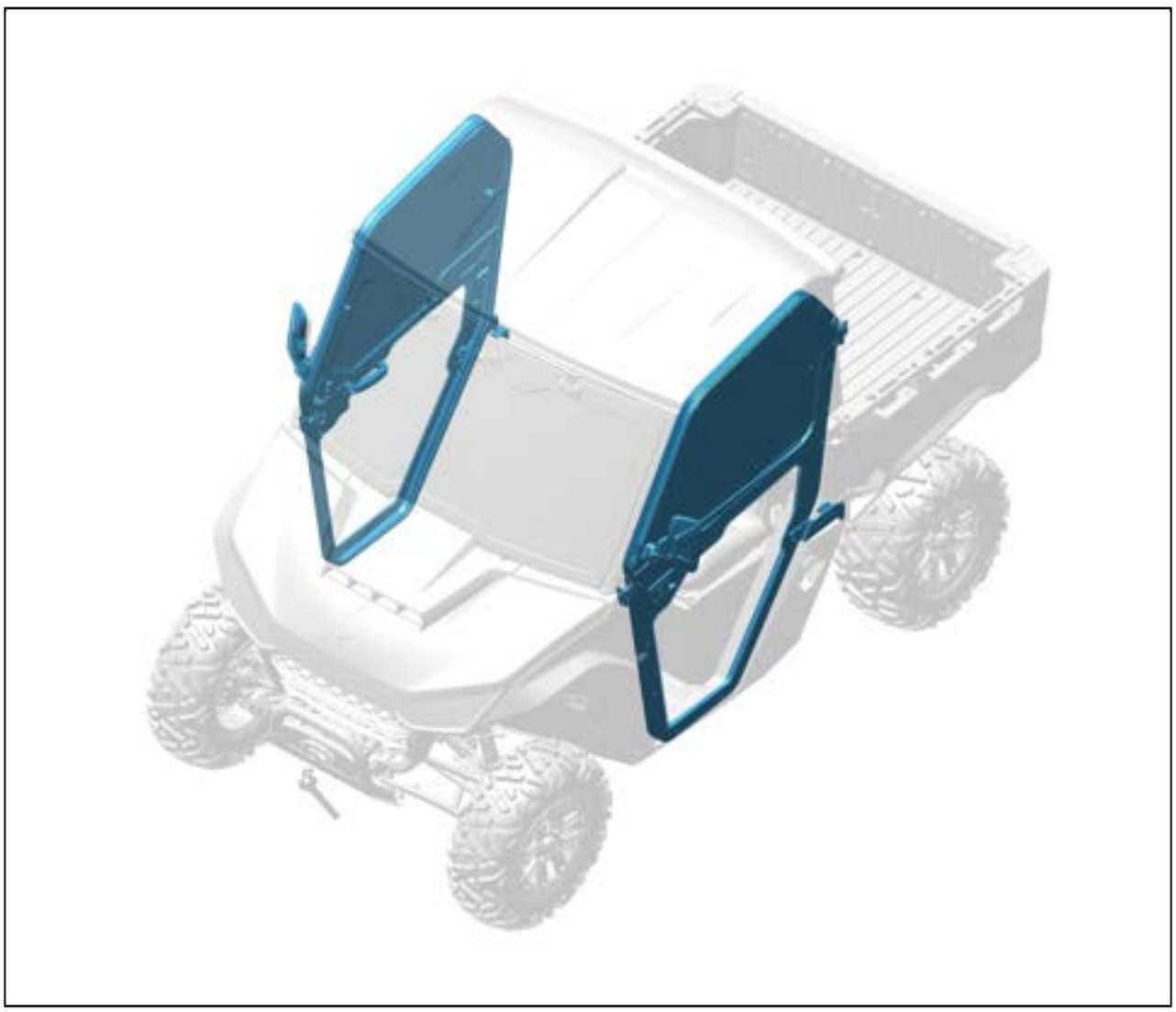
Half Door



Mesh Door

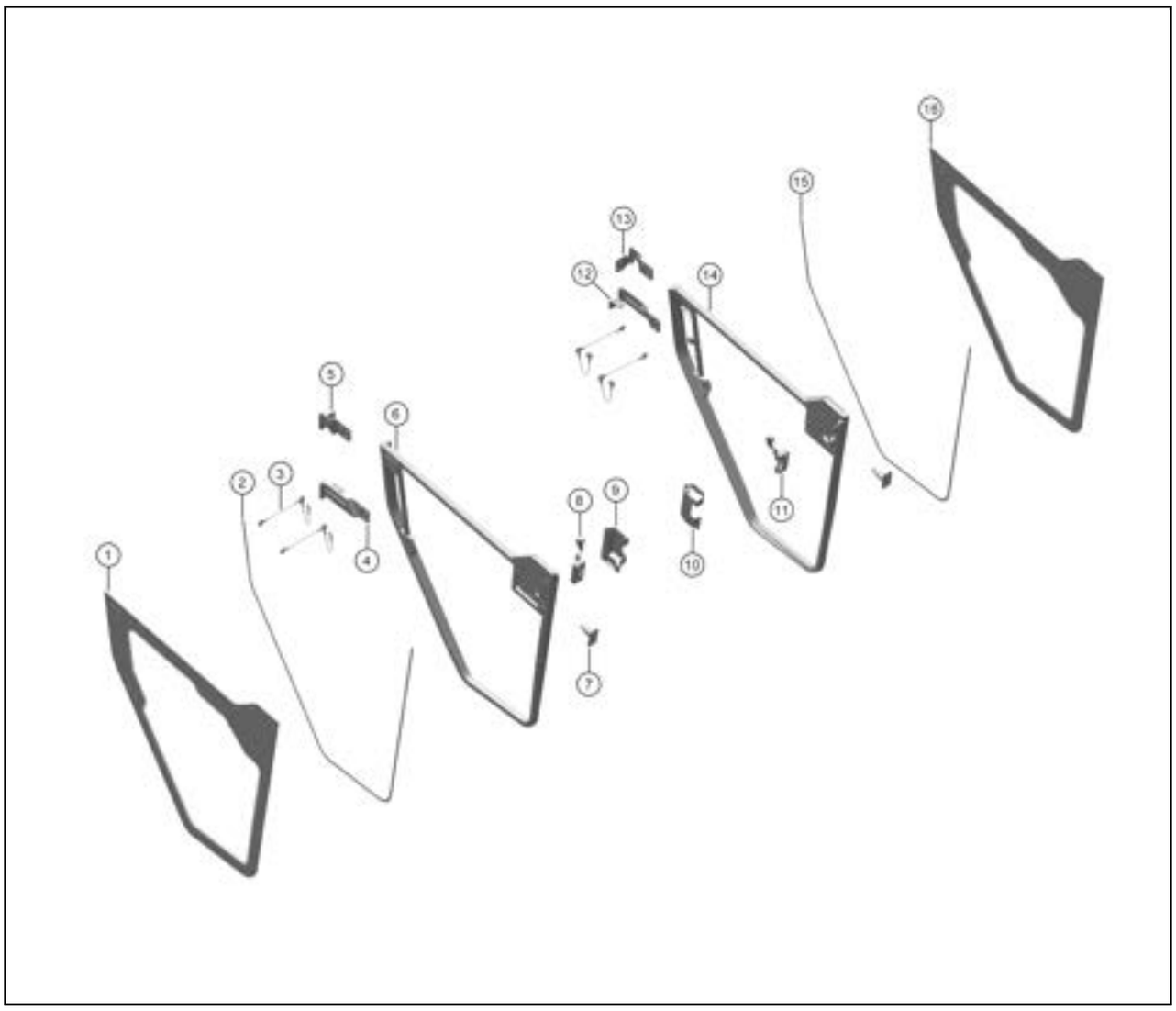


Full Door



8.1.2.2 Exploded View Diagram

Door and Accessory Assemblies



1	Right Half Door	9	Right Half-Door Latch Cover
2	Right Half-Door Noise-Insulating Foam Strip	10	Left Half Door Cover
3	Front Door Latch Cable	11	Left Half Door Assembly
4	Right Lower Hinge Bracket Assembly	12	Left Lower Hinge Bracket Assembly
5	Right Upper Hinge Bracket Assembly	13	Left Upper Hinge Bracket Assembly
6	Right Half-Door Frame Welded Assembly	14	Left Half-Door Frame Welded Assembly
7	Door Latch Striker Welded Assembly	15	Left Half-Door Noise-Insulating Foam Strip
8	Right Half-Door Latch Assembly	16	Left Half Door

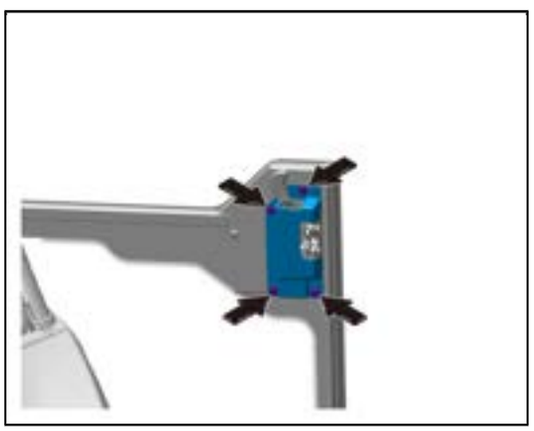
8.1.3 Repair Procedure Guidance

8.1.3.1 Left Half Door Assembly

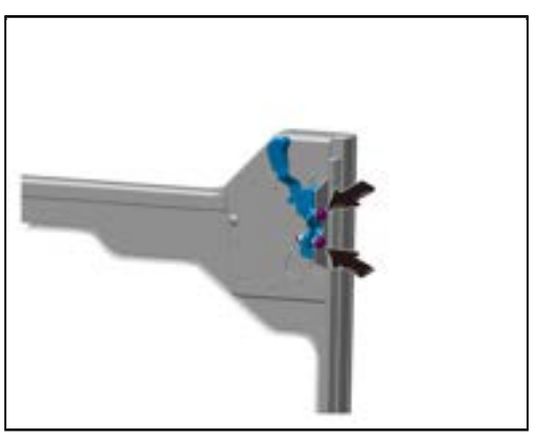
NOTICE:
The following procedure describes removal and installation of the left half door assembly. The procedure for the right half-door latch assembly is the same.

Removal Procedure

1. Removing the left half door assembly



a. Remove the 4 retaining bolts from the left half door cover, then remove the cover.



b. Remove the 2 retaining bolts from the left half door assembly, then remove the latch assembly.

Installation Procedure

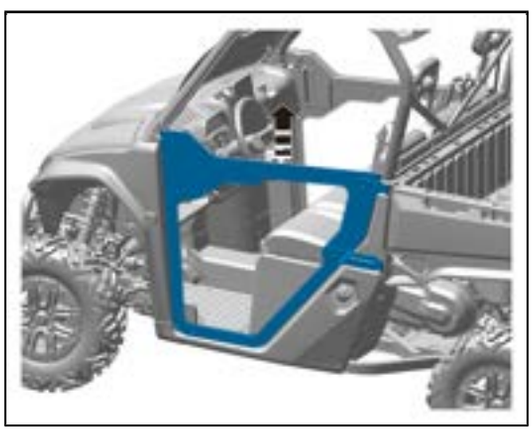
1. Install the left half door assembly in the reverse order of removal.

8.1.3.2 Left Half Door

NOTICE:
The following procedure describes removal and installation of the left half door. The procedure for the right half door is the same.

Removal Procedure

1. Removing the left half door



a. Lift the left half door upwards and remove it.

CAUTION:
This procedure requires two people.

Installation Procedure

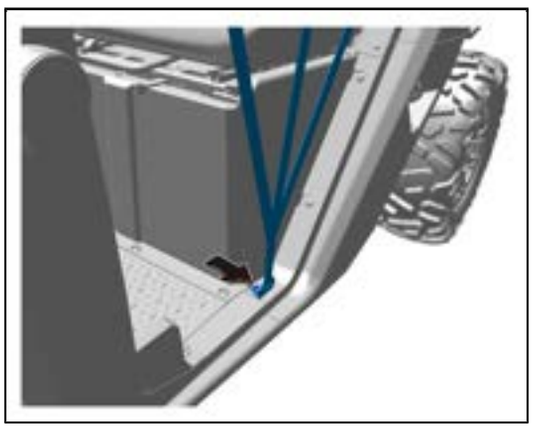
1. Install the left half door in the reverse order of removal.

8.1.3.3 Left Mesh Door

NOTICE:
The following procedure describes removal and installation of the left mesh door. The procedure for the right mesh door is the same.

Removal Procedure

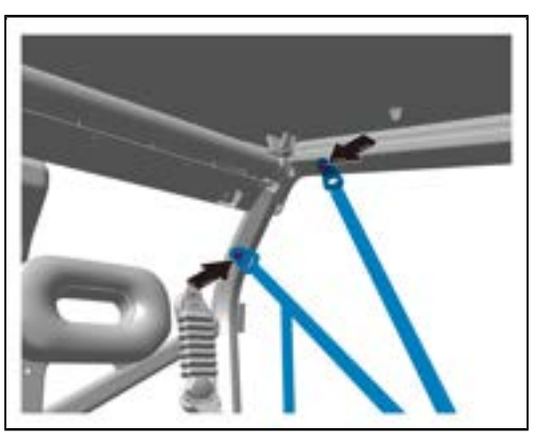
1. Removing the left mesh door



a. Remove the retaining bolt from the left mesh door.



b. Remove the retaining bolt from the left mesh door.



c. Remove the 2 retaining bolts from the left mesh door, then remove the mesh door.

Installation Procedure

1. Install the left mesh door in the reverse order of removal.

8.1.3.4 Door Assembly

NOTICE:
This manual uses removal and installation of the left front door assembly as an example. Removal and installation of the right front, right rear and left rear door assemblies may be carried out with reference to the left front procedure.

Removal Procedure

1. Removing the door assembly



a. Lift the door assembly upwards and remove it.

CAUTION:
This procedure requires two people.

Installation Procedure

1. Install the door assembly in the reverse order of removal.

8.2 Body Shell Assembly

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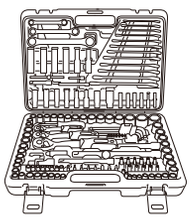
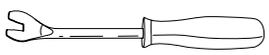
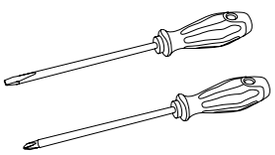
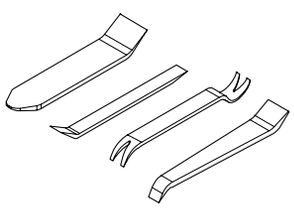
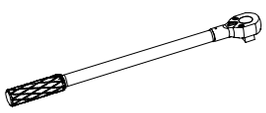
8.2.1 Specifications

8.2.1.1 Fastener Specifications

Item	Torque (N·m)	Torque (ft-lbs)
Right Passenger Grab Bar Retaining Bolt, M8 × 20	22~30	17~22
Right Passenger Grab Bar Retaining Bolt, M8 × 45	22~30	17~22
Seat Belt Retaining Bolt	35~40	26~30
Roof Rail Rear Welded Assembly Retaining Bolt M10×1.25×35	40~50	30~37
Roof Rail Rear Welded Assembly Retaining Bolt M10×1.25×85	40~50	30~37
A-Pillar Crossmember Welded Assembly Retaining Bolt M10×1.25×20	40~50	30~37
Left A-Pillar Welded Assembly Retaining Bolt, M10 × 1.25 × 20	40~50	30~37
Left A-Pillar Welded Assembly Retaining Bolt, M10 × 1.25 × 35	22~30	17~22
Front Bumper Welded Assembly Retaining Bolt M10×1.25×20	22~30	17~22
Front Bumper Welded Assembly Retaining Bolt M10×1.25×60	22~30	17~22
Front Bracket Welded Assembly Retaining Bolt M8×20	22~30	17~22
Front Bracket Welded Assembly Retaining Bolt M8×40	22~30	17~22
Seat Cushion Lower Bracket Welded Assembly Retaining Bolt M8×20	22~30	17~22
Seat Cushion Lower Bracket Welded Assembly Retaining Bolt M8×40	22~30	17~22
Silencer Lower Mounting Bracket Retaining Bolt, M8 × 20	22~30	17~22

8.2.2 Service Tools

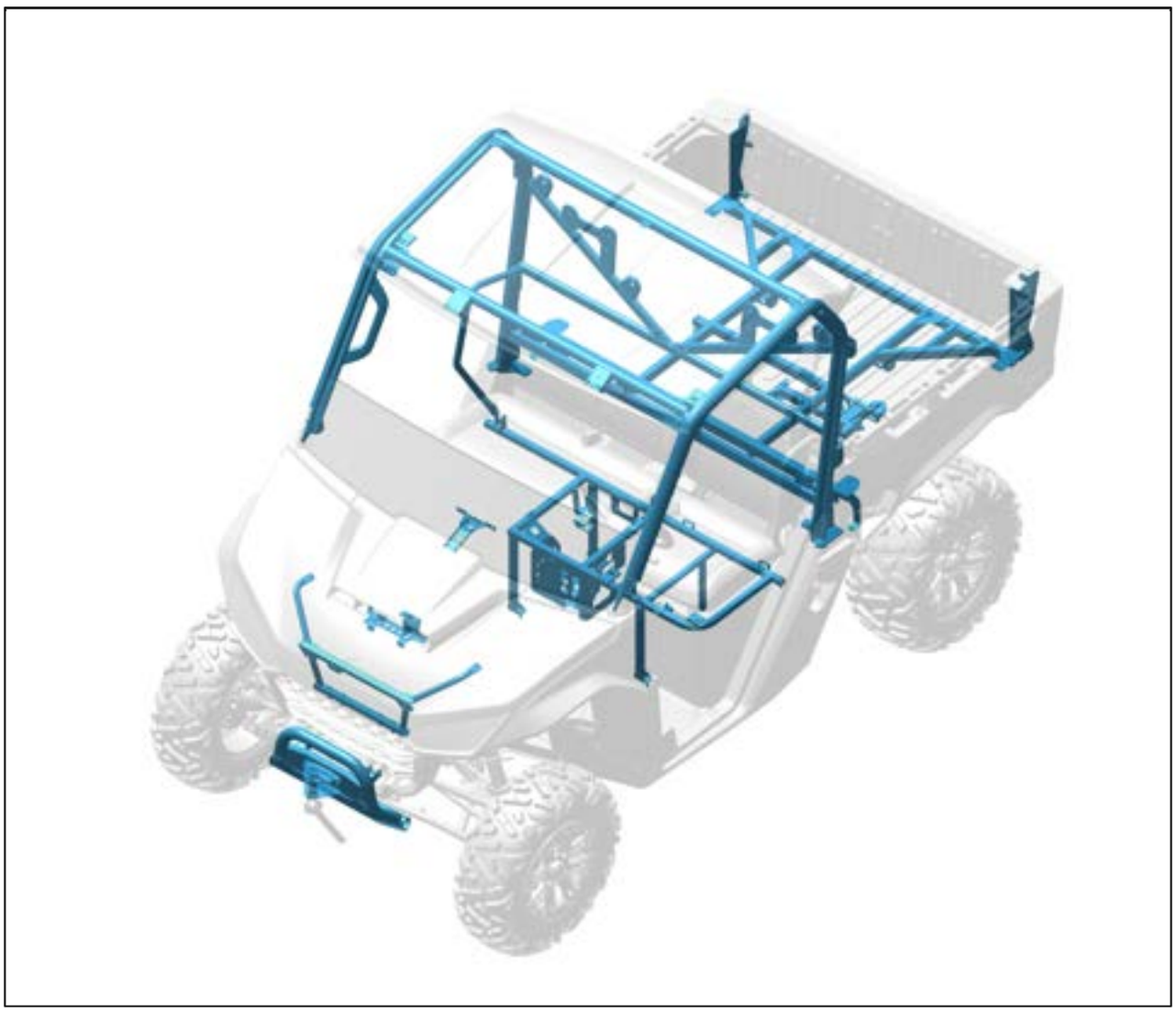
8.2.2.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)
2	Trim clip removal tool		Removing clips
3	Screwdriver		Removing screws
4	Interior trim removal lever		Removing the plastic trim component
5	Torque Wrench		Tightening bolts and nuts to the specified torque

8.2.3 Component Location and Exploded View

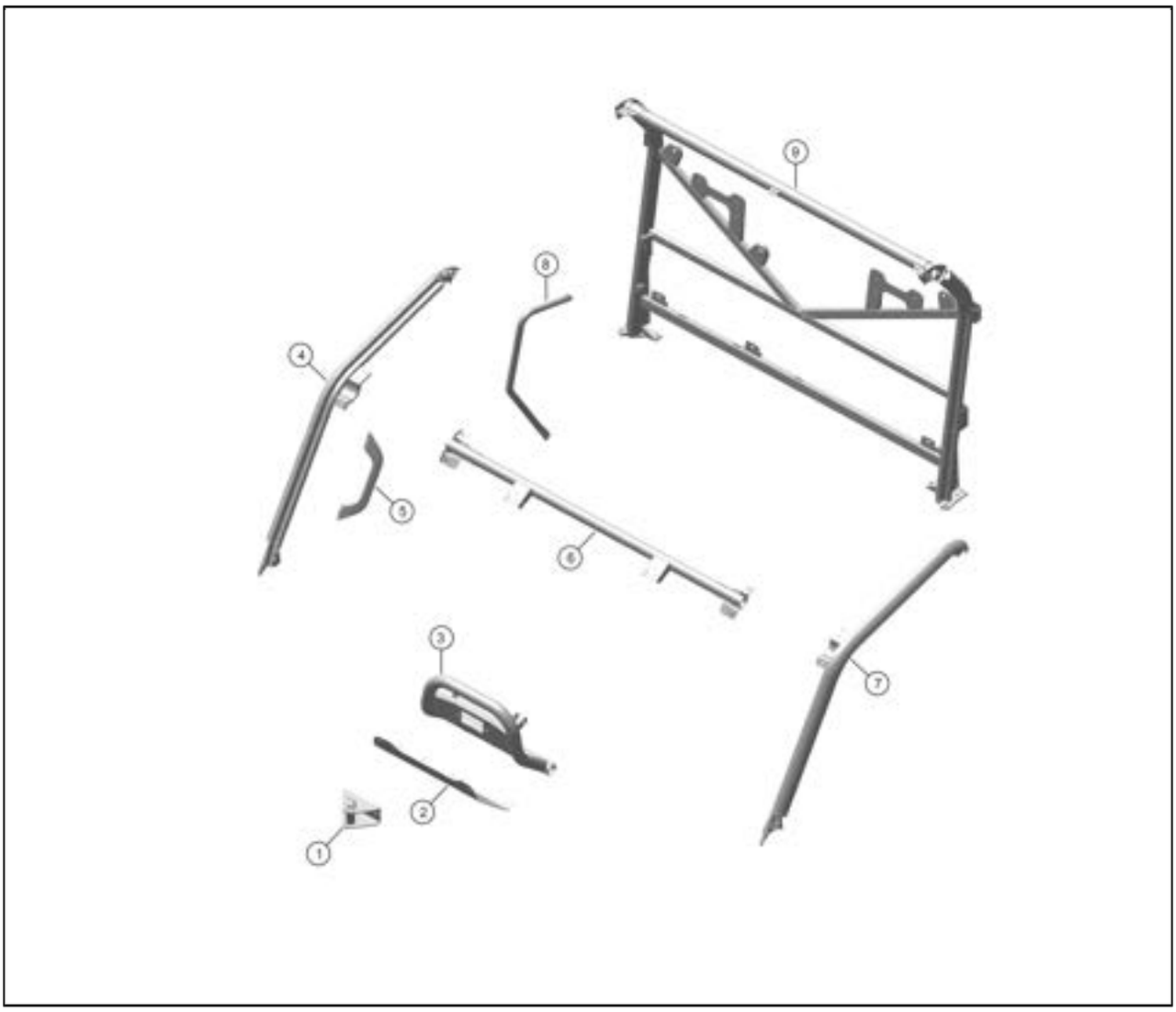
8.2.3.1 Component Location Diagram

Body Shell Assembly

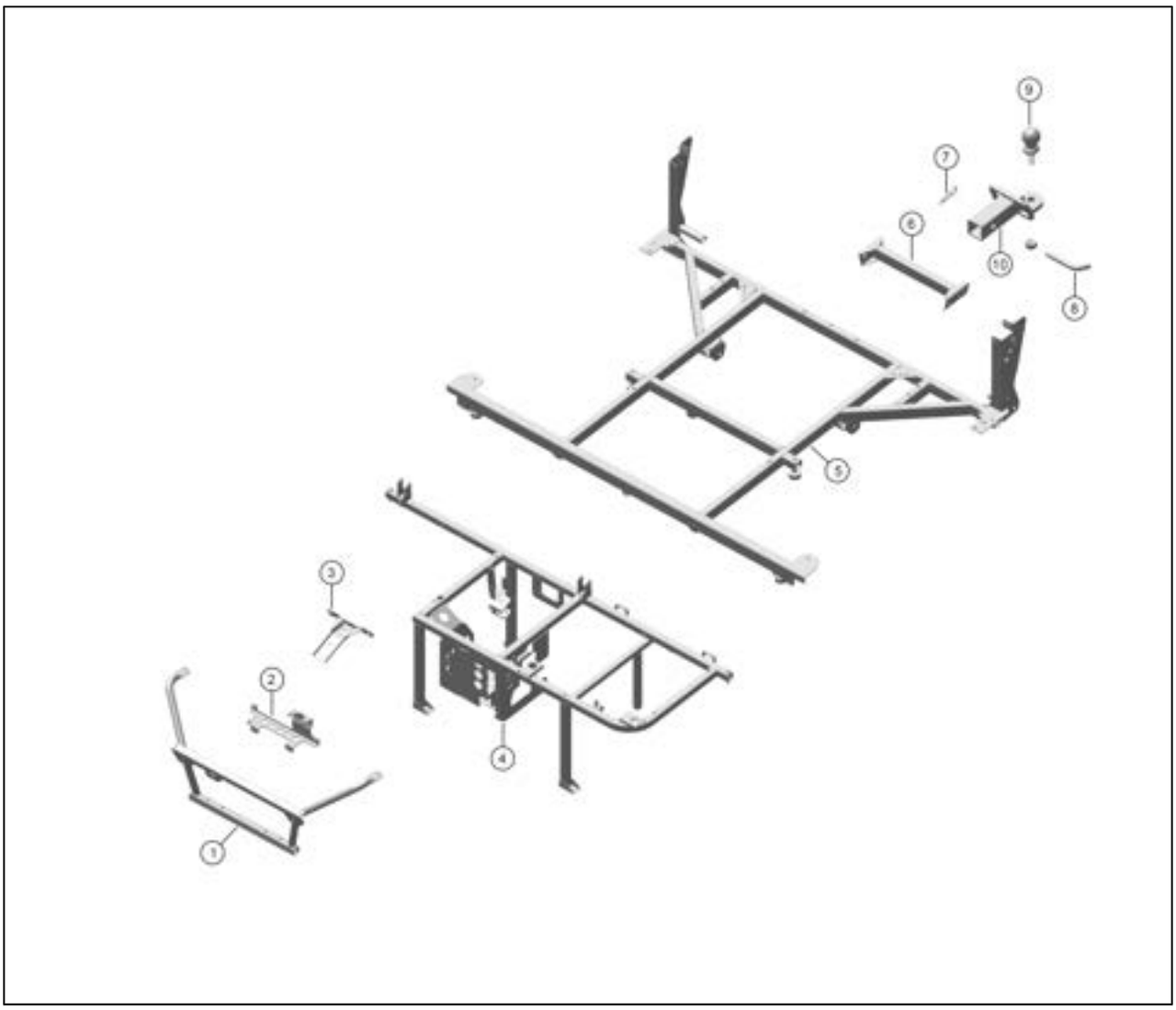


8.2.3.2 Exploded View Diagram

Body Shell Assembly



1	Front Towing Assembly	6	A-Pillar Crossmember Welded Assembly
2	Front Bumper Guard Assembly	7	Left A-Pillar Welded Assembly
3	Front Bumper Welded Sub-assembly	8	Right Passenger Grab Bar
4	Right A-Pillar Welded Assembly	9	Rear Roof Rail Welded Assembly
5	Passenger Grab Handle Assembly		



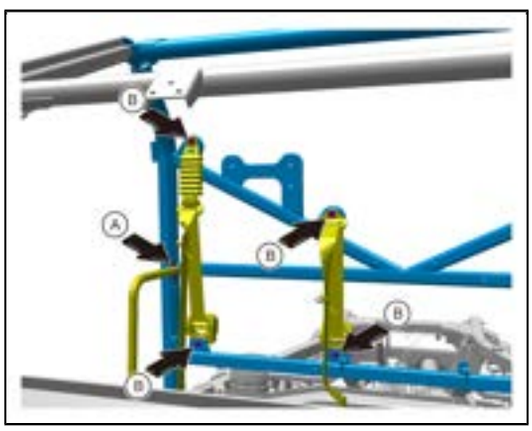
1	Front Bracket Welded Assembly	6	Lower Silencer Mounting Bracket Assembly
2	Radiator Bracket Assembly	7	Locking Pin
3	Instrument Panel Shroud Mounting Bracket	8	Tow hitch pin
4	Seat Cushion Lower Bracket Welded Assembly	9	Tow hitch assembly
5	Cargo Box Support Bracket Welded Assembly	10	Tow Hitch Welded Assembly

8.2.4 Repair Procedure Guidance

8.2.4.1 Rear Roof Rail Welded Assembly

Removal Procedure

1. To remove the headliner left inner cover, See: Headliner Left Inner Cover.
2. To remove the headliner, See: Headliner.
3. To remove the headrest, See: Headrest.
4. To remove the left and right half doors, See: Left Half Door.
5. To remove the driver's seat assembly, See: Driver's Seat Assembly.
6. To remove the passenger backrest assembly, See: Passenger Backrest Assembly.
7. To remove the passenger seat cushion assembly, See: Passenger Seat Cushion Assembly.
8. To remove the left inner roof bar cover, See: Left Inner Roof Bar Cover.
9. To remove the right inner roof bar cover, See: Right Inner Roof Bar Cover.
10. To remove the left roof bar side cover, See: Left Roof Bar Side Cover.
11. To remove the right roof bar side cover, See: Right Roof Bar Side Cover.
12. To remove the CVT air intake duct 1, See: CVT Intake Pipe 1.
13. To remove the CVT air intake duct 2, See: CVT Intake Pipe 2.
14. To remove the rear panel, See: Rear Back Panel.
15. Removing the rear roof rail welded assembly

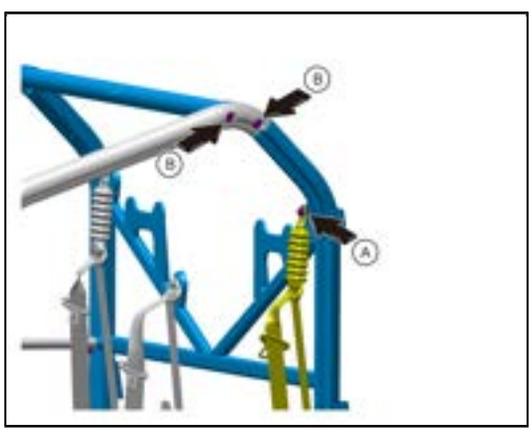


a. Remove right passenger grab bar retaining bolt A (M8 × 45), then detach the right passenger grab bar.

Torque: 17–22 ft-lbs (22–30 N·m)

b. Remove the 4 seat belt retaining bolts and nuts B.

Torque: 26–30 ft-lbs (35–40 N·m).

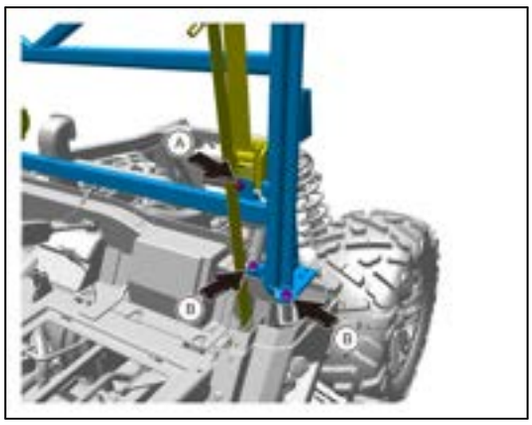


c. Remove seat belt retaining bolt and nut A.

Torque: 26–30 ft-lbs (35–40 N·m).

d. Remove the 2 retaining bolts B (M10 × 1.25 × 35) from each side of the rear roof rail welded assembly.

Torque: 30–37 ft-lbs (40–50 N·m)



e. Remove seat belt retractor retaining bolt and nut A.

Torque: 26–30 ft-lbs (35–40 N·m).

f. Remove the 2 retaining bolts B (M10 × 1.25 × 85) from each side of the rear roof rail welded assembly, then remove the assembly.

Torque: 30–37 ft-lbs (40–50 N·m)

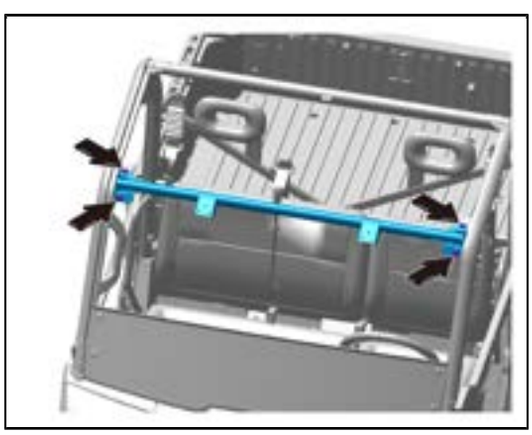
Installation Procedure

1. Install the roof rail rear welded assembly in the reverse order of removal.

8.2.4.2 A-Pillar Crossmember Welded Assembly

Removal Procedure

1. To remove the headliner left inner cover, See: Headliner Left Inner Cover.
2. To remove the headliner, See: Headliner.
3. Removing the A-pillar crossmember welded assembly



a. Remove the 4 A-pillar crossmember welded assembly retaining bolts (M10 × 1.25 × 20), then remove the assembly.

Torque: 30–37 ft-lbs (40–50 N·m)

Installation Procedure

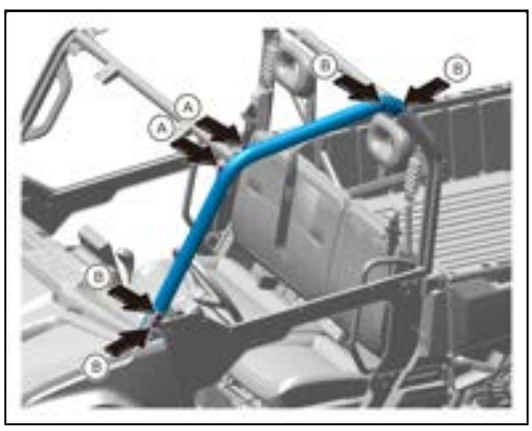
1. Install the A-pillar crossmember welded assembly in the reverse order of removal.

8.2.4.3 Left A-Pillar Welded Assembly

NOTICE:
• This manual uses the left A-pillar welded assembly as an example for removal and refitting procedures. Procedures for the right side are similar.

Removal Procedure

1. To remove the headliner left inner cover, See: Headliner Left Inner Cover.
2. To remove the headliner, See: Headliner.
3. To remove the front half windscreen, See: Front Half Windscreen.
4. Removing the left A-pillar welded assembly



a. Remove the 2 mounting bolts A (M10 x 1.25 x 20) from the left A-pillar welded assembly (double-row).

Torque: 30–37 ft-lbs (40–50 N·m)

b. Remove the 4 retaining bolts B (M10 × 1.25 × 35) from the left A-pillar welded assembly, then remove the assembly.

Torque: 30–37 ft-lbs (40–50 N·m)

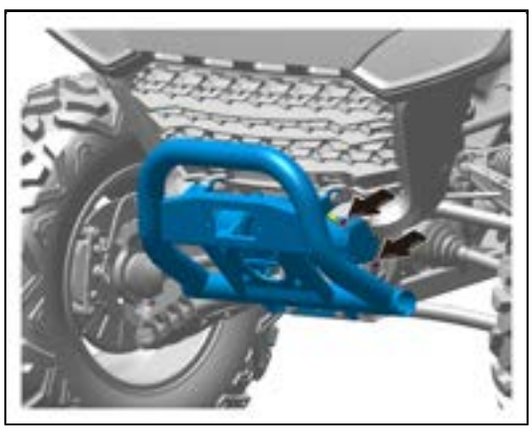
Installation Procedure

1. Install the left A-pillar welded assembly in the reverse order of removal.

8.2.4.4 Front Bumper Welded Sub-assembly

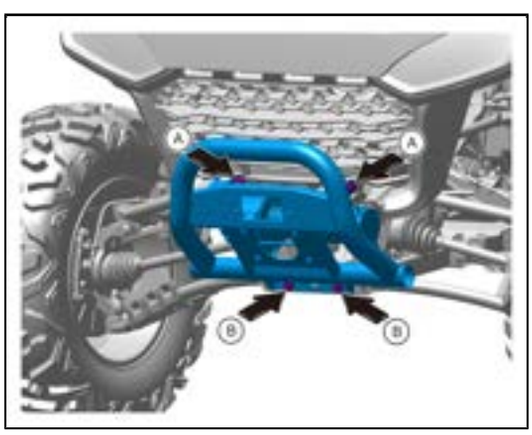
Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the winch roller fairlead, See: Winch Roller Fairlead.
3. To remove the front bumper guard assembly, See: Front Bumper Guard Assembly.
4. Removing the front bumper welded assembly



a. Remove the 2 winch motor retaining nuts.

Torque: 2.9 ft-lbs(4N·m)



b. Remove the 2 mounting bolts A (M10 x 1.25 x 60) from the front bumper welded assembly.

Torque: 30–37 ft-lbs (40–50 N·m)

c. Remove the 2 mounting bolts B (M10 x 1.25 x 20) from the front bumper welded assembly.

Torque: 30–37 ft-lbs (40–50 N·m)



d. Remove the 4 winch motor retaining bolts, then remove the front bumper welded assembly.

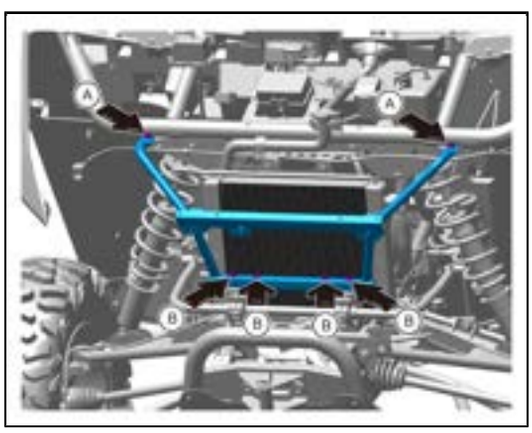
Installation Procedure

1. Install the front bumper welded assembly in the reverse order of removal.

8.2.4.5 Front Bracket Welded Assembly

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. To remove the headlamp cover, See: Headlamp Cover.
4. To remove the flasher unit, See: Flasher Unit.
5. To remove the front panel, See: Front Panel.
6. To remove the headlamp bezel assembly, See: Headlamp Bezel Assembly.
7. To remove the horn, See: Horn.
8. Removing the front bracket welded assembly



a. Remove the 2 mounting bolts A (M8 x 20) from the front bracket welded assembly.

Torque: 17–22 ft-lbs (22–30 N·m)

b. Remove the 4 mounting bolts B (M8 x 40) and remove the front bracket welded assembly.

Torque: 17–22 ft-lbs (22–30 N·m)

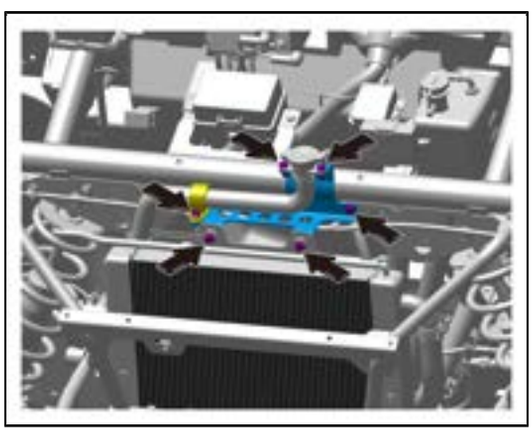
Installation Procedure

1. Install the front support rack welded assembly in the reverse order of removal.

8.2.4.6 Radiator Bracket Assembly

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. To remove the headlamp cover, See: Headlamp Cover.
4. To remove the flasher unit, See: Flasher Unit.
5. To remove the front panel, See: Front Panel.
6. To remove the headlamp bezel assembly, See: Headlamp Bezel Assembly.
7. Removing the radiator bracket assembly



a. Remove the 6 radiator bracket retaining bolts (M8 × 12), then remove the radiator bracket assembly.

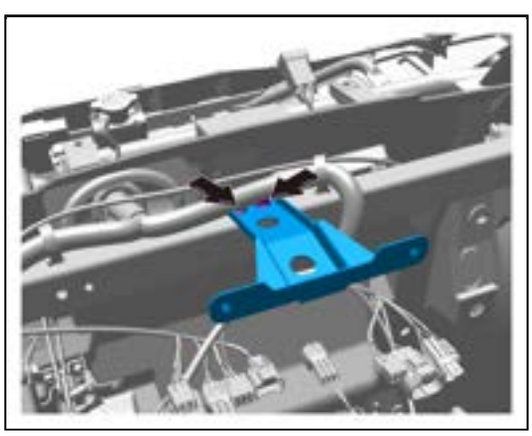
Installation Procedure

1. Install the radiator bracket assembly in the reverse order of removal.

8.2.4.7 Instrument Panel Shroud Mounting Bracket

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front half windscreen, See: Front Half Windscreen.
3. To remove the front service cover, See: Front Service Cover.
4. To remove the headlamp cover, See: Headlamp Cover.
5. To remove the flasher unit, See: Flasher Unit.
6. To remove the front panel, See: Front Panel.
7. To remove the front mudguard, See: Front Mudguard.
8. To remove the headliner left inner cover, See: Headliner Left Inner Cover.
9. To remove the headliner, See: Headliner.
10. To remove the left A-pillar welded assembly, See: Left A-Pillar Welded Assembly.
11. To remove the instrument cover, See: Instrument Cover.
12. To remove the centre display, See: Centre Display.
13. To remove the switch panel, See: Switch Panel.
14. To remove the lower centre console storage compartment, See: Lower Centre Console Storage Compartment.
15. To remove the upper instrument panel, See: Upper Instrument Panel.
16. Removing the instrument cluster cover mounting bracket



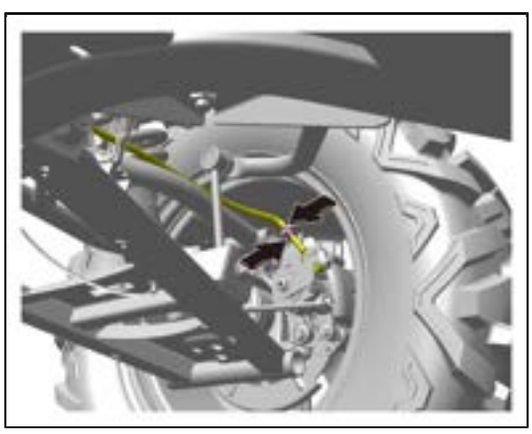
a. Remove the 2 instrument cluster cover mounting bracket retaining bolts, then remove the bracket.

Installation Procedure

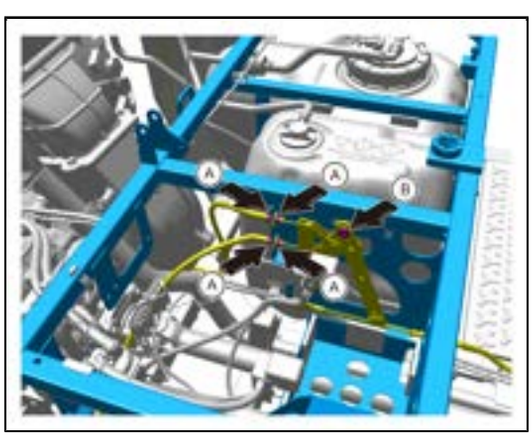
1. Install the instrument cluster cover mounting bracket in the reverse order of removal.

8.2.4.8 Seat Cushion Lower Bracket Welded Assembly

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the left half-door, See: Left Half Door.
3. To remove the driver's seat assembly, See: Driver's Seat Assembly.
4. To remove the passenger backrest assembly, See: Passenger Backrest Assembly.
5. To remove the passenger seat cushion assembly, See: Passenger Seat Cushion Assembly.
6. To remove the centre guide cover, See: Centre Guide Cover.
7. To remove the centre under-seat cover, See: Centre Under-Seat Cover.
8. To remove the battery assembly, See: Battery.
9. To remove the voltage regulator/rectifier, See: Voltage Regulator/Rectifier.
10. To remove the left inner roof bar cover, See: Left Inner Roof Bar Cover.
11. To remove the right inner roof bar cover, See: Right Inner Roof Bar Cover.
12. To remove the left roof bar side cover, See: Left Roof Bar Side Cover.
13. To remove the left side cover, rear section, See: left Side Cover, Rear Section.
14. To remove the ECU cover, See: ECU Cover.
15. To remove the ECU assembly, See: ECU Assembly.
16. To remove the seat belt buckle assembly, See: Seat Belt Buckle Assembly.
17. To remove the rear seat cushion guard, See: Rear Seat Cushion Guard.
18. To remove the under-seat panel, See: Under-Seat Panel.
19. Removing seat cushion lower bracket welded assembly

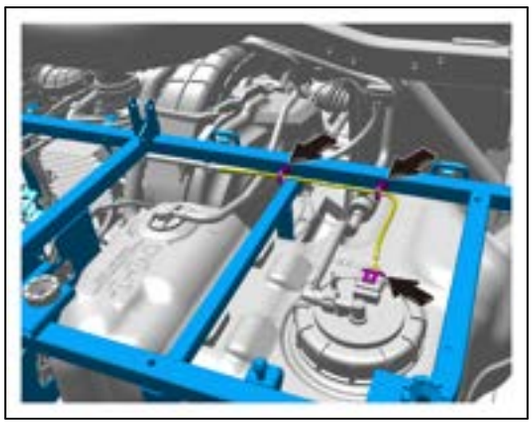


a. Loosen the 2 mounting nuts on the left and right sides of the parking brake cable assembly, and detach the assembly.

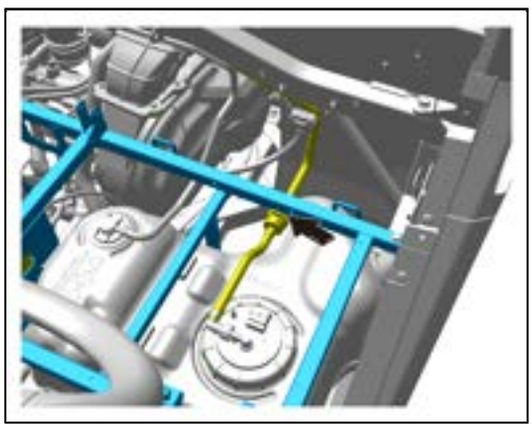


b. Loosen the 4 mounting nuts A on the parking brake cable assembly.

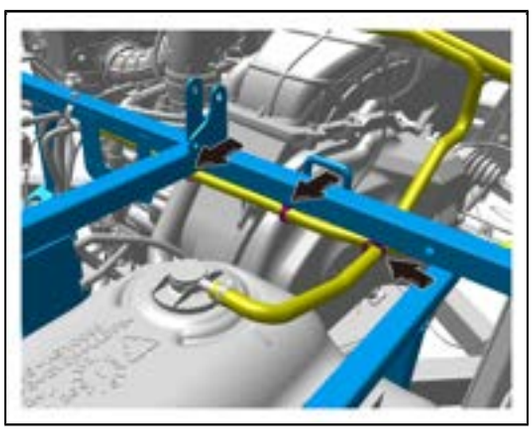
c. Remove mounting bolt B from the parking brake cable assembly, and detach the assembly.



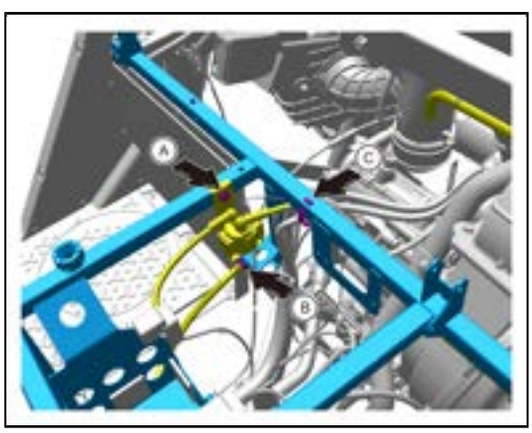
d. Disconnect the fuel tank wiring harness connector and release the 2 wiring harness retaining clips.



e. Detach the fuel filter.



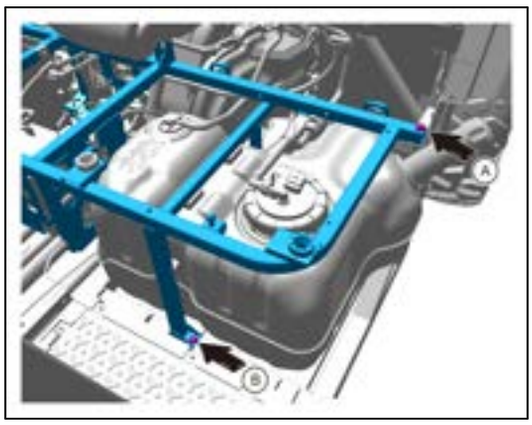
f. Release the fuel hose from the 3 retaining clips.



g. Remove the starter relay mounting bolt A and remove the relay aside.

h. Loosen shift cable retaining nut B, then detach the shift cable assembly.

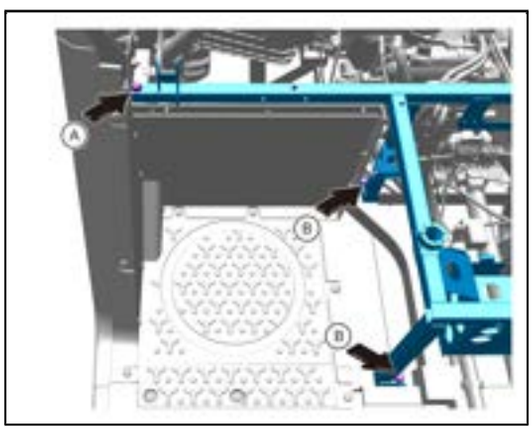
i. Release wiring harness retaining clip C.



j. Remove under-seat bracket welded assembly retaining bolt A (M8 × 40).

Torque: 17–22 ft-lbs (22–30 N·m)

k. Remove under-seat bracket welded assembly retaining bolt B (M8 × 20).



l. Remove under-seat bracket welded assembly retaining bolt A (M8 × 40).

Torque: 17–22 ft-lbs (22–30 N·m)

m. Remove the 2 retaining bolts B (M8 × 20) from the under-seat bracket welded assembly, then remove the assembly.

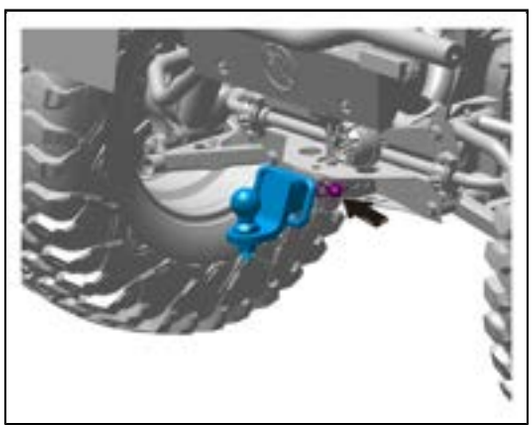
Installation Procedure

1. Install the seat cushion lower bracket welded assembly in the reverse order of removal.

8.2.4.9 Tow Hitch Welded Assembly

Removal Procedure

1. Removing the tow hitch welded assembly



a. Remove the locking pin, extract the clevis pin, and withdraw the tow hitch welded assembly.

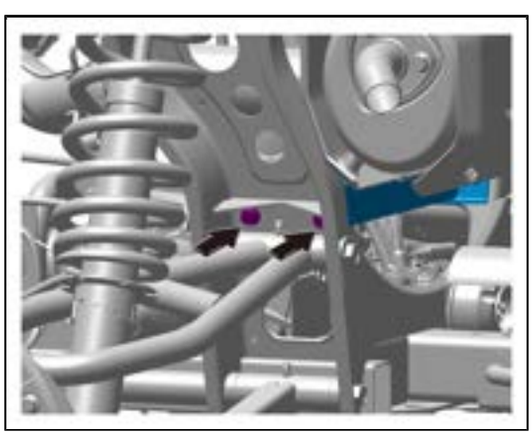
Installation Procedure

1. Install the tow hitch welded assembly in the reverse order of removal.

8.2.4.10 Lower Silencer Mounting Bracket Assembly

Removal Procedure

1. Removing the lower silencer mounting bracket assembly



a. Remove the 2 retaining bolts (M8 × 20) from each side of the lower silencer mounting bracket assembly, then remove the assembly.

Torque: 17–22 ft-lbs (22–30 N·m)

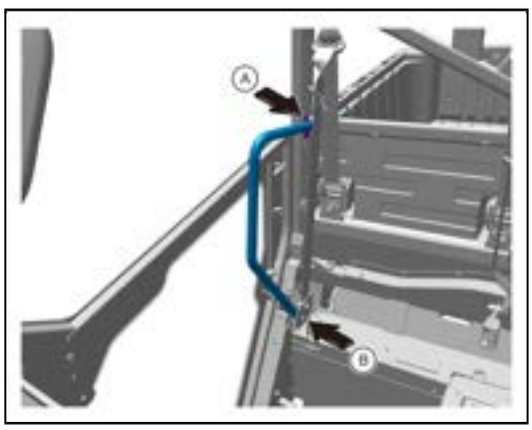
Installation Procedure

1. Install the lower silencer mounting bracket assembly in the reverse order of removal.

8.2.4.11 Right Passenger Grab Bar

Removal Procedure

1. To remove the passenger backrest assembly, See: Passenger Backrest Assembly.
2. To remove the passenger seat cushion assembly, See: Passenger Seat Cushion Assembly.
3. To remove the right inner roof bar cover, See: Left Inner Roof Bar Cover.
4. Removing the driver grab bar welded assembly



a. Remove right passenger grab bar retaining bolt A (M8 × 45).

Torque: 17–22 ft-lbs (22–30 N·m)

b. Remove right passenger grab bar retaining bolt B (M8 × 20), then remove the right passenger grab bar.

Torque: 17–22 ft-lbs (22–30 N·m)

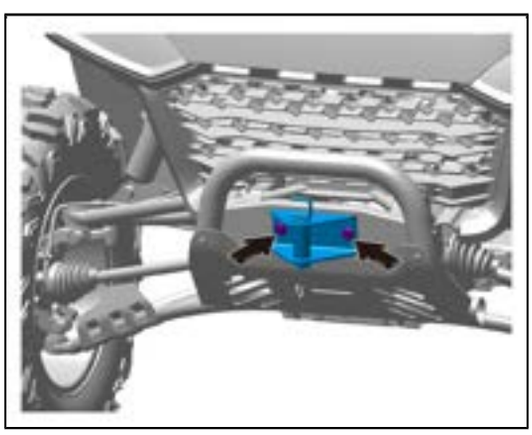
Installation Procedure

1. Install the right passenger grab bar in the reverse order of removal.

8.2.4.12 Front Towing Assembly

Removal Procedure

1. Removing the front towing assembly



a. Remove the 2 bolts securing the front towing assembly, then remove the front towing assembly.

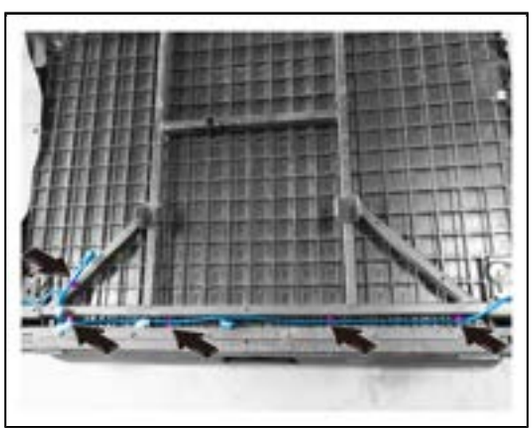
Installation Procedure

1. Install the front towing assembly in the reverse order of removal.

8.2.4.13 Cargo Box Support Bracket Welded Assembly

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the gas strut assembly, See: Gas Strut Assembly.
3. To remove the rear cargo box assembly, See: Rear Cargo Box Assembly.
4. To remove the rear cargo box heat shield, See: Rear Cargo Box Heat Shield.
5. To remove the cargo box retaining strip, See: Cargo Box Retaining Strip.
6. To remove the cargo box trim panel, See: Cargo Box Guard Assembly.
7. To remove the cargo box tailgate assembly, See: Cargo Box Tailgate Assembly.
8. Removing the cargo box support bracket welded assembly



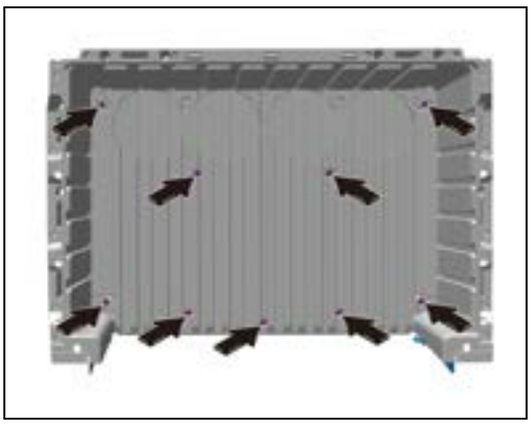
a. Release the rear cargo box wiring harness from the 5 retaining clips, then remove the wiring harness.

b. Detach the harness retaining clip and cut the cable tie.

NOTICE:
Cable ties on the harness are single-use and must be replaced after removal.



c. Remove one retaining bolt from each side of the cargo box support bracket welded assembly.



d. Remove the 9 remaining mounting bolts and remove the cargo box support bracket welded assembly.

Installation Procedure

1. Install the cargo box support bracket welded assembly in the reverse order of removal.

9.1 Exterior Trim System

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9.1.4.5 Front Service Cover 850

9.1.4.6 Front Headlamp Cover 850

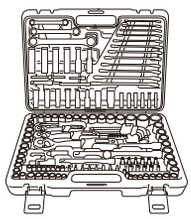
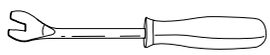
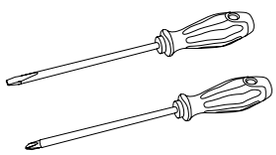
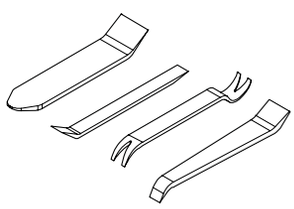
9.1.4.7 Headlamp Bezels 852

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9.1.1 Service Tools

9.1.1.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)
2	Trim clip removal tool		Removing the retaining fastener
3	Screwdriver		Removal and installation of mounting screws
4	Interior trim removal lever		Removing interior and exterior trim parts
5	Hose Clamp Pliers		Removing the clamp

9.1.2 Description and Operation

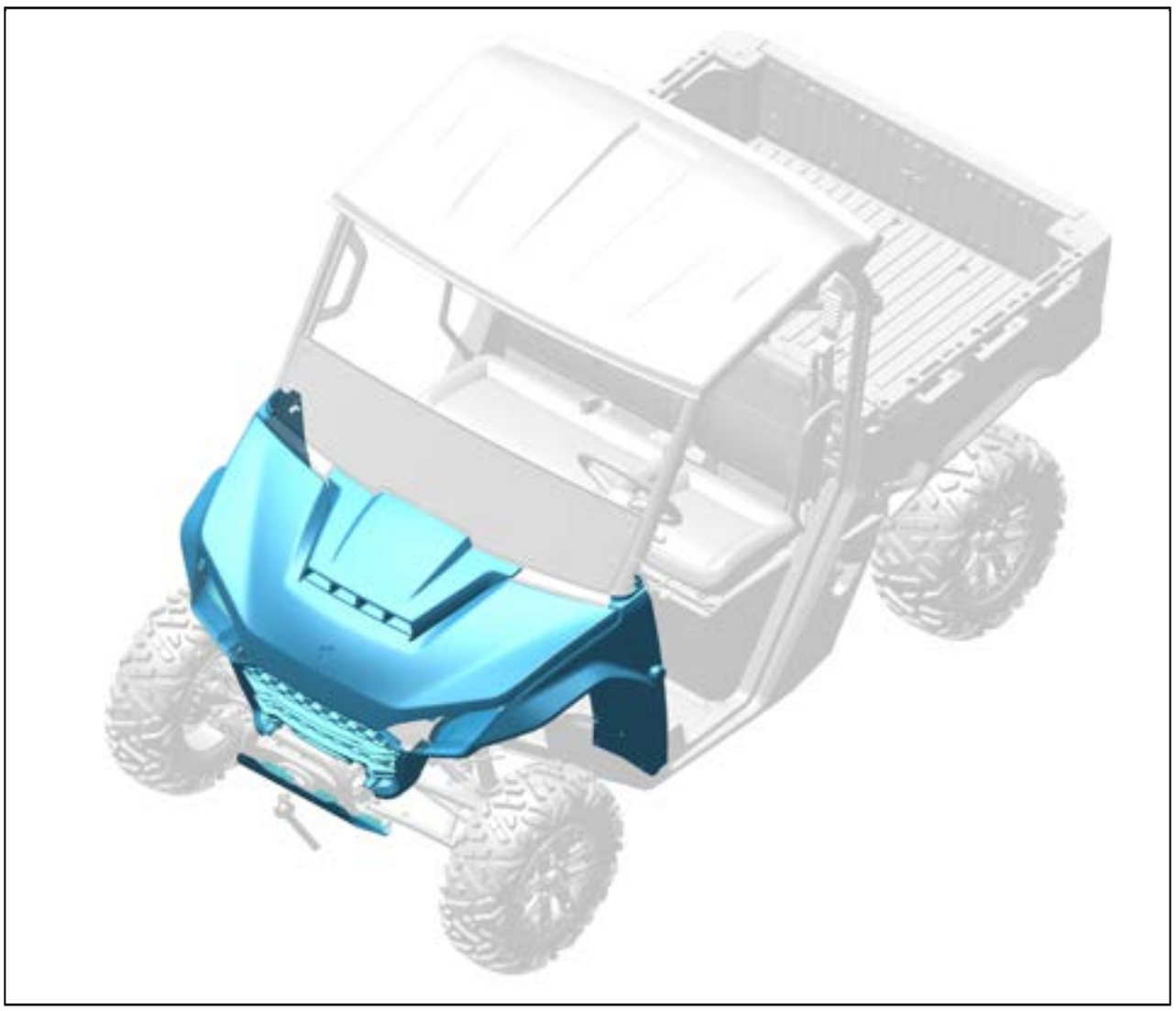
9.1.2.1 Warnings and Precautions

1. Use a suitable interior trim removal tool to remove the outer interior trim. If such a tool is not available, a screwdriver or equivalent tool may be used, but it must be suitably wrapped to prevent damage.
2. Do not force off any component that cannot be removed easily. Check whether any mounting screws or push-in clips have been overlooked.
3. Push-in clips are wear items. Check the removed push-in clips for damage and renew them if necessary.
4. After removing the components, check whether any push-in clips remain on the body. Before installing the components, ensure that no component push-in clips are left on the body.
5. When installing the components, check that all retaining fasteners are present.

9.1.3 Component Location and Exploded View

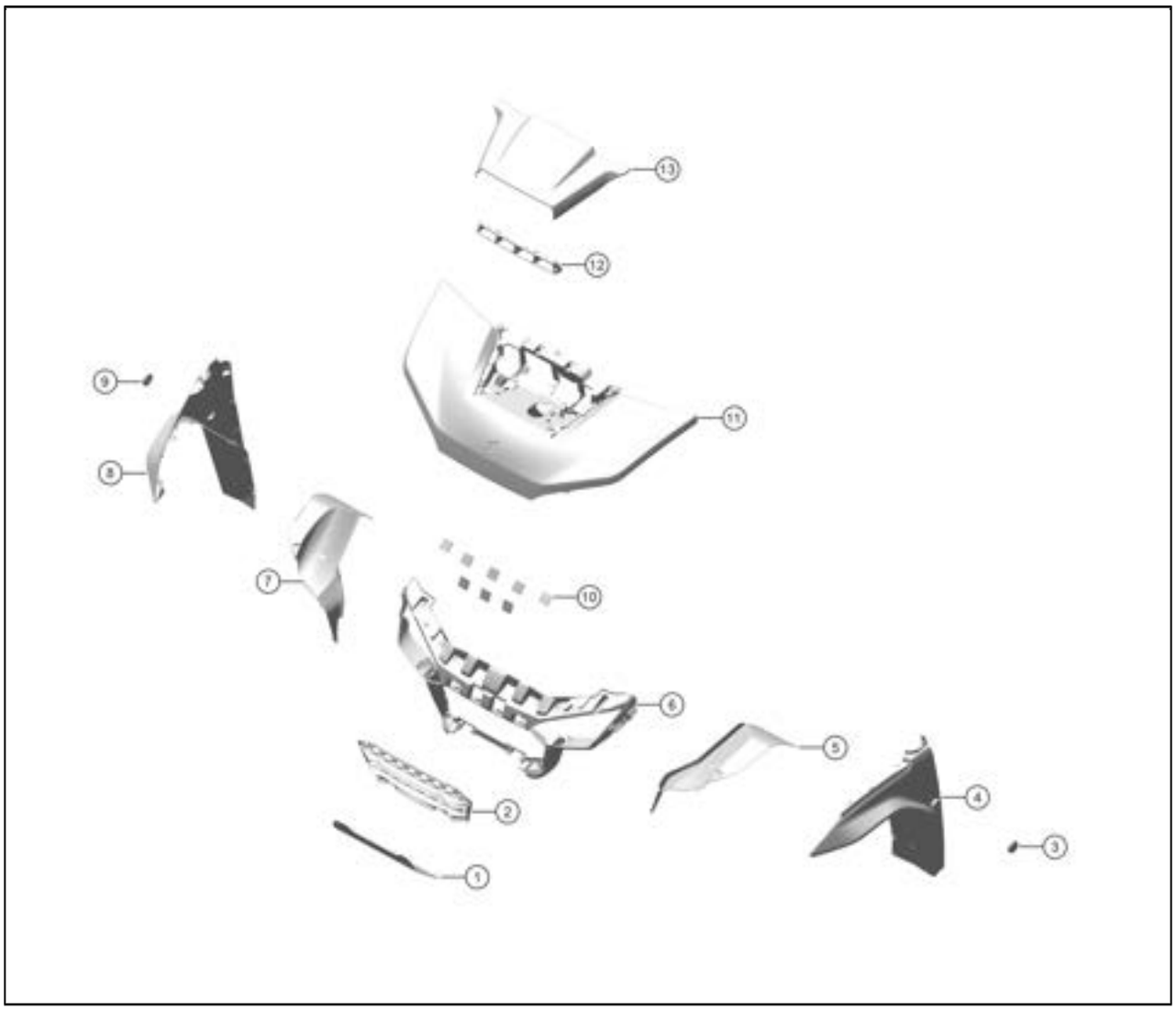
9.1.3.1 Component Location Diagram

Exterior Trim System



9.1.3.2 Exploded View Diagram

Exterior Trim System



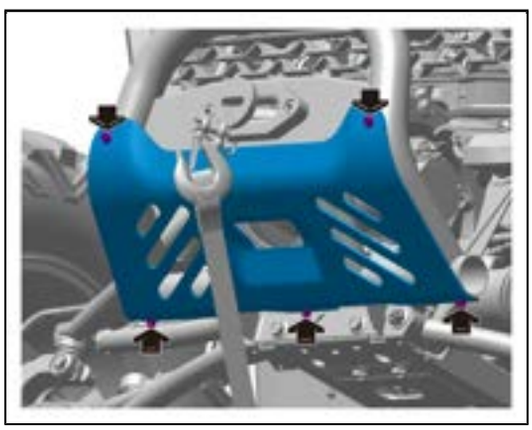
1	Front Bumper Guard Assembly	8	Front Mudguard
2	Front Air Intake Grille	9	Round Reflector
3	Round Reflector	10	Battery Foam Pad
4	Front Mudguard	11	Front Panel
5	Left Front Headlamp Cover	12	Service Cover Air Guide Grille
6	Headlamp Bezels	13	Front Service Cover
7	Right Headlamp Bezel		

9.1.4 Repair Procedure Guidance

9.1.4.1 Front Bumper Guard Assembly

Removal Procedure

1. Removing the front bumper guard assembly



a. Remove the 5 mounting bolts securing the front bumper guard, then remove the front bumper guard panel assembly.

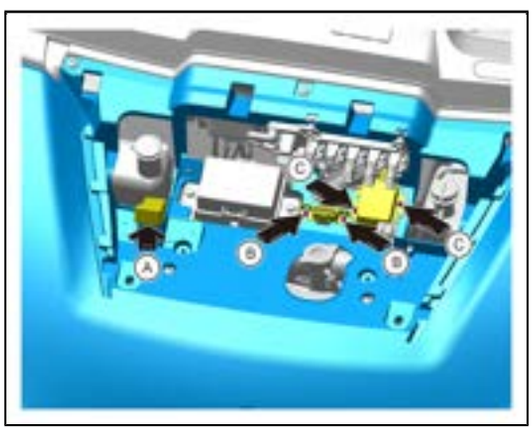
Installation Procedure

1. Install the front bumper guard assembly in the reverse order of removal.

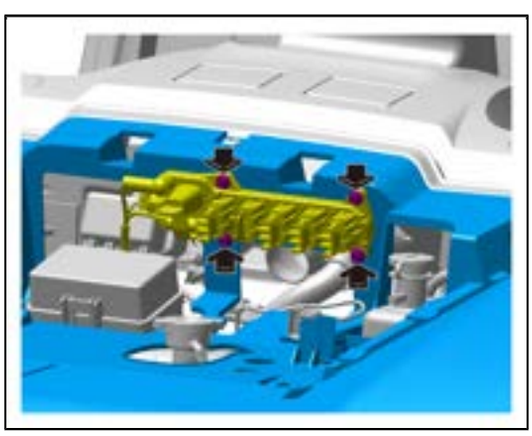
9.1.4.2 Front Panel

Removal Procedure

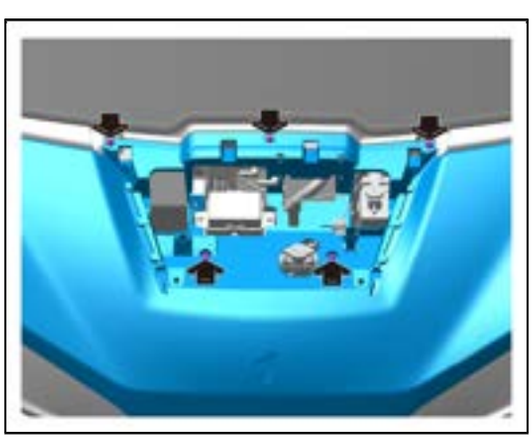
1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. To remove the headlamp cover, See: Headlamp Cover.
4. To remove the flasher unit, See: Flasher Unit.
5. Removing the front panel



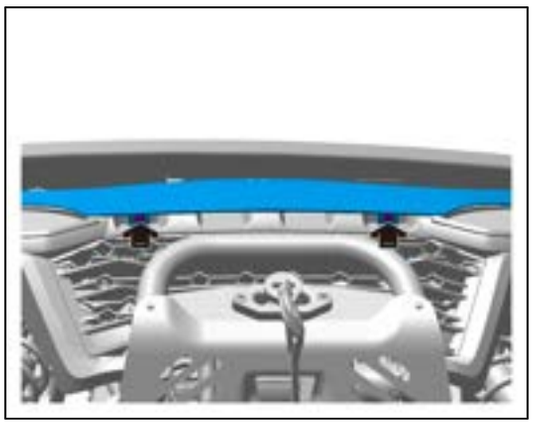
a. Disconnect main cable A.
b. Remove the 2 securing screws B from the OBD interface and disconnect it.
c. Remove the 2 securing screws C from the winch wireless control module and disconnect it.



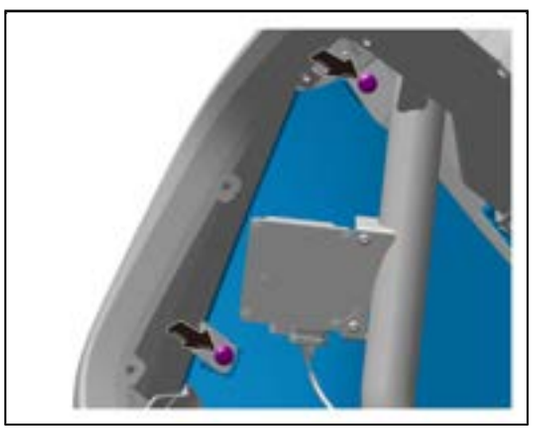
d. Remove the 4 mounting bolts from the PDU and disconnect it.



e. Remove the 5 mounting bolts from the front panel.



f. Remove the 2 mounting bolts from the front panel.



g. Remove the 2 mounting bolts on the left and right sides of the front panel, and detach the panel.

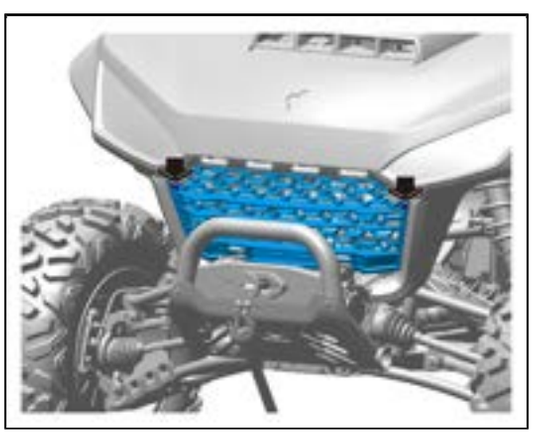
Installation Procedure

1. Install the front panel in the reverse order of removal.

9.1.4.3 Front Air Intake Grille

Removal Procedure

1. Removing front air intake grille



a. Remove the 2 mounting bolts from the front air intake grille.

b. Detach the front air intake grille.

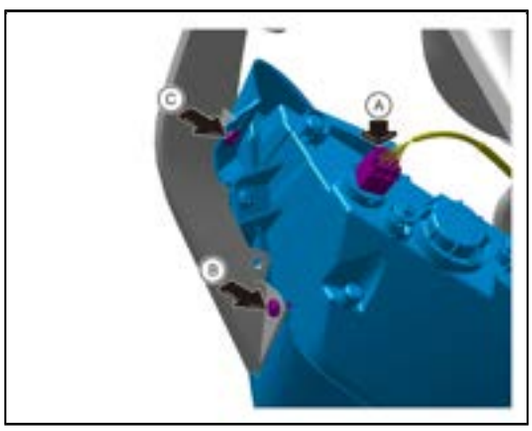
Installation Procedure

1. Install the front air intake grille in the reverse order of removal.

9.1.4.4 Headlamp Bezel Assembly

Removal Procedure

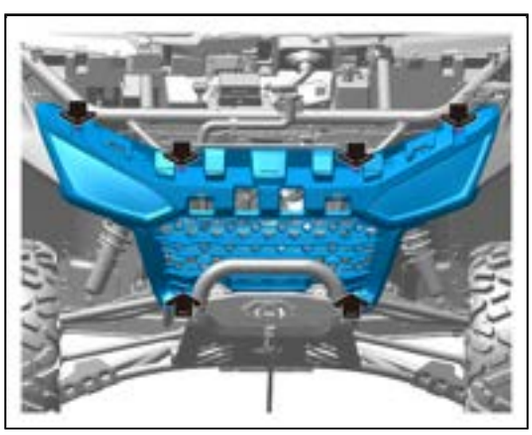
1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. To remove the headlamp cover, See: Headlamp Cover.
4. To remove the flasher unit, See: Flasher Unit.
5. To remove the front panel, See: Front Panel.
6. Removing the headlamp bezel assembly



a. Disconnect wiring harness connectors A from the left and right headlamps.

b. Pry off retaining clips B from the left and right headlamp bezel assemblies.

c. Remove mounting bolts C from the left and right headlamp bezel panel assemblies.



d. Remove the 6 mounting bolts from the headlamp bezel assembly and take off the assembly.

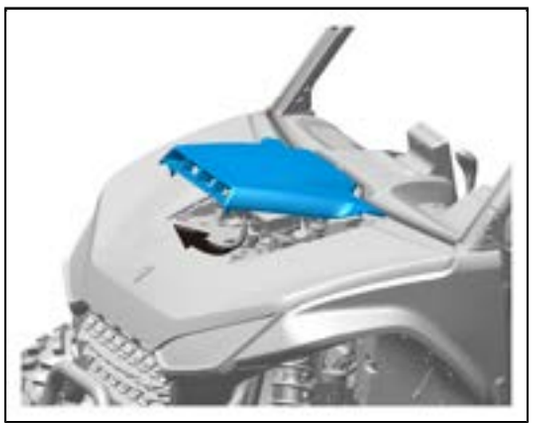
Installation Procedure

1. Install the headlamp bezel in the reverse order of removal.

9.1.4.5 Front Service Cover

Removal Procedure

1. Removing the front service cover



a. Open the front service cover in the direction of the arrow, and pull it forward to remove it.

Installation Procedure

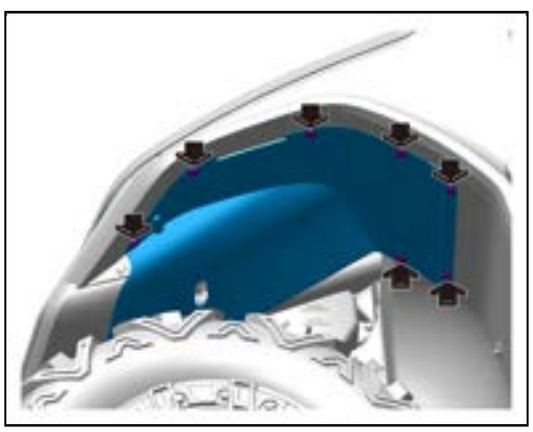
1. Install the front service cover in the reverse order of removal.

9.1.4.6 Front Headlamp Cover

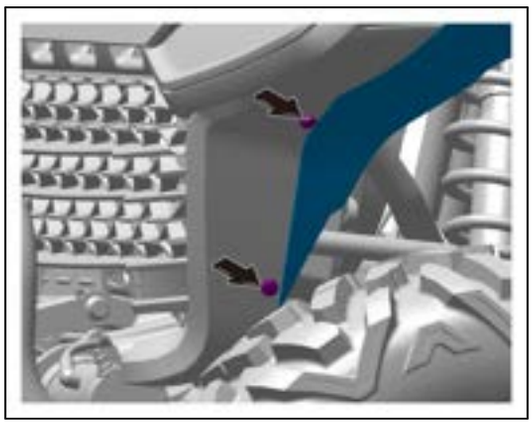
NOTICE:
• This manual uses the removal and installation of the left headlamp cover as an example. Removal and installation of the right headlamp cover may be carried out in the same manner.

Removal Procedure

1. Removing the headlamp cover



a. Pry out the 7 retaining fasteners securing the headlamp cover.



b. Pry out the 2 retaining fasteners securing the headlamp cover.

c. Detach the front headlamp cover.

Installation Procedure

1. Install the headlamp cover in the reverse order of removal.

9.1.4.7 Headlamp Bezels

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. To remove the headlamp cover, See: Headlamp Cover.
4. To remove the flasher unit, See: Flasher Unit.
5. To remove the front panel, See: Front Panel.
6. To remove the headlamp bezel assembly, See: Headlamp Bezel Assembly.
7. To remove the headlight, See: Headlamp.
8. To remove the front air intake grille, See: Front Air Intake Grille.
9. Removing the headlamp bezel



a. Remove the headlamp bezel.

Installation Procedure

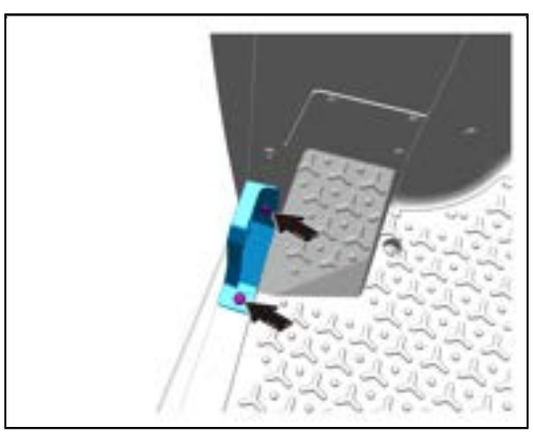
1. Install the headlamp bezel in the reverse order of removal.

9.1.4.8 Front Mudguard

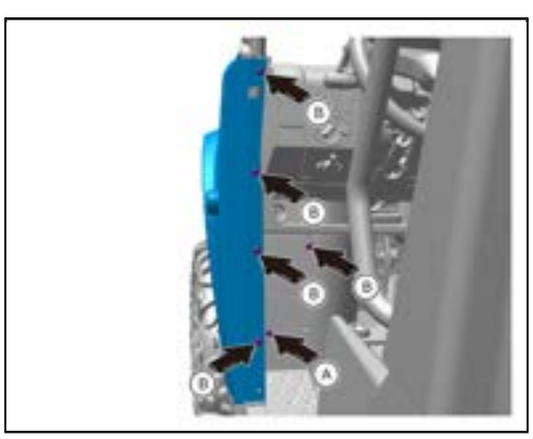
NOTICE:
• This manual uses the removal and installation of the left front wheel arch liner as an example. Removal and installation of the right front wheel arch liner may be carried out in the same manner.

Removal Procedure

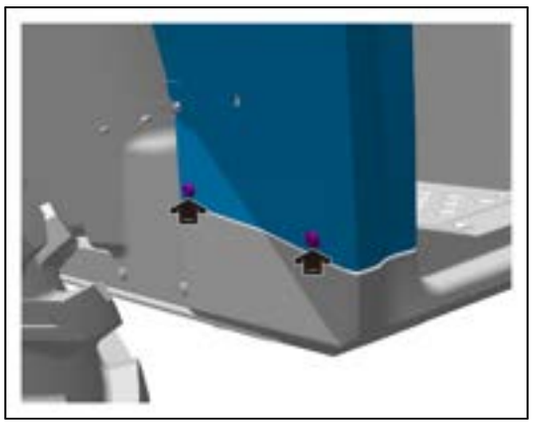
1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. To remove the headlamp cover, See: Headlamp Cover.
4. To remove the flasher unit, See: Flasher Unit.
5. To remove the front panel, See: Front Panel.
6. Removing the front mudguard



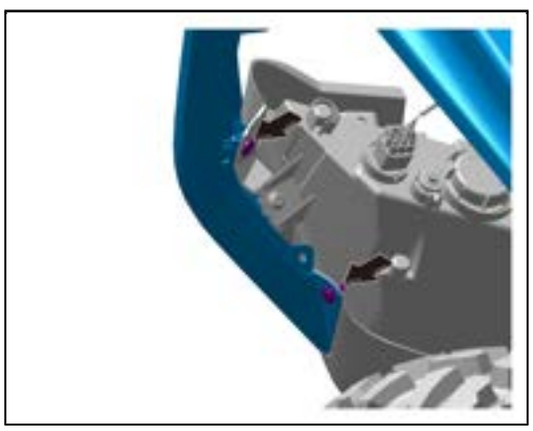
a. Remove the 2 mounting bolts from the footwell guard, and detach the guard.



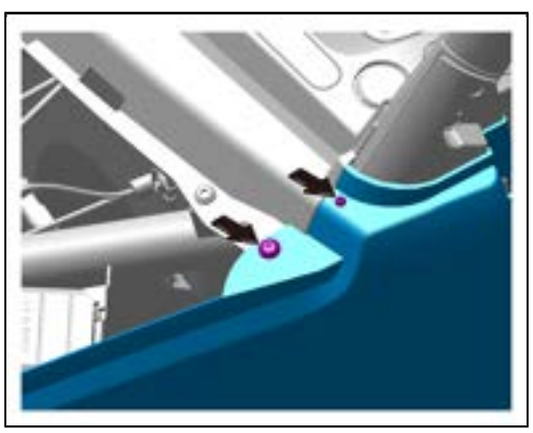
b. Pry off retaining clip A from the front mudguard.
c. Remove the 5 mounting bolts B from the front mudguard.



d. Pry off retaining clip from the front mudguard, and remove mounting bolt.



e. Pry off retaining clip from the front mudguard, and remove mounting bolt.



f. Remove securing screw and mounting bolt from the front mudguard, and detach the mudguard.

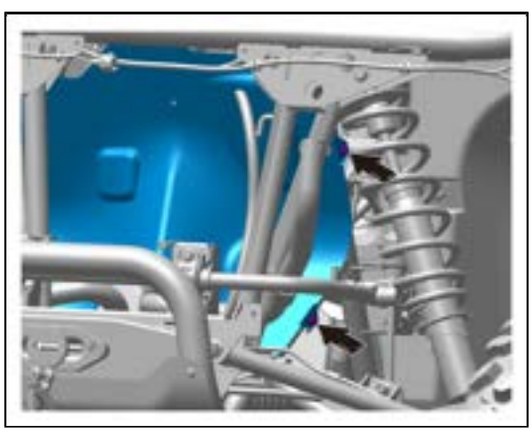
Installation Procedure

1. Install the front mudguard in the reverse order of removal.

9.1.4.9 Radiator Rear Baffle

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To drain the coolant, See: Coolant Draining and Refilling.
3. To remove the front service cover, See: Front Service Cover.
4. To remove the headlamp cover, See: Headlamp Cover.
5. To remove the flasher unit, See: Flasher Unit.
6. To remove the front panel, See: Front Panel.
7. To remove the headlamp bezel assembly, See: Headlamp Bezel Assembly.
8. To remove the horn, See: Horn.
9. To remove the front bracket welded assembly, See: Front Bracket Welded Assembly.
10. To remove the radiator, See: Radiator.
11. Removing radiator rear baffle



a. Remove the 2 retaining bolts from each side of the radiator rear baffle.

b. Release the retaining clips along the radiator rear baffle, cut the wiring harness cable ties, and detach the shield.

NOTICE:
• Cable ties on the harness are single-use and must be replaced after removal.

Installation Procedure

1. Install the radiator rear baffle in the reverse order of removal, observing the following:
   a. After filling with coolant, bleed the cooling system following See: the standard bleeding procedure.

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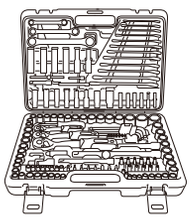
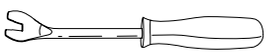
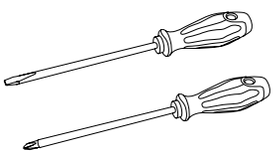
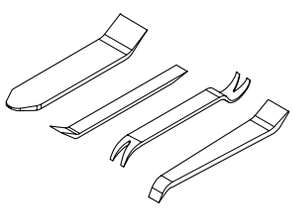
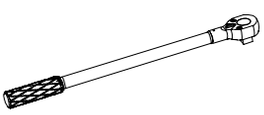
9.2.1 Specifications

9.2.1.1 Fastener Specifications

Item	Torque (N·m)	Torque (ft-lbs)
Headliner Spoiler Retaining Bolt, M6×16	8~12	6~9
Passenger Grab Handle Assembly Retaining Bolt, M8×25	17~22	22~30
Seat Belt Retaining Bolt	35~40	26~30

9.2.2 Service Tools

9.2.2.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)
2	Trim clip removal tool		Removing the retaining fastener
3	Screwdriver		Removal and installation of mounting screws
4	Interior trim removal lever		Removing interior and exterior trim parts
5	Torque Wrench		Tightening bolts and nuts to the specified torque

9.2.3 Description and Operation

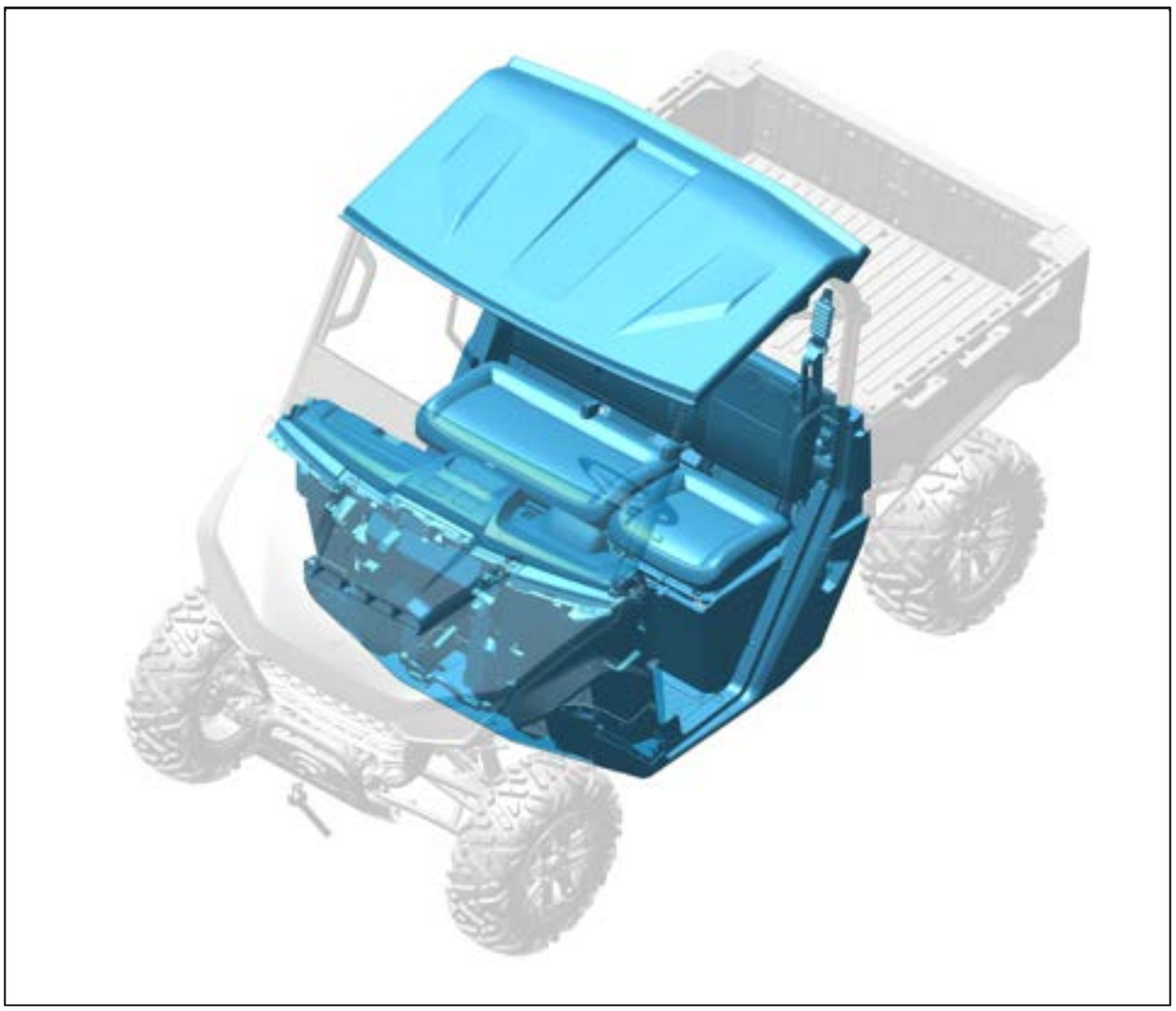
9.2.3.1 Warnings and Precautions

1. Use a suitable interior trim removal tool to remove the interior trim. If such a tool is not available, a screwdriver or equivalent tool may be used, but it must be suitably wrapped to prevent damage.
2. Do not force off any component that cannot be removed easily. Check whether any mounting screws or push-in clips have been overlooked.
3. Push-in clips are wear items. Check the removed push-in clips for damage and renew them if necessary.
4. After removing the components, check whether any push-in clips remain on the body. Before installing the components, ensure that no component push-in clips are left on the body.
5. When installing the components, check that all retaining fasteners are present.

9.2.4 Component Location and Exploded View

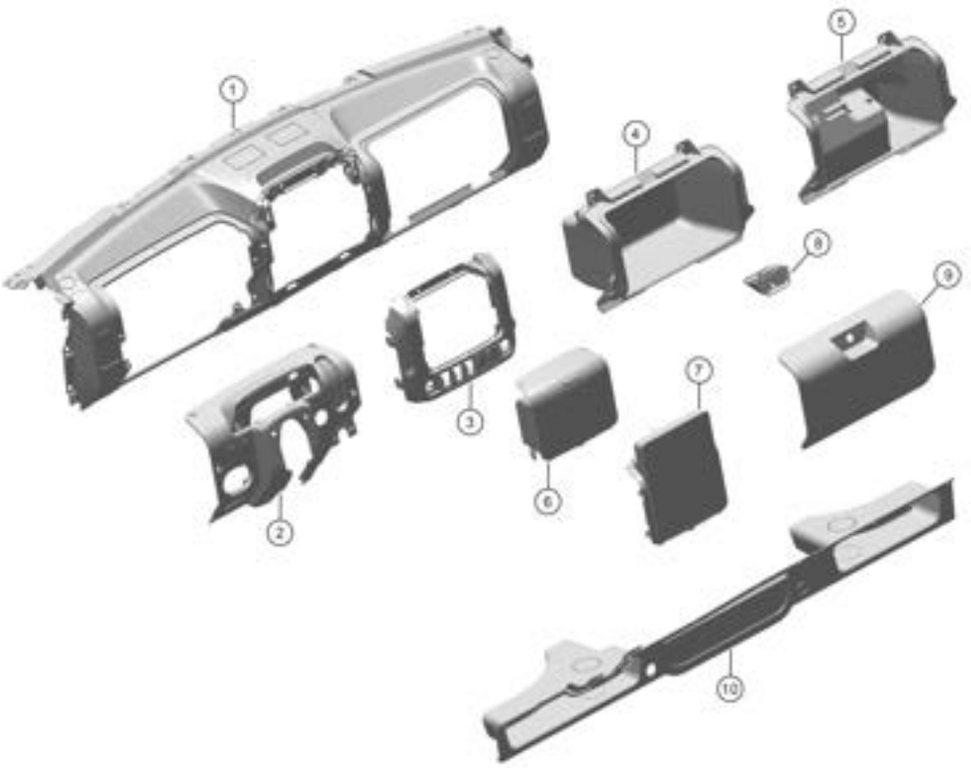
9.2.4.1 Component Location Diagram

Interior Trim System

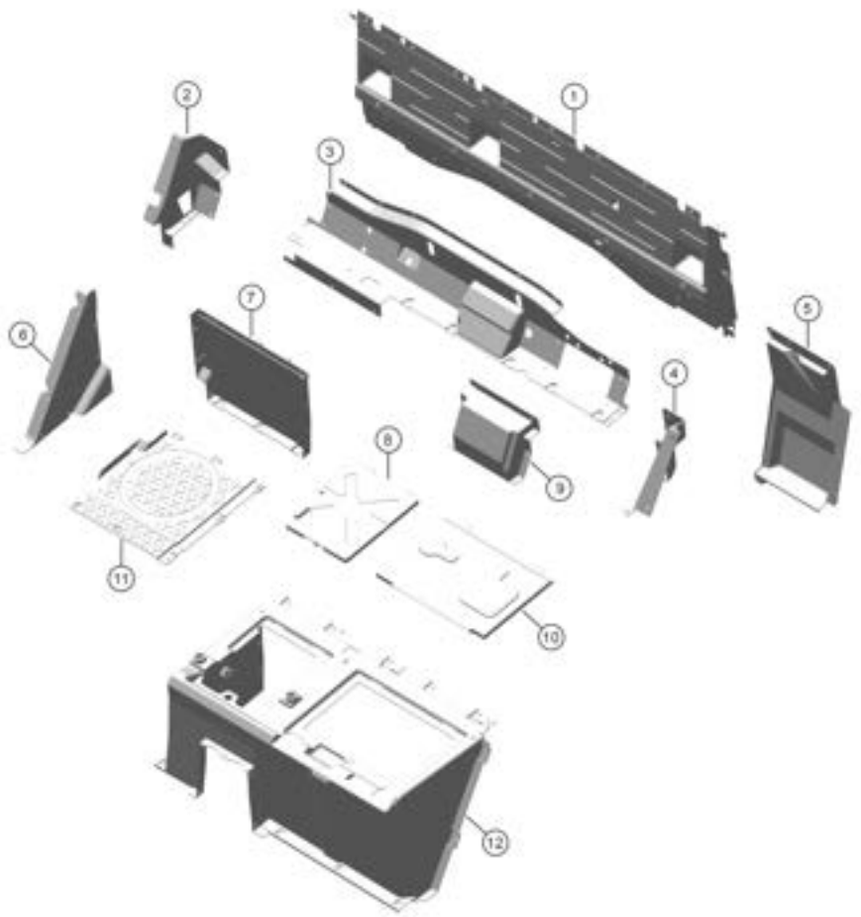


9.2.4.2 Exploded View Diagram

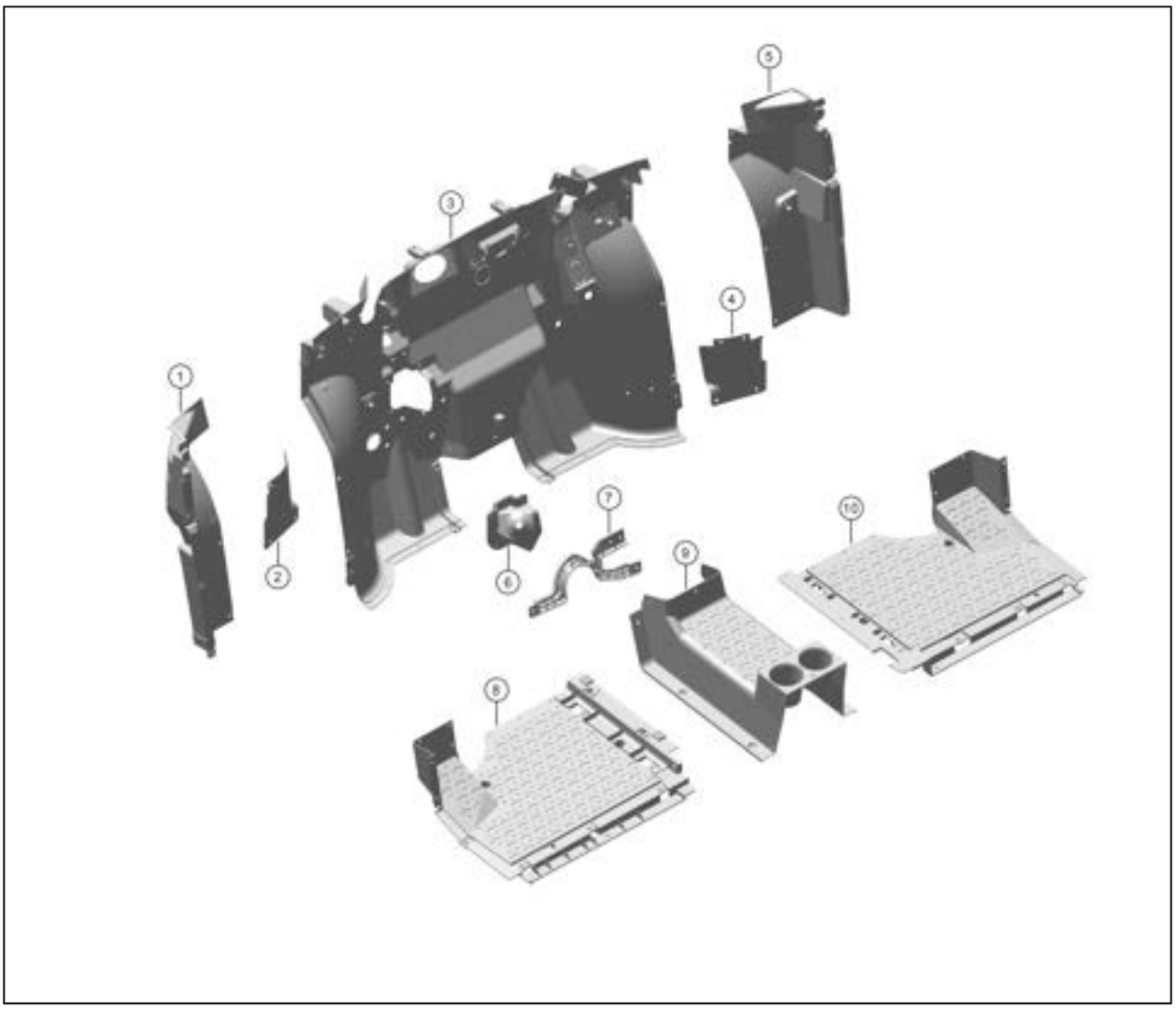
Interior Trim System



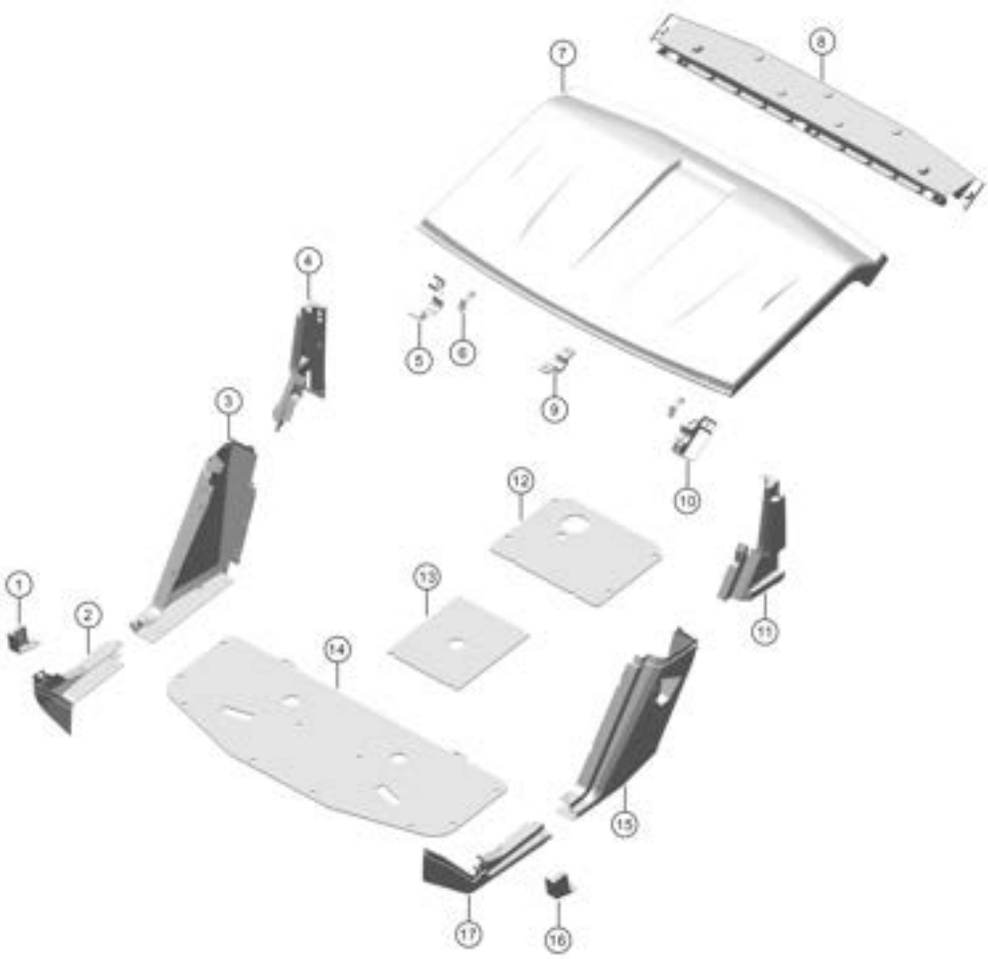
1	Upper Instrument Panel	6	Centre Storage Compartment
2	Instrument Cover	7	Centre Display
3	Switch Panel	8	Passenger Storage Box Latch
4	Passenger Storage Box Body	9	Passenger Glovebox Lid
5	Passenger Storage Box Body	10	Lower Centre Console Storage Compartment



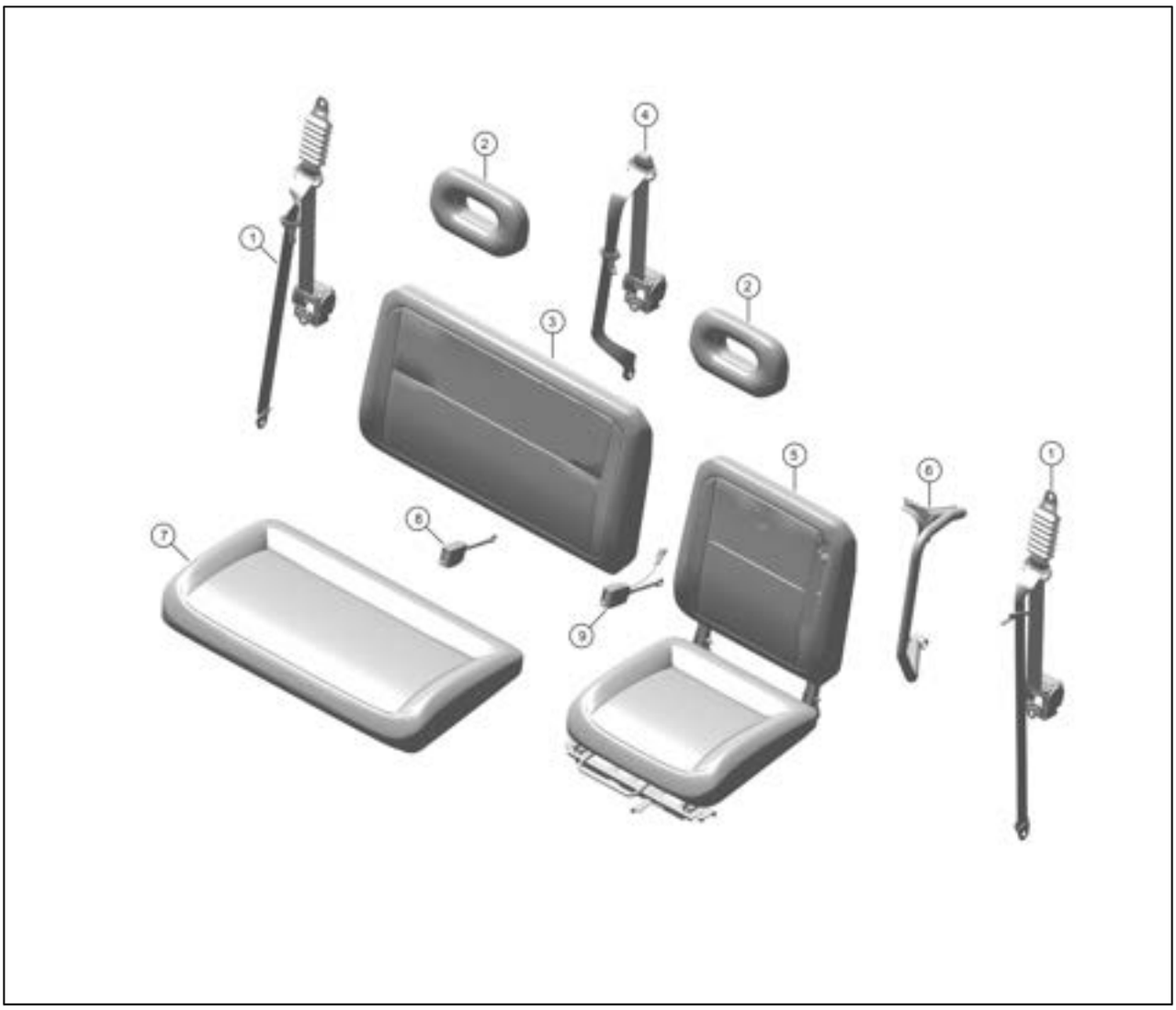
1	Rear Back Panel	7	Right Rear Baffle
2	Right Inner Roof Bar Cover	8	Centre Under-Seat Cover
3	Rear Seat Cushion Guard	9	ECU Cover
4	Left Inner Roof Bar Cover	10	Left Under-Seat Cover
5	Fuel Tank Guard	11	Storage Platform
6	Right Side Cover Inner Trim	12	Under-Seat Panel



1	Front Left Shield	6	Steering Universal-Joint Shaft Seal Boot
2	Left Footwell Guard	7	Front Shift Cable Bracket
3	Front Centre Shield	8	Left Footboard
4	Right Footwell Guard	9	Centre Guide Cover
5	Front Right Shield	10	Right Footboard



1	Right Foot Guard	10	Headliner Left Inner Panel
2	Right Side Cover, Front Section	11	Left Roof Bar Side Cover
3	Right Side Cover, Rear Section	12	Rear skid plate
4	Right Roof Bar Side Cover	13	Centre skid plate
5	Headliner Right Inner Panel	14	Front skid plate
6	Headliner Inner Liner Retaining Clamp	15	Left Side Cover, Rear Section
7	Headliner	16	Left Footwell Guard
8	Headliner Spoiler	17	Left Side Cover, Front Section
9	U-Shaped Clamp Plate		



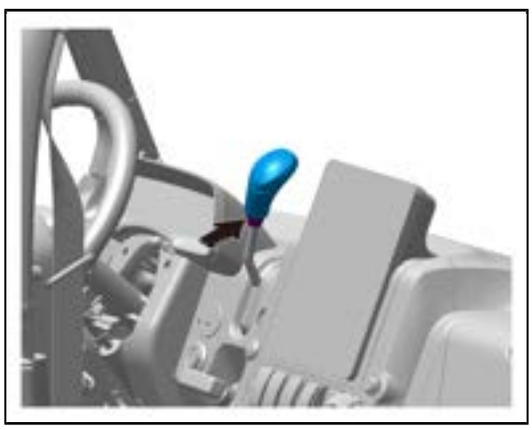
1	Retractor Assembly (without Load Limiter)	6	Driver Handguard Tube Welded Assembly
2	Headrest	7	Passenger Seat Cushion Assembly
3	Passenger Backrest Assembly	8	Seat belt buckle assembly (without seat belt warning)
4	Retractor Assembly (with Load Limiter)	9	Seat Belt Buckle Assembly (with Seat Belt Warning)
5	Driver'S Seat Assembly		

9.2.5 Repair Procedure Guidance

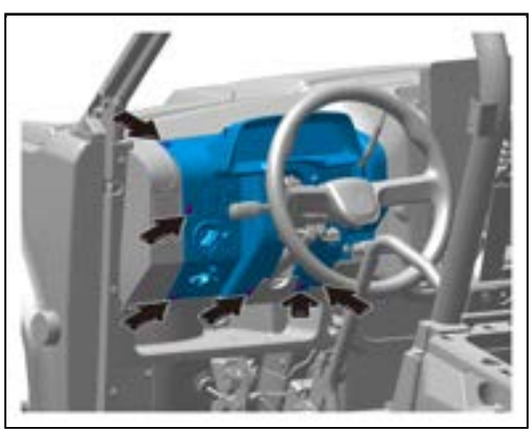
9.2.5.1 Instrument Cover

Removal Procedure

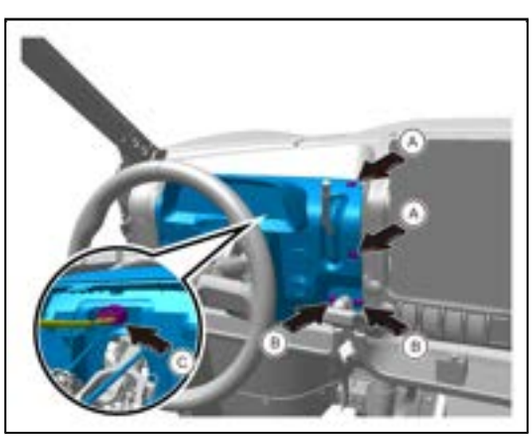
1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. Removing the instrument cover assembly



a. Loosen the retaining nut, turn the shift lever assembly and remove it.



b. Unclip the 6 retaining clips from the instrument cluster cover.

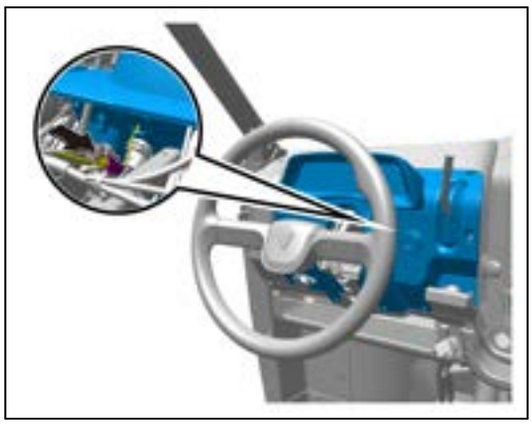


c. Release the 2 retaining clips (A) from the instrument cluster cover.

d. Remove the 2 mounting bolts B securing the instrument cover, then pull the instrument cover assembly out by a suitable distance.

CAUTION:
• When pulling it out, take care not to pull the harness excessively, as this may damage the harness.

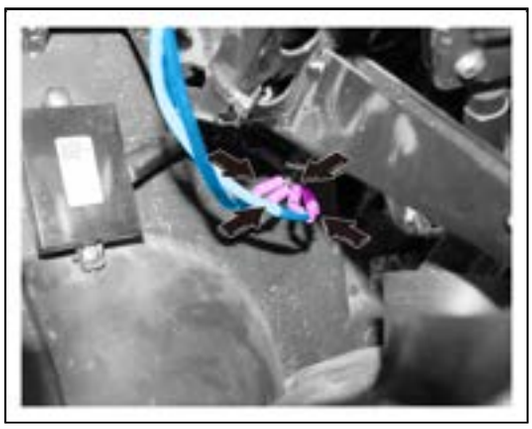
e. Disconnect the instrument cluster cover wiring harness connector C.



f. Disconnect the push-button start switch wiring harness connector.

CAUTION:

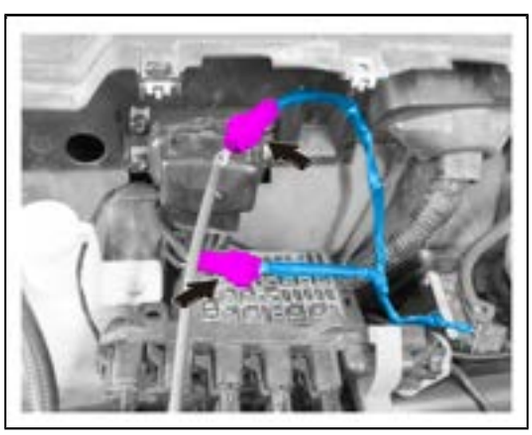
- **This step applies only to models equipped with a push-button start system.**



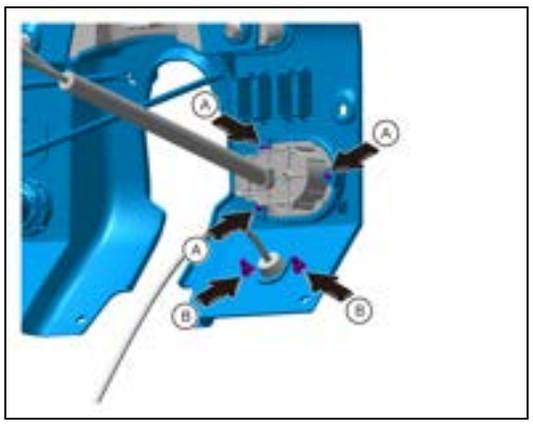
g. Disconnect the 4 wiring harness connectors from the instrument cluster cover.



h. Disconnect the 2 wiring harness connectors from the instrument cluster cover.

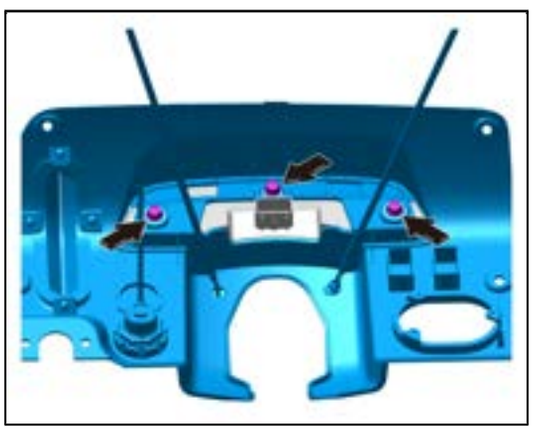


i. Disconnect the 2 harness connectors from the instrument cover, then remove the instrument cover.



j. Remove the 3 retaining screws (A) securing the 2WD/4WD selector switch, then remove the switch.

k. Remove the 2 retaining bolts and nuts (B) securing the winch switch socket, then remove the socket.



l. Remove the 3 instrument cluster mounting bolts and detach the instrument cluster.

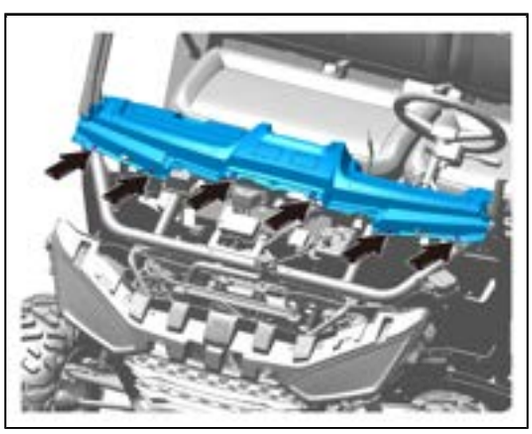
Installation Procedure

1. **Install the instrument cover in the reverse order of removal, noting the following points:**
   a. After installation, check if the connector is properly secured and the connection is fully seated.
   b. Switch the vehicle on and check that the instrument panel functions correctly.

9.2.5.2 Upper Instrument Panel

Removal Procedure

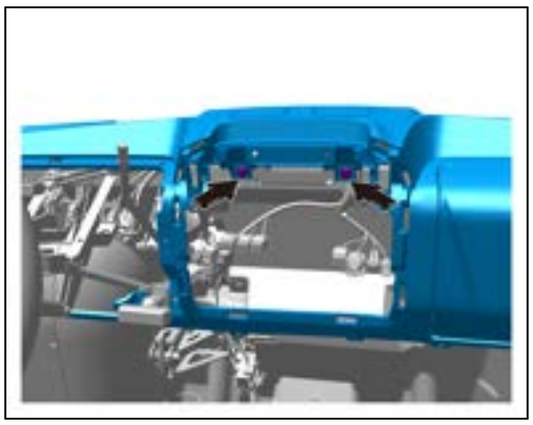
1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front half windscreen, See: Front Half Windscreen.
3. To remove the front service cover, See: Front Service Cover.
4. To remove the headlamp cover, See: Headlamp Cover.
5. To remove the flasher unit, See: Flasher Unit.
6. To remove the front panel, See: Front Panel.
7. To remove the front mudguard, See: Front Mudguard.
8. To remove the headliner left inner cover, See: Headliner Left Inner Cover.
9. To remove the headliner, See: Headliner.
10. To remove the left A-pillar welded assembly, See: Left A-Pillar Welded Assembly.
11. To remove the instrument cover, See: Instrument Cover.
12. To remove the centre display, See: Centre Display.
13. To remove the switch panel, See: Switch Panel.
14. To remove the lower centre console storage compartment, See: Lower Centre Console Storage Compartment.
15. Removing the upper instrument panel



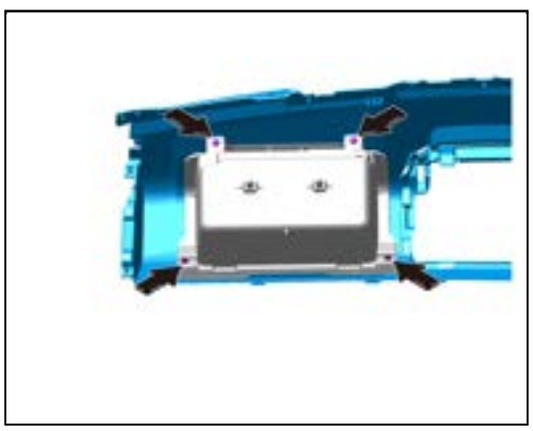
a. Remove the 6 retaining bolts from the upper instrument panel.



b. Remove the 2 retaining bolts from both the left and right sides of the upper instrument panel.



c. Remove the 2 retaining bolts securing the upper instrument panel, then remove the panel.



d. Remove the 4 retaining bolts from the upper instrument panel, then remove the passenger glove box.

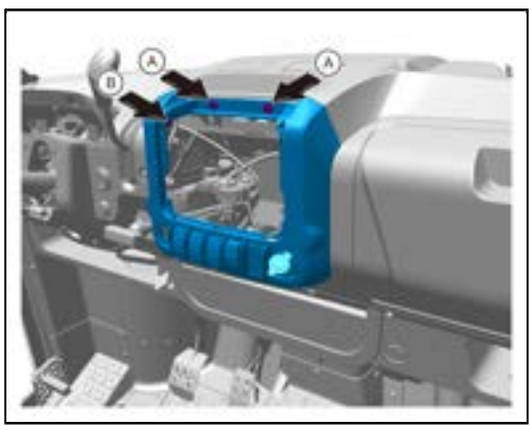
Installation Procedure

1. Install the upper instrument panel in the reverse order of removal.

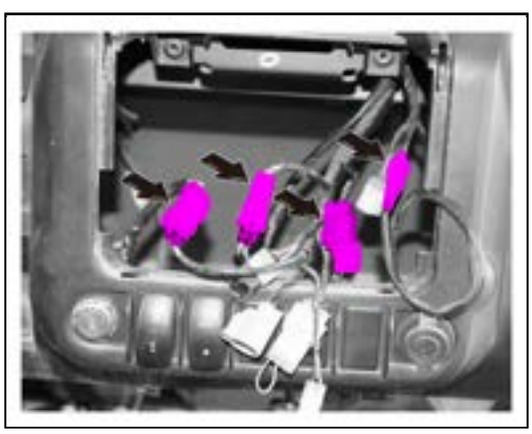
9.2.5.3 Switch Panel

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the centre display, See: Centre Display.
3. Removing the switch panel



a. Release the 2 retaining clips (A) from the switch panel.
b. Remove the retaining bolt (B) on both the left and right sides of the switch panel.



c. Disconnect the 4 wiring harness connectors from the switch panel, then remove the panel.

CAUTION:
For models equipped with a centre display screen, an additional 3 wiring harness connectors must be disconnected.

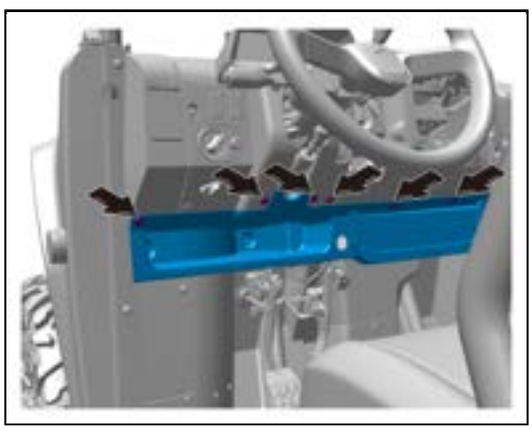
Installation Procedure

1. Install the switch panel in the reverse order of removal.

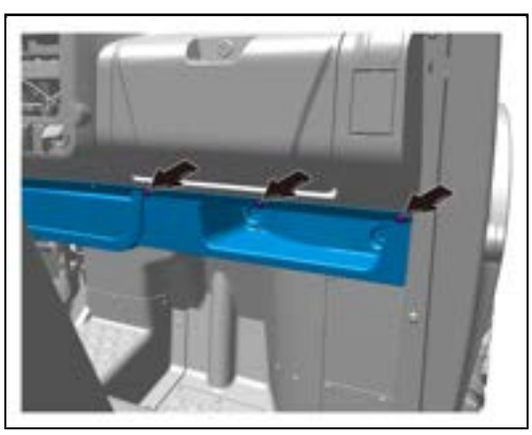
9.2.5.4 Lower Centre Console Storage Compartment

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the centre display, See: Centre Display.
3. To remove the 12V power outlet, See: 12V Power Outlet.
4. Removing the lower centre console storage compartment



a. Release the 6 retaining clips from the lower centre console storage compartment.



b. Release the 3 retaining clips and remove the lower centre console storage compartment.

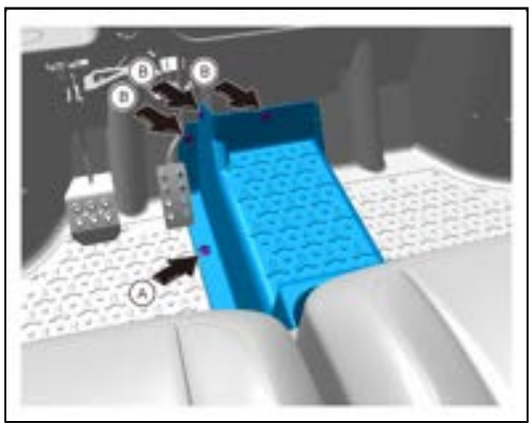
Installation Procedure

1. Install the lower centre console storage compartment in the reverse order of removal.

9.2.5.5 Centre Guide Cover

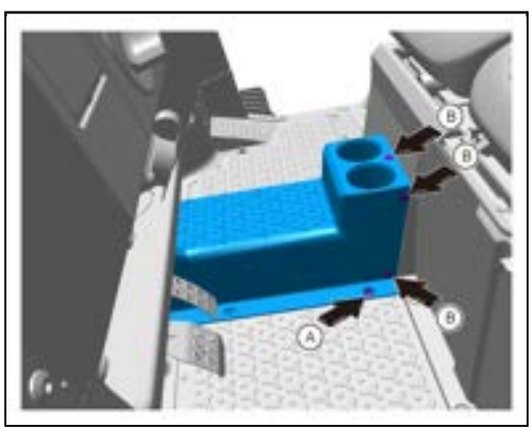
Removal Procedure

1. Removing the centre guide cover



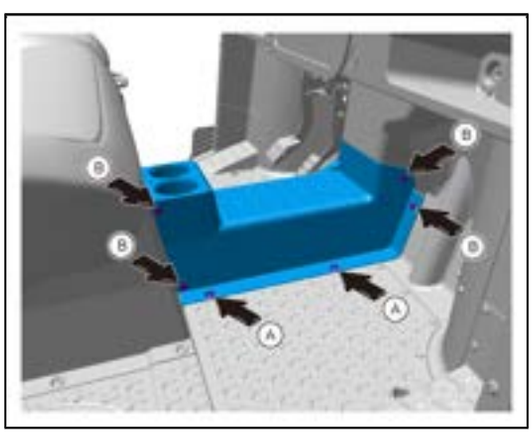
a. Remove centre guide cover retaining bolt A.

b. Pry out the 3 retaining clips B securing the centre guide cover.



c. Remove centre guide cover retaining bolt A.

d. Pry out the 3 retaining clips B securing the centre guide cover.



e. Remove the 2 centre guide cover retaining bolts A.

f. Pry out the 4 retaining clips B, then remove the centre guide cover.

Installation Procedure

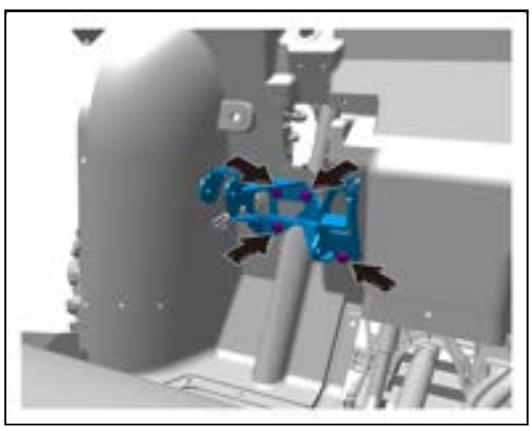
1. Install the centre guide cover in the reverse order of removal.

9.2.5.6 Front Centre Shield

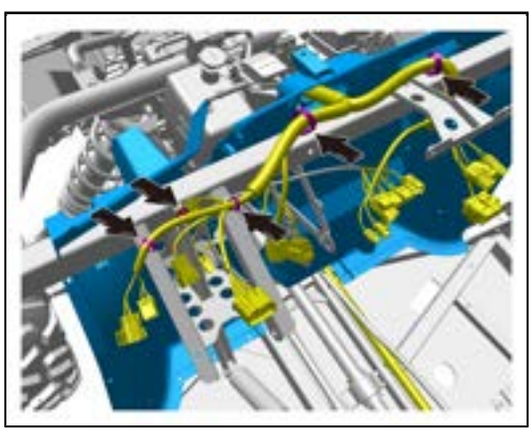
Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front half windscreen, See: Front Half Windscreen.
3. To remove the front service cover, See: Front Service Cover.
4. To remove the headlamp cover, See: Headlamp Cover.
5. To remove the flasher unit, See: Flasher Unit.
6. To remove the front panel, See: Front Panel.
7. To remove the front mudguard, See: Front Mudguard.
8. To remove the left half-door, See: Left Half Door.
9. To remove the headliner left inner cover, See: Headliner Left Inner Cover.
10. To remove the headliner, See: Headliner.
11. To remove the left A-pillar welded assembly, See: Left A-Pillar Welded Assembly.
12. To remove the instrument cover, See: Instrument Cover.
13. To remove the centre display, See: Centre Display.
14. To remove the switch panel, See: Switch Panel.
15. To remove the lower centre console storage compartment, See: Lower Centre Console Storage Compartment.
16. To remove the upper instrument panel, See: Upper Instrument Panel.
17. To remove the instrument cluster control module, See: Instrument Cluster Control Module.
18. To remove the steering wheel, See: Steering Wheel.
19. To remove the combination switch, See: Combination Switch.
20. To remove the gas strut assembly, See: Gas Strut Assembly.
21. To remove the combination switch from the steering column, See: Steering Column.
22. To remove the EPS steering universal-joint assembly, See: EPS Steering Universal Joint Assembly.
23. To remove the front handbrake cable assembly, See: Front Handbrake Cable Assembly.
24. To remove the driver's seat assembly, See: Driver's Seat Assembly.
25. To remove the passenger backrest assembly, See: Passenger Backrest Assembly.
26. To remove the passenger seat cushion assembly, See: Passenger Seat Cushion Assembly.
27. To remove the centre guide cover, See: Centre Guide Cover.
28. To remove the right side cover inner trim, See: Right Side Cover Inner Trim.
29. To remove the centre under-seat cover, See: Centre Under-Seat Cover.
30. To remove the left inner roof bar cover, See: Left Inner Roof Bar Cover.
31. To remove the right inner roof bar cover, See: Right Inner Roof Bar Cover.
32. To remove the left roof bar side cover, See: Left Roof Bar Side Cover.
33. To remove the right roof bar side cover, See: Right Roof Bar Side Cover.
34. To remove the left side cover, rear section, See: left Side Cover, Rear Section.
35. To remove the rear section of right side cover, See: Rear Section of Right Side Cover.

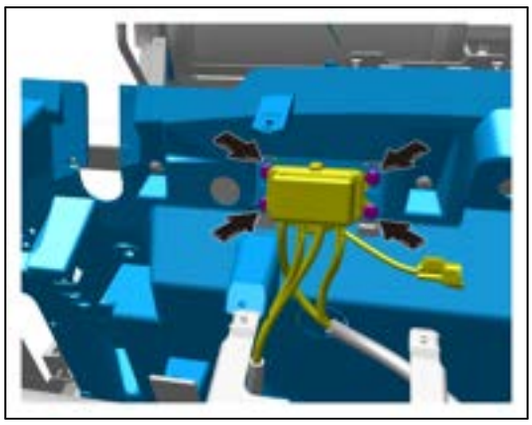
36.To remove the front sections of the left and right side covers, See: Front Section of Left Side Cover.
37.To remove the ECU cover, See: ECU Cover.
38.To remove the ECU assembly, See: ECU Assembly.
39.To remove the seat belt buckle assembly, See: Seat Belt Buckle Assembly.
40.To remove the rear seat cushion guard, See: Rear Seat Cushion Guard.
41.To remove the under-seat panel, See: Under-Seat Panel.
42.To remove the left footboard, See: Left Footboard.
43.To remove the right footboard, See: Right Footboard.
44.To remove the left and right footwell guards, See: Left Footwell Guard.
45.To remove the accelerator pedal assembly, See: Accelerator Pedal Assembly.
46.To remove the brake pedal welded assembly, See: Brake Pedal Welded Assembly.
47.Removing the front centre shield



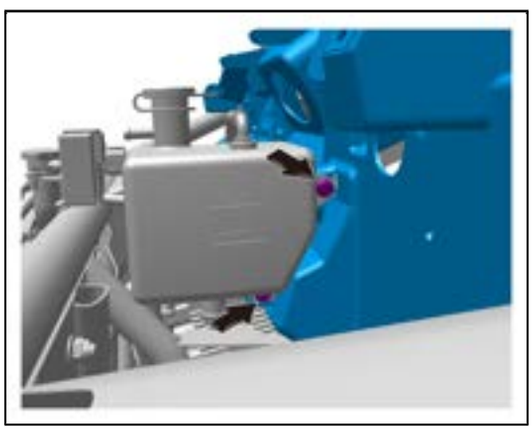
a. Remove the 4 retaining bolts and remove the brake pedal mounting bracket.



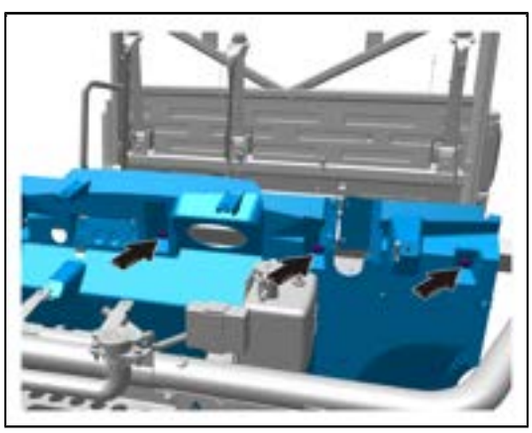
b. Remove the instrument wiring harness retaining bolt.
c. Release the instrument wiring harness from the 4 retaining clips, then disconnect the wiring harness.



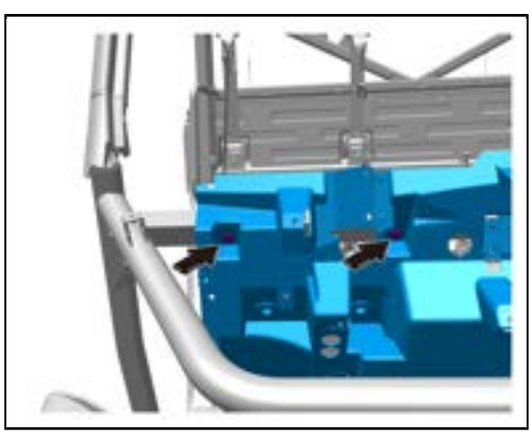
d. Remove the 4 winch contactor retaining bolts, then detach the winch contactor.



e. Remove the 2 coolant expansion tank retaining bolts.



f. Pry out the 3 retaining clips securing the front centre shield.



g. Pry out the 2 retaining clips, then remove the front centre shield.

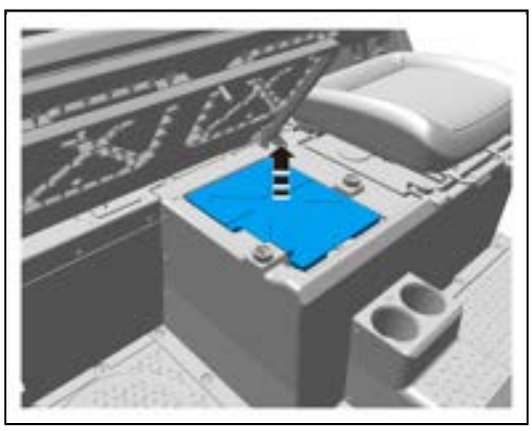
Installation Procedure

1. Install the front centre shield in the reverse order of removal.

9.2.5.7 Centre Under-Seat Cover

Removal Procedure

1. Removing the centre under-seat cover



a. Lift up and remove the centre under-seat cover plate.

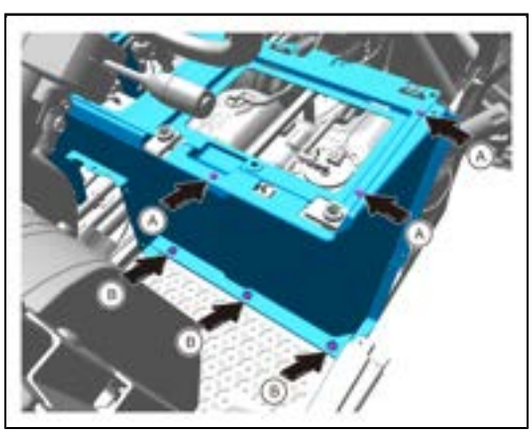
Installation Procedure

1. Install the centre under-seat cover in the reverse order of removal.

9.2.5.8 Under-Seat Panel

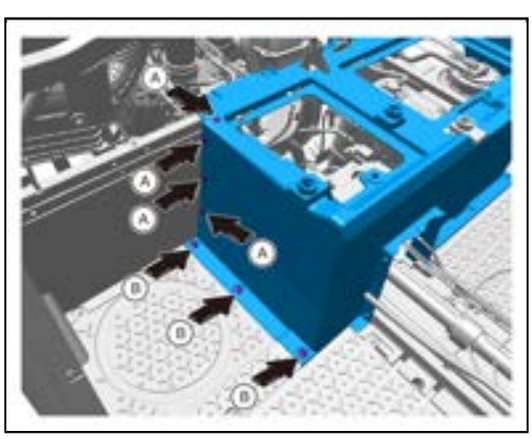
Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the left half-door, See: Left Half Door.
3. To remove the driver's seat assembly, See: Driver's Seat Assembly.
4. To remove the passenger backrest assembly, See: Passenger Backrest Assembly.
5. To remove the passenger seat cushion assembly, See: Passenger Seat Cushion Assembly.
6. To remove the centre guide cover, See: Centre Guide Cover.
7. To remove the centre under-seat cover, See: Centre Under-Seat Cover.
8. To remove the left inner roof bar cover, See: Left Inner Roof Bar Cover.
9. To remove the right inner roof bar cover, See: Right Inner Roof Bar Cover.
10. To remove the left roof bar side cover, See: Left Roof Bar Side Cover.
11. To remove the left side cover, rear section, See: left Side Cover, Rear Section.
12. To remove the ECU cover, See: ECU Cover.
13. To remove the ECU assembly, See: ECU Assembly.
14. To remove the seat belt buckle assembly, See: Seat Belt Buckle Assembly.
15. To remove the rear seat cushion guard, See: Rear Seat Cushion Guard.
16. Removing the under-seat panel



a. Release the 3 retaining clips A from the under-seat panel.

b. Remove the 3 retaining bolts B from the under-seat panel.



c. Release the 4 retaining clips A from the under-seat panel.

d. Remove the 3 retaining bolts B and remove the under-seat panel.

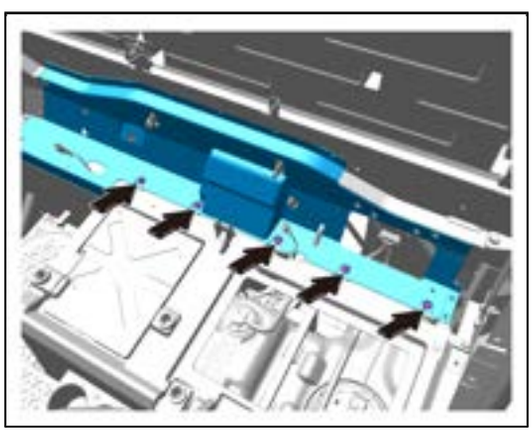
Installation Procedure

1. Install the under-seat panel in the reverse order of removal.

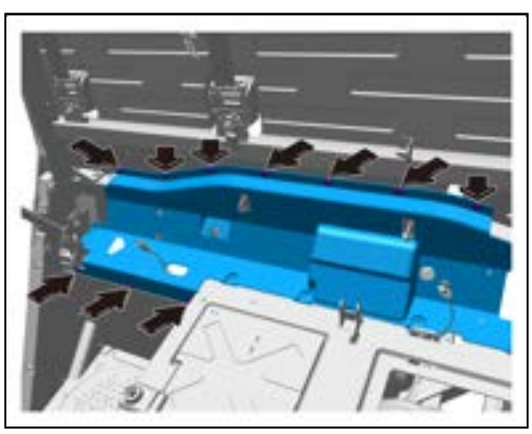
9.2.5.9 Rear Seat Cushion Guard

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the driver's seat assembly, See: Driver's Seat Assembly.
3. To remove the passenger seat cushion assembly, See: Passenger Seat Cushion Assembly.
4. To remove the passenger backrest assembly, See: Passenger Backrest Assembly.
5. To remove the ECU cover, See: ECU Cover.
6. To remove the ECU assembly, See: ECU Assembly.
7. To remove the left inner roof bar cover, See: Left Inner Roof Bar Cover.
8. To remove the right inner roof bar cover, See: Right Inner Roof Bar Cover.
9. To remove the seat belt buckle assembly, See: Seat Belt Buckle Assembly.
10. Removing the rear seat cushion guard



a. Remove the 5 rear seat cushion guard retaining bolts.



b. Pry out the 10 retaining clips, then remove the rear seat cushion guard.

Installation Procedure

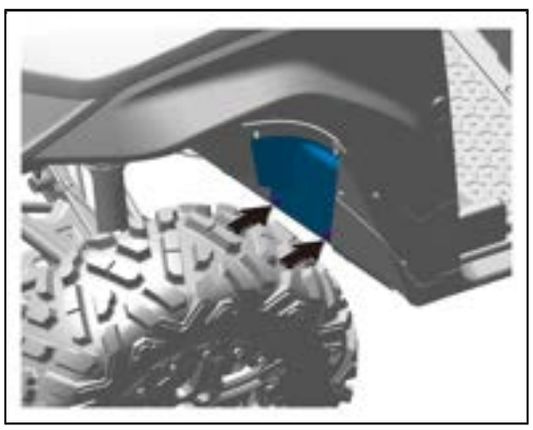
1. Install the seat back panel in the reverse order of removal.

9.2.5.10 Left Footwell Guard

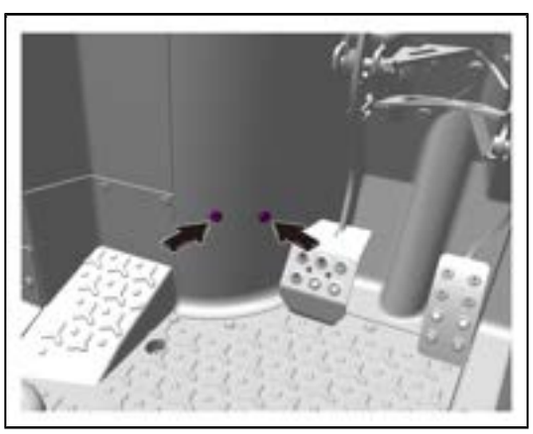
NOTICE:
• This manual describes the removal and installation of the left footwell guard as an example; refer to this procedure for the right footwell guard.

Removal Procedure

1. Removing the left footwell guard



a. Release the 2 retaining clips from the left footwell guard.



b. Release 2 retaining clip and remove the left footwell guard.

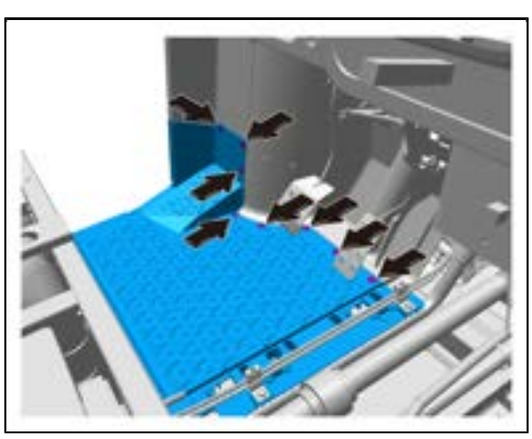
Installation Procedure

1. Install the lh footwell guard in the reverse order of removal.

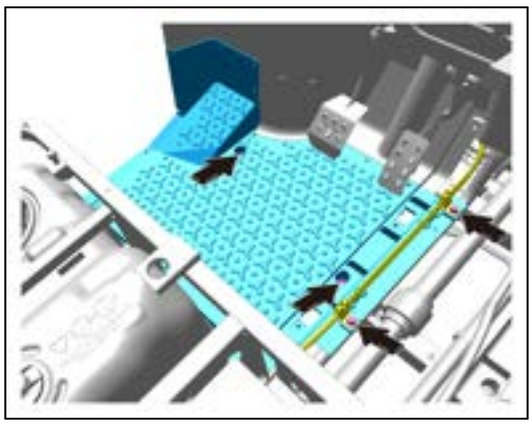
9.2.5.11 Left Footboard

Removal Procedure

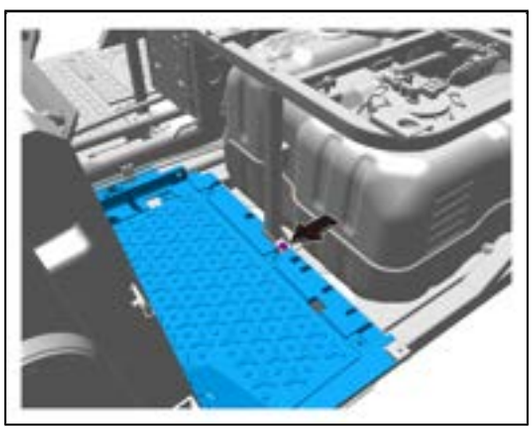
1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. To remove the left headlamp cover, See: Headlamp Cover.
4. To remove the flasher unit, See: Flasher Unit.
5. To remove the front panel, See: Front Panel.
6. To remove the front mudguard, See: Front Mudguard.
7. To remove the left half-door, See: Left Half Door.
8. To remove the driver's seat assembly, See: Driver's Seat Assembly.
9. To remove the passenger backrest assembly, See: Passenger Backrest Assembly.
10. To remove the passenger seat cushion assembly, See: Passenger Seat Cushion Assembly.
11. To remove the centre guide cover, See: Centre Guide Cover.
12. To remove the centre under-seat cover, See: Centre Under-Seat Cover.
13. To remove the left inner roof bar cover, See: Left Inner Roof Bar Cover.
14. To remove the right inner roof bar cover, See: Right Inner Roof Bar Cover.
15. To remove the left roof bar side cover, See: Left Roof Bar Side Cover.
16. To remove the left side cover, rear section, See: left Side Cover, Rear Section.
17. To remove the front section of left side cover, See: Front Section of Left Side Cover.
18. To remove the ECU cover, See: ECU Cover.
19. To remove the ECU assembly, See: ECU Assembly.
20. To remove the seat belt buckle assembly, See: Seat Belt Buckle Assembly.
21. To remove the rear seat cushion guard, See: Rear Seat Cushion Guard.
22. To remove the under-seat panel, See: Under-Seat Panel.
23. Removing the left footboard



a. Pry out the 8 retaining clips securing the left footboard.



b. Remove the 4 bolts securing the left footboard.



c. Remove mounting bolt securing the left footboard, then remove the left footboard.

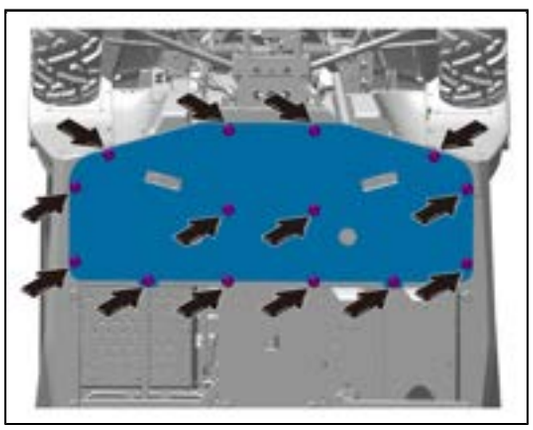
Installation Procedure

1. Install the left footboard in the reverse order of removal.

9.2.5.12 Front skid plate

Removal Procedure

1. Removing the front skid plate



a. Remove the 14 bolts securing the front skid plate, then remove the front skid plate.

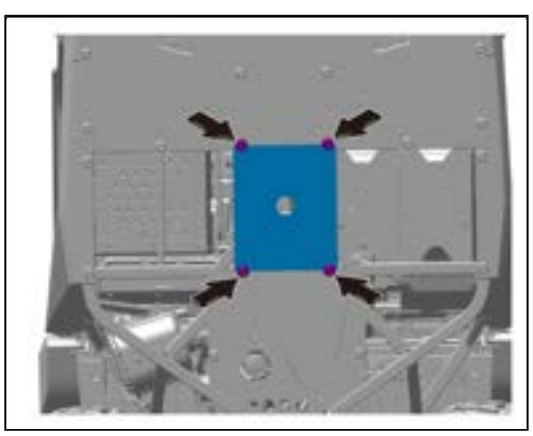
Installation Procedure

1. Install the front skid plate in the reverse order of removal.

9.2.5.13 Centre skid plate

Removal Procedure

1. Removing the centre skid plate



a. Remove the 4 bolts securing the centre skid plate, then remove the centre skid plate.

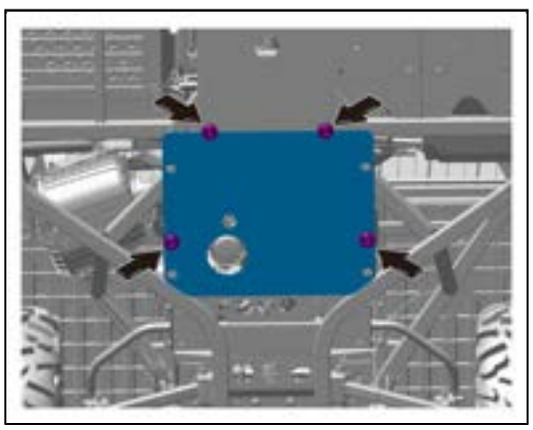
Installation Procedure

1. Install the centre skid plate in the reverse order of removal.

9.2.5.14 Rear skid plate

Removal Procedure

1. Removing the rear skid plate



a. Remove the 4 bolts securing the rear skid plate, then remove the rear skid plate.

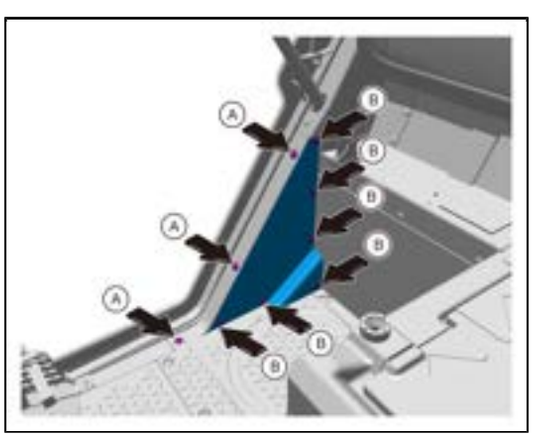
Installation Procedure

1. Install the rear skid plate in the reverse order of removal.

9.2.5.15 Right Side Cover Inner Trim

Removal Procedure

1. Removing the right side cover inner trim



a. Remove the 3 right side cover inner trim retaining bolts A.

b. Pry out the 6 retaining clips B securing the switch panel, then remove the right side cover inner trim.

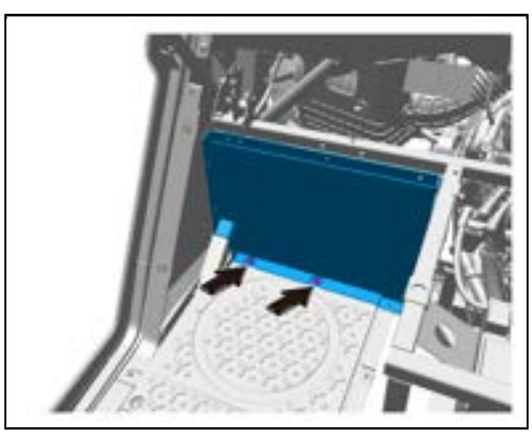
Installation Procedure

1. Install the right side cover inner trim in the reverse order of removal.

9.2.5.16 Right Rear Baffle

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the left half-door, See: Left Half Door.
3. To remove the driver's seat assembly, See: Driver's Seat Assembly.
4. To remove the passenger backrest assembly, See: Passenger Backrest Assembly.
5. To remove the passenger seat cushion assembly, See: Passenger Seat Cushion Assembly.
6. To remove the centre guide cover, See: Centre Guide Cover.
7. To remove the right side cover inner trim, See: Right Side Cover Inner Trim.
8. To remove the centre under-seat cover, See: Centre Under-Seat Cover.
9. To remove the left inner roof bar cover, See: Left Inner Roof Bar Cover.
10. To remove the right inner roof bar cover, See: Right Inner Roof Bar Cover.
11. To remove the left roof bar side cover, See: Left Roof Bar Side Cover.
12. To remove the left side cover, rear section, See: left Side Cover, Rear Section.
13. To remove the ECU cover, See: ECU Cover.
14. To remove the ECU assembly, See: ECU Assembly.
15. To remove the seat belt buckle assembly, See: Seat Belt Buckle Assembly.
16. To remove the rear seat cushion guard, See: Rear Seat Cushion Guard.
17. To remove the under-seat panel, See: Under-Seat Panel.
18. Removing the right rear baffle



a. Remove the 2 right rear baffle retaining bolts, then remove the right rear baffle.

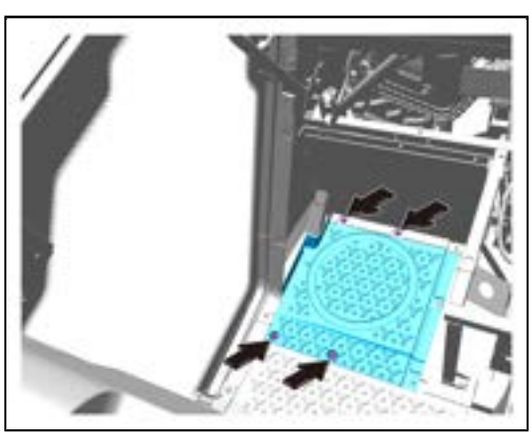
Installation Procedure

1. Install the right rear baffle in the reverse order of removal.

9.2.5.17 Storage Platform

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the left half-door, See: Left Half Door.
3. To remove the driver's seat assembly, See: Driver's Seat Assembly.
4. To remove the passenger backrest assembly, See: Passenger Backrest Assembly.
5. To remove the passenger seat cushion assembly, See: Passenger Seat Cushion Assembly.
6. To remove the centre guide cover, See: Centre Guide Cover.
7. To remove the right side cover inner trim, See: Right Side Cover Inner Trim.
8. To remove the centre under-seat cover, See: Centre Under-Seat Cover.
9. To remove the left inner roof bar cover, See: Left Inner Roof Bar Cover.
10. To remove the right inner roof bar cover, See: Right Inner Roof Bar Cover.
11. To remove the left roof bar side cover, See: Left Roof Bar Side Cover.
12. To remove the left side cover, rear section, See: left Side Cover, Rear Section.
13. To remove the ECU cover, See: ECU Cover.
14. To remove the ECU assembly, See: ECU Assembly.
15. To remove the seat belt buckle assembly, See: Seat Belt Buckle Assembly.
16. To remove the rear seat cushion guard, See: Rear Seat Cushion Guard.
17. To remove the under-seat panel, See: Under-Seat Panel.
18. Removing the storage platform



a. Remove the 4 storage platform retaining bolts, then remove the storage platform.

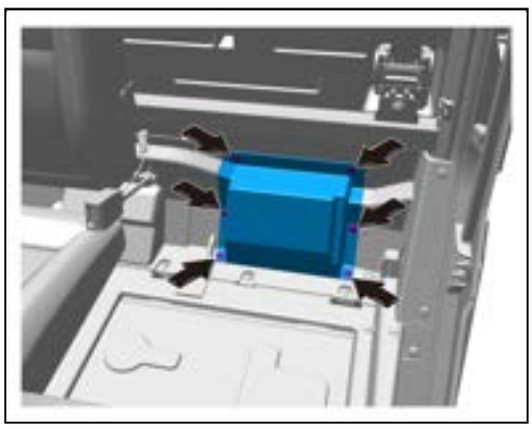
Installation Procedure

1. Install the storage platform in the reverse order of removal.

9.2.5.18 ECU Cover

Removal Procedure

1. To remove the driver's seat assembly, See: Driver's Seat Assembly.
2. Removing the ECU cover



a. Pry out the 6 switch panel retaining clips, then remove the ECU cover.

Installation Procedure

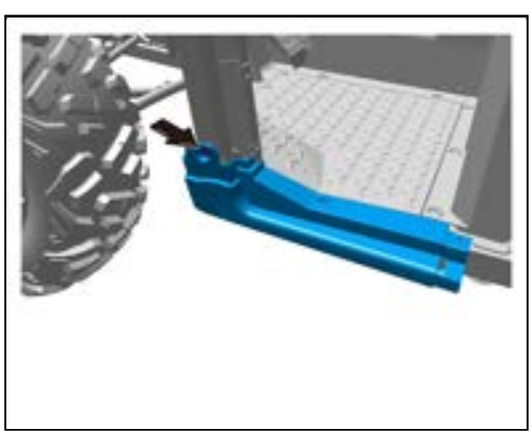
1. Install the ECU cover in the reverse order of removal.

9.2.5.19 Left Side Cover, Front Section

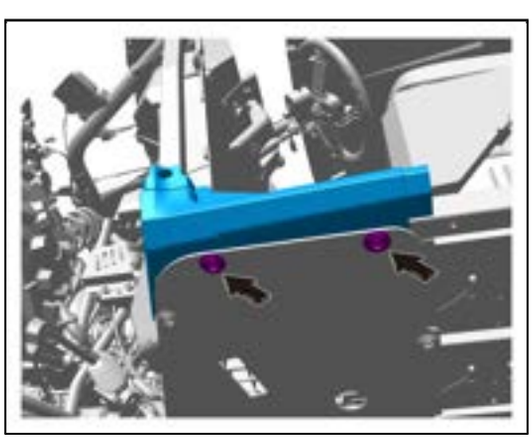
NOTICE:
• This manual describes the removal and installation of the left side panel front section as an example; refer to this procedure for the right side panel front section.

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. To remove the left headlamp cover, See: Headlamp Cover.
4. To remove the flasher unit, See: Flasher Unit.
5. To remove the front panel, See: Front Panel.
6. To remove the front mudguard, See: Front Mudguard.
7. To remove the left half-door, See: Left Half Door.
8. To remove the driver's seat assembly, See: Driver's Seat Assembly.
9. To remove the left inner headliner bar cover, See: Left Inner Roof Bar Cover.
10. To remove the left roof bar side cover, See: Left Roof Bar Side Cover.
11. To remove the left side cover, rear section, See: left Side Cover, Rear Section.
12. Removing the front section of left side cover



a. Remove the front section of left side cover retaining bolt.



b. Remove the 2 front section retaining bolts, then remove the front section of left side cover.

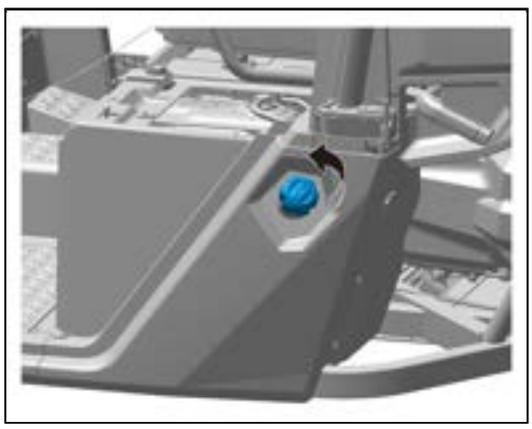
Installation Procedure

1. Install the front section of the left side panel in the reverse order of removal.

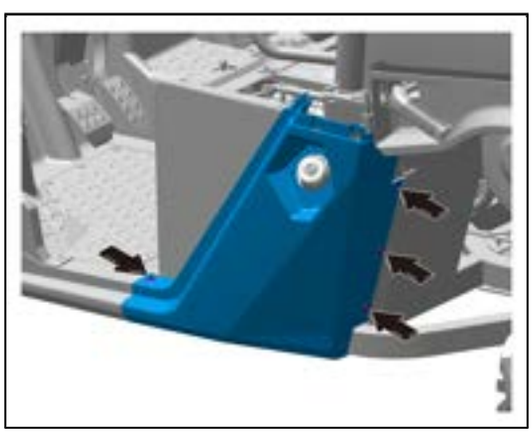
9.2.5.20 Left Side Cover, Rear Section

Removal Procedure

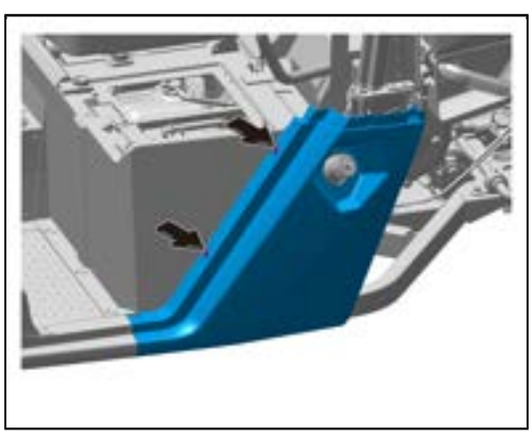
1. To remove the left half-door, See: Left Half Door.
2. To remove the driver's seat assembly, See: Driver's Seat Assembly.
3. To remove the left inner roof bar cover, See: Left Inner Roof Bar Cover.
4. To remove the left roof bar side cover, See: Left Roof Bar Side Cover.
5. Removing the rear section of left side panel



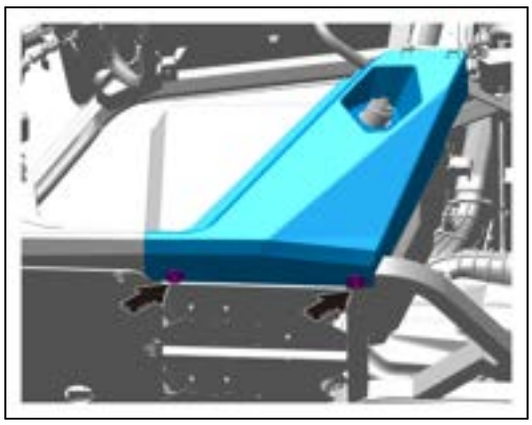
a. Unscrew the fuel filler cap anti-clockwise.



b. Remove the 4 retaining bolts from the rear section of the left side panel.



c. Remove the 2 retaining bolts from the rear section of the left side panel.



d. Remove the 2 retaining bolts and remove the rear section of the left side panel.

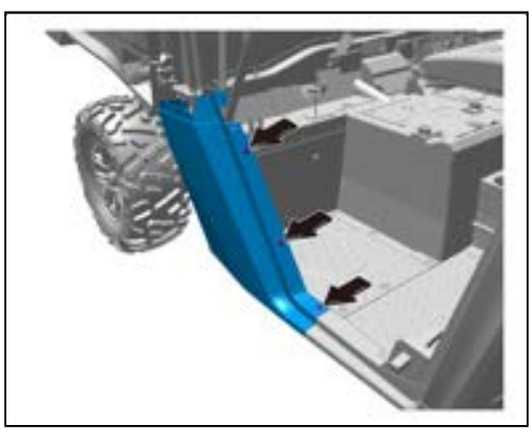
Installation Procedure

1. Install the rear section of the left side panel in the reverse order of removal.

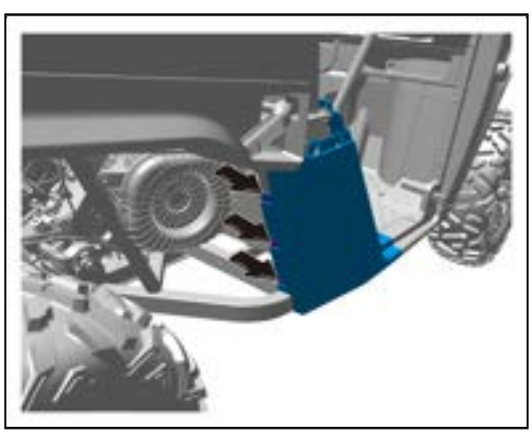
9.2.5.21 Right Side Cover, Rear Section

Removal Procedure

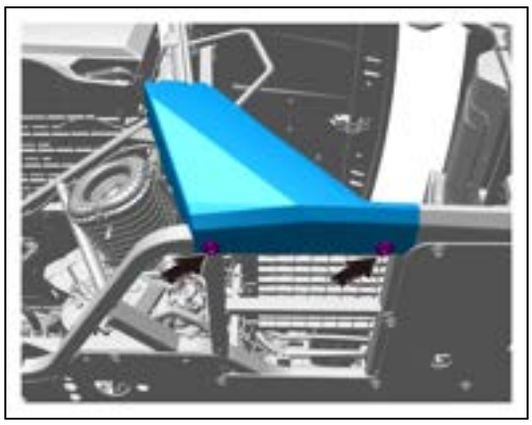
1. To remove the right half door, See: Left Half Door.
2. To remove the passenger backrest assembly, See: Passenger Backrest Assembly.
3. To remove the passenger seat cushion assembly, See: Passenger Seat Cushion Assembly.
4. To remove the right inner roof bar cover, See: Right Inner Roof Bar Cover.
5. To remove the right roof bar side cover, See: Right Roof Bar Side Cover.
6. Removing the rear section of right side cover



a. Remove the 3 rear section retaining bolts from the right side cover.



b. Remove the 3 rear section retaining bolts from the right side cover.



c. Remove the 2 rear section retaining bolts, then remove the rear section of right side cover.

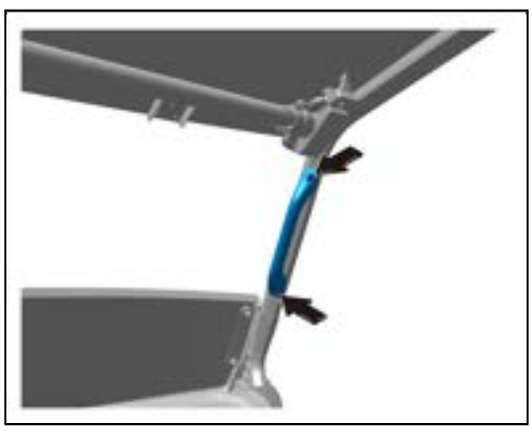
Installation Procedure

1. Install the rear section of the right side panel in the reverse order of removal.

9.2.5.22 Passenger Grab Handle Assembly

Removal Procedure

1. Removing the passenger grab handle assembly



a. Remove the 2 retaining screws (M8×25) and remove the passenger grab handle assembly.

Torque: 17–22 ft-lbs (22–30 N·m)

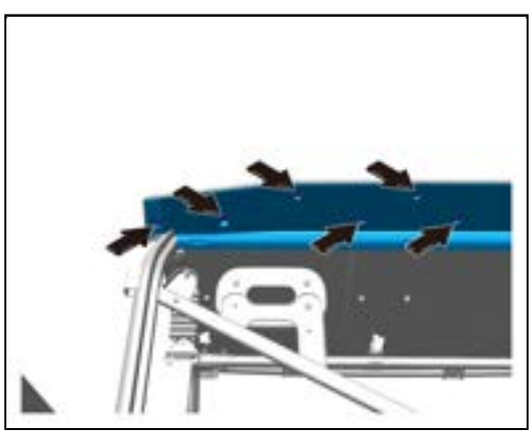
Installation Procedure

1. Install the passenger grab handle assembly in the reverse order of removal.

9.2.5.23 Headliner Spoiler

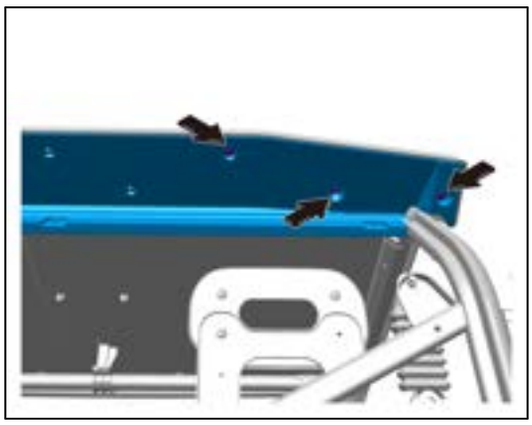
Removal Procedure

1. Removing the rear headliner spoiler



a. Remove the 6 M6 × 16 rear headliner spoiler retaining bolts.

Torque: 6–9 ft-lbs (8–12 N·m).



b. Remove the 3 M6 × 16 rear headliner spoiler retaining bolts, then remove the rear headliner spoiler.

Torque: 6–9 ft-lbs (8–12 N·m).

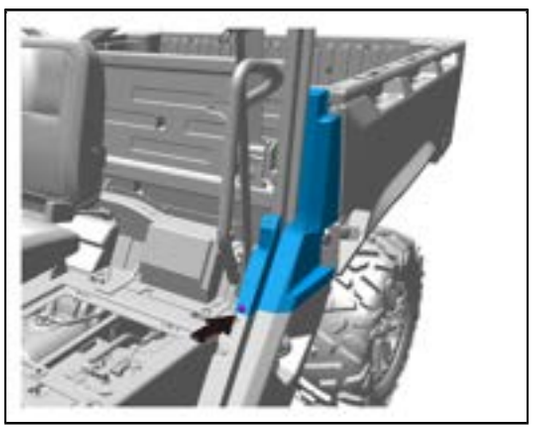
Installation Procedure

1. Install the headliner spoiler in the reverse order of removal.

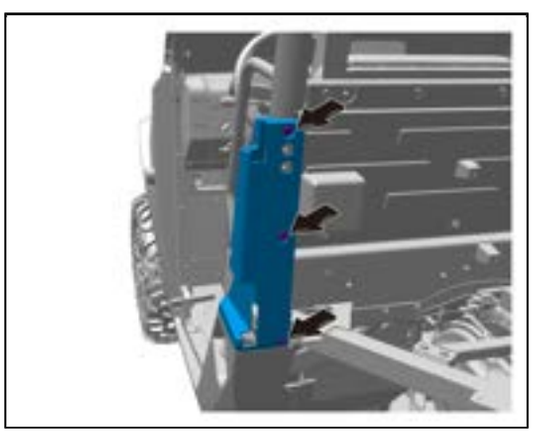
9.2.5.24 Left Roof Bar Side Cover

Removal Procedure

1. To remove the left half-door, See: Left Half Door.
2. To remove the driver's seat assembly, See: Driver's Seat Assembly.
3. To remove the left inner roof bar cover, See: Left Inner Roof Bar Cover.
4. Removing the left roof bar side cover



a. Remove the left roof bar side cover retaining bolt.



b. Remove the 3 left roof bar side cover retaining bolts, then remove the cover.

Installation Procedure

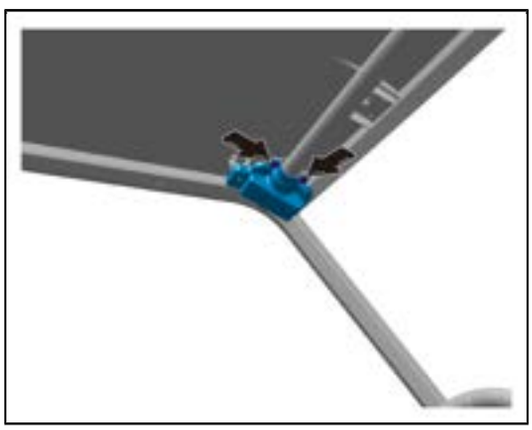
1. Install the left roof bar side cover in the reverse order of removal.

9.2.5.25 Headliner Left Inner Panel

NOTICE:
• This manual describes the removal and installation of the left inner headliner cover as an example; the procedure for the right inner headliner cover is identical.

Removal Procedure

1. Removing the left inner headliner cover



a. Remove the 2 mounting bolts and remove the left inner headliner cover.

Installation Procedure

1. Install the left inner headliner cover in the reverse order of removal.

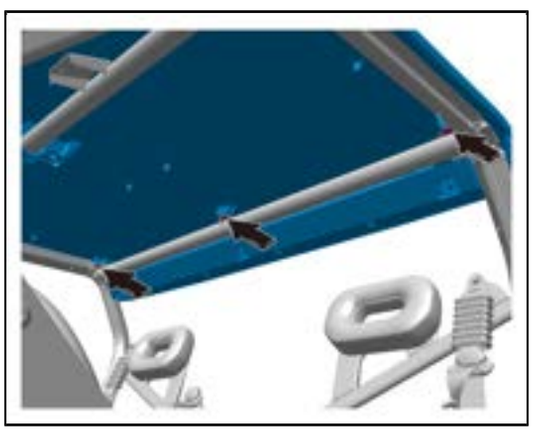
9.2.5.26 Headliner

Removal Procedure

1. To remove the headliner left inner cover, See: Headliner Left Inner Cover.
2. Removing the headliner



a. Remove the 2 headliner retaining bolts.



b. Remove the 3 headliner retaining bolts, then remove the headliner.

NOTICE:
• Two people are required to remove the headliner assembly.

Installation Procedure

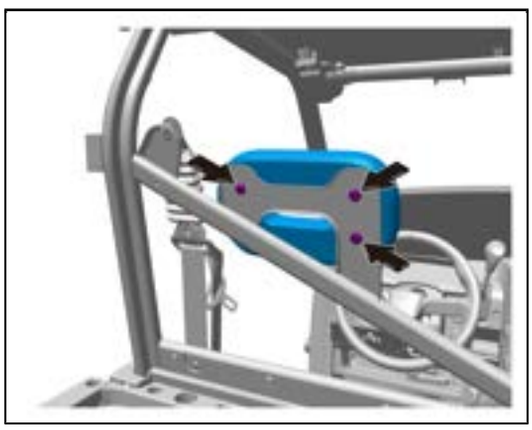
1. Install the headliner in the reverse order of removal.

9.2.5.27 Headrest

NOTICE:
• This manual describes the removal and installation of the left headrest as an example; the procedure for the right headrest is identical.

Removal Procedure

1. Removing the headrest



a. Remove the 3 mounting bolts and remove the headrest.

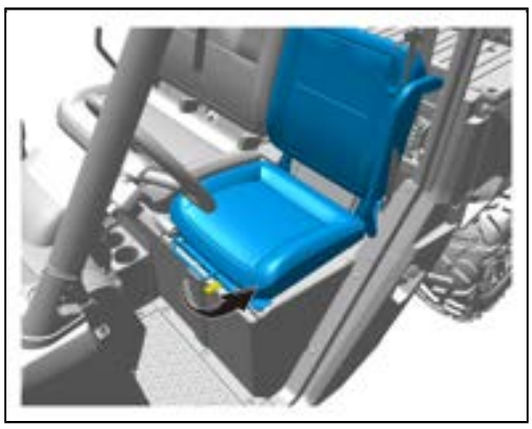
Installation Procedure

1. Install the headrest in the reverse order of removal.

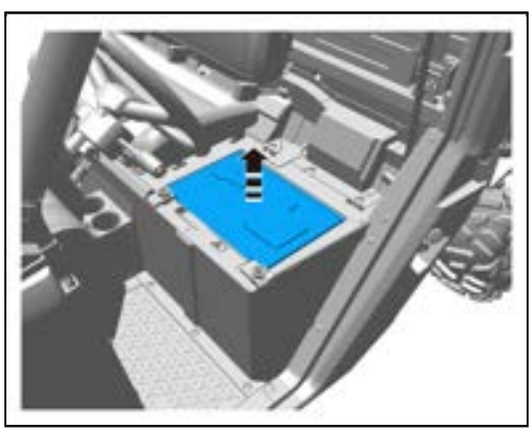
9.2.5.28 Driver'S Seat Assembly

Removal Procedure

1. Removing the driver's seat assembly



a. Push the release lever in the direction of the arrow and lift the driver seat assembly upwards to remove it.



b. Lift the driver under-seat cover plate upwards to remove it.



c. Remove the 3 driver's grab bar welded assembly retaining bolts, then remove the assembly.

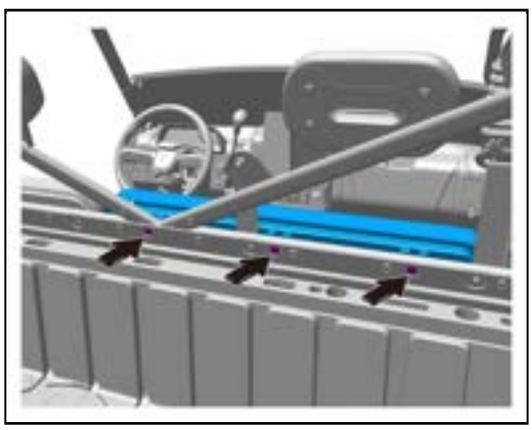
Installation Procedure

1. Install the driver's seat assembly in the reverse order of removal.

9.2.5.29 Passenger Seat Backrest Assembly

Removal Procedure

1. Removing the passenger backrest assembly



a. Remove the 3 passenger backrest retaining bolts, then remove the passenger backrest assembly.

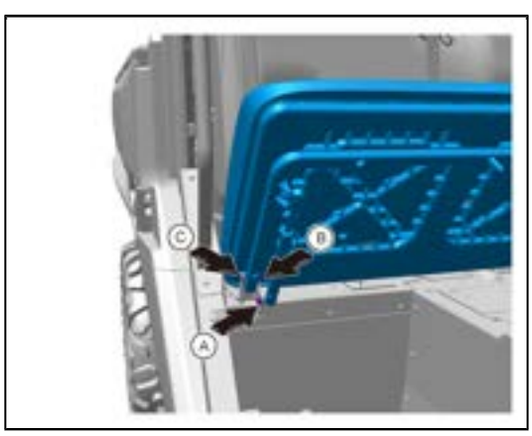
Installation Procedure

1. Install the passenger backrest assembly in the reverse order of removal.

9.2.5.30 Passenger Seat Cushion Assembly

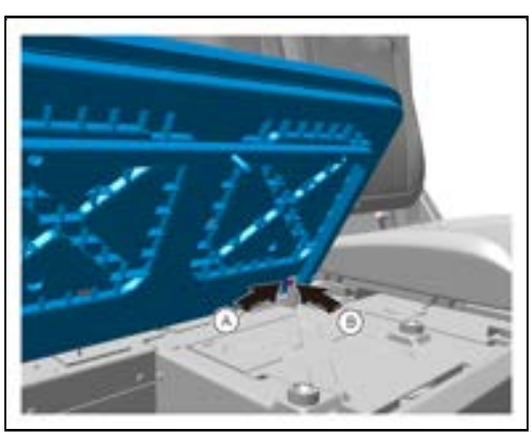
Removal Procedure

1. Removing the passenger seat cushion assembly



a. Remove passenger seat cushion assembly retaining nut A.

b. Remove locking pin B, then remove pivot pin C.



c. Remove locking pin A and pivot pin B, then remove the passenger seat cushion assembly.

Installation Procedure

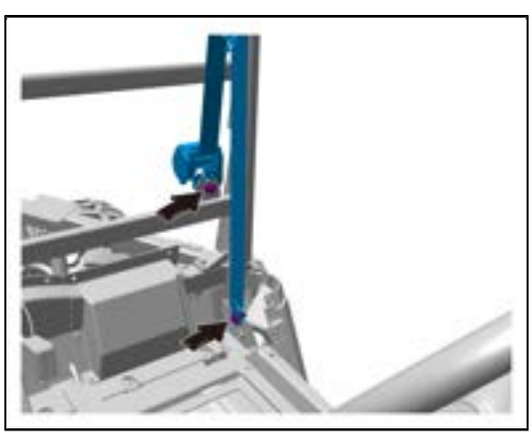
1. Install the passenger seat cushion assembly in the reverse order of removal.

9.2.5.31 Seat Belt Retractor Assembly

NOTICE:
• The removal and installation of the left seat belt retractor assembly is described as an example. The procedure for the right and centre seat belt retractor assemblies is similar.

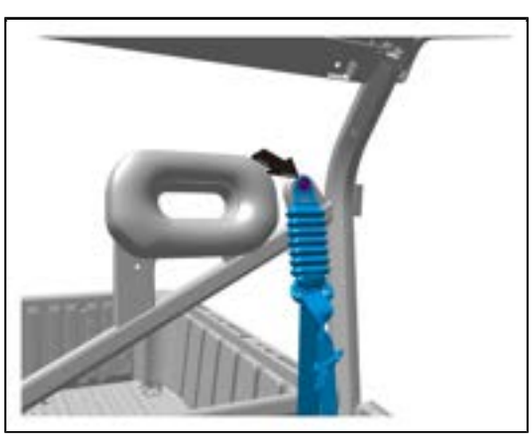
Removal Procedure

1. To remove the driver's seat assembly, See: Driver's Seat Assembly.
2. To remove the passenger backrest assembly, See: Passenger Backrest Assembly.
3. To remove the passenger seat cushion assembly, See: Passenger Seat Cushion Assembly.
4. To remove the left and right half doors, See: Left Half Door.
5. To remove the left inner roof bar cover, See: Left Inner Roof Bar Cover.
6. To remove the right inner roof bar cover, See: Right Inner Roof Bar Cover.
7. To remove the left roof bar side cover, See: Left Roof Bar Side Cover.
8. To remove the right roof bar side cover, See: Right Roof Bar Side Cover.
9. To remove the CVT air intake duct 1, See: CVT Intake Pipe 1.
10. To remove the CVT air intake duct 2, See: CVT Intake Pipe 2.
11. To remove the rear panel, See: Rear Back Panel.
12. Removing seat belt retractor assembly



a. Remove the 2 seat belt retractor retaining bolts.

26~30 ft-lbs(35~40N·m)



b. Remove the mounting bolts and detach the seat belt retractor assembly.

26~30 ft-lbs(35~40N·m)

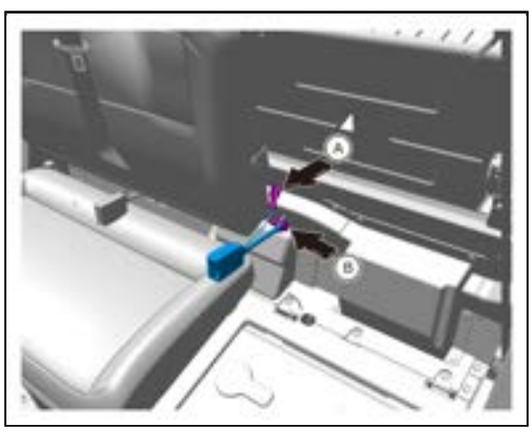
Installation Procedure

1. Install the seat belt retractor assembly in the reverse order of removal.

9.2.5.32 Seat Belt Buckle Assembly

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the driver's seat assembly, See: Driver's Seat Assembly.
3. Removing seat belt buckle assembly



a. Disconnect the wiring harness connector A from the seat belt buckle assembly.

CAUTION:
This step only applies to the driver's seat belt buckle assembly.

b. Remove the mounting bolt and nut B, and detach the seat belt buckle assembly.

Installation Procedure

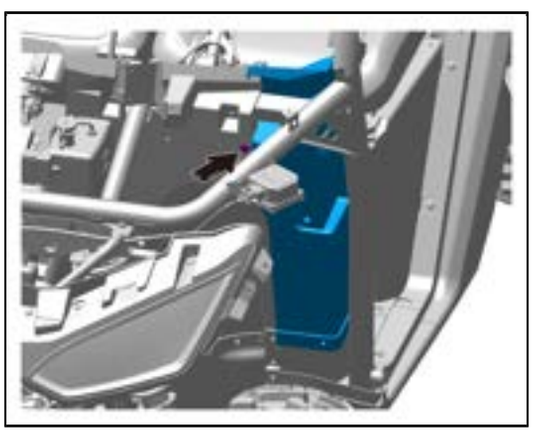
1. Install the seat belt buckle assembly in the reverse order of removal.

9.2.5.33 Front Left Shield

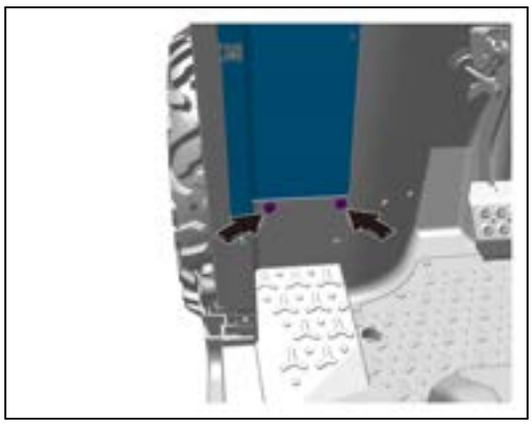
NOTICE:
• This manual describes the removal and installation of the front left shield as an example; refer to this procedure for the front right splash shield.

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front half windscreen, See: Front Half Windscreen.
3. To remove the front service cover, See: Front Service Cover.
4. To remove the headlamp cover, See: Headlamp Cover.
5. To remove the flasher unit, See: Flasher Unit.
6. To remove the front panel, See: Front Panel.
7. To remove the front mudguard, See: Front Mudguard.
8. To remove the headliner left inner cover, See: Headliner Left Inner Cover.
9. To remove the headliner, See: Headliner.
10. To remove the left A-pillar welded assembly, See: Left A-Pillar Welded Assembly.
11. To remove the instrument cover, See: Instrument Cover.
12. To remove the centre display, See: Centre Display.
13. To remove the switch panel, See: Switch Panel.
14. To remove the lower centre console storage compartment, See: Lower Centre Console Storage Compartment.
15. Removing the front left shield



a. Remove the front left shield retaining bolt.



b. Pry out the 2 front left shield retaining clips, then remove the front left shield.

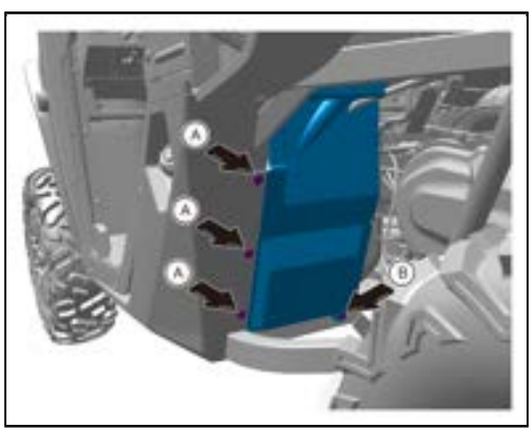
Installation Procedure

1. Install the front left shield in the reverse order of removal.

9.2.5.34 Fuel Tank Guard

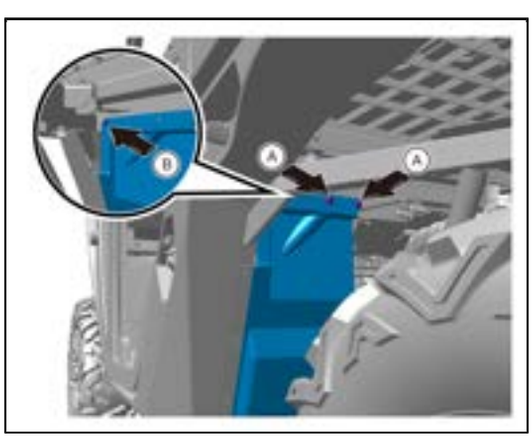
Removal Procedure

1. Removing the fuel tank guard



a. Remove the 3 fuel tank guard retaining bolts A.

b. Pry out fuel tank guard retaining clip B.



c. Remove the 2 fuel tank guard retaining bolts A.

d. Pry out fuel tank guard retaining clip B, then remove the fuel tank guard.

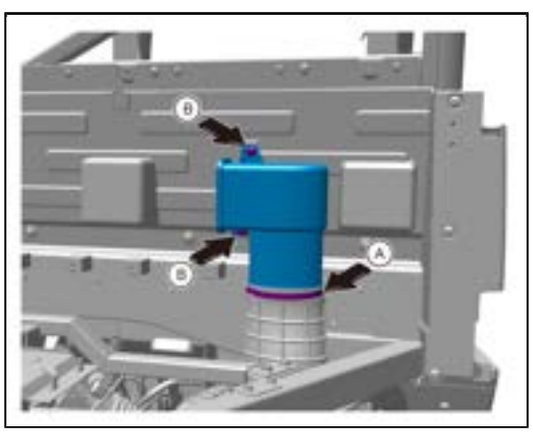
Installation Procedure

1. Install the fuel tank guard in the reverse order of removal.

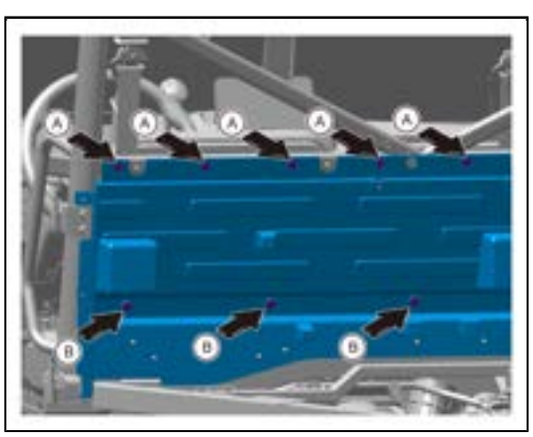
9.2.5.35 Rear Back Panel

Removal Procedure

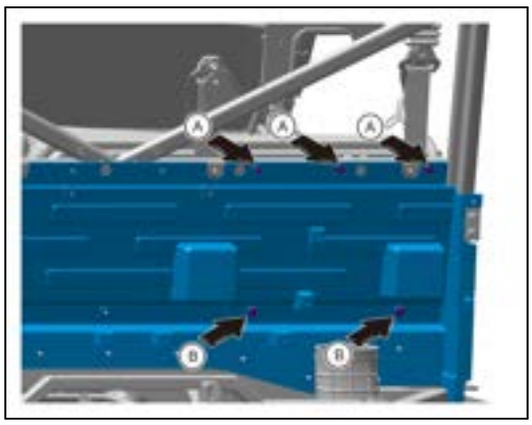
1. To remove the driver's seat assembly, See: Driver's Seat Assembly.
2. To remove the passenger backrest assembly, See: Passenger Backrest Assembly.
3. To remove the passenger seat cushion assembly, See: Passenger Seat Cushion Assembly.
4. To remove the left and right half doors, See: Left Half Door.
5. To remove the left inner roof bar cover, See: Left Inner Roof Bar Cover.
6. To remove the right inner roof bar cover, See: Right Inner Roof Bar Cover.
7. To remove the left roof bar side cover, See: Left Roof Bar Side Cover.
8. To remove the right roof bar side cover, See: Right Roof Bar Side Cover.
9. To remove the CVT air intake duct 1, See: CVT Intake Pipe 1.
10. To remove the CVT air intake duct 2, See: CVT Intake Pipe 2.
11. Removing the rear back panel



a. Loosen clamp A and disconnect the intake pipe.
b. Remove the 2 intake pipe retaining bolts B.

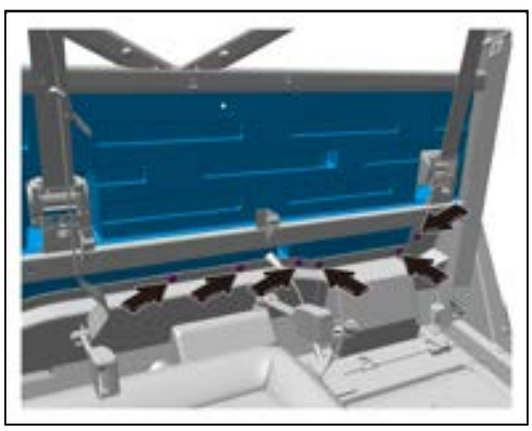


c. Pry out the 5 rear back panel retaining clips A.
d. Remove the 3 rear back panel retaining bolts B.

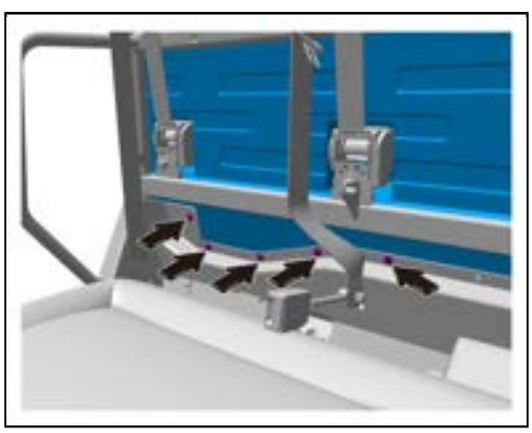


e. Pry out the 3 rear back panel retaining clips A.

f. Remove the 2 rear back panel retaining bolts B.



g. Pry out the 6 rear back panel retaining clips.



h. Pry out the 5 cabin rear panel retaining clips, then remove the rear back panel.

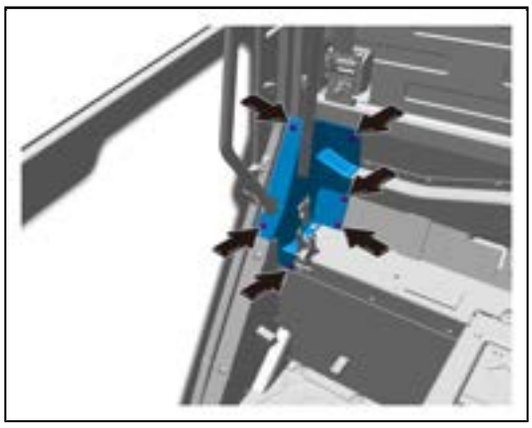
Installation Procedure

1. Install the rear plate in the reverse order of removal.

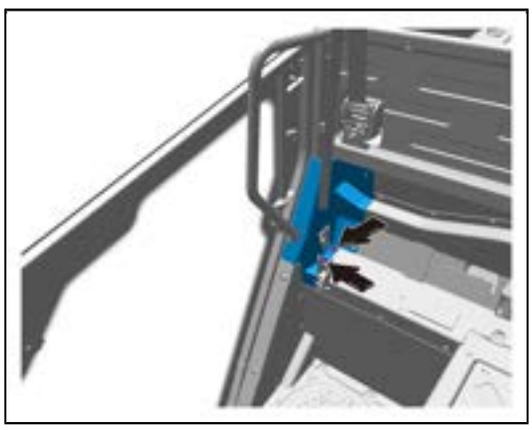
9.2.5.36 Right Inner Roof Bar Cover

Removal Procedure

1. To remove the passenger backrest assembly, See: Passenger Backrest Assembly.
2. To remove the passenger seat cushion assembly, See: Passenger Seat Cushion Assembly.
3. Removing the right inner roof bar cover



a. Pry out the 6 right inner roof bar cover retaining clips.



b. Remove the 2 right inner roof bar cover retaining bolts, then remove the right inner roof bar cover.

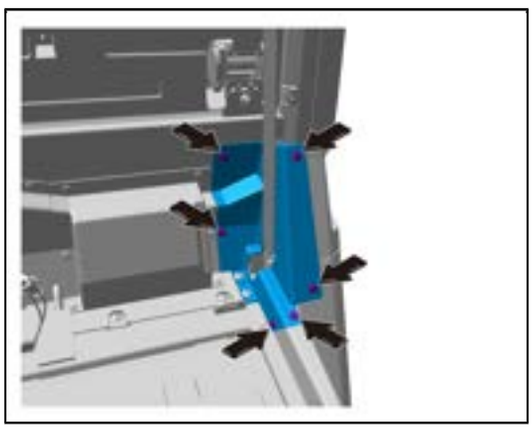
Installation Procedure

1. Install the right inner roof bar cover in the reverse order of removal.

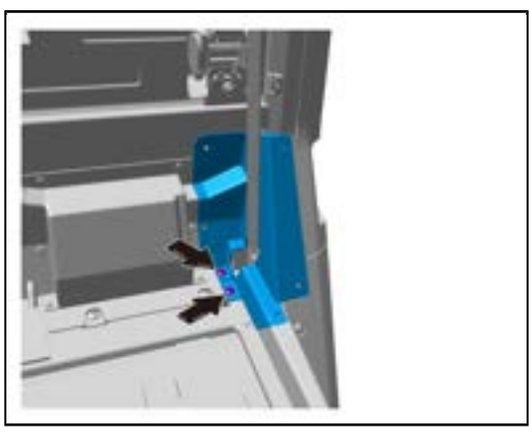
9.2.5.37 Left Inner Roof Bar Cover

Removal Procedure

1. To remove the driver's seat assembly, See: Driver's Seat Assembly.
2. Removing the left inner roof bar cover



a. Pry out the 6 left inner roof bar cover retaining clips.



b. Remove the 2 left inner roof bar cover retaining bolts, then remove the left inner roof bar cover.

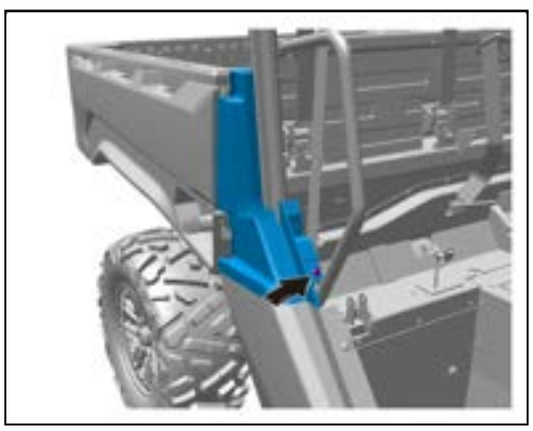
Installation Procedure

1. Install the left inner roof bar cover in the reverse order of removal.

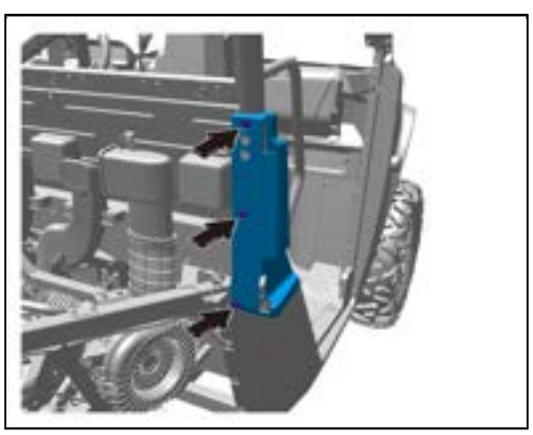
9.2.5.38 Right Roof Bar Side Cover

Removal Procedure

1. To remove the right half door, See: Left Half Door.
2. To remove the passenger backrest assembly, See: Passenger Backrest Assembly.
3. To remove the passenger seat cushion assembly, See: Passenger Seat Cushion Assembly.
4. To remove the right inner roof bar cover, See: Right Inner Roof Bar Cover.
5. Removing the right roof bar side cover



a. Remove the right roof bar side cover retaining bolt.



b. Remove the 3 right roof bar side cover retaining bolts, then remove the right roof bar side cover.

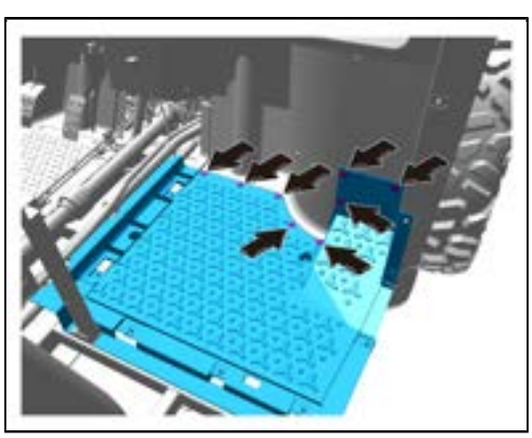
Installation Procedure

1. Install the right roof bar side cover in the reverse order of removal.

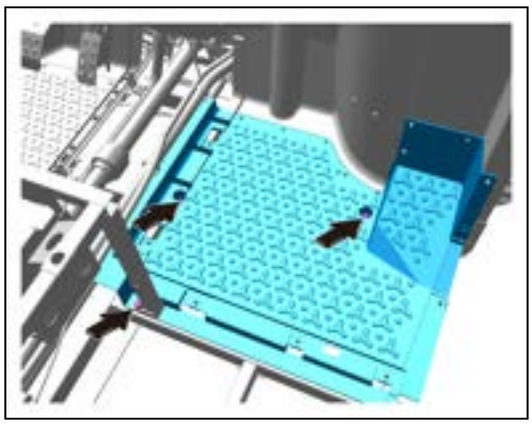
9.2.5.39 Right Footboard

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. To remove the left headlamp cover, See: Headlamp Cover.
4. To remove the flasher unit, See: Flasher Unit.
5. To remove the front panel, See: Front Panel.
6. To remove the front mudguard, See: Front Mudguard.
7. To remove the left half-door, See: Left Half Door.
8. To remove the driver's seat assembly, See: Driver's Seat Assembly.
9. To remove the passenger backrest assembly, See: Passenger Backrest Assembly.
10. To remove the passenger seat cushion assembly, See: Passenger Seat Cushion Assembly.
11. To remove the centre guide cover, See: Centre Guide Cover.
12. To remove the right side cover inner trim, See: Right Side Cover Inner Trim.
13. To remove the centre under-seat cover, See: Centre Under-Seat Cover.
14. To remove the left inner roof bar cover, See: Left Inner Roof Bar Cover.
15. To remove the right inner roof bar cover, See: Right Inner Roof Bar Cover.
16. To remove the left roof bar side cover, See: Left Roof Bar Side Cover.
17. To remove the right roof bar side cover, See: Right Roof Bar Side Cover.
18. To remove the left side cover, rear section, See: left Side Cover, Rear Section.
19. To remove the rear section of right side cover, See: Rear Section of Right Side Cover.
20. To remove the ECU cover, See: ECU Cover.
21. To remove the ECU assembly, See: ECU Assembly.
22. To remove the seat belt buckle assembly, See: Seat Belt Buckle Assembly.
23. To remove the rear seat cushion guard, See: Rear Seat Cushion Guard.
24. To remove the under-seat panel, See: Under-Seat Panel.
25. To remove the cargo platform, See: Storage Platform.
26. Removing the right footboard



a. Pry out the 8 retaining clips securing the left footboard.



b. Remove the 3 left footboard retaining bolts, then remove the right footboard.

Installation Procedure

1. Install the right footboard in the reverse order of removal.

9.3 Cargo Box Assembly

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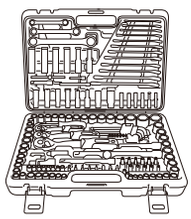
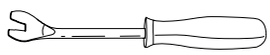
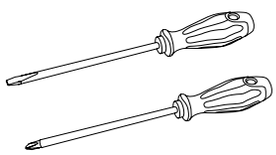
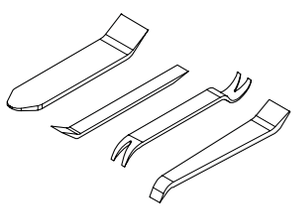
9.3.4.12 Rear Cargo Box Assembly..... 930

9.3.4.13 Rear Cargo Box Heat Shield..... 931

9.3.4.14 Tailgate Striker..... 932

9.3.1 Service Tools

9.3.1.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)
2	Trim clip removal tool		Removing the retaining fastener
3	Screwdriver		Removal and installation of mounting screws
4	Interior trim removal lever		Removing interior and exterior trim parts
5	Hose Clamp Pliers		Removing the clamp

9.3.2 Description and Operation

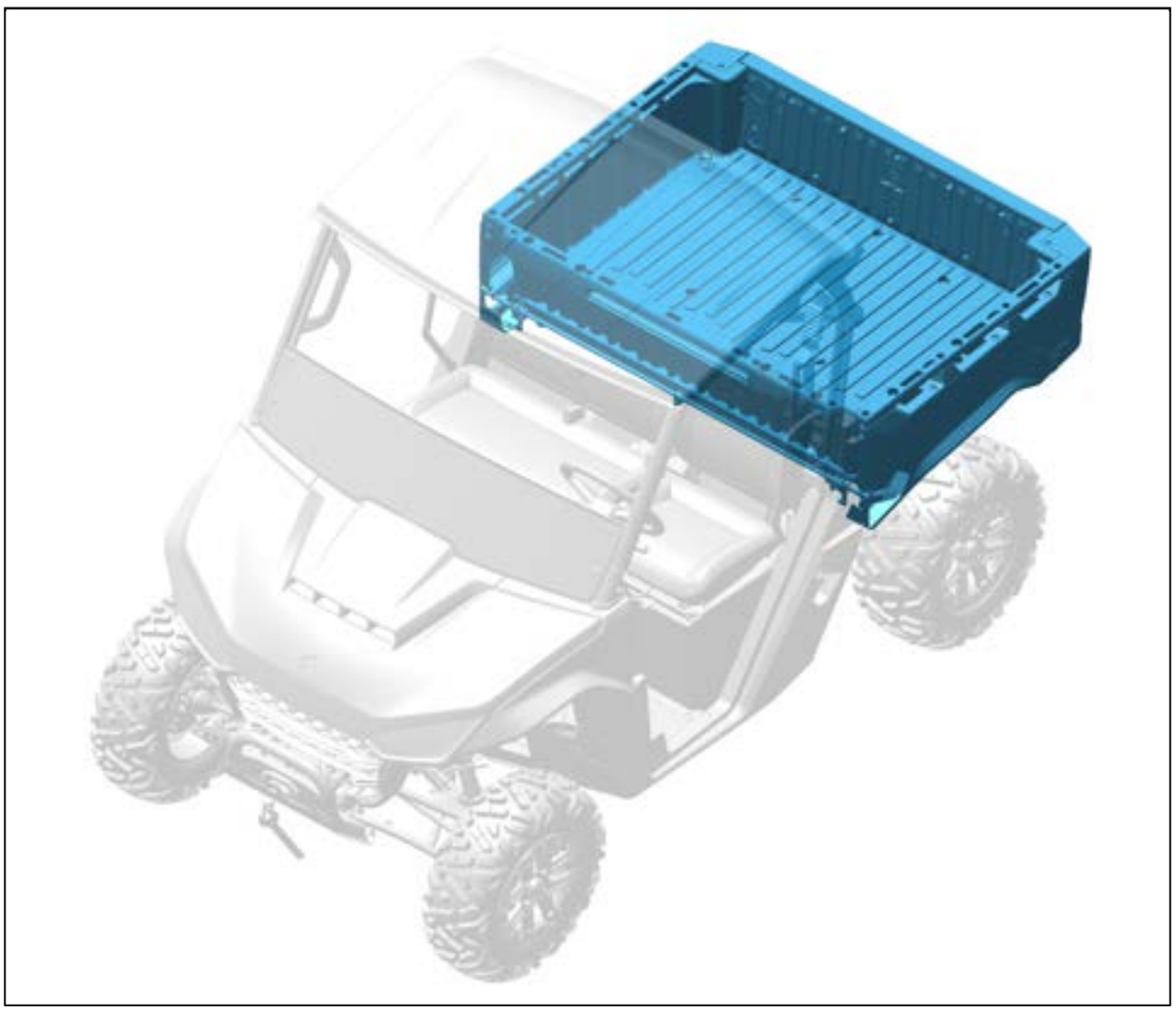
9.3.2.1 Warnings and Precautions

1. Use a suitable interior trim removal tool to remove the outer interior trim. If such a tool is not available, a screwdriver or equivalent tool may be used, but it must be suitably wrapped to prevent damage.
2. Do not force off any component that cannot be removed easily. Check whether any mounting screws or push-in clips have been overlooked.
3. Push-in clips are wear items. Check the removed push-in clips for damage and renew them if necessary.
4. After removing the components, check whether any push-in clips remain on the body. Before installing the components, ensure that no component push-in clips are left on the body.
5. When installing the components, check that all retaining fasteners are present.

9.3.3 Component Location and Exploded View

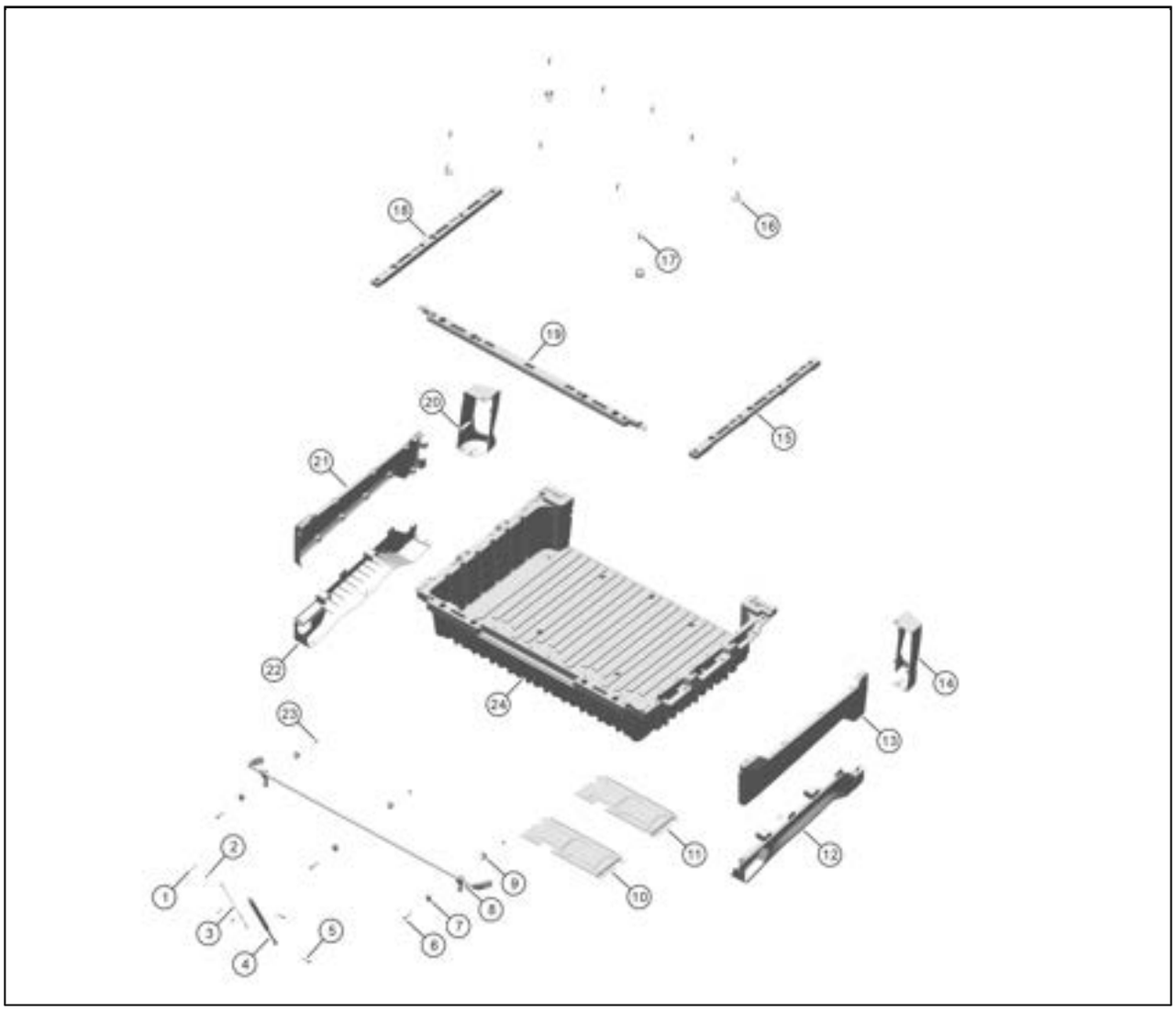
9.3.3.1 Component Location Diagram

Cargo Box Assembly System



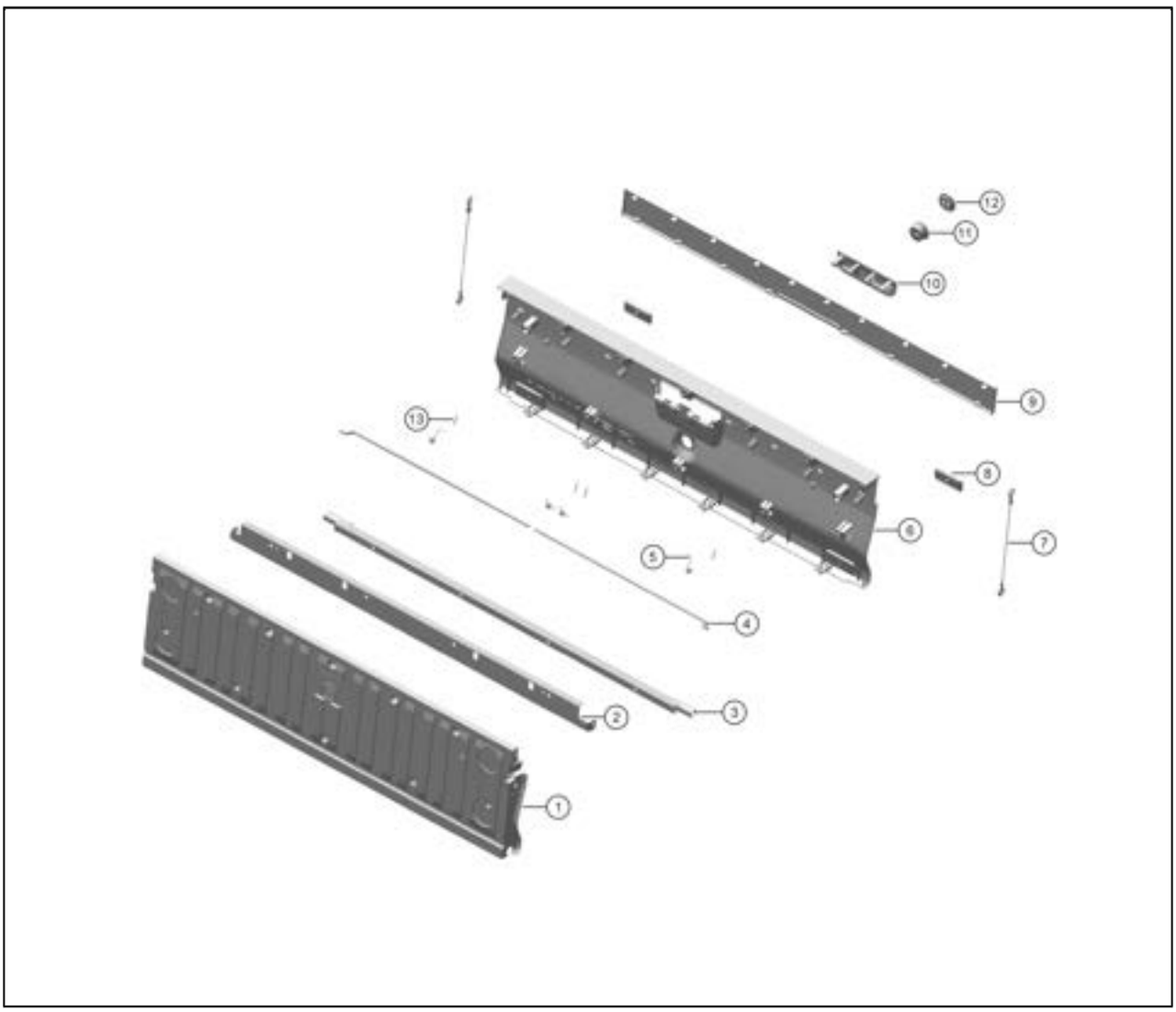
9.3.3.2 Exploded View Diagram

Cargo Box Assembly System



1	Locking Pin 8	9	Cargo Box Lock Striker Block	17	Large Pan Head Hex Socket Bolt M8 × 35.
2	Plain Washer, Grade A, 10	10	Rear Cargo Box Heat Shield	18	Right Cargo Box Retaining Strip
3	Cargo Box Cable Assembly	11	Rear Cargo Box Heat Shield	19	Front Cargo Box Retaining Strip
4	Gas Strut Assembly	12	Left Cargo Box Guard Panel	20	Right Tail Lamp Cover
5	Clevis Pin ∅10×40	13	Left Cargo Box Trim Panel	21	Right Cargo Box Trim Panel
6	M8 × 50 Hex Flange Bolt	14	Left Tail Lamp Cover	22	Right Cargo Box Guard Panel

7	Cargo Box Lock Striker Block	15	Left Cargo Box Retaining Strip	23	Hex Flange Locknut With Non-Metallic Insert M8
8	Cargo Box Tilt Control Assembly	16	Cargo Box Tie-Down Hook	24	Rear Cargo Box



1	Cargo Box Tailgate	8	Square Reflectors
2	Cargo Box Tailgate Reinforcement Bracket	9	Tailgate Trim Strip
3	Tailgate Pivot Assembly	10	Tailgate Handle
4	Cargo Box Tailgate Lock Rod	11	Camera Mounting Assembly
5	Lock Rod Torsion Spring	12	Tail Lamp Cover Plug
6	Cargo Box Front Panel	13	R-Clip
7	Cargo Box Tailgate Support Cable Assembly		

9.3.4 Repair Procedure Guidance

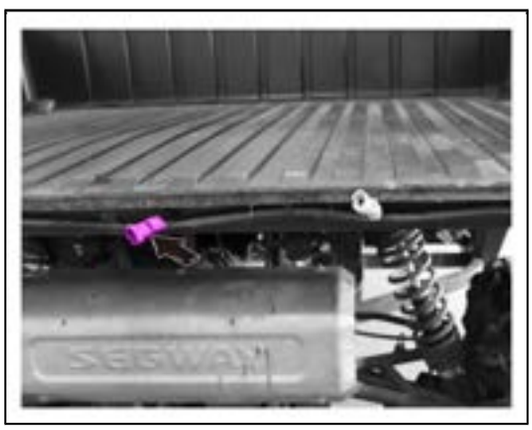
9.3.4.1 Cargo Box Tailgate Assembly

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.

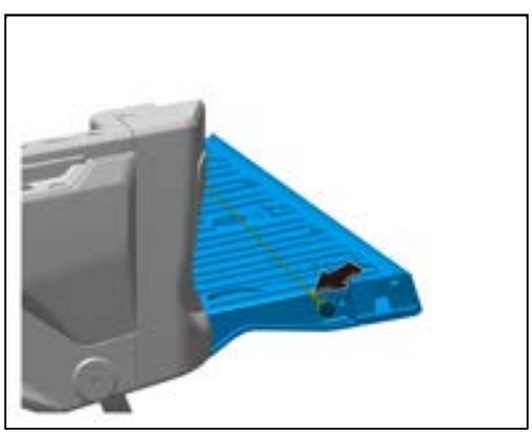
NOTICE:
• If the vehicle is not equipped with a reversing camera, it is not necessary to disconnect the power supply.

2. Removing tailgate assembly

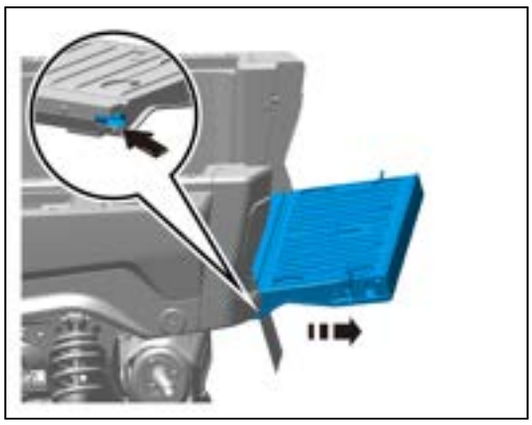


a. Disconnect the rear view camera wiring harness connector.

NOTICE:
• This feature is not fitted on all models.



b. Disconnect the cargo box tailgate support cable assemblies on both sides.



c. Following the direction of the arrow, disengage the left side first, then tilt and remove the cargo box tailgate assembly.

CAUTION:

- **The cargo box tailgate hinge assembly has a removal notch on the left side only. Do not forcibly remove the tailgate assembly as a whole, as this may damage the vehicle body.**

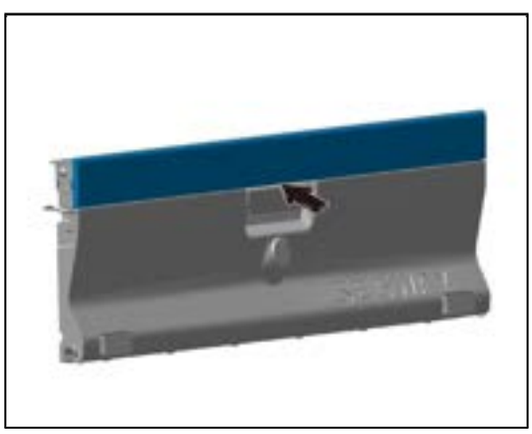
Installation Procedure

1. Install the tailgate assembly in the reverse order of removal.

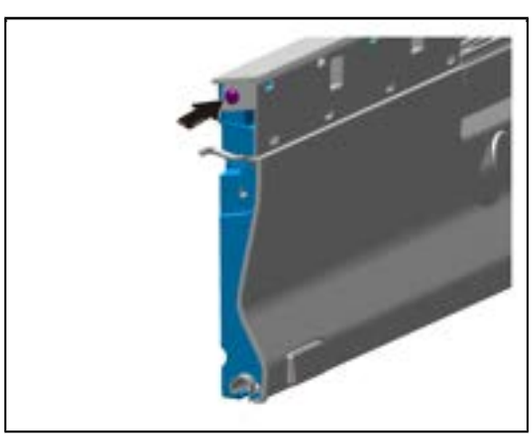
9.3.4.2 Disassembling Tailgate Assembly

Removal Procedure

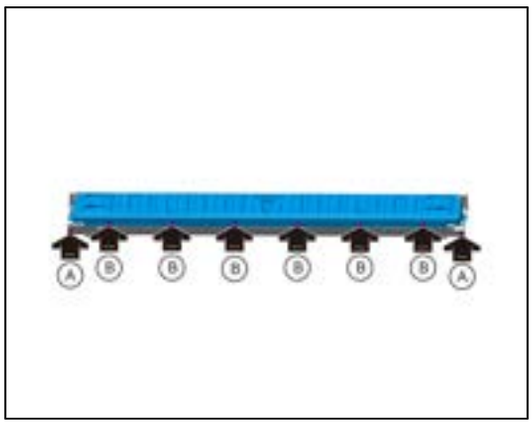
1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the cargo box tailgate assembly, See: Cargo Box Tailgate Assembly.
3. Dismantling tailgate assembly



a. Carefully pry off and remove the tailgate trim strip.

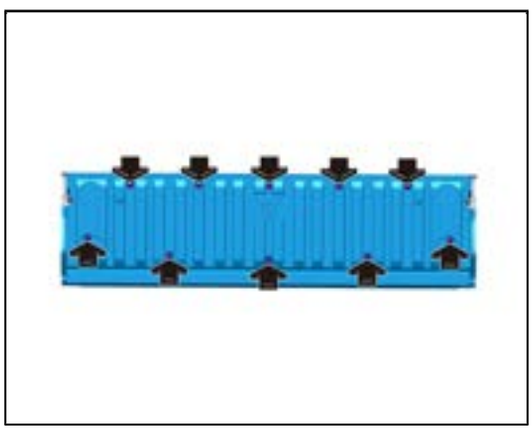


b. Remove the mounting bolts for the left and right tailgate outer panels.

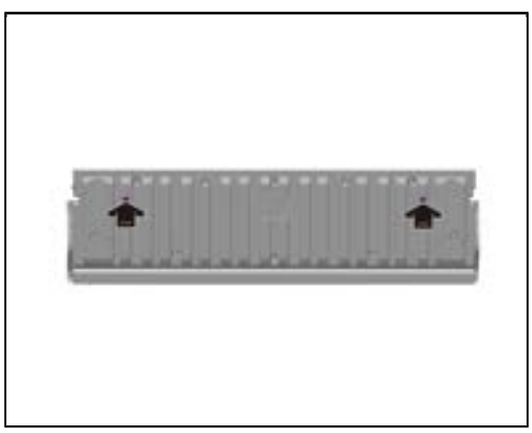


c. Pry out the 2 retaining clips A securing the cargo box tailgate.

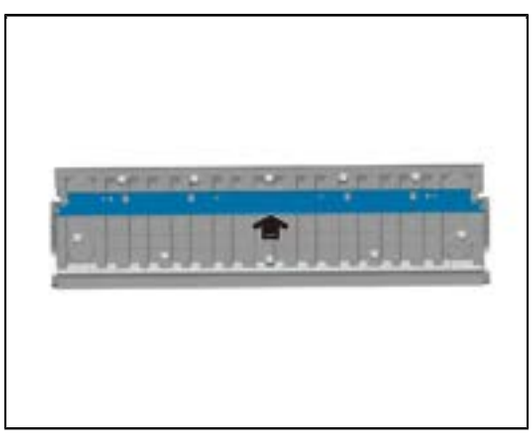
d. Remove the 6 cargo box tailgate retaining bolts B.



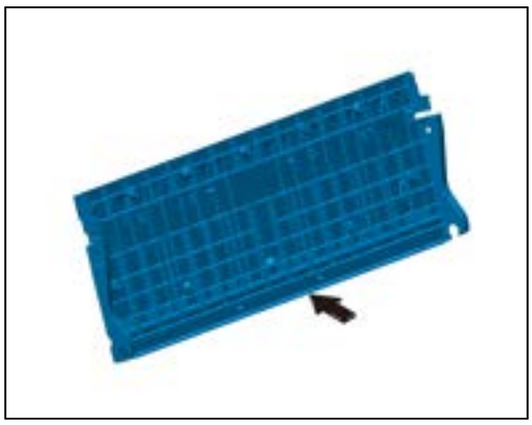
e. Remove the 10 tailgate outer panel retaining bolts, then remove the tailgate outer panel.



f. Remove the 2 tailgate reinforcement bracket retaining bolts.



g. Remove the tailgate reinforcement bracket.



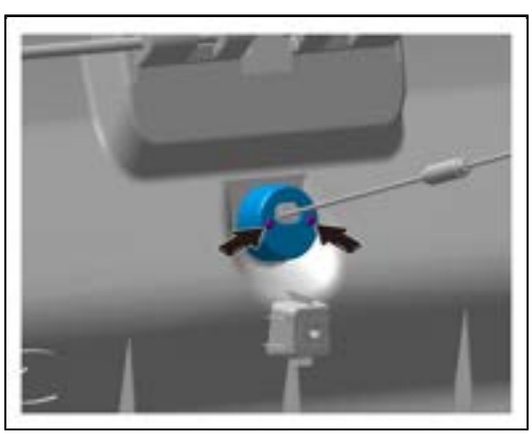
h. Remove the cargo box tailgate.



i. Remove the tail lamp cover plug.

NOTICE:

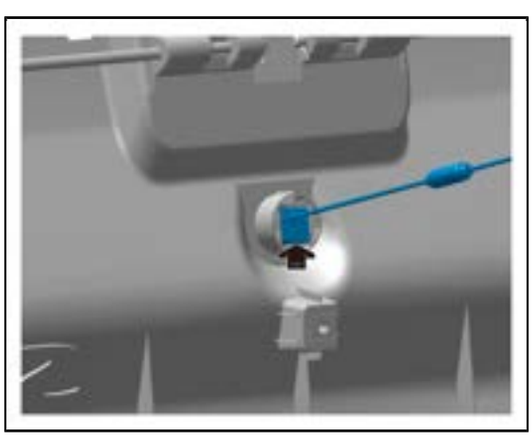
- Removal method for configuration 1



j. Remove the 2 upper camera mounting cover retaining screws, then remove the cover.

NOTICE:

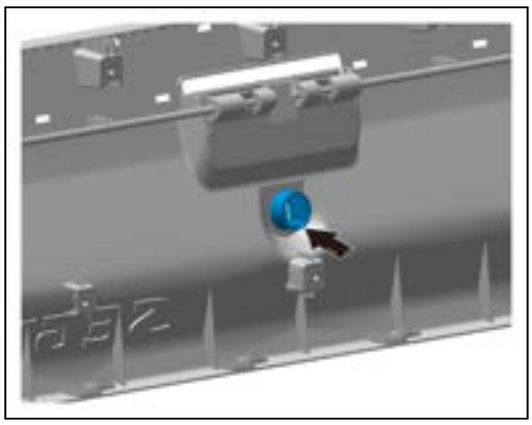
- Removal method for configuration 2



k. Remove the reversing camera.

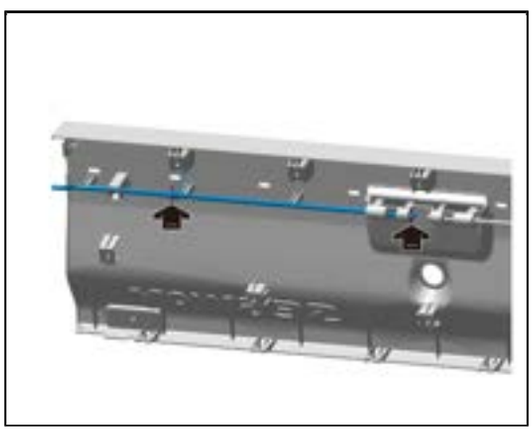
NOTICE:

- Removal method for configuration 2



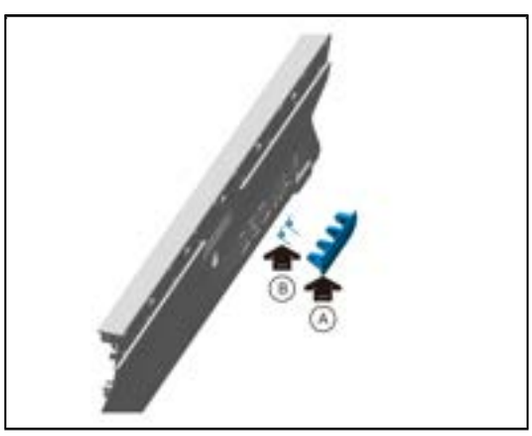
l. Remove the camera mounting base.

NOTICE:
• Removal method for configuration 2



m. Remove the 2 retaining pins from the tailgate latch assembly, then remove the tailgate latch rod.

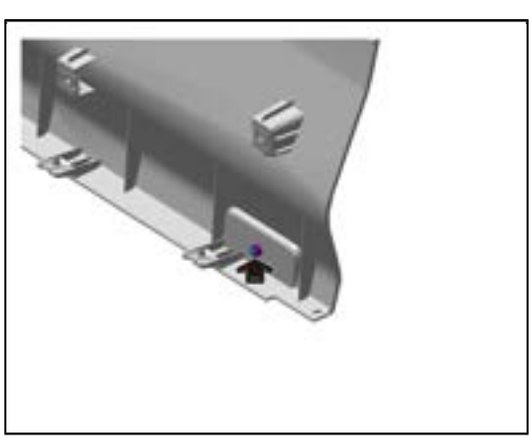
NOTICE:
• The left side is shown as an example. Remove the right side in the same manner. • Before removal, note the installation orientation and locating positions of the components, and make alignment marks for reassembly.



n. Remove tailgate handle A.

o. Remove the 2 handle return springs B.

CAUTION:
• Before removal, note the installation orientation and locating positions of the components, and make alignment marks for reassembly.



p. Remove the mounting nuts and detach the left and right square reflectors.

Installation Procedure

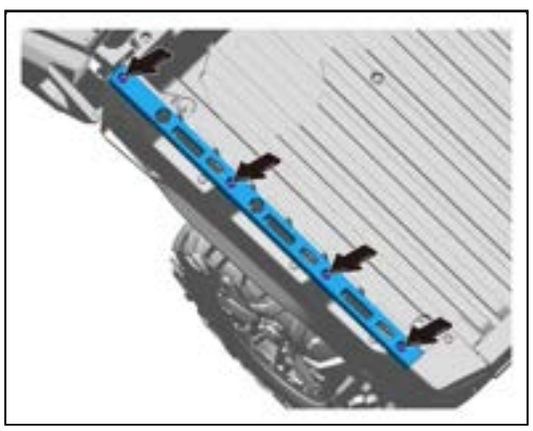
1. Install the cargo box lock in the reverse order of disassembly.

9.3.4.3 Cargo Box Retaining Strip

NOTICE:
• This procedure describes removal and installation of the left cargo box retaining strip. Remove and install the right cargo box retaining strip in the same manner.

Removal Procedure

1. Removing the cargo box retaining strip



a. Remove the 4 cargo box retaining strip retaining bolts.

b. Remove the cargo box retaining strip.

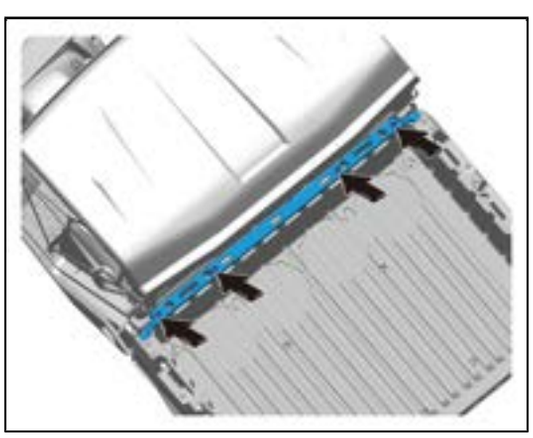
Installation Procedure

1. Install the cargo box retaining strip in the reverse order of removal.

9.3.4.4 Front Cargo Box Retaining Strip

Removal Procedure

1. To remove the cargo box retaining strips on both sides, See: Cargo Box Retaining Strip.
2. Removing the cargo box front retaining strip



a. Remove the 4 cargo box front retaining strip retaining bolts.

b. Remove the cargo box front retaining strip.

Installation Procedure

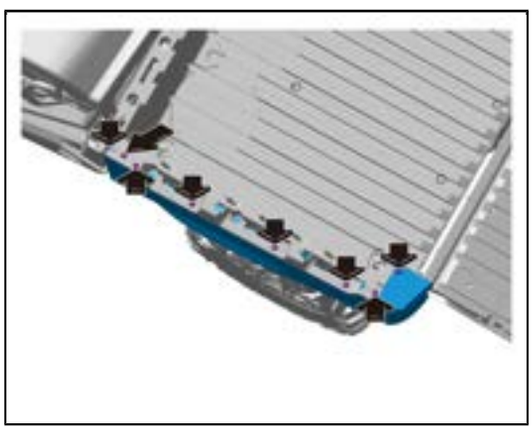
1. Install the cargo box front retaining strip in the reverse order of removal.

9.3.4.5 Cargo Box Guard Panel Assembly

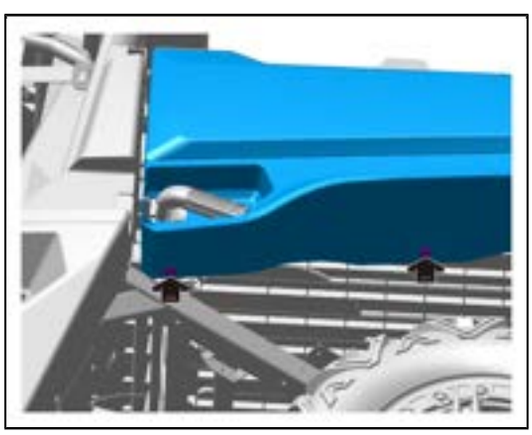
NOTICE:
• This manual describes the removal and installation of the left (Left) cargo box outer side panel assembly. The procedure for the right assembly is similar.

Removal Procedure

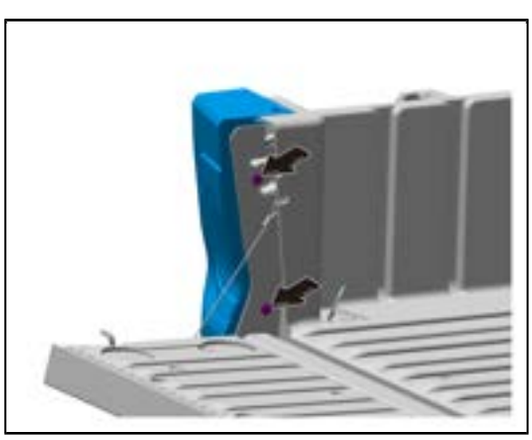
1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the cargo box retaining strip, See: Cargo Box Retaining Strip.
3. Removing the cargo box guard panel assembly



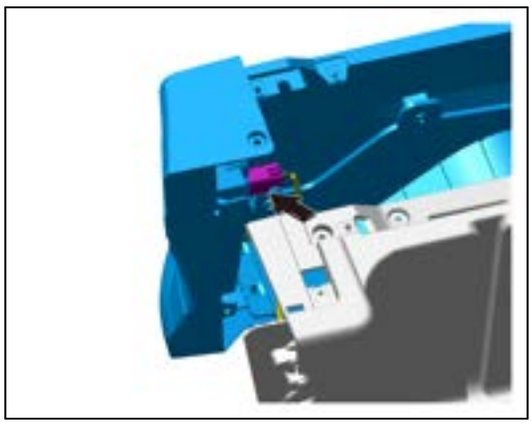
a. Remove the 8 cargo box guard panel assembly retaining bolts.



b. Remove the 2 cargo box guard panel assembly retaining bolts.



c. Remove the 2 cargo box guard panel assembly retaining bolts, then detach the assembly.



d. Disconnect the cargo box guard panel assembly wiring harness connector, then remove the assembly.

Installation Procedure

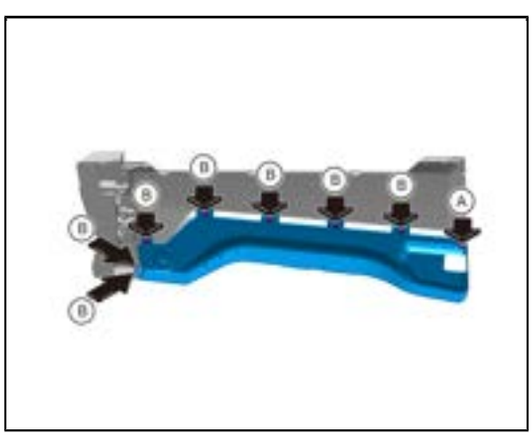
1. Install the left cargo box guard panel assembly in the reverse order of removal.

9.3.4.6 Cargo Box Guard Panel

NOTICE:
• This manual describes the removal and installation of the left (Left) cargo box guard. The procedure for the right guard is similar.

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the cargo box retaining strip, See: Cargo Box Retaining Strip.
3. To remove the cargo box guard assembly, See: Cargo Box Guard Assembly.
4. To remove the tail lamp, See: Tail Lamp.
5. Removing the cargo box guard panel



a. Pry out retaining clip A securing the cargo box guard panel.

b. Remove the 7 cargo box guard panel retaining bolts B, then remove the guard panel.

Installation Procedure

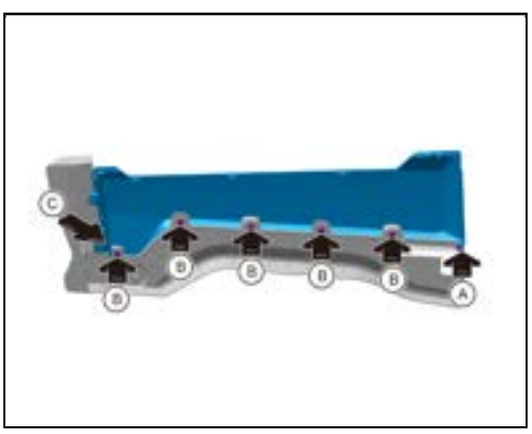
1. Install the cargo box guard in the reverse order of removal.

9.3.4.7 Cargo Box Trim Panel

NOTICE:
• This manual uses the removal and installation of the left cargo box trim panel as an example. Removal and installation of the right cargo box trim panel may be carried out in the same manner.

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the cargo box retaining strip, See: Cargo Box Retaining Strip.
3. To remove the cargo box guard assembly, See: Cargo Box Guard Assembly.
4. To remove the tail lamp, See: Tail Lamp.
5. Removing the left cargo box trim panel



a. Pry out retaining clip A securing the cargo box trim panel.
b. Remove the 5 cargo box trim panel retaining bolts B.
c. Remove cargo box trim panel retaining screw C, then remove the trim panel.

Installation Procedure

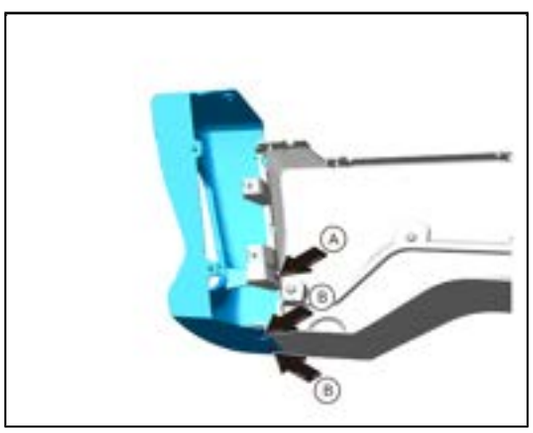
1. Install the left cargo box trim panel in the reverse order of removal.

9.3.4.8 Tail Lamp Cover

NOTICE:
• This manual uses the left rear lamp as an example for removal and installation. Removal and installation of the right rear lamp are carried out in the same manner.

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the cargo box retaining strip, See: Cargo Box Retaining Strip.
3. To remove the cargo box guard assembly, See: Cargo Box Guard Assembly.
4. To remove the tail lamp, See: Tail Lamp.
5. Removing the tail lamp cover



a. Remove tail lamp cover retaining screw A.

b. Remove the 2 tail lamp cover retaining bolts B, then remove the tail lamp cover.

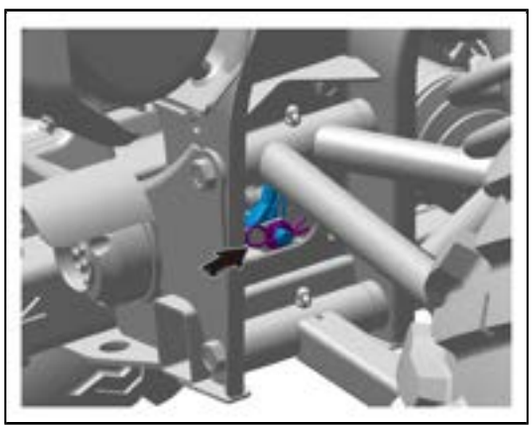
Installation Procedure

1. Install the tail lamp cover in the reverse order of removal.

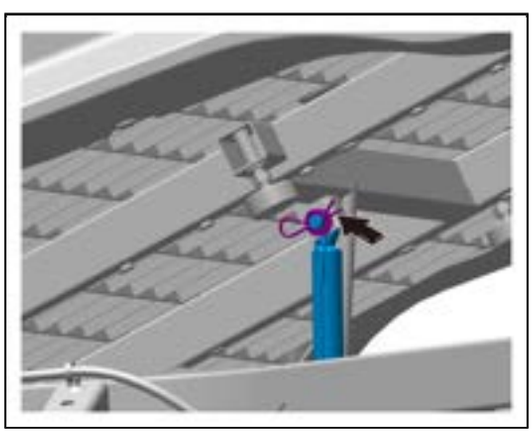
9.3.4.9 Gas Strut Assembly

Removal Procedure

1. Removing the gas strut assembly



a. Remove the lower locking pin and clevis pin from the gas strut assembly.



b. Remove the upper locking pin and clevis pin from the gas strut assembly.

c. Remove the gas strut assembly together with the cargo box cable assembly.

CAUTION:

- **This operation requires 2 people. Use suitable tooling to secure the cargo box assembly; one person performs the removal while the second person supports the assembly.**



d. Release the retaining clamp and separate the gas strut assembly from the cargo box cable assembly.

Installation Procedure

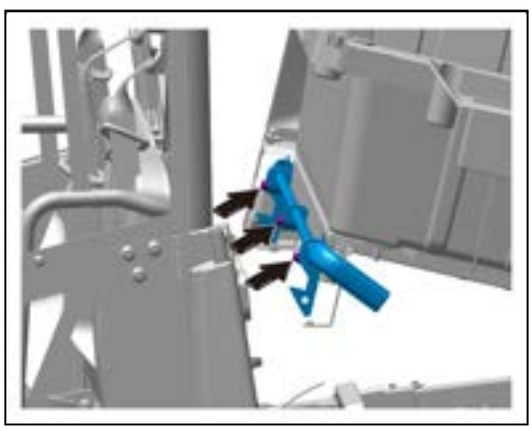
1. Install the gas strut assembly in the reverse order of removal, observing the following precautions:

   a. When installing the cargo box cable assembly, have a second person assist in adjusting its mounting position.

9.3.4.10 Cargo Box Tilt Control Assembly

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the left cargo box retaining strip, See: Cargo Box Retaining Strip.
3. To remove the left cargo box guard assembly, See: Cargo Box Guard Assembly.
4. Removing the cargo box tilt control assembly



a. Remove the 3 retaining bolts and nuts from the cargo box tilt control assembly, then remove the assembly.

CAUTION:

- This operation requires two persons.
- Mark the spring mounting positions prior to removal to prevent misalignment during assembly and avoid repeated work.

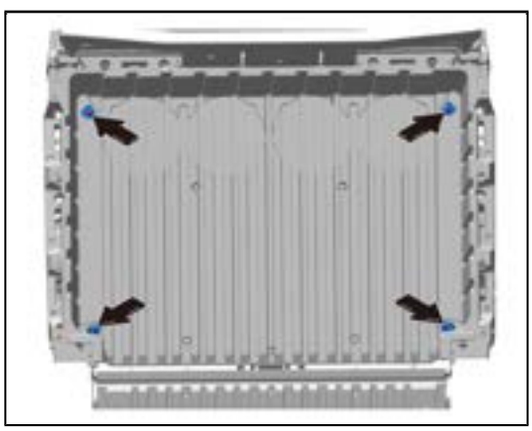
Installation Procedure

1. Install the cargo box tilt control assembly in the reverse order of removal.

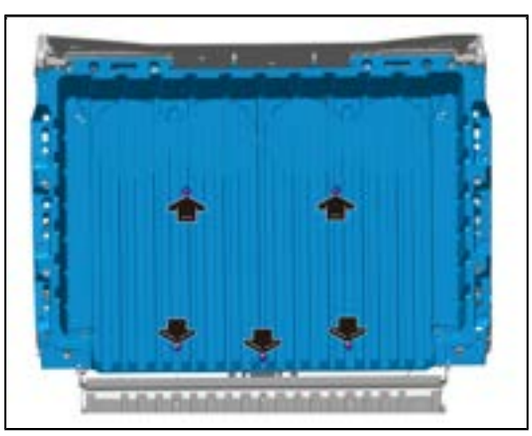
9.3.4.11 Rear Cargo Box

Removal Procedure

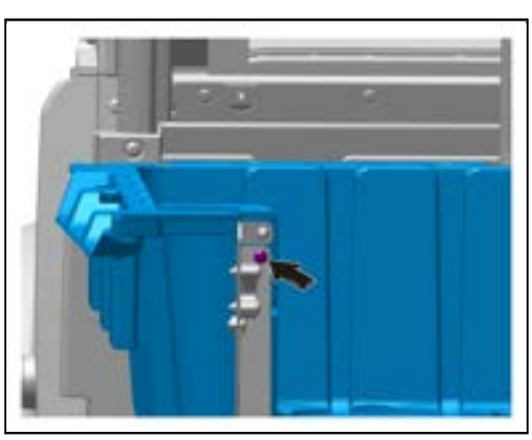
1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the cargo box retaining strips on both sides, See: Cargo Box Retaining Strip.
3. To remove the cargo box front retaining strip, See: Cargo Box Front Retaining Strip.
4. To remove the cargo box guard assemblies on both sides, See: Cargo Box Guard Assembly.
5. Removing the rear cargo box



a. Remove the 4 retaining bolts and take off the 4 cargo box tie-down hooks.



b. Remove the 5 retaining bolts from the rear cargo box.



c. Remove the retaining bolts from the left and right sides of the rear cargo box.

d. Remove the rear cargo box with the assistance of a second person.

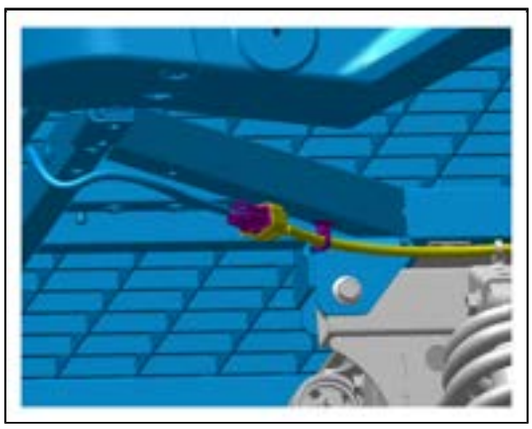
Installation Procedure

1. Install the rear cargo box in the reverse order of removal.

9.3.4.12 Rear Cargo Box Assembly

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the gas strut assembly, See: Gas Strut Assembly.
3. Removing the rear cargo box assembly

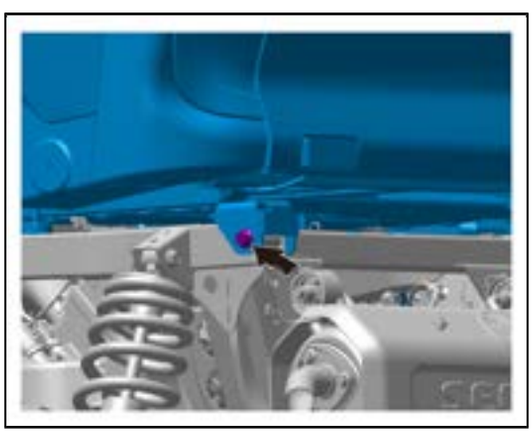


a. Pry off retaining clip from the rear cargo box assembly.

b. Disconnect the rear cargo box assembly wiring harness connector.

NOTICE:

- This manual uses one wiring harness connector as an example; other configurations can be handled similarly.



c. Remove the retaining bolts from the left and right sides of the rear cargo box assembly.

d. Remove the rear cargo box assembly with the assistance of a second person.

CAUTION:

- Remove the rear cargo box assembly and secure the wiring harnesses and other components out of the way.

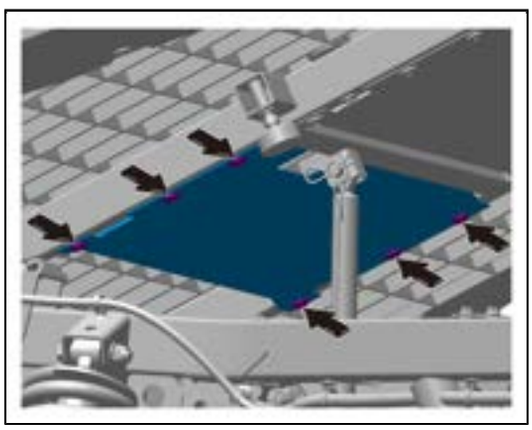
Installation Procedure

1. Install the rear cargo box assembly in the reverse order of removal.

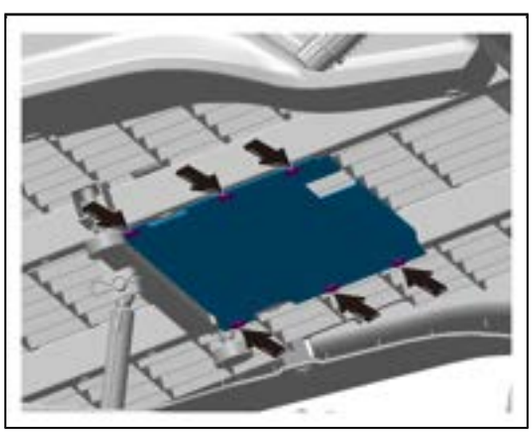
9.3.4.13 Rear Cargo Box Heat Shield

Removal Procedure

1. Removing the rear cargo box heat shield



a. Remove the 6 retaining bolts from rear cargo box heat shield (1), then remove the heat shield.



b. Remove the 6 retaining bolts from rear cargo box heat shield (2), then remove the heat shield.

Installation Procedure

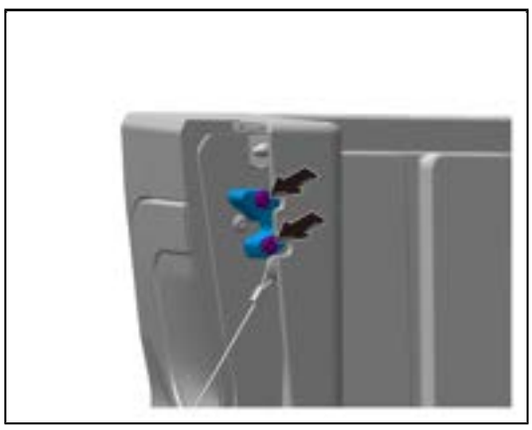
1. Install the rear cargo box heat shield in the reverse order of removal.

9.3.4.14 Tailgate Striker

NOTICE:
• This procedure describes removal and installation of the left tailgate striker. Removal and installation of the right tailgate striker are carried out in the same manner.

Removal Procedure

1. Removing the tailgate striker



a. Remove the 2 tailgate striker retaining bolts, then remove the tailgate striker.

Installation Procedure

1. Install the tailgate striker in the reverse order of removal.

9.4 Windscreen and Accessories

9.4.1 Service Tools..... 934

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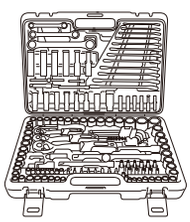
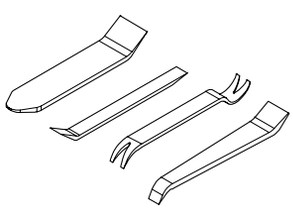
9.4.4.5 Windscreen Washer Reservoir and Pump Assembly 944

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9.4.4.7 Front Half Windscreen..... 945

9.4.1 Service Tools

9.4.1.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)
2	Interior trim removal lever		Removing interior and exterior trim parts

9.4.2 Description and Operation

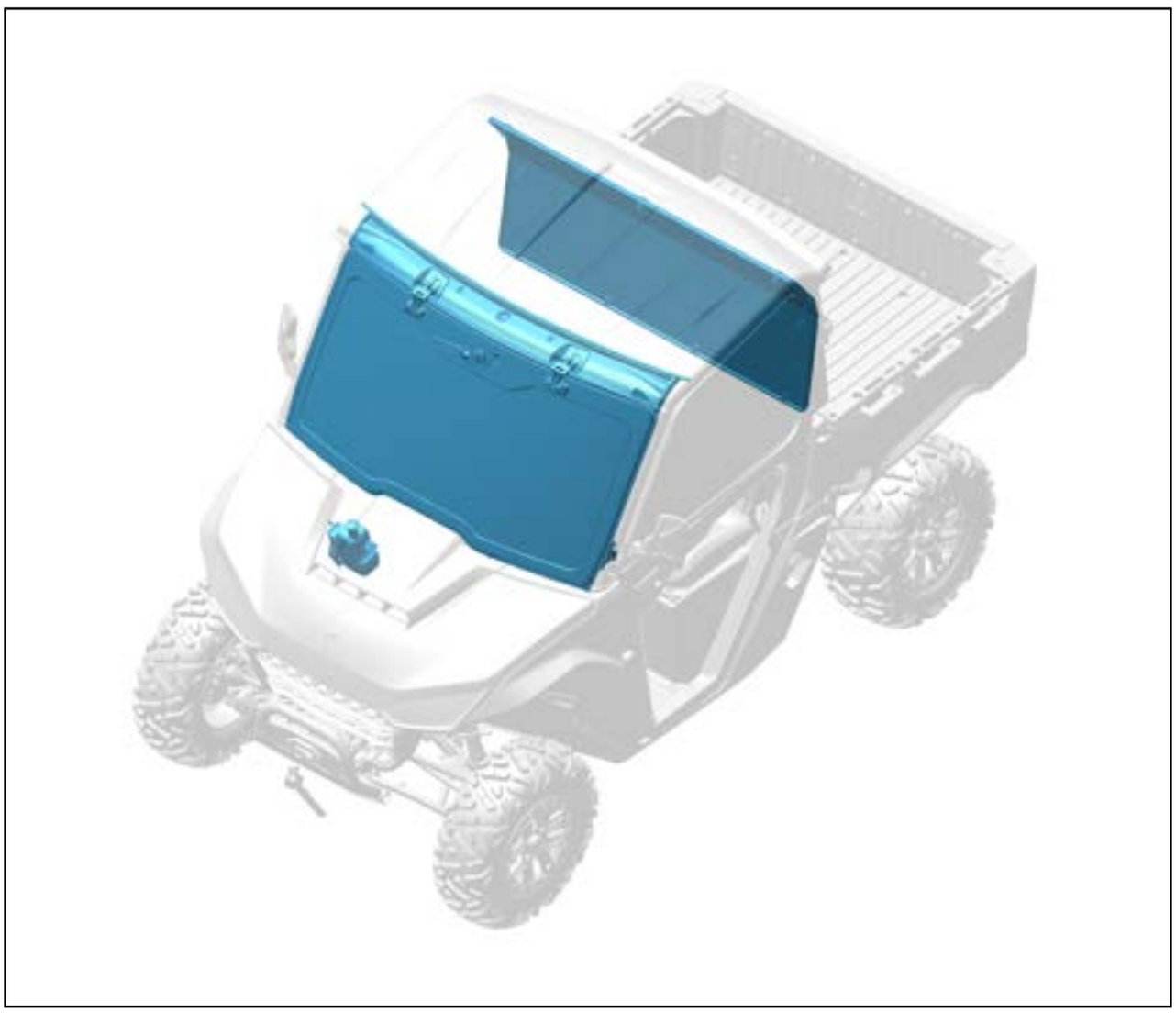
9.4.2.1 Warnings and Precautions

1. Always wear protective clothing and safety goggles when removing a broken front windscreen.
2. After removal, thoroughly clean up all broken glass fragments, ensuring no residue is left behind.
3. If a window glass is cracked but remains intact, apply protective tape in a crisscross pattern across the glass to prevent further damage or personal injury.

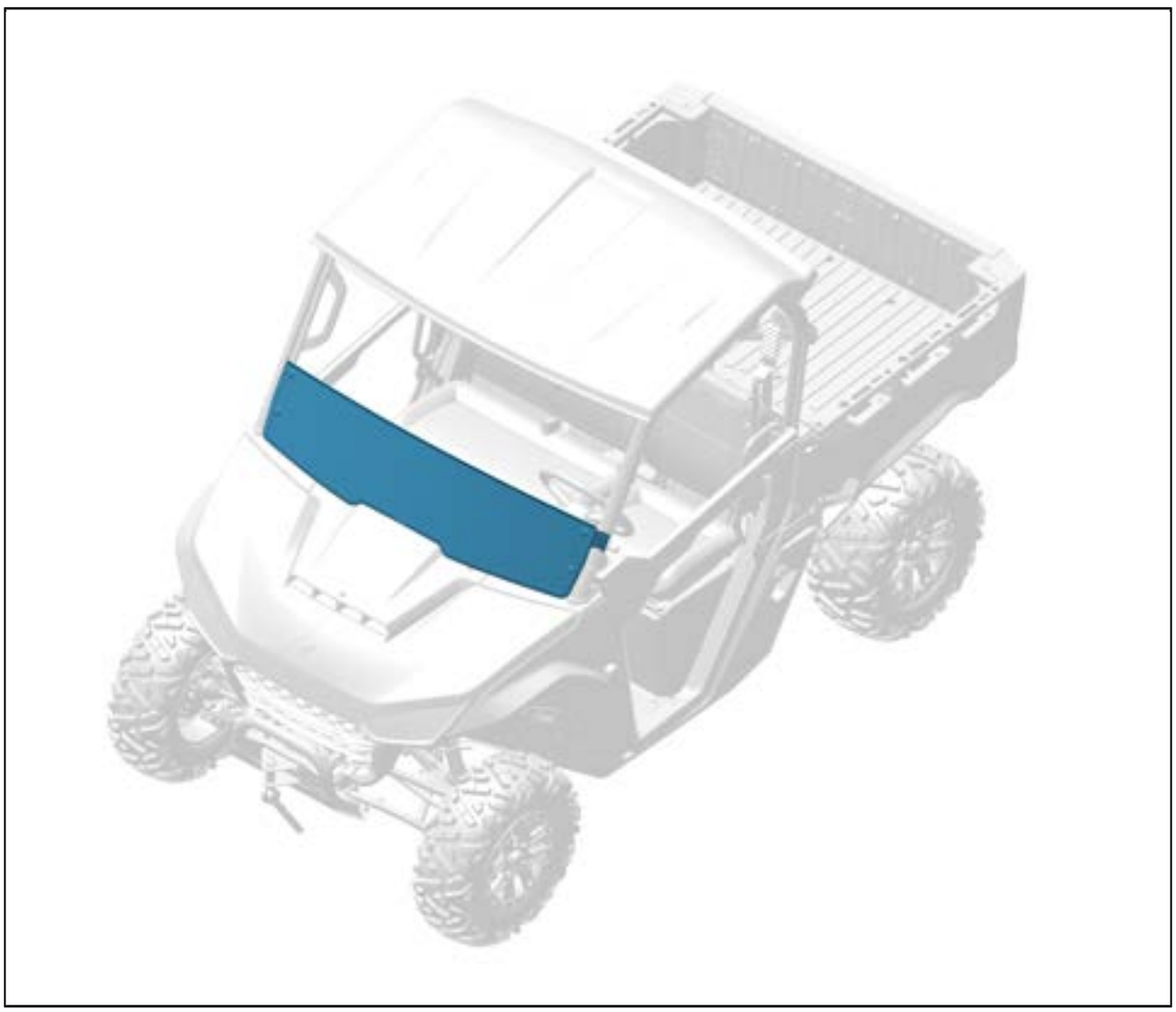
9.4.3 Component Location and Exploded View

9.4.3.1 Component Location Diagram

Windscreen and Accessories

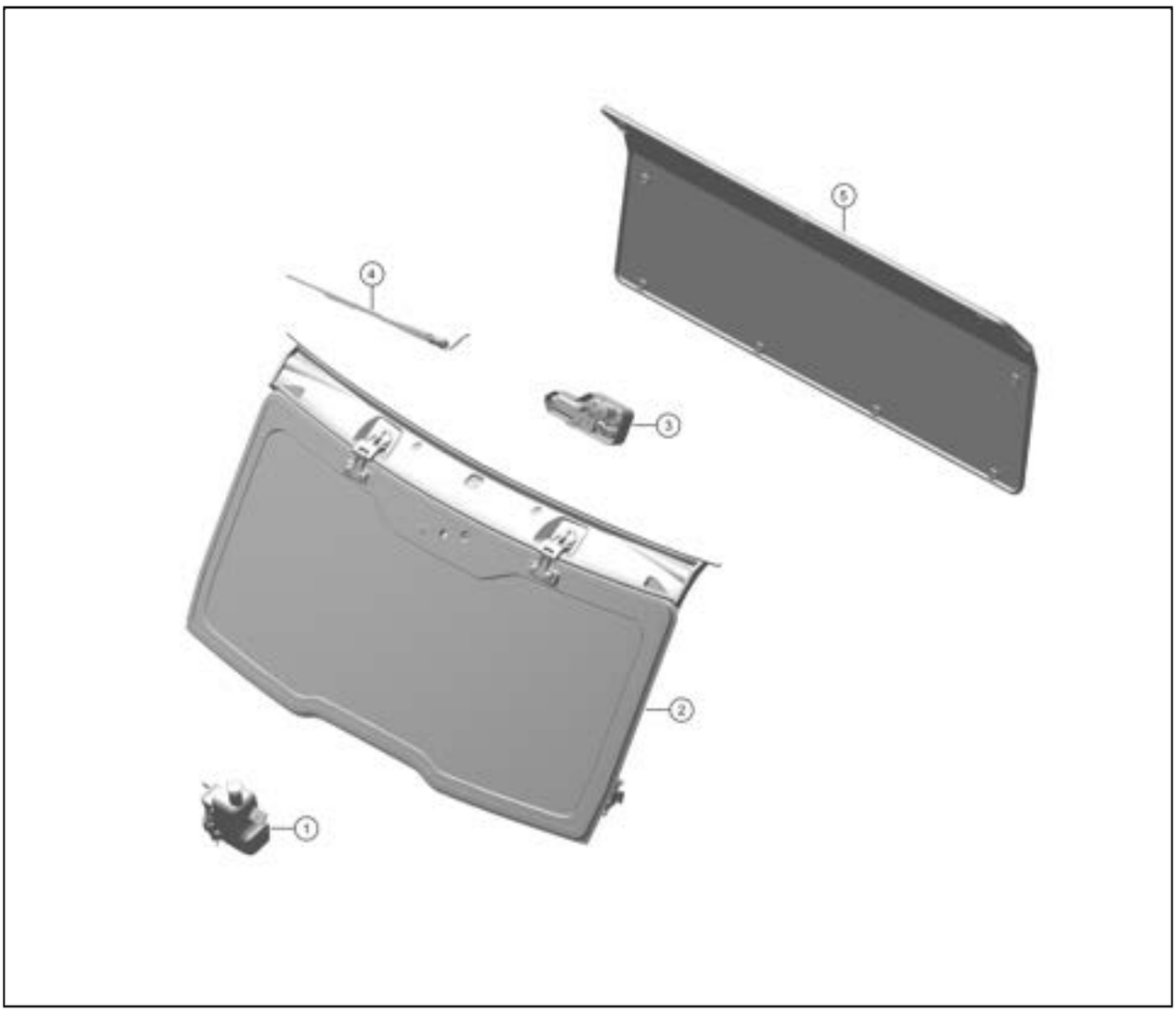


Front Half Windscreen



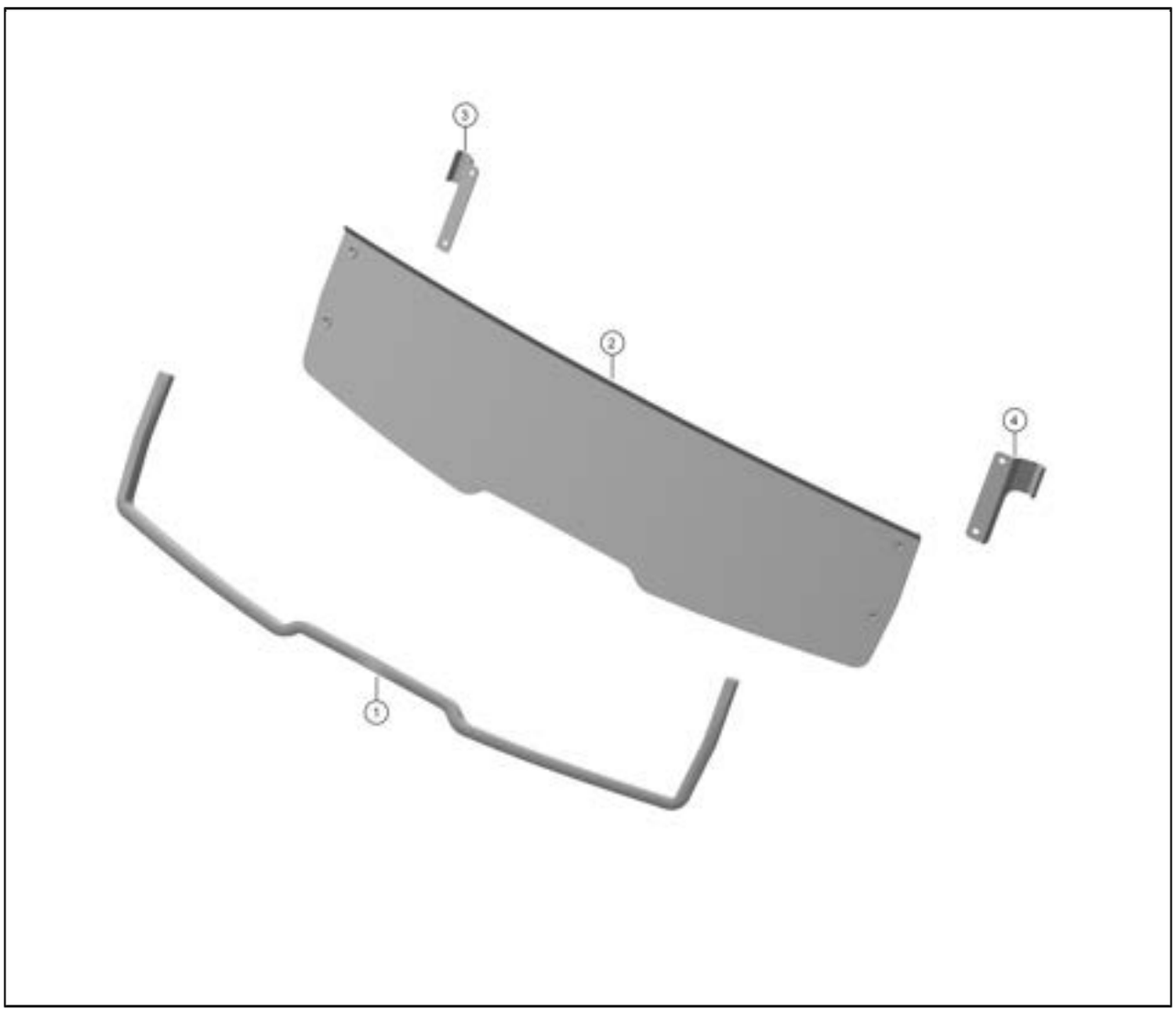
9.4.3.2 Exploded View Diagram

Windscreen and Accessories



1	Windscreen Washer Reservoir and Pump Assembly	4	Wiper Arm
2	Front Windscreen Assembly	5	Rear Windscreen
3	Wiper Motor		

Front Half Windscreen



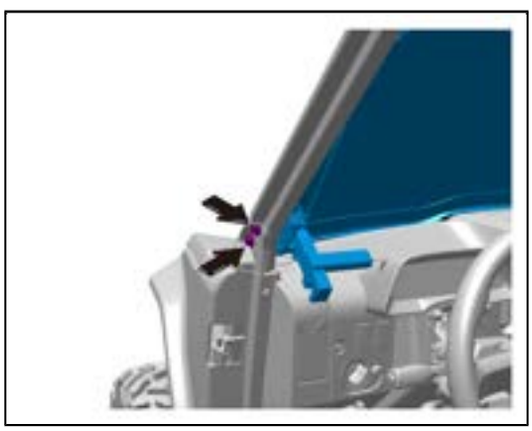
1	Front Half Windscreen Weatherstrip	3	Right Half-Windscreen Quick-Release Bracket
2	Front Half Windscreen	4	Left Half-Windscreen Quick-Release Bracket

9.4.4 Repair Procedure Guidance

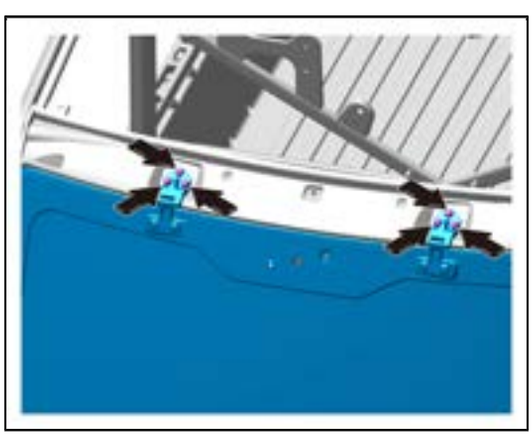
9.4.4.1 Front Windscreen Assembly

Removal Procedure

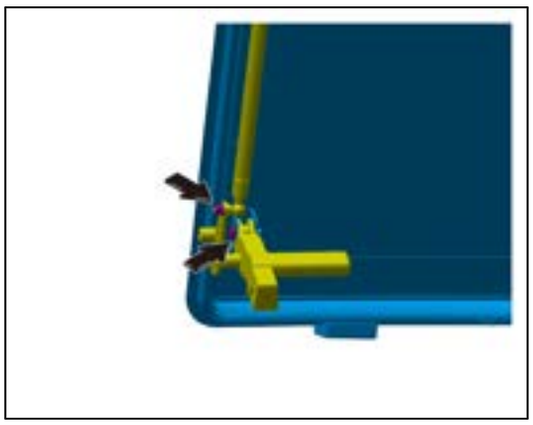
1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the headliner left inner cover, See: Headliner Left Inner Cover.
3. To remove the headliner, See: Headliner.
4. To remove the windscreen wiper arm, See: Windscreen Wiper Arm.
5. To remove the wiper motor, See: Wiper Motor.
6. Removing the front windscreen assembly



a. Remove the 2 retaining bolts from both the left and right sides of the front windscreen assembly.



b. Remove the 6 retaining bolts and carefully remove the front windscreen assembly with the assistance of a second person.



c. Remove the 1 retaining bolt and nut from both the bracket and the extension rod, then detach the bracket from the rod.

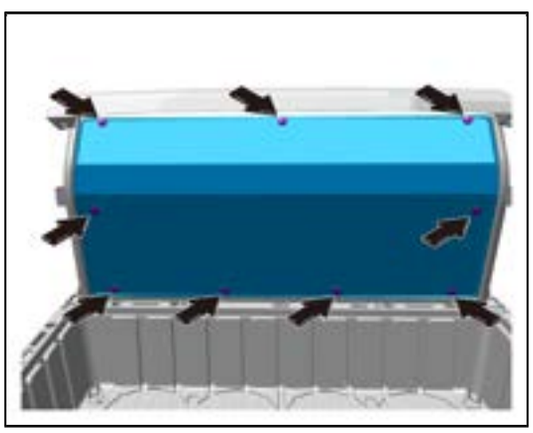
Installation Procedure

1. Install the front windscreen assembly in the reverse order of removal.

9.4.4.2 Rear Windscreen

Removal Procedure

1. Removing the rear windscreen



a. Remove the 9 rear windscreen mounting bolts. With the assistance of a second person, lift off the rear windscreen.

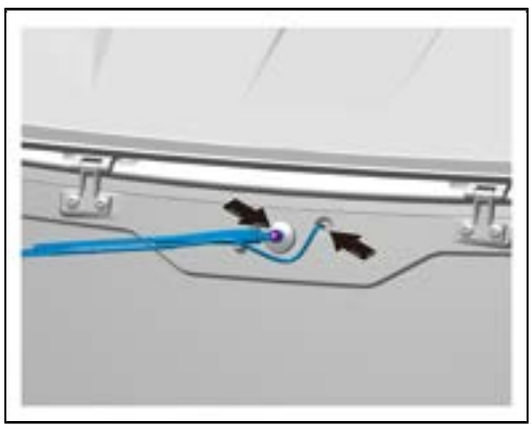
Installation Procedure

1. Install the rear windscreen in the reverse order of removal.

9.4.4.3 Wiper Arm

Removal Procedure

1. Removing the wiper arm



a. Disconnect the washer fluid hose.

b. Remove the wiper arm retaining nut, then detach the wiper arm.

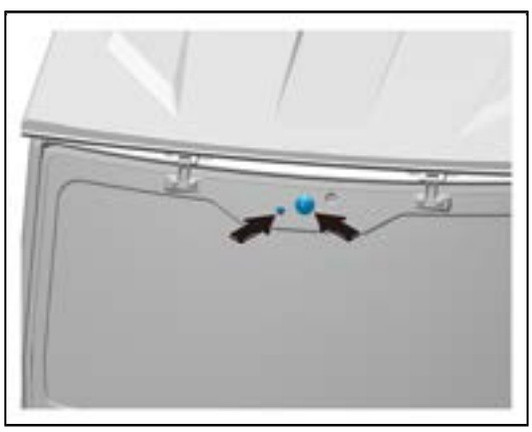
Installation Procedure

1. Install the wiper arm in the reverse order of removal.

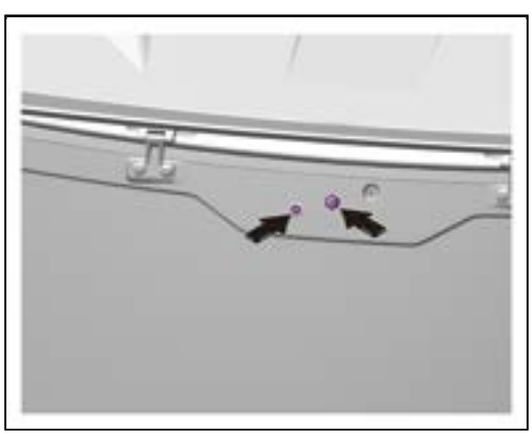
9.4.4.4 Wiper Motor

Removal Procedure

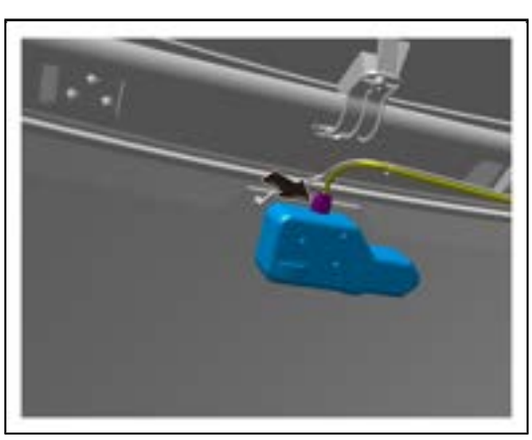
1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the windscreen wiper arm, See: Windscreen Wiper Arm.
3. Removing the wiper motor



a. Carefully pry off the 2 wiper motor nut caps.



b. Remove the 2 wiper motor retaining nuts.



c. Disconnect the wiper motor electrical connector and remove the motor.

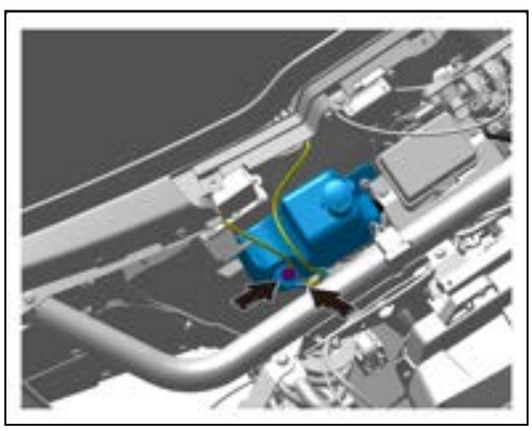
Installation Procedure

1. Install the wiper motor in the reverse order of removal.

9.4.4.5 Windscreen Washer Reservoir and Pump Assembly

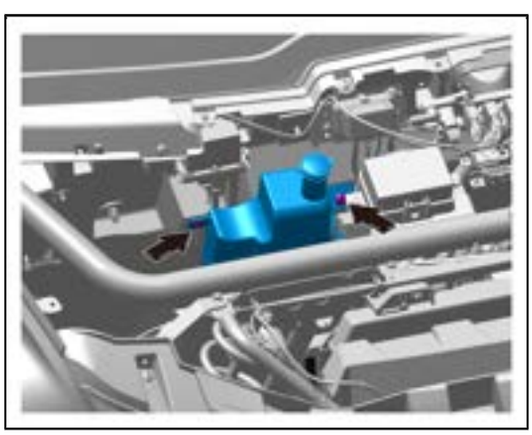
Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the front service cover, See: Front Service Cover.
3. To remove the headlamp cover, See: Headlamp Cover.
4. To remove the flasher unit, See: Flasher Unit.
5. To remove the front panel, See: Front Panel.
6. Removing the windscreen washer reservoir and pump assembly



a. Disconnect the windscreen washer reservoir and pump assembly electrical connector.

b. Disconnect the washer fluid hose.



c. Remove the 2 mounting bolts, then remove the windscreen washer reservoir and pump assembly.

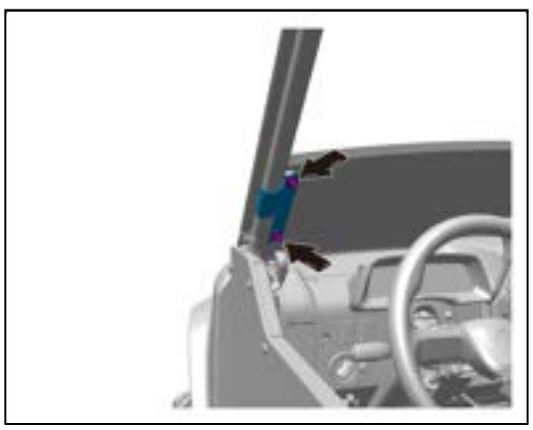
Installation Procedure

1. Install the windscreen washer reservoir and pump assembly in the reverse order of removal.

9.4.4.6 Half-Windscreen Quick-Release Bracket

Removal Procedure

1. Removing the half-windscreen quick-release bracket



a. Remove the 2 half-windscreen quick-release bracket retaining bolts, then remove the bracket.

Installation Procedure

1. Install the half-windscreen quick-release bracket in the reverse order of removal.

9.4.4.7 Front Half Windscreen

Removal Procedure

1. Removing the front half windscreen



a. Remove the 2 retaining bolts from each side of the front half windscreen, then remove the windscreen.

CAUTION:
This procedure requires two people.

Installation Procedure

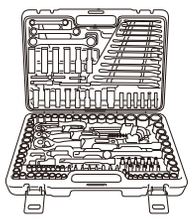
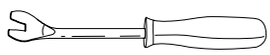
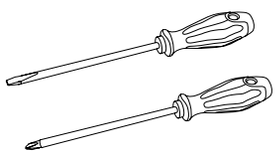
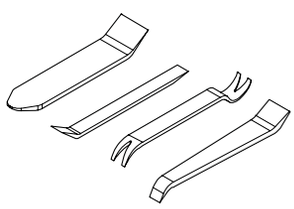
1. Install the front half windscreen in the reverse order of removal.

10.1 Heater System

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10.1.1 Service Tools

10.1.1.1 Recommended Tools and Equipment

Item No.	Tool Description	Tool Diagram	Purpose/Use
1	Socket Wrench Set		Removing and installing fasteners (bolts and nuts)
2	Trim clip removal tool		Removing the retaining fastener
3	Screwdriver		Removal and installation of mounting screws
4	Interior trim removal lever		Removing interior and exterior trim parts
5	Hose Clamp Pliers		Removing the clamp

10.1.2 Description and Operation

10.1.2.1 Warnings and Precautions

1. Before carrying out any maintenance, modifications, or cleaning on the heating system, ensure the ignition is switched off and the key is removed. Allow the engine coolant to cool to a safe temperature (≤60°C) to prevent scalding from hot coolant or accidents caused by live electrical components.
2. Do not operate the heating system for extended periods if the coolant level is low or abnormal, or if there is an engine fault. Doing so could cause engine overheating, loss of heater function, or coolant hose rupture and leakage.
3. Regularly inspect and clean the blower air intake and heater ducts to prevent blockages from dirt and debris, which can reduce airflow and heating performance. Additionally, check coolant hoses routinely for leaks or scale build-up that could cause the heating system to fail.
4. If there is a sudden drop in airflow, abnormal noise, or unusual odours from the air vents during heater operation, switch off the system immediately and stop the vehicle for inspection. Do not continue use, to prevent further component damage or safety hazards.
5. In winter, if the vehicle has been parked for an extended period, allow the engine coolant to reach its normal operating temperature before switching on the heater. This prevents poor heating performance and excessive load on the blower motor due to low coolant temperatures.

10.1.2.2 System Description

1. System Description
   a. The heating system is a thermal management system utilising engine coolant as a heat source. It uses control units, sensors, and actuators to regulate cabin temperature, air distribution, and comfort functions.
   b. The heating system incorporates several functions, primarily cabin temperature control, airflow regulation, and windscreen demisting.
2. Components
   a. The heating system mainly comprises the heater matrix housing assembly, heater control panel, engine coolant hoses, air ducting, and associated wiring harnesses.

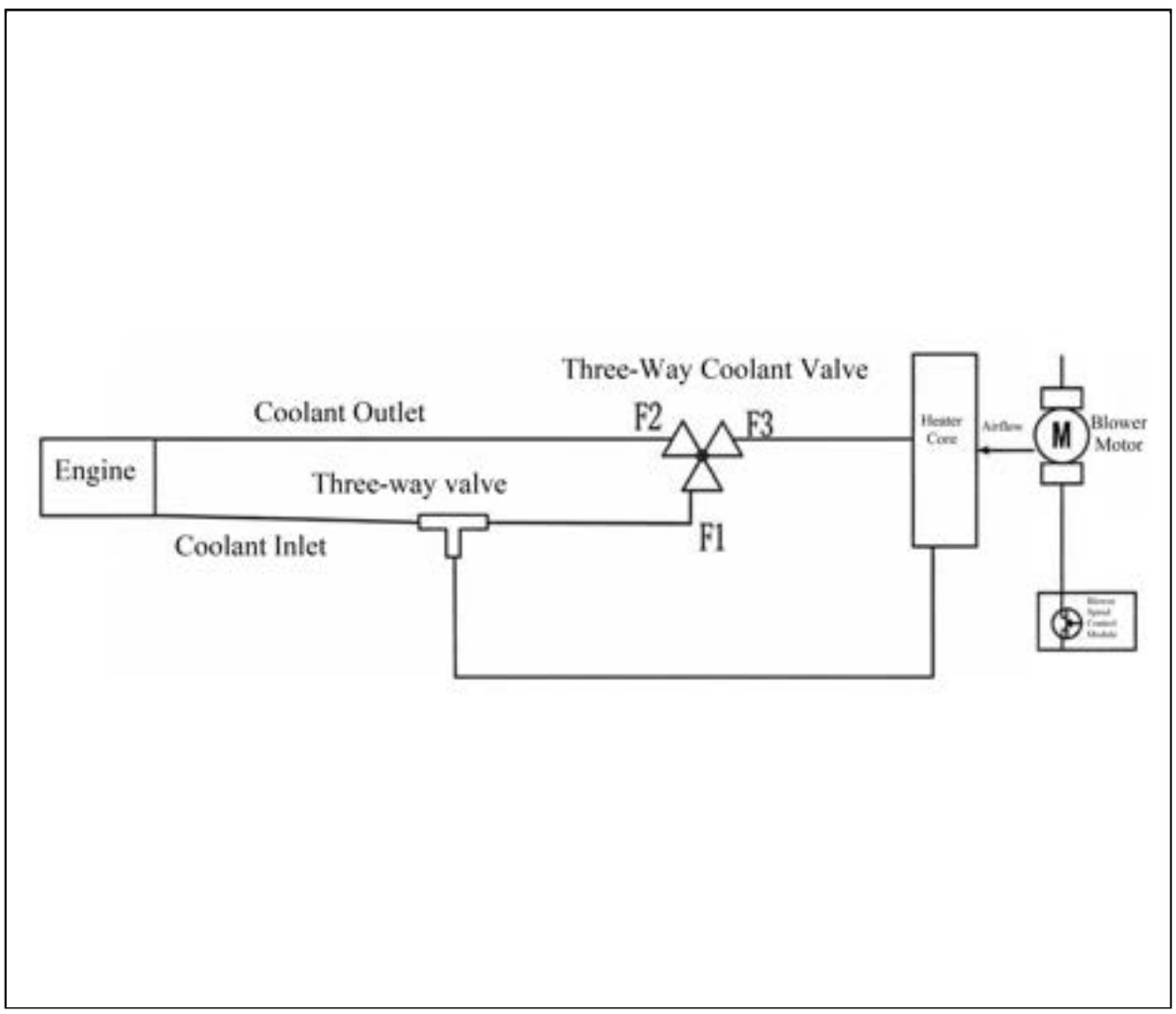
10.1.3 System Operating Principle

10.1.3.1 Introduction to Principles

System Overview

1. Operating Principle

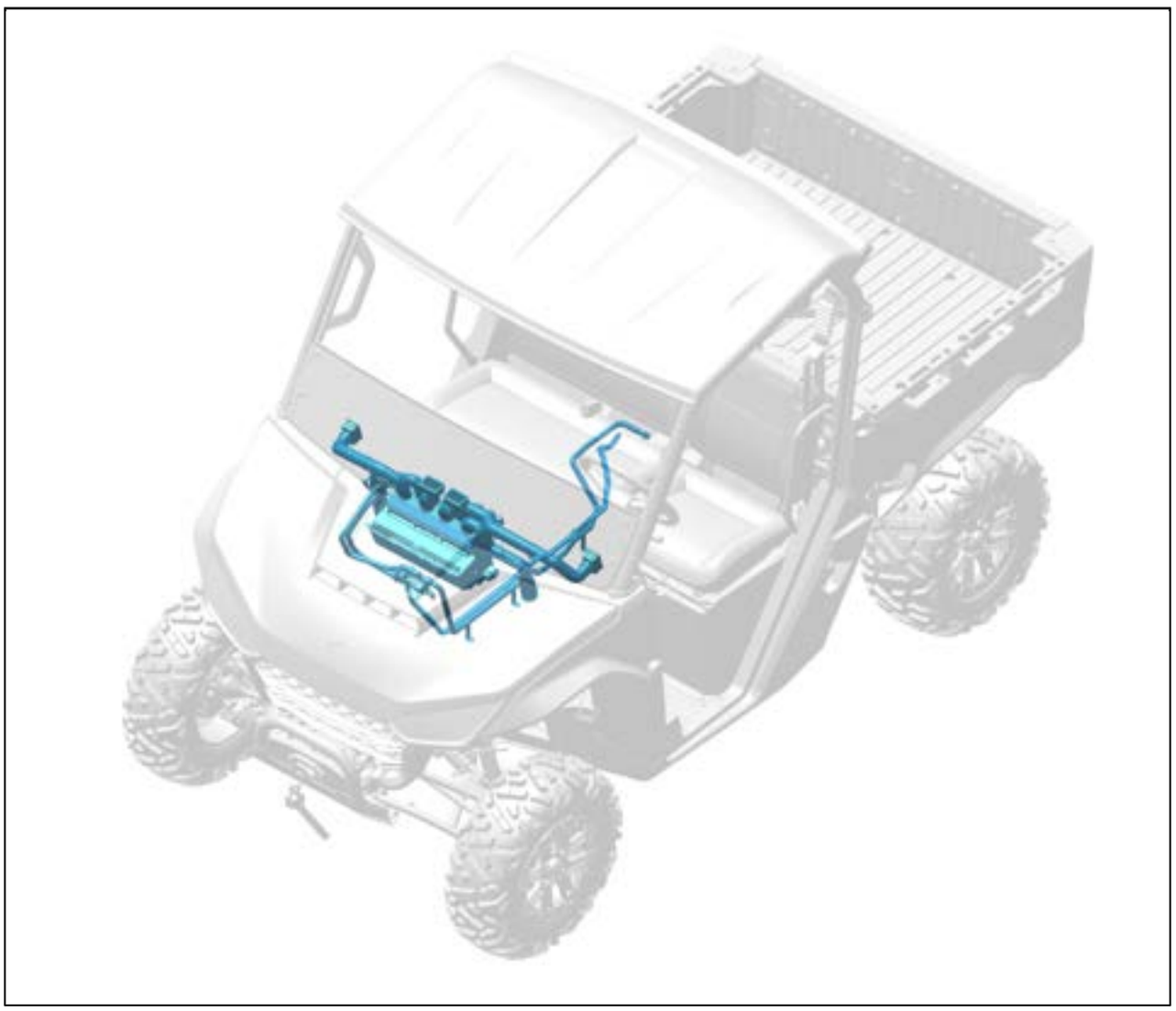
   a. The heater system uses engine coolant for heating. After the coolant is heated by the engine, it passes through the heater hoses to an electronically controlled three-way coolant valve, which controls whether hot coolant flows into the heater core to provide warm air. In ventilation mode, the hot coolant valve remains open to the engine coolant circuit and bypasses the heater core, so that the discharge air temperature remains close to the ambient air temperature.



10.1.4 Component Location and Exploded View

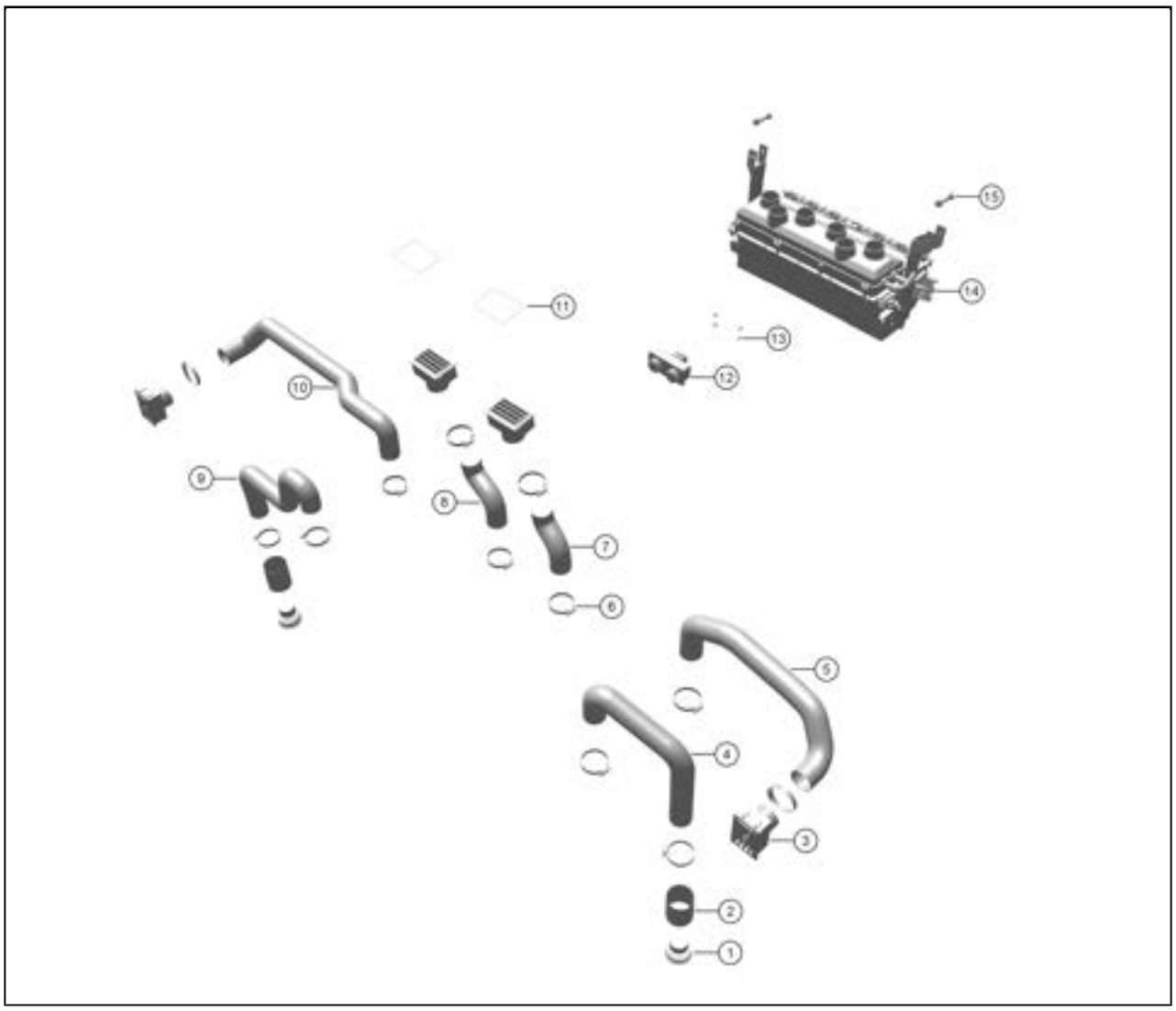
10.1.4.1 Component Location Diagram

Air Conditioning System

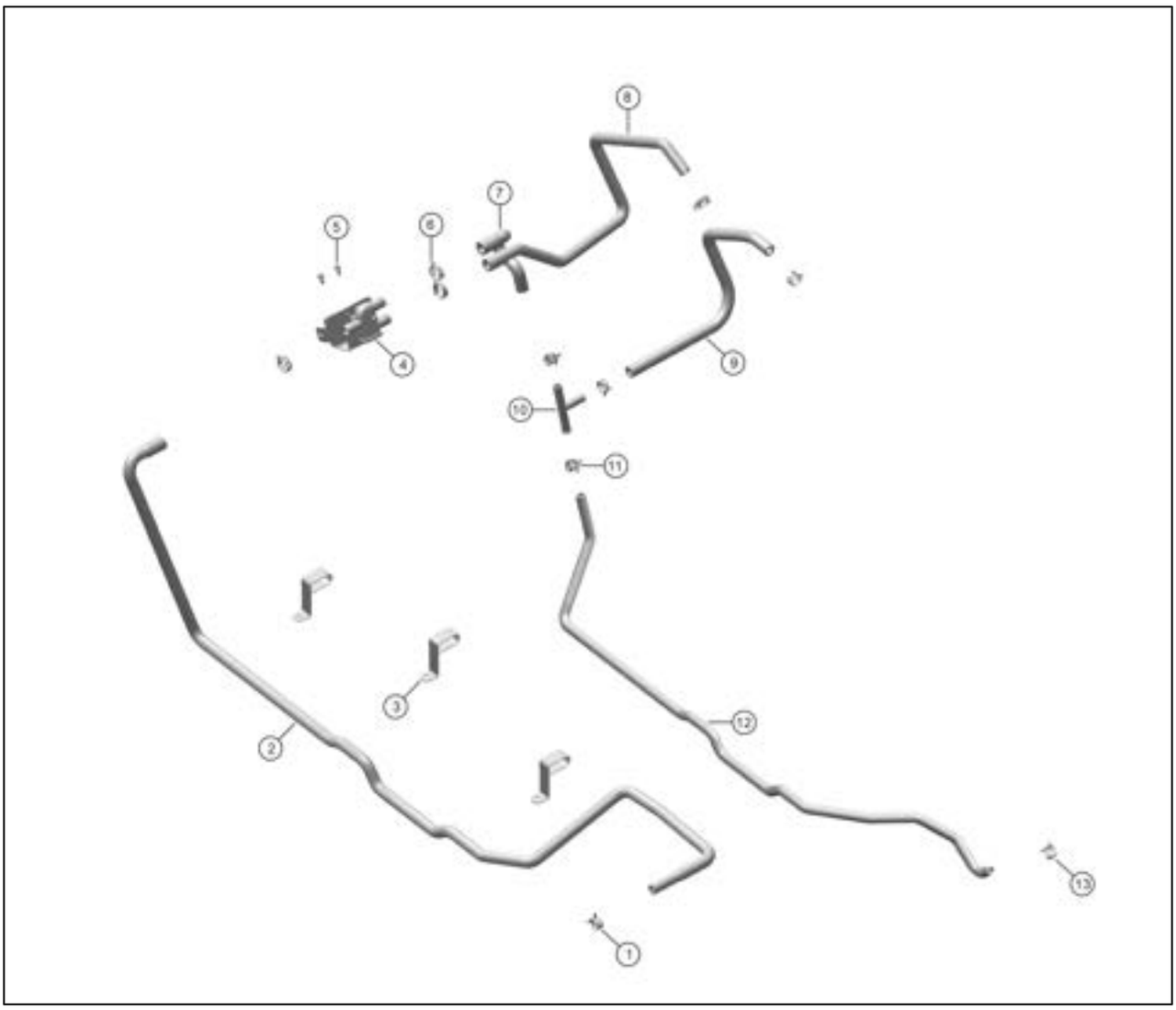


10.1.4.2 Exploded View Diagram

Air Conditioning System



1	Footwell Air Outlet	6	Type A worm drive hose clamp 60	11	Foam Pad (0.6 mm)
2	Rubber Sleeve	7	Demister Air Duct Assembly (Right)	12	Heater Control Panel Assembly
3	Air Outlet	8	Demister Air Duct Assembly (Left)	13	Black Self-Tapping Screw ST4.2x13
4	Footwell Air Duct Assembly (Right)	9	Footwell Air Duct Assembly (Left)	14	Heater Matrix Housing Assembly
5	Face-Level Air Duct Assembly (Right)	10	Face-Level Air Duct Assembly (Left)	15	Hex Flange Bolt M8x55 (Trivalent Chrome, Grade 10.9) and Type 1 Hex Nut M8



1	Spring Band Hose Clip (20 mm)	6	Spring Band Hose Clip (28 mm)	11	Spring Band Hose Clip (22 mm)
2	Electronic 3-Way Valve Coolant Inlet Hose	7	Electronic 3-Way Valve Coolant Outlet Hose 2	12	Electronic 3-Way Valve Coolant Outlet Hose
3	Hose Clip	8	Electronic 3-Way Valve Coolant Outlet Hose 1	13	Spring Band Hose Clip (20 mm)
4	Electronic Three-Way Valve	9	Heater Matrix Outlet Hose		
5	M6 × 12 Hex Flange Bolt	10	T-Connector (16x16x16)		

10.1.5 General Fault Diagnosis and Operation

10.1.5.1 Fault Symptom List

Heater System Fault Diagnosis

Symptom(s)	Possible Causes	Recommended Repair Procedure
Blower motor does not operate at any speed	1.Fuse blown	Replace the fuse
	2. Poor Electrical Connection	Inspect and tighten as necessary
	3. Poor Earth Connection	Clean and tighten securely
	4.Switch faulty	Replace the switch
	5.Blower motor faulty	Replace the blower motor
	6.Blower resistor faulty	Replace the blower resistor
Blower motor operates at only one speed	1.Switch faulty	Replace the switch
	2.Blower resistor faulty	Replace the blower resistor
Blower motor runs, but no air is discharged	1. Air Intake Blocked	Replace the blower resistor
	2.Fan not securely fastened to the motor shaft	Fasten securely
Insufficient heating performance	1.Three-way valve not operating properly	Inspect the three-way coolant valve for damage. Replace it if damaged.
	2.Heater core clogged internally	Flush the heater core or replace it as necessary
	3.Heater core passages blocked	Remove foreign matter from the heater core
Defroster does not operate properly	1.Defroster hose damaged or air duct seal leaking	Replace the defroster hose or repair the air duct seal

Performance Fault Diagnosis

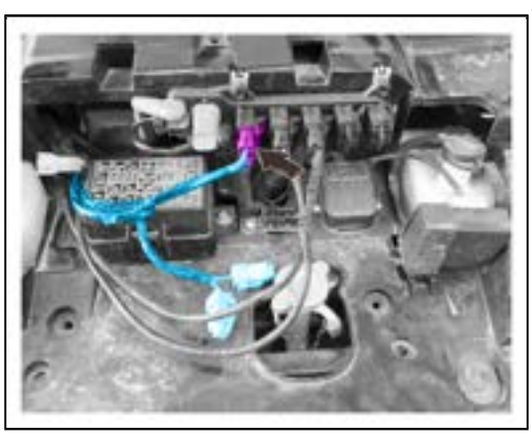
Symptom(s)	Possible Causes	Recommended Repair Procedure
Low Airflow	1.Blower speed control module faulty	Replace the blower speed control module
	2.Air duct damaged and leaking	Remove and replace the air duct
	3.Fan not securely fastened to the motor shaft	Remove the blower motor and secure it properly

10.1.6 Repair Procedure Guidance

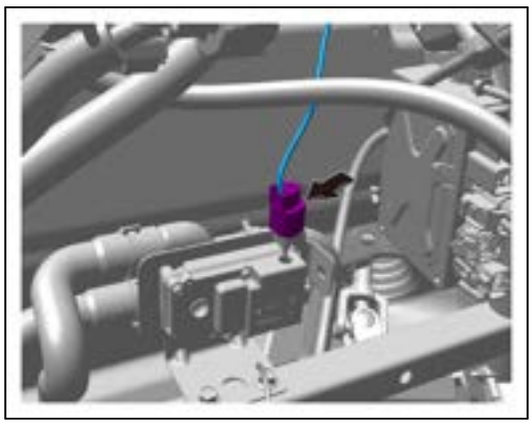
10.1.6.1 Heater Matrix Housing Assembly

Removal Procedure

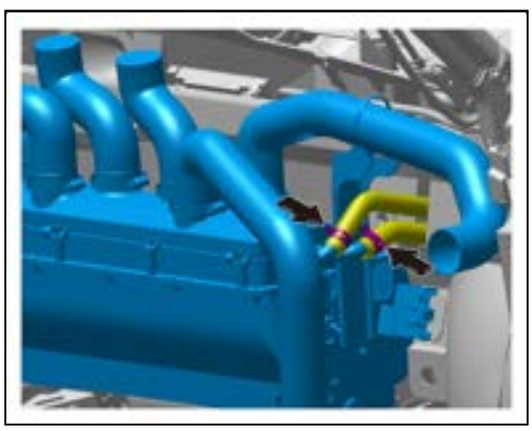
1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To drain the coolant, See: Coolant Draining and Refilling.
3. To remove the headliner left inner cover, See: Headliner Left Inner Cover.
4. To remove the headliner, See: Headliner.
5. To remove the windscreen wiper arm, See: Windscreen Wiper Arm.
6. To remove the wiper motor, See: Wiper Motor.
7. To remove the windscreen assembly, See: Windscreen Assembly.
8. To remove the front service cover, See: Front Service Cover.
9. To remove the headlamp cover, See: Headlamp Cover.
10. To remove the flasher unit, See: Flasher Unit.
11. To remove the front panel, See: Front Panel.
12. To remove the front mudguard, See: Front Mudguard.
13. To remove the left A-pillar welded assembly, See: Left A-Pillar Welded Assembly.
14. To remove the instrument cover, See: Instrument Cover.
15. To remove the centre display, See: Centre Display.
16. To remove the switch panel, See: Switch Panel.
17. To remove the lower centre console storage compartment, See: Lower Centre Console Storage Compartment.
18. To remove the upper instrument panel, See: Upper Instrument Panel.
19. Removing the heater matrix housing assembly



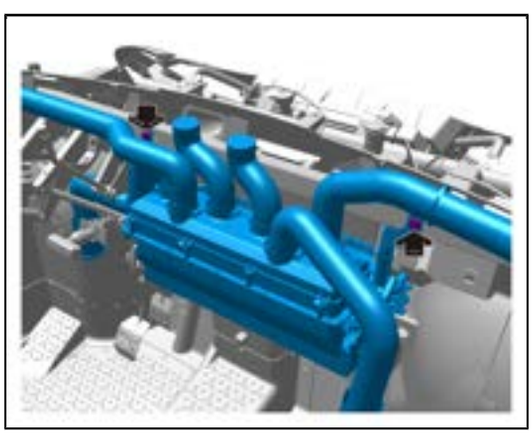
a. Disconnect the heater matrix housing electrical connector.



b. Disconnect the heater matrix housing electrical connector.



c. Loosen the 2 hose clips and disconnect the 2 coolant hoses from the heater matrix housing.



d. Remove the 2 mounting bolts and remove the heater matrix housing assembly.

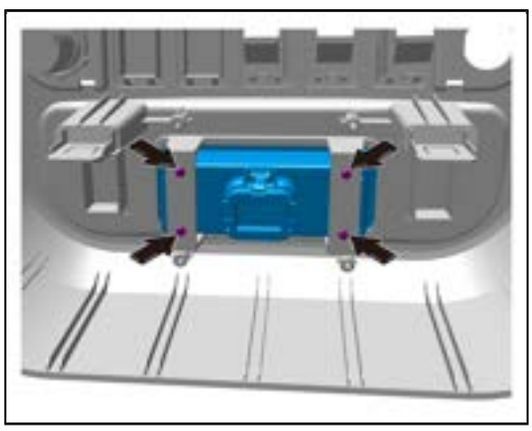
Installation Procedure

1. Install the ECU assembly by following the reverse steps of removal, with the following considerations:
   a. After filling with coolant, bleed the cooling system following See: the standard bleeding procedure.

10.1.6.2 Heater Control Panel Assembly

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the centre display, See: Centre Display.
3. To remove the switch panel, See: Switch Panel.
4. Removing the heater control panel assembly



a. Remove the 4 securing screws and detach the heater control panel assembly.

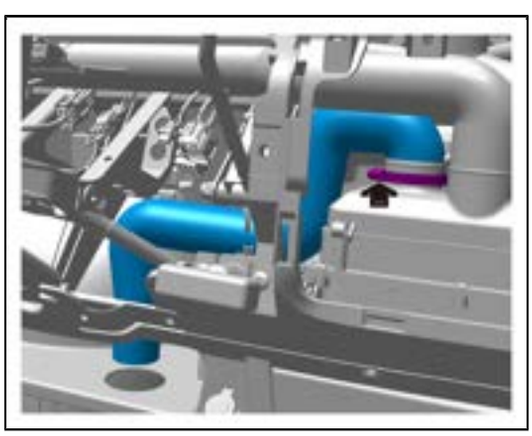
Installation Procedure

1. Install the heater control panel assembly in the reverse order of removal.

10.1.6.3 Footwell Air Duct Assembly (Left)

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the instrument cover, See: Instrument Cover.
3. To remove the centre display, See: Centre Display.
4. To remove the switch panel, See: Switch Panel.
5. To remove the footwell air outlet, See: Footwell Air Outlet.
6. Removing the footwell air duct assembly (Left)



a. Loosen the securing clip and remove the footwell air duct assembly (Left).

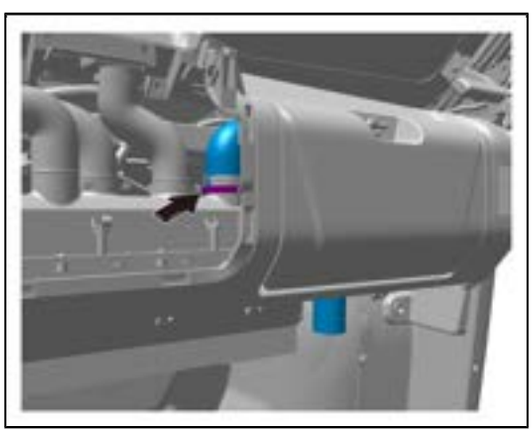
Installation Procedure

1. Install the footwell air duct assembly (Left) in the reverse order of removal.

10.1.6.4 Footwell Air Duct Assembly (Right)

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the instrument cover, See: Instrument Cover.
3. To remove the centre display, See: Centre Display.
4. To remove the switch panel, See: Switch Panel.
5. To remove the footwell air outlet, See: Footwell Air Outlet.
6. To remove the lower centre console storage compartment, See: Lower Centre Console Storage Compartment.
7. Removing the footwell air duct assembly (Right)



a. Loosen the securing clip and remove the footwell air duct assembly (Right).

Installation Procedure

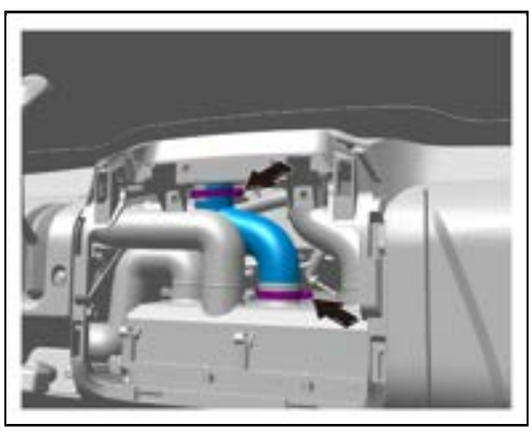
1. Install the footwell air duct assembly (Right) in the reverse order of removal.

10.1.6.5 Demister Air Duct Assembly

NOTICE:
• This procedure details the removal and installation of the left demister air duct assembly; the right procedure is similar.

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the centre display, See: Centre Display.
3. To remove the switch panel, See: Switch Panel.
4. Removing the demister air duct assembly



a. Loosen the 2 securing clip and remove the demister air duct assembly.

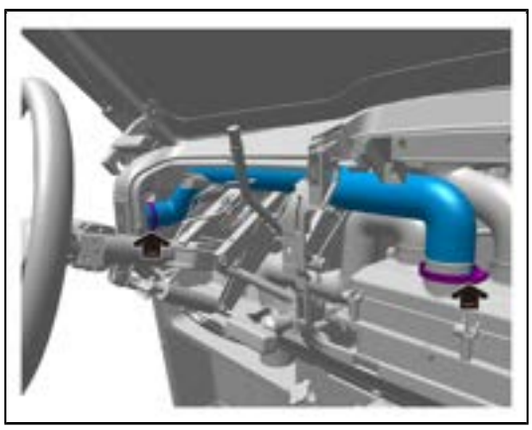
Installation Procedure

1. Install the demister air duct assembly in the reverse order of removal.

10.1.6.6 Face-Level Air Duct Assembly (Left)

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the instrument cover, See: Instrument Cover.
3. To remove the centre display, See: Centre Display.
4. To remove the switch panel, See: Switch Panel.
5. Removing the face-level air duct assembly (Left)



a. Loosen the 2 securing clips and remove the face-level air duct assembly (Left).

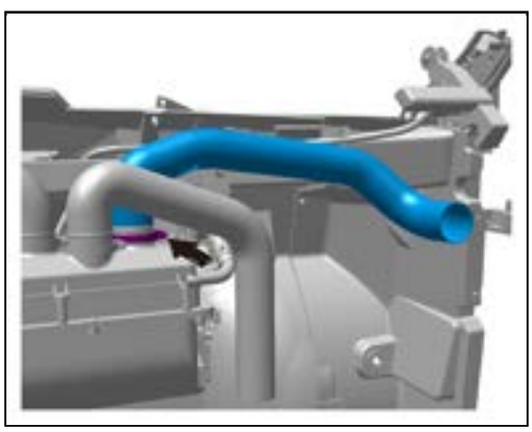
Installation Procedure

1. Install the face-level air duct assembly (Left) in the reverse order of removal.

10.1.6.7 Face-Level Air Duct Assembly (Right)

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the headliner left inner cover, See: Headliner Left Inner Cover.
3. To remove the headliner, See: Headliner.
4. To remove the windscreen wiper arm, See: Windscreen Wiper Arm.
5. To remove the wiper motor, See: Wiper Motor.
6. To remove the windscreen assembly, See: Windscreen Assembly.
7. To remove the front service cover, See: Front Service Cover.
8. To remove the headlamp cover, See: Headlamp Cover.
9. To remove the flasher unit, See: Flasher Unit.
10. To remove the front panel, See: Front Panel.
11. To remove the front mudguard, See: Front Mudguard.
12. To remove the left A-pillar welded assembly, See: Left A-Pillar Welded Assembly.
13. To remove the instrument cover, See: Instrument Cover.
14. To remove the centre display, See: Centre Display.
15. To remove the switch panel, See: Switch Panel.
16. To remove the lower centre console storage compartment, See: Lower Centre Console Storage Compartment.
17. To remove the upper instrument panel, See: Upper Instrument Panel.
18. Removing the face-level air duct assembly (Right)



a. Loosen the securing clip and remove the face-level air duct assembly (Right).

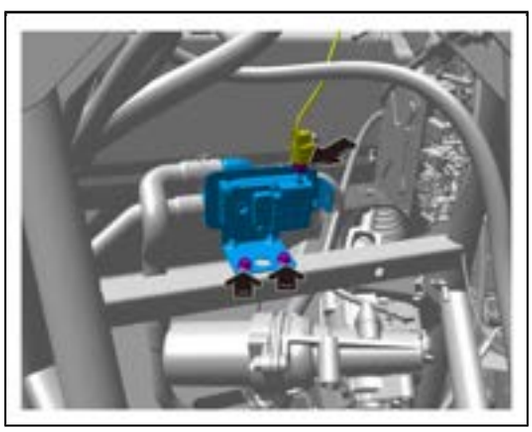
Installation Procedure

1. Install the face-level air duct assembly (Right) in the reverse order of removal.

10.1.6.8 Electronic Three-Way Valve

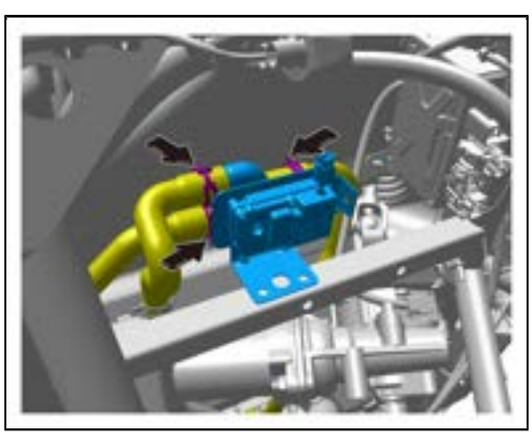
Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To drain the coolant, See: Coolant Draining and Refilling.
3. To remove the front service cover, See: Front Service Cover.
4. To remove the headlamp cover, See: Headlamp Cover.
5. To remove the flasher unit, See: Flasher Unit.
6. To remove the front panel, See: Front Panel.
7. To remove the headlamp bezel assembly, See: Headlamp Bezel Assembly.
8. To remove the horn, See: Horn.
9. To remove the front bracket welded assembly, See: Front Bracket Welded Assembly.
10. To remove the radiator, See: Radiator.
11. To remove the radiator rear baffle, See: Radiator Rear Baffle.
12. Removing the electronic 3-way valve



a. Disconnect the electronic 3-way valve electrical connector.

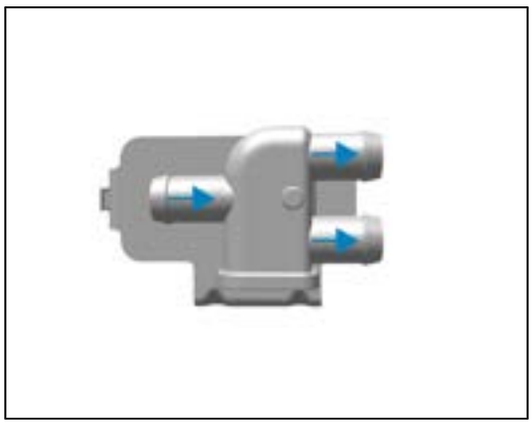
b. Remove the 2 mounting bolts from the electronic 3-way valve.



c. Loosen the 3 hose clips, disconnect the 3 coolant hoses, and remove the electronic 3-way valve.

CAUTION:

- During removal, mark the positions of the coolant hoses relative to the valve ports. Incorrect installation will result in improper coolant circulation.



d. The electronic 3-way valve is directional; ensure it is installed in the correct orientation.

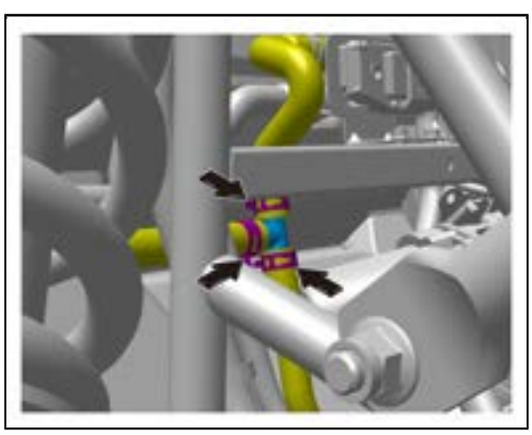
Installation Procedure

1. **Install the electronic three-way valve in the reverse order of removal, noting the following:**
   a. After filling with coolant, bleed the cooling system following See: the standard bleeding procedure.

10.1.6.9 T-Connector (16x16x16)

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To drain the coolant, See: Coolant Draining and Refilling.
3. To remove the front service cover, See: Front Service Cover.
4. To remove the headlamp cover, See: Headlamp Cover.
5. To remove the flasher unit, See: Flasher Unit.
6. To remove the front panel, See: Front Panel.
7. To remove the headlamp bezel assembly, See: Headlamp Bezel Assembly.
8. To remove the horn, See: Horn.
9. To remove the front bracket welded assembly, See: Front Bracket Welded Assembly.
10. To remove the radiator, See: Radiator.
11. To remove the radiator rear baffle, See: Radiator Rear Baffle.
12. Removing the T-connector (16x16x16)



a. Loosen the 3 coolant hose clamps and disconnect the hoses from the three-way connector (16 × 16 × 16), then remove the connector.

CAUTION:

- During removal, mark the positions of the coolant hoses relative to the valve ports. Incorrect installation will result in improper coolant circulation.

Installation Procedure

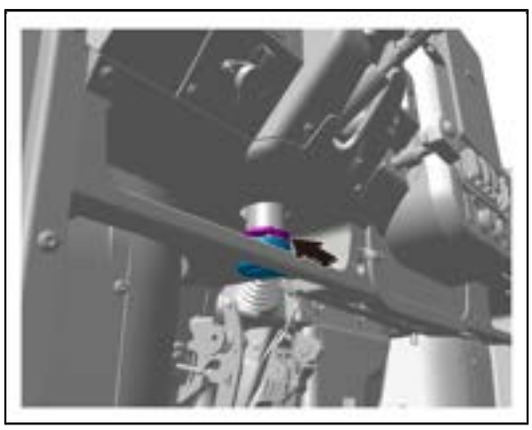
1. Install the three-way connector (16 × 16 × 16) in the reverse order of removal, noting the following:
   a. After filling with coolant, bleed the cooling system following See: the standard bleeding procedure.

10.1.6.10 Footwell Air Outlet

NOTICE:
• This manual illustrates the removal and installation of the left footrest; the removal and installation of the right footrest can be performed in a similar manner.

Removal Procedure

1. Removing the footwell air outlet



a. Detach the rubber sleeve, loosen the securing clip, and remove the footwell air outlet.

Installation Procedure

1. Install the footwell air outlet in the reverse order of removal.

10.1.6.11 Air Outlet

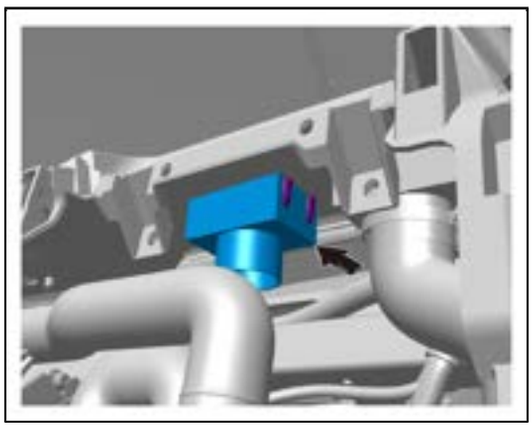
NOTICE:
• This procedure details the removal and installation of a single air outlet; the process applies similarly to other air vents.

Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the centre display, See: Centre Display.
3. To remove the switch panel, See: Switch Panel.
4. To remove the windscreen demister air duct assembly, See: Windscreen Demister Air Duct

Assembly.

5. Removing the air outlet



a. Release the 4 retaining clips on the sides of the air outlet and remove it.

Installation Procedure

1. Install the air outlet in the reverse order of removal.

10.1.6.12 Air Conditioning Wiring Harness

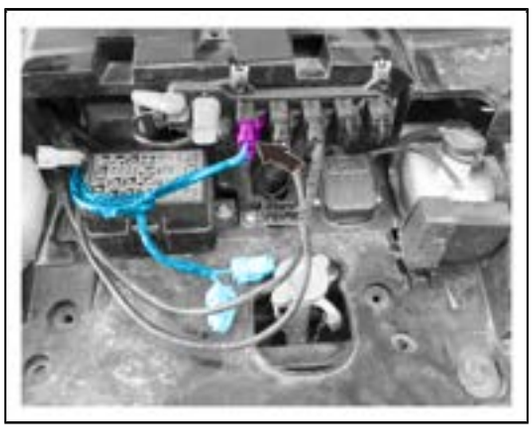
Removal Procedure

1. To disconnect the negative battery terminal, See: Battery Power Connection/Disconnection Procedure.
2. To remove the windscreen assembly, See: Windscreen Assembly.
3. To remove the front service cover, See: Front Service Cover.
4. To remove the headlamp cover, See: Headlamp Cover.
5. To remove the flasher unit, See: Flasher Unit.
6. To remove the front panel, See: Front Panel.
7. To remove the left half-door, See: Left Half Door.
8. To remove the front mudguard, See: Front Mudguard.
9. To remove the headliner left inner cover, See: Headliner Left Inner Cover.
10. To remove the left A-pillar welded assembly, See: Left A-Pillar Welded Assembly.
11. To remove the instrument cover, See: Instrument Cover.
12. To remove the centre display, See: Centre Display.
13. To remove the switch panel, See: Switch Panel.
14. To remove the lower centre console storage compartment, See: Lower Centre Console

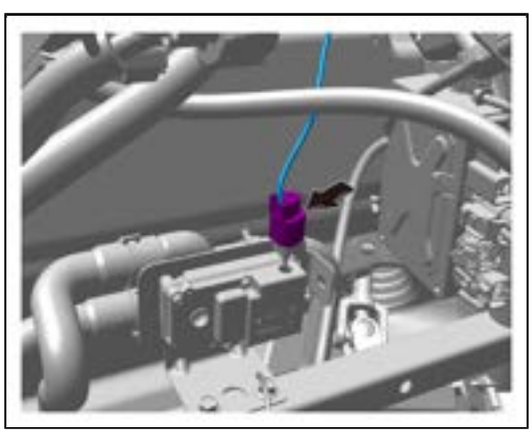
Storage Compartment.

15. To remove the upper instrument panel, See: Upper Instrument Panel.

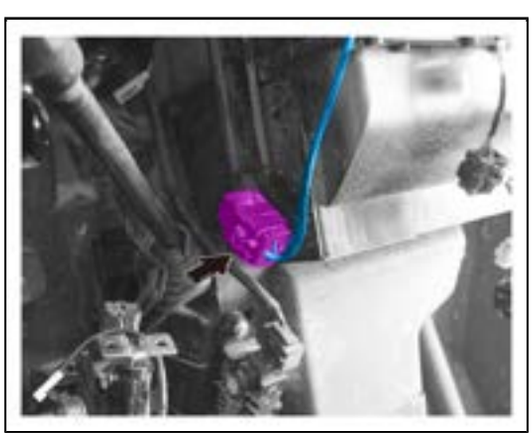
16. Removing the air conditioning wiring harness



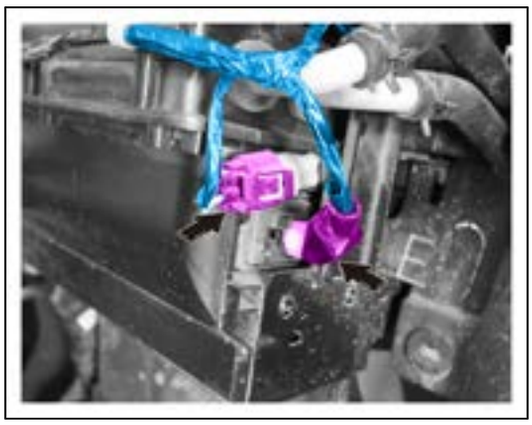
a. Disconnect the air conditioning electrical connector.



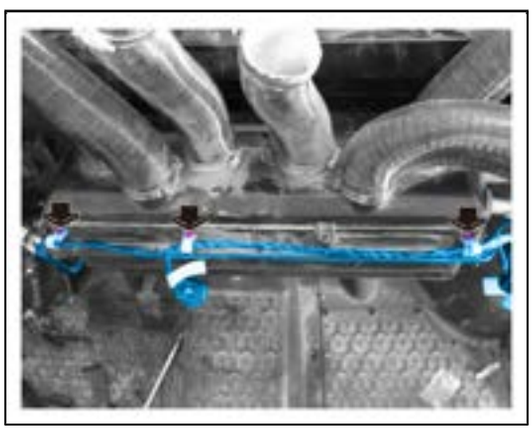
b. Disconnect the air conditioning electrical connector.



c. Disconnect the air conditioning electrical connector.



d. Disconnect the 2 air conditioning wiring harness.



e. Remove the 3 securing screws from the air conditioning wiring harness bracket, release the retaining clips along the loom, cut the cable ties, and remove the wiring harness.

NOTICE:
• Cable ties on the harness are single-use and must be replaced after removal.

Installation Procedure

1. Install the air conditioning wiring harness in the reverse order of removal.



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