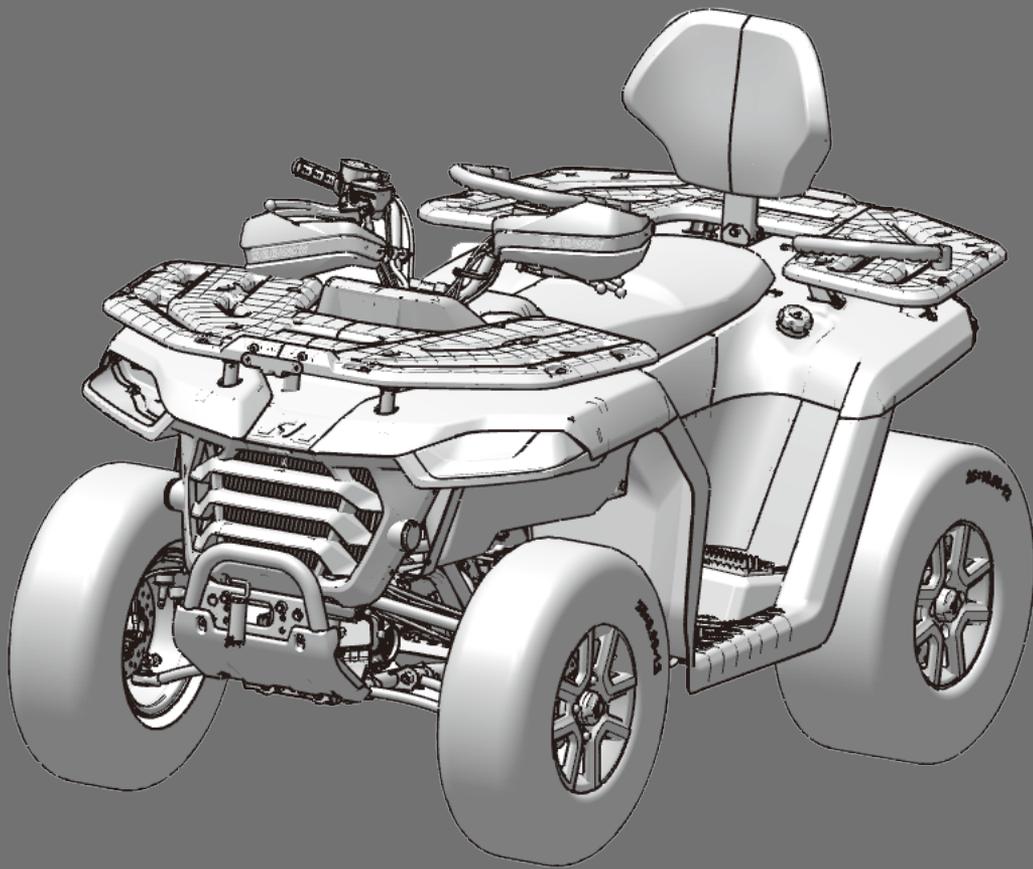




AT10/AT10W  
SERIES MODELS

# SERVICE MANUAL



2025/01/10 V1.0



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# SUMMARY

This manual provides information on diagnostics, maintenance procedures, adjustments and specifications for the 1000ATV series for use by service technicians.

All materials, illustrations and product descriptions contained in this manual are in accordance with the status at the time of publication to ensure the efficient safety of vehicles, continuous research and development, may lead to parts of the manual account do not tally with the vehicle actual situation, so the state of the vehicle body shall prevail, when in doubt it is suggested that you contact the Segway Powersports dealership, for the latest status of this manual or information relating to the product part number or special tools.

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The above statement applies to all text, images, and forms.

1. This manual is provided by Segway Technology Ltd. and is intended for qualified professional and technical personnel.

If you do not have the proper training and do not proper tools and equipment, attempting to perform repairs and maintenance can injure the repairer himself or others, and may also damage the vehicle or cause it to not be operated properly.

2. Proper vehicle maintenance and repair is very important for the personal safety of maintenance personnel and the safe, reliable operation of motor vehicles. If you need to replace a part, please use the same part or the part specified by Segway, do not use parts that are not recognized by Segway. Do not use parts not approved by Segway for replacement.

3. The recommended maintenance procedures described in this manual are an effective way to perform repairs and maintenance, some of which require the use of specialized tools.

Therefore, if replacement parts, repair procedures or tools not approved or recommended by Segway are used, you must first verify that there is no risk to personal safety or safe operation of the vehicle. or safe operation of the vehicle.



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# TERMINOLOGY

|                    |                                   |        |                          |
|--------------------|-----------------------------------|--------|--------------------------|
| A                  | ampere(s)                         | lb     | pounds(s)                |
| ABDC               | after bottom dead center          | m      | meter(s)                 |
| AC                 | alternating current               | mm     | Millimeter(s)            |
| ATDC               | after top dead center             | min    | minute(s)                |
| BBDC               | before bottom dead center         | N      | newton(s)                |
| BDC                | bottom dead center                | Nm     | Newton meters            |
| BTDC               | before top dead center            | Pa     | pascal(s)                |
| C                  | degree(s) Celcius                 | HP(PS) | horsepower               |
| CVT                | centrifugal variable Transmission | psi    | pound(s) per square inch |
| DC                 | direct current                    | r      | revolution               |
| F                  | farad(s)                          | rpm    | revolution(s) per minute |
| F                  | degree(s) Fahrenheit              | TDC    | top dead center          |
| ft                 | foot, feet                        | TIR    | total indicator reading  |
| g                  | gram(s)                           | V      | volt(s)                  |
| kg/cm <sup>2</sup> | Kilograms per square centimeter   | W      | watt(s)                  |
| h                  | hour(s)                           | Ω      | ohm(s)                   |
| L                  | liter(s)                          |        |                          |

This manual is applicable to the following vehicle models: :

SGW1000F-A1/SGW1000F-A2/SGW1000F-A3/SGW1000F-A4/

SGW1000F-A5/SGW1000F-A6/SGW1000F-A7/SGW1000F-A8/

SGW1000F-A9/SGW1000F-A10

# NOTES BEFORE MAINTENANCE

This manual includes a variety of "warnings", "attention", "tips", etc., which must be carefully followed in order to reduce the risk of injury during repair or maintenance. Improper repair or maintenance will damage the vehicle or bring safety hazards to the vehicle.

## **⚠ WARNING**

**WARNING** indicates a potential hazard that may result in severe injury or death to the operator, bystander or person(s) inspecting or servicing the vehicle.

## **⚠ CAUTION**

**CAUTION** indicates a potential hazard that may result in personal injury or damage to the vehicle.

## **TIPS**

**TIPS** provide maintenance information to give the corresponding reminder, express and explanation.

## **IMPORTANT**

**IMPORTANT** provides key reminders during disassembly, assembly, and inspection of components.

Please understand the construction, performance, repair methods and safety requirements of the vehicle being repaired before servicing.

### **Preparation of tools and gauges**

Prepare the necessary tools and measuring instruments before the repair work.

### **Specialized tools**

The disassembly of some parts requires the use of special tools, please do not use other tools instead.

### **Parts disassembly**

Before repair work, first identify the cause of the malfunction and confirm whether disassembly or disassembly is required based on the actual condition of the malfunction.

### **Disassemble**

If the disassembly process is complex and requires too many parts to be disassembled, take care that the performance or shape of all parts is not damaged.

### **Parts**

When parts are damaged and need to be replaced, use parts approved or recommended by Segway.

### **Replacements**

All components should be assembled with strict adherence to standard values such as torque and indeed adjustment values.

If disassembled, the following parts must be replaced with new ones:

- shims
- O-ring
- cotter pin

Use the recommended lubricant in the specified position before assembly

### **Rubber parts and hoses**

Prevent rubber parts and hoses from coming into contact with gasoline or lubricating oil.

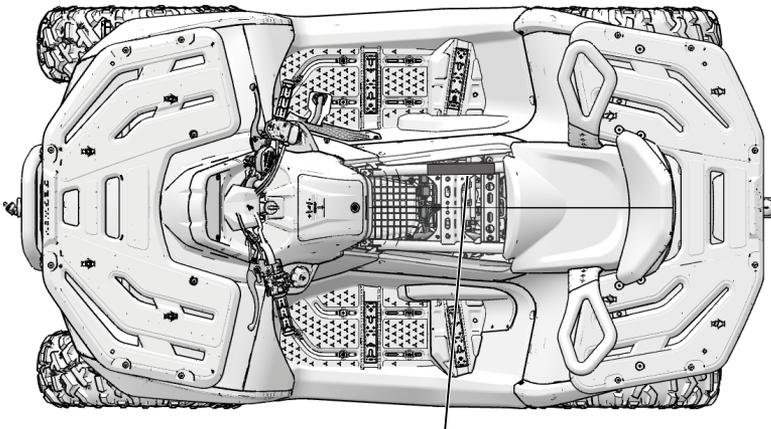
## GENERAL INFORMATION

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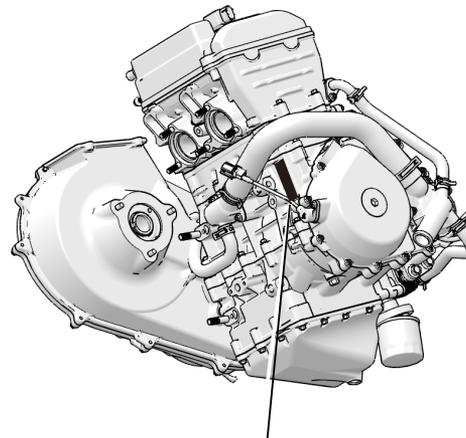
## VEHICLE IDENTIFICATION NUMBER/ENGINE SERIAL CODE

### VEHICLE IDENTIFICATION NUMBER

The vehicle identification number is located on the frame cross tube under the seat cushion and the engine number is embossed on the engine. It is used to assist the customer when ordering spare parts from the dealer or as a reference in case the vehicle is stolen. when the customer needs to order spare parts from the dealer or as a reference in the event of theft of the vehicle..



Vehicle Frame Identification Number (VFIN)



Engine Serial No.

### VEHICLE IDENTIFICATION CODE COMPOSITION

\*A0SAAPX1? X X X X X X X X X X\*

1 2 3 4 5 6 7 8 9 10

| No. | Serial Number Meaning | Digits | No. | Serial Number Meaning | Digits |
|-----|-----------------------|--------|-----|-----------------------|--------|
| 1   | OEM CODE              | 3      | 6   | INSPECTION            | 1      |
| 2   | MODEL                 | 1      | 7   | DATE                  | 1      |
| 3   | ENGINE CODE           | 1      | 8   | SERIAL NUMBER         | 1      |
| 4   | DISPLACEMENT          | 1      | 9   | FACTOR NUMBER         | 1      |
| 5   | POWER                 | 1      | 10  | PRODUCTION NUMBER     | 6      |

## TECHNICAL PARAMETERS OF VEHICLE

| ITEM   | SPECIFICATIONS   |                                  |
|--|--|----------------------------------|
|  | AT10<br>(SGW1000F-A1/A2/A3/A4)   | AT10 W<br>(SGW1000F-A5/A6/A7/A8) |
| Vehicle  |  |                                  |
| Length   | 2412mm   | 2429mm                           |
| Width  | 1256mm   | 1489mm                           |
| Height   | 1452mm   | 1492mm                           |
| Wheel base   | 1455mm   |                                  |
| Ground clearance                                     | 275mm  | 275mm(27")/320mm(30")            |
| Turning diameter                                     | 8500 mm  |                                  |
| Curb weight  | 518kg  | 549kg                            |
| Front rack load                                      | 40kg   |                                  |
| Rear rack load                                       | 60kg   |                                  |
| Recommended<br>Traction quality Pulled load quality) | 450kg  |                                  |
| Engine   |  |                                  |
| Engine model   | 293MY-2  |                                  |
| Engine type  | Four stroke, single cylinder, water cooled, vertical, double overhead camshaft |                                  |
| Cylinder diameter × stroke                           | 93×73.6  |                                  |
| Engine displacement                                  | 999.99 ml  |                                  |
| Compression ratio                                    | 10.9:1   |                                  |
| Idle speed   | 1450±145 r/min   |                                  |
| Maximum power  | 71kW / 8000 r/min  |                                  |
| Maximum torque                                       | 88 N·m / 7500 r/min  |                                  |
| Starting way   | Electric start   |                                  |
| Lubrication way                                      | Pressure spray   |                                  |
| Engine oil type                                      | SAE 5W-40 SN or higher   |                                  |
| Engine oil capacity                                  | 2200 mL  |                                  |
| Front axle gear oil type                             | SAE 80W-90 GL-5  |                                  |
| Empty Volume   | 310 mL   |                                  |
| Rear axle gear<br>oil model                          | SAE 80W-90 GL-5  |                                  |
| Empty Volume   | 1200 mL  |                                  |

| ITEM                     | SPECIFICATIONS                         |              |            |                                  |             |  |
|--------------------------|--|--------------|------------|----------------------------------|-------------|--|
|                          | AT10<br>(SGW1000F-A1/A2/A3/A4)         |              |            | AT10 W<br>(SGW1000F-A5/A6/A7/A8) |             |  |
| Air filter               | Paper filter element                   |              |            |                                  |             |  |
| Fuel tank type           | Barrier type plastic fuel tank         |              |            |                                  |             |  |
| Fuel tank capacity       | 23 L                                   |              |            |                                  |             |  |
| Fuel type                | Petrol(E10)/87#(US)/92 #(GB)           |              |            |                                  |             |  |
| Spark plug type          | B7RTC/B8RTC                            |              |            |                                  |             |  |
| Spark plug clearance     | 0.6~0.8mm                              |              |            |                                  |             |  |
| Variable speed way       | CVT                                    |              |            |                                  |             |  |
| Variable speed ratio     | 0.717~2.976                            |              |            |                                  |             |  |
| L Transmission ratio     | 13.192~54.755                          |              |            |                                  |             |  |
| H Transmission ratio     | 8.802~36.534                           |              |            |                                  |             |  |
| Reverse gear ratio       | 11.515~47.794                          |              |            |                                  |             |  |
| Tire                     |  |              |            |                                  |             |  |
| Tire type                | Vacuum tire                            |              |            |                                  |             |  |
| Front tire specification | 27×9.00-14                             | 27×9.00 R14  | 27×9.00-14 | 27×9.00R14                       | 30×10.00R14 |  |
| Rear tire specification  | 27×11.00-14                            | 27×11.00 R14 | 27×9.00-14 | 27×9.00R14                       | 30×10.00R14 |  |
| Front tire pressure      | 7.0psi (48.3kPa)                       |              |            |                                  |             |  |
| Rear tire pressure       | 7.0psi (48.3kPa)                       |              |            |                                  |             |  |
| Brake type               | Disc brake                             |              |            |                                  |             |  |
| Front wheel front beam:  | -5~20mm                                |              |            | -5~20mm                          |             |  |
| Main pin rear camber (°) | 5                                      |              |            | 3                                |             |  |
| Wheel Camber (°)         | -0.1                                   |              |            | -0.1                             |             |  |
| Main pin camber (°)      | 8                                      |              |            | 8                                |             |  |
| Main pin offset (mm)     | 3.5                                    |              |            | -0.5                             |             |  |
| Suspension System        |  |              |            |                                  |             |  |
| Foot brake mode          | Foot operation                         |              |            |                                  |             |  |
| Front braking mode       | Hand operation                         |              |            |                                  |             |  |
| Brake fluid type         | DOT4                                   |              |            |                                  |             |  |
| Front suspension         | Double-wishbone independent suspension |              |            |                                  |             |  |
| Rear suspension          | Double-wishbone independent suspension |              |            |                                  |             |  |
| Front shock absorber     | Hydraulic Spring/Air sac               |              |            |                                  |             |  |
| Rear shock absorber      | Hydraulic Spring/Air sac               |              |            |                                  |             |  |
| Fr. Suspension stroke    | 185mm                                  |              |            | 173mm                            |             |  |
| Rr. Suspension stroke    | 210mm                                  |              |            | 210mm                            |             |  |

# GENERAL INFORMATION

## SEGWAY AT10

| ITEM                             | SPECIFICATIONS                 |                                  |
|----------------------------------|--------------------------------|----------------------------------|
|                                  | AT10<br>(SGW1000F-A1/A2/A3/A4) | AT10 W<br>(SGW1000F-A5/A6/A7/A8) |
| Electrical System                |                                |                                  |
| Ignition mode                    | electricity (ECU)              |                                  |
| Charge                           | 980W/5500 rpm / 680W/5500 rpm  |                                  |
| Battery                          | 12V 32Ah                       |                                  |
| Headlamp                         | Head light                     | LED or H4/55W                    |
|                                  | Day Light                      | LED                              |
|                                  | Turn signal                    | LED                              |
|                                  | Front Position Light           | LED                              |
| Rear tail light - position light | LED or 5 W P21/5W              |                                  |
| Rear taillights - Brake lights   | LED or 21 W P21/5W             |                                  |
| Turn signal lamp                 | LED or 10W RY10W               |                                  |

## UNIT CONVERSION TABLE

| TORQUE                        |             |                    |
|-------------------------------|-------------|--------------------|
| Unit                          | coefficient | Convert to         |
| N·m                           | × 0.1020    | kg·m               |
| N·m                           | ×0.7376     | ft·lbs             |
| N·m                           | ×8.851      | in·lbs             |
| kg·m                          | ×9.807      | N·m                |
| kg·m                          | ×7.233      | ft·lbs             |
| kg·m                          | ×86.80      | in·lbs             |
| in·lbs                        | ×0.833      | ft·lbs             |
| in·lbs                        | ×0.116      | kg·m               |
| PRESSURE                      |             |                    |
| kPa                           | × 0.01020   | kg/cm <sup>2</sup> |
| kPa                           | × 0.1450    | psi                |
| kPa                           | × 0.7501    | cmHg               |
| kg/cm <sup>2</sup>            | × 98.07     | kPa                |
| kg/cm <sup>2</sup>            | × 14.22     | psi                |
| cm Hg                         | × 1.333     | kPa                |
| POWER                         |             |                    |
| N                             | × 0.1020    | kg                 |
| N                             | × 0.2248    | lb                 |
| kg                            | × 9.807     | N                  |
| kg                            | × 2.205     | lb                 |
| VOLUME                        |             |                    |
| L                             | × 0.2642    | gal (US)           |
| L                             | × 0.2200    | gal (imp)          |
| L                             | × 1.057     | qt (US)            |
| L                             | × 0.8799    | qt (imp)           |
| L                             | × 2.113     | pint (US)          |
| L                             | × 1.816     | pint (imp)         |
| mL                            | 0.03381     | oz (US)            |
| mL                            | 0.02816     | oz (imp)           |
| mL                            | 0.06102     | cu in              |
| SPEED                         |             |                    |
| km/h                          | × 0.6214    | mph                |
| POWER                         |             |                    |
| kW                            | × 1.360     | PS                 |
| kW                            | × 1.341     | HP                 |
| PS                            | × 0.7355    | kW                 |
| PS                            | × 0.9863    | HP                 |
| TEMPERATURE                   |             |                    |
| °C to °F : °C x 9/5 + 32 = °F |             |                    |
| °F to °C : °F - 32 x 5/9 = °C |             |                    |

### TORQUE

The following tables list the tightening torque for the major fasteners, and the parts requiring use of a non-permanent locking agent or liquid gasket.

Letters used in the "Remarks" column mean:

L: Apply a non-permanent locking agent.

| Firmware torque for key engine components   |                               |  |                   |              |
|---|-------------------------------|--|-------------------|--------------|
| Designation                                 | Tightening torque range (n·m) | Mounting position                          | Mounting position | Glued or not |
| Plug npt3/8                                 | (32±2) N·m                    | Upper crankcase                            | L                 | /            |
| Piston nozzle regulators                    | 20±2                          | Upper crankcase                            |                   | /            |
| Connecting rod bolt                         | 5n·m+20n·m+110°               | Connecting rod                             |                   | 12.9         |
| Bolt assembly m10×1.25×110                  | 12n·m+28n·m+90°               | Crankcase                                  |                   | 10.9         |
| Bolt m8×90                                  | 34±1                          | Crankcase                                  |                   | 10.9         |
| Bolt m6×25                                  | (10±2) N·m                    | Oil pump                                   |                   | 8.8          |
| Bolt m6×20                                  | (10±2) N·m                    | Oil pump                                   |                   | 8.8          |
| Bolt m14                                    | 18±2                          | Oil sump                                   |                   | /            |
| Bolt m6×30                                  | (11±1) N·m                    | Crankcase                                  |                   | 8.8          |
| Hexagon socket pan head step bolts          | 12±2                          | Chain guides                               |                   | 8.8          |
| Oil pressure sensor                         | 14±2                          | Cylinder body                              |                   | /            |
| Cylinder head bolts m11×1.25×150            | 12n·m→35n·m→180°              | Cylinder head                              |                   | 10.9         |
| Hexagonal flange face bolts m6×12           | 18±2                          | Timing slave sprocket                      | L                 | 12.9         |
| Spark plugs(ngk)                            | 13±2                          | Cylinder head                              |                   | /            |
| Hexagon socket cheese head screws m6×16     | 18±2                          | Magneto motor rotor                        | L                 | /            |
| Bolt m12×1.25×30                            | 155±8                         | Magneto motor rotor                        | L                 | 12.9         |
| Hexagonal flange face nuts m22×1            | 140±10                        | Starting primary driven gear<br>Pinion     | L                 | 10           |
| Viewport cover                              | 12±2                          | Left crankcase cover                       |                   | /            |
| Oil filter fitting                          | 35±5                          | Left crankcase cover                       |                   | /            |
| Water temperature sensor                    | 12±2                          | Cylinder body                              |                   | /            |
| Hexagonal flange face bolts m10×1.25×30     | 70±5                          | Transmission bracket                       |                   | /            |
| Starter motor positive wire positive Nut m6 | 7±1                           | Starter motor                              |                   | /            |
| Nut m10×1.25                                | 45±5                          | Engine gearbox combination<br>Installation | L                 | 10           |

# GENERAL INFORMATION

SEGWAY AT10

|  |       |  |   |      |
|--|-------|--|---|------|
| Cvt driven wheel bolt<br>m10×1.25×80       | 80±5  | Cvt driven wheel                                   |   | 12.9 |
| Bolt m12×1.25×185                          | 120±8 | Cvt active wheel                                   |   | 12.9 |
| Hexagonal flange face bolts<br>m10×1.25×25 | 50±5  | Rear axle output gear<br>(Differential)            | L | 8.8  |
| Trunnion shaft                             | 20±2  | Rear output fork                                   |   | /    |
| Nut 33×1.5                                 | 245±5 | Three-axis assembly/<br>turn front<br>Output shaft |   | 8    |
| Bolt m8×70                                 | 25±2  | Transmission<br>combination box                    |   | 8.8  |
| Bolt m8×40                                 | 25±2  | Transmission<br>combination box                    |   | 8.8  |
| Hexagonal flange face nuts<br>m22×1        | 140±5 | Front output gear shaft                            | L | 10   |
| Hexagonal flange face lock nuts<br>m14×1.5 | 120±5 | Front output driven<br>conical teeth<br>Shafts     |   | /    |
| Solenoid valve assembly                    | 35±2  | Front output driven<br>conical teeth<br>Shafts     |   | /    |
| Conventional engine bolt torque            |       |  |   |      |
| M6   | 8~12  |  |   | 8.8  |
| M8   | 20~30 |  |   | 8.8  |

# GENERAL INFORMATION

## SEGWAY AT10

| Vehicle-specific fastener torque                      |               |                   |                   |         |           |              |                                |
|---|---------------|-------------------|-------------------|---------|-----------|--------------|--------------------------------|
| Projects  | Standard part | Performance Grade | Tightening torque |         |           | Whether Glue | Remarks                        |
|   |               |                   | N·M               | KGF·M   | FT·LB     |              |                                |
| Front engine mounting bolts                           | M12×1.25×80   | 10.9              | 108~127           |         |           |              | Self-locking nuts              |
| Engine mounting bolts                                 | M12×1.25×110  | 10.9              | 108~127           |         |           |              | Self-locking nuts              |
|   | M10×1.25×40   | 10.9              | 65~75             |         |           |              | Self-locking nuts              |
| Front axle mounting bolts                             | M10×1.25×125  | 10.9              | 65~75             |         |           |              | Self-locking nuts              |
|   | M10×1.25×20   | 8.8               | 45~60             |         |           | L            |                                |
|   | M10×1.25×16   | 8.8               | 45~60             |         |           |              |                                |
| Install bolts in front of the front rocker arm        | M10×1.25×90   | 10.9              | 55~65             | 5.5~6.5 | 40.5~48   |              | Self-locking nuts              |
| Rear lower rocker arm mounting bolts                  | M10×1.25×90   | 10.9              | 55~65             | 5.5~6.5 | 40.5~48   |              | Self-locking nuts              |
| Rear lower rocker arm mounting bolts                  | M10×1.25×95   | 10.9              | 55~65             | 5.5~6.5 | 40.5~48   |              | Self-locking nuts              |
| Rear down rocker arm mounting bolts                   | M10×1.25×140  | 10.9              | 55~65             | 5.5~6.5 | 40.5~48   |              | Self-locking nuts              |
| Front shock absorber mounting bolts                   | M10×1.25×55   | 10.9              | 40~50             | 4.0~5.0 | 29.5~36.9 |              | Self-locking nuts              |
| Rear shock absorber mounting bolts                    | M10×1.25×55   | 10.9              | 40~50             | 4.0~5.0 | 29.5~36.9 |              | Self-locking nuts              |
| Steering knuckle lower mounting bolts                 | M10×1.25×40   | 10.9              | 40~50             | 4.0~5.0 | 29.5~36.9 |              | Self-locking nuts              |
| Rear left and right rocker arms and rear wheel mounts | M10×1.25×100  | 10.9              | 55~65             | 5.5~6.5 | 40.5~48   |              | Self-locking nuts              |
| Oxygen sensor   | /             | /                 | 15~20             |         |           |              | Self-adhesive                  |
| Steering grip cover bolt                              | M8×1.25×45    | 8.8               | 22~29             |         |           |              | Hexagon socket head cap screws |
| Wheel brake disc installation bolt                    | A03e10004001  | 8.8               | 25~28             |         |           | L            | Self-adhesive                  |
| Right side surround pipe assembly mounting bolts      | M10×1.25×25   | 8.8               | 45~60             |         |           | L            |                                |
| Left side surround pipe assembly mounting bolts       | M10×1.25×25   | 8.8               | 45~60             |         |           | L            |                                |
| Wheel side caliper body bolts                         | M10×1.25×25   | 10.9              | 40~50             |         |           | L            |                                |
| Brake master cylinder mounting bolts                  | M8×1.25×25    | 8.8               | 22~29             |         |           | L            |                                |

# GENERAL INFORMATION

SEGWAY AT10

|   |              |      |         |         |           |   |                                |
|---|--------------|------|---------|---------|-----------|---|--------------------------------|
| Steel rim mounting nuts                         | T08000016002 | 10   | 70~80   |         |           |   | Categorical                    |
| Aluminium rim mounting nuts                     | T08000011002 | 10   | 70~80   |         |           |   | Categorical                    |
| Drive shaft mounting bolts                      | M10×1.25×25  | 10.9 | 40~50   | 4.0~5.0 | 29.5~36.9 | L | Hexagon socket head cap screws |
| Balance bar mounting bolts                      | M8×30        | 8.8  | 22~29   |         |           | L |                                |
| Wheel hub nut                                   | M24×2        | 10   | 220~380 |         |           |   | Categorical                    |
| Steering rocker arm and eps locking screw bolt  | M8×40        | 10.9 | 35~40   | 3.5~4.0 | 25.8~29.5 | L | Categorical                    |
| Eps installation bolt                           | M10×1.25×20  | 8.8  | 30~40   | 3.0~4.0 | 22.1~29.5 | L |                                |
| Eps steering universal joint locking screw Bolt | M8×35        | 10.9 | 35~40   | 3.5~4.0 | 25.8~29.5 | L | Categorical                    |
| Steering rocker arm spacer lock nut             | M10          | 8    | 45~50   |         |           |   |                                |

# MAINTENANCE

|   |             |
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## TECHNICAL SPECIFICATIONS

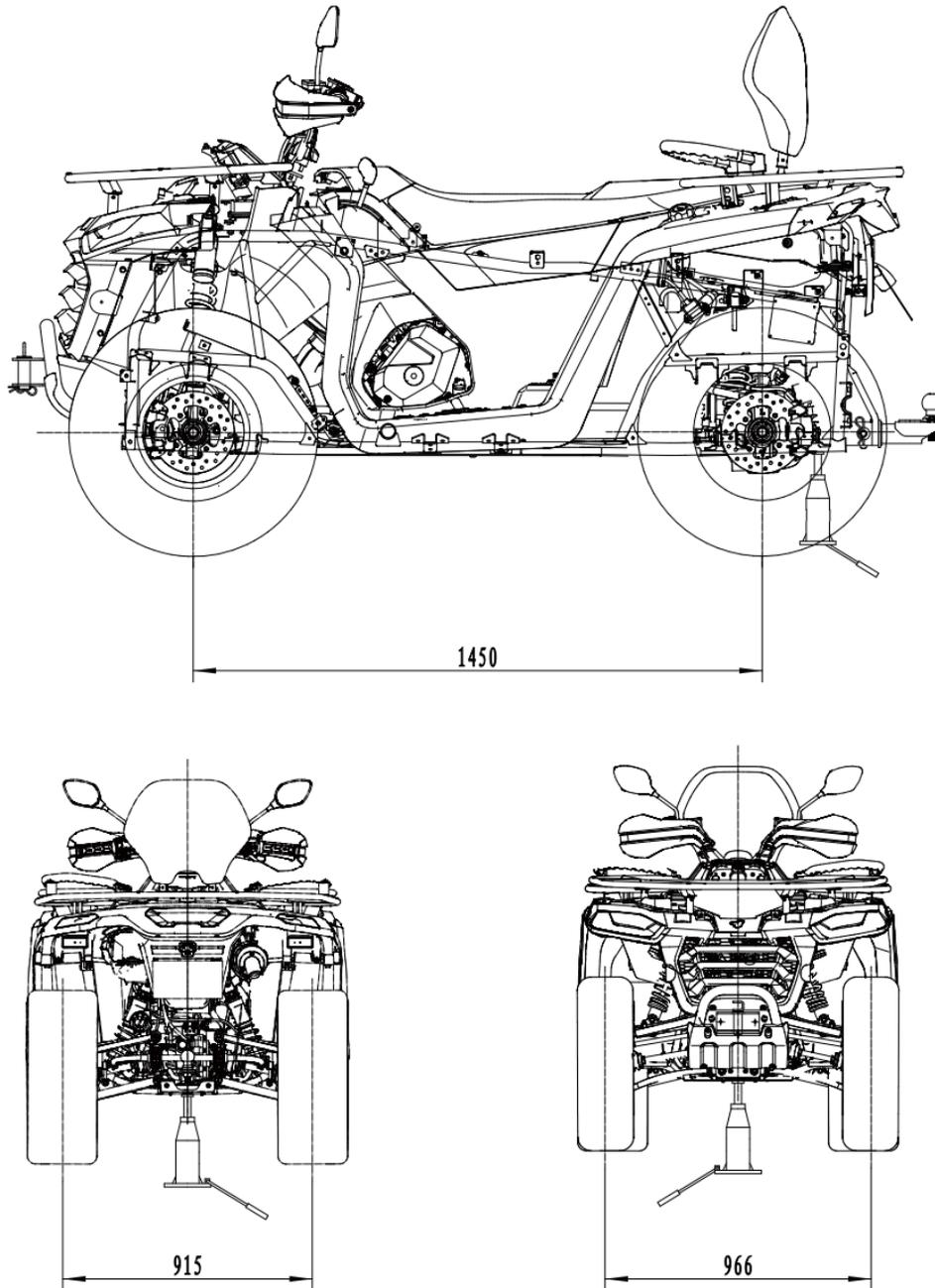
| General specifications         |                                  |                 |
|--------------------------------|----------------------------------|-----------------|
| Item                           | standard                         | usage limit     |
| Cylinder leakage               | —                                | 20%             |
| Intake valve clearance (cold)  | 0.1 ~ 0.15mm (0.0039" ~ 0.0059") | —               |
| Exhaust valve clearance (cold) | 0.2 ~ 0.25mm (0.0079" ~ 0.0098") | —               |
| Front Tire Pressure            | 7 psi ( 48 kPa)                  | —               |
| Rear Tire Pressure             | 7 psi ( 48 kPa)                  | —               |
| Wheel Front Beam               | -5 ~ 5mm                         | —               |
| Shock spring adjustment        | 1~5                              | —               |
| Brake Pad Thickness            | 5mm                              | 0.060 (1.5 mm)  |
| Brake Disc Thickness           | 5mm                              | 0.170 (4.32 mm) |
| Spark Plug Model               | B7RTC/B8RTC                      |                 |

| Fluid Specifications      |                           |               |
|---------------------------|---------------------------|---------------|
| Item                      | model number              | Capacity      |
| oil                       | SAE10W-40/SN or higher    | 2200 ml       |
| Engine coolant            | Differential              | 5500 ml       |
| Front Gear box Fluid      | SAE 80W-90 GL5            | 310 ml        |
| Rear Gear Box Fluid       | SAE 80W-90 GL5            | 1200ml        |
| brake fluid               | DOT4                      | —             |
| grease nipple             | Universal Joint Lubricant | grease nipple |
| Universal Joint Lubricant | Universal Joint Lubricant | grease nipple |
| fuels                     | 87#、92#                   | 23 L          |

## VEHICLE LIFTING SUPPORT POSITION

Park the vehicle on a flat, non-slip surface. Make sure the vehicle shift lever is set to Park.

To lift the front or rear of the vehicle, place the jacks at the left and right centers of the front or rear of the vehicle as shown below:



Schematic diagram of jack stands location

## MAINTENANCE CYCLE TABLE

The periodic maintenance table describes the inspection, adjustment and lubrication of important parts. Inspect, clean, lubricate, adjust and replace parts as necessary. When inspections indicate the need for replacement parts, use genuine Segway parts from your Segway dealer.

| SYMBOL | DESCRIPTION   |
|--------|---|
| ▶      | Perform these procedures more often for vehicles subjected to severe use.   |
| D      | Have an authorized dealer or other qualified person perform these services. |

### Heavy use is defined:

- ◆ Frequent immersion in mud, water, or sand
- ◆ Frequent or prolonged operation in dusty environments
- ◆ Short trip cold weather operation
- ◆ Racing or racing style high RPM use
- ◆ Long periods of low-speed, heavy-duty operation
- ◆ Idle vehicles for long periods of time

### **WARNING**

The D-marking process may cause component failure and result in serious injury or death. Have an authorized dealer or other qualified person perform these services.

Perform all services with the first arriving maintenance condition. Record maintenance and services in the maintenance log.

### Break-in period

The break-in period is the first 25 hours or 320km of vehicle operation (whichever comes first).

Start by driving slowly, varying the throttle angle, and do not operate at constant idle.

Regularly check fluid levels, control switches and components on the daily pre-driving checklist.

During break-in, change the oil and filter within 25 hours or 320km (whichever comes first).

For additional break-in information, refer to the Owner's Manual.

## BREAK-IN MAINTENANCE

| ITEM               | MAINTENANCE INTERVAL<br>(WHICHEVER COMES FIRST) |          |            | REMARKS  |
|--------------------|---|----------|------------|--|
|                    | HOURS   | CALENDAR | MILES (KM) |  |
| Fuel System        | 25 H  | 1 M      | 200 (320)  | Break-in check: cycle key to pressurize fuel pump. check lines and fittings for leaks and abrasion |
| Engine oil change  | 25 H  | 1 M      | 200 (320)  | Break-in check: oil and filter change  |
| Front gearcase oil | 25 H  | 1 M      | 200 (320)  | Break-in check: oil level check  |
| Rear gearcase oil  | 25 H  | 1 M      | 200 (320)  | Break-in check: oil level check  |

## PERIODIC MAINTENANCE

Make sure to perform proper maintenance at recommended intervals as indicated in the tables. Some items of the maintenance schedule must be performed in function of the calendar, regardless of the distance or time of operation.

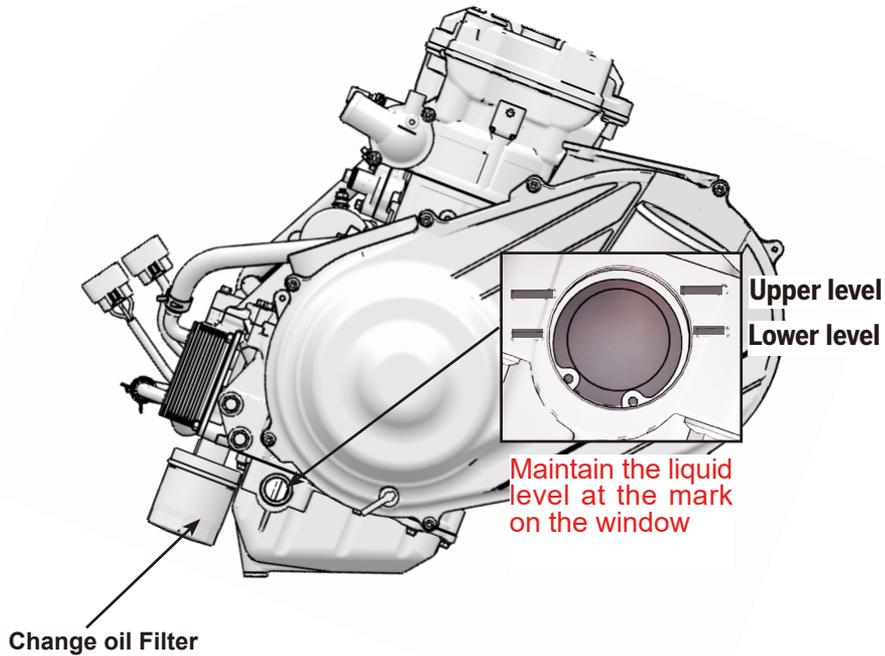
| ITEM                       | MAINTENANCE INTERVAL<br>(WHICHEVER COMES FIRST) |          |             | REMARKS   |
|----------------------------|---|----------|-------------|---|
|                            | HOURS   | CALENDAR | MILES (KM)  |   |
| ▶ Brake pad wear           | 10 H  | Monthly  | 100 (160)   | Inspect periodically. replace as needed                                   |
| Battery                    | 20 H  | Monthly  | 200 (320)   | Check terminals. clean. test  |
| ▶ Air filter, main element | 50H   |          | 500 (800)   | Inspect. replace as needed. inspect frequently if subjected to severe use |
| ▶ General lubrication      | 50 H  | 3 M      | 500 (800)   | Lubricate all fittings, pivots, cables, etc.                              |
| Throttle Body Intake Duct  | 50 H  | 6 M      | 500 (800)   | Inspect duct for proper sealing/air leaks                                 |
| Drive belt                 | 50 H  | 6 M      | 500 (800)   | Inspect. adjust. replace as needed  |
| Cooling system             | 100 H   | 12 M     | 1000 (1600) | Inspect coolant strength seasonally. pressure test system yearly          |
| ▶ Engine oil change        | 100 H   | 12 M     | 1000 (1600) | Change the oil and filter   |
| ▶ Oil lines and fasteners  | 100 H   | 12 M     | 1000 (1600) | Inspect for leaks and loose fittings                                      |

| ITEM |                                   | MAINTENANCE INTERVAL<br>(WHICHEVER COMES FIRST) |          |             | REMARKS   |
|------|-----------------------------------|---|----------|-------------|---|
|      |                                   | HOURS   | CALENDAR | MILES (KM)  |   |
| ▶    | Front gearcase oil                | 100 H   | 12 M     | 1000 (1600) | Change fluid.   |
| ▶    | Rear gearcase oil                 | 100 H   | 12 M     | 1000 (1600) | Change fluid  |
| D    | Fuel system/filter                | 100 H   | 12 M     | 1000 (1600) | Cycle key to pressurize fuel pump.<br>check for leaks at fill cap, fuel lines/rail<br>and fuel pump.<br>replace lines every two years |
| ▶    | Radiator<br>(if applicable)       | 100 H   | 12 M     | 1000 (1600) | Inspect. clean external surfaces  |
| ▶    | Cooling hoses<br>(if applicable)  | 100 H   | 12 M     | 1000 (1600) | Inspect for leaks   |
| ▶    | Engine mounts                     | 100 H   | 12 M     | 1000 (1600) | Inspect   |
|      | Exhaust muffler/<br>pipe / Joints | 100 H   | 12 M     | 1000 (1600) | Inspect. clean. replace worn parts  |
| D    | Spark plug                        | 100 H   | 12 M     | 1000 (1600) | Inspect. replace as needed  |
| D    | Clutches (drive and<br>driven)    | 100 H   | 12 M     | 1000 (1600) | Inspect. clean. replace worn parts  |
| D    | Front wheel bearings              | 100 H   | 12 M     | 1000 (1600) | Inspect. replace as needed  |
| D    | Brake fluid                       | 200 H   | 24 M     | 2000(3200)  | Change every two years  |
|      | Spark arrester                    | 300 H   | 36 M     | 3000(4800)  | Clean out   |
| ▶    | Coolant                           |   | 60 M     |             | Replace coolant   |
| D    | Valve clearance                   | 500 H   |          | 5000(8000)  | Inspect. adjust   |
|      | Idle speed                        |   |          |             | Adjust as needed  |
| D    | Toe adjustment                    |   |          |             | Inspect periodically. adjust when<br>parts are replaced   |
|      | Headlight aim                     |   |          |             | Adjust as needed  |

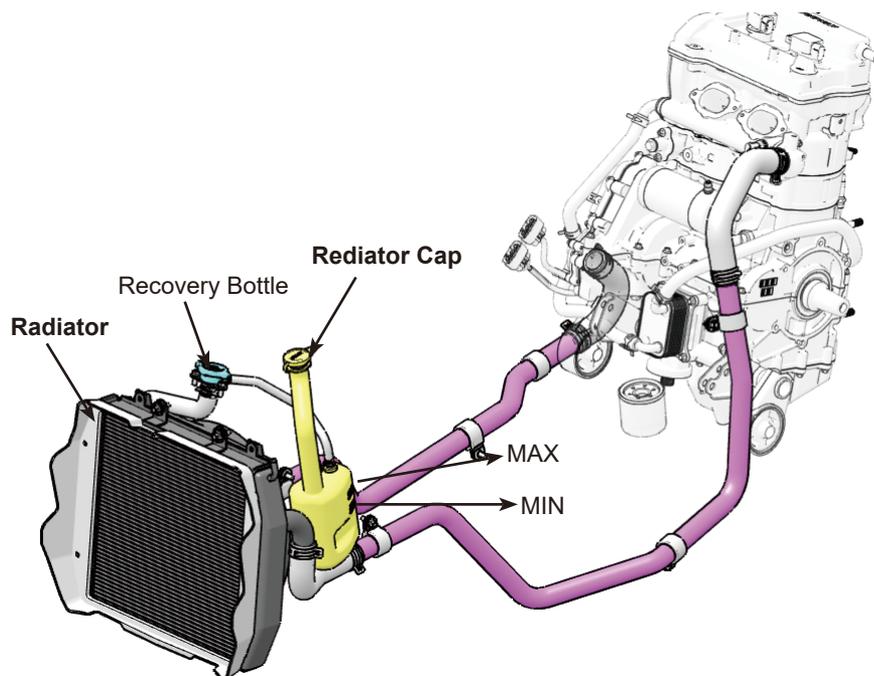
## MAINTENANCE REFERENCE

| Item           | Recommended Model         | Capacity | Inspection Method                                   | Schedule                      |
|----------------|---------------------------|----------|---|-------------------------------|
| Engine         | SAE10W-40/SN<br>or higher | 2200 mL  | Maintain the liquid level at the mark on the window | Refer to Maintenance Schedule |
| Engine Coolant | ECO BS -35 °C green       | 5500 mL  | Maintain the level between the fill lines.          | Refer to Maintenance Schedule |

### Engine Oil

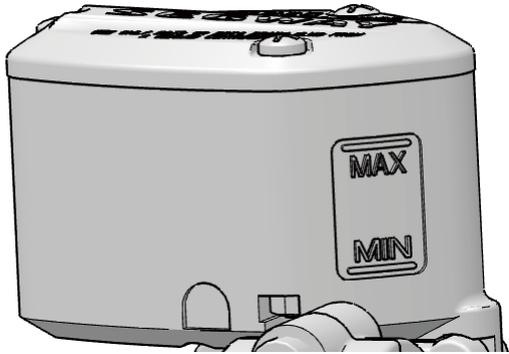
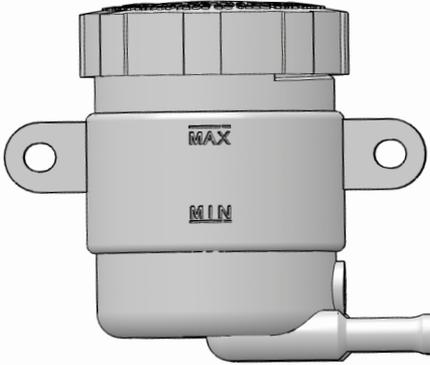
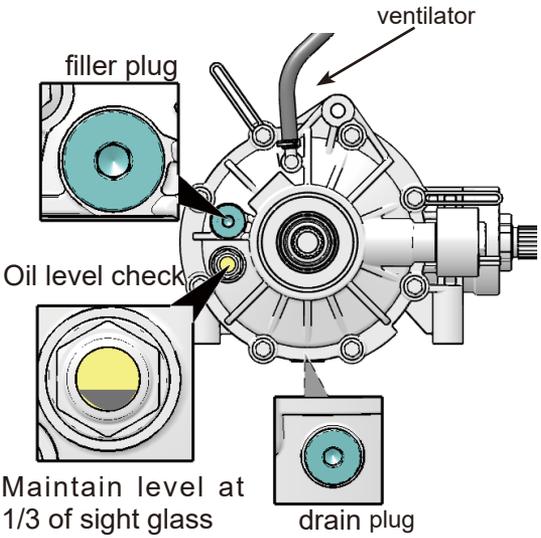
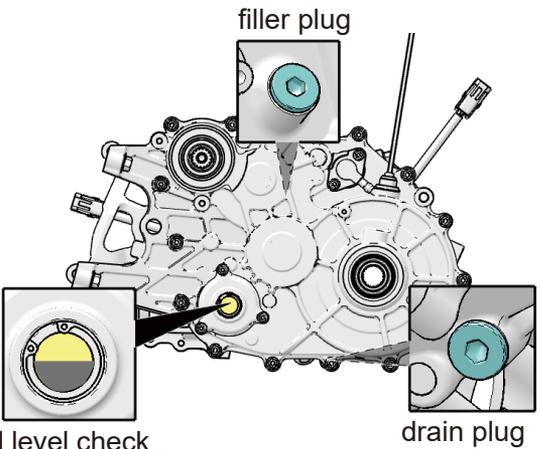


### Engine Coolant



## SEGWAY AT10

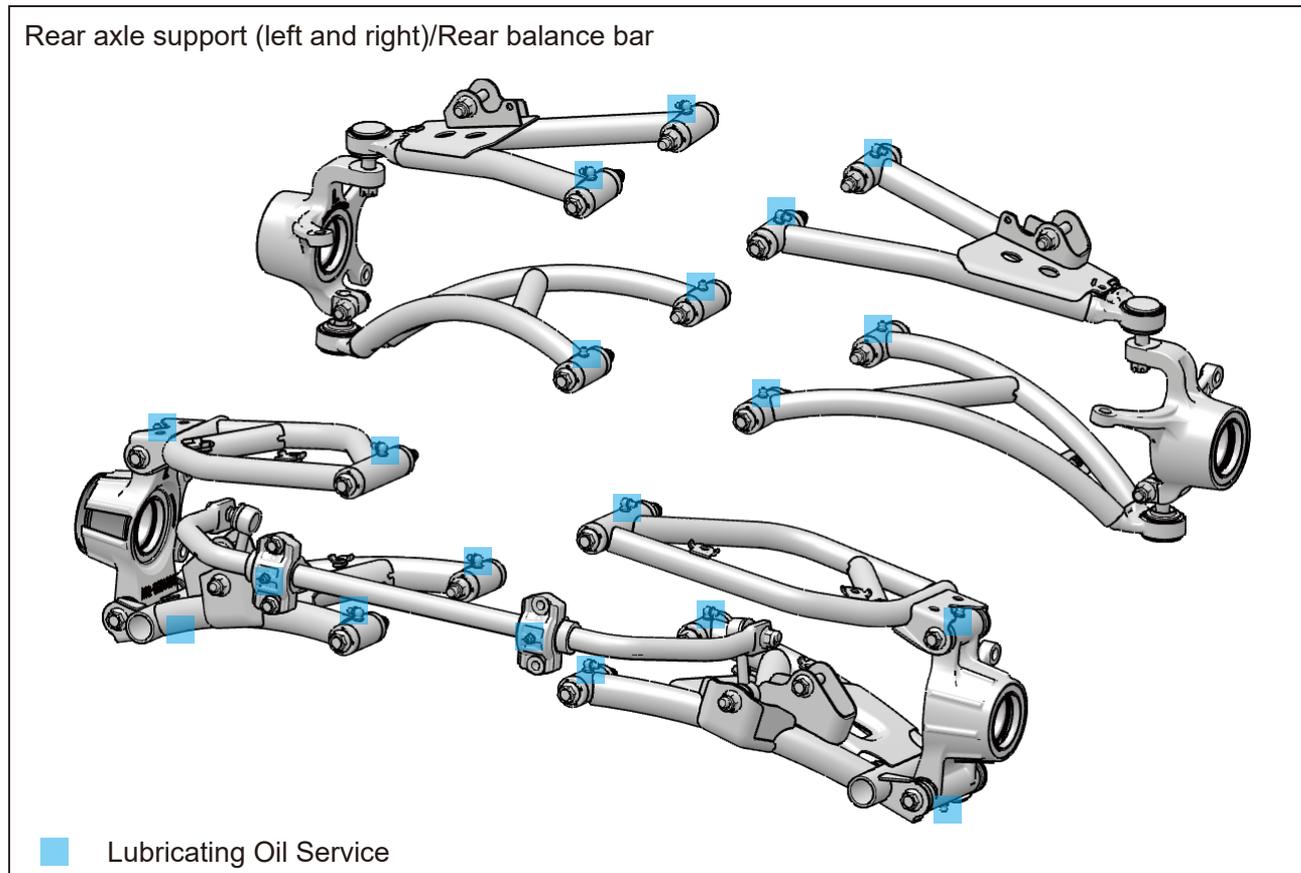
| Item                | Recommended Model | Capacity | Inspection Method                                       | Schedule                      |
|---------------------|-------------------|----------|---|-------------------------------|
| Brake fluid         | DOT4              | ---      | Maintain the level between the fill lines.              | Refer to Maintenance Schedule |
| Front axle gear oil | SAE 80W-90 GL5    | 310 mL   | Maintain the liquid level at 1/3 of the window position | Refer to Maintenance Schedule |
| Rear axle gear oil  | SAE 80W-90 GL5    | 1200 mL  | Keep the liquid level in the middle of the window       | Refer to Maintenance Schedule |

|   |   |
|---|---|
| <p><b>Hand brake upper pump brake fluid cup</b></p> <p>LOWER is brake fluid<br/>Lower limit (when fluid is cold)</p>  | <p><b>Brake fluid</b></p>  <p>Keep the coolant level between the MIN and MAX mark on the bottle (while the liquid cools)</p> |
| <p><b>Front axle gear oil</b></p>  <p>Maintain level at 1/3 of sight glass</p>                                       | <p><b>Rear Axle Gear Oil</b></p>  <p>Maintain fluid level in the center of the sight glass</p>                              |

### GREASE

The front and rear suspension arms, balance rods and driving shafts of the vehicle are designed with fueling nozzles. Grease these parts with lubricating oil regularly, make sure these parts are dry before filling.

| Item                       | Recommended Model | Capacity                       | Schedule       |
|----------------------------|-------------------|--------------------------------|----------------|
| Front and rear rocker arms | Lithium grease    | Grease Fittings (2 pumps max.) | Per 1600 miles |
| Rear axle support          | Lithium grease    | Grease Fittings (2 pumps max.) | Per 1600 miles |
| Rear stabilizer bar        | Lithium grease    | Grease Fittings (2 pumps max.) | Per 1600 miles |



### REMAINING LUBRICATION FILLING

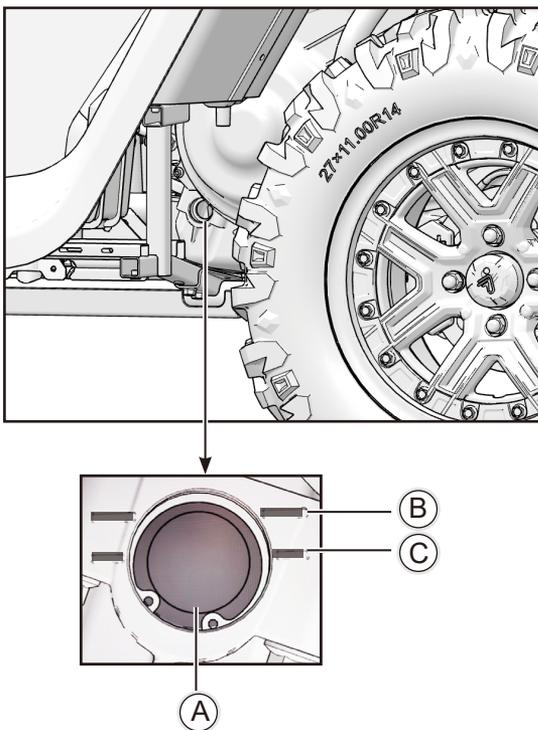
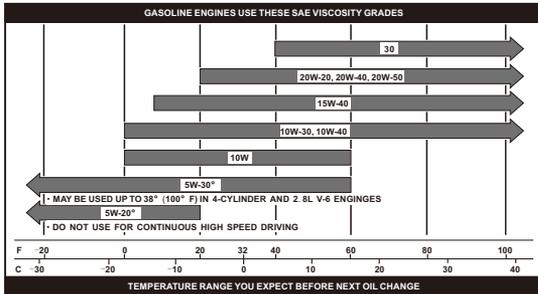
| Oil filling part                             | number of locations | Annotations                 |
|--|---------------------|-----------------------------|
| splines of the transmission shaft            | 1 locations         | Lithium grease, no overflow |
| Front and rear shaft inner ball cage splines | 4 locations         | Lithium grease, no overflow |
| Brake pedal pivot shaft                      | 1 locations         | Lithium grease, no overflow |
| Shift arm shaft                              | 1 locations         | Lithium grease, no overflow |
| Shift cable connection                       | 2 locations         | Lithium grease, no overflow |
| Steering rod spherical seat                  | 2 locations         | Lithium grease, no overflow |
| Parking cable connection point               | 3 locations         | Lithium grease, no overflow |

**GENERAL VEHICLE INSPECTION AND MAINTENANCE****PRE-RIDE / DAILY INSPECTION**

Perform the following pre-ride inspection daily, and when servicing the vehicle at each scheduled maintenance.

- ◆ Engine Oil - Check for proper level on dipstick located in oil tank (refer to “Engine Oil Level” procedure)
- ◆ Tires - check condition and pressures
- ◆ Fuel tank - fill to proper level
- ◆ All brakes - check operation and fluid level and adjustment (includes parking brake on INT’L Model)
- ◆ Throttle - check for free operation and closing
- ◆ Headlights/Taillights/Brakelights - also check operation of all indicator lights, instrument cluster and switches
- ◆ Ignition switch - check for proper function
- ◆ Wheels - check for tightness of wheel nuts and axle nuts. check to be sure axle nuts are secured by cotter pins
- ◆ Engine Intake Pre-Filter - Inspect pre-filter and clean with soapy water and compressed air if necessary
- ◆ Steering - check for free operation noting any unusual looseness in any area
- ◆ Loose parts - visually inspect vehicle for any damaged or loose nuts, bolts or fasteners
- ◆ Engine coolant - check for proper level at the recovery bottle
- ◆ Drive Shaft Boots - Inspect inner and outer boots for tears or damage on both front and rear drive shafts
- ◆ Check all front and rear suspension components for wear or damage.
- ◆ Frame, Nuts, Bolts, and Fasteners
- ◆ Periodically inspect the torque of all fasteners in accordance with the maintenance schedule. Check that all cotter pins are in place. Refer to specific fastener torques listed in each chapter.

## ENGINE MAINTENANCE



### ENGINE OIL LEVEL CHECK

#### IMPORTANT

Running the engine with an incorrect oil level may result in serious engine damage.

#### Oil type:

**SAE10W-40/SN or higher**

#### Oil level check

【A】 Oil Window

【B】 Upper scale

【C】 Lower scale

1. Park the vehicle on a level surface with the engine stopped.

The engine oil dipstick is located above the left pedal side of the vehicle.

2. Unscrew the dipstick and pull it out.
3. Wipe the dipstick clean and reinsert it, then remove it and check the oil level.
4. Check the oil level as shown below: upper scale and lower scale. The oil level between the upper scale and the lower scale is the proper oil level, below the lower scale indicates that the oil quantity is too low, above the upper scale indicates that the oil quantity is too low.
5. After cleaning the dipstick, pump it in again and tighten it.
6. If the oil level is close to or below the lower level mark, add the proper amount of oil.

#### Oil level check after engine maintenance (oil change)

#### IMPORTANT

This procedure is only for the first oil level check after a new car or engine service (oil change).

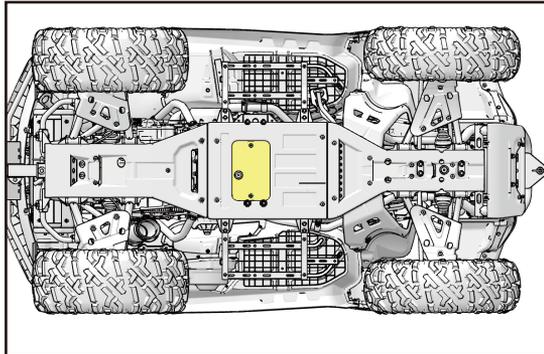
#### NOTE

During cold weather operation, checking for elevated oil levels may indicate a buildup of crankcase contaminants such as gas or moisture, and if the oil level exceeds the upper limit mark, change the oil immediately.

ENGINE OIL EMISSIONS

Always change the engine oil and oil filter at regular intervals.

Replacement intervals or replacement mileage are available in the Weekly Maintenance Schedule. Change the oil and oil filter at the times given in the Periodic Maintenance Chart.

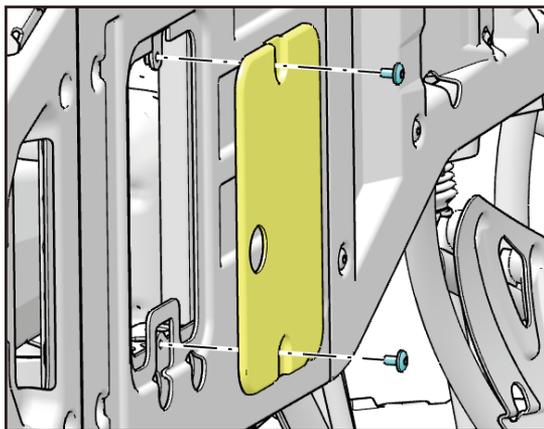


**⚠ WARNING**

Change the oil filter when you change the oil.

Hot oil can cause skin burns. Do not allow hot oil to come in contact with your skin.

The engine oil drain plug is located at the bottom of the vehicle engine.



【A】 Bolt M6×16

【B】 Frame bottom plate maintenance cover plate

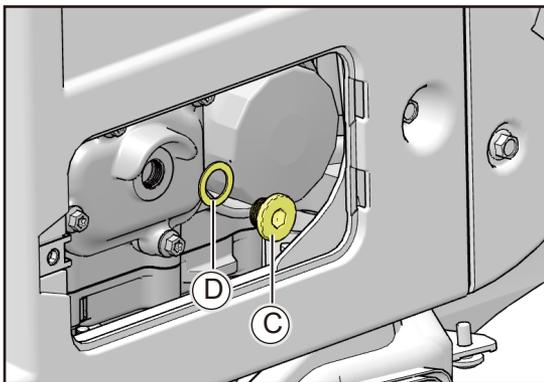
【C】 Oil drain plug

【D】 Copper washer 14×21×1

1. Place the vehicle on a level surface.
2. Start the engine and let it warm up for two to three minutes at idle time.

**⚠ WARNING**

The used oil and filters must be disposed of in a safe and environmentally compliant manner.



3. Remove the underframe maintenance cover.
4. Place a suitable container underneath the oil drain plug to collect the discharged used oil.
5. Remove the oil drain plug, take off the copper washer and wait for the used oil to be completely discharged.
6. Place a suitable container under the oil drain plug to collect the discharged used oil.
7. Wait for the used oil to be completely discharged.
8. Install the copper washer and oil drain plug in place.

Drain plug torque

16-20N.m(11.8-14.8ft·lb)

## CLEANING THE FILTERS

### IMPORTANT

Clean the filter at every oil change.

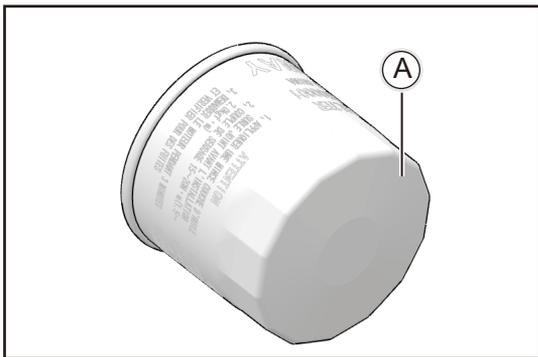
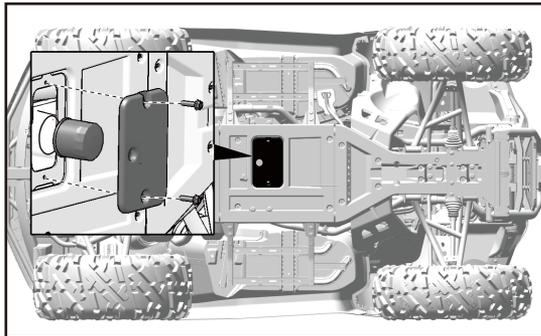
The oil filter is located under the bottom guard service cover.

#### 【A】 Oil Filter

1. Remove the screws from the underframe service cover, remove the underframe service cover where the oil filter is located, and place a towel under the oil filter.
2. Use an oil filter wrench to remove the oil filter.
3. Replace the o-ring with a new one, lubricate it with oil and install it on the new filter.
4. Tighten the new filter to the specified torque.

oil filter

12 N•m



## FILLING THE ENGINE OIL

The engine oil filler port is located under the seat cushion.

Add the proper amount of recommended oil, do not overfill.

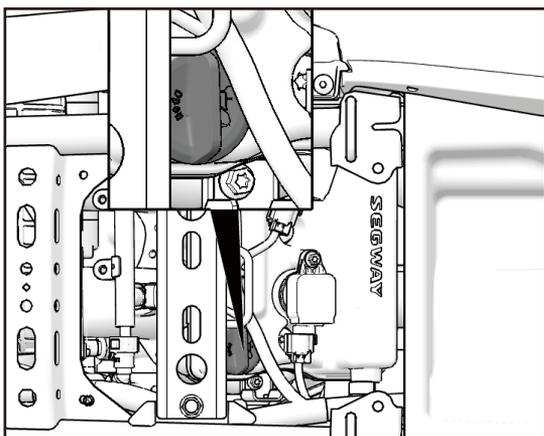
#### Oil type:

**SAE10W-40/SN or higher grade**

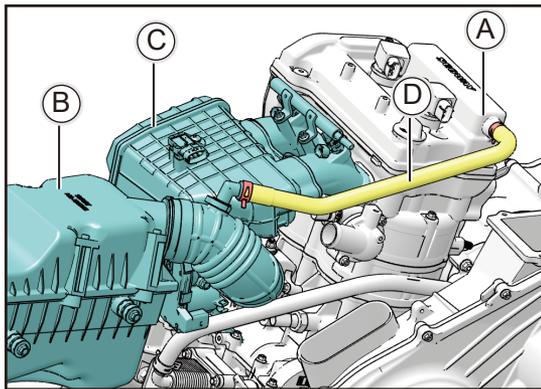
#### Oil capacity:

**2200mL**

1. Unscrew the motor oil filler cap.
2. Add the proper amount of the recommended type of oil, do not overfill, oil level between the oil sight glass is the proper level.
3. Retighten the oil filler cap.
4. Place the shifter in Park.
5. Lock the parking brake.
6. Start the engine and let it idle for 1 to 2 minutes.
7. Stop the engine.
8. Check for leaks.
9. Check the oil level and add oil as necessary to bring the oil level to the proper level.
10. Dispose of used filter and oil properly.

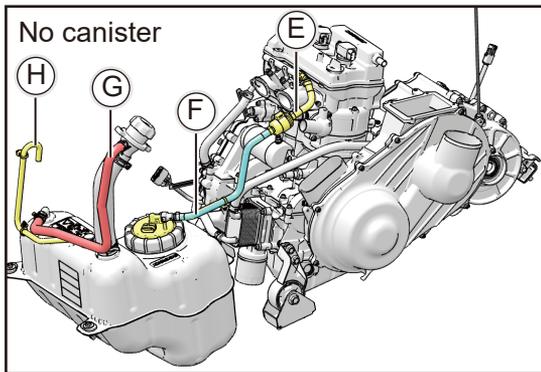


**ENGINE/FUEL TANK HOSE INSPECTION**



The engine and fuel tank are equipped with vent hoses. Check for possible kinks or damaged, cracked air hoses. The hose is molded for proper installation.

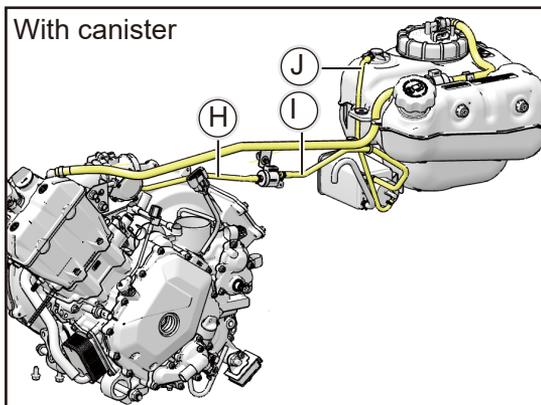
- 【A】 Engine
- 【B】 Air filter
- 【C】 Pressure stabilizing chamber
- 【D】 Engine exhaust pipe
- 【E】 Oil rail end high-pressure oil pipe
- 【F】 Oil pump end high-pressure oil pipe
- 【G】 Ventilation hose
- 【H】 Breathing valve hose
- 【I】 Carbon canister desorption hose
- 【J】 Adsorption hose



Engine Exhaust Gas Hose: Extends along the engine to the bottom port of the air filter.

Injector End High Pressure Hose: Extends from the engine along the frame main tube to the fuel tank inlet.

Fuel tank vent hose: extends vertically down the fuel tank.



**⚠ CAUTION**

Make sure the hose is not kinked or crushed.

**ENGINE CYLINDER LEAKAGE TEST**

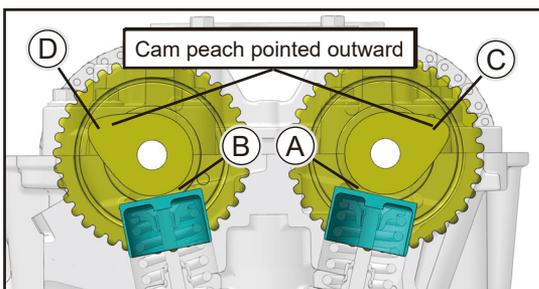
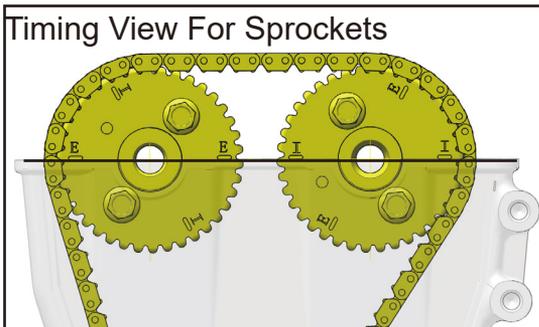
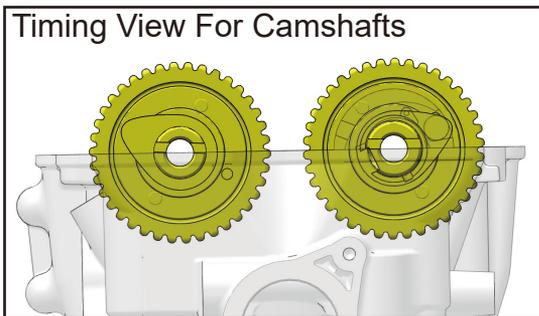
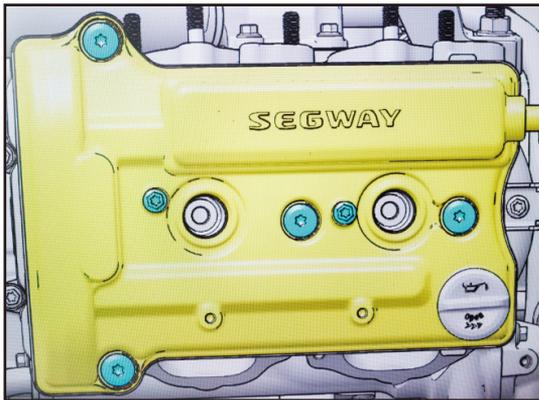
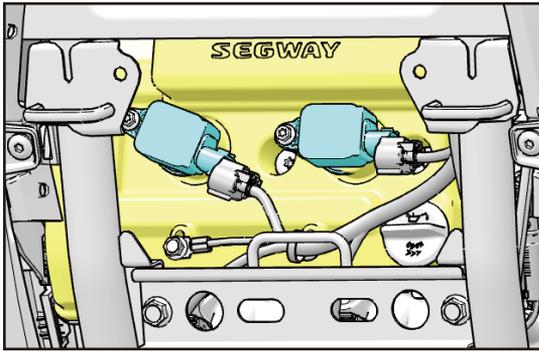
Cylinder leakage testing is the best indication of engine conditions. Follow the tester manufacturer's instructions for cylinder leakage testing. Never use a high pressure leak tester with high pressure tester, such as crankshaft seal movement and leakage.

**Cylinder leakage service limits:**

**20%.**

If leakage exceeds service limit, check engine for cause.

### VALVE LASH CHECK



#### **CAUTION**

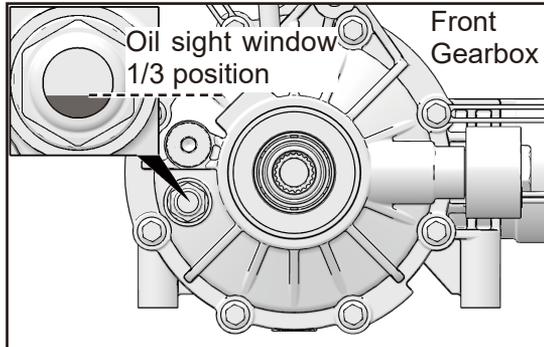
Valve lash should be done at room temperature on a cold engine.

1. disconnect the negative (-) battery cable.
2. Remove the seat
3. Remove the ignition coil by unbolting the ignition coil with a tool.
4. Remove the spark plug with the spark plug socket included in the kit.
5. Remove the 3 hexagon socket head cap screws [D] securing the cylinder head cover. Remove the cylinder head cover [E].
6. Rotate the camshaft until the cam tips [C] and [D] above the valve you are checking are facing upwards.
7. Measure the valve lash [A] and [B] with a thickness gauge (plug gauge).
8. Repeat until all four valves have been checked.

| Measuring valve clearance (cold) |                                 |
|----------------------------------|---------------------------------|
| exhaust                          | 0.2 ~ 0.3mm (0.0080" ~ 0.0120") |
| Import.                          | 0.1 ~ 0.2mm (0.0040" ~ 0.0080") |

If the valve clearance measurement does not meet the specifications, please refer to 3-5-36 for adjusting the clearance.

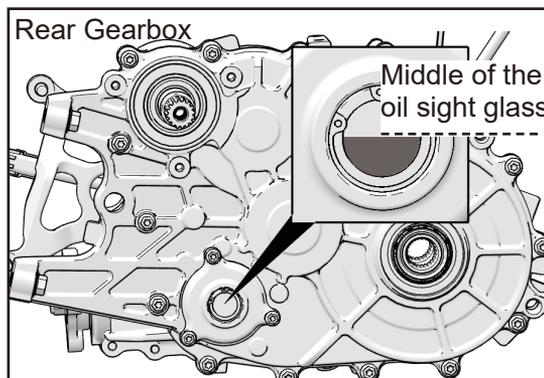
### FRONT GEARBOX AND REAR GEARBOX



#### FRONT AXLE OIL LEVEL CHECK

Front axle oil level can be viewed through the oil window on the left side of the front axle to see the amount of oil, the amount of oil is located in the oil show window 1/3 position for the normal oil level, such as the oil level is too low, you should add the appropriate amount of recommended fluids.

#### CHECK FRONT AND REAR TRANSMISSION FLUID LEVELS



Rear gearbox can be viewed through the oil window on the left side of the rear gearbox to see the oil level, the oil level is located in the middle of the oil show window for the normal oil level, if the oil level is too low, the appropriate amount of recommended fluid should be added.

Change the gearbox oil at the time specified in the Maintenance Interval Schedule; if an oil level check must be performed, perform the following procedure:

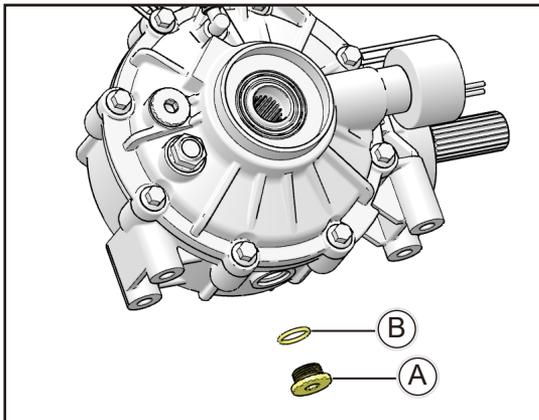
- ◆ Prepare a measuring cup and place it under the front (rear) gearbox drain plug.
- ◆ Remove the drain plug and wait for the gear oil to drain completely.
- ◆ Check the amount of oil in the measuring cup.

Front Transmission Fluid Volume: 310mL

Rear Transmission Fluid Volume: 1200mL

### FRONT REDUCTION GEARBOX OIL DRAIN

The front reduction gearbox oil drain plug is located at the very bottom of the front reduction gearbox.



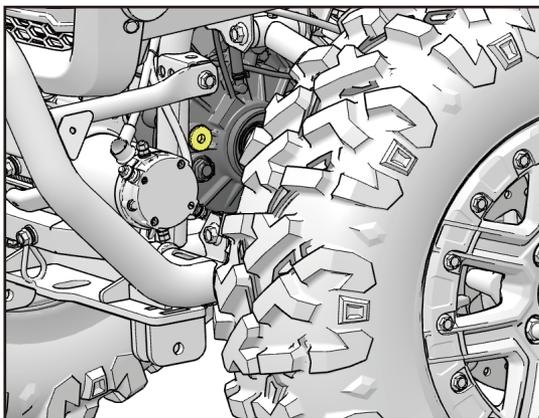
【A】 Oil drain plug

【B】 O-ring

- ◆ Place a container under the drain plug of the front reduction gearbox to collect the discharged waste oil.
- ◆ Place the vehicle on a level surface.
- ◆ Remove the drain plug and O-ring.
- ◆ Wait until the gear oil is completely drained, then clean and install the drain plug, and install a new O-ring.
- ◆ Torque to the required value:

#### Oil drain plug torque

16-20N.m(1.6-2.0 kgf·m, 11.8-14.8ft·lb)



### FRONT REDUCTION GEARBOX GEAR OIL FILLING

The front gearbox filler plug is located on the right side of the front gearbox and can be accessed through the right front wheel side.

【C】 Filler plug

【D】 O-ring

1. Remove filler plug and o-ring.
2. Add the proper amount of recommended fluid

**Gear oil model:**

**SAE 80W-90 GL5**

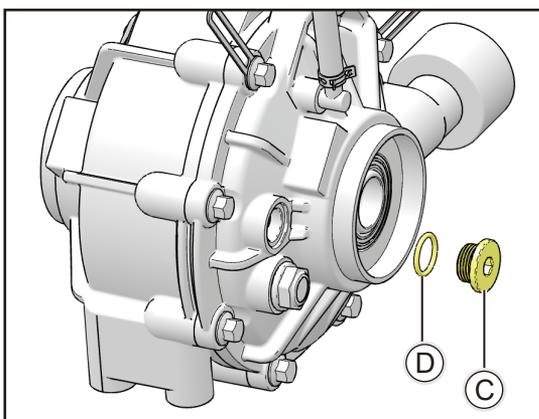
**Gear oil capacity:**

**310 mL**

3. Reinstall the filler plug. Tighten to the desired torque value.

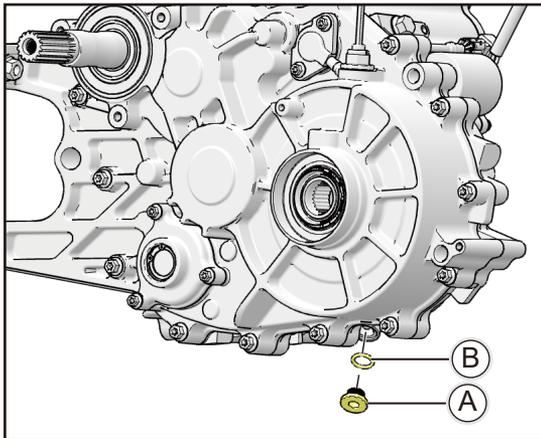
#### Injection Plug Torque

16-20N.m(1.6-2.0 kgf·m, 11.8-14.8ft·lb)



4. Check for spills.
5. Dispose of the discharged waste oil in a reasonable manner in accordance with local requirements.

**REAR REDUCTION GEARBOX DRAIN**



The rear reduction gearbox oil drain plug is located at the very bottom of the rear reduction gearbox.

- 【A】 Oil drain plug
- 【B】 O-ring

- ◆ Place a container under the rear gearbox drain plug to collect the discharged waste oil.
- ◆ Place the vehicle on a level surface.
- ◆ Remove the oil drain plug and O-ring from the rear gearbox.
- ◆ Wait until the gear oil is completely drained, clean and install the drain plug, and install a new o-ring.
- ◆ The torque reaches the required value:

| Drain plug torque                       |
|---|
| 16-20N.m(1.6-2.0 kgf·m, 11.8-14.8ft·lb) |



**REAR REDUCTION GEARBOX GEAR OIL FILLING**

The rear gearbox filler plug is located on the right side of the rear gearbox and can be entered through the rear side of the right rear wheel.

- 【C】 Filler plug
- 【D】 O-ring

1. Remove the filler plug and o-ring.
2. Add the proper amount of recommended gear oil.

**Gear oil model:**

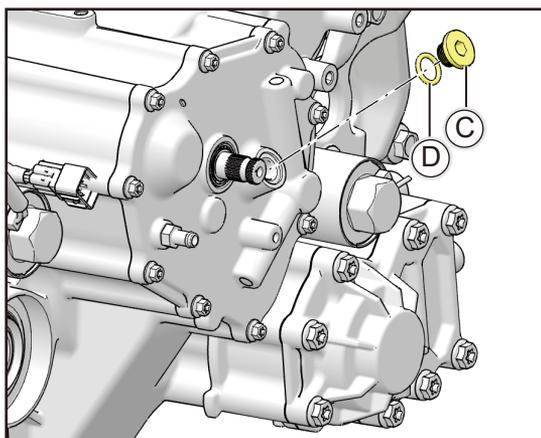
**SAE 80W-90 GL5**

**Gear oil capacity:**

**1200 mL**

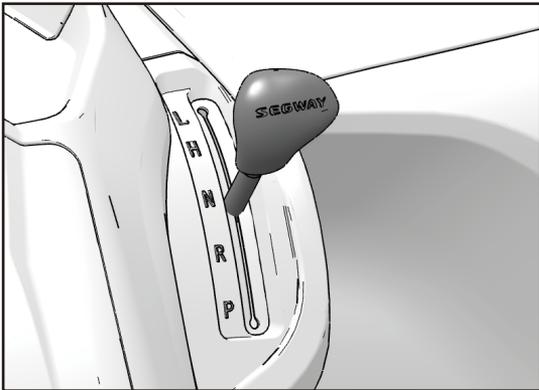
3. Reinstall the filler plug. Tighten to the desired torque value.

| Torque of injection plug                |
|---|
| 16-20N.m(1.6-2.0 kgf·m, 11.8-14.8ft·lb) |



4. Check for spills.
5. Dispose of the discharged waste oil in a reasonable manner in accordance with local requirements.

## SHIFT LEVER INSPECTION/ADJUSTMENT



Adjustment of the shift lever may be required if the following conditions

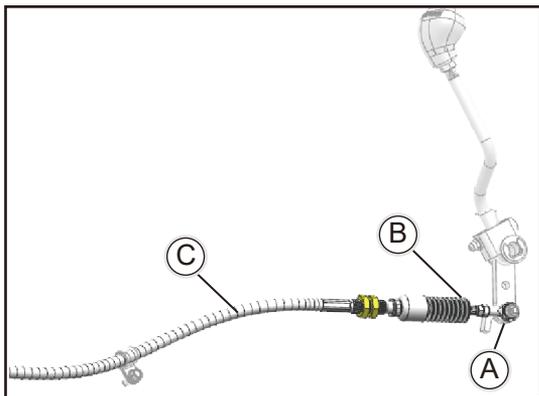
included:

- ◆ No gear on the combination meter
- ◆ Gear noise during acceleration and deceleration
- ◆ Cannot put into gear
- ◆ Excessive gear clearance (noise)
- ◆ Shift lever moved out of desired range

【A】 Pivot bushing

【B】 Dust cover

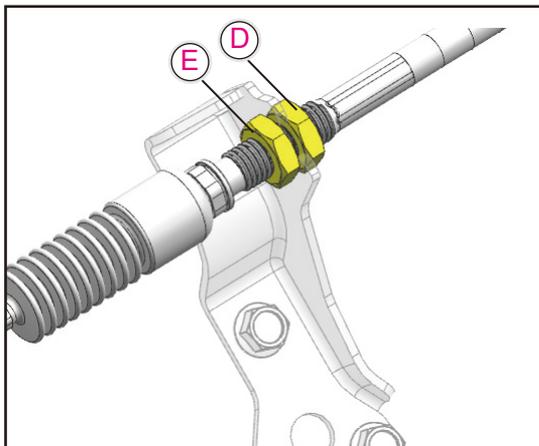
【C】 Shift cable



- ◆ Find the shift cable connected to the gearbox;
- ◆ Check the shift cable, shaft bushing, and dust cover; If worn or damaged, please replace it.
- ◆ If adjustment is required, loosen the locking nut and pull the cable out of the support to move the locking nut.
- ◆ The front and rear ends of the shift cable have locking nuts that can adjust the cable, and both ends can be adjusted. It is recommended to adjust the rear end, as the rear space is convenient for operation.

【D】 Lock the nut tightly

【E】 Lower locking nut



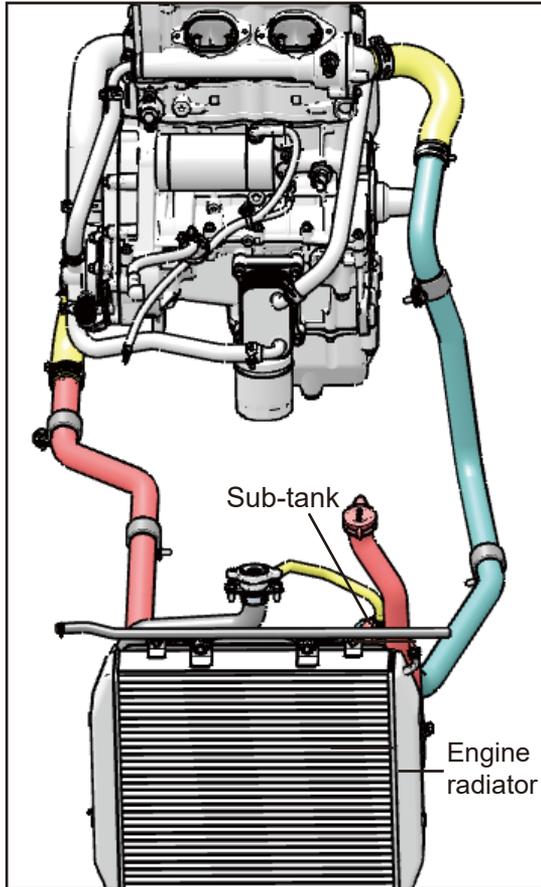
- ◆ Adjust the shift cable to have the same amount slightly exceeding the cable travel in high gear.
- ◆ Loosen the upper and lower locking nuts as required for appropriate cable adjustment.

### NOTE

This process may require several attempts to adjust to the appropriate position.

- ◆ This process may require several attempts to adjust to the appropriate position. Once the appropriate position is obtained, move the cable and upper locking nut into the support. Tighten the locking nut and rest it against the support.
- ◆ Start the engine and shift between all gears to ensure that the shift cable is adjusted correctly. If there is still noise from the gearbox gears, it is necessary to check the gearbox.

### COOLING SYSTEM



#### COOLING SYSTEM OVERVIEW

The engine coolant level is controlled or maintained by the cooling system. The cooling system components are the sub-tank, radiator, radiator pressure cap and connecting hoses.

As the operating temperature of the coolant rises, it expands (heats up), and excess coolant is pushed out of the radiator through the pressure cap and into the sub-tank. As the engine coolant temperature decreases, the coolant shrinks (cools) and enters the radiator through the pressure cap from the sub-tank. The radiator.

#### **CAUTION**

The coolant level is normal to drop in a new car because the system is removing air from the machine. Observe the coolant level frequently during break-in.

If air is not completely removed from the cooling system, the engine may overheat.

#### COOLING SYSTEM HOSES

High pressure in the radiator hose can cause coolant leakage **【A】** or hose breakage cracked, (if the line is not connected) to be properly maintained. Visually inspect the hose for signs of damage. Squeeze the hose. the hose should not be hard and brittle, nor should it be soft or swollen.

If there is wear, cracks **【B】** or bulging **【C】**, replace the hose with a new one.

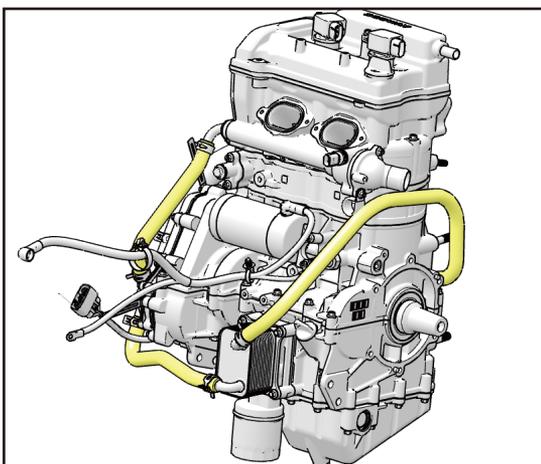
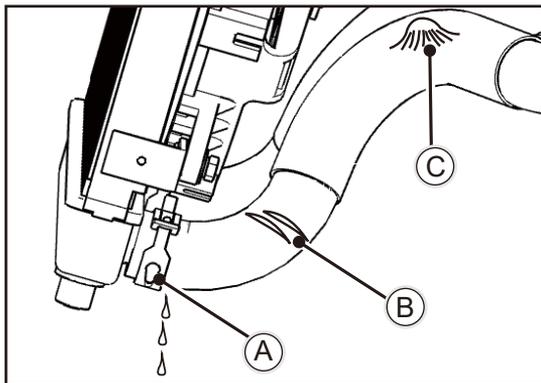
Check that hoses are securely connected and clamps are properly tightened.

Check all radiator hoses for cracks, deterioration, wear or leaks. Replace as necessary.

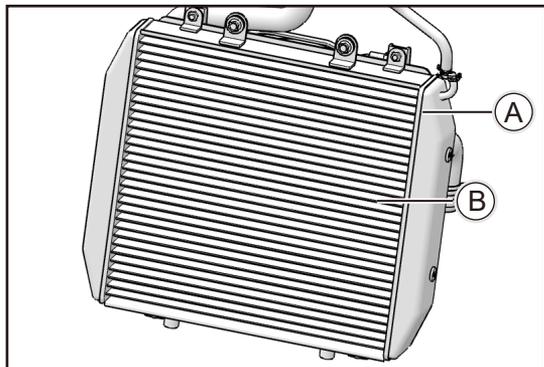
Check all hose clamps for sealing and securing hose clamps. Replace if necessary.

Check all engine hoses for cracks, deterioration, wear or leaks. Replace as necessary.

Check all hose clamps for sealing and securing hose clamps. Replace if necessary.



### RADIATOR CHECK



- ◆ Check the radiator air passages for blockage or damage or obstructions.
- ◆ If the corrugated fins **【A】** are deformed, carefully straighten them.

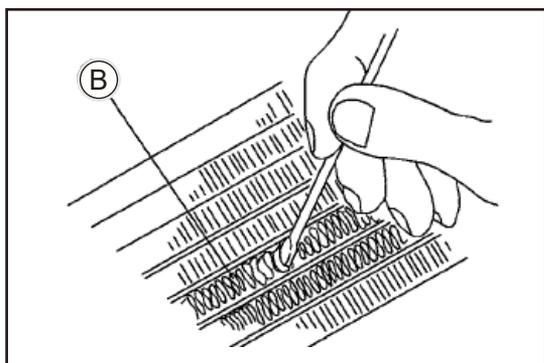
**【A】** Radiator

**【B】** Corrugated fins

- ◆ Remove obstructions with low-pressure compressed air or low-pressure water.

#### **⚠ CAUTION**

Washing the vehicle with a high-pressure water gun may damage the radiator fins and affect the radiator's cooling effect.



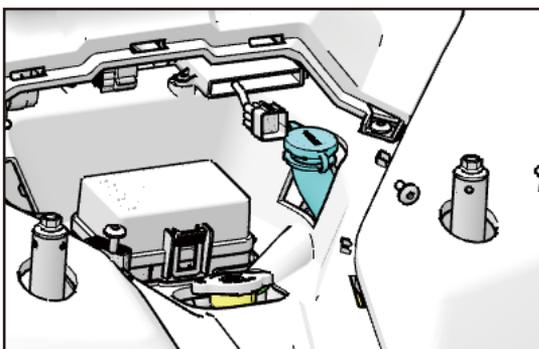
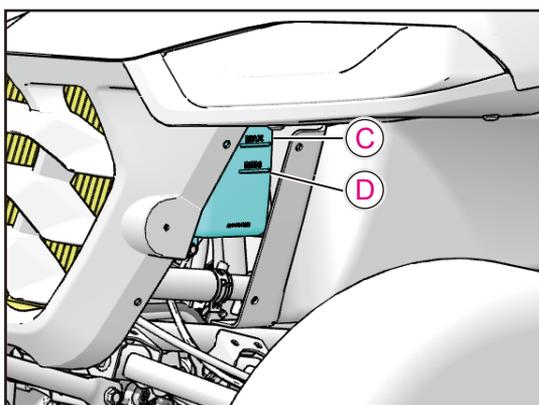
### COOLANT BOTTLE COOLANT LEVEL CHECK AND REFILL

The coolant bottle is located above the front left wheel of the vehicle.

- ◆ Observe the coolant level in the coolant sub-tank from the front left side of the vehicle.
- ◆ If the level is low, add coolant. Keep the coolant level at the minimum and maximum marks on the bottle (liquid cooling).

**【C】** Maximum

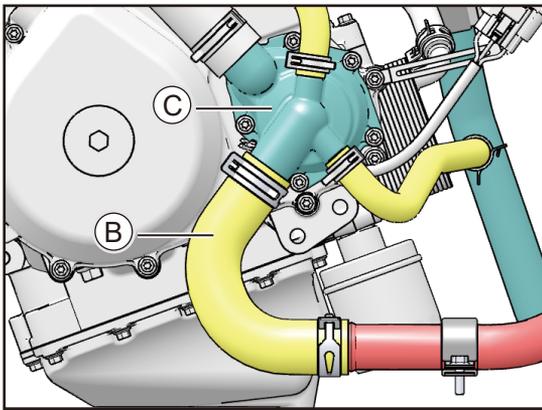
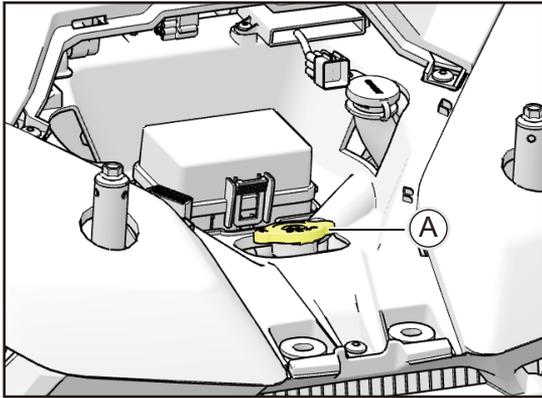
**【D】** Minimum



The sub-tank coolant filler is located under the front access cover.

1. Remove front rack
2. Remove the quick release front access cover.
3. Unscrew the cap and pour in fresh coolant. Observe the coolant level during pouring Do not exceed the maximum level.
4. Reinstall the front access cover and front rack.

## COOLANT REPLACEMENT



To ensure that the coolant maintains its ability to protect the engine, we recommend that the system be completely drained and a new antifreeze 50/50 premix added every two (2) years.

**⚠ CAUTION**

Steam spillage can burn the skin. Do not remove the pressure cover when the engine is warm. Remove the pressure cap. Allow engine to cool before removing pressure cap.

When any cooling system fluid is drained and serviced or repaired, replace the coolant with fresh antifreeze 50/50 premix. If the recovery bottle has run dry, check the fluid level in the radiator. Add coolant as needed.

【A】 Pressure cover

【B】 Engine water inlet hose

【C】 Water pump cover

1. Remove the front rack and front access cover.
2. Slowly remove the pressure cap to relieve cooling system pressure.
3. Place a drain pan under the water pump.
4. Remove the left foot pedal, slide the clamp back and remove the **engine water inlet hose** 【B】 from the water pump cover to drain the coolant from the cooling system.
5. Allow coolant to drain completely and dispose of used coolant properly.
6. Reinstall coolant hoses and hose clamps.
7. The cooling system must be vented before filling the coolant.
8. Using a funnel, slowly add the recommended coolant through the radiator fill port (pressure cap). When adding the recommended coolant, observe the level in the coolant bottle and keep the coolant level between the minimum and maximum marks on the bottle (liquid coolant).
9. Reinstall the pressure cap. Use of a non-standard pressure cap will affect the proper functioning of the recovery system. Qualified parts are available from your dealer.

**Coolant Model:**

**Permanent antifreeze  
(green, soft water 50%, cooling water 50%)**

**Coolant Capacity:**

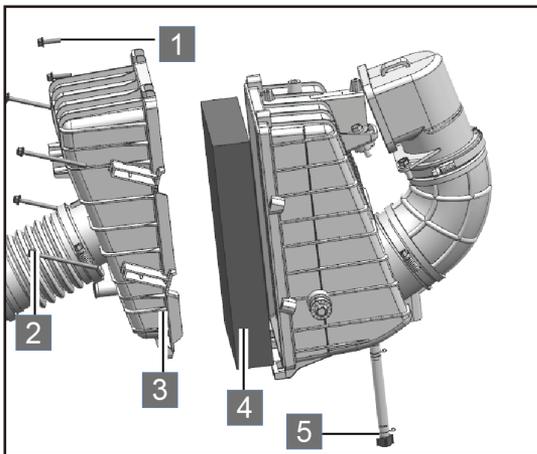
**5500mL**

## INTAKE AND EXHAUST MAINTENANCE

### AIR FILTER

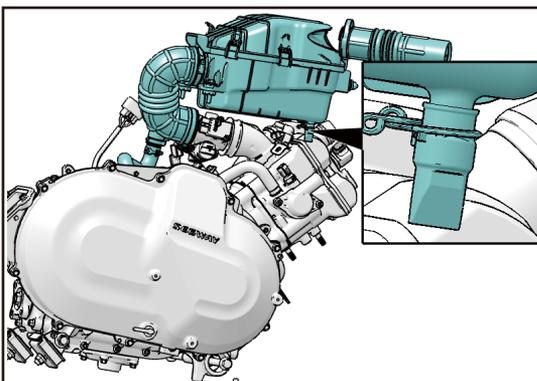
The air filter element is a paper air filter element. The air filter needs to be replaced after a certain period of time. In extremely dusty conditions, the air filter needs to be changed more frequently.

◆ The air filter is located under the air filter cover.



- 【A】 Air filter cover
- 【B】 Air filter assembly
- 【C】 Clip
- 【D】 Air filter upper housing
- 【E】 Filter element

1. Remove the seat cushion and remove the air filter cover.
2. Lift the air filter cover off by removing the four tabs on the upper housing of the air filter.
3. Remove the air filter cartridge housing.
4. Remove the cartridge from the cassette and replace the cartridge for cleaning or replacement.
5. Reinstall the cartridge on the filter.
6. Reinstall the air filter upper housing and air filter cover.



### AIR FILTER DRAIN CHECK

Check the air filter drain at each filter element change.

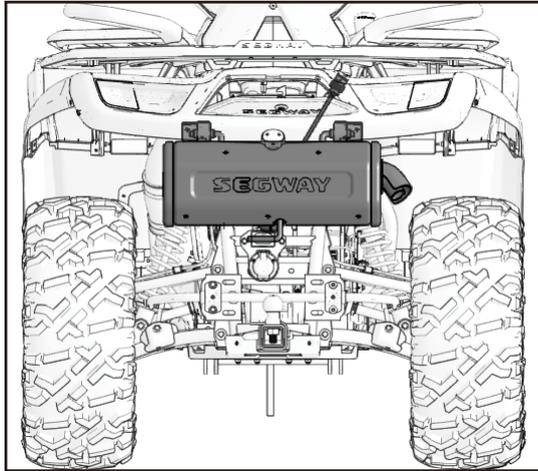
Service the air intake system drain.

Check the drain opening to make sure it is not clogged with debris so that it drains properly.

If necessary, remove the leak plug under the drain opening to drain.

**SPARK ARRESTOR**

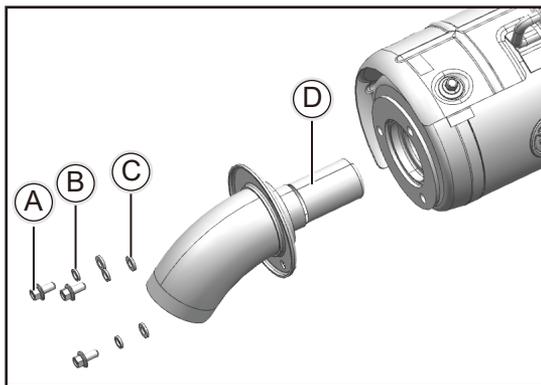
Spark arrestors prevent random sparks from igniting other combustibles. Regular maintenance can prevent carbon buildup. deferred maintenance can reduce engine performance.



**⚠ WARNING**

- ◆ Make sure the exhaust pipe is cool. The engine has just stopped working and can burn your skin due to overheating of the exhaust pipe.
- ◆ To reduce the risk of fire, ensure that no combustible materials are in the area at the time of removal.
- ◆ The use of safety glasses is recommended in this procedure.

It is important to remove the buildup of dirt in the exhaust pipe for periodic carbon emissions, as shown below:



- 【A】 Bolt M6\*16 (3 pcs)
- 【B】 Spring washer (3 pcs)
- 【C】 Flat washer (3 pcs)
- 【D】 Spark arrestor
- 【E】 Gasket

Let pipes completely cool down to avoid getting burned.

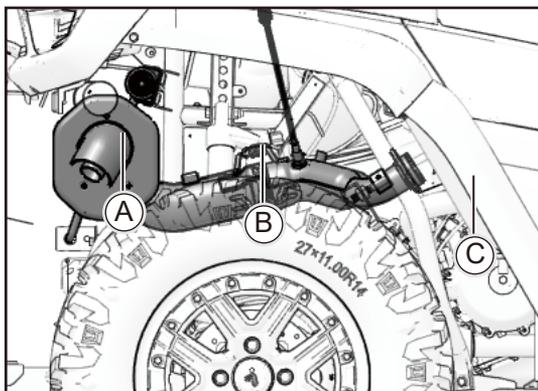
1. Remove three M6×16 bolts, spring washers, and flat washers.
2. Cleaning spark arrestor with soap and water, and as needed with a wire brush to remove all cinders. (Should be cleaned every 100 hours of service.)
3. Reinstall the muffler spark eliminator and bolts.

|                           |
|---------------------------|
| Torque of fastening bolts |
| 11N.m(8ft·lb)             |

**EXHAUST HEAT SHIELD INSPECTION**

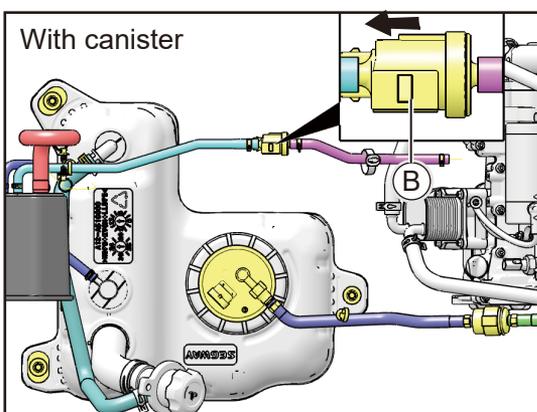
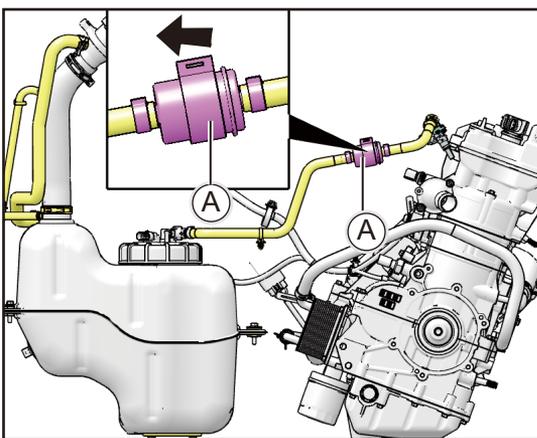
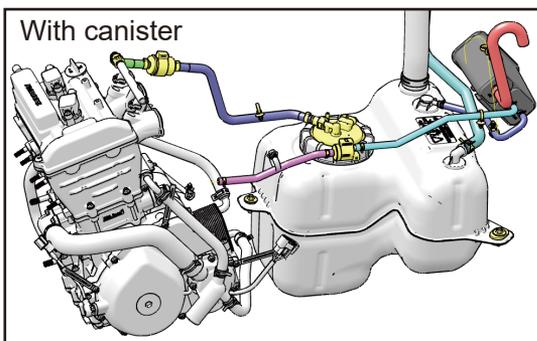
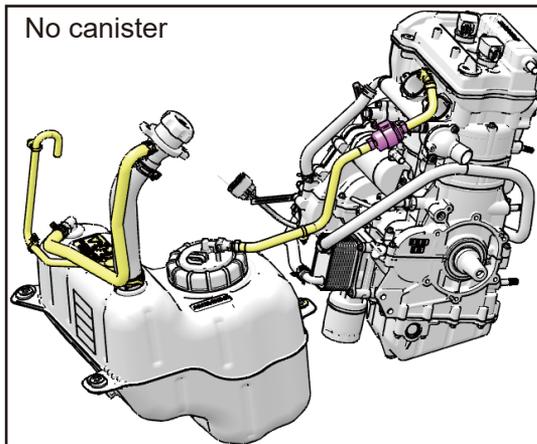
**IMPORTANT**

Check the exhaust heat shield to make sure it is in good condition and has been secured.



- 【A】 Muffler barrel heat insulation plate
- 【B】 Upper and lower heat shield of exhaust pipe rear section
- 【C】 Heat shield in front of the front exhaust pipe

## FUEL SYSTEM AND AIR INTAKE



### FUEL SYSTEM

#### ⚠ WARNING

Gasoline burns easily under certain conditions

- ◆ You must be extremely careful when dealing with gasoline.
- ◆ When refueling, the engine must be shut off and must be done outdoors or in a well-ventilated area.
- ◆ At or near the refueling or gasoline storage place. No smoking, no open flames or sparks.
- ◆ Do not overflow when refueling. Do not fill the tank to the neck.
- ◆ If gasoline gets on your skin or clothes, wash them with soap and water immediately and change clothes.

### FUEL FILTER

Symptoms of a restricted fuel tank vent include the following: dented and distorted fuel tank, engine malfunction or stalling, reduced engine performance, or excessive exhaust gas temperatures high exhaust temperatures.

【A】 Fuel filter assembly

【B】 Carbon canister solenoid valve

The fuel filter is located under the seat cushion and is visible when the seat cushion is removed.

- ◆ Locate and inspect the fuel filter. Note the direction of the arrow on the filter (if removed).
- ◆ If there is visible debris in the filter, replace it.

#### ⚠ CAUTION

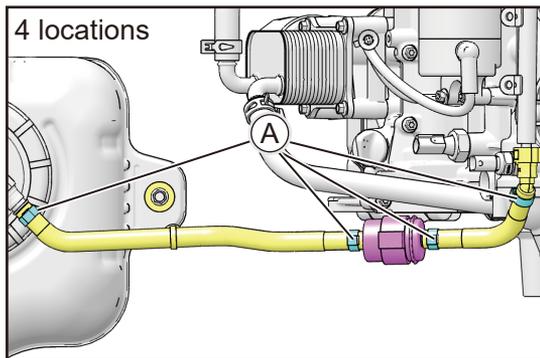
Be sure to install the filter in the direction shown (see left)

- ◆ Check the fuel tank vent line for signs of wear, cracks or damage. If necessary, replace the vent tube as necessary.
- ◆ Ensure that the ventilation ducts are correctly arranged and that the cable ties are secured.

#### IMPORTANT

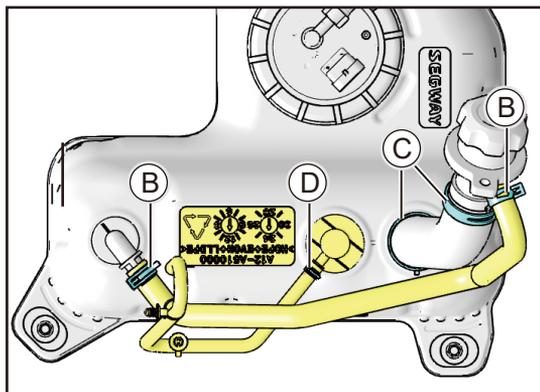
Make sure there are no kinks or crushes in the vent hose.

### FUEL LINE



- 【A】 Four joints of high-pressure oil pipe
- 【B】 Ventilation pipe joint
- 【C】 Gas port connection hose joint
- 【D】 Breather valve hose connector

First check the piping connections on the tank for leaks, wear, deterioration, damage, etc. Replace fuel lines if necessary. Inspect the fuel lines connecting the engine to the fuel tank for signs of wiring and quick connects for signs of failure, wear, deterioration, damage or leaks. Replace and connect lines if necessary.



Replace if necessary, connect lines. Inspect the throttle disconnect hose that connects the fuel tank to the engine, check the lines and quick connects for signs of trouble, wear, deterioration, damage, or leaks. Replace and connect lines if necessary.

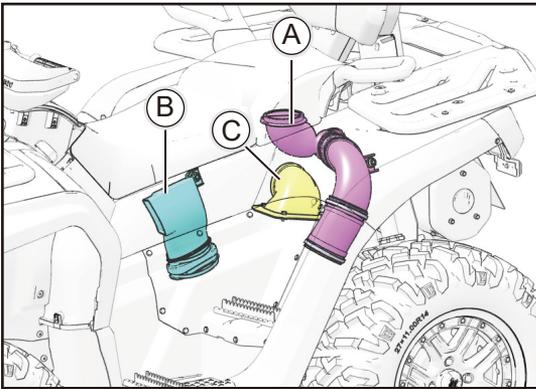
- ◆ Ensure fuel lines are properly laid out and secured.

### IMPORTANT

Make sure lines are not twisted or pinched.

## CVT

### CVT INTAKE SCREEN CHECK



It is recommended that the CVT air intake filter be checked periodically and the following procedure should be followed:

The CVT has 2 air inlets and 1 air outlet, both located under the seat cushion.

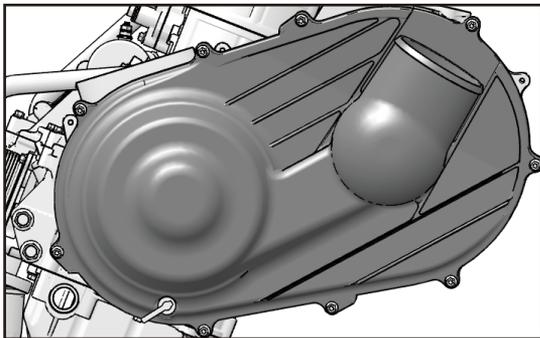
【A】 Inlet 1

【B】 Inlet 2

【C】 Air outlet

Periodically clean and wash the CVT air inlet, inlet screen and outlet for impurities and foreign objects.

Replace the inlet and outlet filters with new ones if necessary.

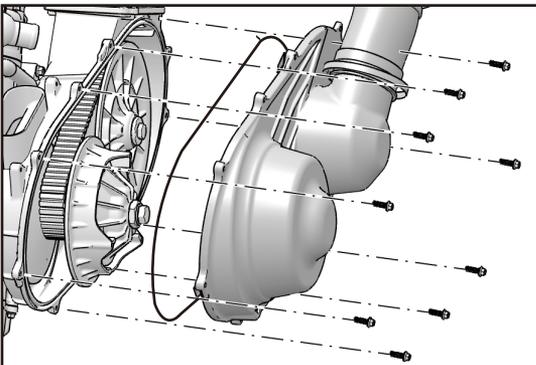


### CVT BELT

Replace the CVT drive belt at the time specified in the vehicle maintenance schedule. If the CVT belt is damaged, replace it as well.

#### ⚠ WARNING

Failure to remove all debris when replacing the belt could result in vehicle damage, loss of control and serious injury or death.

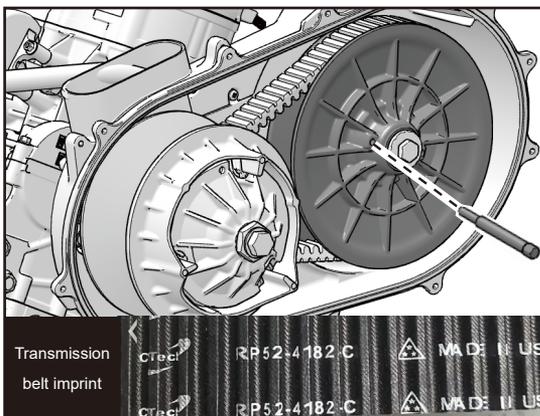


Stop the vehicle engine and allow the vehicle to cool sufficiently before replacing.

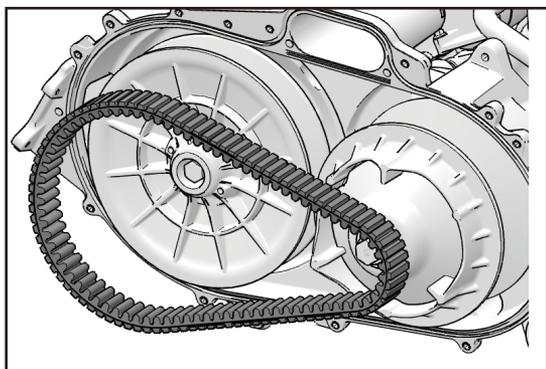
1. Remove the CVT outer cover bolts and remove the CVT outer cover and CVT cover sealing ring
2. with the follower wheel top lever (special) against the hole of the follower wheel as shown in the figure, so that the the follower wheel disk open.

#### ⚠ CAUTION

Before removing the drive belt, note the direction of the marks on the drive belt (e.g., manufacturer's name, arrow mark, etc.) so that the drive belt can be reinstalled on the pulley in the original direction.



3. Remove the drive belt to be replaced and clean any debris from the CVT compartment.



## INSTALLATION OF DRIVE BELTS

### **⚠ CAUTION**

Make sure the new belt orientation is the same as the original belt installation.

Installation steps are essentially the reverse of those for removal.

1. Wrap the drive belt around the CVT master and follower pulleys.
2. Pull out the driven pulley top lever and tighten the CVT driven pulley disk.
3. Install the CVT seal and tighten the CVT outer cover.

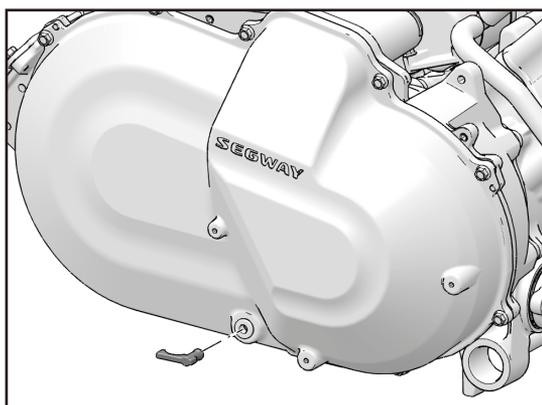
#### CVT outer cover bolts

10 N•m (1 kgf•m, 80 in•lb)

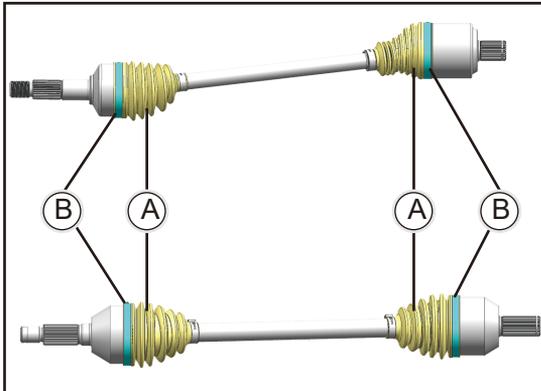
## DRY CVT

There are some instances where water can accidentally soak into the CVT system, before driving the vehicle dry it first.

1. Remove the clutch drain plug.
2. Wait for the water to drain and reinstall the drain plug.
3. Place the transmission in "P" and pull up the parking handle.
4. Start the engine.
5. Use varying throttle openings for 10-15 seconds to expel moisture and air, dry the belts and CVT, do not hold the throttle fully open for more than 10 seconds.
6. Allow the engine speed to remain at idle speed, apply the brake, and shift the transmission to the lowest available range.
7. Belt slip test, if belt slips, repeat process.
8. If the vehicle needs service, contact your Segway dealer to provide you with assistance.

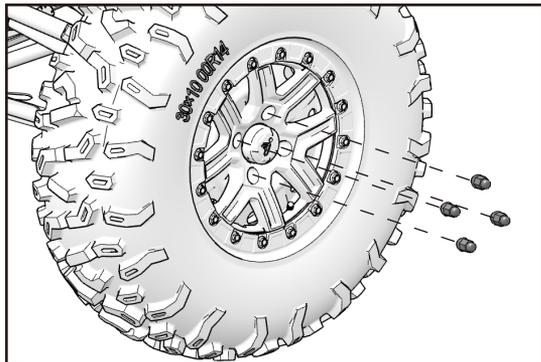


## DRIVE SHAFT MAINTENANCE / TIRES



### DRIVE SHAFT DUST SLEEVE INSPECTION

Inspect the front and rear driveshaft dust boots 【A】 for cuts, damage or grease leaks. If the dust boots show any of these symptoms, they should be replaced. Check dust boot clamps 【B】 for proper positioning.



### WHEEL PARTS REMOVAL

1. Stop the engine.
2. Place the shift lever in the "P" position and lock the parking brake.
3. Loosen, but do not remove, the four wheel mounting nuts with a tool.
4. Raise the side of the vehicle with jack support in a suitable location.
5. Remove the rim mounting nuts.
6. Remove the entire wheel.

### WHEEL MOUNTING

For tire mounting as opposed to removal, tighten the 4-piece tire mounting nuts to the specified torque value.

|            | front wheel    | rear wheel     |
|------------|----------------|----------------|
| Tires Size | 27×9.00-14     | 27×11.00-14    |
|            | 27×9.00R14     | 27×11.00R14    |
|            | 30×10.00R14    | 30×10.00R14    |
|            | For AT10W only | For AT10W only |

| Wheel Mounting Nut |
|--------------------|
| 100~120N·m         |

#### ⚠ CAUTION

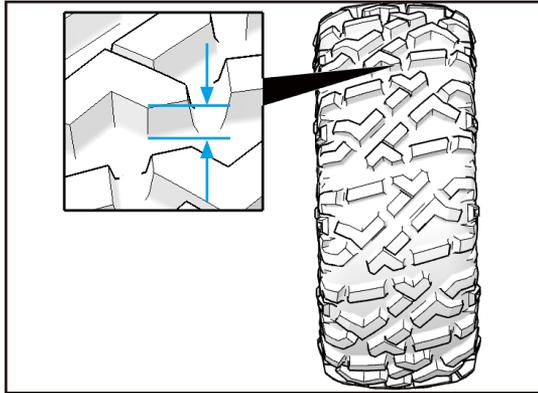
Always use wheels of the same size as recommended in the Service Manual or it may result in loss of vehicle control.

#### ⚠ CAUTION

Do not lubricate bolts or nuts.

**TIRE TREAD DEPTH**

Check the tire tread block wear, when the tire tread block wear is at least 1.6mm above the tread, the tire should be replaced.

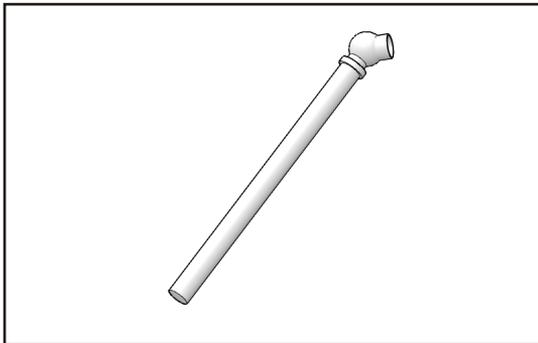


**! WARNING**

Operating with worn tires increases the likelihood of vehicle skidding and possible loss of control. Worn tires can cause accidents. When tire tread wear reach the limit, always replace the tires.

**TIRE PRESSURE CHECK**

When checking tire pressure, follow these steps

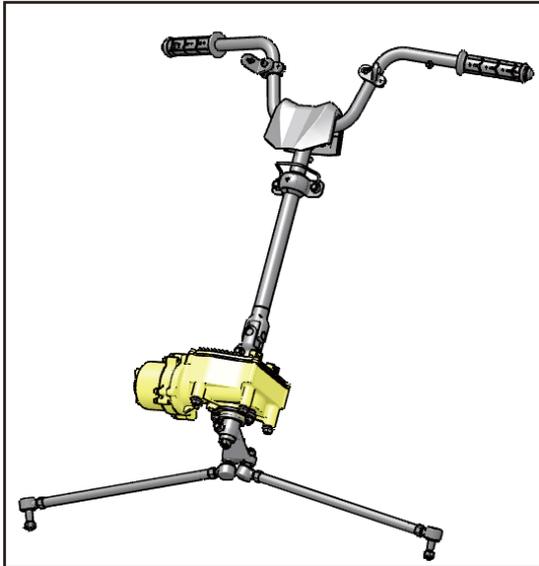


|               | front wheel     | rear wheel      |
|---------------|-----------------|-----------------|
| tire pressure | 7.0psi(48.3kPa) | 7.0psi(48.3kPa) |

Tire Pressure Checking Guide, please observe the following when checking tire pressure:

- ◆ Inspect the tires only after they have cooled down.
- ◆ If the vehicle has been parked for at least 3 hours or has not been driven for more than 1.5km (kilometers), then checking at this time will give an accurate cold tire inflation pressure reading.
- ◆ Check tire pressure with a tire pressure checking device or the tire pressure gauge in your vehicle's tool kit.
- ◆ It is normal for tire pressure to increase after driving, do not lower the tire pressure.

## STEERING MAINTENANCE



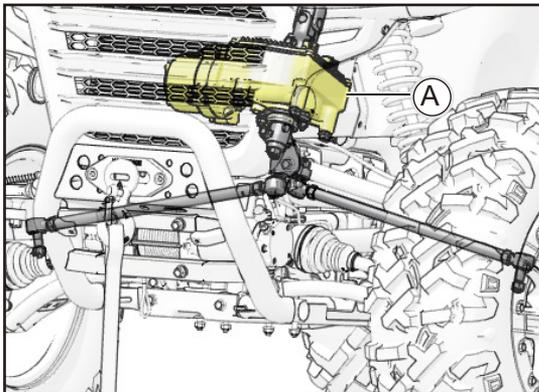
### STEERING SYSTEM CHECK

Steering system components should be checked periodically for loose fasteners, worn tie rod ends/transverse tie rod fasteners, loose steering shaft universal joints, and tie rod ball wear.

Replace any worn or damaged steering parts. The steering should travel the full range of travel of free movement with no sticking. Check all cables, hoses and wiring of the wiring to ensure that the steering mechanism is not restricted.

#### NOTE

Check front beam alignment when replacing steering components.



### POWER STEERING (EPS MODELS)

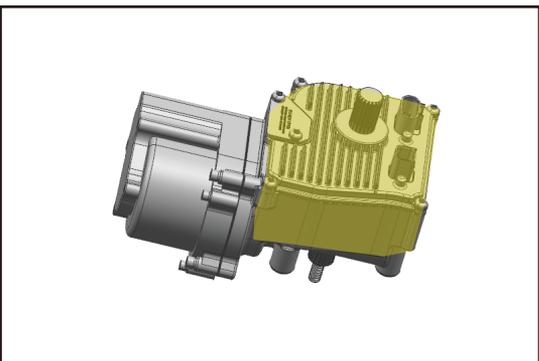
#### 【A】 Power steering

Removing the right front inner fender allows access to the power steering unit through the right front wheel cover.

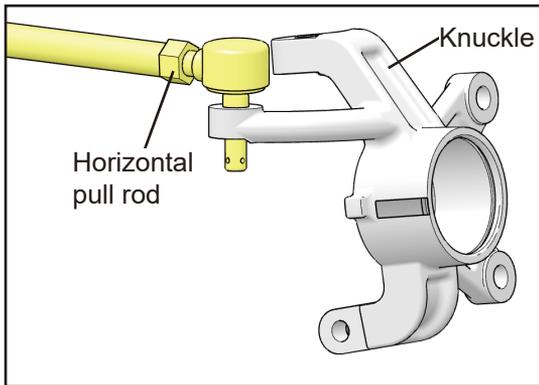
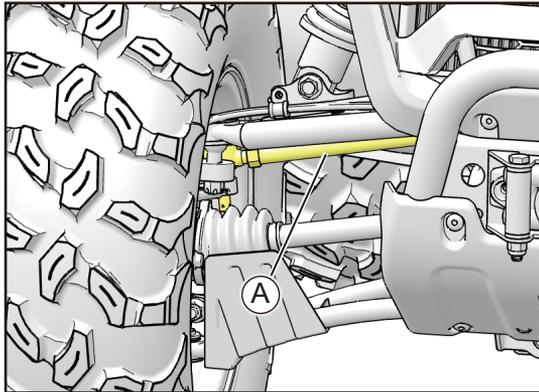
Clean the area around and on top of the power steering unit frequently for proper cooling.

#### NOTE

After riding in muddy conditions, be sure to thoroughly clean these areas



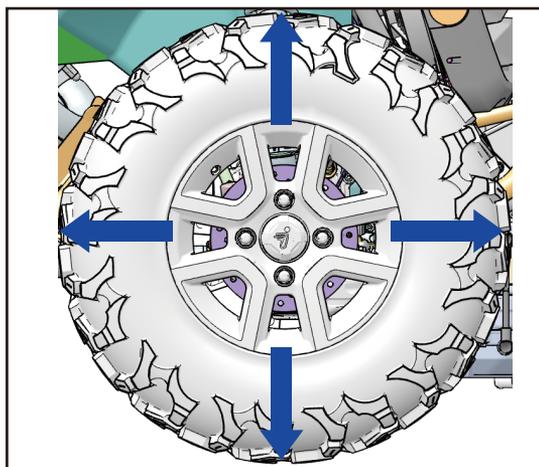
TRANSVERSE TIE ROD INSPECTION



**NOTE**

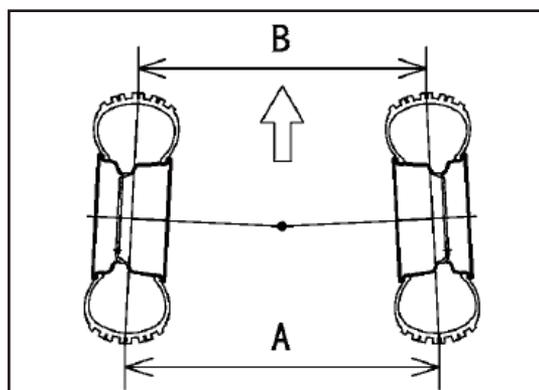
Whenever you replace a steering component, check the front beam for alignment

- ◆ To check the clearance of the transverse tie rod **[A]** , grasp the transverse tie rod and pull it in all directions to feel if there is any movement.
- ◆ Replace any worn or damaged steering parts. The steering should move freely throughout the entire travel range without sticking.
- ◆ Lift the front end of the vehicle so that the front wheels are off the ground, checking for a loose front wheel/hub assembly by grasping first the top and bottom of the vehicle's front wheels, then the front and rear of the vehicle's front wheels. Try pushing inward and pulling outward to move the wheel and hub.
- ◆ If abnormal movement is detected, inspect the hub and wheel assembly to determine the cause. cause (Loose wheel mounting nuts or loose front hub nuts.)



ANTERIOR BEAM CHECK

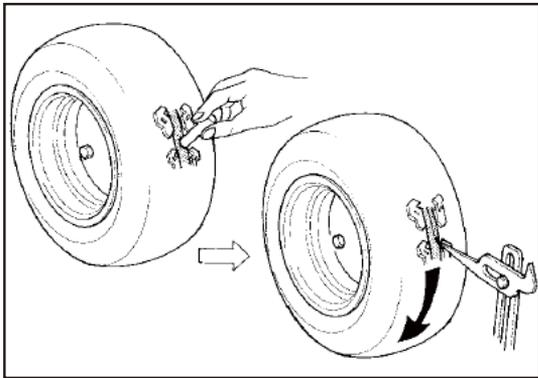
- ◆ Front beam means that the distance between the front ends of the two front wheels is less than the distance between the rear ends at the height of the axle. The difference in distance is called the front beam value. When there is a front beam, the distance A (rear) is greater than B (front) when looking down from the top of the car, as shown in the figure.
- ◆ The function of the front beam is to prevent the front wheels from running off at any time and to reduce the sliding friction between the tires and the ground. If the front beam is incorrect, the front wheels will slide against the ground, resulting in tread damage or abnormal wear.



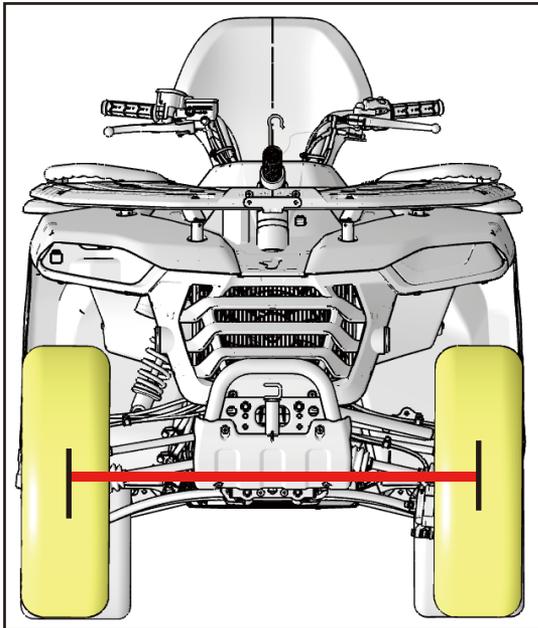
The main pin rear and camber angles are fixed and do not require adjustment.

$$A \text{ (rear) } - B \text{ (front) } = \text{ front beam value}$$

(Distances A and B are measured at the height of the vehicle's axle when parked on a flat surface.)



- ◆ Apply a thick line of chalk or paint near the center of the front tire.
- ◆ As you turn the wheel, use a needle tip plotter to make a small mark near the center of the chalk coating.



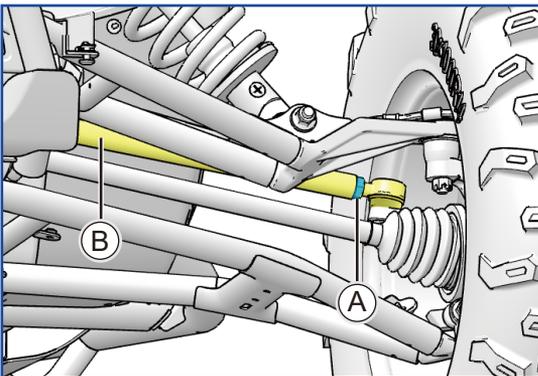
- ◆ Place the front wheels on the ground and turn the steering wheel upright to secure it.
- ◆ At axle height, measure the distance between the front and rear scribed or painted lines of the front tires.
- ◆ Subtract the front measurement from the rear measurement to obtain the front beam.

If the front beam is not within the specified range, continue the front beam adjustment procedure.

**Standard: -5 ~ -20 mm**

### FRONT BEAM ADJUSTMENT

- 【A】 Anti Loosening Nut
- 【B】 Tie rods



- ◆ Loosen the jam nut 【A】 and turn the adjusting tie rods 【B】 on both sides the same number of turns to achieve the specified front beam.

### **⚠ WARNING**

Adjust the length of the cross tie bar so that the visible threads on the ends of the cross tie bar are of uniform length. A non-uniform thread length can result in damage to the cross tie rod ends.

- ◆ Check the front beam.
- ◆ Tighten:

Cross tie bar adjustment lock nut torque

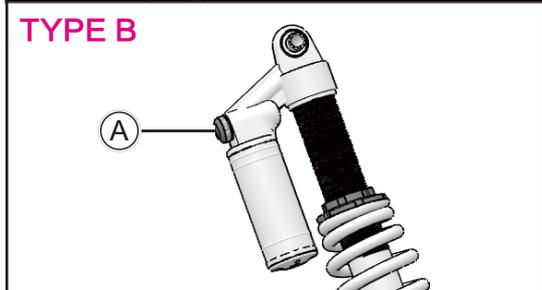
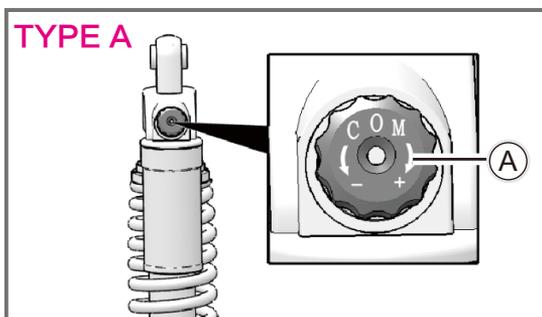
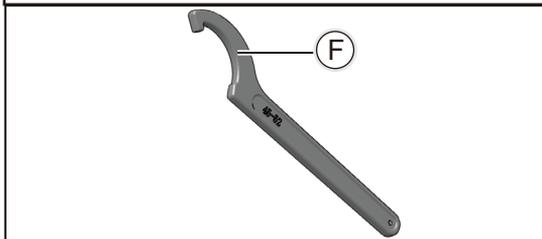
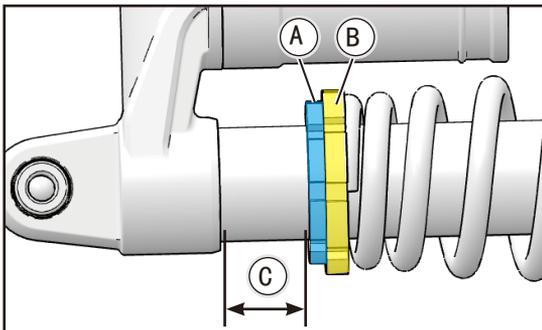
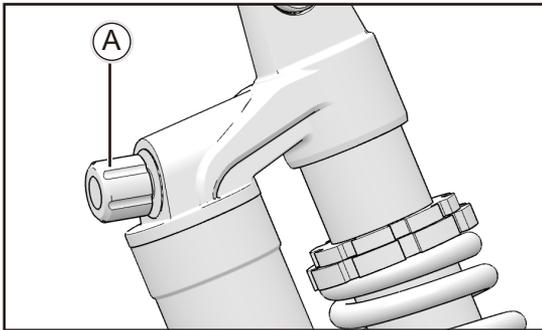
45 N.m (4.5 kgf·m, 34 ft·lb)

- ◆ Test drive vehicles.

### SHOCK ABSORBER

#### SHOCK ABSORBER INSPECTION

Since the front shock absorbers are sealed units, they cannot be disassembled and only require external inspection. If one unit is damaged, replace both shock absorbers as a set. If only one unit is replaced and both are not balanced, it may cause the vehicle to become unstable at high speeds or the overall comfort deterioration of the vehicle at high speeds.



#### ADJUSTABLE PNEUMATIC SHOCK ADJUSTMENT

##### Spring Preload Adjustment

Adjust the upper spring end cap with a special tool

- ◆ Adjusting the end cap downward increases the spring preload.
- ◆ Decrease the spring preload by adjusting the end cap upward.

【A】 Lock nut 【B】 Adjustment nut

【C】 Spring preload position

- ◆ Screw the lock nut 【A】 to the desired position, and then unscrew the adjusting nut 【B】 , adjust the nut position 【C】 .

##### Spring preload position 【C】 setting

Standard (For AT10 only):

Front shock absorber 24mm(0.94in.).

Usage range: 10mm(0.39in.)~44mm(1.73in.)

Rear shock absorber 65mm(2.56in.)

Operating range 45mm(1.77in.)~85mm(3.35in.)

Standard (For AT10W only):

Front shock absorber 111mm(4.37in.),

Usage range: 91mm(3.58in.)~131mm(5.16in.)

Rear shock absorber 112mm(4.41in.),

Operating range 92mm(3.62in.)~132mm(5.20in.)

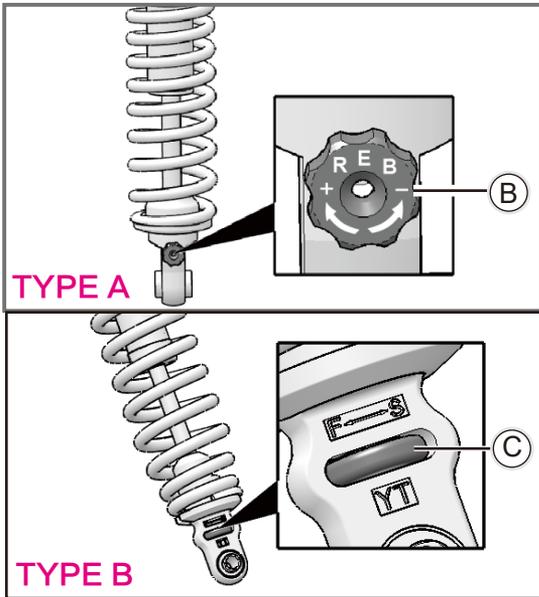
##### Spring Lock Nut Torque

30 N·m

##### Compression Damping Adjustment

【A】 Compression damping adjustment valve

- ◆ Rotate the upper compression damping adjuster by hand, increasing the damping clockwise and decreasing it counterclockwise.
- ◆ The compression damping regulator has 7 gears, the initial gear is set to the 4th gear.



### Restoration damping adjustment

**【B】** Recovering the damping adjusting valve

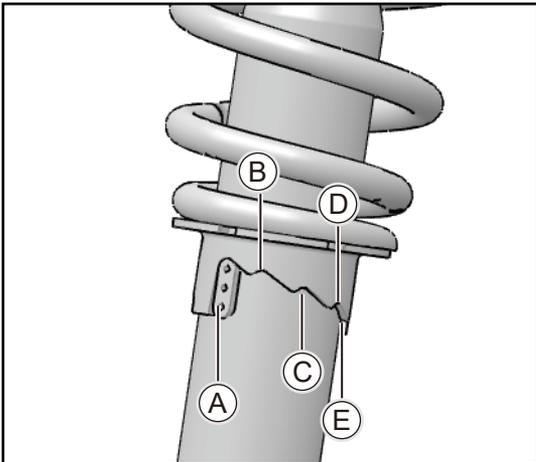
- ◆ Rotate the lower compression damping adjuster by hand, increasing the damping clockwise and decreasing it counterclockwise.
- ◆ The compression damping regulator has 7 gears, the initial gear is set to the 4th gear.

**【C】** Recovering the damping adjusting valve.

- ◆ Rotational recovery damping increases in the direction of “S”.
- ◆ Turning in the “F” direction reduces the return damping.

### OIL SHOCK ABSORBER ADJUSTMENT

The damping has 5 positions for different loads or driving conditions.

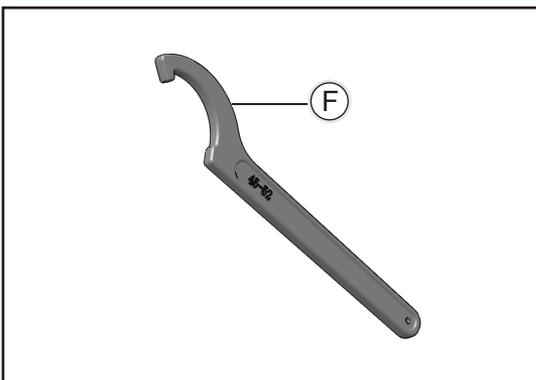


| position          | sprung | environment | load  | topography | speed |
|-------------------|--------|-------------|-------|------------|-------|
| ↑                 | soft   | soft        | Light | smooth     | low   |
| standard position | ↑      | ↑           | ↑     | ↑          | ↑     |
| ↓                 | hard   | hard        | Heavy | bumpy      | high  |

Position **【A】** : Standard position.

Position **【B】 【C】 【D】 【E】** : According to the vehicle load, speed increase, the

Gradually adjust

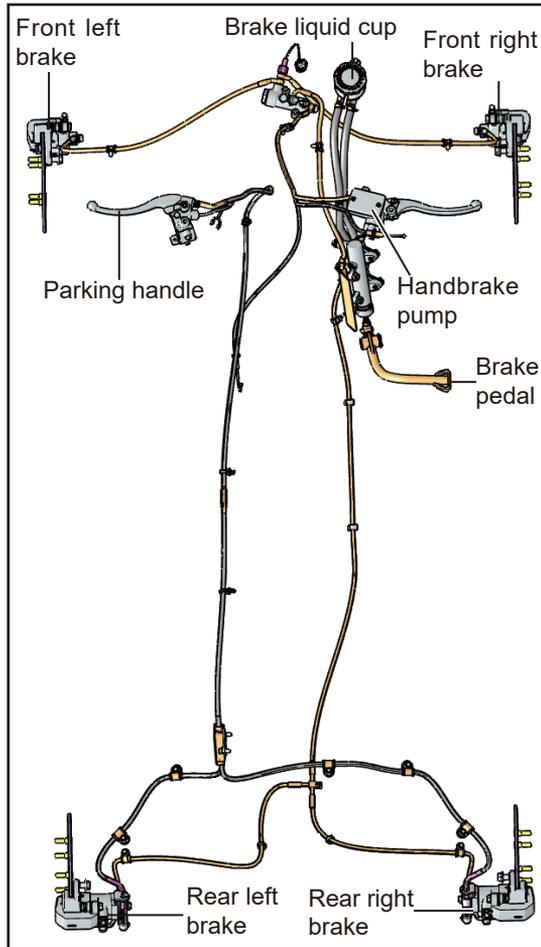


Use the hook wrench **【F】** (in the supplied tool bag) to adjust the shock spring pressure.

**⚠ CAUTION**

When adjusting the shock absorbers, always adjust both the left and right shock absorbers to the same position. gradually adjust upward or downward one position at a time. Do not attempt to make large adjustments as this may damage the shock absorbers.

**BRAKING SYSTEM**



Front and rear brakes are hydraulic disc brakes, activated by the brake pedal

**⚠ WARNING**

The brake fluid level must be checked periodically:

An overfilled brake cylinder may cause brake resistance or brake lock-up, which could result in serious injury or death. Keep the brake fluid at the recommended level and do not overfill. Brake Discs Brake discs must be checked for periodic wear: If the brake discs are worn, they should be replaced.

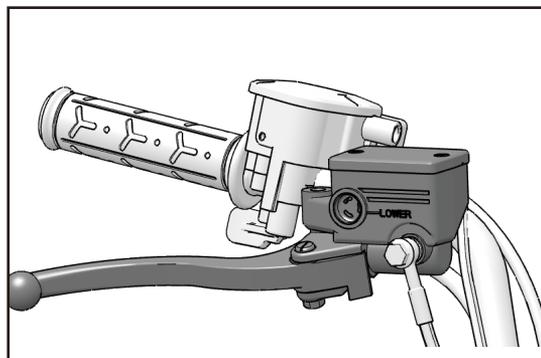
The following checks are recommended to keep the brake system in good working order. If the brakes fails during heavy use in normal operation, it should be checked frequently.

- ◆ Always keep the brake fluid at the proper level. Check for fluid leaks in the brake system.
- ◆ Check that the brake travel is not too long or feels uncomfortably soft.
- ◆ Check for worn, damaged or loose friction pads. Replace the brake pads when the remaining limit, you must replace the brake pads brake pad thickness is not less than 1.5mm.
- ◆ Check the safety and surface condition of the brake disk. Use the recommended brake cleaner to remove all grease. Do not use spray lubricants or other lubrication products. If there is damage (cracks, excessive corrosion, warping), contact your dealer before operation.

**BRAKE FLUID LEVEL CHECK ON HANDBRAKE UPPER PUMP**

Use the recommended brake fluid:

|             |      |
|-------------|------|
| brake fluid | DOT4 |
|-------------|------|



Verify that the handbrake master pump reservoir level is at the specified level.

**【LOWER】** Brake fluid cup minimum level mark. ◦

Check the fluid level through the fluid level sight hole, if it is below the minimum level line

**【LOWER】** , check and replenish the brake fluid. ◦

For replenishing the flow brake fluid in the brake lines, the addition procedure is as follows: :

- ◆ Remove the screw on the brake fluid cup cover of the handbrake pump, and replenish the brake fluid cup with the same grade of brake fluid.
- ◆ Replenish the brake fluid cup with brake fluid of the same grade.

## ⚠ CAUTION

Brake fluid can damage plastic and painted surfaces, use caution when adding.

If brake fluid comes into contact with skin or eyes, flush immediately with plenty of water.

If there is any further discomfort, please consult a doctor immediately.

Check brake pads for wear.

## BRAKE FLUID CUP LEVEL CHECK

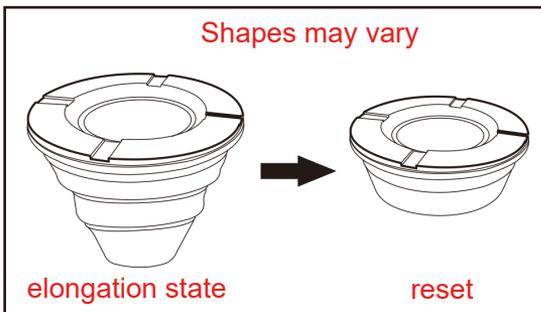
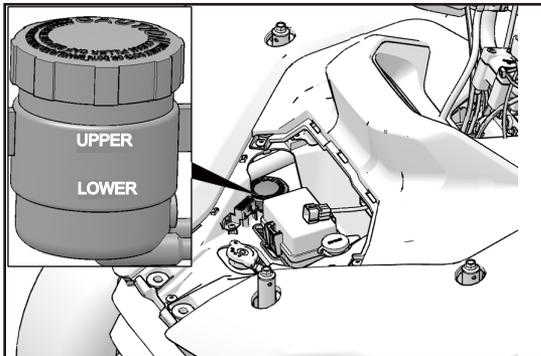
The rear brake oil cup is located between the left front upper inner fender and the front shock absorber.

- ◆ Place the entire vehicle on a level surface and check is the fluid level in the oil cup.

**A**] - MAX - High level in the brake fluid cup.

**B**] - MIN - Minimum level in the brake fluid cup.

- ◆ If the fluid level falls below the minimum level line - LOWER - or below, replenish the brake fluid with the same grade.



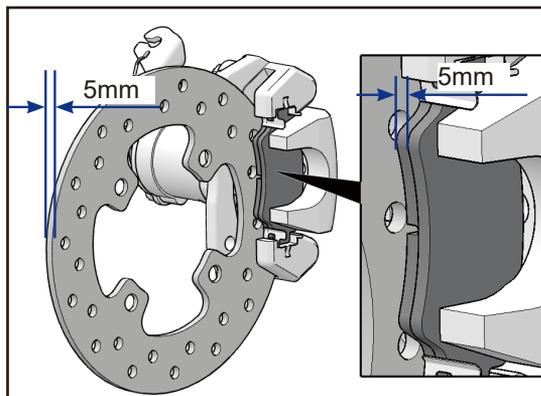
## ⚠ CAUTION

After replenishing or replacing the brake fluid, check whether the oil cup pad under the oil cup cover is in an elongated state. If the oil cup gasket is elongated, it is necessary to reset the oil cup gasket (as shown in the figure). If the oil cup gasket is not reset, brake fluid will spill out of the oil cup when the oil cup cover is tightened.

- ◆ If the oil cup gasket is stretched, reset the oil cup gasket first.
- ◆ Tighten the oil cup cover.

## ⚠ CAUTION

Replenish or refill DOT4 brake fluid as required.

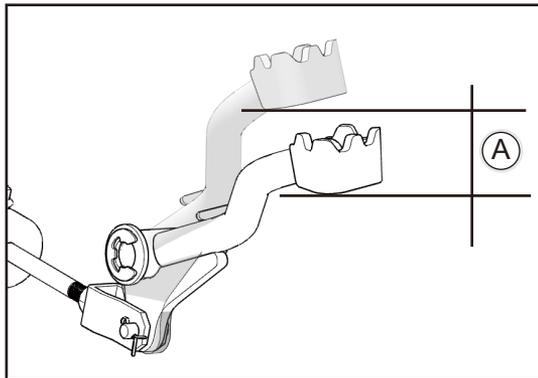


## BRAKE LININGS AND DISCS

Brake lining and disc wear will depend on the severity of use and driving conditions. Brake linings wear faster in wet and muddy conditions. Check the wear of the brake linings and discs regularly according to the maintenance schedule. If the brake lining and disc are worn beyond the required values, the brake lining and disc must be replaced. (See pages 10-13, 10-14, 10-18, 10-19 )

|                        |                    |       |
|------------------------|--------------------|-------|
| Brake Lining Thickness | Standard thickness | 5.0mm |
|                        | Minimum thickness  | 1.5mm |
| Brake Disc Thickness   | Standard thickness | 5.0mm |
|                        | Minimum thickness  | 4.0mm |

**BRAKE PEDAL AIR TRAVEL CHECK**



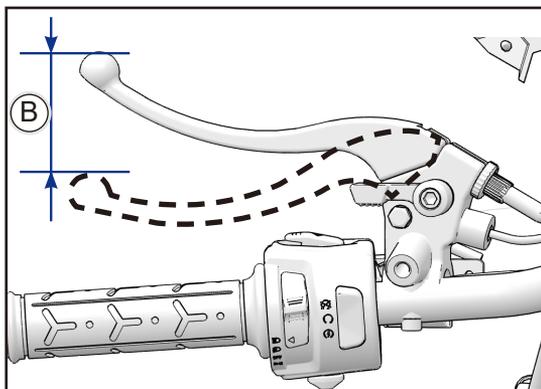
**【A】** Brake pedal travel

- ◆ Check the empty travel of the brake pedal **【A】** .
- ◆ Depress the brake pedal gently with your foot until the brake pedal is depressed.

If the rear brake pedal has too much air travel, adjust it,

**Rear brake pedal travel standard:**

**(2 to 3) mm (0.08 to 0.12 inch)**



**PARKING HANDLE WORKING STROKE CHECK**

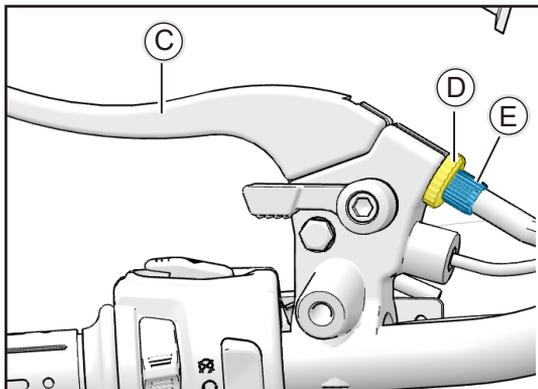
**【B】** Parking handle working stroke

- ◆ Check the working stroke of the parking handle **【B】** .
- ◆ Squeeze the parking handle by hand until it is parked.

If the working travel of the parking handle is large, adjust it.

**Parking handle working travel standard:**

**(10 to 20) mm (0.4 to 0.8 inch)**



**PARKING HANDLE FREE TRAVEL ADJUSTMENT**

**【C】** Brake handle

**【D】** Anti Loosening Nut

**【E】** Brake lever adjuster

- ◆ Turn the brake lever adjuster to lock the jam nut **【D】** .

- ◆ Tighten the jam nut **【D】** .

until the correct travel is achieved.

## ELECTRICAL AND IGNITION SYSTEMS

### BATTERY MAINTENANCE

Keep battery terminals and connections free of corrosion, if cleaning is required, use a stiff wire. If cleaning is required, remove corrosion with a stiff wire brush, clean with a solution of one tablespoon of baking soda and one cup of water, rinse well with tap water, dry with a clean towel, lubricate with dielectric grease or vanadium. Rinse well with tap water, dry with a clean towel, and grease the terminals with dielectric grease or petroleum jelly. Apply dielectric grease or petroleum jelly to the end.

#### **⚠ WARNING**

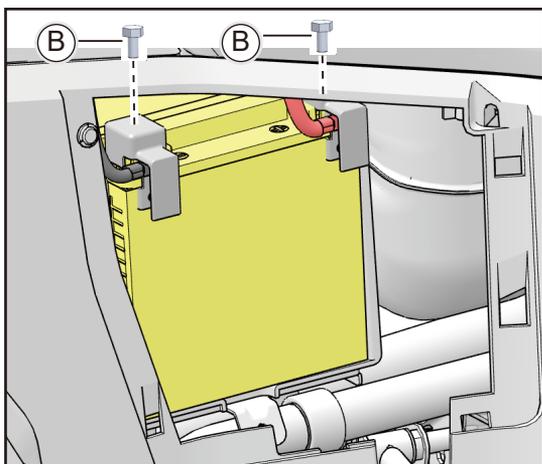
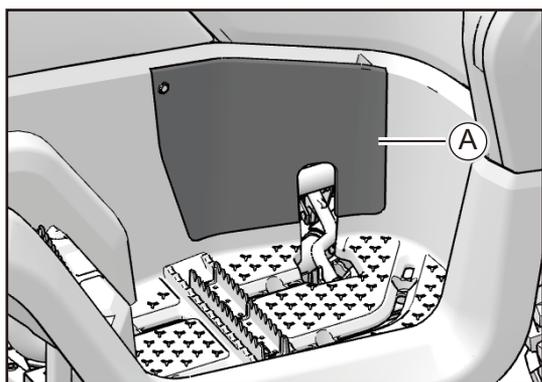
12V batteries contain toxic and corrosive sulfuric acid, skin contact may result in burns.

If the solution in the battery accidentally splashes on your eyes, skin or clothes, please wash them immediately with plenty of water and seek medical advice promptly.

Batteries can produce explosive gases, so keep away from sparks, flames, cigarettes, etc..

Always charge the 12V battery in an open area. Do not charge the 12V battery in a poorly ventilated garage or closed room.

Always wear eye protection when working near the battery.



### BATTERY REMOVAL

#### **⚠ CAUTION**

If the electrolyte overflows, immediately rinse with a solution of baking soda and water, and then rinse thoroughly with water to prevent damage to the vehicle.

The battery is located above the right footrest. To replace or service the battery, perform the following steps:

Turn off the vehicle power before removing the battery

**【A】 Battery maintenance cover**

**【B】 Positive and negative battery terminal fixing bolts**

1. Use a tool to remove the retaining screws of the battery access cover.
2. Remove the strap holding the battery in place.
3. Roll up the protective rubber boot.
4. Remove the negative battery screw and disconnect the black (negative) battery cable.
5. Remove the positive battery screw and disconnect the red (positive) battery cable.
6. Remove the battery from the vehicle. Battery Installation

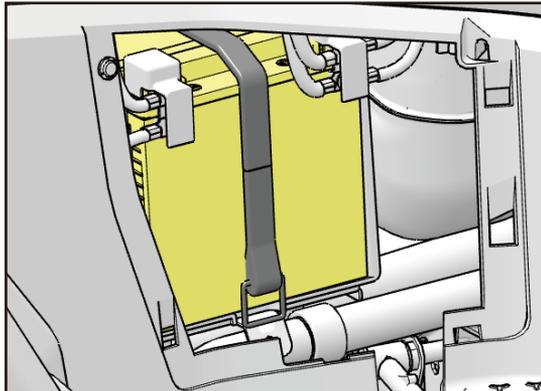
## BATTERY INSTALLATION

**⚠ CAUTION**

To reduce the possibility of sparking: each time the battery is removed, disconnect the black (negative) cable to reconnect. When reinstalling the battery, install the black (negative) cable last.

---

cable last when reinstalling the battery.



1. Clean battery cables and terminals with a stiff wire brush. Corrosion can be removed with a solution of one cup of water and one tablespoon of baking soda. Rinse well with water and dry thoroughly.
2. Place the battery in the tray.
3. Bolt the positive (red) cable to the positive battery terminal and return the insulating rubber boot into place.
4. Bolt the negative (black) cable to the negative battery terminal and return the insulating rubber boot to place.
5. Secure the battery with the battery tie-down straps.
6. Verify that the cables are properly routed.

## BATTERY CHARGING

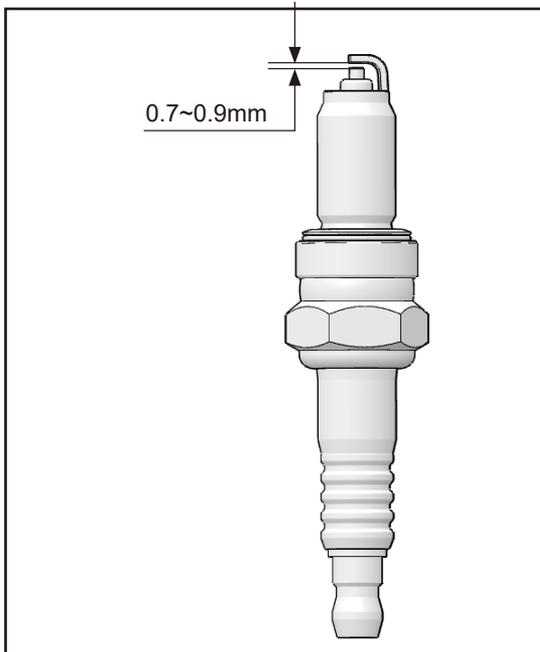
**⚠ CAUTION**

If charging, the hydrogen gas produced by the 12V battery is a flammable explosive gas. Therefore, observe the following precautions before charging:

- ◆ If charging a 12V battery still installed in the vehicle, be sure to disconnect the ground cable.
  - ◆ When connecting and disconnecting the charger cable to the 12V battery, make sure the power switch on the charger is turned off.
  - ◆ Charge only slowly (5A or less). If fast charging is used, the 12V battery may explode.
-

## SPARK PLUGS

Refer to the recommended spark plug type and gap specifications. Spark Plug Torque Specifications.



### ⚠ CAUTION

Using non-recommended spark plugs can cause serious engine damage.

Always use recommended spark plugs or their equivalent.

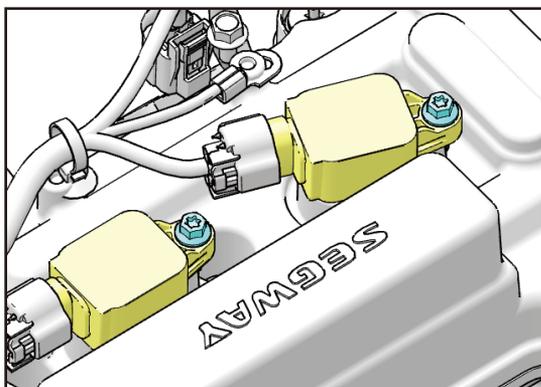
| spark plugs | model number  | spark plug gap | Spark Plug Torque            |
|-------------|---------------|----------------|------------------------------|
|             | B7RTC / B8RTC | 0.7~0.9mm      | 12 N.m (1.2 kgf·m, 8.8ft·lb) |

## SPARK PLUG CHECK

Spark plug condition indicates engine operation. Check or refer to the maintenance replacement spark plug Periodic Maintenance Program for the time.

### ⚠ CAUTION

Hot exhaust systems and engines can cause burns. When removing spark plugs for inspection wear protective gloves.



- 【A】 Bolt
- 【B】 Ignition coil
- 【C】 Spark plug
- 【D】 Spark Plug Sleeve

The spark plug is located under the seat cushion

1. Remove the seat cushion and the windshield at the bottom of the seat cushion.
2. Unplug the ignition coil harness and remove the ignition coil retaining bolt.
3. Remove the ignition coil, with the spark plug located under the ignition coil.
4. Using the special wrench for the spark plug in the tool bag, turn the spark plug counterclockwise.

Installation is performed in the reverse order of removal, and tightening is performed to the specified torque.

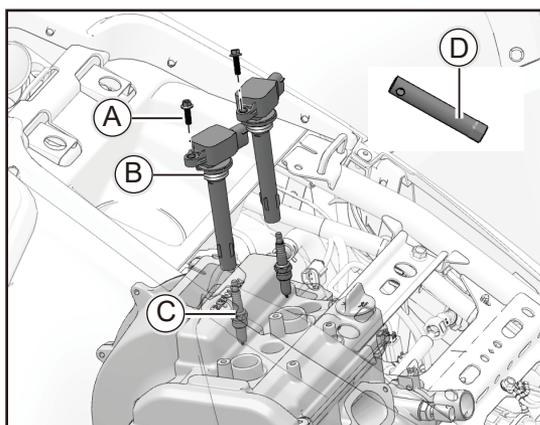
### Normal Plug

Normal insulator tips are gray, tan, or light brown. Very little there are burning deposits. The electrodes are not burned or corroded. This indicates that the engine is burning is adequate.

The tip should not be white. A white insulator tip indicates overheating due to use of improper spark plugs or incorrect throttle body adjustment.

### need to be replaced

Contaminated insulator tips are black. Moist oil film covers the launching end. The entire head may have a carbon layer. Generally, the electrodes are not worn. A common cause of fouling general cause of fouling is excessive oil, use of unrecommended oil or poor fuel quality.



**ENGINE LUBRICATION SYSTEM**

EXPLODED VIEW.....3-1-2

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ENGINE OIL FLOW CHART.....3-1-6

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    Checking the oil level through the observation hole.....3-1-7

OIL PRESSURE.....3-1-8

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    Removing the oil filter assembly .....3-1-9

    Install the oil filter assembly .....3-1-9

    Disassemble the oil pump assembly.....3-1-9

    Install the oil pump assembly .....3-1-9

OIL COOLER ASSEMBLY.....3-1-10

    Remove the oil cooler assembly.....3-1-10

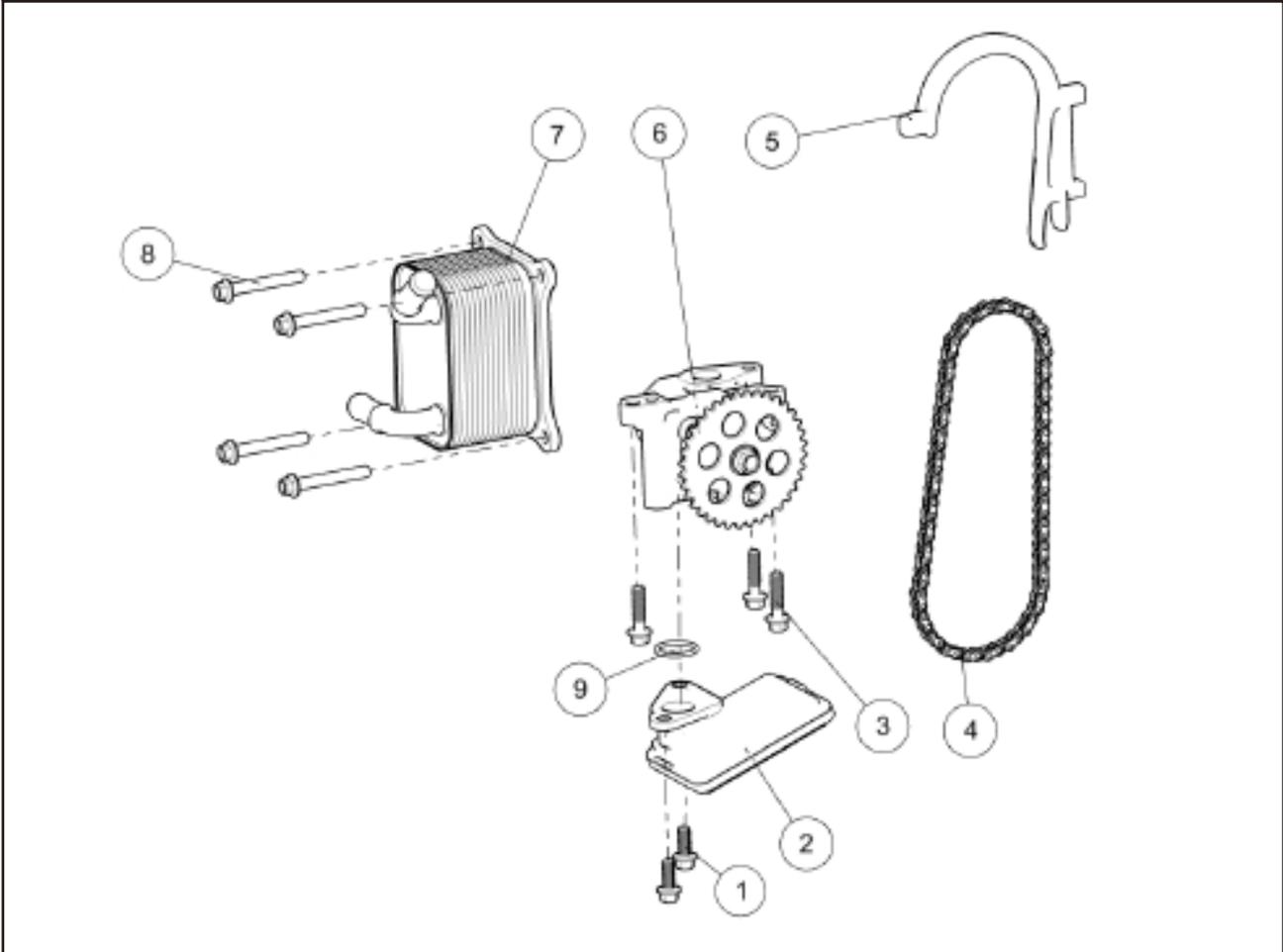
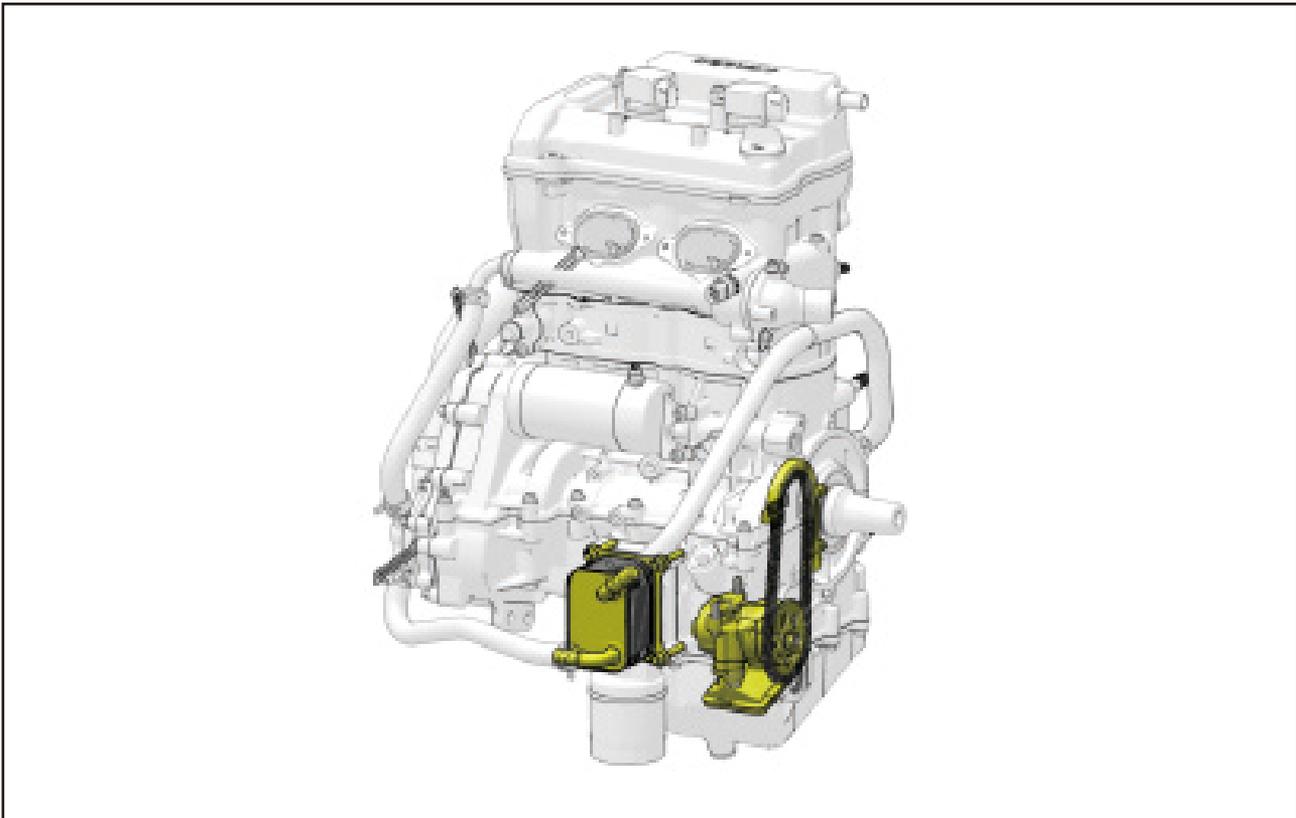
    Install the oil cooler assembly .....3-1-10

OIL FILTER .....3-1-11

    Removing the oil filter.....3-1-11

    Installation of oil filter .....3-1-11

## EXPLODED VIEW



| No. | Fastener                   | Torque |       |          | Remarks |
|-----|----------------------------|--------|-------|----------|---------|
|     |                            | N·m    | kgf·m | ft·lb    |         |
| 1   | BOLT M6×16                 | 9.8    | 1.0   | 87 in·lb |         |
| 2   | OIL FILTER NET             |        |       |          |         |
| 3   | BOLT M6×25                 | 9.8    | 1.0   | 87 in·lb |         |
| 4   | OIL PUMP CHAIN             |        |       |          |         |
| 5   | OIL PUMP CHAIN GUARD PLATE |        |       |          |         |
| 6   | OIL PUMP                   |        |       |          |         |
| 7   | OIL COOLER                 |        |       |          |         |
| 8   | BOLT M6×45                 | 9.8    | 1.0   | 87 in·lb |         |
| 9   | O-RING 19×2                |        |       |          |         |

G: Apply grease for oil seal and O-ring.

L: Apply a non-permanent locking agent.

O: Apply gear oil(SAE 80W/90/GL-5).

## TECHNICAL PARAMETER

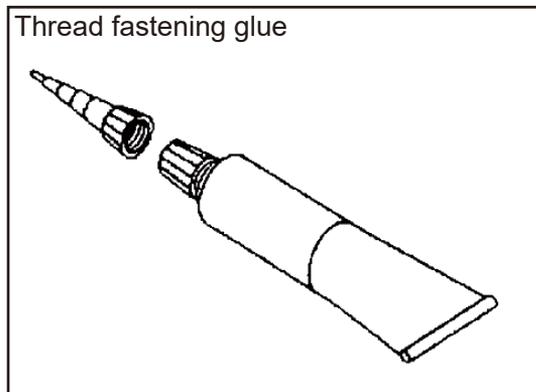
| Item  | Parameter   |
|---|---|
| Engine Oil:<br>Grade<br>Viscosity<br>Filling amount | API SN or higher<br>5W-40/SN or higher<br>2.5 L (First time, no residual oil in the engine)<br>2.2 L (Regular oil change) |
| Oil pressure measurement (working temperature):     | More than 69 kPa (10psi) @1400r/min (rpm)<br>More than 276 kPa (40 psi) @7000r/min (rpm)                                  |
| Oil Pressure Sensor:                                | Always open, working pressure: 250±10kPa  |

## SPECIAL TOOLS

Oil pressure gauge, 10 kgf/cm<sup>2</sup>



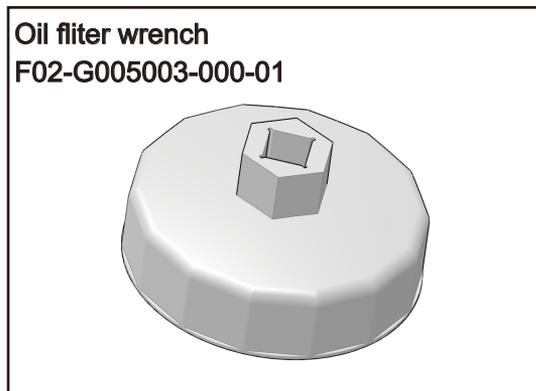
Thread fastening glue



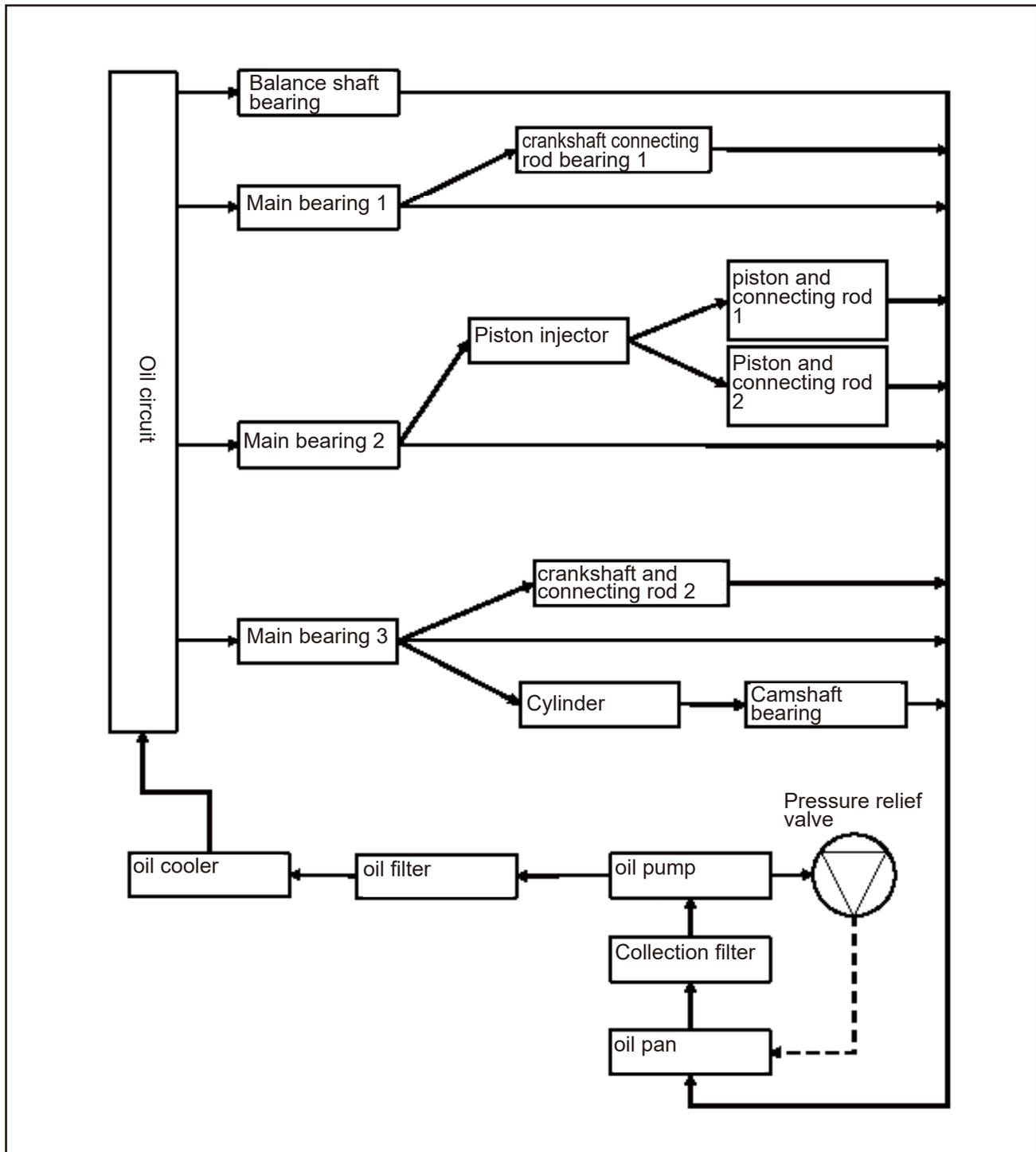
Oil pressure gauge connector



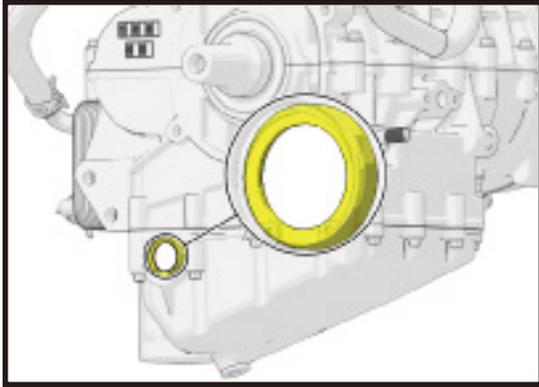
Oil filter wrench  
F02-G005003-000-01



## ENGINE OIL FLOW CHART



## OIL LEVEL CHECK



### **⚠ WARNING**

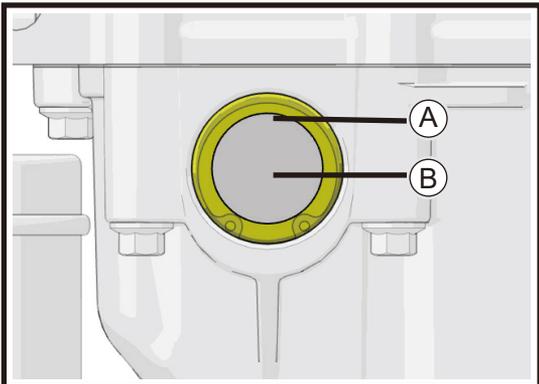
Operating the vehicle with insufficient, deteriorated or contaminated engine oil can result in engine or drivetrain stalling, malfunction and damage.

### Checking the oil level through the observation hole

- ◆ Park the vehicle on a level surface so that it is level.
- ◆ If the oil has just been changed, start the engine and idle it for 5 minutes to fill the oil filter.

### **⚠ CAUTION**

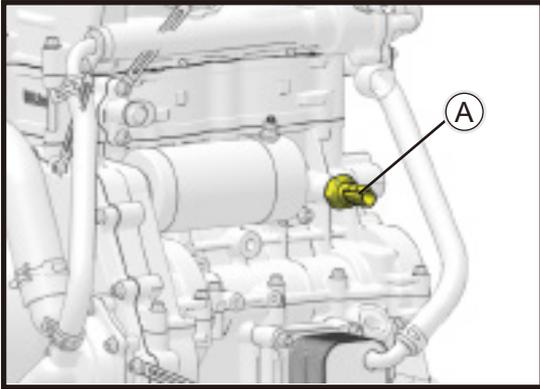
Let the engine idle for a few minutes so that the oil can reach all parts of the engine. Running the engine without oil can cause serious damage.



- ◆ Stop the engine and wait for 2 minutes for the oil in the oil circuit to return to the oil pan.
- ◆ Visualize the observation hole, the level should be between the highest point of the observation hole **【A】** and the middle point of the observation hole **【B】**.

If the oil level is below the midpoint **【B】**, refill the oil through the filler neck. The specification of the refilled oil should be the same as the one originally used.

## OIL PRESSURE



### Measure oil pressure

- ◆ Connect the oil pressure gauge connector 【C】 to the oil pressure gauge 【B】
- ◆ Clean the area around the oil pressure sensor 【A】 and remove the oil pressure sensor
- ◆ Connect the oil pressure gauge connector 【C】
- ◆ Start the engine, make the engine reach working temperature, observe the reading of the oil pressure gauge

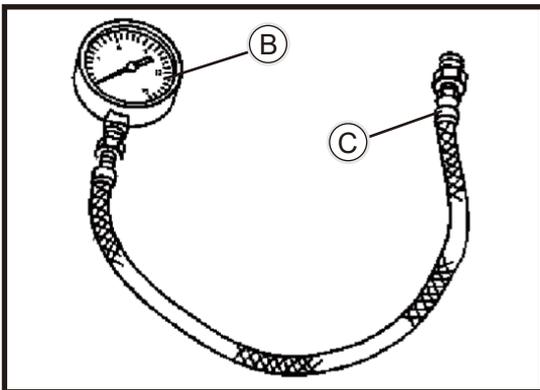
Special tools:

Oil pressure gauge, 10 kgf/cm<sup>2</sup> E01GZ0030001

Oil pressure gauge connector:E01GZ0031001

#### Oil pressure requirement (heat engine state)

More than 69 kPa (10 psi) @1400r/min (rpm)  
More than 276 kPa (40 psi) @7500r/min (rpm)



- ◆ Shutdown engine.
- ◆ Remove the oil pressure gauge and connector

### ⚠ WARNING

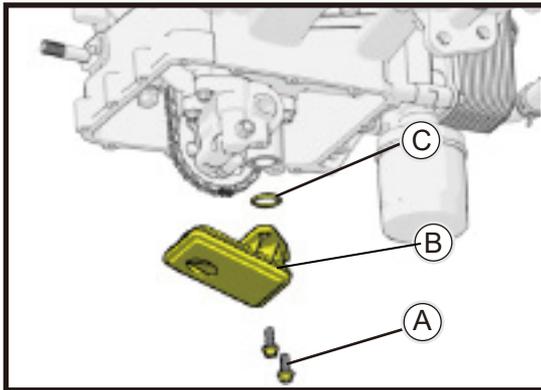
When disassembling the pressure gauge connector, pay attention to prevent the hot engine oil from being scalded. The hot engine oil will flow out through the oil passage.

- ◆ Install the oil pressure sensor and tighten it to the specified torque
- ◆ Tightening torque

#### Oil pressure sensor

15 N·m (1.5 kgf·m, 11 ft·lb)

## OIL PUMPS



### Removing the oil filter assembly

◆ Disassembly:

【A】 Bolt M6×16

【B】 Oil filter assembly

【C】 O-ring 19×2

### Install the oil filter assembly

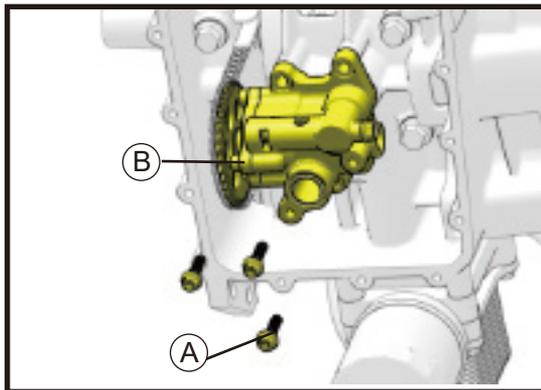
◆ Place 【C】 over the 【B】 pipe with the larger side of the outer ring in contact with the upper flange face of 【B】 .

◆ Apply appropriate amount of oil to the outer ring of 【C】 , align the position of the oil hole and press in 【B】 .

◆ Install the bolt 【A】 and tighten it according to the torque.

◆ Tightening torque

| Bolt 【A】                     |
|------------------------------|
| 9.8 N•m (1.0kgf•m, 87 in•lb) |



### Disassemble the oil pump assembly

◆ Removal:

【A】 Bolt M6×25

【B】 Oil pump assembly

◆ Remove the bolt 【A】 , turn 【B】 at an appropriate angle, and take it out after disengaging the chain.

### Install the oil pump assembly

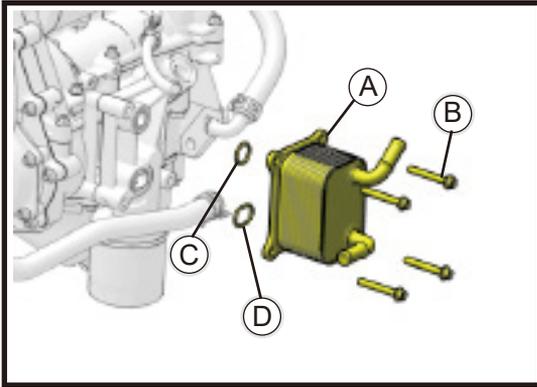
◆ Turn the oil pump 【B】 sprocket at an appropriate angle, the sprocket engages with the chain, and the oil pump end is aligned with the locating pin.

◆ Install the bolt 【A】 and tighten it according to the torque.

◆ Tightening torque

| Bolt 【A】                     |
|------------------------------|
| 9.8 N•m (1.0kgf•m, 87 in•lb) |

## OIL COOLER ASSEMBLY



### Remove the oil cooler assembly

- ◆ Drain engine coolant and oil.
- ◆ Disassembly
- 【A】 Oil cooler assembly
- 【B】 Bolt M6×40
- 【C】 Oil cooler sealing ring
- 【D】 O-ring 17×2

### Install the oil cooler assembly

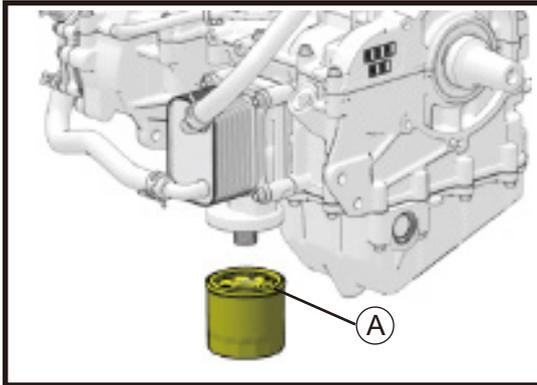
- ◆ Use a new O-ring 【C】 【D】 and press it into the seal groove.
- ◆ Align the oil cooler bolt holes and screw in the bolts 【B】 .
- ◆ Tightening torque

| Bolt 【B】 【C】                 |
|------------------------------|
| 9.8 N•m (1.0kgf•m, 87 in•lb) |

- ◆ Replenish engine coolant and oil

### ⚠ CAUTION

When installing, it is necessary to check that the O-ring is intact and not twisted. If the O-ring is damaged, it will cause oil leakage, which may result in abnormal wear or even damage to internal engine parts. If necessary, replace the O-ring with a new one.

**OIL FILTER****Removing the oil filter**

- ◆ Drain engine coolant and oil.
- ◆ Disassembly

Use the filter wrench to remove the **【A】** oil filter.

**Installation of oil filter**

- ◆ Use a new oil filter **【A】** , apply oil to the oil filter seal before installation, and tighten with a filter wrench.
- ◆ Tightening torque

Oil filter **【A】** tightening torque

25 N•m (2.55kgf•m, 222 in•lb)

**WATER PUMP ASSEMBLY**

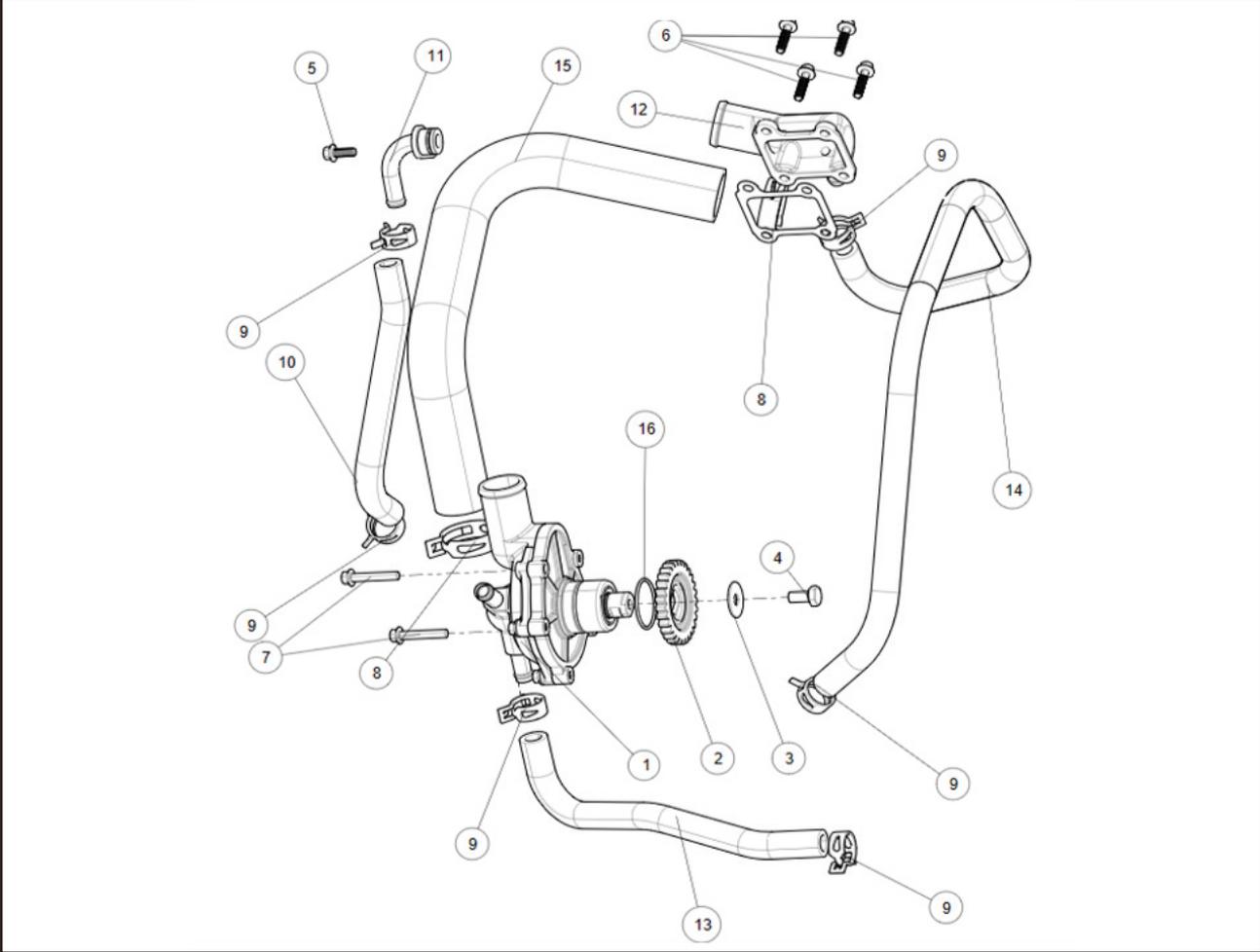
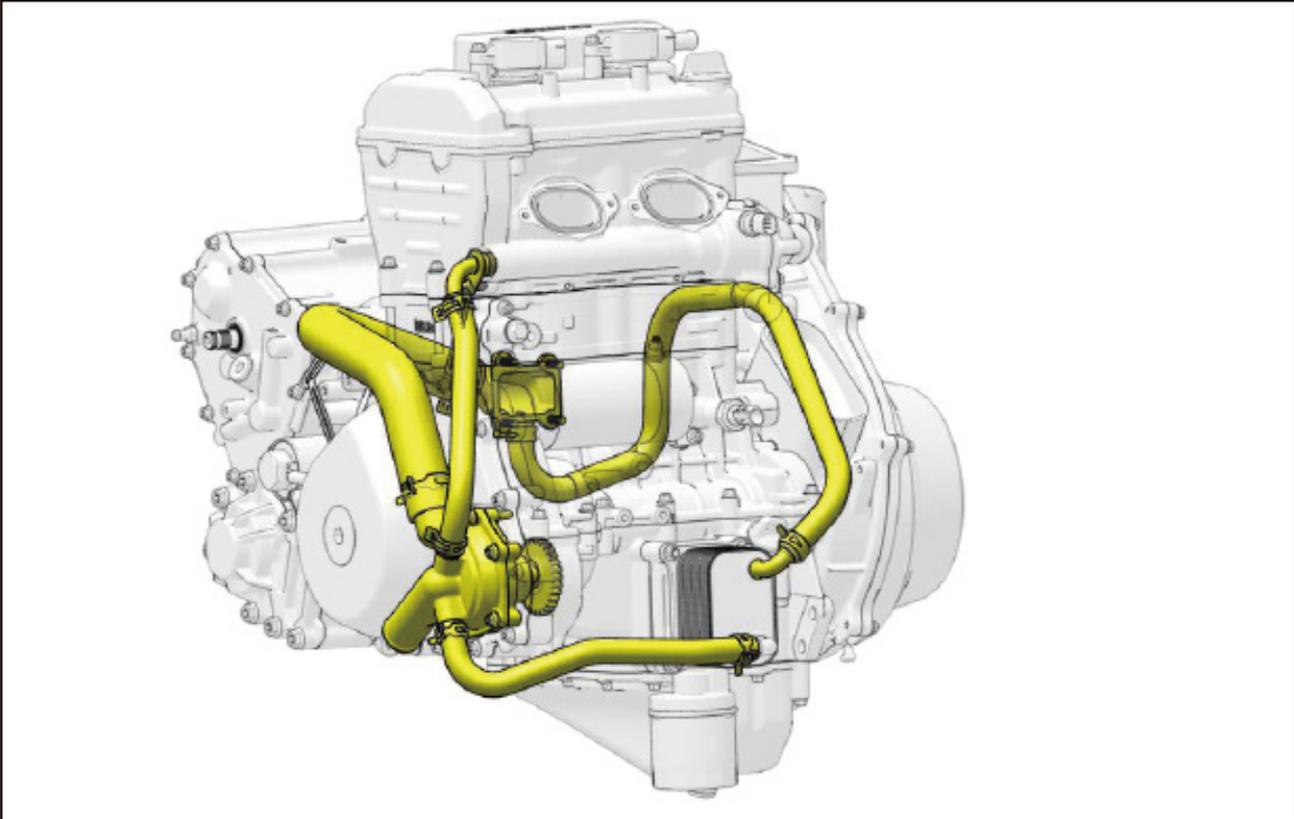
EXPLODED VIEW.....3-2-2

WATER PUMP ASSEMBLY .....3-2-4

    Disassembly of water pumps.....3-2-4

    Installation of water pumps.....3-2-5

**EXPLODED VIEW**



| No. | Fastener                | Torque |       |          | Remarks |
|-----|-------------------------|--------|-------|----------|---------|
|     |                         | N·m    | kgf·m | ft·lb    |         |
| 1   | WATER PUMP              |        |       |          |         |
| 2   | WATER PUMP GEAR         |        |       |          |         |
| 3   | SHIM 8.5×26×1.5         |        |       |          |         |
| 4   | BOLT M8×16              | 35     | 3.5   | 26       |         |
| 5   | BOLT M6×16              | 9.8    | 1.0   | 87 in·lb |         |
| 6   | BOLT M6×25              | 9.8    | 1.0   | 87 in·lb |         |
| 7   | BOLT M6×35              | 9.8    | 1.0   | 87 in·lb |         |
| 8   | CLAMP 38                |        |       |          |         |
| 9   | HOSE CLAMP 21           |        |       |          |         |
| 10  | CIRCULATING WATER PIPE  |        |       |          |         |
| 11  | WATER OUTLET CONNECTION |        |       |          |         |
| 12  | INLET PIPE              | 9.8    | 1.0   | 87 in·lb |         |
| 13  | OIL COOLER OUTLET PIPE  |        |       |          |         |
| 14  | OIL COOLER INLET PIPE   |        |       |          |         |
| 15  | OUTLET PIPE             |        |       |          |         |
| 16  | O RING 15.6X1.78        |        |       |          |         |

G: Use grease suitable for oil seals and O-rings

L: Use fastening agent.

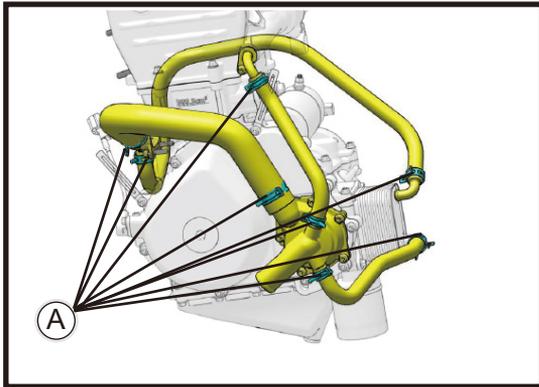
O: Apply oil.

## WATER PUMP ASSEMBLY

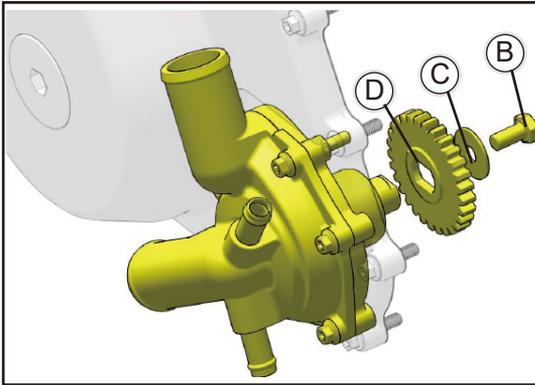
### Disassembly of water pumps

#### ⚠ WARNING

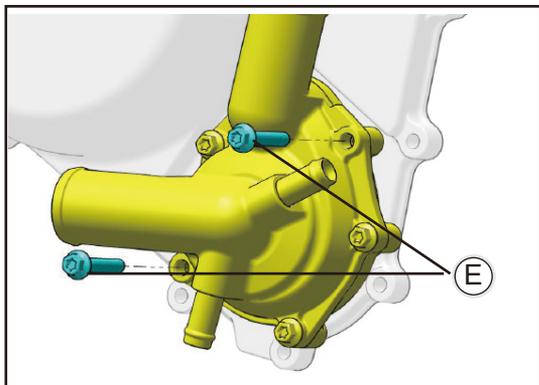
It is important to ensure that the engine has cooled before disassembly. High temperature coolant and vapors can cause serious injury.



- ◆ Remove the eight clamps **【A】** and take off the large and small circulating water pipes.

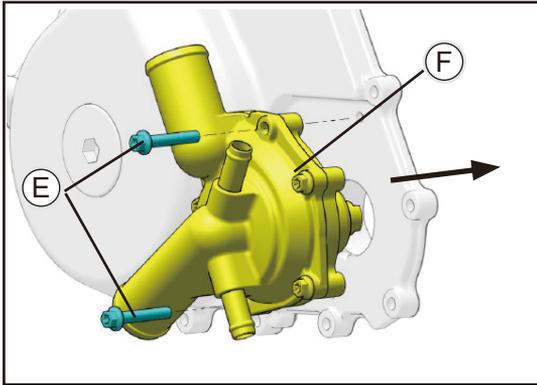


- ◆ Remove the left crankcase cover subassembly (see Crankcase Assembly chapter).



- ◆ Unscrew the bolt **【B】**, and remove the gasket **【C】** and pump gear **【D】** in turn.
- ◆ Simply remove the two water pump mounting bolts M6 x 35 **【E】** and replace the water pump assembly.

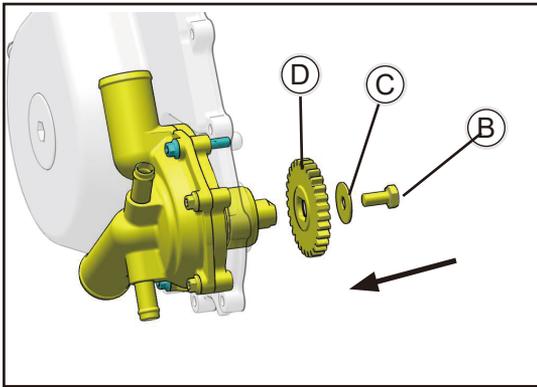
## Installation of water pumps



- ◆ Insert the replacement water pump assembly or the original water pump assembly **【A】** into the left crankcase cover and press the water pump bolts **【B】**.

**Bolt 【E】**

9.8 N·m (1 kgf·m, 87 in·lb)



- ◆ Install the water pump gear **【D】**, the combination washer **【C】**, and the bolt M8×16 **【B】** in order.

- ◆ Finally install the left crankcase cover (see Crankcase Assembly chapter).

**Bolt 【B】**

9.8 N·m (1 kgf·m, 87 in·lb)

**STARTING SYSTEM**

**EXPLODED VIEW.....3-3-2**

**SPECIAL TOOLS.....3-3-4**

**Remove the starter motor.....3-3-5**

**Install the starter motor .....3-3-5**

**Disassemble the starting overload protector and the double gear assembly .....3-3-6**

**Install starting overload protector and double gear assembly.....3-3-6**

**Disassemble the magneto rotor.....3-3-7**

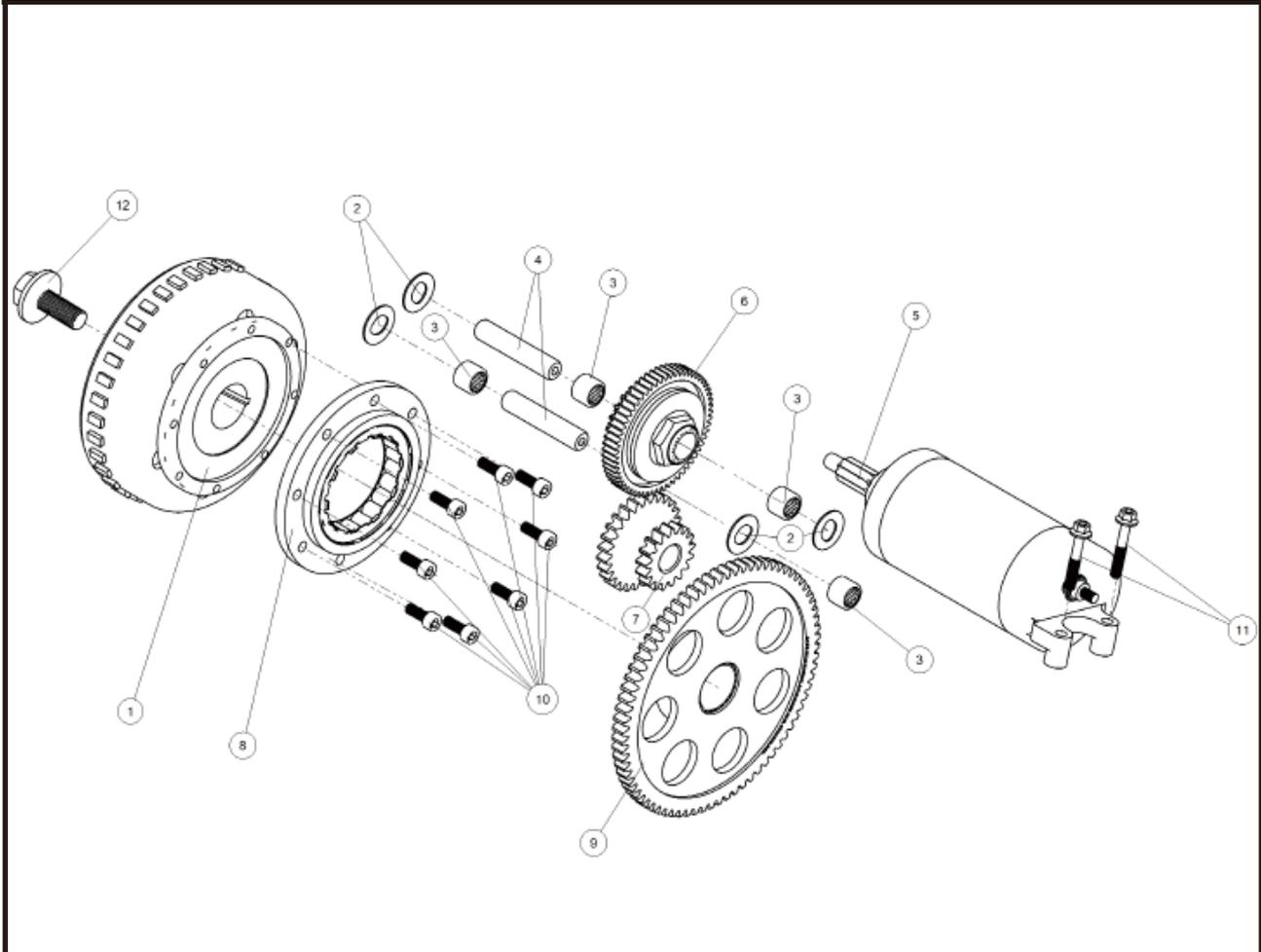
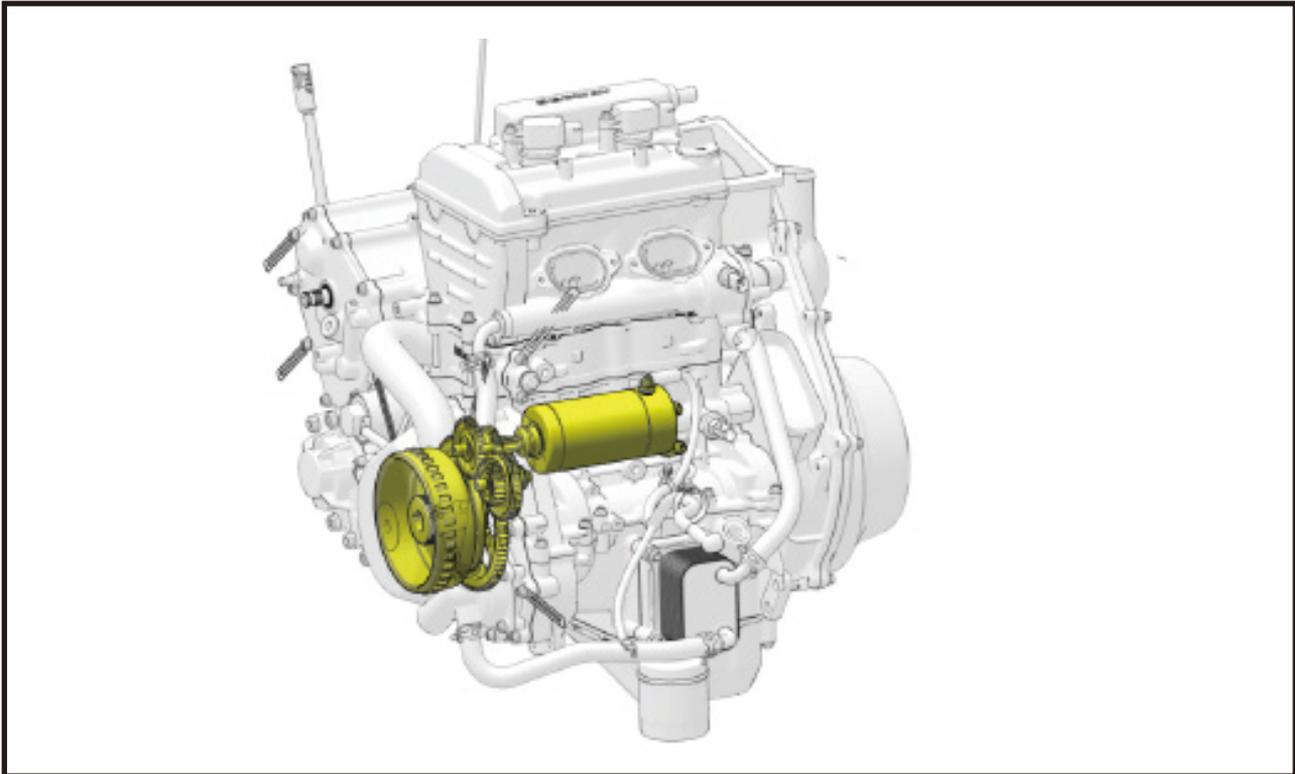
**Install the magneto rotor .....3-3-7**

**Check the starting overrunning clutch .....3-3-7**

**Disassemble the starting overrunning clutch .....3-3-8**

**Install the starting overrunning clutch.....3-3-8**

## EXPLODED VIEW



| No. | Fastener                             | Torque |       |          | Remarks |
|-----|--------------------------------------|--------|-------|----------|---------|
|     |                                      | N·m    | kgf·m | ft·lb    |         |
| 1   | MAGNETO ROTOR ASSEMBLY(680W)         |        |       |          |         |
| 2   | FLAT WASHER 12×24×1                  |        |       |          |         |
| 3   | NEEDLE ROLLER BEARING HK121612       |        |       |          |         |
| 4   | DOUBLE GEAR SHAFT                    |        |       |          |         |
| 5   | STARTER MOTOR                        |        |       |          |         |
| 6   | ACTIVATE OVERLOAD PROTECTOR          |        |       |          |         |
| 7   | STARTING DOUBLE GEAR                 |        |       |          |         |
| 8   | STARTING OVERRUNNING CLUTCH ASSEMBLY |        |       |          |         |
| 9   | STARTING DRIVEN GEAR ASSEMBLY        |        |       |          |         |
| 10  | BOLT M6×16                           | 9.8    | 1.0   | 87 in·lb | L       |
| 11  | BOLT M6×35                           | 9.8    | 1.0   | 87 in·lb |         |
| 12  | BOLT M12×1.25×30                     | 150    | 15.3  | 111      |         |

G: Use grease suitable for oil seals and O-rings

L: Use fastening agent.

O: Apply oil.

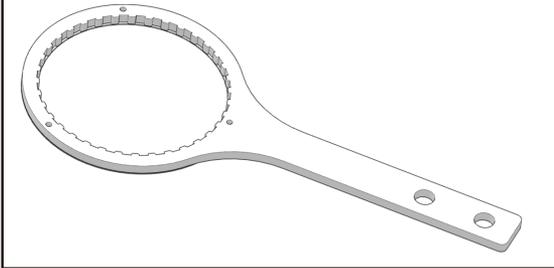
SS: Use silicone sealant.

S: Tighten in order.

R: Spare parts

## SPECIAL TOOLS

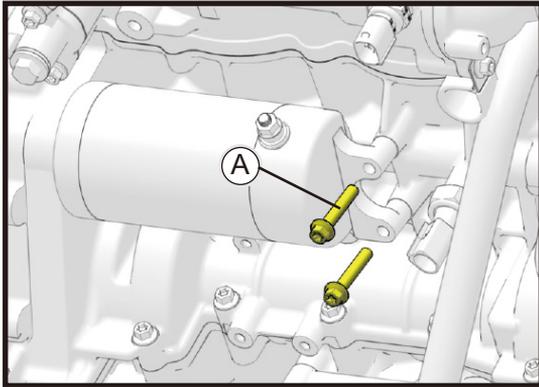
Flywheel anti-rotation wrench  
E02J23002001



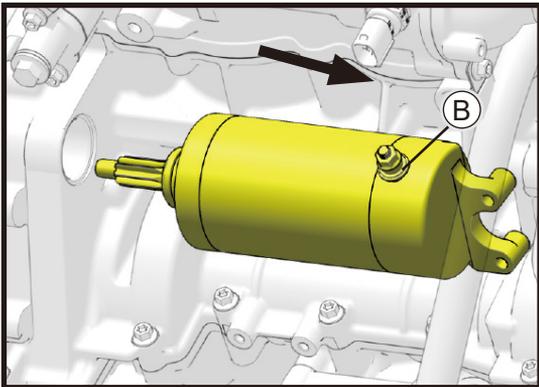
Magneto rotor puller  
E01GZ0010001



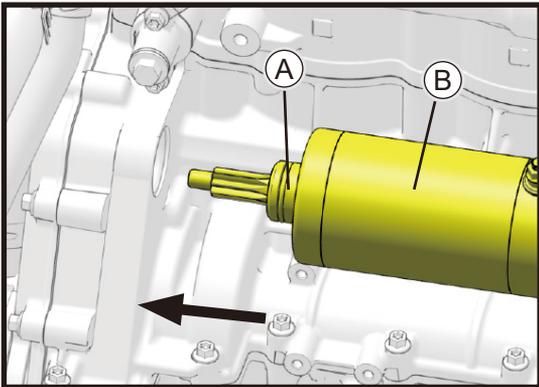
## Remove the starter motor



- ◆ Disconnect the connecting wire harness on the starter motor and remove the two bolts 【A】



- ◆ Pull out the starter motor 【B】 and remove the starter motor



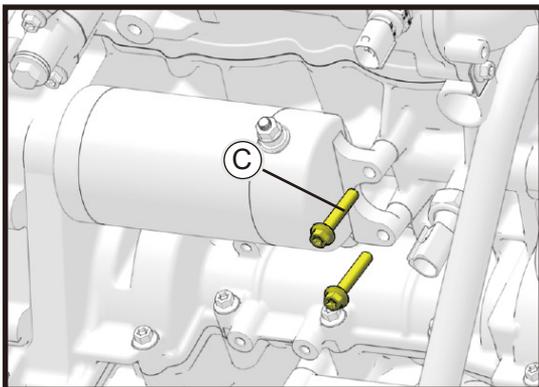
## Install the starter motor

- ◆ Check whether the O-ring 【A】 at the gear end of the starter motor is intact, and apply a proper amount of engine oil on the surface of the O-ring
- ◆ Align the starter motor 【B】 with the mounting hole and insert

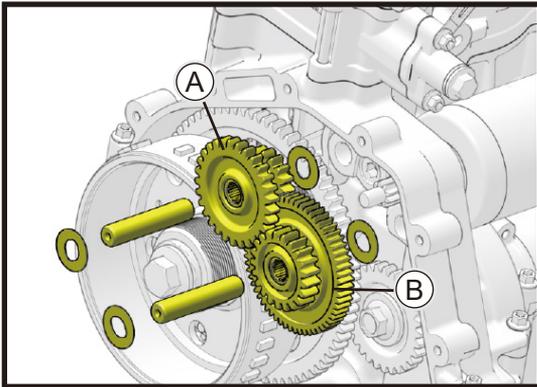
- ◆ Screw in two bolts 【C】 to fix the starter motor

Bolt 【C】

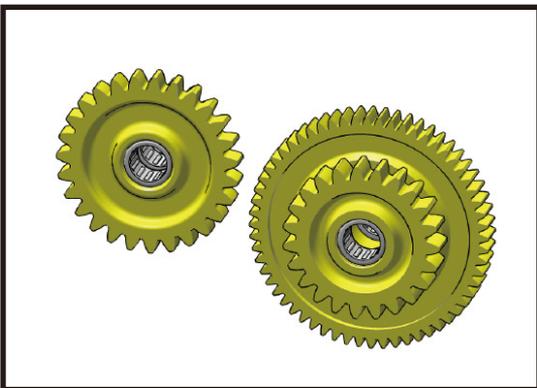
9.8 N·m (1 kgf·m, 87 in·lb)



## Disassemble the starting overload protector and the double gear assembly

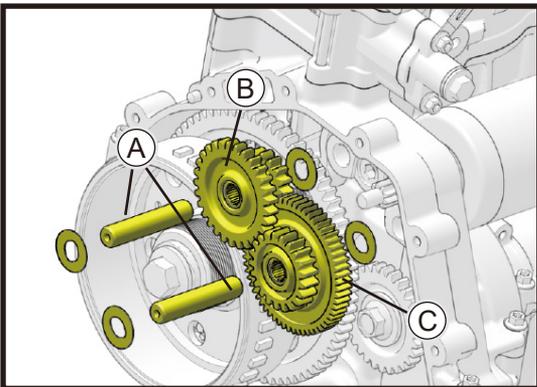


- ◆ Remove the gasket and gear shaft, take out the double gear assembly 【A】 and the starting overload protector 【B】



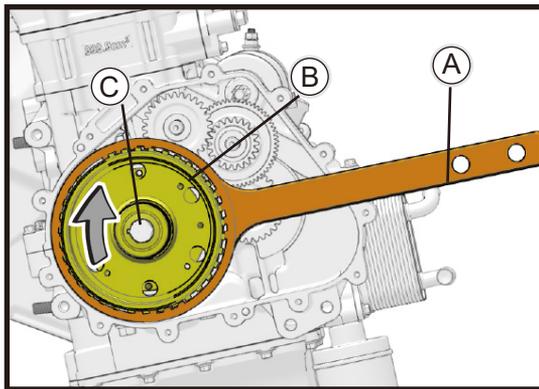
- ◆ Check whether the gear is damaged, check the clearance of the gear shaft hole, if the clearance is too large, you need to replace the gear assembly

## Install starting overload protector and double gear assembly

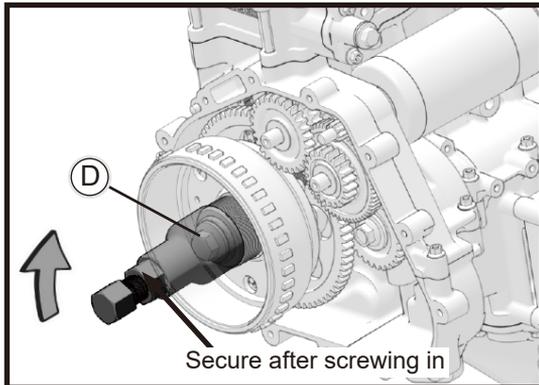


- ◆ Install the gear shaft 【A】 into the starting double gear assembly 【B】 and the starting overload protector 【C】 , and install shims at both ends
- ◆ After meshing the large gear of 【B】 with the small gear of 【C】 , install it into the upper crankcase

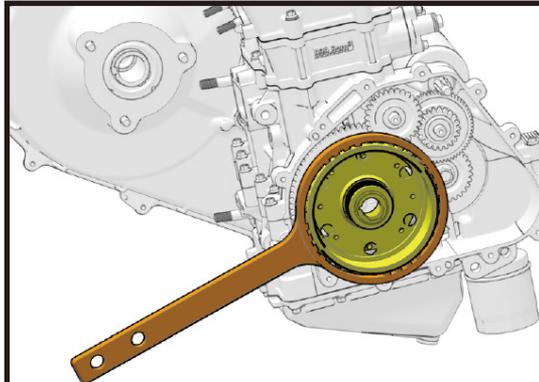
## Disassemble the magneto rotor



- ◆ Remove the left crankcase cover sub-assembly (see the chapter on crankcase assembly)
- ◆ Use the magneto rotor anti-rotation wrench **【A】** to fix the magneto rotor **【B】**, and at the same time turn the wrench clockwise to remove the bolt **【C】**



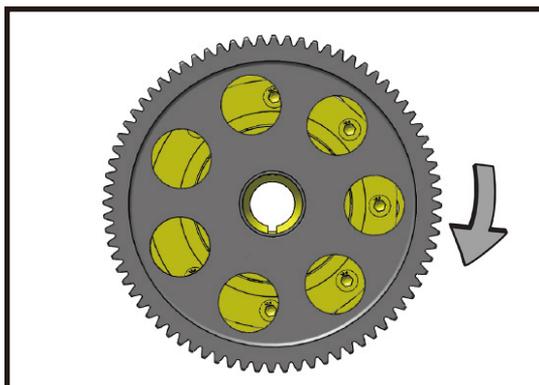
- ◆ Screw the magneto rotor puller **【D】** into the thread of the magneto rotor, fix the puller disc with a wrench, turn the puller rod with another wrench, and remove the magneto rotor



## Install the magneto rotor

- ◆ Remove impurities and oil on the crankshaft installation cone and the matching cone of the magneto rotor
- ◆ Combine the magneto rotor and the overrunning clutch and align it with the crankshaft.
- ◆ Use special tools to fix the magneto rotor and tighten the mounting bolts

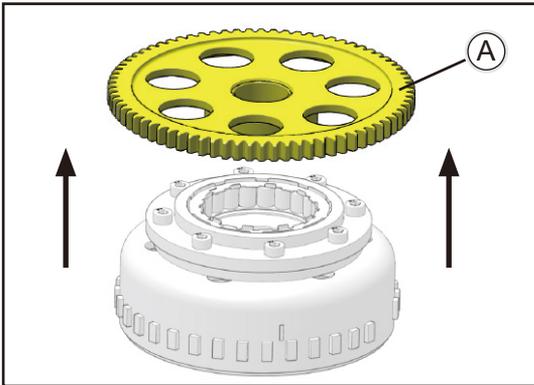
|                               |
|-------------------------------|
| Bolt                          |
| 150 N•m (15.3kgf•m, 111ft•lb) |



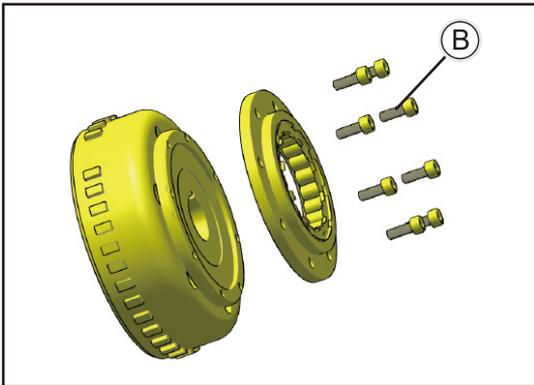
## Check the starting overrunning clutch

- ◆ Place the magneto rotor and the overrunning clutch on the worktable, and place the magneto rotor and overrunning clutch on the worktable on the gear surface, with the gear side facing up, and rotating the gear clockwise should rotate freely
- ◆ Rotate the gear counterclockwise, the gear should be locked in place immediately without slipping

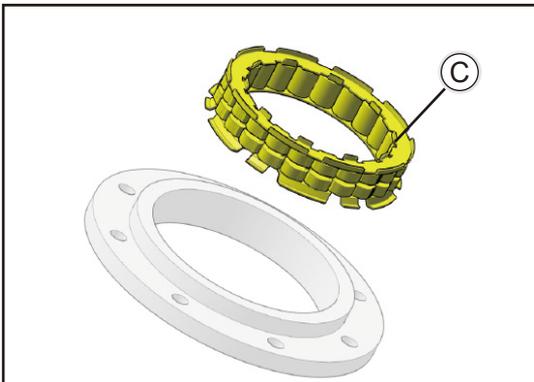
### Disassemble the starting overrunning clutch



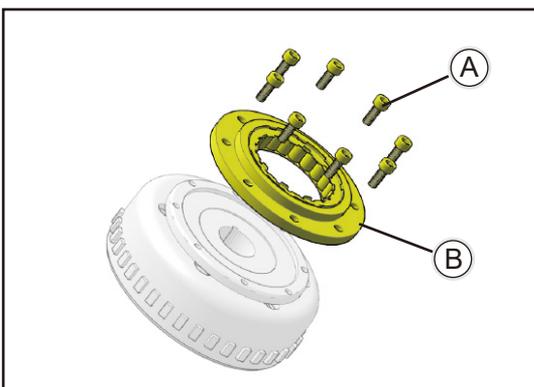
- ◆ Take out the starting driven gear assembly **【A】** from the overrunning clutch
- ◆ Check whether the bearing surface of the starting driven gear and the bushing surface are worn, check whether the bearing surface of the starting driven gear and the bushing surface are worn and damaged



- ◆ Remove 8 connecting bolts **【B】** to separate the overrunning clutch from the magneto rotor



- ◆ Separate the one-way assembly from the fixing seat, and check whether the roller surface in the one-way assembly is worn or damaged



### Install the starting overrunning clutch

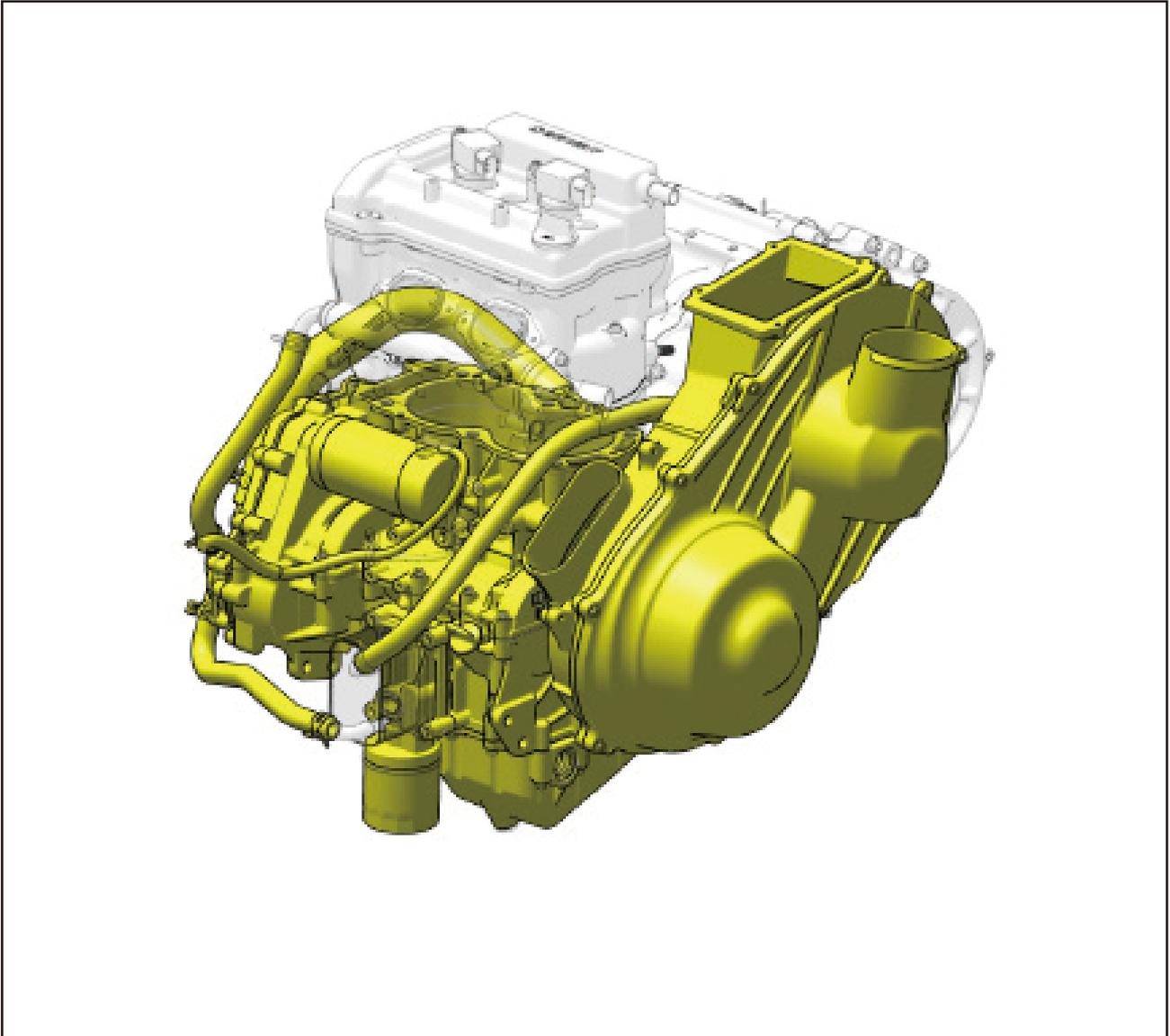
- ◆ Assemble the starting overrunning clutch **【B】**
- ◆ Apply thread fastening glue to the threaded surface of the mounting bolt **【A】**, assemble the starting overrunning clutch and the magneto rotor, and tighten the bolts

|                             |
|-----------------------------|
| Bolt <b>【A】</b>             |
| 9.8 N·m (1 kgf·m, 87 in·lb) |

## **CRANKCASE, CRANKSHAFT, BALANCE SHAFT**

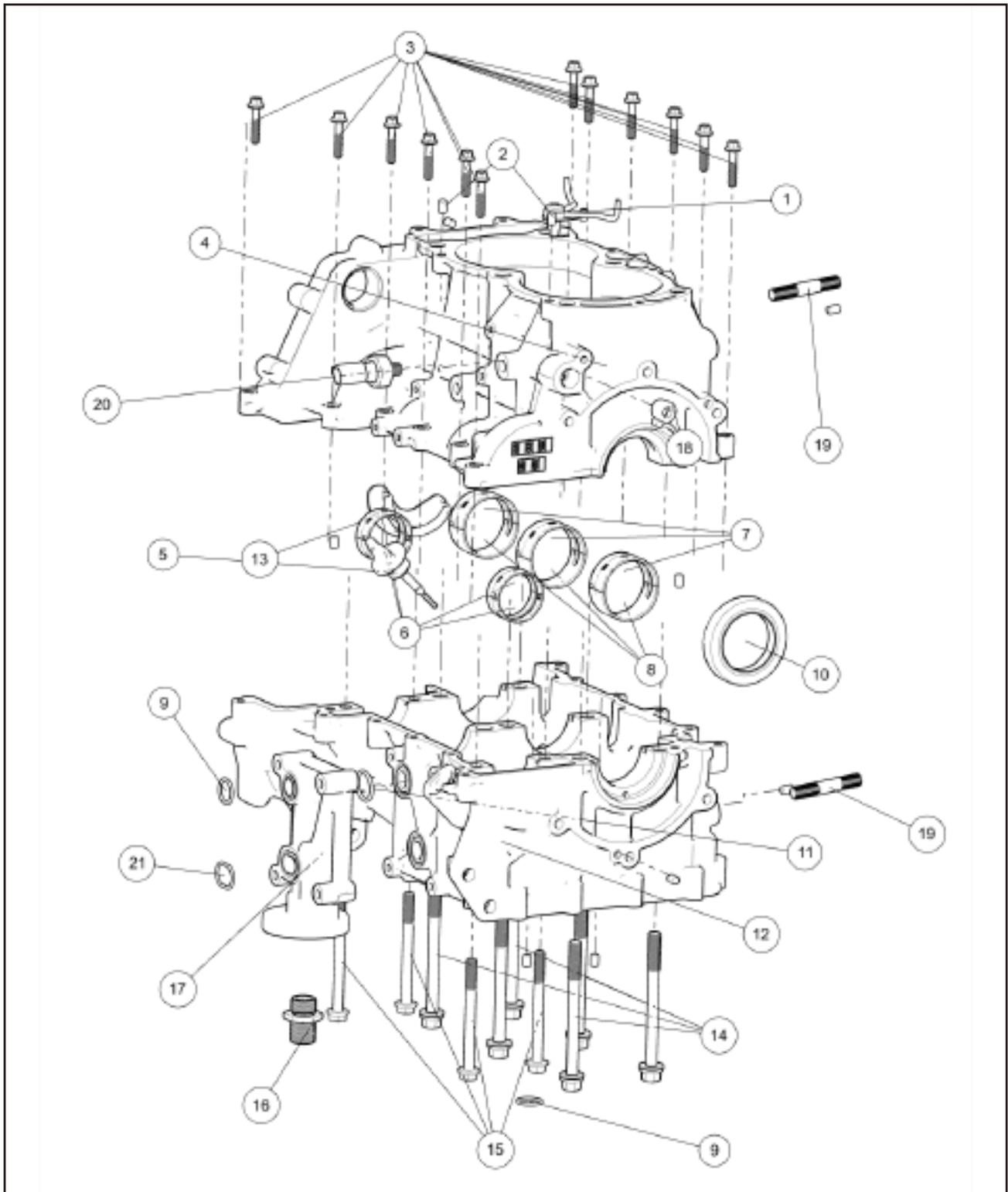
|   |               |
|---|---------------|
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| Connecting Rod Bearing Selection .....                    | <b>3-4-21</b> |

**EXPLOSIVE VIEW**



# SEGWAY AT10 CRANKCASE, CRANKSHAFT, BALANCE SHAFT

Explosive view of Up and down the case sub-assembly



# CRANKCASE, CRANKSHAFT, BALANCE SHAFT SEGWAY AT10

| No. | Fastener                        | Torque |       |          | Remarks |
|-----|---------------------------------|--------|-------|----------|---------|
|     |                                 | N·m    | kgf·m | ft·lb    |         |
| 1   | PISTON COOLING NOZZLE           | 20     | 2     | 14.8     |         |
| 2   | DOWEL PIN 6X 10                 |        |       |          |         |
| 3   | BOLT M6×30                      | 9.8    | 1.0   | 87 in·lb |         |
| 4   | Upper crankcase                 |        |       |          |         |
| 5   | Oil dipstick                    |        |       |          |         |
| 6   | BALANCE SHAFT BEARING COMPENENT |        |       |          |         |
| 7   | CRANKCASE CRANKSHAFT BUSHING    |        |       |          |         |
| 8   | Lower crankcase bearing shell   |        |       |          |         |
| 9   | O-RING 17×2                     |        |       |          |         |
| 10  | OIL SEAL 47X70X12               |        |       |          |         |
| 11  | O-RING 19×2                     |        |       |          |         |
| 12  | lower crankcase                 |        |       |          |         |
| 13  | TIMING CHAIN LIMIT PLATE        |        |       |          |         |
| 14  | BOLT M10×1.25×110               | 30     | 2.94  | 21.14    |         |
| 15  | BOLT M8×90                      | 35     | 3.5   | 26       |         |
| 16  | OIL DRAIN PLUG M14              | 35     | 3.5   | 26       |         |
| 17  | Oil filter mounting seat        |        |       |          |         |
| 18  | PLUG NPT3/8                     | 32     | 3.26  | 23.6     |         |
| 19  | DOUBLE-ENDED STUD M10X1.25X60   | 45     | 4.59  | 33.21    |         |
| 20  | OIL PRESSURE SENSOR             | 14     | 1.42  | 10.32    |         |
| 21  | Oil cooler sealing ring         |        |       |          |         |

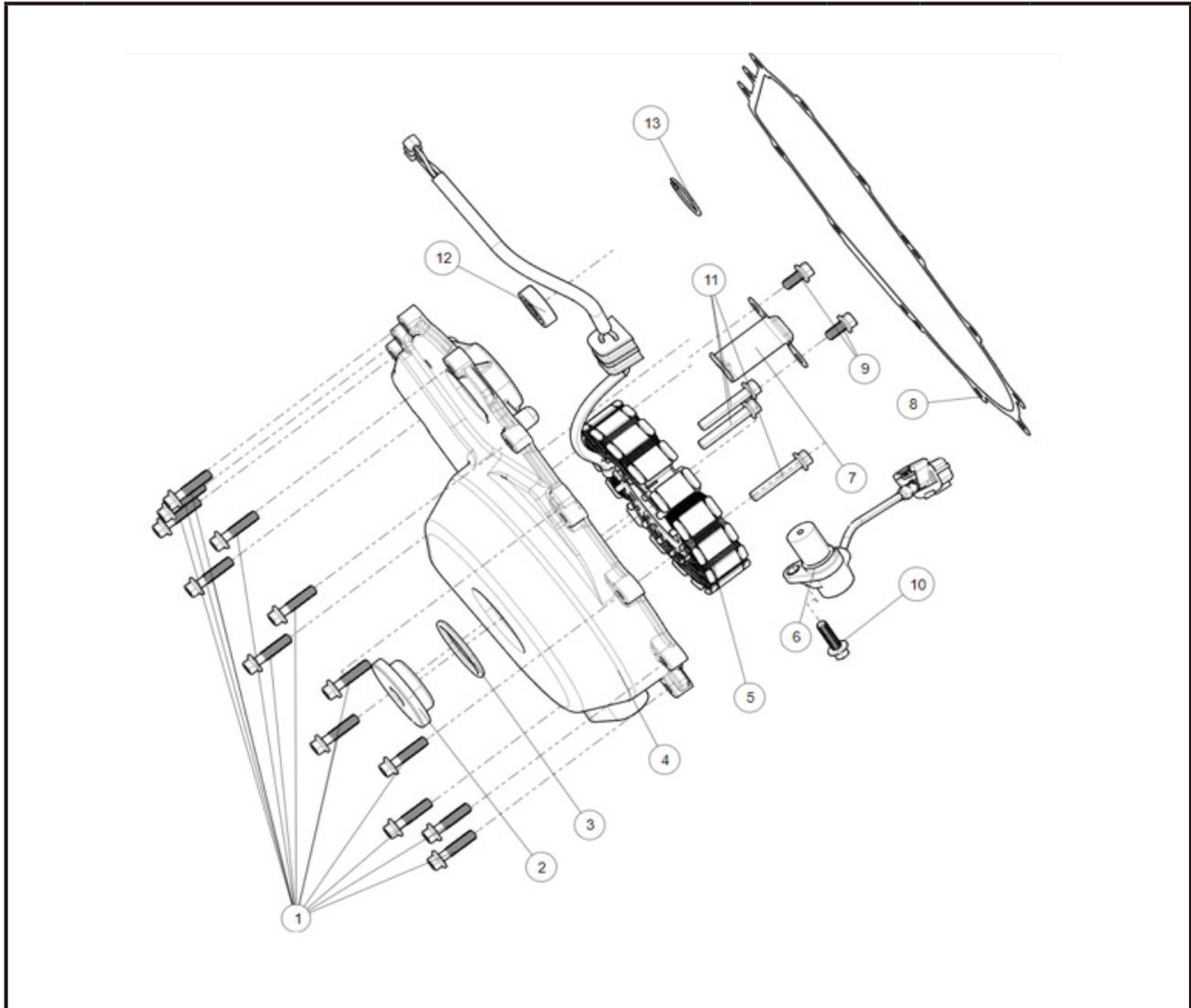
G: Use grease suitable for oil seals and O-rings

L: Use fastening agent.

O: Apply oil.

# SEGWAY AT10 CRANKCASE, CRANKSHAFT, BALANCE SHAFT

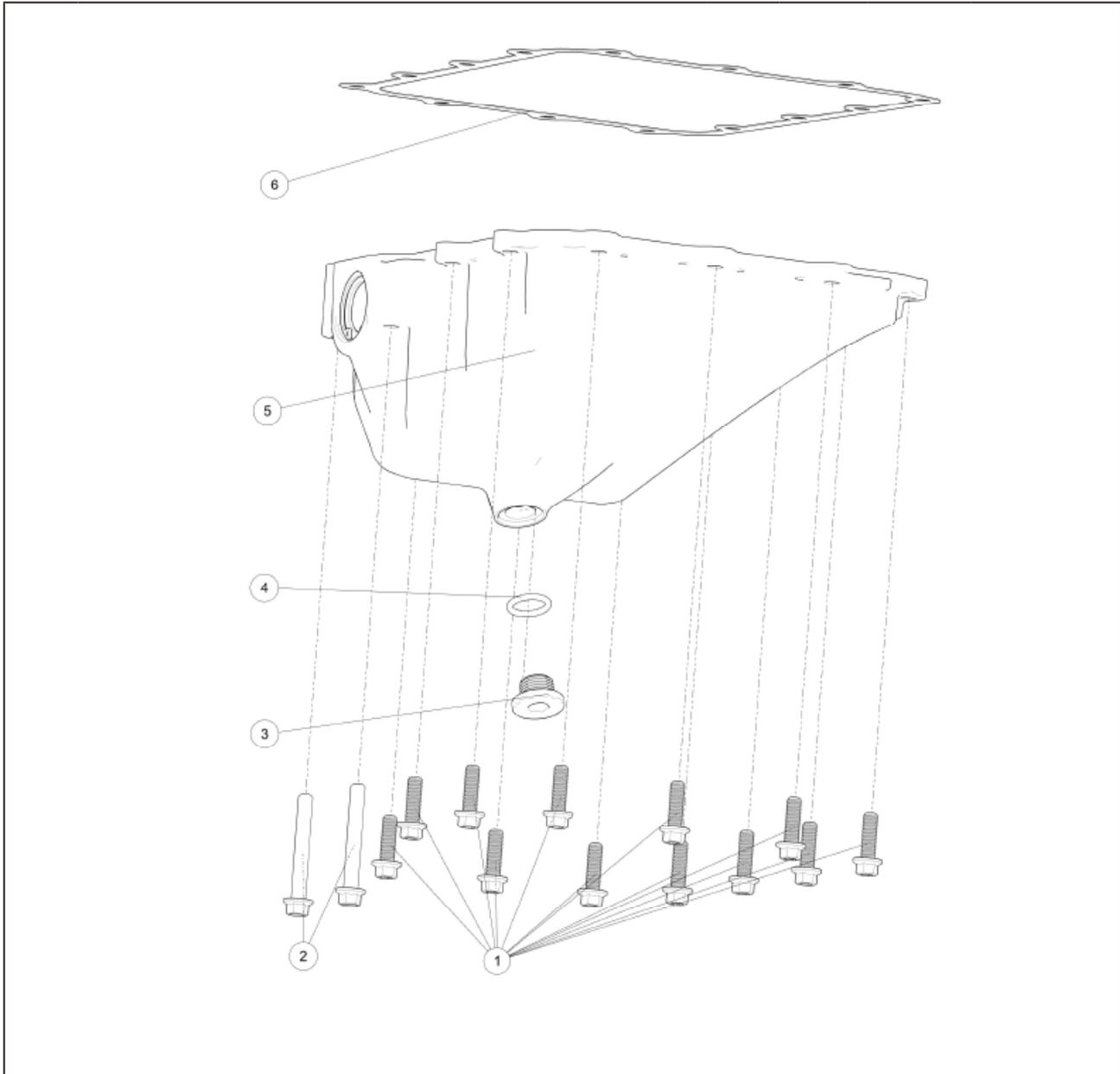
## Explosive view of Left crankcase cover sub-assembly



| No. | Fastener                      | Torque |       |          | Remarks |
|-----|-------------------------------|--------|-------|----------|---------|
|     |                               | N·m    | kgf·m | ft·lb    |         |
| 1   | BOLT M6×25                    | 9.8    | 1.0   | 87 in·lb |         |
| 2   | STATOR COVER PLUG             |        |       |          |         |
| 3   | O-RING 35×3.5                 |        |       |          |         |
| 4   | LEFT CRANKCASE COVER          |        |       |          |         |
| 5   | MAGNETO STATOR ASSEMBLY(680W) |        |       |          |         |
| 6   | CRANKSHAFT POSITION SENSOR    |        |       |          |         |
| 7   | CRIMPING PLATE                |        |       |          |         |
| 8   | LEFT CRANKCASE COVER GASKET   |        |       |          |         |
| 9   | BOLT M6×12                    | 9.8    | 1.0   | 87 in·lb |         |
| 10  | BOLT M6×35                    | 9.8    | 1.0   | 87 in·lb |         |
| 11  | BOLT M6×20                    | 9.8    | 1.0   | 87 in·lb |         |
| 12  | BEARINGS 629-2RS              |        |       |          |         |
| 13  | CIRCLIPS 26                   |        |       |          |         |

# CRANKCASE, CRANKSHAFT, BALANCE SHAFT SEGWAY AT10

## Explosive view of Oil pan sub-assembly



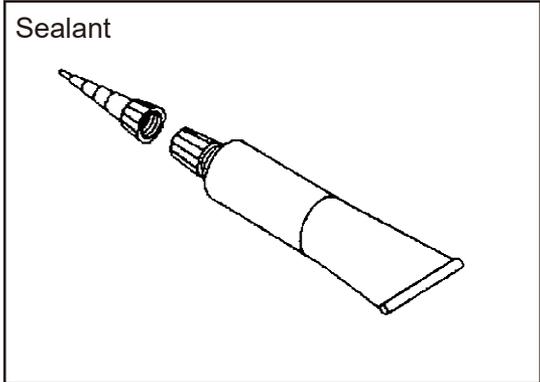
| No. | Fastener        | Torque |       |            | Remarks |
|-----|-----------------|--------|-------|------------|---------|
|     |                 | N·m    | kgf·m | ft·lb      |         |
| 1   | BOLT M6×20      | 9.8    | 1.0   | 87 in · lb |         |
| 2   | BOLT M6×45      | 9.8    | 1.0   | 87 in · lb |         |
| 3   | OIL DRAIN PLUG  | 16     | 1.6   | 11.8       |         |
| 4   | O-RING 13.8×2.5 |        |       |            |         |
| 5   | OIL PAN         |        |       |            |         |
| 6   | OIL PAN SEAL    |        |       |            |         |

**TECHNICAL PARAMETER**

| Item                       | Standard   |
|----------------------------|--|
| Crankcase:<br>spindle bore | I group: 51.007 ~ 51.012 mm (2.0082" ~ 2.0083")<br>II group: 51.012 ~ 51.017 mm (2.0083" ~ 2.0085")<br>III group: 51.018 ~ 51.026 mm (2.0086" ~ 2.0089") |
| Balance shaft bore         | I group: 41.000 ~ 41.008 mm (1.6142" ~ 1.6145")<br>II group: 41.008 ~ 41.016 mm (1.6145" ~ 1.6148")  |

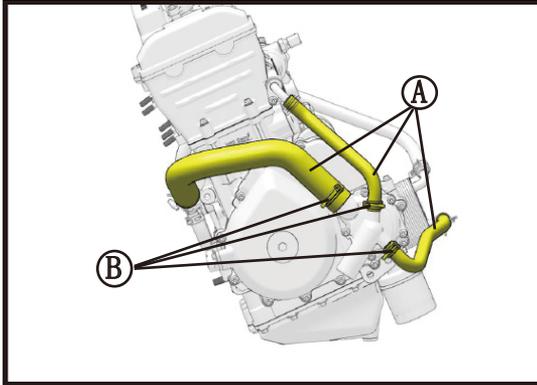
# CRANKCASE, CRANKSHAFT, BALANCE SHAFT *SEGWAY AT10*

## SPECIAL TOOLS

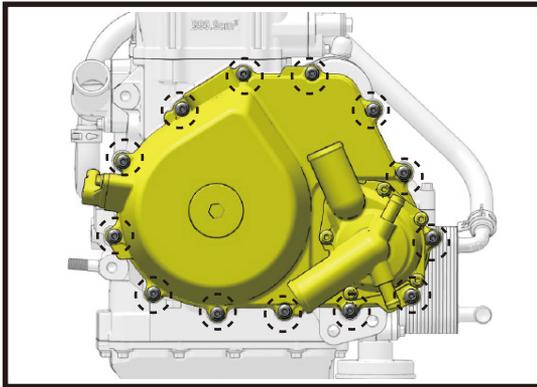


## LEFT CRANKCASE COVER

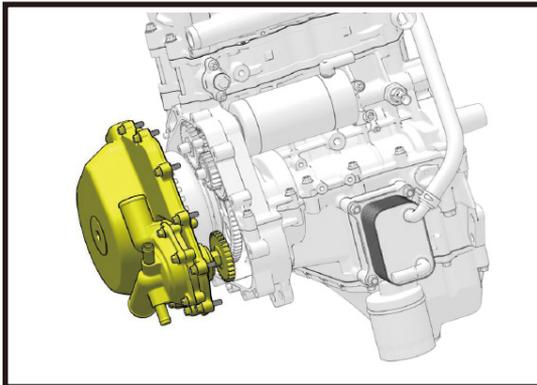
### Removing the left crankcase cover



- ◆ Loosen the three clamps 【B】 and remove the water pump hose 【A】 .



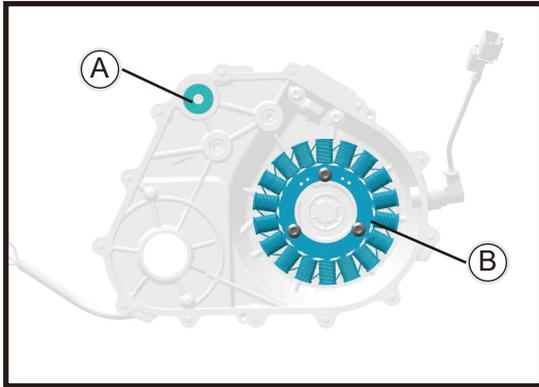
- ◆ Remove the 13 left crankcase cover bolts



- ◆ Gently pry around the left crankcase cover to remove the left crankcase cover as a whole from the crankcase.

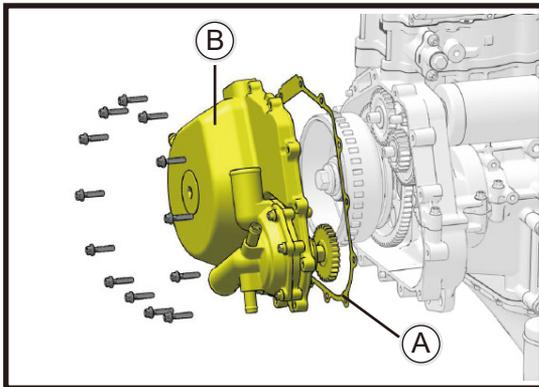
### ⚠ CAUTION

The magneto rotor is magnetic and care must be taken when installing and removing the left crankcase cover. Do not put your fingers between the left crankcase cover and the crankcase to avoid injury.



## Left crankcase cover inspection

- ◆ Check bearing 【A】 , stator coil 【B】 condition.
- ◆ If the bearings need to be replaced, remove the bearings by heating the left crankcase cover bearing holes or by using the special bearing removal tool.

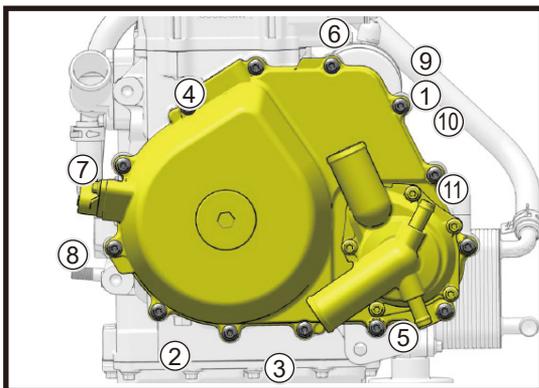


## Left Crankcase Cover Installation

- ◆ Install the left crankcase cover assembly 【B】 and the new gasket 【A】 , aligning the location of the locating pin on the crankcase, into the left crankcase cover.

### ⚠ CAUTION

The magneto rotor is magnetic and care must be taken when installing and removing the left crankcase cover. Do not put your fingers between the left crankcase cover and the crankcase to avoid injury.



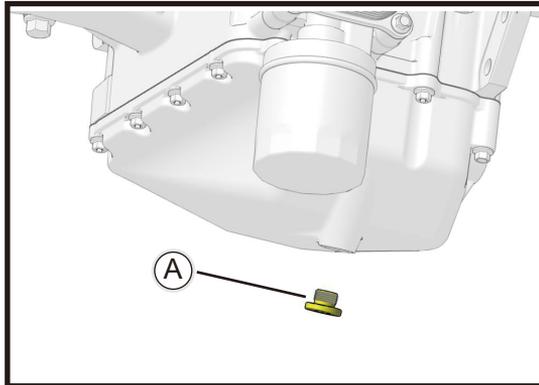
- ◆ Tighten the bolts sequentially in the installation tightening sequence.

Bolt

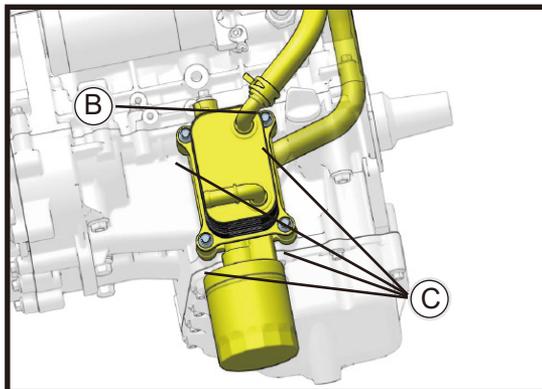
9.8 N·m (1 kgf·m, 87 in·lb)

## CRANKCASE, CRANKSHAFT, BALANCE SHAFT

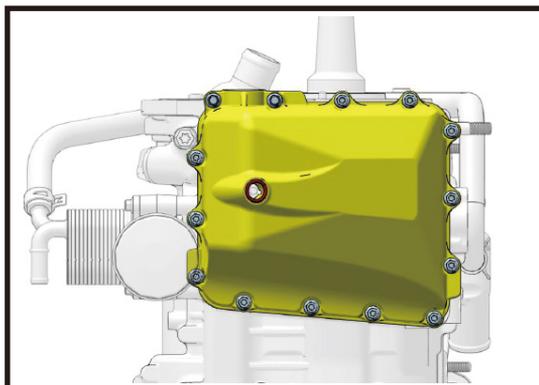
### Removing the crankcase



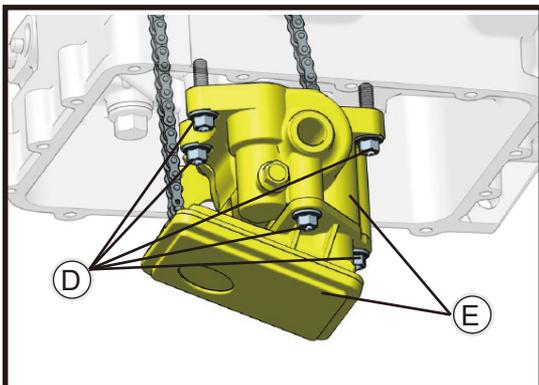
- ◆ The cylinders and gas distribution system need to be removed before removing the crankcase (see Cylinder Head Cylinder Block Subassembly section)
- ◆ Remove the oil pan drain screw **【A】** and drain the oil from the oil pan.



- ◆ Remove the hose fitting **【A】** and pull out the hose.
- ◆ Remove the 4 bolts **【B】** securing the oil filter element mounting base and attached oil cooler assembly.

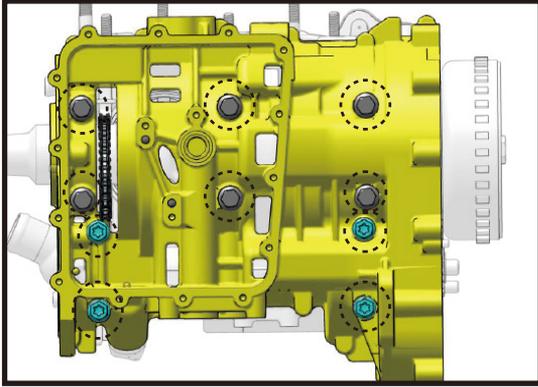


- ◆ Remove the 15 oil pan mounting bolts **【B】** and remove the oil pan from the crankcase.

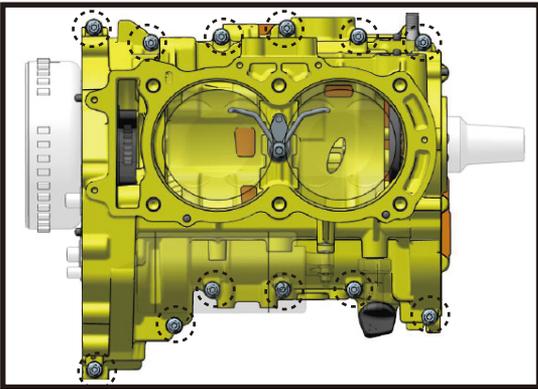


- ◆ Remove the three M6 x 25 bolts securing the oil pump and oil strainer **【E】** and the two M6 x 16 bolts securing the oil strainer **【D】**, and remove the chain and the oil pump and oil strainer.

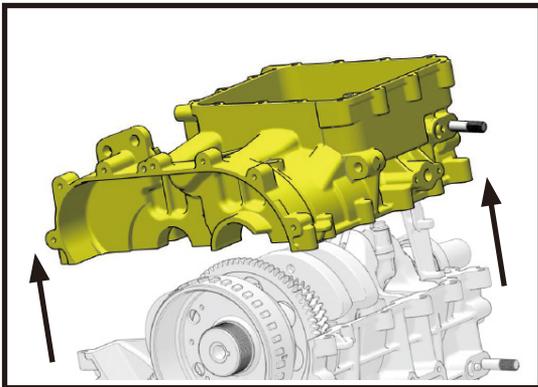
# CRANKCASE, CRANKSHAFT, BALANCE SHAFT *SEGWAY AT10*



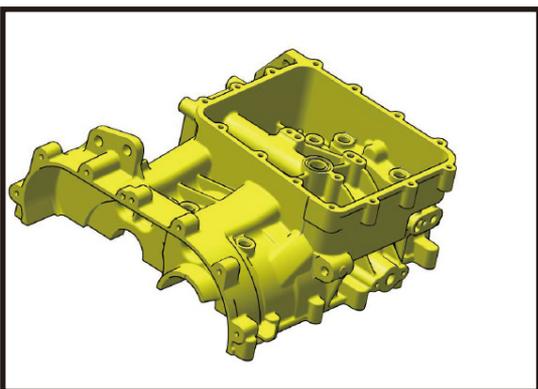
- ◆ Remove the six M10 x 110 bolts and four M8 x 90 bolts from the crankcase.



- ◆ Reverse the case and remove the 12 M6 x 30 crankcase upper and lower closing case bolts.

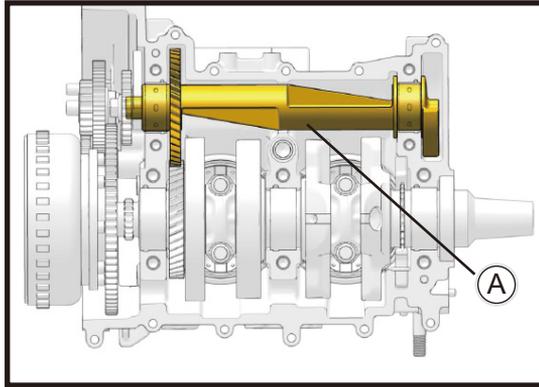


- ◆ Use a rubber mallet to gently tap around the lower crankcase and lift the lower crankcase up when it is loose.



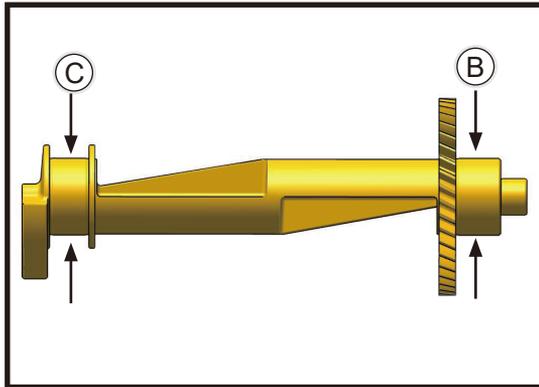
- ◆ After the lower crankcase has been successfully removed, take care to protect the main crank journal shingle mounting area from scratching the shingle mounting surface.

# SEGWAY AT10 CRANKCASE, CRANKSHAFT, BALANCE SHAFT



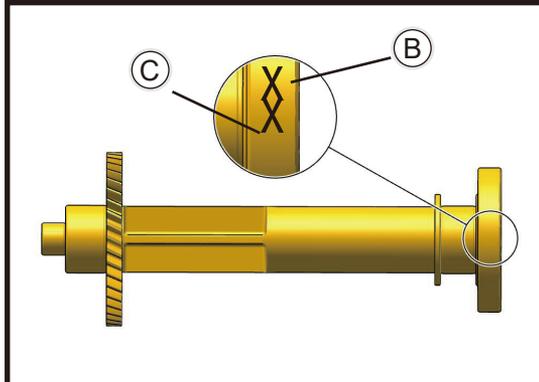
## Removing the balance shaft

- ◆ Slowly turn the balance shaft **【A】** and remove the balance shaft from the upper crankcase.



## Check the balance shaft

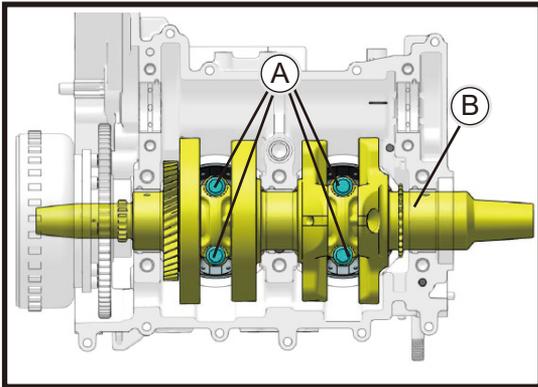
- ◆ Check the balance shaft gear for damage.
- ◆ Measure the shaft diameter **【B】** and **【C】** dimensions, choosing two directions 90° apart when measuring. If any of the journal dimensions are out of limits, it is necessary to replace the balance shaft.
- ◆ The journal size group marking is engraved on the plane of the balance block as shown in the figure, the outer measurement marking is journal **【C】** size, and the inner measurement is journal **【B】** size.
- ◆ The group marking is divided into “ I ” and “ II ”, and the dimensions are shown in the table below. If the measured dimension exceeds the limit value, it is necessary to replace the balance shaft.



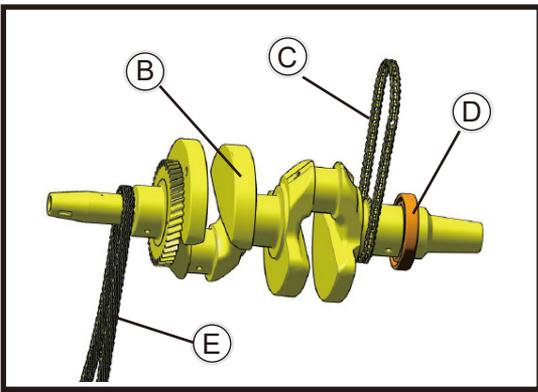
| Balance shaft journal size |   |                                       |
|----------------------------|---|---------------------------------------|
|                            | I   | II                                    |
| Standardized values:       | 37.992 ~ 37.996 mm<br>(1.4957" ~ 1.4959") | 37.996 ~ 38 mm<br>(1.4959" ~ 1.4961") |
| Limit values:              | 37.973 mm(1.495")                         |                                       |

# CRANKCASE, CRANKSHAFT, BALANCE SHAFT SEGWAY AT10

## Removing the crankshaft

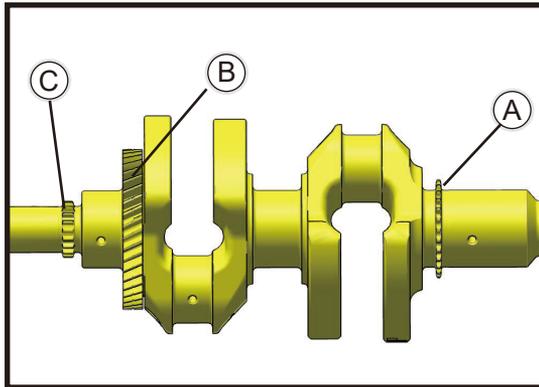


- ◆ Remove the 【A】 connecting rod bolts.
- ◆ Carefully remove the crankshaft 【B】 from the upper crankcase.
- ◆ Remove the oil pump chain assembly 【C】 , oil seal 【D】 , and timing chain assembly 【E】 from the crankshaft.

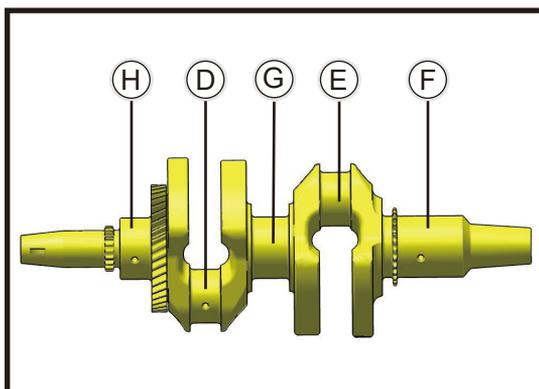
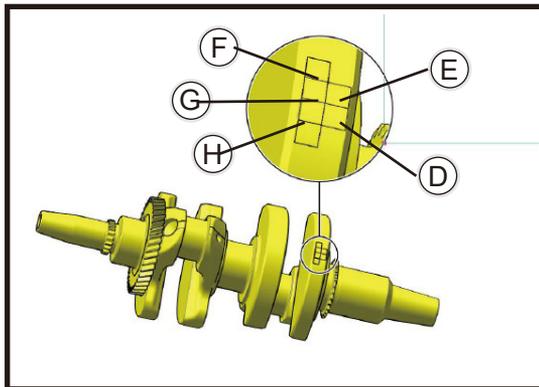


# SEGWAY AT10 CRANKCASE, CRANKSHAFT, BALANCE SHAFT

## Check the crankshaft

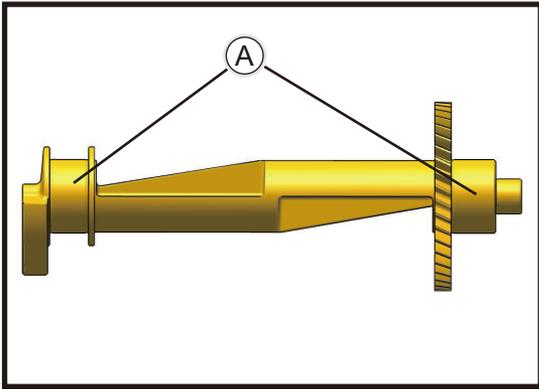


- ◆ Check the timing sprocket teeth **【A】**, balance main gear **【B】**, and oil pump sprocket teeth **【C】** on the crankshaft for damage or wear.
- ◆ If any of the teeth are damaged, the entire crankshaft component needs to be replaced.
- ◆ Measure the dimensions of each main journal and connecting rod journal, and select two directions at 90° intervals for each position when measuring. If the journal wear exceeds the limit, the crankshaft needs to be replaced.
- ◆ The balance block near the output end of the crankshaft is marked with two lines totaling six characters, one column with arabic numerals to identify the main journal groupings, and the other column with uppercase English letters to identify the connecting rod journal groupings.
- ◆ The following table lists the dimensions corresponding to each group. Check to see that the dimensions are within the specified limits; if they are outside the limits, the crankshaft component will need to be replaced.
- ◆ Crankshaft journal diameter

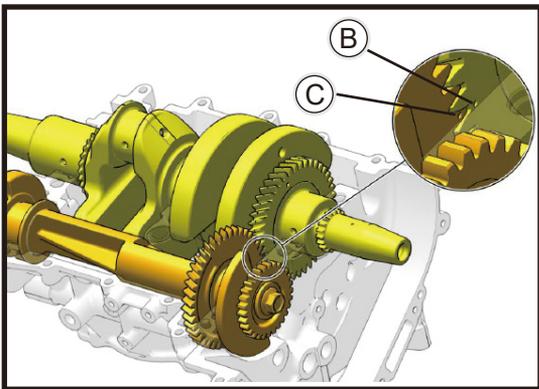


| spindle diameter              |             |   |
|-------------------------------|-------------|---|
| 1                             | Standards   | 46.98-46.987 mm<br>(1.8496-1.8499 in.)  |
|                               | limit value | 46.933 mm(1.8478 in.)                   |
| 2                             | Standards   | 46.988-46.995 mm<br>(1.8499-1.8502 in.) |
|                               | limit value | 46.947 mm(1.8483 in.)                   |
| 3                             | Standards   | 46.996-47.004 mm<br>(1.8502-1.8506 in.) |
|                               | limit value | 46.963 mm(1.8489 in.)                   |
| Connecting rod shaft diameter |             |   |
| A                             | Standards   | 40.992-40.997 mm<br>(1.6139-1.6141 in.) |
|                               | limit value | 40.963 mm(1.6127 in.)                   |
| B                             | Standards   | 40.997-41.002 mm<br>(1.6141-1.6143 in.) |
|                               | limit value | 40.968 mm(1.6129 in.)                   |
| C                             | Standards   | 41.002-41.007 mm<br>(1.6143-1.6144 in.) |
|                               | limit value | 40.965 mm(1.6128 in.)                   |

## Installation of balance shaft



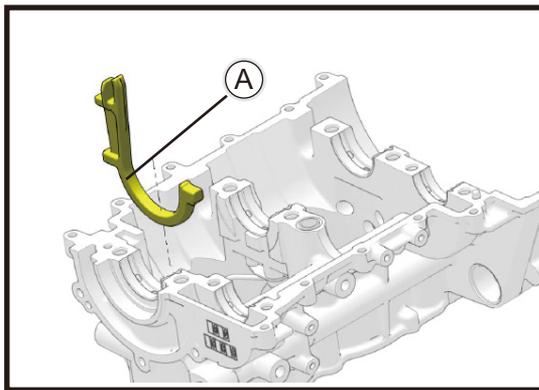
- ◆ Select the corresponding balance shaft shingles according to the grouping markings on the crankcase (see Shingle Selection section).
- ◆ Clean the surface of the balance shaft bore on the upper crankcase, and select the balance shaft shingles of the corresponding grouping to install in the bearing bore.
- ◆ Turn the crankshaft so that the mark **【C】** on the crankshaft gear faces the balance shaft side.
- ◆ Apply engine oil to the balance shaft journal **【A】**.
- ◆ Install the balance shaft and turn it at an appropriate angle to align the mark **【C】** on the balance shaft gear with the mark **【B】** on the crankshaft gear.



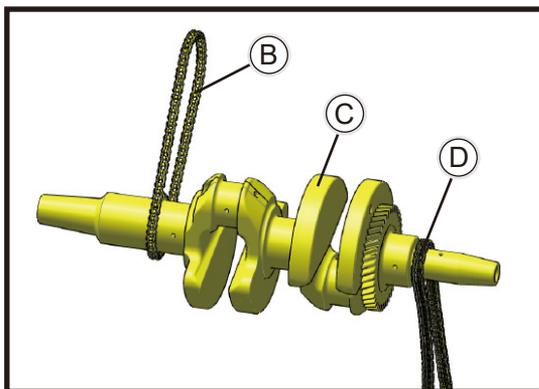
## Installation of crankshaft

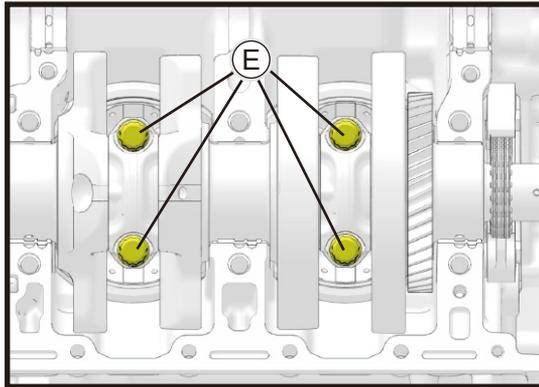
### TIPS

Whether you are using a new crankshaft or reassembling the original crankshaft, refer to the Shaft Shoe Selection section (see “Crankcase Assembly” chapter) to select the appropriate shaft shoe.



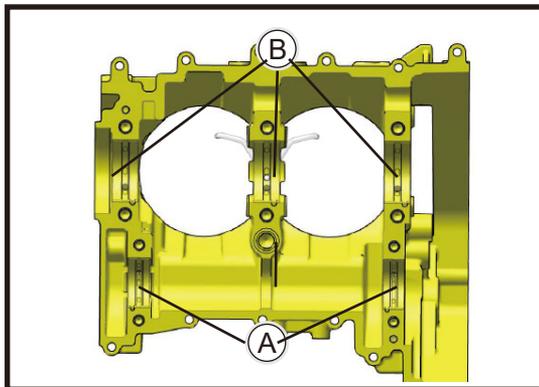
- ◆ Wipe the surfaces of the upper crankcase (main bearings), connecting rods, and connecting rod cover bearing holes clean.
- ◆ Install the main shaft tile and press the main shaft tile into the crankcase main bearing housing.
- ◆ Install the oil pump chain guard **【A】** into the upper crankcase.
- ◆ Apply engine oil to the main bearing shingles and connecting rod shingles.
- ◆ Install the timing chain **【D】** and oil pump chain **【B】** to the crankshaft **【C】** sprocket.
- ◆ Place the crankshaft and chain as a unit into the upper crankcase.
- ◆ Align the connecting rod big end with the crankshaft connecting rod journal and install the corresponding connecting rod cover.





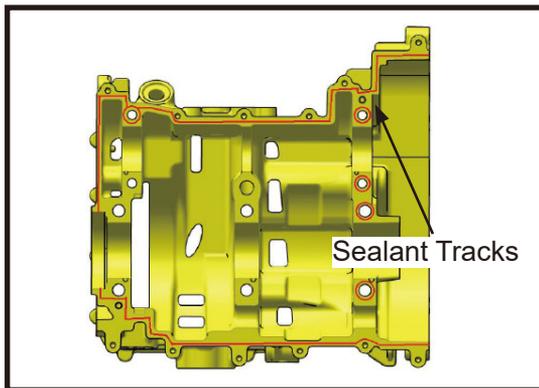
- ◆ Install the connecting rod bolts **【E】** and tighten as required.

| connecting rod bolt                           |
|---|
| initial step: 5 N·m (0.51kgf·m, 3.69 ft·lb)   |
| second step: 20 N·m (2.04 kgf·m, 14.75 ft·lb) |
| Step 3: Turn 110°                             |

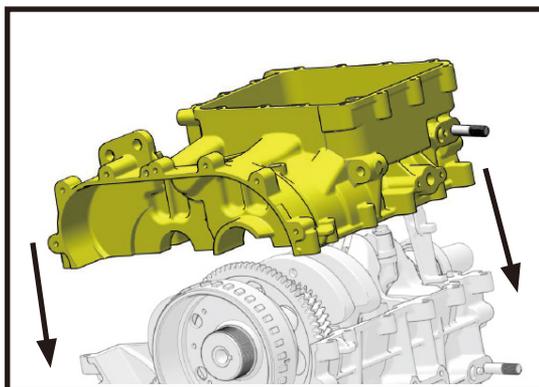


## Crankcase assembly

- ◆ Pre-assembly preparation:
  1. Remove sealant and gaskets from crankcase seal mating surfaces. Marks. Inspect surfaces for scratches or damage.
  2. Remove sealant and other contaminants from bolt holes.
  3. Install the locating pin into the locating pin hole.
  4. Check the oil passages to make sure they are clean and free of contaminants.

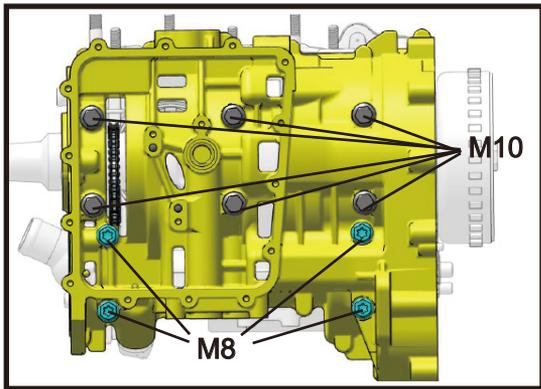


- ◆ According to the crankcase body, crankshaft and balance shaft grouping, select the appropriate axle shingles (see section on axle shingles selection).
- ◆ Install the balance shaft shingles **【A】** and main shaft shingles **【B】** into the corresponding shaft holes of the upper and lower case bodies respectively.



- ◆ Install the crankshaft and balance shaft (refer to the crankshaft connecting rod piston assembly and balance shaft assembly chapters)
- ◆ Apply sealant to the bottom sealing surface of the upper crankcase, and trace the glue line as shown in the figure. The glue line should be continuous and even.
- ◆ Align the sealing surface of the upper crankcase bottom sealing surface with the glue line as shown in the figure.
- ◆ Gently tap around the crankcase with a rubber mallet to ensure there is no gap between the upper and lower case sealing surfaces.

# CRANKCASE, CRANKSHAFT, BALANCE SHAFT SEGWAY AT10



- ◆ Screw in 4 M8 bolts and 8 M10 bolts.

## ⚠ CAUTION

Replace the crankcase bolts with new M10 bolts each time you install the crankcase.

- ◆ Tighten the bolts in place in sequence.

### Bolt M10

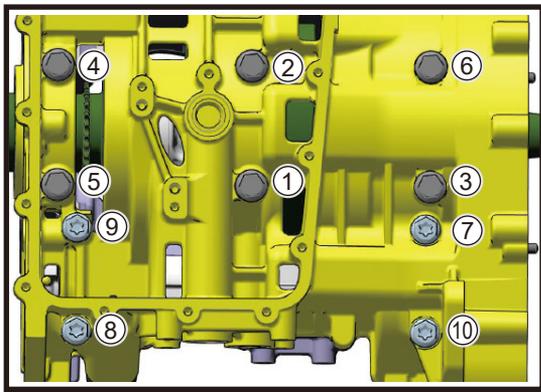
initial step: 12 N·m (1.2 kgf·m, 8.6 ft·lb)  
 second step: 28 N·m (2.8 kgf·m, 20.6 ft·lb)  
 Step 3: Turn 90°

### Bolt M8

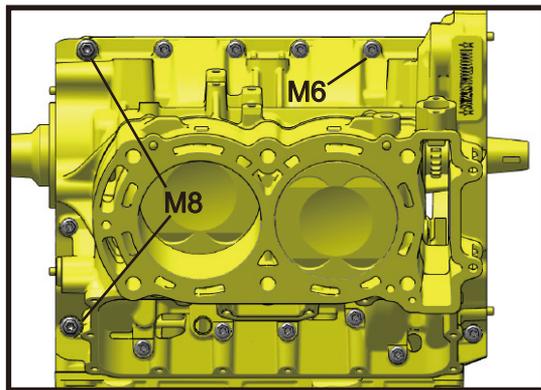
35 N·m (3.5 kgf·m, 26 ft·lb)

### Bolt M6

12 N·m (1.2 kgf·m, 106 in·lbs)



- ◆ Reverse the crankcase and screw in the 12 M6 x 30 crankcase bolts in sequence.



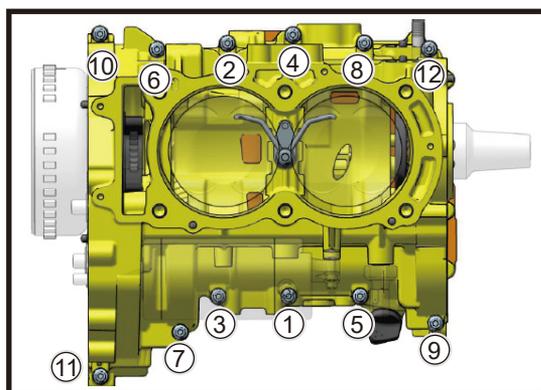
- ◆ Tighten the bolts in sequence to the specified torque.

### Bolt M8

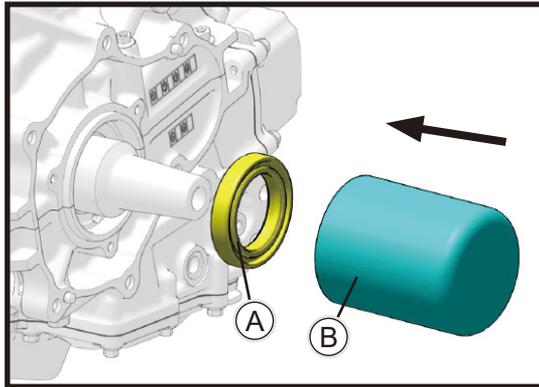
25 N·m (2.5 kgf·m, 18.4 ft·lb)

### Bolt M6

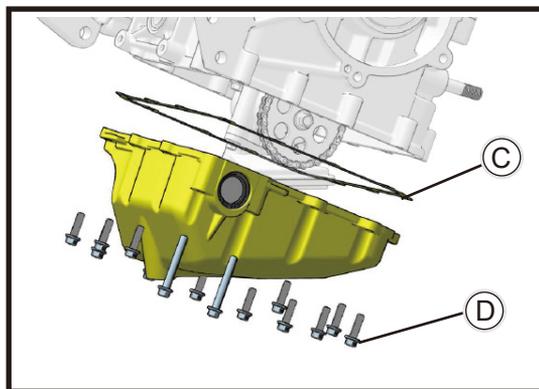
9.8 N·m (1 kgf·m, 89 in·lbs)



# SEGWAY AT10 CRANKCASE, CRANKSHAFT, BALANCE SHAFT



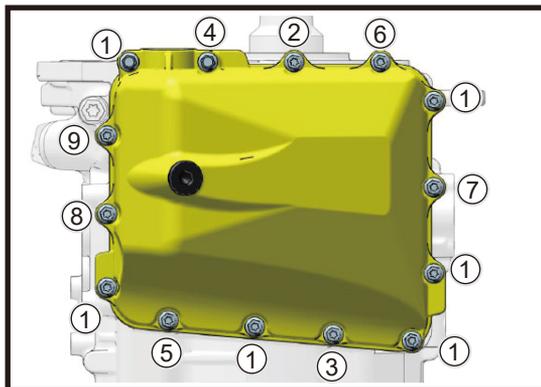
- ◆ Take a new rotary shaft oil seal **【A】** and apply an appropriate amount of engine oil to the lip and outer ring surface. With the lip side of the seal facing inwards, press it vertically into the crankcase using the crankshaft oil seal press-fit tool **【B】**.



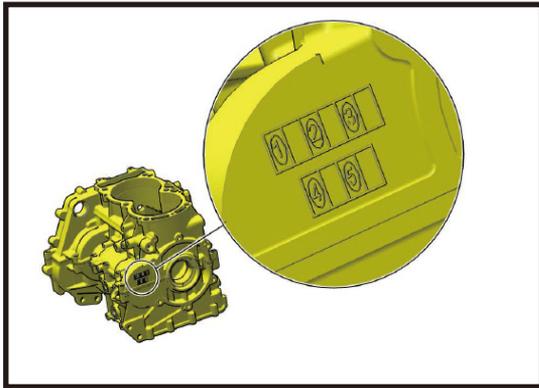
- ◆ Install the oil pump assembly (see Lubrication System section).
- ◆ Take a new oil pan gasket **【C】**, install it in the oil pan, and use a constant torque wrench to tighten the 12 M6 x 20 bolts and two M6 x 45 bolts **【D】** in sequence after pre-tightening them in sequence..

Bolt **【D】**

11 N·m (1.11225kgf·m, 97.35814 in·lbs)



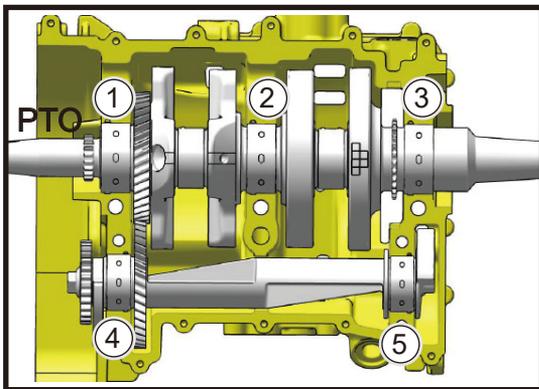
## BEARING SELECTION



### grouping mark

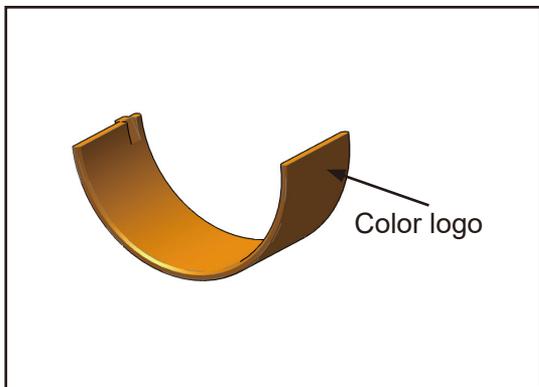
#### Crankcase grouping

- ◆ The upper and lower box crankcase have two rows of grouping marks at the output end, one row for the main shaft, serial numbers 1, 2, 3, and the other row for the balancing shaft, serial numbers 4, 5. Mark the shaft sizes with numbers, corresponding to the table below:



| Crankshaft grouping |                    |                 |
|---------------------|--------------------|-----------------|
| group               | Grouping Size      | grouping marker |
| I                   | 51.007 ~ 51.012 mm | 1               |
| II                  | 51.012 ~ 51.017 mm | 2               |
| III                 | 51.018 ~ 51.026 mm | 3               |

| Balance shaft grouping |                    |                 |
|------------------------|--------------------|-----------------|
| group                  | Grouping Size      | grouping marker |
| I                      | 41.000 ~ 41.008 mm | 1               |
| II                     | 41.008 ~ 41.016 mm | 2               |



#### Group of bearings

The bearings are grouped according to different thicknesses and the grouping markings are located on the outside of the bearings.

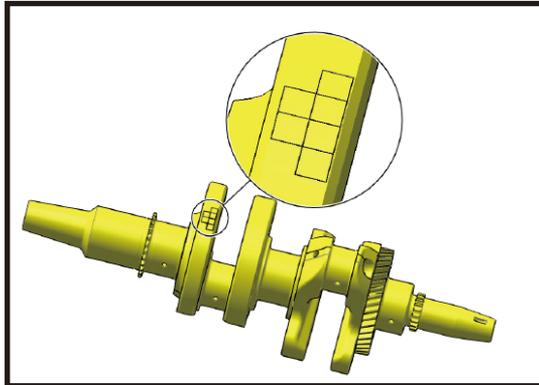
Crankshaft bearings are available in 4 thicknesses and are grouped in blue, white, red and black.

Balance shaft bearings are available in 3 thicknesses, grouped in blue, red and black.

Connecting rod bearings are available in 4 thicknesses, grouped in red, white, blue and green. Crankshaft bearing selection

# SEGWAY AT10 CRANKCASE, CRANKSHAFT, BALANCE SHAFT

- ◆ Select the appropriate crankshaft shingles according to the grouping marks on the crankcase and crankshaft.



| Crankshaft bearing sheet   |                  |       |       |
|----------------------------|------------------|-------|-------|
| Crankcase-crankshaft group | Crankshaft group |       |       |
|                            | 1                | 2     | 3     |
|                            | color selection  |       |       |
| 1                          | red              | white | blue  |
| 2                          | red              | white | blue  |
| 3                          | black            | red   | white |

- ◆ Example

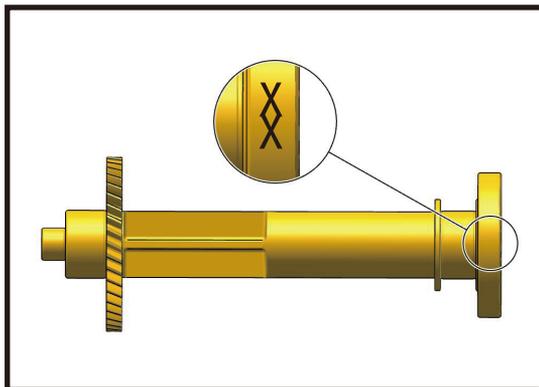
Crankcase Grouping 1-2, 2-2, 3-2, 4-2, 5-1, 6-1

Crankshaft grouping 2-3-3-2-A-A

According to the above table, the selected crankshaft colors are: white, blue,Blue, White.

## Balance Shaft Bearing Selection

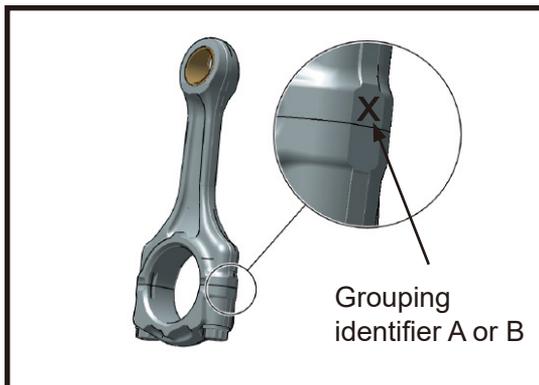
- ◆ Select the appropriate balance shaft bearing according to the grouping marks on the crankcase and balance shaft.



| Balance Shaft bearing sheet   |                     |      |
|-------------------------------|---------------------|------|
| Crankcase-balance shaft group | Balance shaft group |      |
|                               | I                   | II   |
|                               | Color selection     |      |
| 1                             | red                 | blue |
| 2                             | black               | red  |

## Connecting Rod Bearing Selection

- ◆ Select the proper connecting rod bearing according to the grouping marks on the connecting rods and crankshaft.



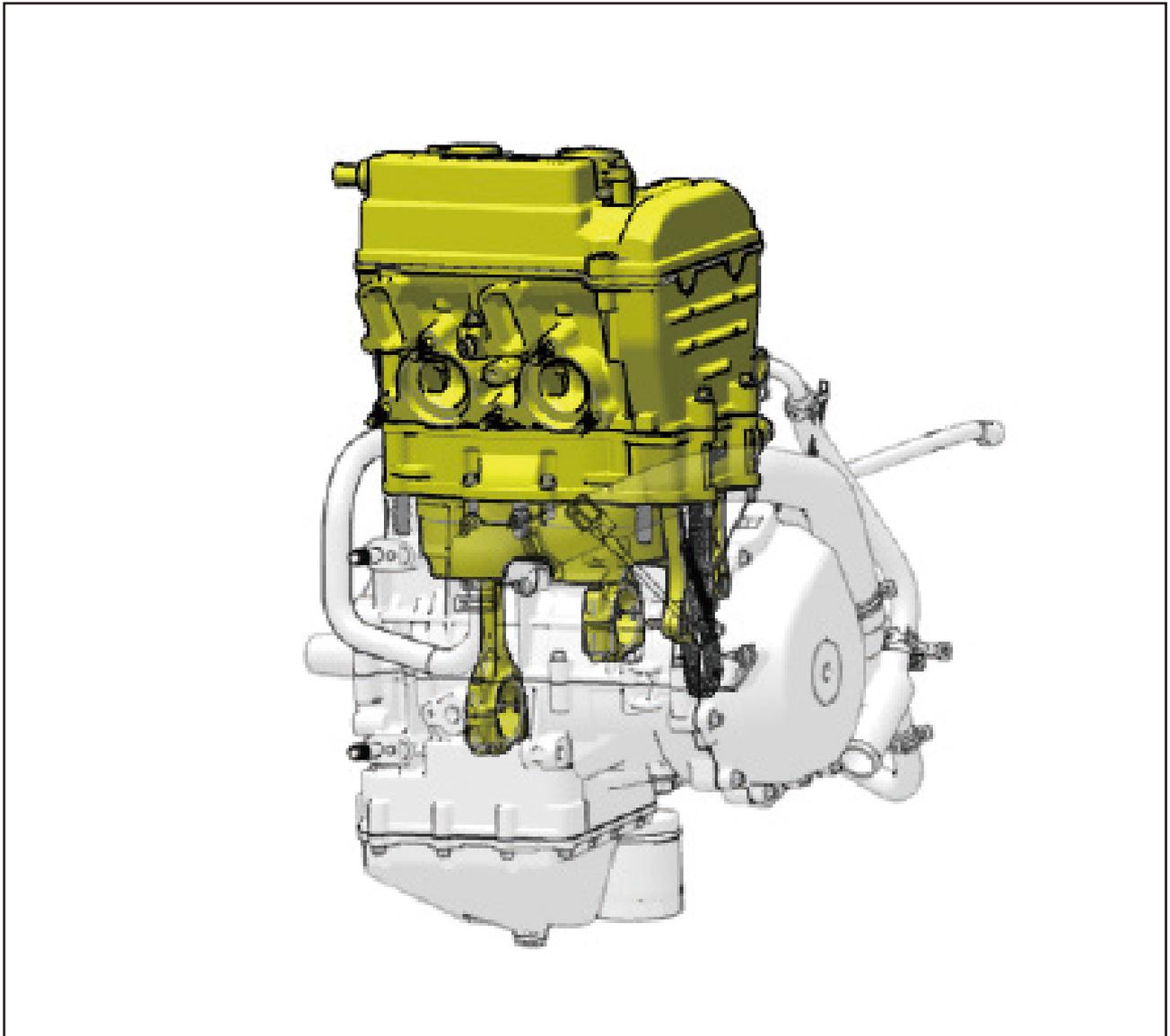
| Connecting Rod Bearing sheet |                  |       |       |
|------------------------------|------------------|-------|-------|
| Connecting Rod Group         | Crankshaft group |       |       |
|                              | A                | B     | C     |
|                              | Color selection  |       |       |
| A                            | blue             | white | green |
| B                            | red              | blue  | white |

**CYLINDER HEAD, CYLINDER, PISTON**

|  |               |
|--|---------------|
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|  |               |
|--|---------------|
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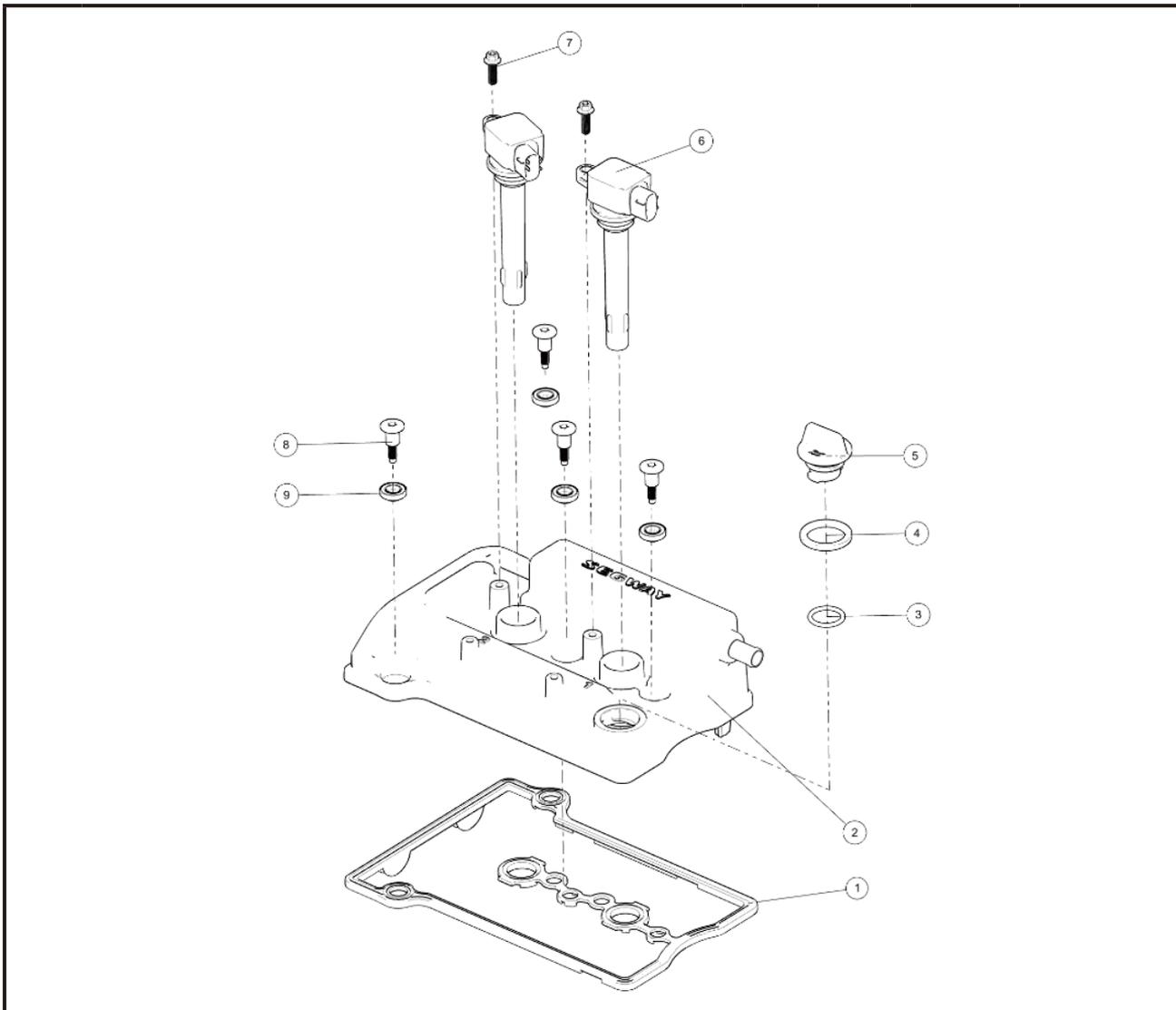
EXPLODED VIEW



# CYLINDER HEAD, CYLINDER, PISTON

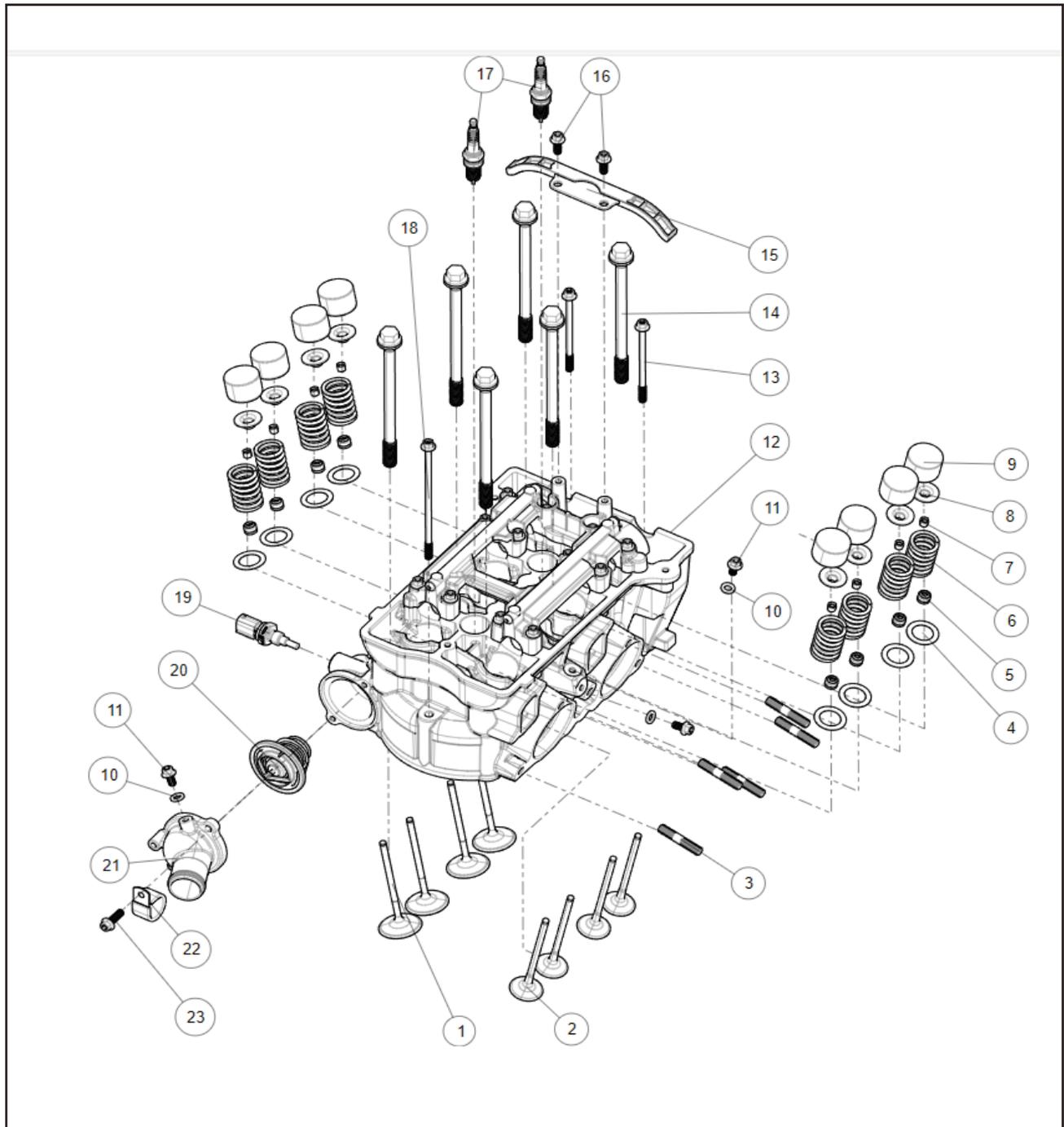
SEGWAY AT10

## Explosive view of Cylinder head cover sub-assembly



| No. | Fastener                         | Torque |       |          | Remarks |
|-----|----------------------------------|--------|-------|----------|---------|
|     |                                  | N·m    | kgf·m | ft·lb    |         |
| 1   | VALVE COVER GASKET               |        |       |          |         |
| 2   | CYLINDER HEAD COVER SUB ASSEMBLY |        |       |          |         |
| 3   | O-RING 22×3                      |        |       |          |         |
| 4   | OIL FILL CAP SEAL                |        |       |          |         |
| 5   | OIL FILL CAP                     |        |       |          |         |
| 6   | IGNITION COIL                    |        |       |          |         |
| 7   | BOLT M6×20                       | 9.8    | 1.0   | 87 in·lb |         |
| 8   | VALVE COVER BOLT                 | 9.8    | 9.8   | 87 in·lb |         |
| 9   | RUBBER ISLOATOR                  |        |       |          |         |

## Explosive view of Cylinder head sub-assembly



# CYLINDER HEAD, CYLINDER, PISTON

SEGWAY AT10

| No. | Fastener                   | Torque |       |          | Remarks |
|-----|----------------------------|--------|-------|----------|---------|
|     |                            | N·m    | kgf·m | ft·lb    |         |
| 1   | EXHAUST VALVE              |        |       |          |         |
| 2   | INTAKE VALVE               |        |       |          |         |
| 3   | STUD M8×43                 |        |       |          |         |
| 4   | VALVE SPRING SEAT          |        |       |          |         |
| 5   | VALVE STEM SEAL            |        |       |          |         |
| 6   | VALVE SPRING               |        |       |          |         |
| 7   | VALVE KEEPER               |        |       |          |         |
| 8   | VALVE RETAINER             |        |       |          |         |
| 9   | VALVE TAPPET               |        |       |          |         |
| 10  | GASKET 6                   |        |       |          |         |
| 11  | BOLT M6×12                 | 9.8    | 9.8   | 87 in·lb |         |
| 12  | CYLINDER HEAD ASSY         | 9.8    | 9.8   | 87 in·lb |         |
| 13  | BOLT M6×90                 |        |       |          |         |
| 14  | CYLINDER HEAD BOLT         |        |       |          | S       |
| 15  | FIXED CAM CHAIN GUIDE      |        |       |          |         |
| 16  | BOLT M6×16                 | 9.8    | 9.8   | 87 in·lb |         |
| 17  | SPARK PLUG(TORCH)          | 11     | 1.1   | 97in·lb  |         |
| 18  | BOLT M6×135                | 9.8    | 9.8   | 87 in·lb |         |
| 19  | WATER TEMPERATURE SENSOR   |        |       |          |         |
| 20  | THERMOSTAT ASSEMBLY(74-87) |        |       |          |         |
| 21  | THERMOSTAT COVER           |        |       |          |         |
| 22  | HOSE CLAMP                 |        |       |          |         |
| 23  | BOLT M6×20                 | 9.8    | 9.8   | 87 in·lb |         |

G: Use grease suitable for oil seals and O-rings

L: Use fastening agent.

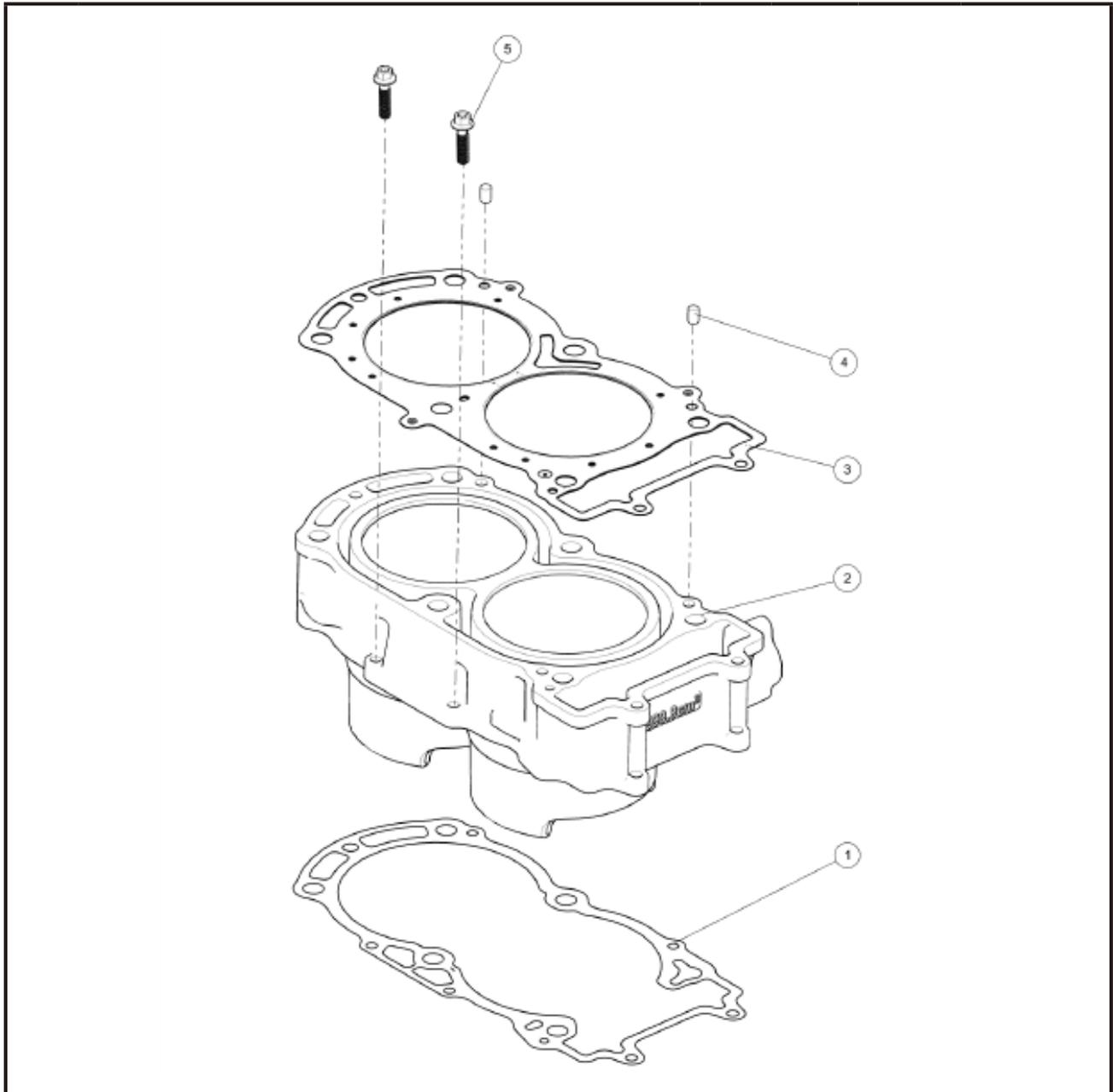
O: Apply oil.

SS: Use silicone sealant.

S: Tighten in order.

R: Spare parts

## Explosive view of Cylinder sub-assembly

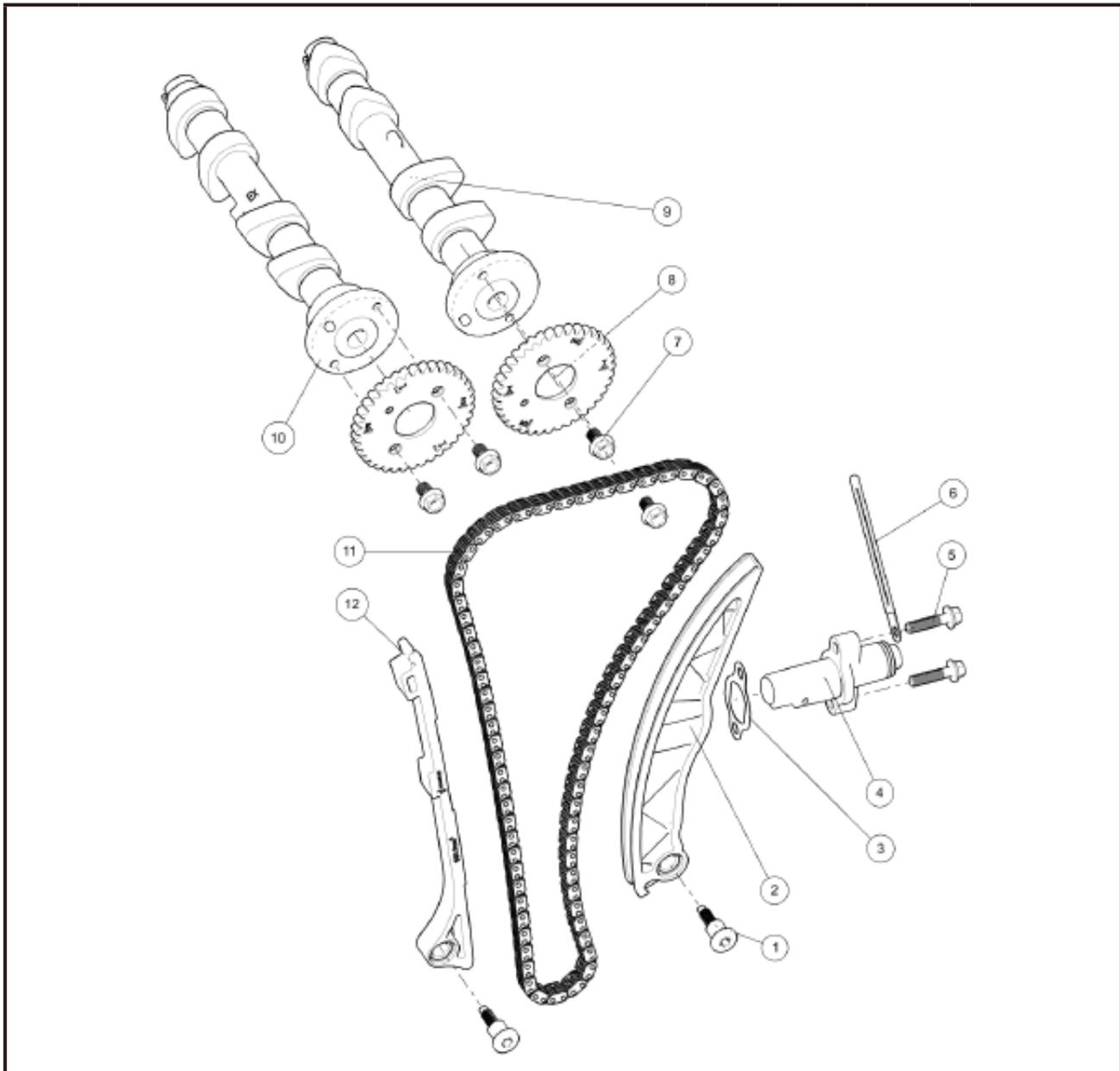


| No. | Fastener             | Torque |       |          | Remarks |
|-----|----------------------|--------|-------|----------|---------|
|     |                      | N·m    | kgf·m | ft·lb    |         |
| 1   | CYLINDER GASKET      |        |       |          |         |
| 2   | CYLINDER BLOCK       |        |       |          |         |
| 3   | CYLINDER HEAD GASKET |        |       |          |         |
| 4   | DOWEL PIN 6X 10      |        |       |          |         |
| 5   | BOLT M6×25           | 9.8    | 1.0   | 87 in·lb |         |

# CYLINDER HEAD, CYLINDER, PISTON

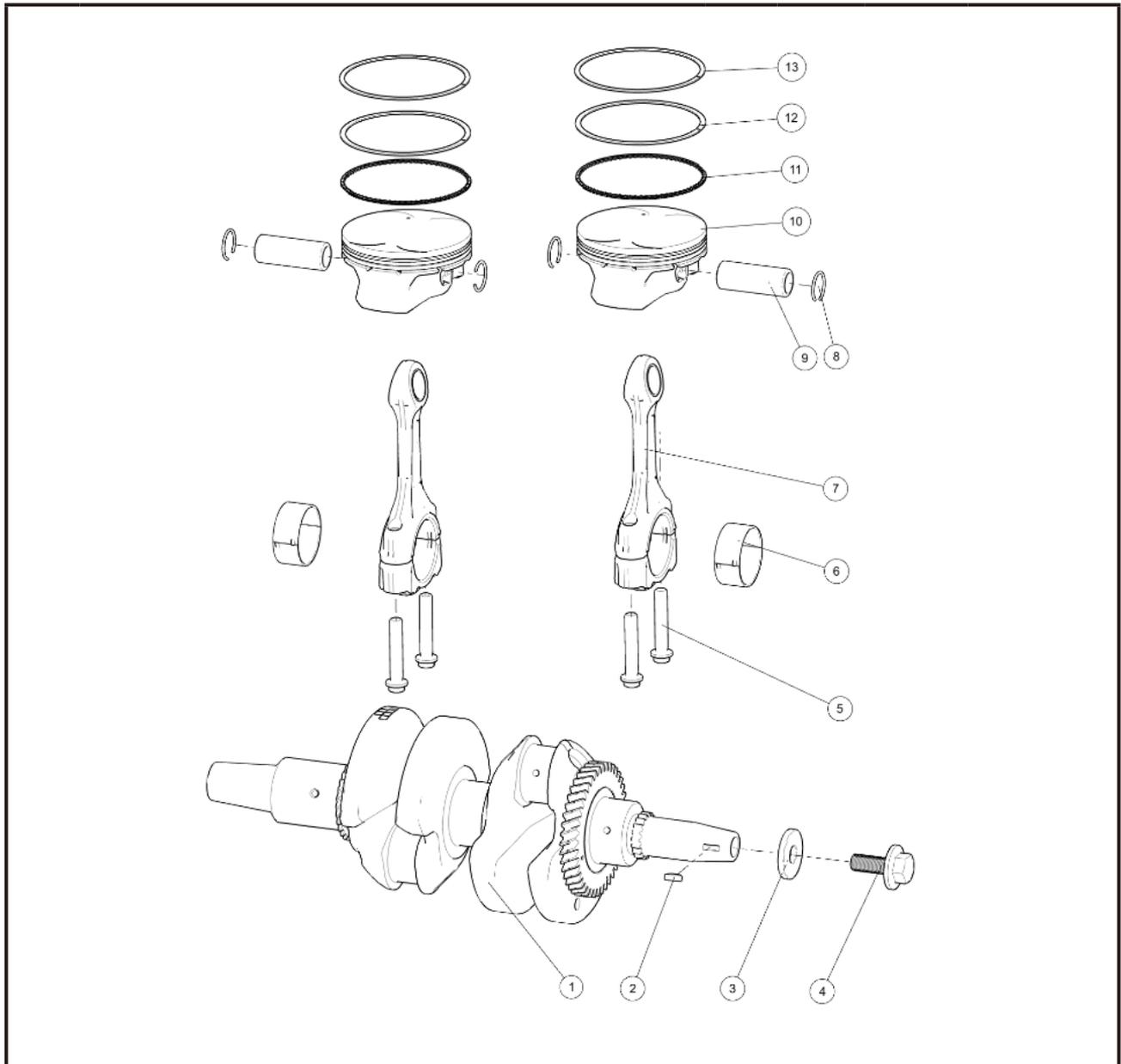
SEGWAY AT10

## Explosive view of Valve Mechanism



| No. | Fastener                              | Torque |       |          | Remarks |
|-----|---------------------------------------|--------|-------|----------|---------|
|     |                                       | N·m    | kgf·m | ft·lb    |         |
| 1   | HEXAGON SOCKET PAN HEAD STEPPED BOLTS |        |       |          |         |
| 2   | AT10 CHAIN TENSIONING PLATE           |        |       |          |         |
| 3   | TENSIONER GASKET                      |        |       |          |         |
| 4   | TENSIONER                             |        |       |          |         |
| 5   | BOLT M6×25                            | 9.8    | 9.8   | 87 in·lb |         |
| 6   | HOSE CLAMP                            |        |       |          |         |
| 7   | BOLT M6×12                            | 9.8    | 9.8   | 87 in·lb | L       |
| 8   | CAM SPROCKET                          |        |       |          |         |
| 9   | INTAKE CAM                            |        |       |          |         |
| 10  | EXHAUST CAM                           |        |       |          |         |
| 11  | TIMING CHAIN                          |        |       |          |         |
| 12  | AT10 CHAIN GUIDE PLATE ASSEMBLY       |        |       |          |         |

## Explosive view of Piston connecting rod assembly



| No. | Fastener                   | Torque |       |       | Remarks |
|-----|----------------------------|--------|-------|-------|---------|
|     |                            | N·m    | kgf·m | ft·lb |         |
| 1   | CRANKSHAFT                 |        |       |       |         |
| 2   | WOODRUFF KEY               |        |       |       |         |
| 3   | FLAT WASHER 12.5x36x4.8    |        |       |       |         |
| 4   | BOLT M12X1.25X30-LH        | 150    | 15.3  | 111   |         |
| 5   | CONNECTING ROD BEARING     |        |       |       |         |
| 6   | CONNECTING ROD ASSEMBLY M9 |        |       |       | O       |
| 7   | WRIST PIN RETAINER         |        |       |       |         |
| 8   | PISTON PIN                 |        |       |       |         |
| 9   | PISTON ( I )               |        |       |       | O       |
| 10  | PISTON ( II )              |        |       |       |         |
| 11  | OIL RING                   |        |       |       |         |
| 12  | SECOND RING                |        |       |       |         |
| 13  | FIRST RING                 |        |       |       |         |

## TECHNICAL PARAMETERS

| Item  | Standard  | Limit                |
|---|---|----------------------|
| Cylinder head:                              |   |                      |
| Cylinder pressure value (use range)         |   |                      |
| Electric starter                            | 1.1 ~ 1.3 MPa (11~13 kgf/cm <sup>2</sup> , 159~188 psi) | ---                  |
| Deformation of cylinder head                | ---   | 0.1 mm (0.004 in.)   |
| Cylinder head height                        | 120.5 ± 0.03 mm (4.7441" ± 0.0012")                     | ---                  |
| Seat ring seal width-exhaust                | 1.5 ~ 1.6 mm (0.0591" ~ 0.0630")                        | 1.9 mm (0.0748")     |
| Seat ring seal width-intake                 | 1.0 ~ 1.1 mm (0.0394" ~ 0.0433")                        | 1.4 mm (0.0551")     |
| Seat angle                                  | 30.0° ± 1.5° / 45.0° ± 0.5° / 60.0° ± 1.5°              | ---                  |
| Inner diameter of valve guide               | 5.500 ~ 5.512 mm (0.2165" ~ 0.2170")                    | ---                  |
| Valve spring:                               |   |                      |
| Free length of valve spring                 | 42.5 mm (1.6732" )                                      | 41.4 mm (1.6299" )   |
| Valve:                                      |   |                      |
| Valve clearance (cold state):               |   |                      |
| exhaust                                     | 0.20 ~ 0.25 mm (0.0079" ~ 0.0098")                      | ---                  |
| Intake                                      | 0.10 ~ 0.15 mm (0.0039" ~ 0.0059")                      | ---                  |
| Bent valve stem                             | ---   | TIR 0.05 mm (0.020") |
| Valve stem diameter:                        |   |                      |
| exhaust                                     | 5.455 ~ 5.470 mm (0.2147" ~ 0.2153")                    |                      |
| Intake                                      | 5.475 ~ 5.490 mm (0.2155" ~ 0.2161")                    |                      |
| Valve stem clearance:                       |   |                      |
| exhaust                                     | 0.030 ~ 0.060 mm (0.0011" ~ 0.0023")                    |                      |
| Intake                                      | 0.010 ~ 0.040 mm (0.0003" ~ 0.0015")                    |                      |
| Total length of valve stem:                 |   |                      |
| exhaust                                     | 96.50 mm (3.7835")                                      |                      |
| Intake                                      | 95.50 mm (3.7598")                                      |                      |
| Valve/valve guide clearance (swing method): |   |                      |
| exhaust                                     | 0.09 ~ 0.17 mm (0.0035" ~ 0.0067")                      | 0.34 mm (0.0133")    |
| Intake                                      | 0.03 ~ 0.11 mm (0.0012" ~ 0.0043")                      | 0.25 mm (0.0110")    |

**TECHNICAL PARAMETERS**

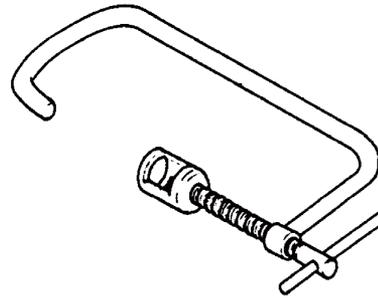
| Item                           | Standard                               | Limit                |
|--------------------------------|--|----------------------|
| Camshaft:                      |  |                      |
| Camshaft lobes height:         |  |                      |
| exhaust                        | 40.08 ± 0.04 mm (1.5780" ± 0.0015")    | 39.99 mm (1.5744")   |
| Intake                         | 40.36 ± 0.04 mm (1.5890" ± 0.0015")    | 40.27 mm (1.5854")   |
| Camshaft journal diameter-all: | 22.954 ~ 22.975 mm (0.9036" ~ 0.9045") | 22.944 mm (0.9033")  |
| Camshaft bearing bore-all:     | 23.000 ~ 23.021 mm (0.9055" ~ 0.9063") | 23.044 mm (0.9072")  |
| Camshaft oil clearance:        | 0.025 ~ 0.067 mm (0.0009" ~ 0.0026")   | 0.1 mm (0.0039")     |
| Camshaft axial clearance:      | 0.10 ~ 0.25 mm (0.0039" ~ 0.0098")     | 0.4 mm (0.0157")     |
| Camshaft journal runout        | ≤ 0.02 mm (0.0008")                    | TIR 0.1 mm (0.0039") |
| Piston:                        |  |                      |
| Piston outer diameter:         |  |                      |
| I                              | 92.951 ~ 92.959 mm (3.6594" ~ 3.6597") | 92.858 mm (3.6558")  |
| II                             | 92.959 ~ 92.967 mm (3.6597" ~ 3.66")   | 92.885 mm (3.6569")  |
| Piston pin hole inner diameter | 20.009 ~ 20.018 mm(0.7877" ~ 0.7881")  | 20.05 mm(0.7893")    |
| Piston pin:                    |  |                      |
| Piston pin outer diameter      | 20.000 ~ 20.005 mm(0.7873" ~ 0.7875")  | 19.98 mm(0.7866")    |
| Piston ring                    |  |                      |
| Installation clearance:        |  |                      |
| Top ring                       | 0.20 ~ 0.35 mm (0.0079" ~ 0.0138")     | 0.5 mm (0.0197")     |
| Second ring                    | 0.35 ~ 0.55 mm (0.0138" ~ 0.0217")     | 0.7 mm (0.0276")     |
| Oil ring                       | 0.20 ~ 0.70 mm (0.0079" ~ 0.0276")     | 0.9 mm (0.0354")     |
| Ring/groove gap:               |  |                      |
| Top ring                       | 0.020 ~ 0.060 mm (0.0007" ~ 0.0023")   | 0.12 mm (0.0047")    |
| Second ring                    | 0.020 ~ 0.060 mm (0.0007" ~ 0.0023")   | 0.12 mm (0.0047")    |
| Piston ring groove width:      |  |                      |
| Top ring                       | 1.22 ~ 1.25 mm (0.0480" ~ 0.0492")     | 1.32 mm (0.0520")    |
| Second ring                    | 1.22 ~ 1.25 mm (0.0480" ~ 0.0492")     | 1.32 mm (0.0520")    |
| Piston ring thickness:         |  |                      |
| Top ring                       | 1.17 ~ 1.19 mm (0.0461" ~ 0.0469")     | 1.10 mm (0.0433")    |
| Second ring                    | 1.17 ~ 1.19 mm (0.0461" ~ 0.0469")     | 1.10 mm (0.0433")    |

## SPECIAL TOOLS

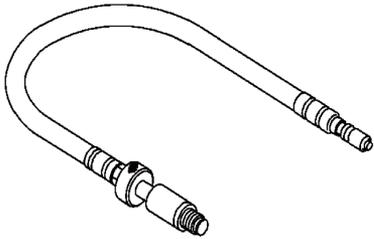
Cylinder pressure gauge



Valve spring presser assembly



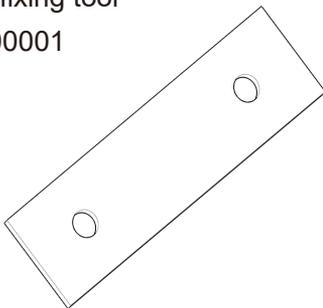
Cylinder pressure gauge connector,  
M10×1.0



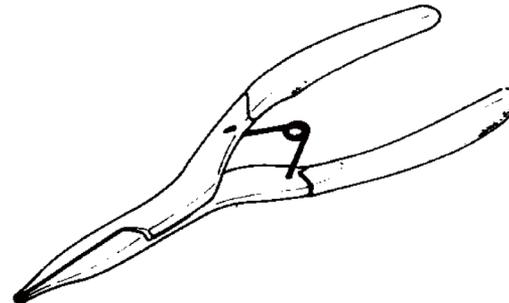
Valve spring press fitting head



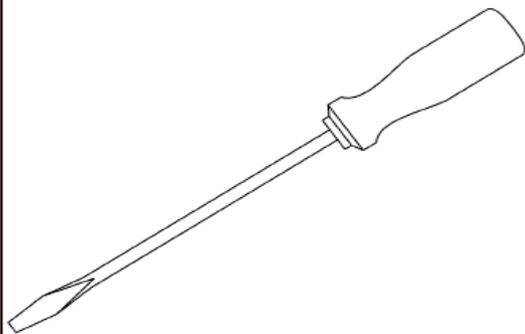
Camshaft fixing tool  
E02A40000001



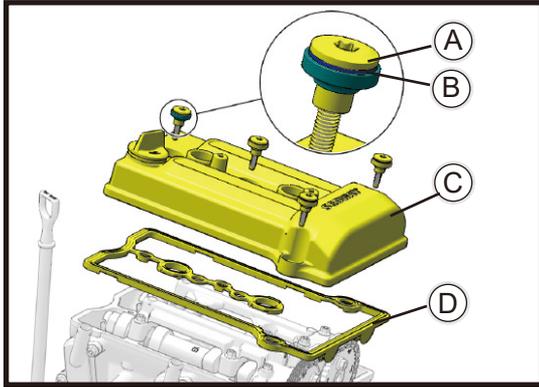
Circlip pliers



screwdriver



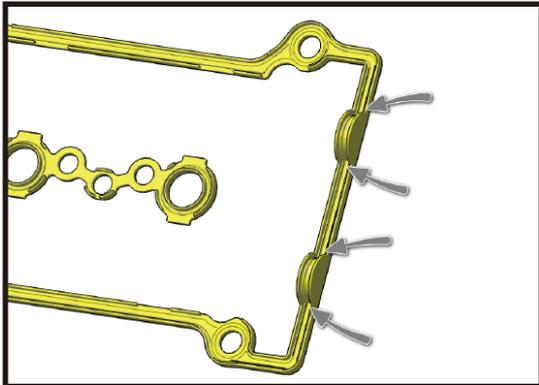
## CYLINDER HEAD COVER



### Remove cylinder head cover

- ◆ Disassembly:
  - 【A】 Hexagon socket pan head step bolts
  - 【B】 Bolt rubber sealing washer 10
  - 【C】 Cylinder head cover subassembly
  - 【D】 Cylinder head cover seal

### Install the cylinder head cover



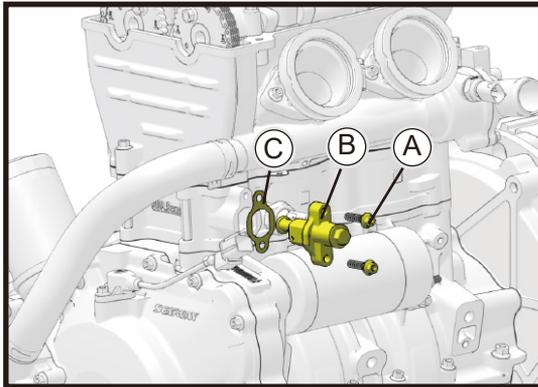
- ◆ If oil leakage occurs, replace the gasket 【B】 and seal 【D】 .
- ◆ Apply silicone rubber sealant to the corners of the two raised blocks before the seal 【D】 is installed.
- ◆ Installation
  - 【D】 Cylinder head cover seal
  - 【C】 Cylinder head cover
  - 【B】 Bolt rubber sealing washer 10
  - 【A】 Hexagon socket head cap screws

- ◆ Tightening torque

| Bolt                        |
|-----------------------------|
| 9.8 N•m (1.0kgf•m, 87in•lb) |

## CAMSHAFT COVER / CAMSHAFT

### Remove the tensioner



#### ⚠ CAUTION

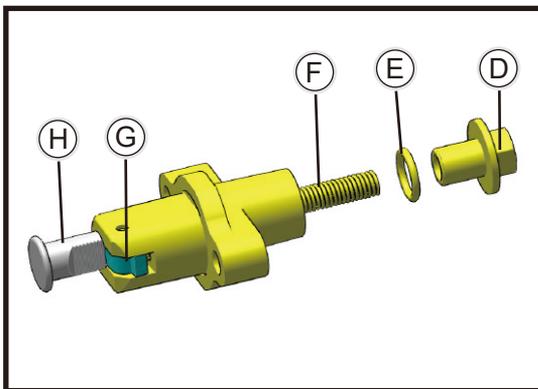
This is a non-return type timing chain tensioner. Once the push rod of the tensioner extends out of the tensioning chain, it cannot return to the initial position. Observe all the following rules:

When removing the tensioner, do not unscrew only part of the mounting bolts. Retightening the mounting bolts from this position may damage the tensioner and timing chain. After the bolts are loosened, the tensioner must be removed according to the instructions in "Timing Chain Tensioner Installation" and returned to its position.

After the tensioner is removed, do not turn the crankshaft. This may change the timing position and damage the valve

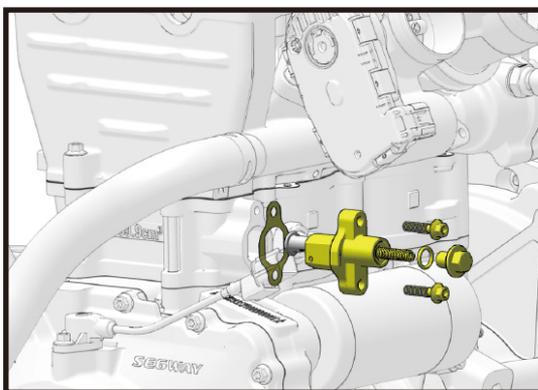
#### ◆ Disassembly:

- 【A】 Bolt M6×25
- 【B】 Tensioner combination
- 【C】 Tensioner gasket



### Install the tensioner

- ◆ Remove the tensioner adjusting hole bolt 【D】 , remove the O-ring 【E】 and the tension rod spring 【F】 .
- ◆ Toggle the locking block 【G】 , and press the adjusting rod 【H】 into the tensioner.
- ◆ Replace with a new tensioner gasket 【C】 .
- ◆ Align the tensioner with the installation hole and install it, and screw in the tensioner bolt 【A】 .
- ◆ Put 【E】 on the bolt 【D】 , and install the spring 【F】 and bolt 【D】 in sequence.
- ◆ Tightening torque

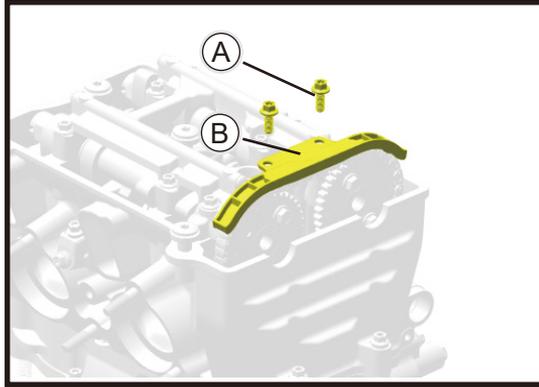


Chain tensioner mounting bolt

9.8 N•m (1.0 kgf•m, 87 in•lb)

Tensioner adjusting hole bolt

12 N•m(1.2 kgf•m,8.8 ft•lb)



## Disassemble camshaft

◆ Disassembly

【A】 Bolt M6×16

【B】 Chain guide plate assembly II

◆ Disassembly

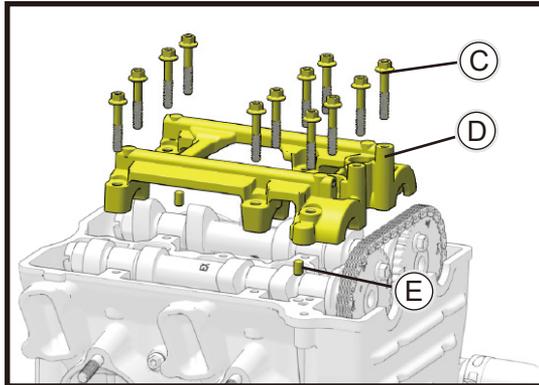
【C】 Bolt M6×35

【D】 Camshaft cover assembly

【E】 Cylindrical pin 6×10

### TIPS

Loosen the bolts that secure the camshaft cover evenly, and carefully lift the camshaft cover from the camshaft.

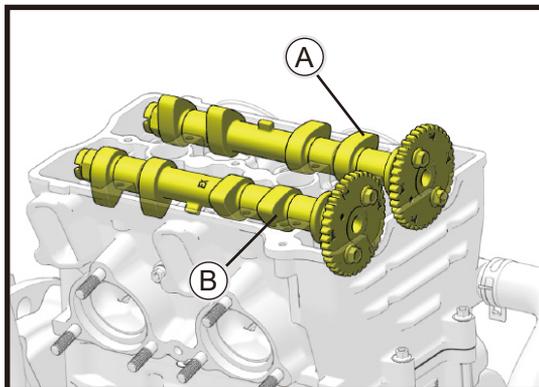


◆ Remove the chain from the camshaft so that the camshaft can be taken out.

### TIPS

Be careful when removing the camshaft from the cylinder head

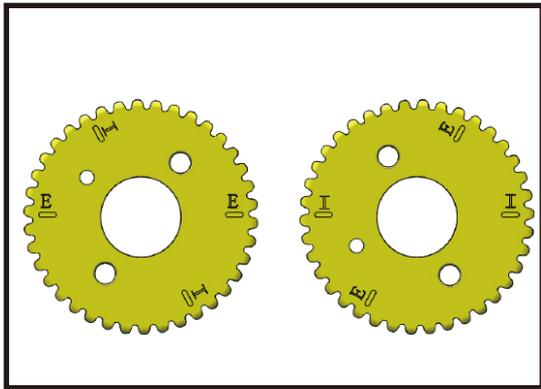
◆ Use a tool similar to an S-shaped hook to hang the timing chain. Prevent the chain from falling into the crankcase.



### TIPS

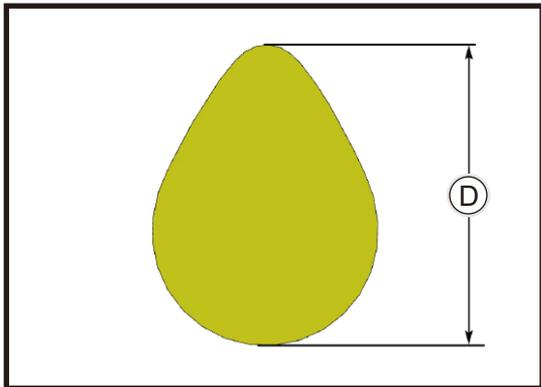
There is an integrated guide block on the crankcase to prevent the chain from falling off the crankshaft.

◆ Mark the intake camshaft 【A】 and exhaust camshaft 【B】 to ensure correct assembly.



## Camshaft sprocket inspection

- ◆ Check whether the camshaft sprocket teeth are worn or damaged. If wear or damage is found, replace the timing chain and sprocket with a new one.



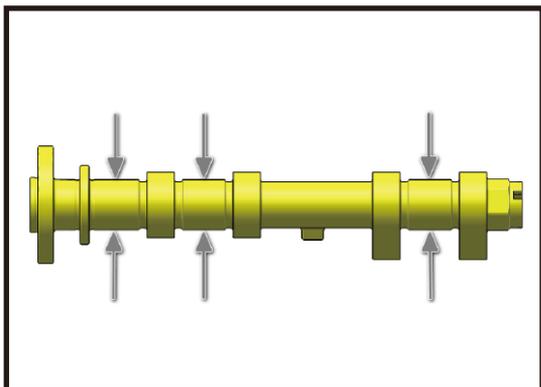
## Camshaft / camshaft lobe inspection

- ◆ Visually check whether the camshaft lobe is worn or damaged.
- ◆ Use a micrometer to measure the height of the camshaft lobe **【D】**.

Camshaft lobe height:

|         | Standard                               | Limit              |
|---------|--|--------------------|
| exhaust | 40.08 ± 0.04 mm<br>(1.5780" ± 0.0015") | 39.99 mm (1.5744") |
| intake  | 40.36 ± 0.04 mm<br>(1.5890" ± 0.0015") | 40.27 mm (1.5854") |

- ◆ Visually inspect each camshaft journal for scratches, wear or damage.
- ◆ Measure the journal value of the camshaft with a micrometer and compare with the specification.



| Standard                              | Limit               |
|---------------------------------------|---------------------|
| 22.954 ~ 22.975 mm(0.9036" ~ 0.9045") | 22.944 mm (0.9033") |

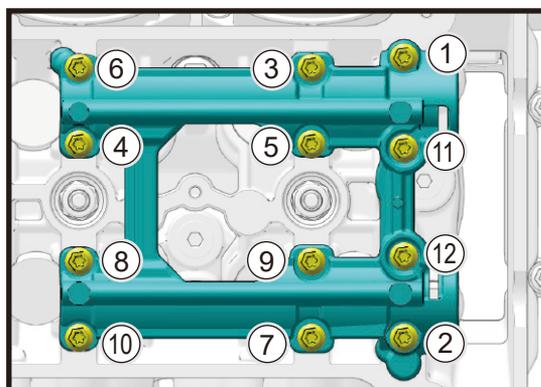
## TIPS

If the camshaft is damaged or the amount of wear on any part exceeds the limit, the camshaft should be replaced

- ◆ Assemble the camshaft cover separately to measure the bore of the camshaft bearing. Tighten the bolts in the specified order.

Camshaft cover bolt

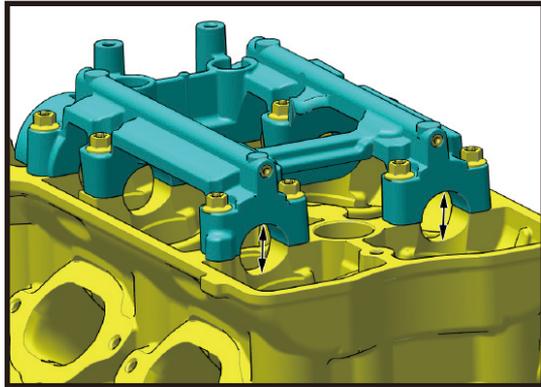
10 N•m (1.0 kgf•m, 89 in•lb)



| Standard                              | Limit               |
|---------------------------------------|---------------------|
| 23.000 ~ 23.021 mm(0.9055" ~ 0.9063") | 23.044 mm (0.9072") |

## TIPS

If the camshaft bearing bore is damaged or the amount of wear exceeds the limit, please replace the cylinder head assembly

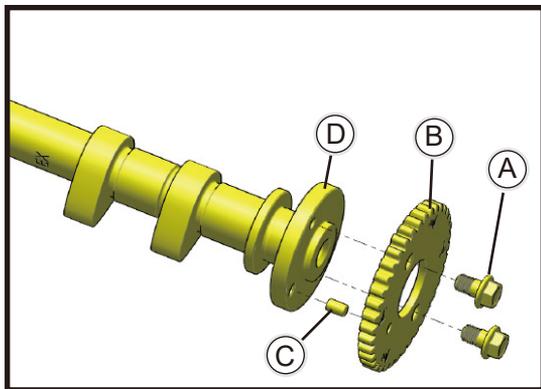


- ◆ Calculate the clearance value by subtracting the camshaft shaft diameter from the camshaft bearing bore, and compare it with the specification

| Standard                            | Limit             |
|-------------------------------------|-------------------|
| 0.025~ 0.067 mm (0.0009" ~ 0.0026") | 0.10 mm (0.0039") |

**⚠ CAUTION**

Cylinder head and camshaft cover are combined processing and must be replaced as a set

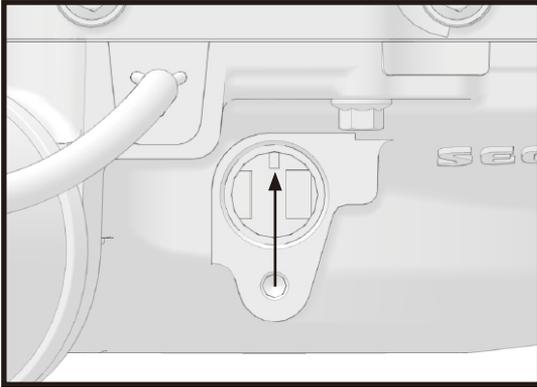


### Install camshaft sprocket

- ◆ Install the cylindrical pin **【C】** into the camshaft **【D】** .
- ◆ Align the position of the pin hole and install the timing sprocket **【B】** , with the symbol on the side facing outward.
- ◆ Apply thread tightening agent to the bolt **【A】** , and tighten the bolt according to the torque.
- ◆ Tightening torque

| Sprocket bolt                |
|------------------------------|
| 19 N•m (1.9 kgf•m, 14 ft•lb) |

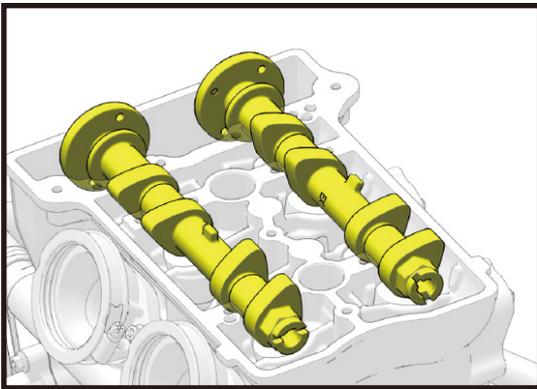
## Camshaft installation / timing adjustment



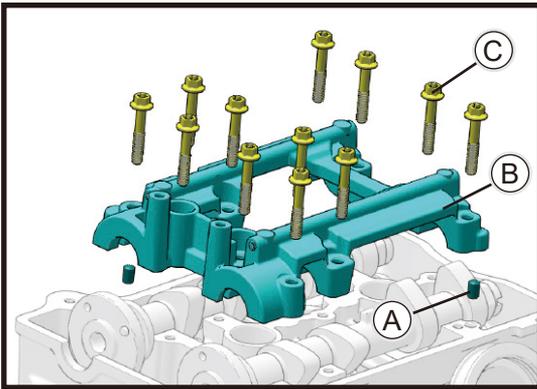
### ⚠ CAUTION

If any parts in the valve train have been replaced, please refer to the valve clearance adjustment procedure sequence.

## Camshaft installation/timing adjustment



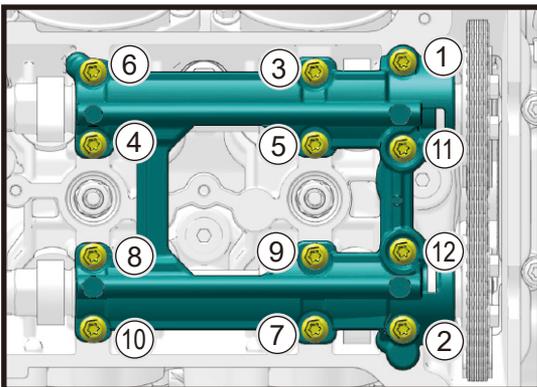
- ◆ Rotate the engine so that the top dead center (TDC) mark of the magneto rotor is aligned or in the center of the crankshaft position sensor (CPS) mounting hole.
- ◆ In accordance with the intake and exhaust camshaft marks made during disassembly. If you install a new camshaft or the camshaft is not marked, you can compare it with the electronic catalog according to the part number on the camshaft.
- ◆ Before installation, lubricate all camshaft tips and journal surfaces with engine oil.
- ◆ Put the intake and exhaust camshafts into the corresponding cylinder head bearing seats. Turn the camshaft so that the cam lobe points outwards.
- ◆ Installation:

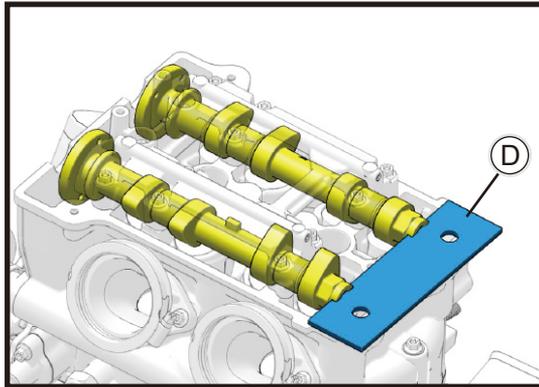


- 【A】 Cylindrical pin 6×10
- 【B】 Camshaft cover assembly
- 【C】 Bolt M6×35

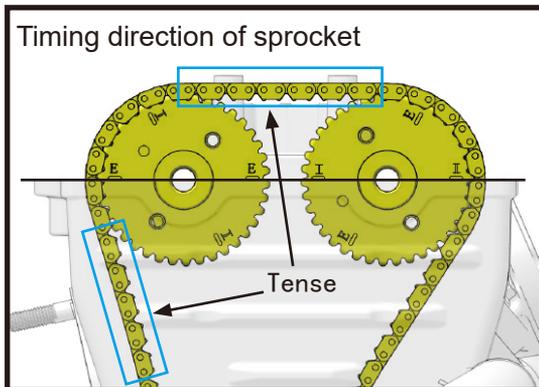
- ◆ Tighten the camshaft cover mounting bolts 【C】 in order.
- ◆ Tightening torque

|                             |
|-----------------------------|
| Bolt M6                     |
| 9.8 N•m (1.0kgf•m, 87in•lb) |



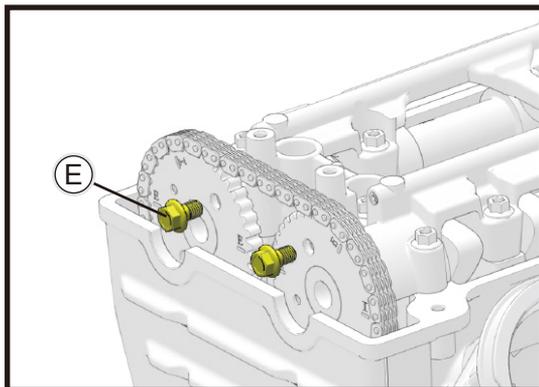


- ◆ Insert the camshaft fixing tool **【D】** into the camshaft end groove shown in the figure to fix the intake and exhaust camshafts. If necessary, use an open-end wrench to turn the camshaft.
- ◆ According to the method in the first step, confirm that the top dead center mark has not changed.
- ◆ Lift the timing chain and snap the sprocket into the chain. At the same time, the side of the sprocket marked with "I" and "E" is outside.
- ◆ Keep the chain tensioned as shown in the figure, install the sprocket on the camshaft, adjust the sprocket so that the top surface of the cylinder head is flush with the mark on the sprocket



**⚠ CAUTION**

The "I" mark on the intake camshaft sprocket is aligned with the top surface of the cylinder head, and the "E" mark on the exhaust camshaft sprocket is aligned with the top surface of the cylinder head. Install the exhaust camshaft sprocket first (opposite the cam chain tensioner) to ensure accurate cam timing.



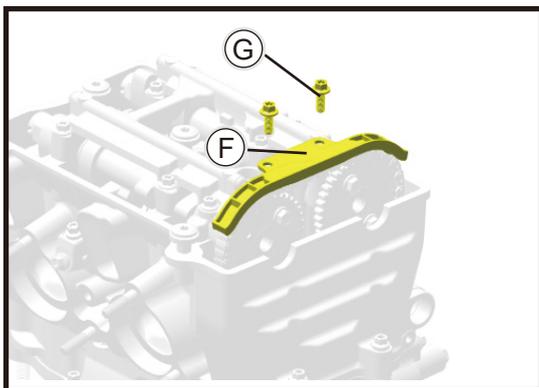
- ◆ Screw a bolt **【E】** into each sprocket and tighten it according to the torque. Apply thread tightening agent to the thread of the bolt **【E】**.
- ◆ Install the camshaft chain tensioner (see Install the tensioner).
- ◆ Rotate the crankshaft at an appropriate angle, insert the bolt **【E】** into the other bolt hole of the sprocket, and tighten it according to the torque. Apply thread tightening agent to the thread of the bolt **【E】**.

|                             |
|-----------------------------|
| Bolt M6                     |
| 9.8 N•m (1.0kgf•m, 87in•lb) |

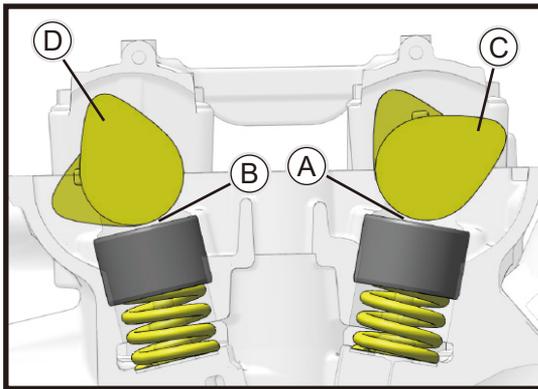
- ◆ Installation
- 【F】** Chain guide plate assembly II
- 【G】** Bolt M6×16

- ◆ Tightening torque

|                             |
|-----------------------------|
| Bolt M6                     |
| 9.8 N•m (1.0kgf•m, 87in•lb) |



### Valve clearance adjustment

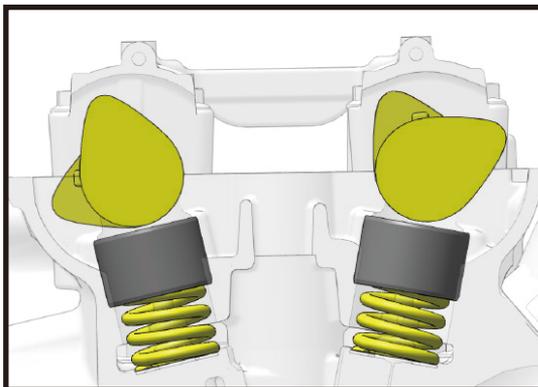


#### ⚠ CAUTION

Before installing the camshaft or finally assembling the engine, be sure to check the valve clearance

- ◆ Camshaft installation (see camshaft installation/timing adjustment)
- ◆ Camshaft cover installation (see camshaft installation/timing adjustment)
- ◆ Rotate the camshaft so that the lobes 【C】 and 【D】 of the cam above the valve to be measured face up.
- ◆ Use a thickness gauge (feel gauge) to measure the valve clearance 【A】 and 【B】. If the gap exceeds the requirement, record the measurement result.
- ◆ Repeat the above steps until all valves are checked

| Valve clearance requirements (cold) |                                  |
|-------------------------------------|----------------------------------|
| exhaust:                            | 0.2 ~ 0.25mm (0.0079" ~ 0.0098") |
| Air intake:                         | 0.1 ~ 0.15mm (0.0039" ~ 0.0059") |



- ◆ If the valve clearance measurement does not meet the requirements, please remove the camshaft cover and camshaft.
- ◆ Remove the valve lifter that does not meet the valve clearance requirements.

#### TIPS

In order to ensure that the parts can be installed back to the original position, the matching parts should be put together and arranged according to their position on the cylinder head. The removed parts should be marked or placed on an arranged shelf.

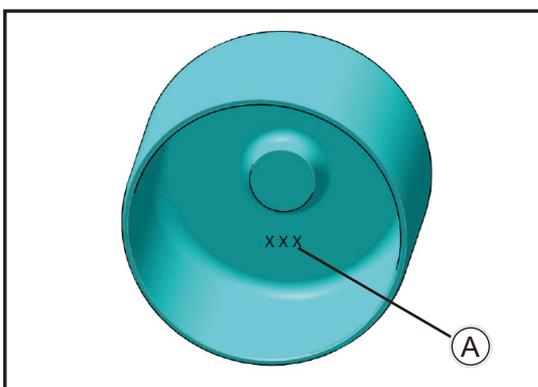
- ◆ Record the 3 digits 【A】 at the bottom of the tappet.
- ◆ Refer to the tappet selection matrix on the following page to select a suitable tappet.
- ◆ Install the selected tappet.
- ◆ Repeat the above steps until all valve clearances are adjusted.
- ◆ Reinstall the camshaft and camshaft cover, and tighten the bolts as required.
- ◆ Tightening torque:

Bolt (M6)

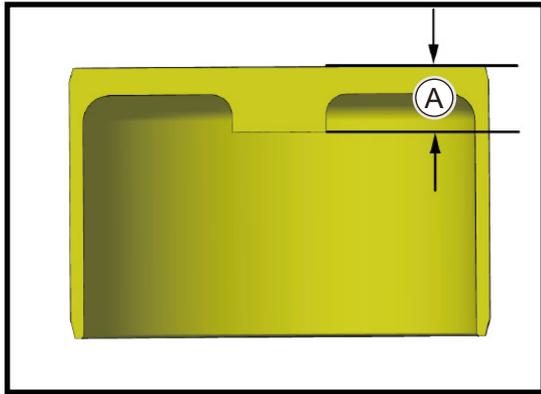
9.8 N•m (1.0kgf•m, 87in•lb)

- ◆ Measure and confirm that each valve clearance is within the required range.

If the valve clearance is not within the required range, repeat this procedure.



## Selection of valve tappet



### TIPS

Valve clearance specifications and measured valve clearance are calculated in millimeters (mm). A 480 tappet means that the center thickness of the tappet **【A】** is 4.80mm.

The valve tappet part number is F01A20007XXX, and "XXX" corresponds to the specified tappet thickness. As shown in the following table:

### Optional tappet specifications

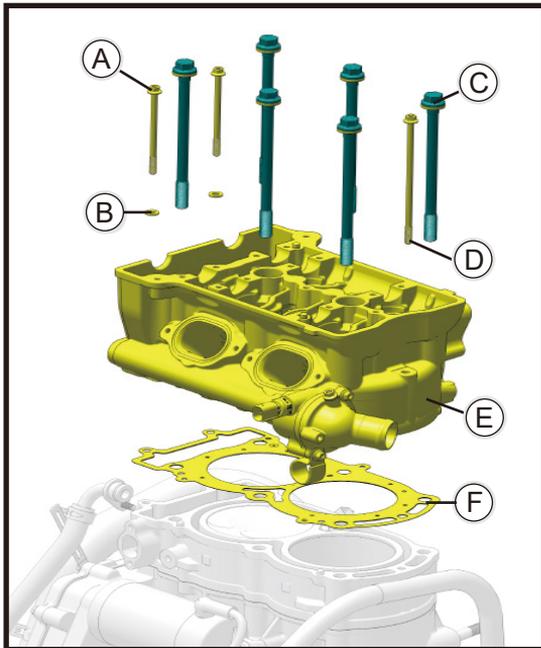
|             |            |     |     |     |     |     |     |     |     |     |     |
|-------------|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Part number | F01A20007- | 001 | 002 | 003 | 004 | 005 | 006 | 007 | 008 | 009 | 010 |
|             | 3 digits   | 480 | 482 | 484 | 486 | 488 | 490 | 492 | 494 | 496 | 498 |
| Part number | F01A20007- | 011 | 012 | 013 | 014 | 015 | 016 | 017 | 018 | 019 | 020 |
|             | 3 digits   | 500 | 502 | 504 | 506 | 508 | 510 | 512 | 514 | 516 | 518 |
| Part number | F01A20007- | 021 | 022 | 023 | 024 | 025 | 026 | 027 | 028 | 029 | 030 |
|             | 3 digits   | 520 | 522 | 524 | 526 | 528 | 530 | 532 | 534 | 536 | 538 |
| Part number | F01A20007- | 031 | 032 | 033 | 034 | 035 | 036 | 037 | 038 | 039 | 040 |
|             | 3 digits   | 540 | 542 | 544 | 546 | 548 | 550 | 552 | 554 | 556 | 558 |
| Part number | F01A20007- | 041 | 042 | 043 | 044 | 045 | 046 | 047 | 048 | 049 | 050 |
|             | 3 digits   | 560 | 562 | 564 | 566 | 568 | 570 | 572 | 574 | 576 | 578 |





## CYLINDER HEAD

### Remove cylinder head



### TIPS

Cylinder head maintenance can be performed on the entire vehicle.

#### ◆ Disassembly:

【A】 Bolt M6×90

【B】 Aluminum washer 6

【C】 Cylinder bolt M11×1.25×150

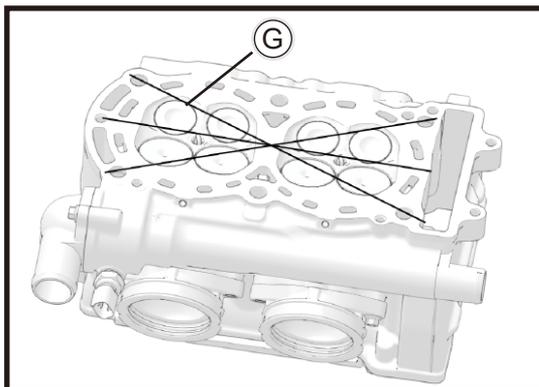
【D】 Bolt M6×135

◆ Remove the cylinder head 【E】 and, if necessary, use a plastic hammer to gently tap the cylinder head to loosen it for easy removal.

◆ Remove the cylinder head gasket 【F】.

### Cylinder head inspection

◆ Thoroughly clean the cylinder head underside of the cylinder head of any head gasket material and traces of carbon buildup left on the underside of the cylinder head.



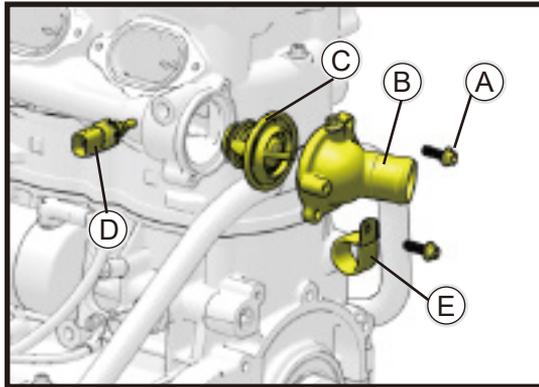
### Check for cylinder head distortion

◆ Keep the bottom surface of the cylinder head clean.

◆ Place a straightedge 【G】 on the bottom surface of the cylinder head.

◆ Measure the distance between the straightedge 【G】 and different positions of the cylinder head with a plug gauge.

Cylinder head deformation limit: 0.1 mm (0.0039"), if the cylinder head deformation exceeds the limit, replace the cylinder head.

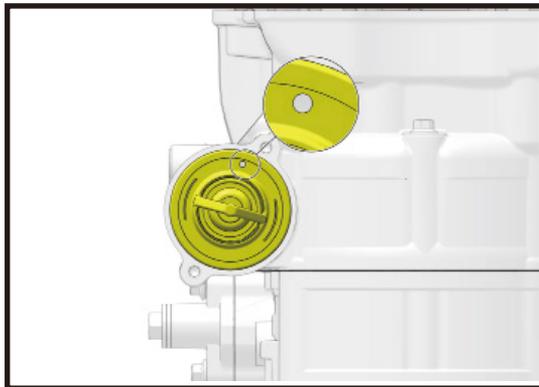


## Remove thermostat, water temperature sensor

◆ Disassembly:

- 【A】 Bolt M6×20
- 【B】 Thermostat cover
- 【C】 Thermostat
- 【D】 Water temperature sensor assembly
- 【E】 Water hose clamp

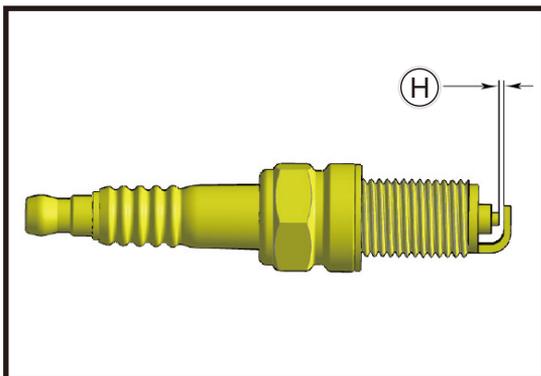
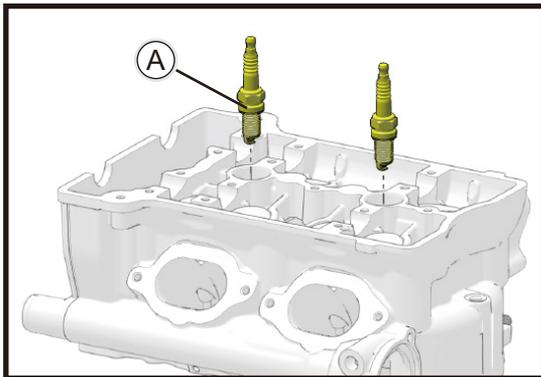
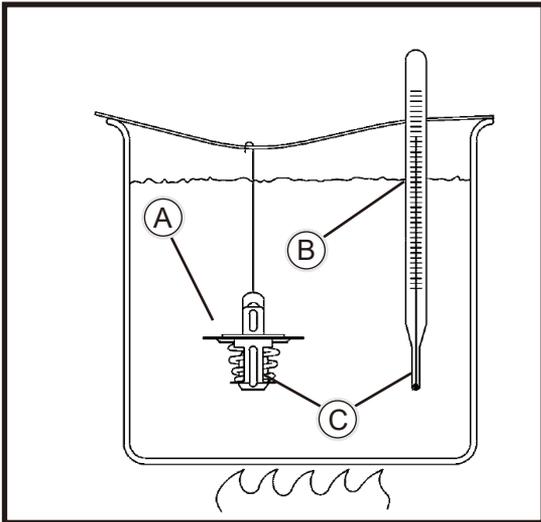
## Installation of thermostat, water temperature sensor



- ◆ Install the thermostat 【C】 , install with the thermostat vent hole up and aligned with the notch in the cylinder head.
- ◆ Install the thermostat cover 【B】 , install the hose clamp 【E】 and tighten the bolt 【A】 .
- ◆ Install the water temperature sensor assembly 【D】 and apply thread sealant during installation.
- ◆ Tightening torque

| Thermostat cover bolts       |
|------------------------------|
| 9.8 N•m (1.0kgf•m, 87 in•lb) |

| Water temperature sensor assembly |
|-----------------------------------|
| 12 N•m (1.2kgf•m, 107 in•lb)      |



## Thermostat check

- ◆ Remove the thermostat and check the thermostat 【A】 at room temperature.
- ◆ If the thermostat opens, replace it with a new one.
- ◆ Check the thermostat opening temperature by placing the thermostat 【A】 and an accurate thermometer 【B】 into the water with the temperature sensing part adjusted to the same height.
- ◆ Gradually increase the temperature of the water while gently stirring the water to even out the temperature.
- ◆ The thermostat opens at a temperature of 74 to 87°C (165.2~188.60F)
- ◆ If the measurement is out of range, replace the thermostat.

## Remove spark plug

- ◆ Removal:
- 【A】 Spark Plug

**⚠ CAUTION**

Never let a spark plug fall on a hard surface. Such an impact can damage the part.

## TIPS

Cover the spark plug hole with a rag when removing the spark plug to prevent anything from falling into the combustion chamber.

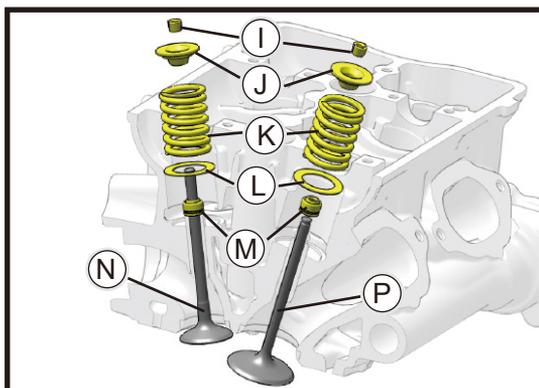
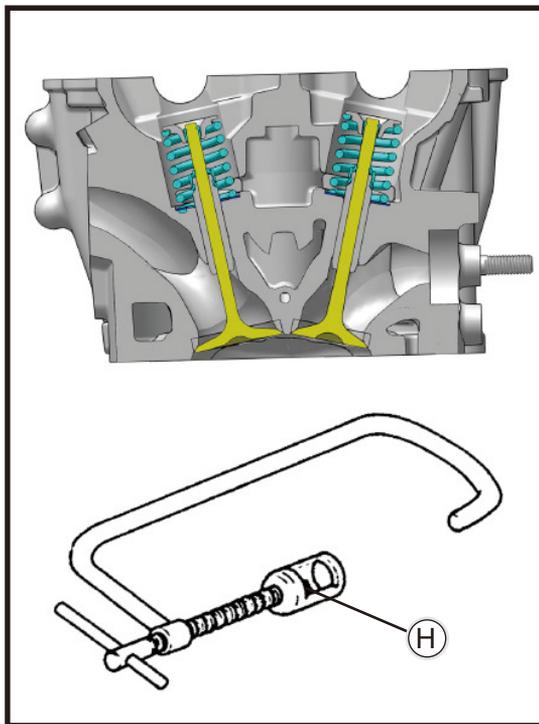
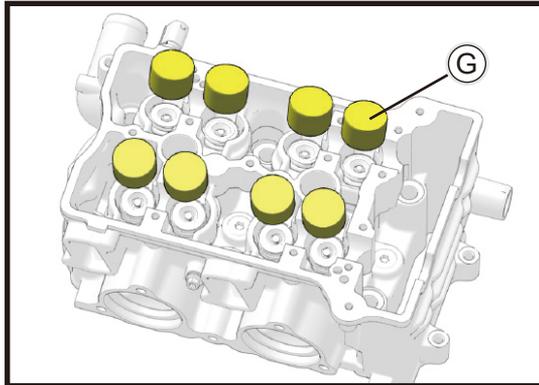
## Installing the spark plug

- ◆ Apply rust inhibitor to the spark plug threads.
- ◆ Install the spark plug.
- ◆ Tighten the torque:

|                            |
|----------------------------|
| spark plugs                |
| 11 N•m (1.1kgf•m, 97in•lb) |

Spark Plug Inspection.

Spark plug electrode gap: 【H】 = 0.6 ~ 0.8



## Remove the valve

**⚠ WARNING**

When disassembling and assembling the cylinder head or operating the valve spring, you need to wear goggles.

**TIPS**

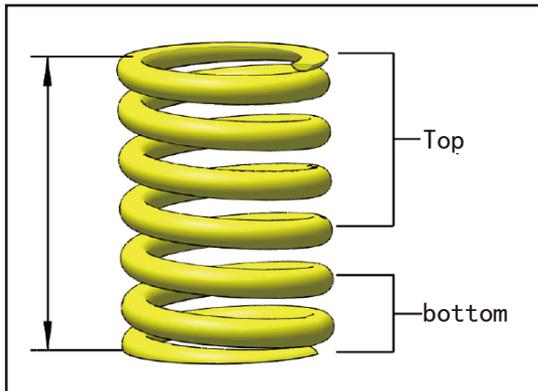
In order to ensure that the parts can be installed back to the original position, the matching parts should be put together and arranged according to their position on the cylinder head. The removed parts should be marked or placed on an arranged shelf.

- ◆ Remove the valve lifter **【G】** from the cylinder head.
- ◆ Use the valve spring compressor **【H】** to press down the valve spring.
- ◆ Remove the valve lock clamp **【I】**.
- ◆ Slowly release the valve spring compressor and remove the compressor.
- ◆ Remove the lock clamp seat **【J】**, valve spring **【K】**, valve spring seat **【L】** and valve oil seal **【M】**.

**TIPS**

As long as the cylinder head is disassembled, the valve oil seal is replaced. Aging, cracking or abrasion of the valve oil seal will lead to increased oil consumption

- ◆ Lift the cylinder head, take out the valve **【N】**, and place it in an orderly manner so that it can be reinstalled in the same valve guide.
- ◆ Repeat the previous steps to remove the remaining valves.
- ◆ Clean the combustion chamber of the cylinder head and the bottom surface of the cylinder head.



- ◆ Measure the free length of each valve spring with a vernier caliper and compare it with the standard value.
- ◆ Free length of valve spring: standard: 1.726" (43.85 mm), service limit: 1.683" (42.75 mm)

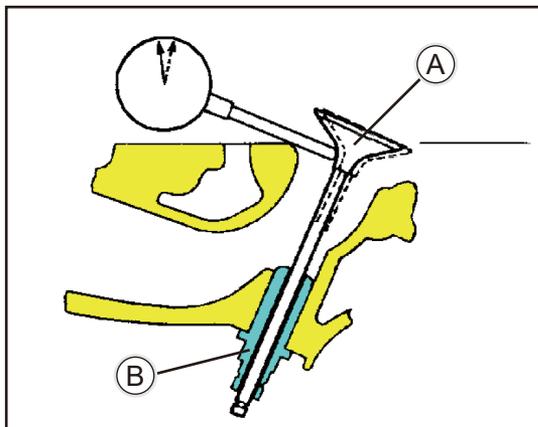
| Standard          | Limit            |
|-------------------|------------------|
| 42.5 mm (1.6732") | 41.4mm (1.6299") |

### Valve guide / valve inspection

- ◆ Valve stem clearance measurement:

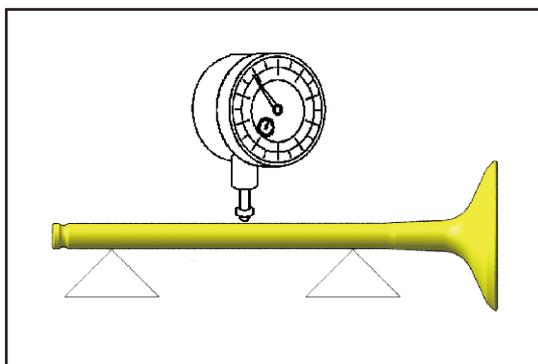
If there is no small aperture gauge, use the swing method to measure the gap between the valve and the valve guide and check the wear of the valve guide. The method is as follows.

- ◆ Insert a new valve **【A】** into the valve guide **【B】**, and place a dial indicator perpendicular to the valve stem on the valve stem, as close as possible to the cylinder head mating surface.
- ◆ Swing the valve lever to measure the valve/valve guide gap.
- ◆ Repeat the measurement in the direction at right angles to the first direction. If the reading exceeds the use limit, replace the cylinder head and camshaft cover assembly.



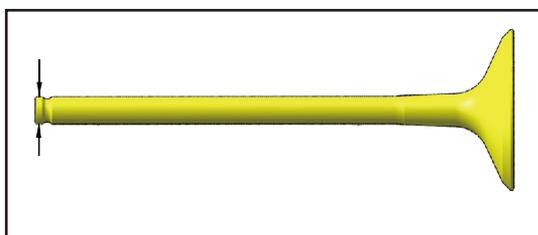
### TIPS

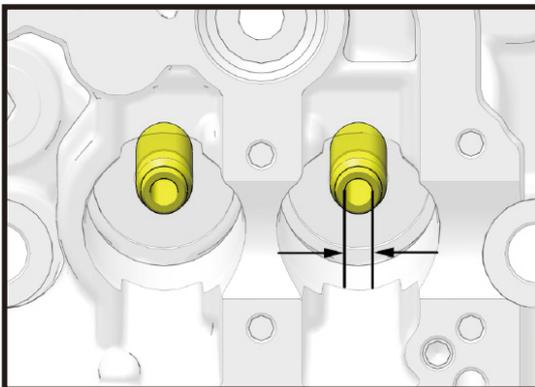
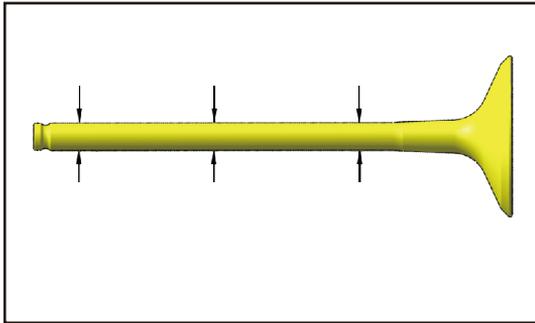
The reading is not the true gap between the valve and the valve guide, because the measurement position is above the guide.



| Valve/valve guide clearance (swing method) |                                   |                    |
|--|-----------------------------------|--------------------|
|  | Standard                          | Limit              |
| exhaust:                                   | 0.09 ~ 0.17 mm(0.0035" ~ 0.0067") | 0.34 mm<br>0.0133" |
| Air intake:                                | 0.03 ~ 0.11 mm(0.0012" ~ 0.0043") | 0.28 mm<br>0.0110" |

- ◆ Measure the beating, pitting and ablation of the valve stem. Check whether the valve rod is bent, clamp the valve on the machine tool or use a "V" block and measure it with a dial indicator.
- ◆ Check whether there is flaring, pitting, abrasion or damage at the end of the valve stem.
- ◆ Check whether there is flaring or abrasion at the lock clip groove.





## TIPS

If necessary, the valve can be re-dressed or ground. If it is severely worn, burned, bent or damaged, it must be replaced

- ◆ Use a micrometer to measure the diameter of the valve stem at three places, and then turn it 90° to measure again (a total of six measurements), and compare with the standard value.

| Valve stem diameter: |   |       |
|----------------------|---|-------|
|                      | Standard                                | Limit |
| exhaust              | 5.455 ~ 5.470 mm<br>(0.2147" ~ 0.2153") | _____ |
| intake               | 5.475 ~ 5.490 mm<br>(0.2155" ~ 0.2161") | _____ |

- ◆ Measure the diameter of the top and bottom of the valve guide hole, and measure two directions at each position.

| Valve guide aperture:                |  |
|--------------------------------------|--|
| 5.500 - 5.515 mm (0.2165" ~ 0.2171") |  |

- ◆ Measure each valve and valve guide combination separately.

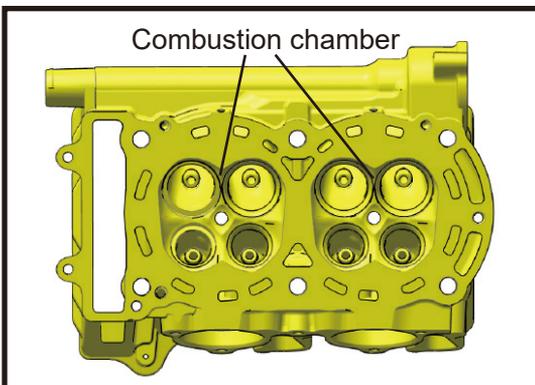
## TIPS

The valve guide cannot be replaced.

## Combustion chamber cleaning

### ⚠ WARNING

Wear protective goggles when cleaning the combustion chamber.



- ◆ Clean all carbon deposits in the combustion chamber and valve seat area.
- ◆ Visually inspect the surface of the cylinder head gasket and the combustion chamber for cracks or damage. Pay close attention to the spark plug and seat ring area.

### ⚠ CAUTION

Do not use metal scrapers, thick wire brushes or abrasive cleaners to clean the cylinder head. May cause damage.

## Seat ring repair

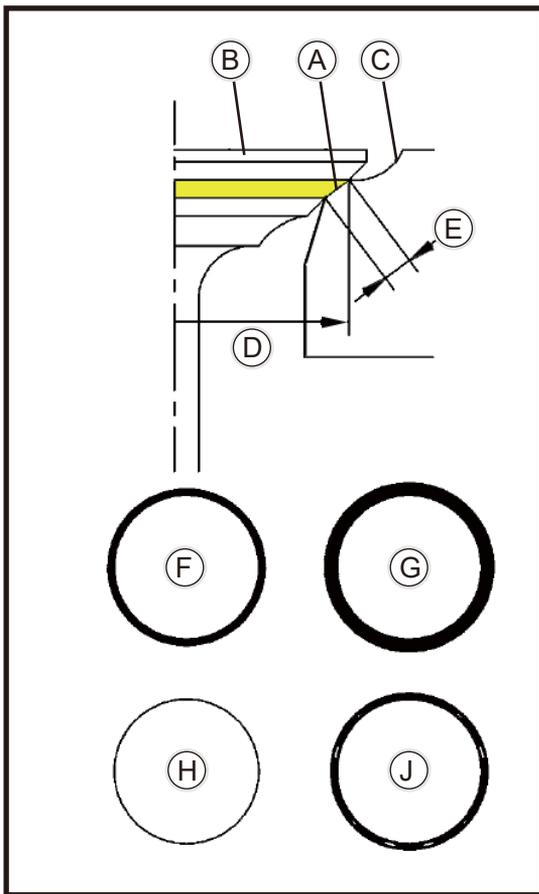
- ◆ Seat ring repair should be carried out by professionals who are proficient in cylinder head repair technology. Repair techniques vary, so please follow the valve repair equipment manufacturer's instructions. Do not over-grind the seat ring.

### ⚠ WARNING

When disassembling and reassembling the cylinder head, wear goggles or face shield.

## Seat ring inspection

- ◆ Remove the valve.
- ◆ Check the contact surface 【A】 between the valve 【B】 and the seat ring 【C】 .
- ◆ Paint the seat ring.
- ◆ Push the valve into the valve guide.
- ◆ Use a grinding tool to press and rotate the valve relative to the seat ring.
- ◆ Take out the valve and check the pattern of the contact surface on the seat ring. The width of the entire circle must be appropriate.
- ◆ Measure the diameter of the outer ring of the contact surface on the seat ring 【D】 .
- ◆ If the outer diameter of the seat ring contact surface is too large or too small, repair the seat ring (see seat ring repair).



- 【F】 Good
- 【G】 Too wide
- 【H】 too narrow
- 【J】 Uneven

| Outer diameter of seat ring contact surface |                                   |
|---|-----------------------------------|
| exhaust                                     | 31.8 ~ 31.9mm (1.2520" ~ 1.2559") |
| intake                                      | 36.8 ~ 36.9mm (1.4488" ~ 1.4528") |

### TIPS

The valve stem and valve guide must be good, otherwise the check will be inaccurate.

- ◆ If the seat ring interface shape is not good, repair the seat ring (see seat ring repair).
- ◆ Use a vernier caliper to measure the width of the part without carbon deposits (bright part) on the seat ring 【E】 .

| Width of contact surface of seat ring |                                 |
|---------------------------------------|---------------------------------|
| Exhaust                               | 1.5 ~ 1.6mm (0.0591" ~ 0.0630") |
| intake                                | 1.0 ~ 1.1mm (0.0394" ~ 0.0433") |

If the width is too wide, too narrow or uneven, repair the valve seat (see valve seat repair)

**Seat ring repair (valve grinding)**

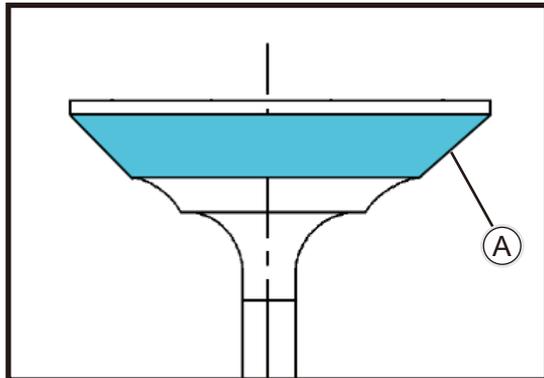
- ◆ Insert the guide into the valve guide.
- ◆ Apply cutting oil to the seat ring and tool.
- ◆ Place the 46° tool on the guide and perform light cutting.
- ◆ Check the cutting area of the seat ring:

If the contact area is less than 75% of the full circle of the seat ring, turn it 180° and do another light cut.

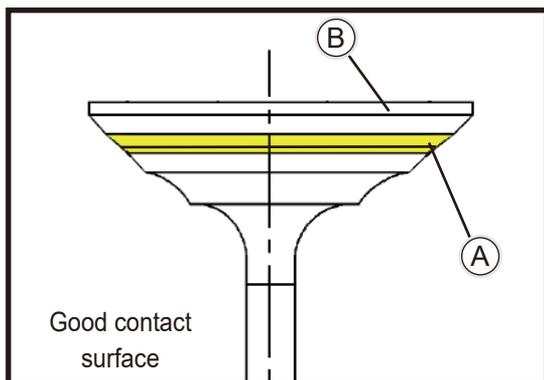
If the tool touches the uncut part of the seat ring, check the guide. Check for burrs, scratches, or excessive jumps. If the guide is bent, it must be replaced.

If the contact surfaces of the tools are all in the same position, it means that the valve guide has been deformed due to improper installation.

If the initial cutting contact area is greater than 75%, continue cutting the seat ring until all dents are removed and a clear seat ring surface appears.



- ◆ To check the contact area on the valve, apply a thin layer of Prussian Blue™ paint on the valve seat ring. If the interference angle is 46°, paint a black permanent mark **【A】** on the entire valve disc surface.
- ◆ Insert the valve into the catheter and tap the valve into place several times.
- ◆ Remove the valve, and use the paint on the valve to confirm where the valve is in contact with the seat ring. The seat ring should touch the middle or slightly higher position of the valve disc surface, and the width should be appropriate



If the contact position is at the top edge of the valve disc surface to the unpainted area **【B】**, it indicates that the contact position between the valve disc surface and the seat ring is too high. At this time, use a 30° tool to lower the seat ring.

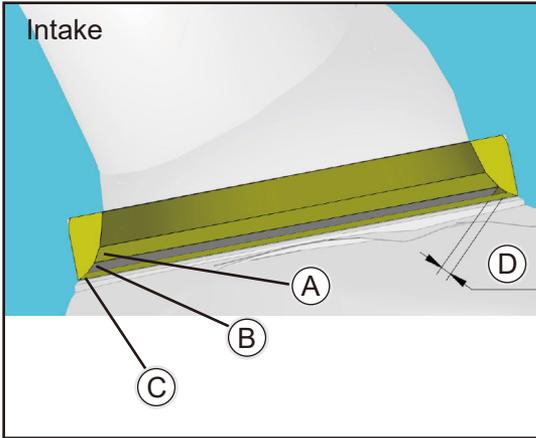
If it is too low, use a 60° tool to raise the seat ring. When the contact area is concentrated on the valve surface, measure the width of the valve seat.

If the seat ring contact surface is too wide or uneven, cut the top and bottom to narrow the seat ring.

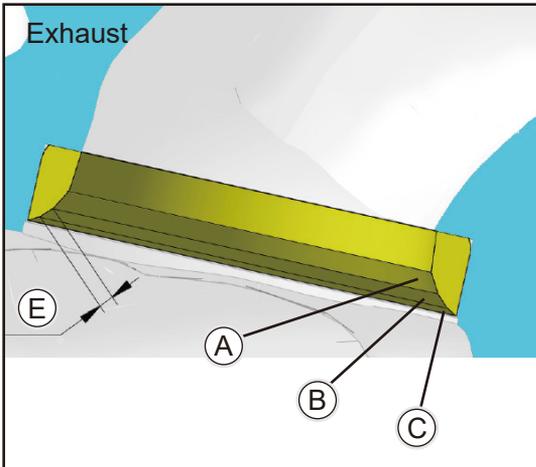
If the seat ring contact surface is too narrow, use a 45° tool to widen it, and recheck the valve surface and the contact surface width on the seat ring after each cut.

**TIPS**

If it is an interference angle, under normal circumstances, the contact surface on the valve disc surface will be very narrow. A uniform and continuous contact surface **【A】** can be seen on the valve disc surface.



- 【A】 30°
  - 【B】 45°
  - 【C】 60°
  - 【D】 1.0 ~ 1.1mm (0.0394" ~ 0.0433")
- limit: 1.4mm (0.055")



- 【A】 30°
  - 【B】 45°
  - 【C】 60°
  - 【E】 1.5 ~ 1.6mm (0.0591" ~ 0.0630")
- limit: 1.9mm (0.075")

- ◆ Wash all the fillings in the area with hot soapy water, and then blow it off with compressed air.
- ◆ Lubricate the valve guide with clean engine oil, and apply an oil-based or water-based abrasive on the valve disc surface.

## TIPS

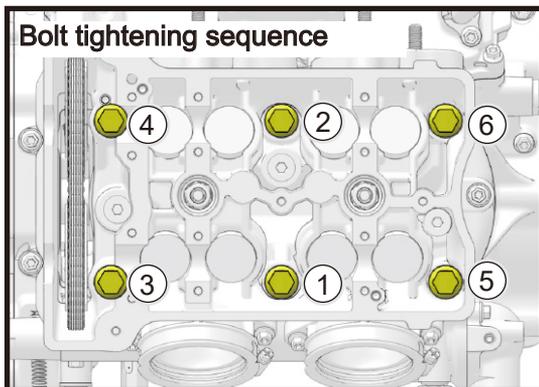
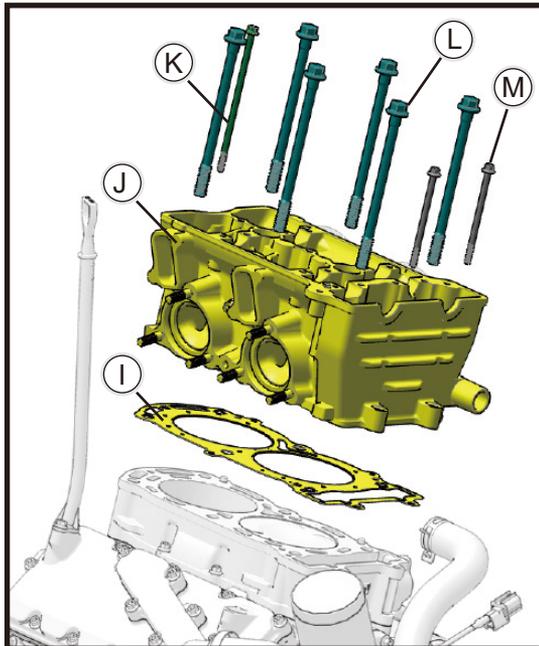
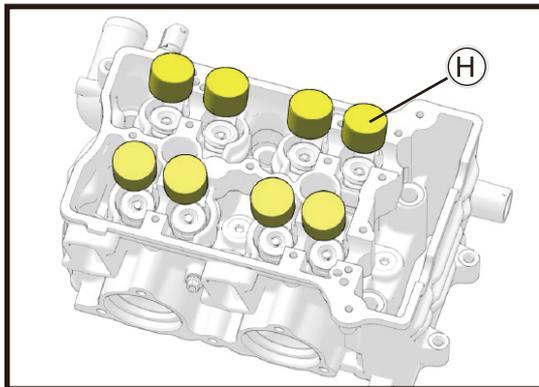
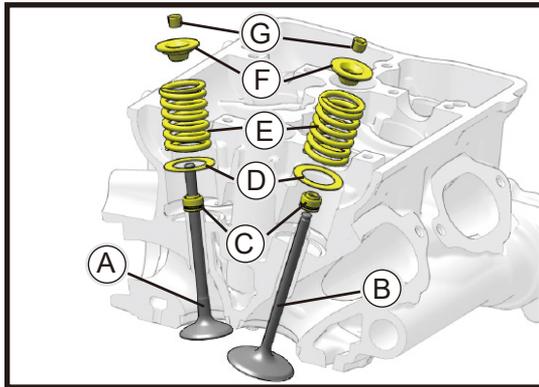
If the interference angle repair method is used, no grinding is required.

- ◆ Use a grinding tool or a section of fuel line connected to the valve stem to insert the valve into the respective guide rail and grind it.
- ◆ Rotate the valve back and forth quickly until the cutting sound is smooth. Lift the valve slightly away from the seat, rotate it 1/4 turn, and repeat the grinding process. Do this 4 to 5 times until the valve is completely seated and the surface of the valve seat is smooth, and then repeat this process for other valves.
- ◆ Thoroughly clean the cylinder head and valve.

## ⚠ CAUTION

Don't grind too much. Excessive grinding will cause the valve to sink into the cylinder head, thereby reducing the valve clearance. If the valve is sunk too deep, the clearance cannot be adjusted and the cylinder head must be replaced.

## Cylinder head assembly



### ⚠ WARNING

When disassembling and assembling the cylinder head or operating the valve spring, you need to wear goggles.

- ◆ Install a new valve oil seal **【C】** on the valve guide, and press the valve oil seal into place with a special tool.
- ◆ Apply engine oil to the valve stem, and insert the exhaust valve **【A】** and intake valve **【B】** into the corresponding valve guides.
- ◆ Install the valve spring seat **【D】**, valve spring **【E】**, lock clip seat **【F】**, and lock clip **【G】** in sequence.
- ◆ Use special tools to compress the spring until there is enough space to install the valve lock clip.
- ◆ Clamp a pair of valve lock clamps into the valve lock clamp groove.
- ◆ Repeat the above steps to install the remaining valves in place.

### ⚠ CAUTION

The valve spring is marked with a mark or the end with a larger pitch is facing upwards.

- ◆ To install the valve lifter, refer to the chapters of "Valve Clearance Adjustment" and "Selection of Lifter".
- ◆ Align the positioning pins on the cylinder block and place the cylinder head gasket **【I】**. The gasket should be clean and free of grease.
- ◆ Align the position of the positioning pin, and place the cylinder head **【J】**. Install new cylinder head bolts **【L】** and tighten them in order.
- ◆ Install the bolts **【K】** and **【M】** at both ends and tighten them according to the torque.

#### Cylinder head bolt **【L】**

first step: 12N·m(1.2 kgf·m, 8.8 ft·lb)  
 Second step: 35N·m(3.57 kgf·m, 25.8 ft·lb)  
 Step 3: Rotate 180°

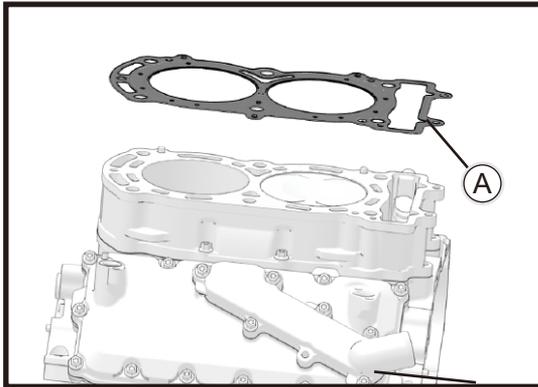
- ◆ Bolt **【K】** and **【M】** tightening torque:

#### Bolt **【K】**, **【M】**

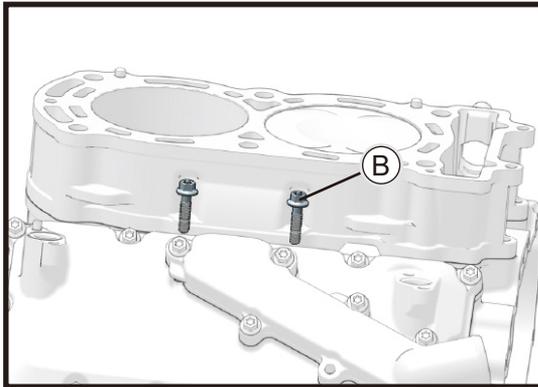
9.8 N·m (1.0 kgf·m, 87 in·lb)

## CYLINDER BLOCK AND PISTON

### Cylinder block removal

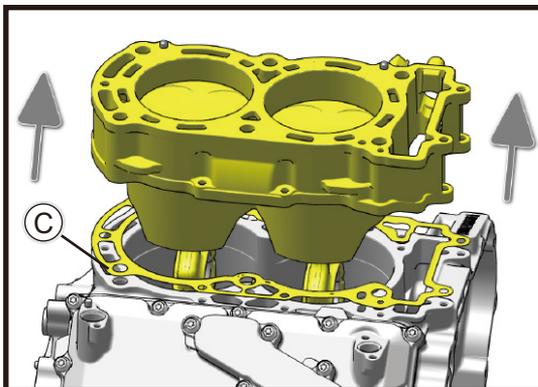


- ◆ Remove the cylinder head gasket 【A】 .
- ◆ Remove the two M6 connecting bolts 【B】 .
- ◆ Disassemble the crankshaft (see the chapter of crankshaft connecting rod piston assembly).
- ◆ Take out the cylinder block and piston as a whole from the crankcase, and remove the cylinder block gasket 【C】 .
- ◆ Remove the piston and connecting rod assembly from the cylinder block.



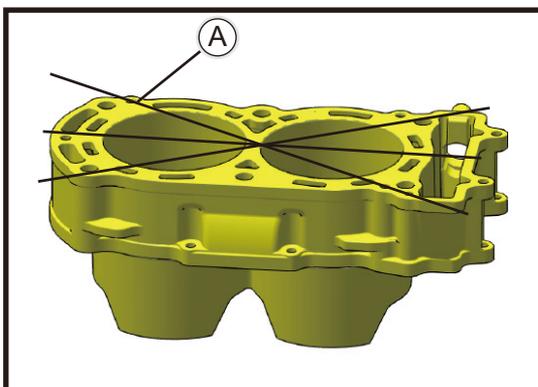
### TIPS

If the piston will continue to be used, please make a mark according to the installation position during disassembly, so that the same cylinder position can be installed in the next assembly.

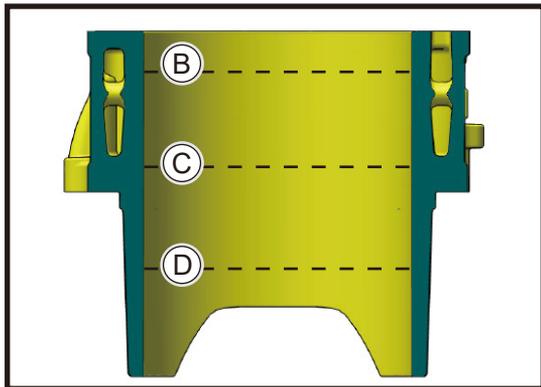


### Cylinder block inspection

- ◆ Keep the top surface of the cylinder block clean, place a straightedge 【A】 on the top surface of the cylinder block, and use a plug rule to measure the distance between the straightedge 【A】 and different positions of the cylinder block. Measure the distance between the ruler 【A】 and different positions of the cylinder block with a plugging ruler. Cylinder head deflection limit: 0.05 mm (0.002"), if the cylinder head deflection exceeds the limit, replace the cylinder block.
- ◆ Check cylinder bore for wear, scoring or damage.
- ◆ Measure the inner diameter of the cylinder bores, at the three heights shown in the illustration ( 【B】 is 15 mm from the top surface, 【C】 is in the center, and 【D】 is 15 mm from the bottom), in two directions (front and rear, left and right), and at a total of six positions for each cylinder bore, and measure them separately.

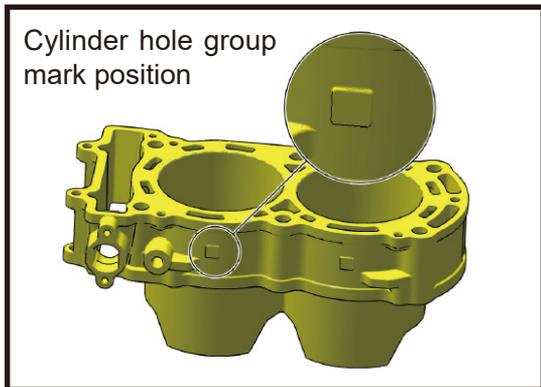


# CYLINDER HEAD, CYLINDER, PISTON

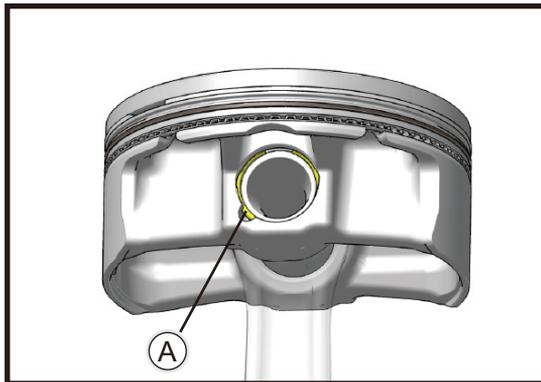


- ◆ A cylinder bore grouping notation ( I or II ) is marked on the step on the intake side of each cylinder in the cylinder block. Compare the bore measurement results with the corresponding grouping dimensions, and replace the cylinder block if the measured value of any bore exceeds the use limit.

| Cylinder Bore Bore Diameter: |    |  |
|------------------------------|----|--|
| standard:                    | I  | 92.992 ~ 93.000 mm (3.6611" ~ 3.6614") |
|                              | II | 93.000 ~ 93.008 mm (3.6614" ~ 3.6617") |
| Limit:                       | I  | 93.027 mm (3.6653")                    |
|                              | II | 93.035 mm (3.6655")                    |



|                     |               |
|---------------------|---------------|
| Roundness limit:    | 0.025(0.001") |
| Cylindricity limit: | 0.025(0.001") |

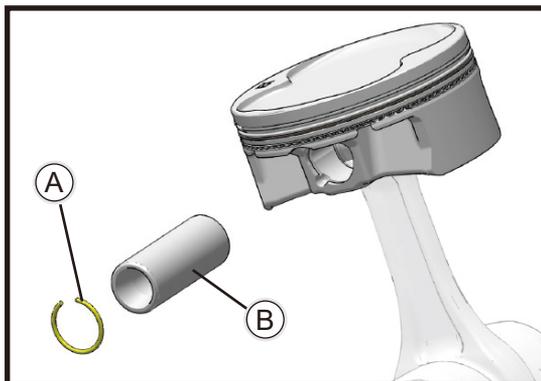


## Disassemble the piston

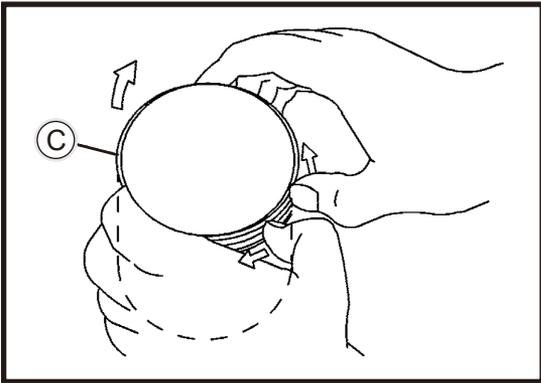
- ◆ Disassemble the cylinder block (see Cylinder Block Disassembly), and remove the piston connecting rod assembly.
- ◆ Put a clean cloth under the piston and remove the piston pin circlip 【A】 from the piston.

**⚠ CAUTION**

Do not reuse the circlip, because disassembly will weaken and deform the elastic force of the circlip. They may fall off and damage the cylinder bore wall.



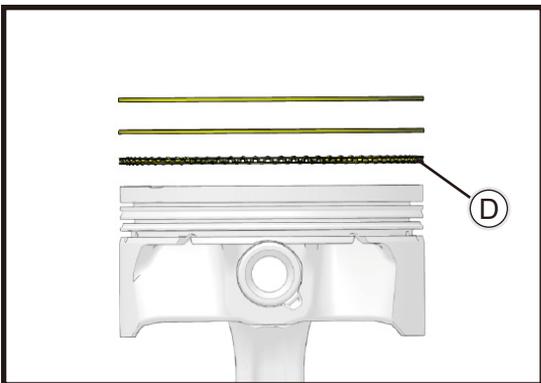
- ◆ Remove the piston pin 【B】 .
- ◆ Remove the piston.



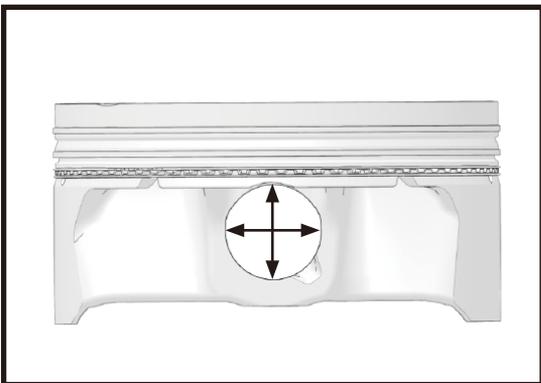
- ◆ Use your fingers to carefully open the opening of the piston ring 【C】 , then lift the piston ring up and remove it from the piston.
- ◆ Remove the remaining piston ring in the same way.

## ⚠ CAUTION

When disassembling the piston ring, do not open it too much, so as not to damage the piston ring or reduce the tension of the piston ring.



- ◆ The oil ring assembly 【D】 is composed of two upper and lower blade rings and an intermediate liner ring. When disassembling, first remove the upper blade ring, then the lower blade ring, and finally the intermediate liner ring.

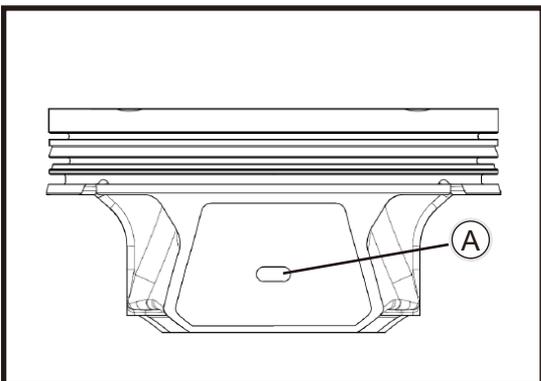


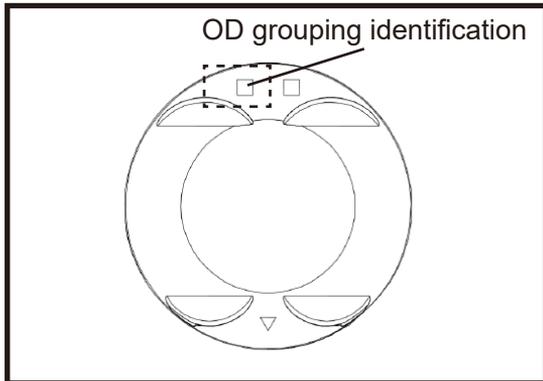
## Piston measurement

- ◆ Measure the diameter of the piston pin hole in two directions (90° apart). If the limit is exceeded, the piston needs to be replaced.

| Piston pin hole diameter |                                       |
|--------------------------|---------------------------------------|
| standard value:          | 20.009 ~ 20.018 mm(0.7877" ~ 0.7881") |
| Limit:                   | 20.05 mm(0.7893")                     |

- ◆ Measure the diameter of the large-diameter detection area on the piston, and record the measurement result.



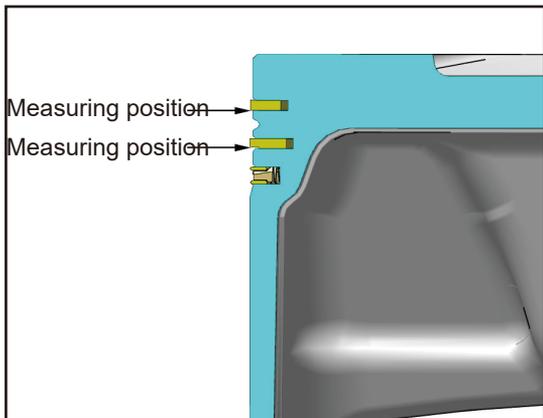


- ◆ Check the grouping marks on the top surface of the piston, compare the measurement results with the grouping values of the piston OD, if it exceeds the limit value, it needs to be replaced.

| Piston diameter |   |                     |
|-----------------|---|---------------------|
|                 | standard                                  | Limit               |
| group I :       | 92.951 ~ 92.959 mm<br>(3.6594" ~ 3.6597") | 92.858 mm (3.6558") |
| group II :      | 92.959 ~ 92.967 mm<br>(3.6597" ~ 3.66")   | 92.885 mm (3.6569") |

## Measuring piston ring groove clearance

- ◆ The piston ring should be parallel to the surface of the piston ring groove. If not the piston and rings need to be replaced.
- ◆ With the piston ring in the piston ring groove, take several measurements with a plug gauge to determine the piston ring/groove clearance.



| Piston ring groove clearance: |                                      |
|-------------------------------|--------------------------------------|
| First course:                 | 0.020 ~ 0.060 mm (0.0007" ~ 0.0023") |
| Second course:                | 0.020 ~ 0.060 mm (0.0007" ~ 0.0023") |
| Limit values:                 | 0.12 mm (0.0047")                    |

If the piston ring groove clearance is greater than the service limit, measure the thickness of the piston rings and the width of the ring grooves as follows to determine whether to replace the rings or the piston or both.

## Piston ring groove width

- ◆ Measure with calipers at multiple locations on the piston.

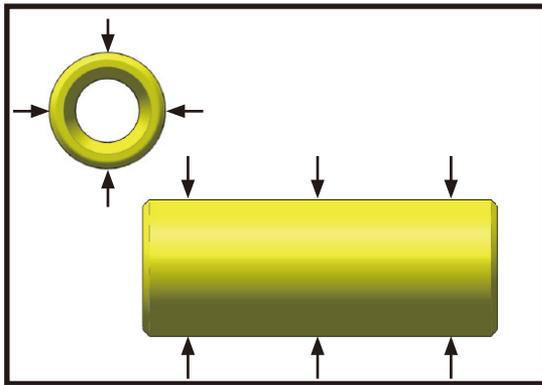
| Piston ring groove width |                     |             |
|--------------------------|---------------------|-------------|
|                          | standard value      | limit value |
| First course:            | 1.22 ~ 1.24 mm      | 1.31mm      |
| Second course:           | (0.0480" ~ 0.0489") | (0.0516")   |

If the width of either ring groove exceeds the limit, the piston needs to be replaced.

## Piston ring thickness

- ◆ Use a micrometer to measure at multiple locations on the piston ring.

| Piston ring thickness |                     |             |
|-----------------------|---------------------|-------------|
|                       | standard value      | limit value |
| First course:         | 1.17 ~ 1.19 mm      | 1.10mm      |
| Second course:        | (0.0461" ~ 0.0469") | (0.0433")   |



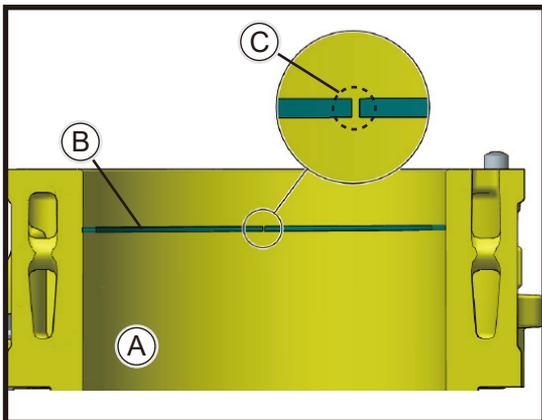
### Measure the piston pin

- ◆ Measure the diameter of the piston pin in three positions and two directions (90° apart). If the limit is exceeded, the piston pin needs to be replaced.

| Piston pin diameter |                                       |
|---------------------|---------------------------------------|
| standard:           | 20.000 ~ 20.005 mm(0.7873" ~ 0.7875") |
| limit:              | 19.98 mm(0.7866")                     |

### Measure the closed gap of the piston ring

- ◆ Use the piston to push the piston ring 【B】 into the cylinder bore 【A】.
- ◆ Use a feeler gauge to measure the closed gap 【C】 when the piston ring is at the top and bottom of the cylinder bore.



### TIPS

After the cylinder bore is worn and deformed, there will be a difference between the closed gap of the piston ring at the top and bottom of the cylinder bore. At this time, the cylindricity and roundness of the cylinder bore should be measured to determine whether the cylinder can continue to be used.

If the closed gap of the piston ring exceeds the limit, a new piston ring needs to be replaced.

| Piston ring closed gap |                                |                |
|------------------------|--------------------------------|----------------|
|                        | standard                       | limit          |
| first air ring:        | 0.25 ~ 0.35 mm(0.01" ~ 0.014") | 0.5 mm(0.02")  |
| The second air ring:   | 0.35 ~ 0.5 mm(0.014" ~ 0.02")  | 0.7 mm(0.028") |
| Oil ring               | 0.2 ~ 0.7 mm(0.008" ~ 0.028")  | 0.9 mm(0.035") |

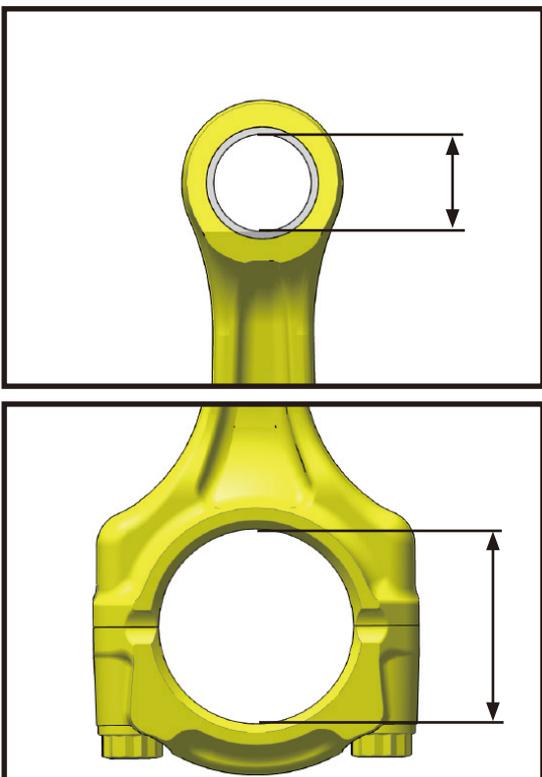
### Connecting rod measurement

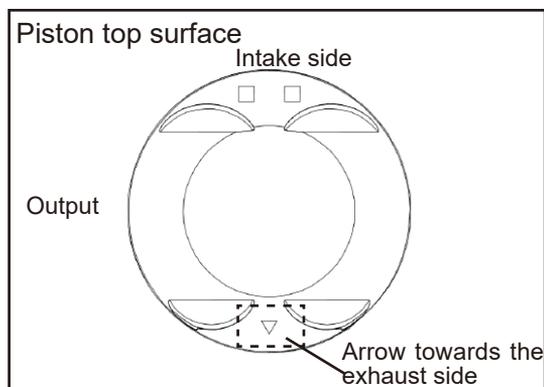
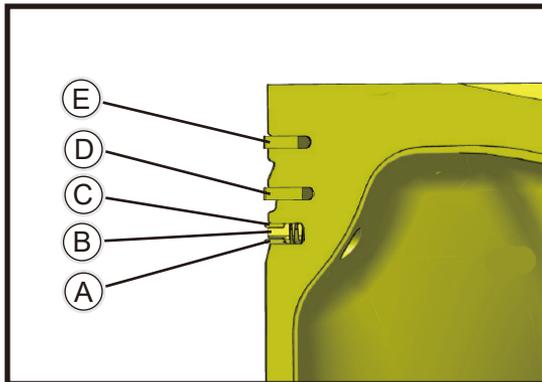
- ◆ Measure the inner diameter of the small end hole of the connecting rod. If the limit is exceeded, the connecting rod needs to be replaced.

| Connecting rod small head aperture |                                       |
|------------------------------------|---------------------------------------|
| standard :                         | 20.015 ~ 20.030 mm(0.7879" ~ 0.7885") |
| limit:                             | 20.06 mm(0.7897")                     |

- ◆ Install the corresponding connecting rod cover (without bearing bushes), and screw in the connecting rod bolts.
- ◆ Tighten the connecting rod bolts to 25Nm (2.5 kgf·m, 18.4 ft·lb).
- ◆ Measure the diameter of the big end of the connecting rod. If it exceeds the limit, the connecting rod needs to be replaced.

| Big head aperture of connecting rod |                                   |
|-------------------------------------|-----------------------------------|
| standard:                           | 44 ~ 44.016 mm(1.7323" ~ 1.7329") |
| Limit:                              | 43.96 mm(1.7307")                 |



**Piston ring installation****TIPS**

When installing the piston ring, apply clean engine oil to the surface. Check the clearance of the piston ring groove (see "Measuring the clearance of the piston ring groove"). If assembling a used piston, the carbon deposits in the piston ring groove and the oil hole of the oil ring groove should be cleaned first

- ◆ Install the oil ring backing ring **【B】** in the bottom piston ring groove so that the two ends are butt (not overlapping), and turn the backing ring so that the opening faces the engine output end.
- ◆ Install the bottom wiper ring **【A】** and turn it so that the ring port faces the intake side of the piston.
- ◆ Install the upper wiper ring **【C】** and turn it so that the ring opening faces the exhaust side of the piston.
- ◆ Install the second air ring, the side with the mark on the ring faces upwards, and turn it so that the ring opening faces the air inlet side.
- ◆ Install the first air ring, the side with the mark on the ring faces upwards, and turn it so that the ring opening faces the exhaust side.

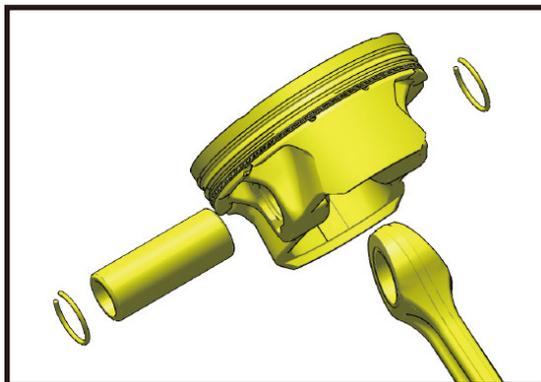
**Piston connecting rod assembly**

- ◆ Piston pin hole, connecting rod small end hole, and piston pin are smeared with clean engine oil.
- ◆ Insert the piston pin and install the new piston pin retaining ring. Turn the retaining ring so that the opening faces upward or downward.

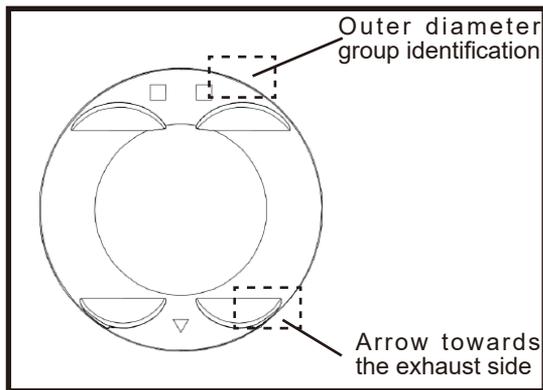
**⚠ CAUTION**

Do not reuse the piston pin retaining ring, as the retaining ring will be deformed during disassembly.

Do not over-compress the retaining ring during installation, so as not to reduce the radial elastic force of the retaining ring



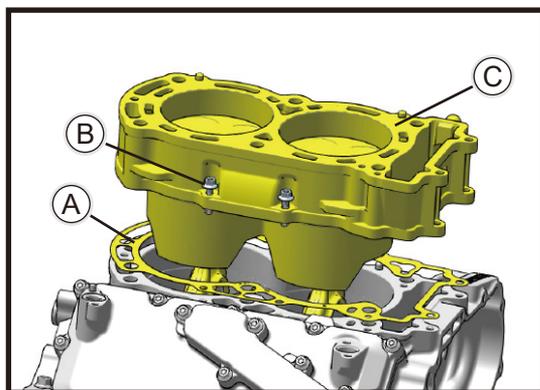
## Cylinder block assembly



- ◆ According to the grouping mark of cylinder bore and piston, select the combination of piston and cylinder block in the same group. For example, the pistons of group "I" correspond to the cylinder bores of group "I", and the pistons of group "II" correspond to the cylinder bores of group "II".
- ◆ After the piston connecting rod assembly is installed, press the piston ring with your fingers, and carefully insert the piston into the cylinder hole from the bottom of the cylinder block.

### ⚠ CAUTION

There is a triangle mark on the top surface of the piston, and the arrow points toward the exhaust side during installation.



- ◆ Keep the sealing surface clean, align the position of the positioning pin, and install a new cylinder block gasket **【A】**.
- ◆ Install the assembled piston and cylinder block assembly **【C】** into the upper crankcase.
- ◆ Screw in the bolt **【B】** and tighten it according to the torque.

Bolt **【B】**

9.8 N·m (1.0 kgf·m, 87 in·lb)

**CYLINDER PRESSURE MEASUREMENT****TIPS**

Fully charge the battery before measuring

- ◆ Warm up the engine completely, then stop it.
- ◆ Disassemble the spark plug (refer to the spark plug chapter).
- ◆ Connect the cylinder pressure gauge and the connector firmly to the spark plug hole.
- ◆ Special tools-cylinder pressure gauge, cylinder pressure gauge connector.
- ◆ Keep the throttle fully open and use the starter motor to drive the engine several times.
- ◆ When the pressure gauge stops rising, stop rotating and read the pressure value.

| Cylinder pressure (reasonable range) |   |
|--------------------------------------|---|
| Electric starter:                    | 1.1 ~ 1.3 MPa (11~13 kgf/cm <sup>2</sup> , 159~188 psi) |

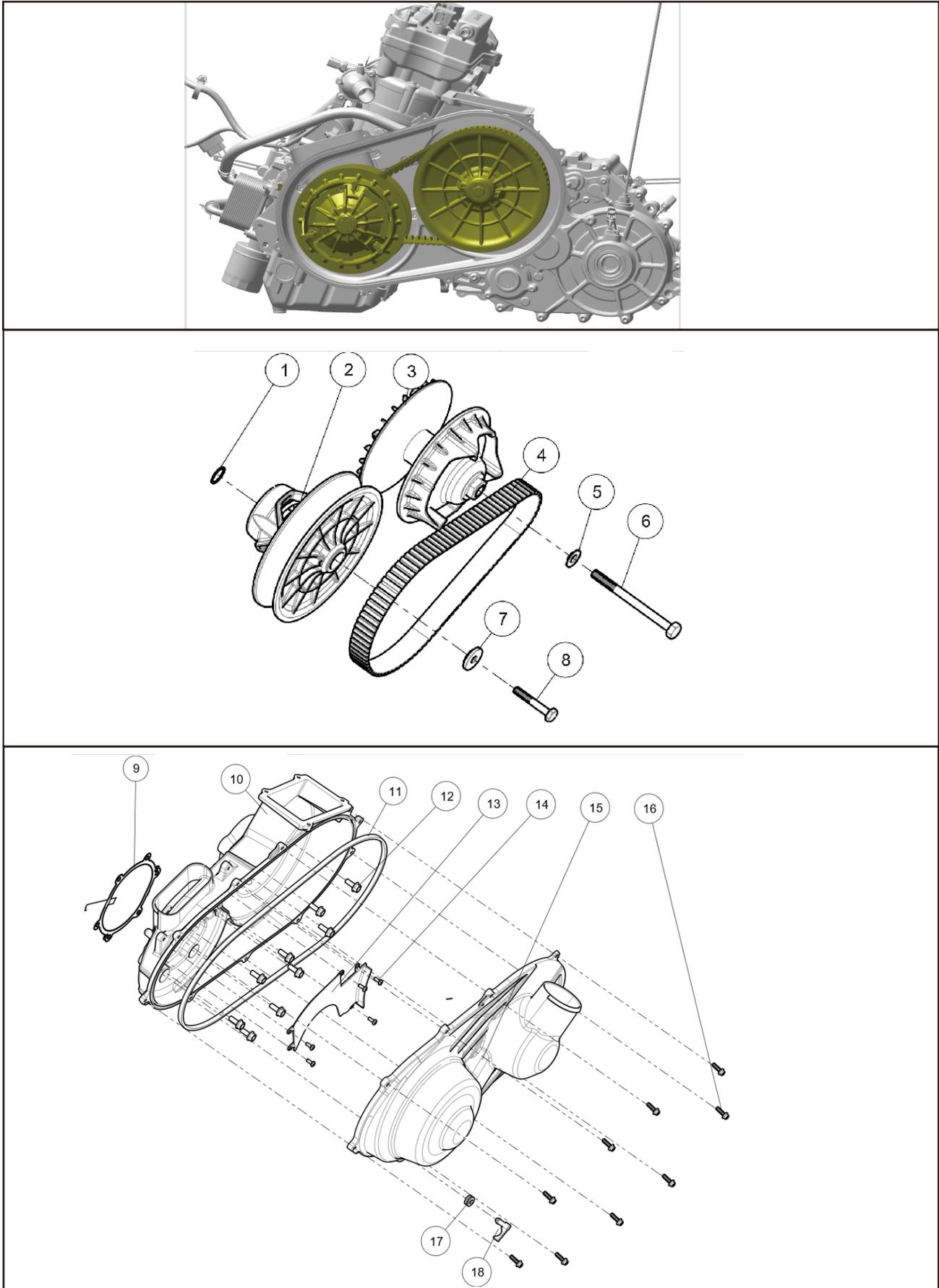
If the pressure value obtained is not within a reasonable range, you should refer to the following table.

| problem  | diagnosis   | Measures (actions)   |
|--|---|--|
| Cylinder pressure value is out of reasonable range         | Due to the valve oil seal and/or piston oil ring damage, the piston, cylinder head and combustion chamber produce carbon deposits (can be determined by the white smoke exhaust). | Remove carbon deposits and replace damaged parts if necessary.                           |
|  | The thickness of the cylinder head gasket is incorrect.   | Replace with standard gaskets.   |
|  | the valve spring is damaged or the elastic force fails,   | replace the spring.  |
| Cylinder pressure value is lower than the reasonable range | Air leakage around the cylinder head  | Replace the damaged cylinder head gasket and check for deformation of the cylinder head. |
|  | Bad valve seat condition  | Repair if necessary.   |
|  | Incorrect valve clearance   | Adjust the valve clearance.  |
|  | Piston/cylinder hole clearance is unreasonable.   | Check the cylinder block and replace/repair if necessary                                 |
|  | Bad condition of piston ring and/or piston ring groove  | Replace the piston and/or piston ring.   |

## CVT SYSTEM

|  |               |
|--|---------------|
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## CVT SYSTEM EXPLOSION DIAGRAM



| No. | Fastener                      | Torque |         |         | Remarks |
|-----|-------------------------------|--------|---------|---------|---------|
|     |                               | N · m  | kgf · m | ft · lb |         |
| 1   | CVT ADJUSTING SHIM            |        |         |         |         |
| 2   | CVT DRIVEN PULLEY             |        |         |         |         |
| 3   | CVT DRIVE PULLEY              |        |         |         |         |
| 4   | CVT BELT                      |        |         |         |         |
| 5   | SPACER 12×28×6                |        |         |         |         |
| 6   | BOLT M12×1.25×142             | 120    | 12.2    | 88      | R, Lh   |
| 7   | SPACER 10.5×36×8              |        |         |         |         |
| 8   | CVT DRIVEN PULLEY BOLTS       | 80     | 8.2     | 59      | R       |
| 9   | CVT INNER COVER SEAL I        |        |         |         |         |
| 10  | CVT INNER COVER               |        |         |         |         |
| 11  | CVT INNER COVER SEAL          |        |         |         |         |
| 12  | HEXAGON FLANGE BOLT M8×20     | 15     | 1.5     | 11      | R, L    |
| 13  | CVT INNER COVER AIR DEFLECTOR |        |         |         |         |
| 14  | SCREWS M5×12                  | 5      | 0.5     | 3.8     | R, L    |
| 15  | CVT OUTER COVER               |        |         |         |         |
| 16  | BOLT M6×20                    | 12     | 1.2     | 9.2     | R, L    |
| 17  | CVT COVER PLUG SEAL           |        |         |         |         |
| 18  | PLUG                          |        |         |         |         |

G:Apply grease for oil seal and O-ring.

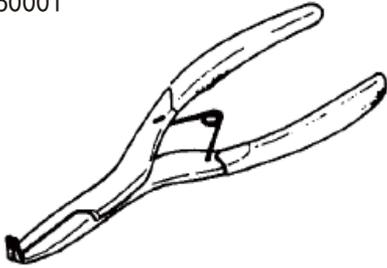
L:Apply a non-permanent locking agent.

Lh:Left-hand Threads

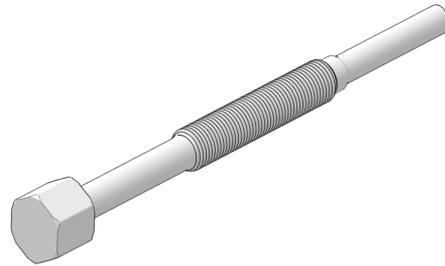
R:Replacement Part.

## SPECIAL TOOLS

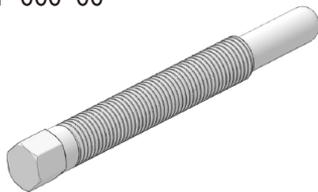
Back-up ring pliers:  
E01GZ0060001



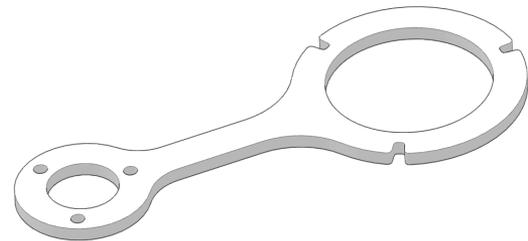
Drive pulley tightening bolt:



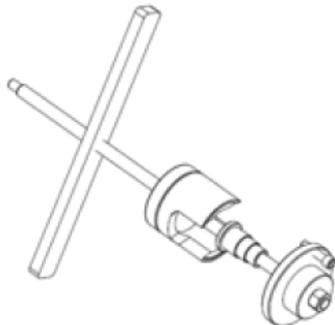
Driven wheel jack bolt:  
E01-E200001-000-00



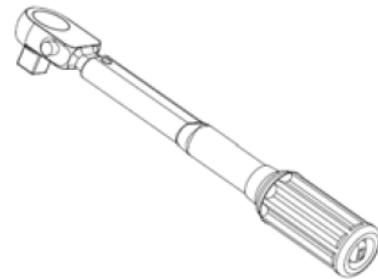
Retaining tool:



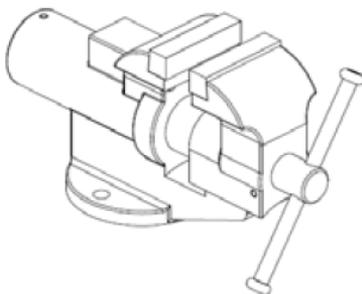
Assembly-Disassembly Tool



Drive pulley retainer:



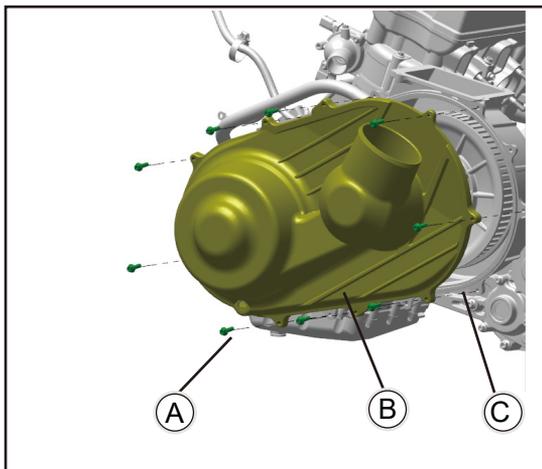
Vise



**CVT COVER REMOVAL/INSTALLATION**

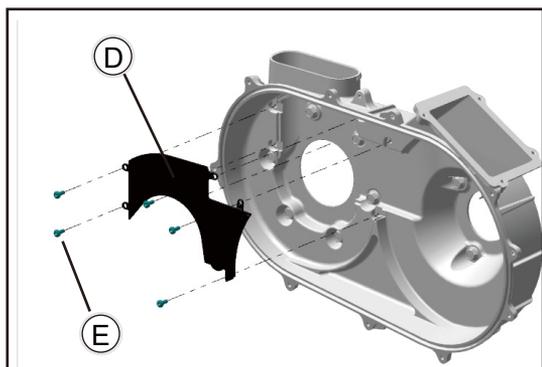
**⚠ WARNING**

Excessive imbalance or excessive operating speed may cause the continuously variable transmission master and slave to fail, resulting in serious injury or death. The main and driven wheels of a continuously variable transmission are precision balanced components designed to operate within certain speed limits. The disassembly/assembly and repair procedures of the main and driven wheel assemblies must be strictly followed. Modifying the engine or continuously variable transmission to increase rpm may cause malfunction.



**CVT COVER REMOVAL**

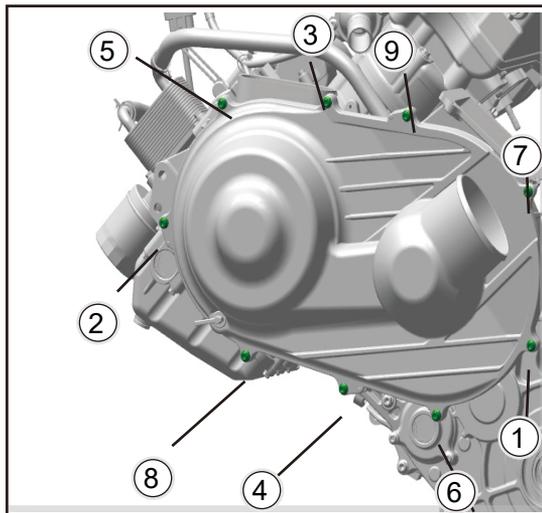
- ◆ Turn off the ignition switch.
- ◆ Demolition
  - CVT outer cover bolt **【A】**
  - CVT outer cover **【B】**



**CVT COVER LINING INSTALLATION**

- ◆ Install the CVT outer cover lining **【D】** into the CVT outer cover.
- ◆ Apply thread locking glue to the M5 screw **【E】** as shown in the picture and tighten it.
- ◆ Torque

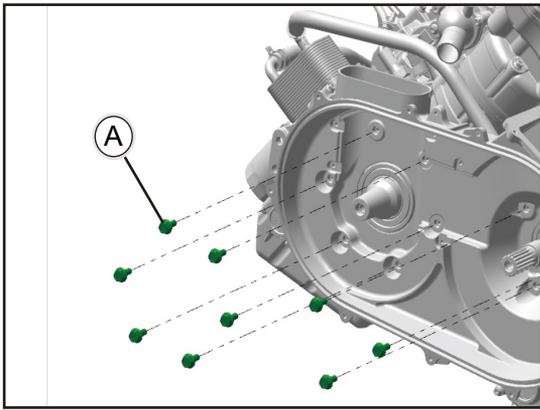
|                  |
|------------------|
| CVT cover screws |
| 5N•m (0.5kgf•m)  |



**CVT COVER INSTALLATION**

- ◆ Install the CVT cover plate seal **【C】** into the CVT inner cover sealing groove
- ◆ Tighten the outer cover bolts according to the tightening sequence as shown in the figure.
- ◆ Torque

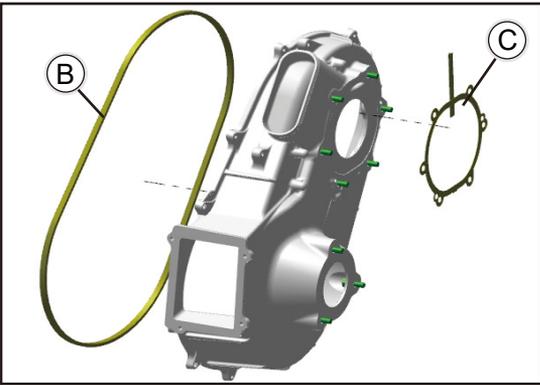
|                  |
|------------------|
| CVT cover bolt   |
| 12N•m (1.2kgf•m) |



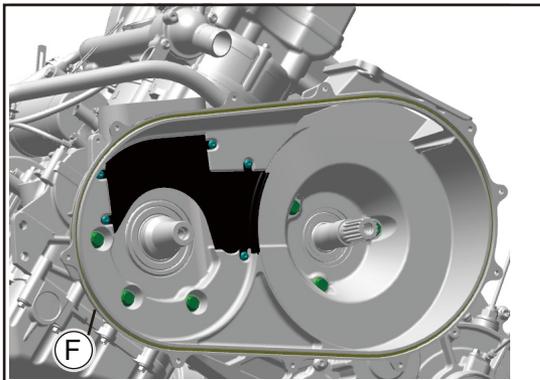
### CVT INNER COVER REMOVAL

- ◆ Remove the driving wheel and driven wheel (see Disassembling the driving wheel)
- ◆ Removal:  
Bolt M8×28 **【A】**  
Remove the CVT inner cover assembly

### CVT inner cover removal:

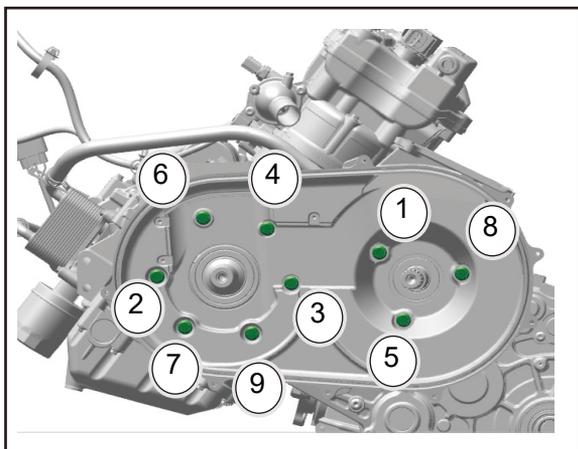


- ◆ Removal:  
CVT outer cover seal **【B】**  
CVT inner cover seal II **【C】**



### CVT INNER COVER INSTALLATION

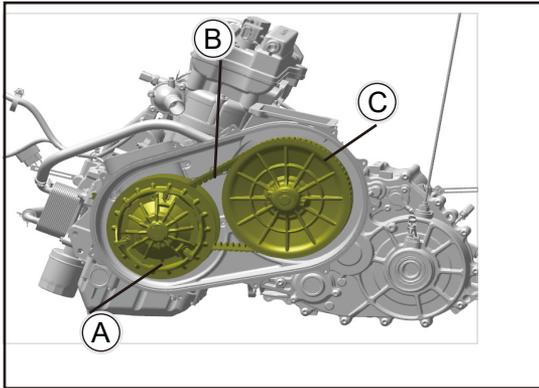
- ◆ If there is obvious water leakage, please replace the CVT outer cover seal **【B】** and CVT inner cover seal II **【C】** .
- ◆ Prepare the CVT inner cover sealing surface for thorough cleaning to remove all residues.
- ◆ Installation:  
CVT inner cover assembly **【F】**



- ◆ Coat the bolts with thread locking glue and tighten the valve cover bolts in the tightening sequence as shown in the figure.
- ◆ Torque

|                  |
|------------------|
| Bolt             |
| 15N•m (1.5kgf•m) |

**DRIVE BELT REMOVAL/INSTALLATION**



**DRIVE BELT REMOVAL**

- ◆ Remove the drive pulley 【A】 (see drive pulley removal).

**CAUTION**

Before disassembling the transmission belt, please pay attention to the direction of the 【A】 printed on the transmission belt (such as manufacturer name, arrow mark, etc.) so that the transmission belt can be reinstalled on the pulley in the original direction.

- ◆ Lift the transmission belt 【B】 from the driven pulley 【C】 .



**DRIVE BELT INSTALLATION**

**CAUTION**

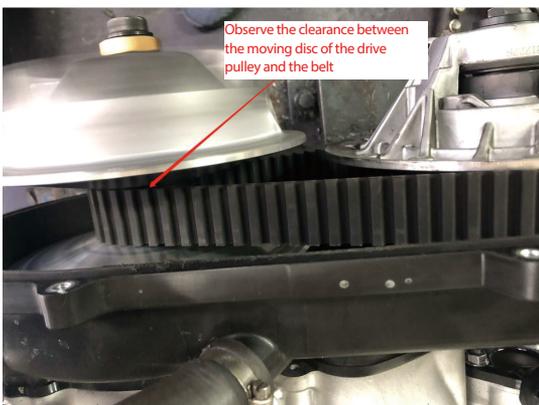
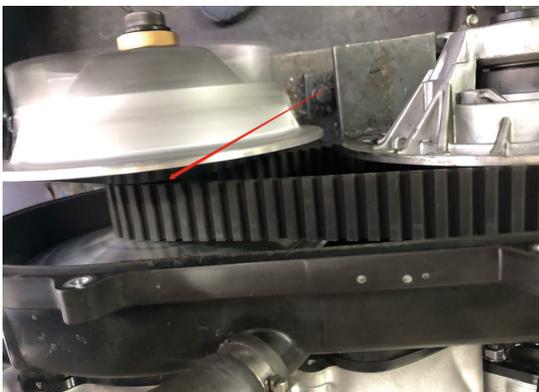
Make sure the printed information is facing the same direction so that the belt rotates in the same direction as when originally installed. When installing a new belt, install it so that the printed 【A】 message can be read from the side of the vehicle.

- ◆ Installation is basically the opposite of disassembly.
- ◆ Wrap the belt 【B】 around the driven pulley 【C】 .
- ◆ Install the driving pulley (see driving pulley installation).
- ◆ Check the drive belt
- ◆ Please refer to the continuously variable transmission system in the "Periodic Maintenance" chapter.

**PULLEYS GEOMETRICAL SPECIFICATIONS**

1. Under idling condition, when CVT is in normal working state, obvious clearance can be seen between belt and moving disc of drive pulley.
2. Under idling condition, if driven pulley rotation, Adjust the position of the driven pulley according to the following two condition

- ◆ When there is no clearance between the moving disc of the drive pulley and the belt, then properly reduce the adjusting shims of the driven pulley
- ◆ When there is an obvious clearance between the moving disc of the drive pulley and the belt, then properly add the adjusting shims of the driven pulley



## DRIVE AND DRIVEN PULLEY REMOVED FROM THE VEHICLE

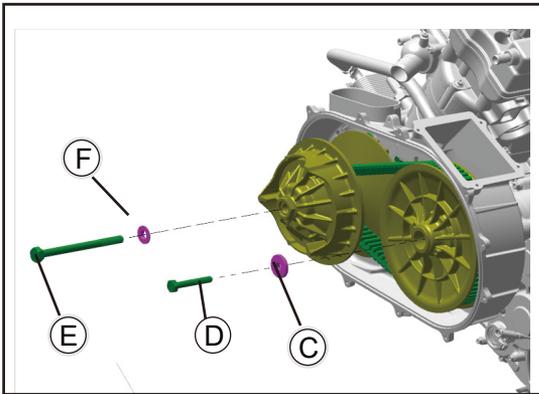
◆ Disassembly:

Remove the CVT outer cover (see CVT outer cover removal)

Loosen the drive pulley bolt 【E】 (left-hand thread)

**⚠ CAUTION**

The drive wheel bolt is left-hand threaded. Turn the wrench clockwise to loosen.



◆ Loosen the driven pulley bolt 【D】 (right thread)

◆ Disassembly:

Drive pulley bolt M12×1.25×142-LH 【E】

Flanged bushing 12×28×6 【F】

Driven pulley bolt M10×1.25×63 【D】

Flange bushing 10.5×36×8 【C】

◆ Tighten the ejector bolt 【H】 of the driven pulley, and separate the belt 【G】 from the driven pulley 【B】.

◆ Tighten the driving wheel ejector bolt 【H】 clockwise, remove the driving wheel 【A】 from the crankshaft, and hold the driving wheel with the driving wheel clamp 【J】 at the same time.

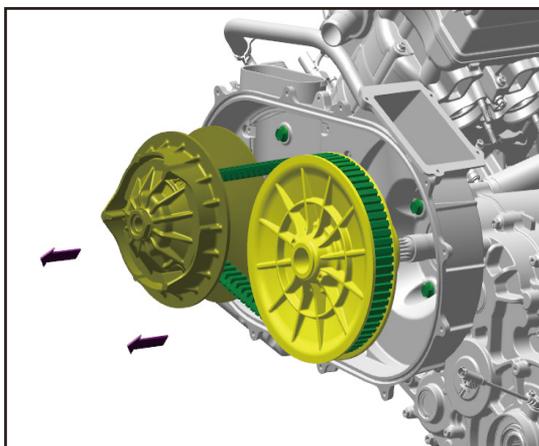
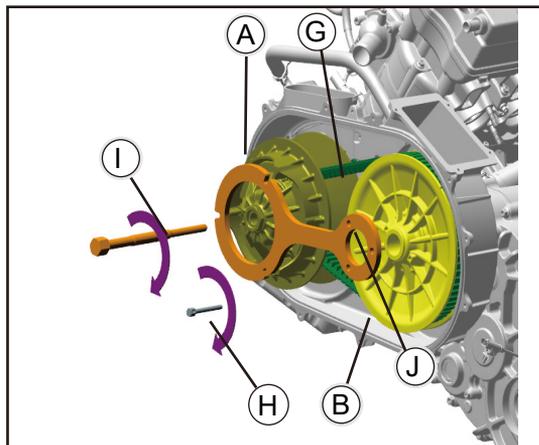
◆ Special tools,

◆ Drive pulley ejector bolt: E01GZ0000008

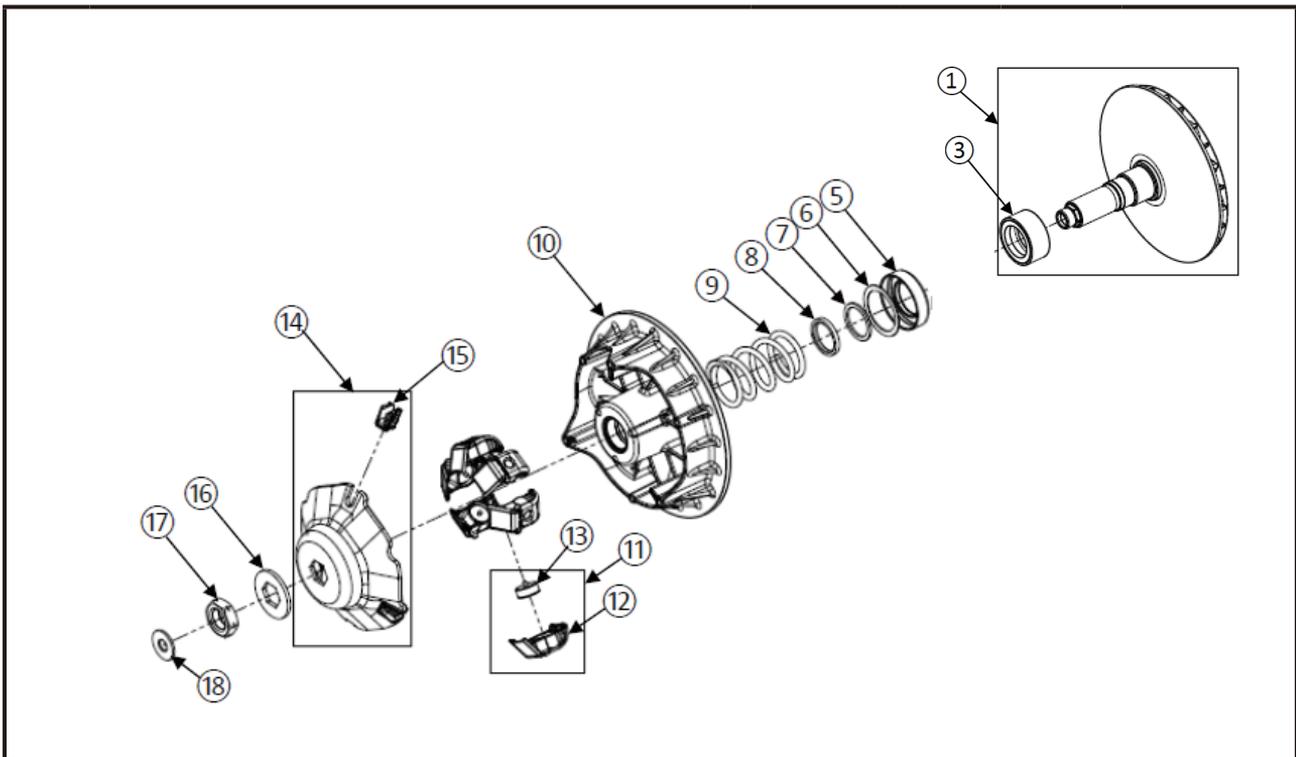
◆ Belt ejector bolt: E01-E200001-000-00

◆ Driving wheel clamp: E01GZ0000012

◆ Remove the drive pulley, drive pulley and drive belt.



**EXPLODED DIAGRAM OF DRIVE ASSEMBLY**



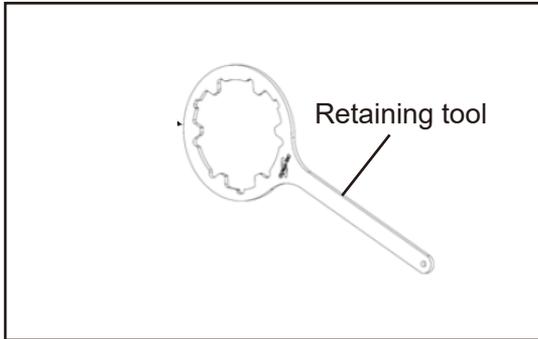
| No. | Fastener                  | Torque |       |       | Remarks |
|-----|---------------------------|--------|-------|-------|---------|
|     |                           | N·m    | kgf·m | ft·lb |         |
| 1   | Fixed sheave              |        |       |       |         |
| 3   | Freewheel or idle bearing |        |       |       |         |
| 5   | Spring seat               |        |       |       |         |
| 6   | Shim (if applicable)      |        |       |       |         |
| 7   | Shim                      |        |       |       |         |
| 8   | Stroke limiter            |        |       |       |         |
| 9   | Spring                    |        |       |       |         |
| 10  | Sliding sheave            |        |       |       |         |
| 11  | Centrifugal mass          |        |       |       |         |
| 12  | Block                     |        |       |       |         |
| 13  | Mass                      |        |       |       |         |
| 14  | Cap                       |        |       |       |         |
| 15  | Cap shoe                  |        |       |       |         |
| 16  | Washer (If applicable)    |        |       |       |         |
| 17  | Nut                       | 180    | 18    | 133   |         |
| 18  | Washer (If applicable)    |        |       |       |         |

## DRIVE ASSEMBLY DISASSEMBLY AND INSTALLATION

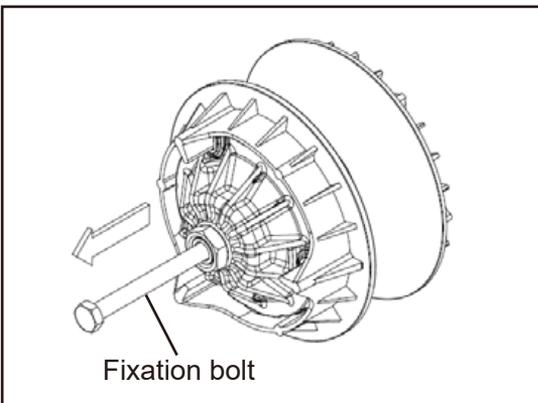
### PULLEY REMOVAL FROM THE VEHICLE

Removing the drive pulley:

- ◆ Remove the fixation bolt from the drive pulley (you will need to use the retaining tool to prevent the pulley from rotating).



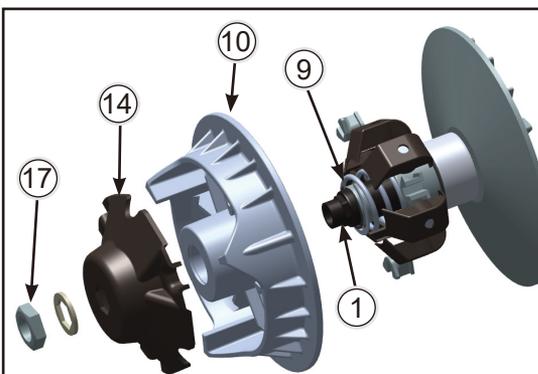
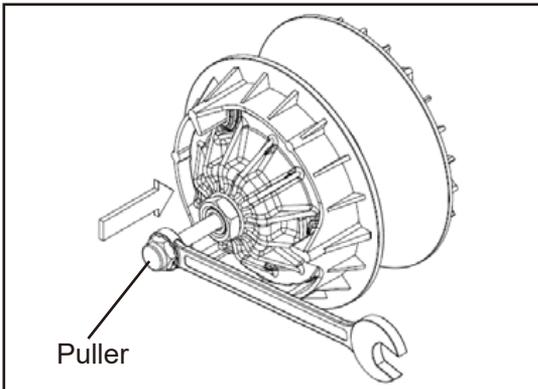
- ◆ Screw the puller in the drive pulley shaft and use a breaker bar. torque the puller until the pulley comes off.



#### NOTE

Hint: apply grease on the tip and on the threads of the puller

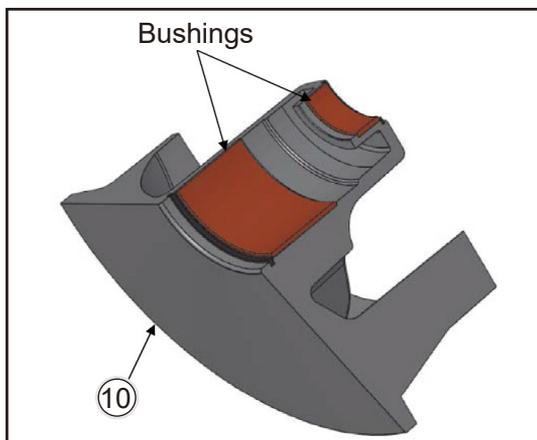
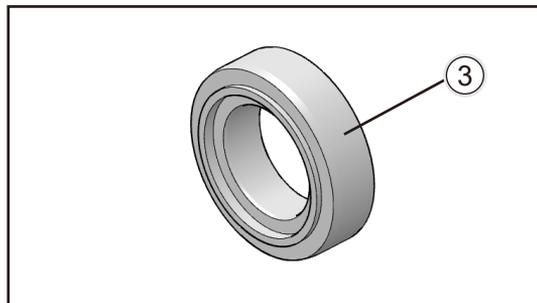
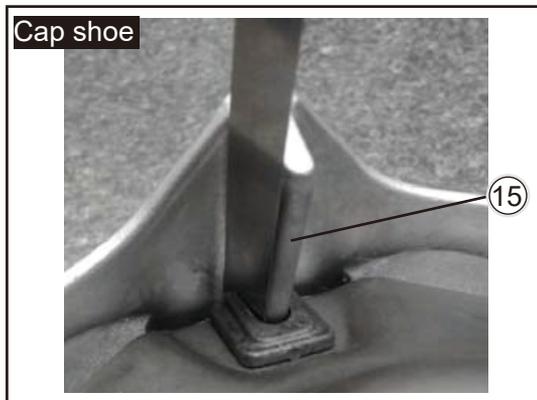
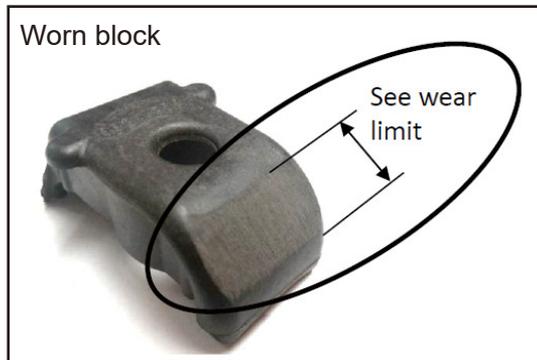
- ◆ If the pulley does not come off, please refer to the CVTech document #0046 - 5239 for complementary information on how to remove the drive pulley.



#### CAUTION

The sliding sheave is spring loaded. When unscrewing the nut ⑰, the spring ⑨ will push the cap ⑭ and the sliding sheave ⑩ up.

During the disassembly process, keep ⑭ and ① on the same line



**DRIVE PULLEY DISASSEMBLY**

Recommended inspection and replacement

1. Check for wear marks on the blocks ⑫ .
- 1.1. Change the blocks ⑫ when the wear marks exceed the wear limit. Admissible wear limit of the block is less than 14mm.

Always change all 6 centrifugal blocks ⑫ at the same time.

2. Check for wear of the cap shoe ⑮ .
- 2.1. Change cap shoes ⑮ when a 1mm feeler gauge enters between the cap shoe ⑮ and sliding sheave ⑩ tower or if the pulley makes too much noise at idle.

Always change all 3 cap shoes ⑮ at the same time.

Measure the spring ⑨ forces at the distances indicated on the CVTech website.

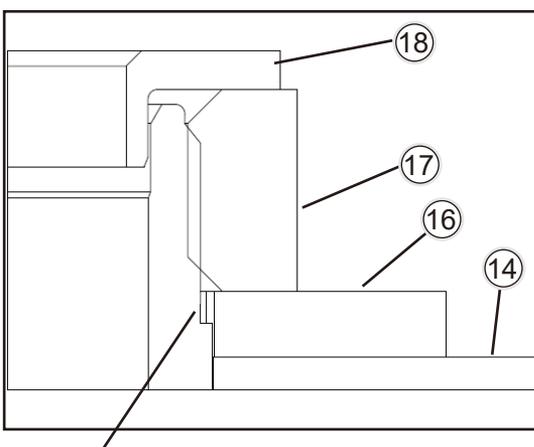
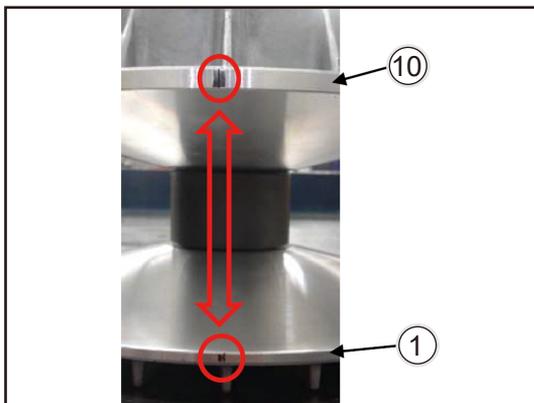
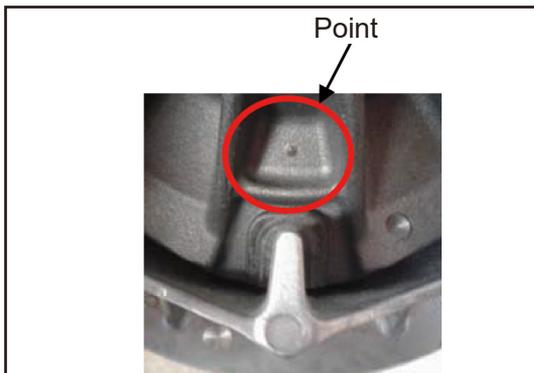
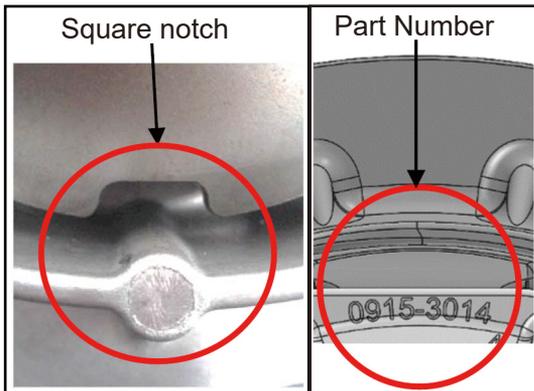
**NOTE**

To maintain the performance of the pulley, make sure the sliding sheave ⑩ bushings are cleaned with a microfiber towel or dry cloth.

**CAUTION**

Do not use acetone to clean the bushings.

### DRIVE PULLEY RE-ASSEMBLY



Hexagon top surface  
on the pulley shaft

Alignment of fixed sheave ①, sliding sheave ⑩ and cap ⑭.

- ◆ Align the 2 notches on the sheaves □ and □ and also the square shape notch or point or part number on the cap ⑭ (depending on cap model) together to make sure the pulley is balanced.

Nut M4×8

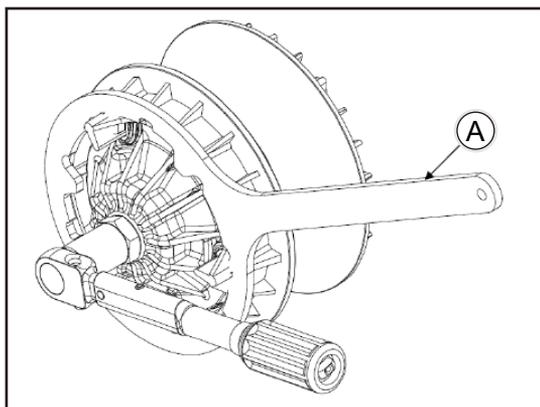
6 N•m (0.6kgf•m, 53in•lb)

### TIGHTENING THE PULLEY

- ◆ Use a torque wrench and a 30 mm or 32mm socket (depending on the version of pulley) to tighten the pulley nut ⑰ (see owner's manual for the proper value).

### NOTE

- ◆ Make sure the alignment of the hexagon shape of the cap ⑭ and washer ⑮ are fully engaged on the shaft hexagon shape before applying torque to the nut ⑰.



### PULLEY TIGHTENING

- ◆ Once the pulley is properly installed, use a torque wrench to tighten the fixation bolt.
- ◆ To tighten the drive pulley, use the retaining tool □A□ to lock the rotation.

#### **⚠ WARNING**

Do not forget to remove the tools from the drive pulley.

#### **NOTE**

Before you start the engine:

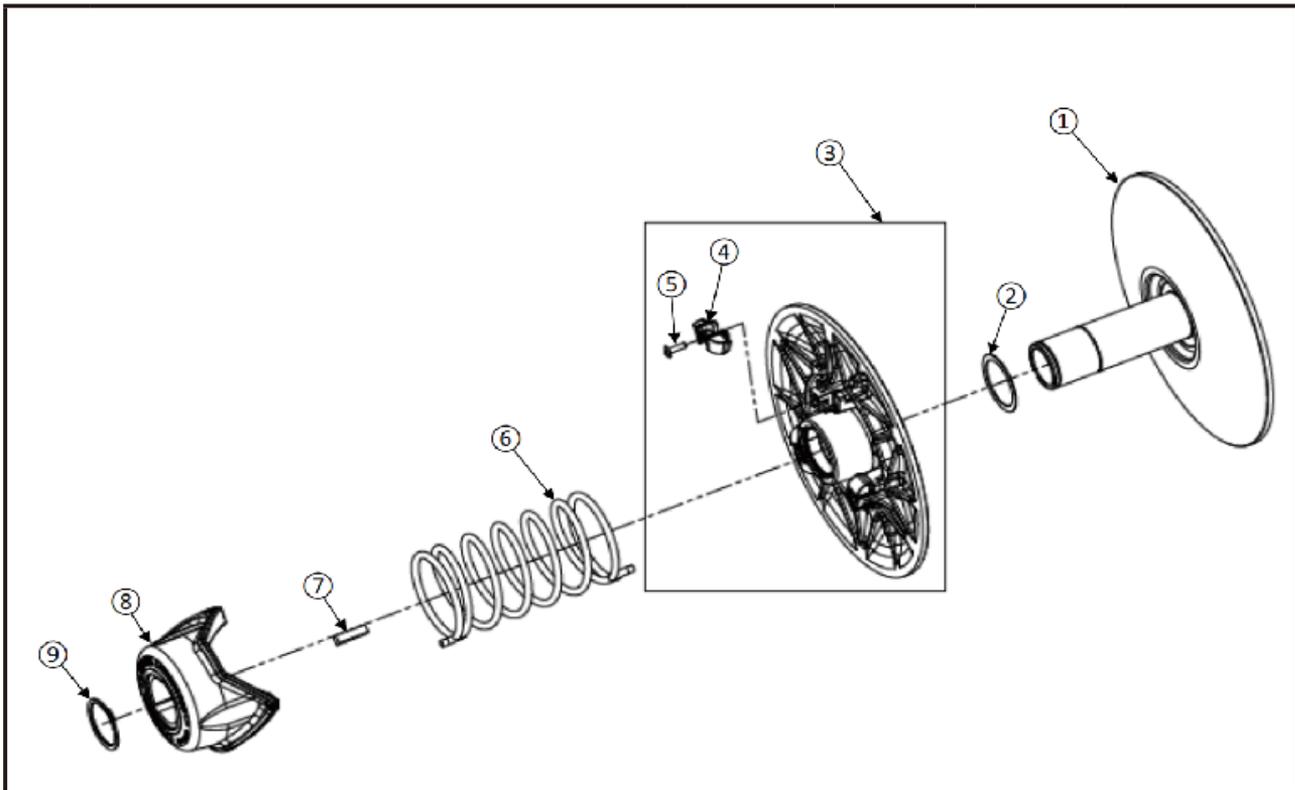
- ◆ Make sure all the components are clean without any trace of oil, dust and contaminants.
- ◆ Do not use any lubricants.

#### **NOTE**

For optimal tightening force

- ◆ Repeat this tightening procedure after traveling a few kilometers with the vehicle.

## CVT DRIVEN PULLEY ASSEMBLY EXPLODED VIEW



| No. | Fastener                | Torque |       |       | Remarks |
|-----|-------------------------|--------|-------|-------|---------|
|     |                         | N·m    | kgf·m | ft·lb |         |
| 1   | Fixed Sheave            |        |       |       |         |
| 2   | Washer                  |        |       |       |         |
| 3   | Sliding Sheave          |        |       |       |         |
| 4   | Cam shoe                |        |       |       | R       |
| 5   | Cam shoe screw          | 3.5    | 0.36  |       | L       |
| 6   | Spring                  |        |       |       |         |
| 7   | Key                     |        |       |       |         |
| 8   | Cam                     |        |       |       | R       |
| 9   | External retaining ring |        |       |       |         |

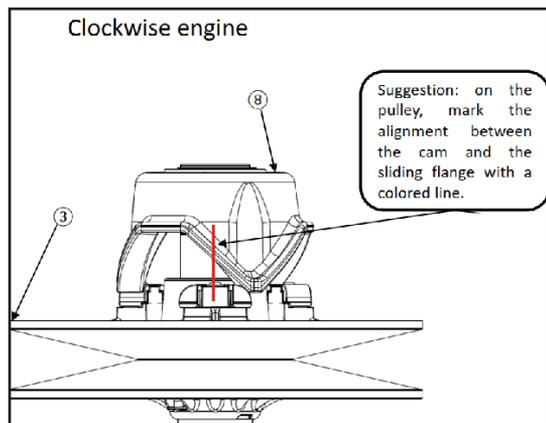
G:Apply grease for oil seal and O-ring.

L:Apply a non-permanent locking agent.

Lh:Left-hand Threads

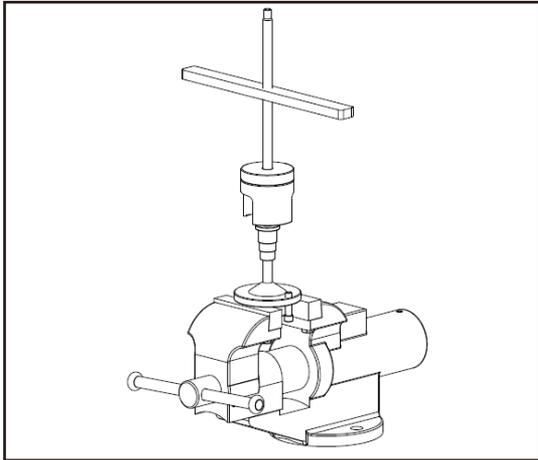
M:Apply molybdenum disulfide grease

R:Replacement Part.

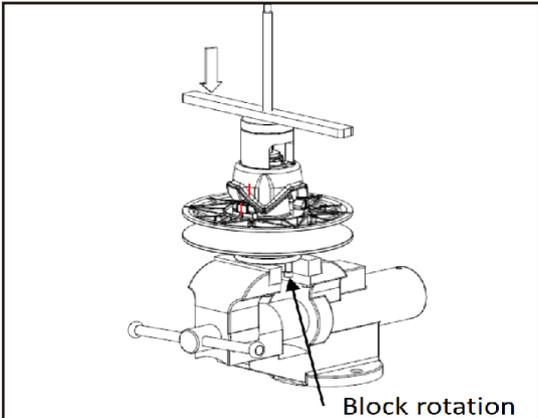
**PULLEY DISASSEMBLY****REMOVING THE DRIVEN PULLEY**

- ◆ Make sure you take note of the position of the spring ⑥ in the sliding sheave ③ and cam ⑧ holes, as well as the alignment of the cam ⑧ versus the cam shoe support. When re-assembling the pulley, the positions must be the same as before disassembly. This ensures that pulley performance is not affected.
- ◆ Lock the pulley rotation by engaging in gear and apply the vehicle brakes.
- ◆ Remove the bolt or nut from the driven pulley.

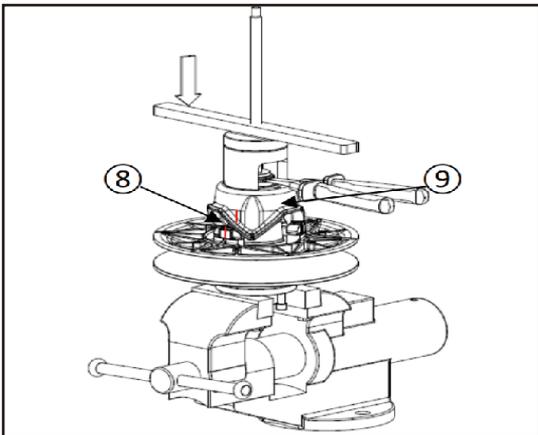
### SPRING DISASSEMBLY



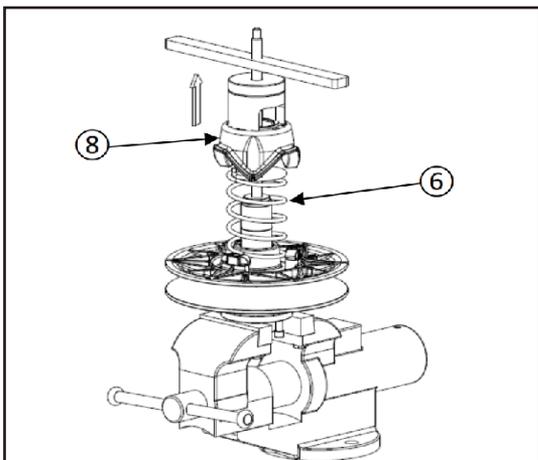
- ◆ Using a vise, mount the disassembly tool as shown .



- ◆ Install the pulley on the disassembly tool as shown .Use the lock screw to prevent the rotation of the pulley on the disassembly.
- ◆ By screwing the bar on the threaded rod, press down the spring seat ⑧(3 to 4 mm max.) in order to free up the external retaining ring ⑨.



- ◆ Remove the external retaining ring ⑨ using the snap ring pliers.



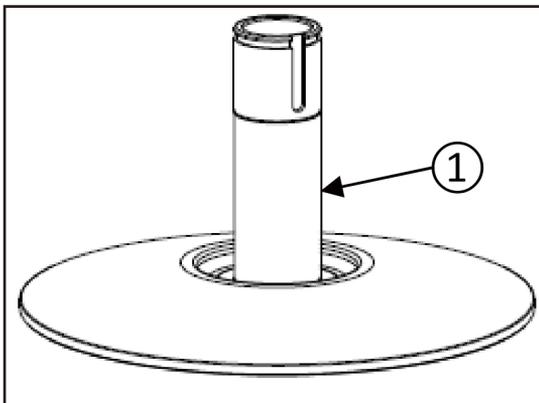
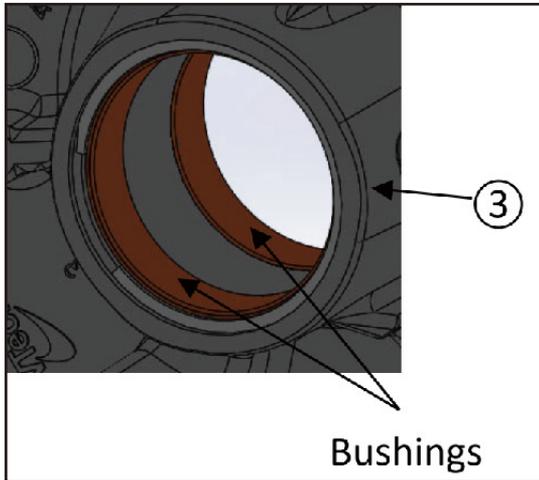
- ◆ Slowly unscrew the bar on the threaded rod to release the spring ⑥ tension.

#### **⚠ WARNING**

Use the disassembly tool to disassemble the cam ⑧. The pulley is spring loaded with significant amount of force. the use of the disassembly tool will keep the pulley compressed.

#### **⚠ WARNING**

Slowly lift the cam ⑧ to free it from the shaft by unscrewing the disassembly tool once the external retaining ring ⑨ is removed.



**RECOMMENDED INSPECTION**

- ◆ Check for wear marks on the cam ⑧.
- ◆ Check for wear marks on the spring ⑥.
- ◆ Perform a visual inspection of the compone.
- ◆ Check the wear of the sliding sheave ③ bushings(visual inspection only). If there is excessive wear, you must replace the whole sheave assembly ③.

**! WARNING**

The bushings cannot be removed from the sliding sheave ③ .

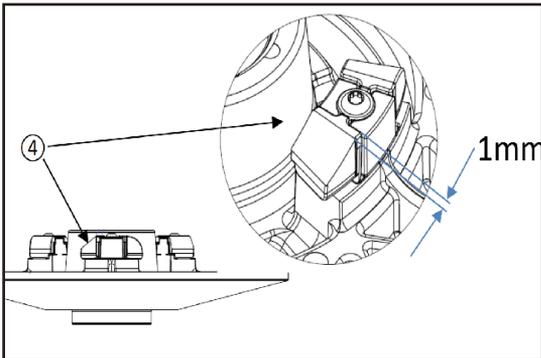
**! WARNING**

The shaft cannot be disassembled from the fixed sheave ① .

**! WARNING**

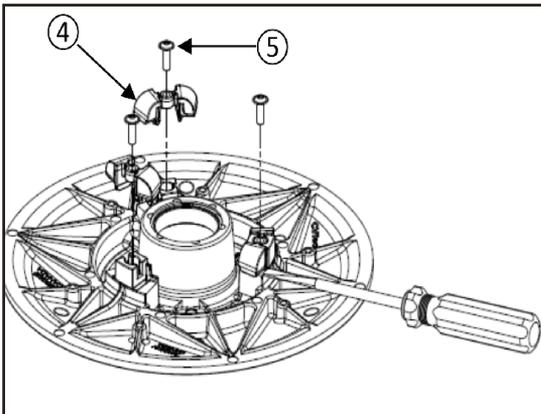
To maintain the performance of the pulley, make sure the sheave bushings are cleaned with a microfiber towel or dry cloth. CAUTION: Do not use acetone to clean bushing and do not use any lubricant.

### SLIDING FLANGE MAINTEN

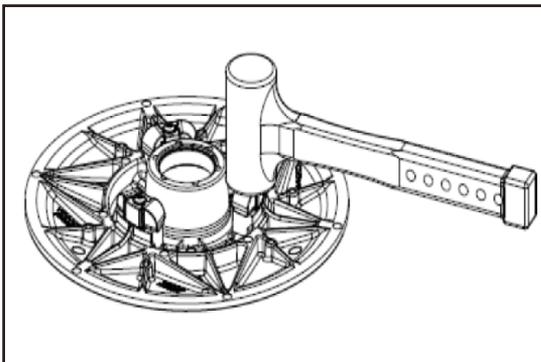


#### RECOMMENDED INSPECTION

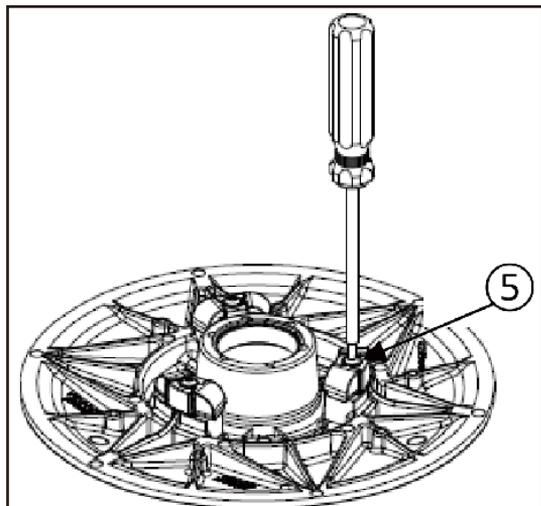
- ◆ If the cam shoes ④ are worn down to about 1 mm before making contact with the cam shoe support, they must be replaced.



- ◆ After removing the cam shoe screws ⑤ with a No. 20 torx screwdriver, the camshoes ④ may be removed using a flathead screwdriver.



- ◆ PMount the new cam shoes ④ using a hamme.

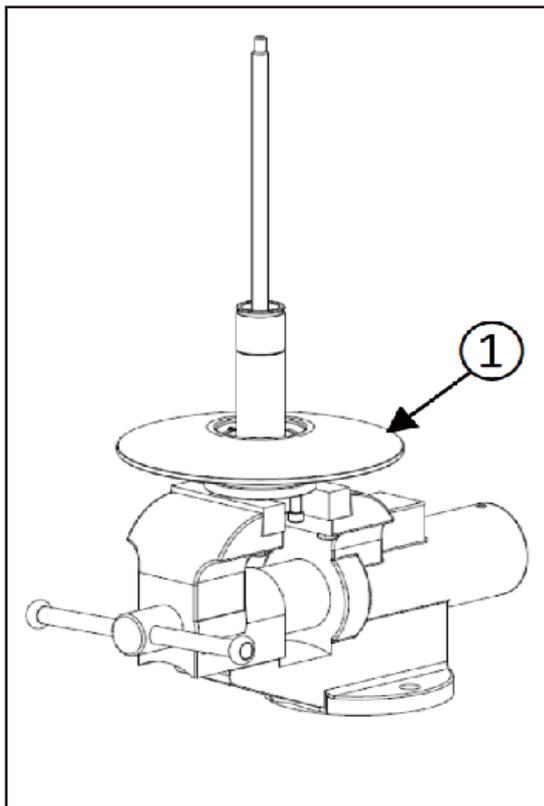


- ◆ Tighten the cam shoe screws ⑤ using no. 20 torx screwdriver to a value of 3.5N.m.

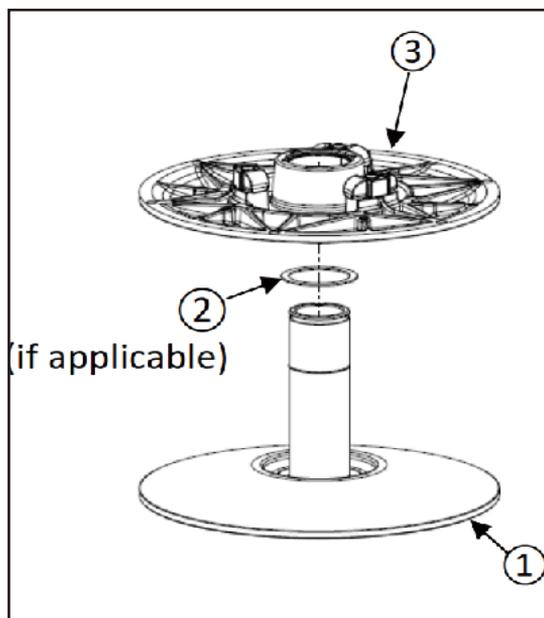
**PULLEY RE-ASSEMBLY**

- ◆ The use of the disassembly tool is required in order to re - assemble the pulley

**Pulley re-assembly**

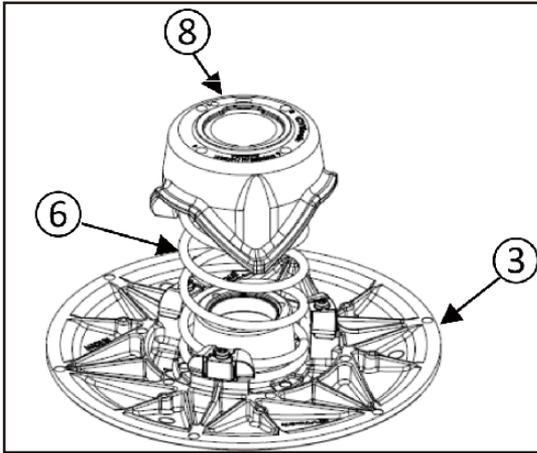


- ◆ Install the fixed sheave ① on the disasse

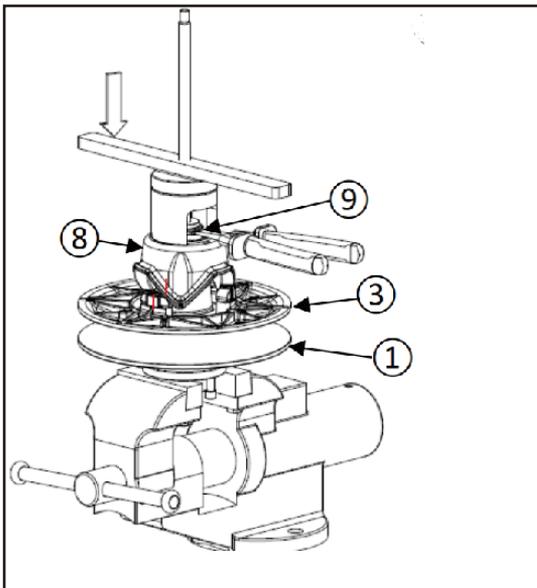


- ◆ Put the washer ② (if applicable) on the fixed sheave ① then put the sliding sheave ③ .

### ROLLERS ③ RE - ASSEMBLY



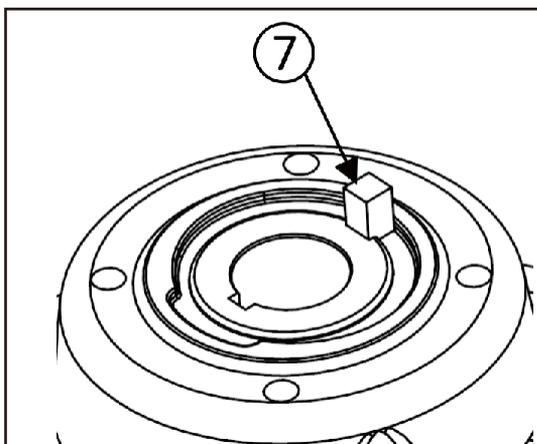
- ◆ Place the spring ⑥ lugs into the proper cam ⑧ hole and the proper sliding sheave ③ hole at the same positions noted during the disassembly steps .



- ◆ IPress down the cam ⑧ onto the fixed sheave ① shaft with the disassembly tool. Position the key ⑦ into the fixed sheave ① shaft groove

- ◆ Put the retaining ring ⑨ on Torque the 4 screws .

- ◆ Make sure that the fixed sheave ① is blocked in rotation, turn the sliding sheave ③ counter clockwise or clockwise to position the cam shoe ④ on the proper side of the cam sliding surface as it was before disassembly



- ◆ Screw the disassembly tool bar until the cam ⑧ is low enough to install the external retai

**FRONT AXLE AND REAR GEARBOX**

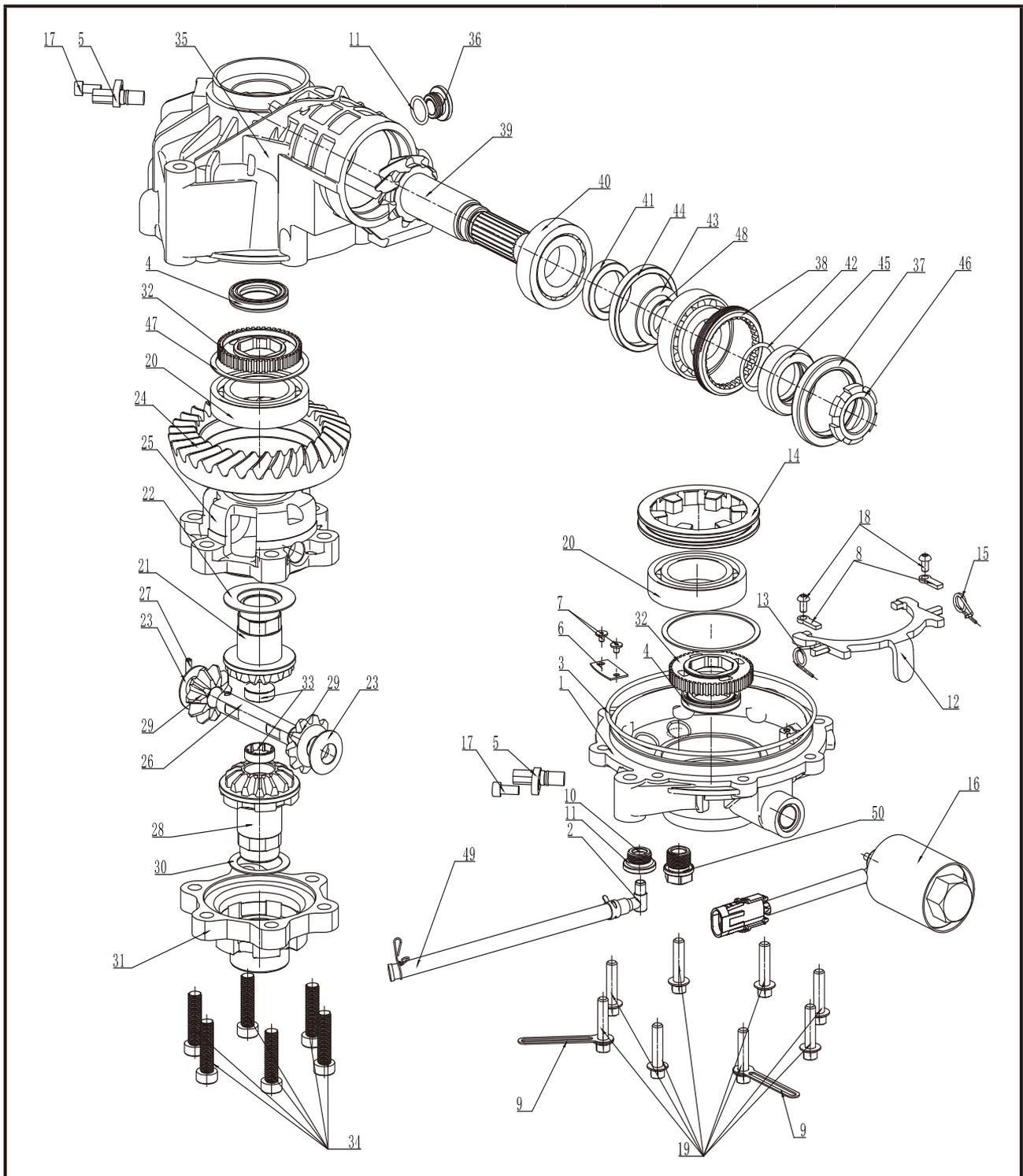
|   |             |
|---|-------------|
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# FRONT AXLE AND REAR GEARBOX

**SEGWAY AT10**

|  |      |
|--|------|
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EXPLODED VIEW OF FRONT AXLE



| No. | Fastener                                      | Torque |       |       | Remarks |
|-----|---|--------|-------|-------|---------|
|     |   | N·m    | kgf·m | ft·lb |         |
| 1   | Front axle box cover                          |        |       |       |         |
| 2   | Zinc alloy air nozzle                         |        |       |       |         |
| 3   | O-Ring $\phi 150 \times \phi 2.5$             |        |       |       | O       |
| 4   | oil seals $\phi 30 \times \phi 45 \times 6.5$ |        |       |       | G       |
| 5   | ABS Wheel Speed Sensor 90 degrees             |        |       |       |         |
| 6   | covers  |        |       |       |         |

# FRONT AXLE AND REAR GEARBOX

SEGWAY AT10

|    |   |     |      |  |  |
|----|---|-----|------|--|--|
| 7  | Hexagon socket thin head screws M4×4              | 1.8 | 0.18 |  | L  |
| 8  | Fork stopper                                      |     |      |  |  |
| 9  | Wire Harness Clip                                 |     |      |  |  |
| 10 | Filling plug M18×1.5                              | 20  | 2    |  |  |
| 11 | O-ring φ16×φ2.5                                   |     |      |  | O  |
| 12 | fork  |     |      |  |  |
| 13 | Reset spring (left-handed)                        |     |      |  |  |
| 14 | bushings  |     |      |  |  |
| 15 | Reset spring (right-handed)                       |     |      |  |  |
| 16 | Solenoid valve part (stroke 6mm)                  |     |      |  |  |
| 17 | Hexagon socket head cap screws M6×14              | 11  | 1.1  |  | L  |
| 18 | Hexagon socket cheese head screws M5×10           | 6.5 | 0.65 |  | L  |
| 19 | Hexagonal flange face bolts M8×1.25×30            | 24  | 2.4  |  |  |
| 20 | Deep groove ball bearing 6009 φ45×φ75×16          |     |      |  |  |
| 21 | Right Half Shaft Gear                             |     |      |  |  |
| 22 | Adjustment shim φ34.2×φ54.8×(0.8, 0.9, 1)         |     |      |  | O  |
| 23 | Bowl shaped gasket φ15.2×φ32×1                    |     |      |  | O  |
| 24 | Front axle driven gear 31 teeth Right-handed      |     |      |  |  |
| 25 | Differential housing                              |     |      |  | O  |
| 26 | Planetary gear shaft φ15×86                       |     |      |  | O  |
| 27 | Elastic cylindrical pin φ4×35                     |     |      |  |  |
| 28 | Front Left Half Shaft Gear                        |     |      |  | O  |
| 29 | planetary gear                                    |     |      |  | O  |
| 30 | Adjustment shims φ34.2×φ46× (0.8, 0.9, 1, 1.1)    |     |      |  | O  |
| 31 | Differential cover                                |     |      |  | O  |
| 32 | Signal ring                                       |     |      |  |  |
| 33 | plug  |     |      |  |  |
| 34 | Hexagon socket cheese head screws M10×1.25×36     | 70  | 7    |  | 10.9 level environmentally friendly white zinc Head coating adhesive |
| 35 | cabinet   |     |      |  |  |
| 36 | Oil drain screw plug M18×1.5                      | 20  | 2    |  |  |
| 37 | oil seals φ48×φ65×9                               |     |      |  | G  |
| 38 | locknut M64x1.5x9                                 | 66  | 6.6  |  | L  |
| 39 | Front axle main gear 9 teeth                      |     |      |  |  |
| 40 | Tapered roller bearing 32206 φ30×φ62×21.25        |     |      |  |  |
| 41 | Spacer φ30.2×φ38×8.3                              |     |      |  |  |
| 42 | O-ring φ30×φ2.8                                   |     |      |  | O  |
| 43 | Adjustment shim φ30.6×φ38×(1.8, 1.9, 2)           |     |      |  |  |
| 44 | Bearing spacer II φ53×φ62×7.6                     |     |      |  |  |
| 45 | Input shaft bushing M27x1.5x10 Left-hand rotation |     |      |  |  |
| 46 | locknut   | 125 | 12.5 |  | L  |
| 47 | Adjustment gasket φ67×φ74.9× (0.8, 0.9, 1, 1.1)   |     |      |  |  |
| 48 | Adjustment gasket φ30.6×φ40× (0.1, 0.15, 0.2)     |     |      |  |  |
| 49 | Ventilation hose component φ7×φ11×400             |     |      |  |  |
| 50 | Oil mirror M18×1.5                                |     |      |  |  |

G: Apply grease for oil seal and O-ring.

L: Apply a non-permanent locking agent.

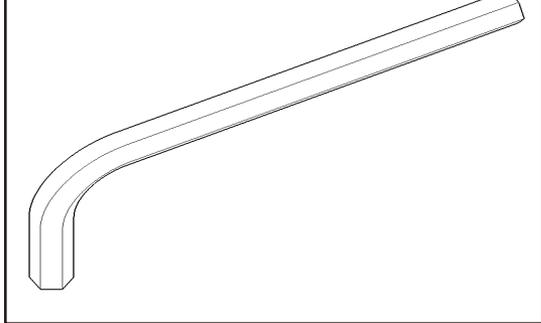
O: Apply gear oil(SAE 80W/90/GL-5).

## TECHNICAL SPECIFICATIONS

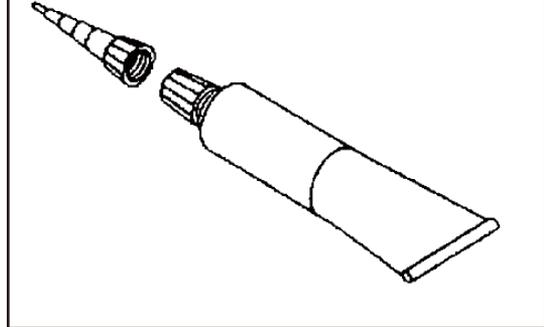
| Item                | Standard  | Service limit |
|---------------------|---|---------------|
| Front axle:         |   |               |
| Type                | SAE 80W-90 GL-5   |               |
| Fill position       | Side of the box(plug screw M18x1.5)   |               |
| Drain position      | Bottom of box(plug screw M18x1.5 component)   |               |
| Volume              | 330 mL (0.35 US qt) (when there is no oil stains after internal cleaning)<br>310 mL (0.33 US qt) ( only when changing gear oil) |               |
| Bevel gear backlash | 0.15~0.25 mm(0.06~0.10 in.)   |               |
| Gearbox assembly:   |   |               |
| Type                | SAE 80W-90 GL-5   |               |
| Fill position       | Side (oil dipstick)   |               |
| Drain position      | Bottom (M14 plug)   |               |
| Volume              | 1200 mL (1.27 US qt) (refill gear oil for the first time)<br>1200 mL (1.27 US qt) (change gear oil)                             |               |
| Bevel gear backlash | 0.15~0.25 mm(0.06~0.10 in.)   |               |

## SPECIAL TOOLS

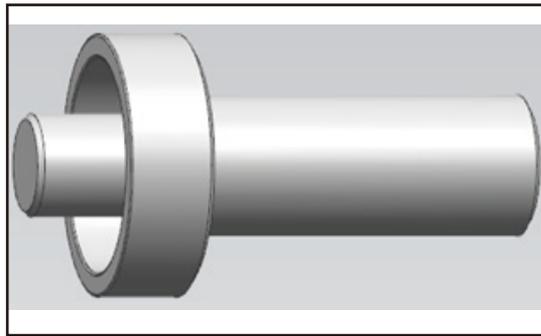
Allen wrench 2.5mm/5mm/8mm/12mm:



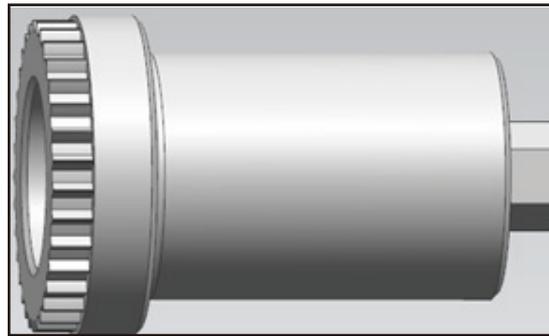
Silicone Sealant:



Bearing press fitting tool:



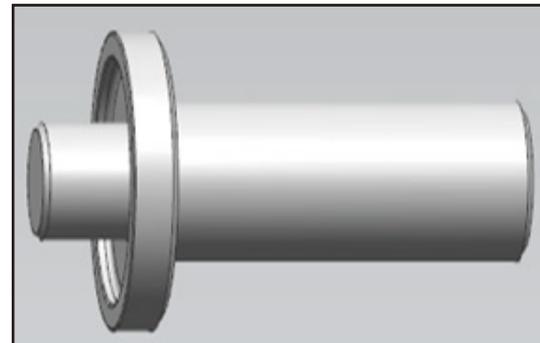
Input shaft gear locking nut tightening tool:



Locking nut tightening tool



Oil seal driving tool



Input shaft drive tooth screw plug socket



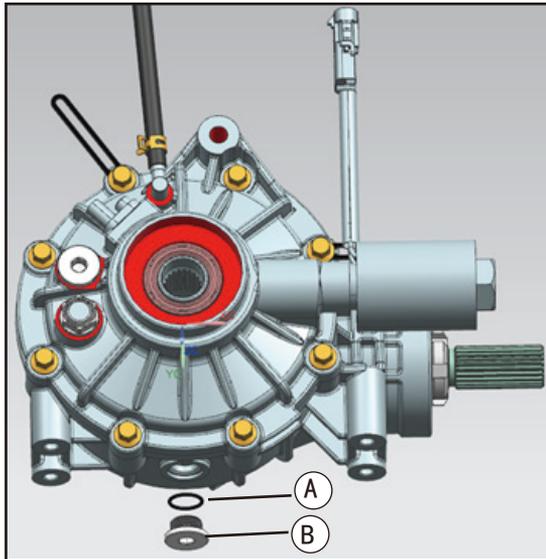
T-sleeve 10mm



## REPLACEMENT OF FRONT AXLE GEAR OIL

**⚠ WARNING**

Vehicle operation with insufficient, deteriorated, or contaminated gear oil will cause accelerated wear and may result in Gearbox Damage, accident, and injury.



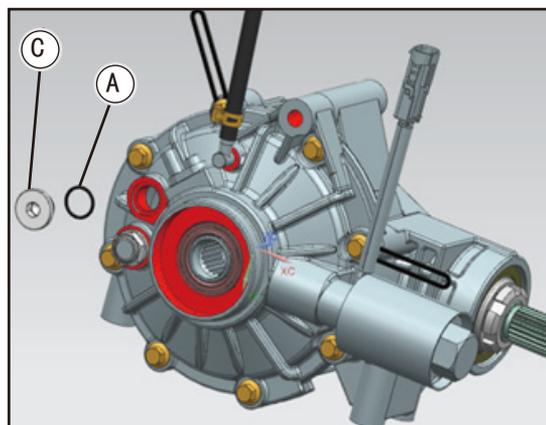
【A】 o-ring  $\phi 16 \times \phi 2.5$

【B】 screw plug M18X1.5 assembly

【C】 screw plug M18X1.5

## DRAIN THE OLD GEAR OIL

- ◆ Tools: 8mm Allen key
- ◆ Rotate B counterclockwise and unscrew it, let it stand for 10 minutes to let the old gear oil flow out, then put A on the threaded end of B, tighten it clockwise, and wipe clean the gear oil spilled around it.
- ◆ Please dispose of waste gear oil in an environmentally friendly manner, please take care of the environment



## ADD NEW GEAR OIL

- ◆ Tools: 8mm Allen key
- ◆ Rotate C counterclockwise to unscrew it, add a certain amount of new gear oil, and then tighten the threaded end of sleeve A and C clockwise to wipe clean the gear oil spilled around.

**⚠ CAUTION**

Pay attention to check the O-ring during installation. If it is damaged, it will lead to poor sealing and leakage of gear oil, which will aggravate the internal wear of the gearbox and eventually cause damage to the gearbox. Please replace the damaged O-ring in time.

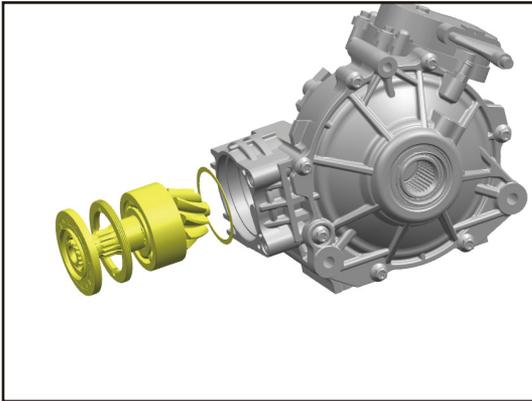
screw plug M18X1.5

20N·m(2.0kgf·m, 13ft·lb)

### ADJUSTMENT OF GEAR CLEARANCE

#### ⚠ WARNING

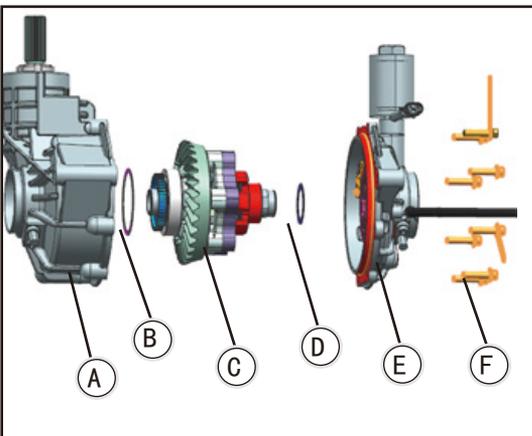
If the gear gap is not adjusted well, it will aggravate the wear of gear parts, resulting in abnormal gear transmission noise, gear surface pitting, reduced transmission efficiency, and shortened overall life.



- 【A】 Front axle box assembly
- 【B】 Adjust the gasket
- 【C】 Differential components
- 【D】 Adjust the gasket
- 【E】 Front axle box cover assembly
- 【F】 Bolt

#### DISASSEMBLE

- ◆ Tool: gear wrench
- ◆ Use a ratchet wrench to rotate clockwise to unscrew 【F】 , remove 8 【F】 , remove the E box cover assembly and 【D】 adjustment gasket, and then remove the 【C】 differential assembly and 【B】 adjustment gasket from the box assembly.



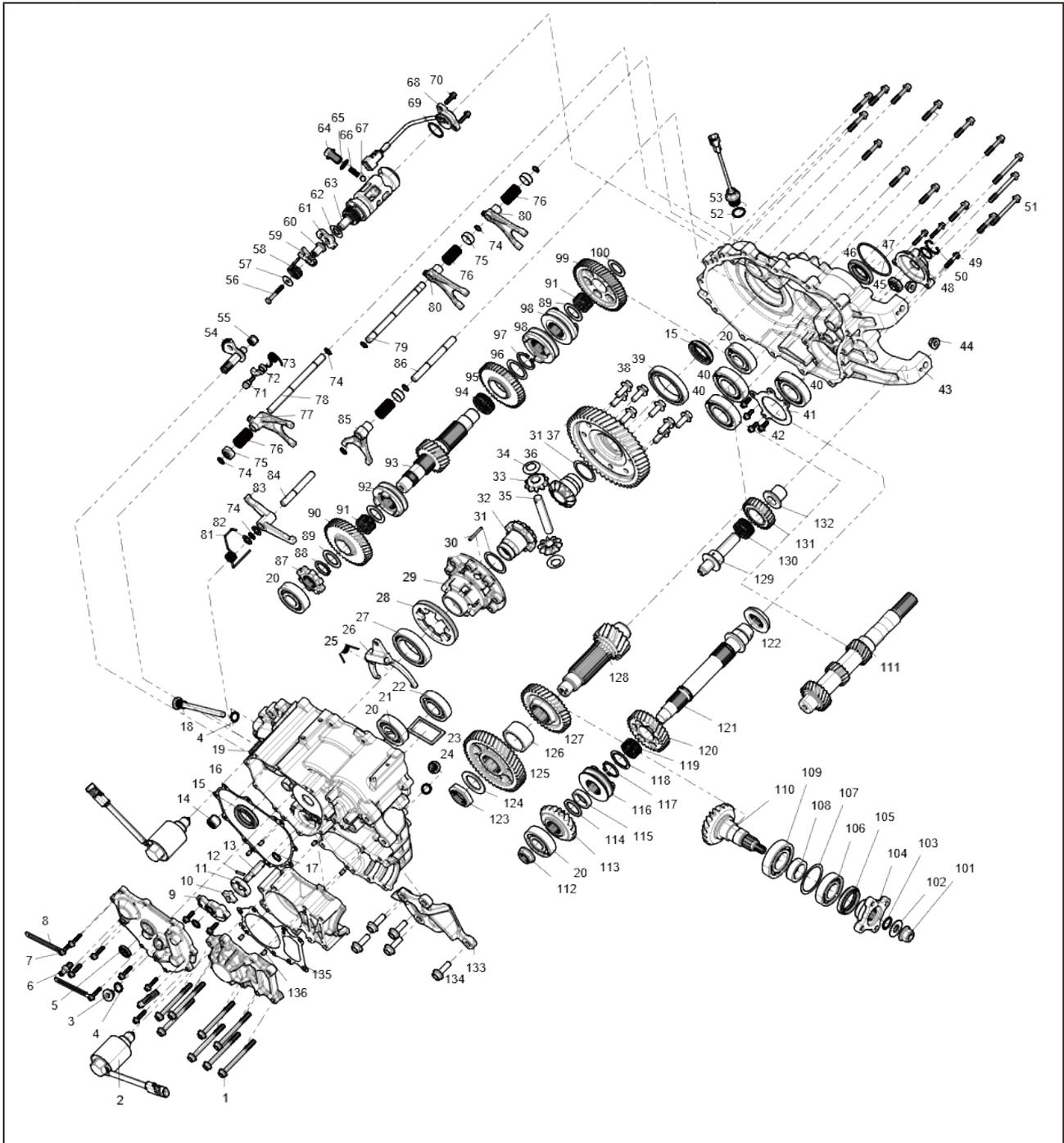
#### INSTALL

- ◆ Tool: gear wrench
- ◆ Take the corresponding thickness of 【B】 according to the gear clearance value, place 【B】 into the inner hole of 【A】 box component, and then insert 【C】 into the inner hole of 【A】 . Take the corresponding thickness of 【D】 according to the assembly requirements, and then install 【D】 on the differential component. Apply silicone rubber flat sealant on the box cover component, and then install the box cover component on the box component. Use a ratchet wrench to rotate F counterclockwise, tighten it, and confirm the gear clearance again. After accuracy (note that the oil seal lip should not be scratched, and the oil seal as a whole should not deform), wipe off the scattered gear oil around it.

#### ⚠ CAUTION

Pay attention to the scratch and damage of the oil seal during installation. If damaged, it will cause the gearbox to leak gear oil, which will accelerate the internal wear of the gearbox and eventually cause damage to the gearbox. Please replace the damaged oil seal in time.

EXPLODED VIEW OF REAR GEARBOX



| No. | Fastener         | Torque |       |       | Remarks |
|-----|------------------|--------|-------|-------|---------|
|     |                  | N·m    | kgf·m | ft·lb |         |
| 1   | BOLT M8×90       | 25     | 2.55  | 18.5  |         |
| 2   | Solenoid valve   |        |       |       |         |
| 3   | SCREW PLUG M14   | 15     | 1.53  | 11.1  |         |
| 4   | O-RING 13.8×2.5  |        |       |       |         |
| 5   | OIL SEAL 15×25×5 |        |       |       | G       |
| 6   | BREATHING JOINT  | 15     | 1.53  | 11.1  | L       |
| 7   | BOLT M6×25       | 12     | 1.22  | 8.86  |         |
| 8   | HOSE CLAMP       |        |       |       |         |
| 9   | OIL PUMP COVER   |        |       |       |         |

# FRONT AXLE AND REAR GEARBOX

SEGWAY AT10

|    |                                       |    |      |      |    |
|----|---------------------------------------|----|------|------|----|
| 10 | INNER GEROTOR                         |    |      |      |    |
| 11 | OUTER GEROTOR                         |    |      |      |    |
| 12 | NEEDLE ROLLER 4×15.8                  |    |      |      |    |
| 13 | OIL PUMP SHAFT                        |    |      |      |    |
| 14 | NEEDLE ROLLER BEARING HK1516          |    |      |      |    |
| 15 | Oil seal 35 × 52 × 7/11               |    |      |      | G  |
| 16 | GEAR SHIFT COVER GASKET               |    |      |      |    |
| 17 | O RING 15.6X1.78                      |    |      |      |    |
| 18 | DIFFERENTIAL SHIFT FORK SHAFT         |    |      |      |    |
| 19 | RIGHT GEARBOX                         |    |      |      | SS |
| 20 | BEARING 6305                          |    |      |      |    |
| 21 | Needle roller P4 × 23.8               |    |      |      |    |
| 22 | BEARING 6206                          |    |      |      |    |
| 23 | STRAINER FILTER                       |    |      |      |    |
| 24 | SCREW PLUG M14                        | 15 | 1.53 | 11.1 |    |
| 25 | RETURN SPRING                         |    |      |      |    |
| 26 | DIFFERENTIAL SHIFT FORK               |    |      |      |    |
| 27 | BEARING 6010                          |    |      |      |    |
| 28 | REAR DIFFERENTIAL OUTPUT SHIFT SLEEVE |    |      |      |    |
| 29 | DIFFERENTIAL HOUSING                  |    |      |      |    |
| 30 | PIN 4 × 35                            |    |      |      |    |
| 31 | SHIM $\Phi$ 40.2 × $\Phi$ 50          |    |      |      |    |
| 32 | RIGHT REAR HALF SHAFT BEVEL GEAR      |    |      |      |    |
| 33 | TRANSMISSION PLANETARY GEAR           |    |      |      |    |
| 34 | BOWL SHAPED GASKET                    |    |      |      |    |
| 35 | REAR OUTPUT PLANETARY GEAR SHAFT      |    |      |      |    |
| 36 | LEFT REAR HALF SHAFT BEVEL GEAR       |    |      |      |    |
| 37 | REAR OUTPUT GEAR                      |    |      |      |    |
| 38 | BOLT M10×1.25×25                      | 25 | 2.55 | 18.5 |    |
| 39 | BEARING 61912                         |    |      |      |    |
| 40 | BEARING 6207                          |    |      |      |    |
| 41 | FRONT BEARING PRESSURE PLATE          |    |      |      |    |
| 42 | BOLT M6×16                            | 12 | 1.22 | 8.86 |    |
| 43 | AT10 LEFT GEARBOX                     |    |      |      | SS |
| 44 | NUT M10X1.25                          |    |      |      |    |
| 45 | OIL WINDOW                            |    |      |      |    |
| 46 | OIL SEAL 30 × 55 × 7                  |    |      |      | G  |
| 47 | O RING 73×3.0                         |    |      |      |    |
| 48 | FRONT NUT COVER PLATE                 |    |      |      | SS |
| 49 | BOLT M6×30                            | 12 | 1.22 | 8.86 |    |
| 50 | CLIP 30                               |    |      |      |    |
| 51 | BOLT M8×70                            | 25 | 2.55 | 18.5 |    |
| 52 | O-RING 19.4×2.3                       |    |      |      |    |
| 53 | VEHICLE SPEED SENSOR                  |    |      |      |    |
| 54 | SHIFT SHAFT                           |    |      |      |    |
| 55 | NEEDLE ROLLER BEARING HK121612        |    |      |      |    |
| 56 | HEXAGON HEAD BOLT M6×40               | 12 | 1.22 | 8.86 |    |
| 57 | SPACER 6.2×22×2                       |    |      |      |    |
| 58 | SECTOR GEAR TORSION SPRING            |    |      |      |    |
| 59 | SECTOR GEAR                           |    |      |      |    |
| 60 | SECTOR GEAR SPACER                    |    |      |      |    |
| 61 | POSITIONING STAR                      |    |      |      |    |

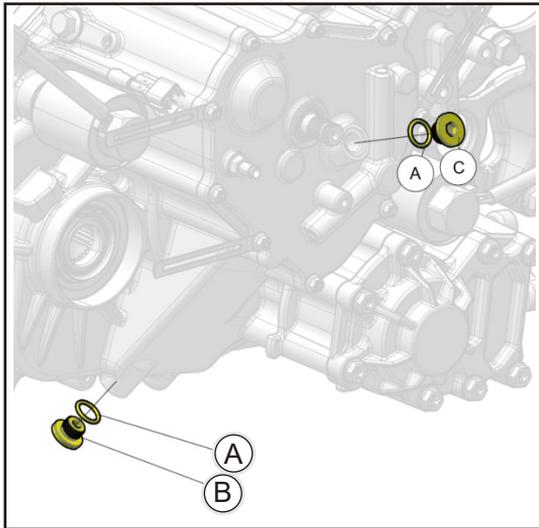
|     |                                      |     |      |      |   |
|-----|--------------------------------------|-----|------|------|---|
| 62  | SPACER 15×28×1                       |     |      |      |   |
| 63  | VARIABLE SPEED DRUM                  |     |      |      |   |
| 64  | NEUTRAL POSITION SPRING PLUG         | 20  | 2.04 | 14.8 |   |
| 65  | GASKET 14×21×1.5                     |     |      |      |   |
| 66  | NEUTRAL POSITION SPRING              |     |      |      |   |
| 67  | BALL 3/8                             |     |      |      |   |
| 68  | GEAR SENSOR                          |     |      |      |   |
| 69  | O-RING 29.6×2.4                      |     |      |      |   |
| 70  | BOLT M6×20                           | 12  | 1.22 | 8.86 |   |
| 71  | SHOULDER BOLT                        | 15  | 1.53 | 11.1 |   |
| 72  | DETENT PAWL                          |     |      |      |   |
| 73  | DETENT PAWL TORSION SPRING           |     |      |      |   |
| 74  | CIRCLIP 12                           |     |      |      |   |
| 75  | SHIFT FORK SPRING SEAT               |     |      |      |   |
| 76  | SHIFT FORK                           |     |      |      |   |
| 77  | L-GEAR FORK                          |     |      |      |   |
| 78  | L-GEAR SHIFT FORK SHAFT              |     |      |      |   |
| 79  | HR SHIFT FORK SHAFT                  |     |      |      |   |
| 80  | H/R GEAR SHIFT FORK                  |     |      |      |   |
| 81  | PARKING ARM RETURN SPRING            |     |      |      |   |
| 82  | SPACER 12×20×1                       |     |      |      |   |
| 83  | PARKING ARM                          |     |      |      |   |
| 84  | PARKING ARM SHAFT                    |     |      |      |   |
| 85  | 2/4 WD FORK                          |     |      |      |   |
| 86  | 2/4 WD FORK SHAFT                    |     |      |      |   |
| 87  | PARKING RATCHET                      |     |      |      |   |
| 88  | CIRCLIP 28×2.5                       |     |      |      |   |
| 89  | WASHER 28×40×2.5                     |     |      |      |   |
| 90  | H-GEAR DRIVEN GEAR                   |     |      |      |   |
| 91  | NEEDLE ROLLER BEARING K28×33×17      |     |      |      |   |
| 92  | H GEAR ENGAGEMENT SLEEVE             |     |      |      |   |
| 93  | COUNTERSHAFT                         |     |      |      |   |
| 94  | NEEDLE ROLLER BEARING K35×40×13      |     |      |      |   |
| 95  | R GEAR DRIVEN GEAR                   |     |      |      |   |
| 96  | SPACER 35×46×1.5                     |     |      |      |   |
| 97  | CIRCLIP 35×2.5                       |     |      |      |   |
| 98  | R/L GEAR COUPLING SLEEVE             |     |      |      |   |
| 99  | L GEAR DRIVEN GEAR                   |     |      |      |   |
| 100 | WASHERS 25 × 38 × 2.5                |     |      |      |   |
| 101 | LOCKING NUT M14X1.5                  | 120 | 12.2 | 88.6 | L |
| 102 | WASHER 15x34x2                       |     |      |      |   |
| 103 | O-RING 20×2.65                       |     |      |      |   |
| 104 | FRONT OUTPUT FLANGE                  |     |      |      |   |
| 105 | OIL SEAL 38×55×7                     |     |      |      | G |
| 106 | BEARING 7206                         |     |      |      |   |
| 107 | SHIM 62×51×0.4                       |     |      |      |   |
| 108 | BEARING SPACER                       |     |      |      |   |
| 109 | BEARING 7207                         |     |      |      |   |
| 110 | FRONT OUTPUT DRIVEN BEVEL GEAR SHAFT |     |      |      |   |
| 111 | MAIN SHAFT                           |     |      |      |   |
| 112 | NUT M22×1                            | 145 | 14.8 | 107  | L |
| 113 | FRONT OUTPUT DRIVE BEVEL GEAR        |     |      |      |   |
| 114 | DRIVE GEAR SHIM                      |     |      |      |   |

# FRONT AXLE AND REAR GEARBOX

SEGWAY AT10

|     |  |     |       |        |   |
|-----|--|-----|-------|--------|---|
| 115 | FRONT OUTPUT DRIVING GEAR BUSHING        |     |       |        |   |
| 116 | 2 4WD COMBINING SLEEVE                   |     |       |        |   |
| 117 | CLIP 32×2                                |     |       |        |   |
| 118 | SPLINE WASHER OD43 × 1.5                 |     |       |        |   |
| 119 | NEEDLE ROLLER BEARING 30 × 34 × 17LE ROL |     |       |        |   |
| 120 | DRIVEN GEAR                              |     |       |        |   |
| 121 | GEAR SHAFT                               |     |       |        |   |
| 122 | HEXAGONAL FLANGE NUT M33 × 1.5           | 240 | 24.49 | 177.12 | L |
| 123 | NUT M33×1.5                              | 240 | 24.49 | 177.12 | L |
| 124 | GASKET 34×52×3                           |     |       |        |   |
| 125 | SECONDARY DRIVEN GEAR                    |     |       |        |   |
| 126 | Bushing 40.5 × 52 × 27                   |     |       |        |   |
| 127 | DRIVE GEAR                               |     |       |        |   |
| 128 | TRIAxIAL                                 |     |       |        |   |
| 129 | REVERSE GEAR SHAFT                       |     |       |        |   |
| 130 | NEEDLE BEARING K30×35×17                 |     |       |        |   |
| 131 | REVERSE GEAR IDLER GEAR                  |     |       |        |   |
| 132 | REVERSE SHAFT BUSHING                    |     |       |        |   |
| 133 | TRANSMISSION CONNECTION BRACKET          |     |       |        |   |
| 134 | HEXAGON FLANGE BOLT M12×1.25×30          | 45  | 4.59  | 33.3   |   |
| 135 | BEVEL GEAR COVER GASKET                  |     |       |        |   |
| 136 | DOWEL PIN 6X 10                          |     |       |        |   |

- G: Apply grease for oil seal and O-ring.  
L: Apply a non-permanent locking agent.  
O: Apply gear oil(SAE 80W/90/GL-5).



## REPLACEMENT OF GEARBOX GEAR OIL

### ⚠ WARNING

Vehicle operation with insufficient, deteriorated, or contaminated speed gearbox oil will cause accelerated wear and may result in Gearbox Damage, accident, and injury.

- 【 A 】 O-ring seal 13.8×2.5
- 【 B 】 Screw plug M14 assembly
- 【 C 】 Screw plug M14

### DRAIN THE GEARBOX OIL

- ◆ Tools: 8mm Allen key.
- ◆ Unscrew 【 B 】 counterclockwise, remove 【 A 】 and 【 B 】 , let the gearbox oil flow out, and keep it for 10 minutes. Then put 【 A 】 on the bottom of the thread of 【 B 】 , tighten it clockwise, and wipe clean the surrounding oil. Waste oil should be poured into a special container to avoid environmental pollution.

Tightening torque of screw plug M14 assembly

15N·m(1.53kgf·m,11.1ft·lb)

### ADD GEARBOX OIL

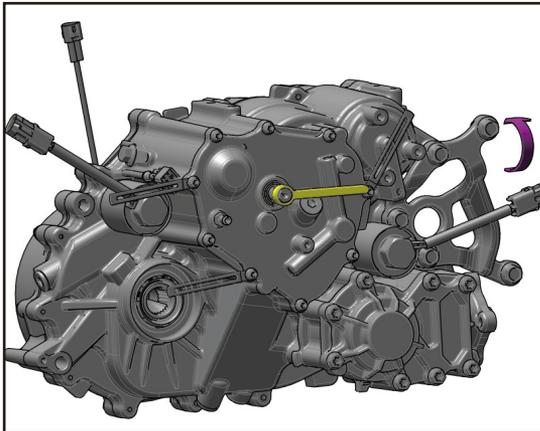
- ◆ Tools: 8mm Allen key.
- ◆ Unscrew 【 C 】 counterclockwise, remove 【 A 】 and 【 C 】 and add new gearbox oil. Put 【 A 】 on the bottom of 【 C 】 thread. Tighten 【 C 】 and wipe off the surrounding oil.

Tightening torque of screw plug M14

15N·m(1.53kgf·m,11.1ft·lb)

### ⚠ CAUTION

During installation, check whether the O-ring is intact and not twisted. If the O-ring is damaged, it will cause gearbox oil leakage, which may cause abnormal wear of the internal parts of the gearbox or even damage the gearbox. Please replace the O-ring with a new one in time.



## DISASSEMBLE THE GEARBOX

### GEAR SETTING

- ◆ Tool: gear wrench
- ◆ Hang the gear counterclockwise to the end as P gear, the clockwise direction is R gear, N gear, H gear, L gear.

### DISASSEMBLE THE DRIVEN BEVEL GEAR COVER ASSEMBLY

- ◆ Disassembling

[A] Bolt M8×90

[B] Bolt M6X25

[C] Plastic-coated wire clip

[D] Gear box right box shift cover

[E] Drive gear nut cover plate

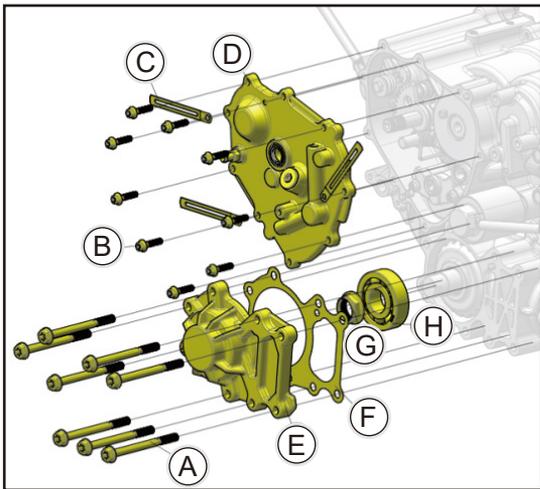
[F] Driven bevel gear cover gasket

[G] Hexagonal flange nut M22×1

[H] Bearing 6305

- ◆ Tools: 8mm socket, 13mm socket, 27mm socket.

- ◆ Unscrew [A] [B] [C] [G] counterclockwise, remove the cover combination and bearings, and use a rubber mallet to tap the box periphery at the bonding surface if necessary.



### DISASSEMBLE THE NUT COVER PLATE AND NUT

- ◆ Disassembly

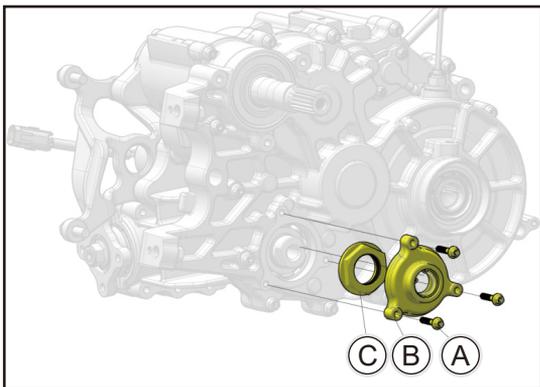
[A] Bolt M6×30

[B] Nut cover plate

[C] Hexagonal flange nut M33×1.5

- ◆ Tools: 8mm socket, 46mm socket

- ◆ Unscrew [A] clockwise, remove [B], and unscrew [C] clockwise.



### DISASSEMBLE THE FOLLOWER BEARING HOUSING AND FRONT OUTPUT DRIVEN ASSEMBLY

- ◆ Disassembly

[A] Front output drive bevel gear

[B] Front output drive bevel gear adjusting shim

[C] Front output drive bevel gear bushing

[D] Driven bearing housing

[E] Hexagonal flange nut M14×1.5

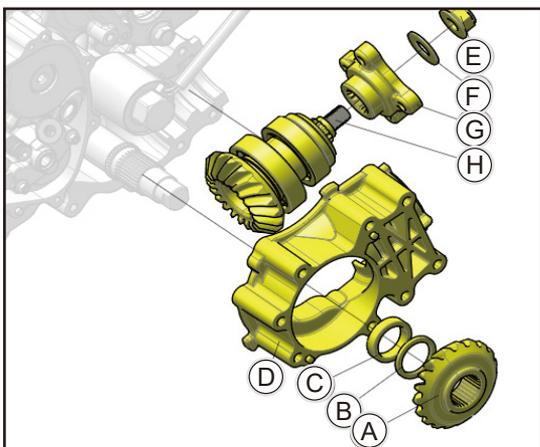
[F] Washer 15×34×2

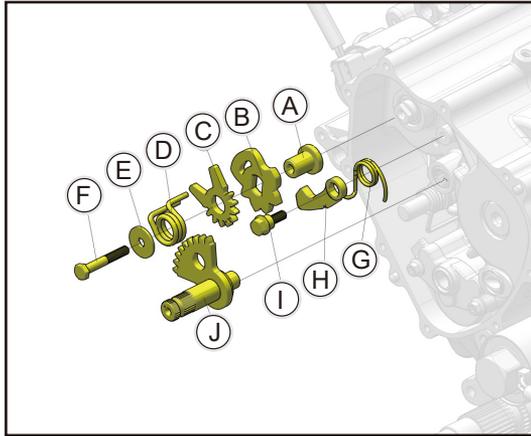
[G] Front output flange

[H] Front output driven tooth assembly

- ◆ Tool: 21mm socket

- ◆ Unscrew [E] clockwise and remove each part in turn.





### DISASSEMBLE THE GEARSHIFT MECHANISM

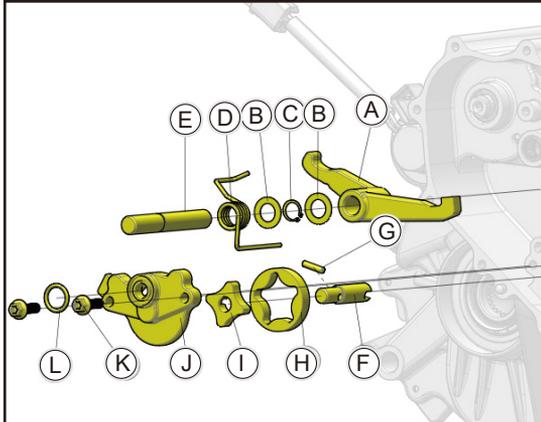
◆ Disassembly

- [A] Bush
- [B] Shift locating gear
- [C] Shift driven gear
- [D] Shift torsion spring
- [E] Washer 6.5×22×2
- [F] Hexagonal head bolts M6×40
- [G] Shift locating plate spring
- [H] Locating plate
- [I] Locating plate bolt M6×21
- [J] Shift shaft assembly

◆ Tool: 10mm socket.

- ◆ Remove [J], unscrew the bolts [F] counterclockwise, remove [E], [D], [C], [B], unscrew the bolts [I] counterclockwise, remove [H], [G], remove [A].

### DISASSEMBLE THE OIL PUMP ASSEMBLY AND PARKING ARM ASSEMBLY



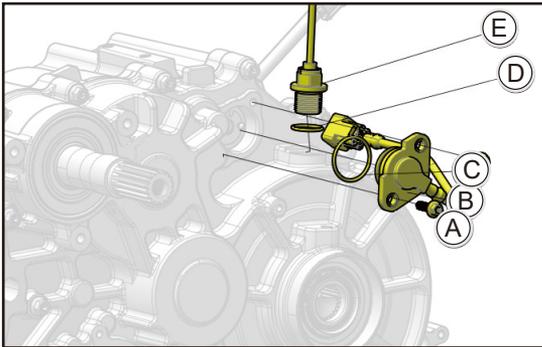
◆ Disassembly

- [A] Parking arm
- [B] Flat washer
- [C] Elastic retaining ring
- [D] Shift torsion spring
- [E] Parking arm shaft
- [F] Oil pump shaft
- [G] Needle roller P4×15.8
- [H] Oil pump outer rotor
- [I] Oil pump inner rotor
- [J] Oil pump cover
- [K] Bolt M6×30
- [L] O-ring 13.8×2.5

◆ Tool: 8mm socket.

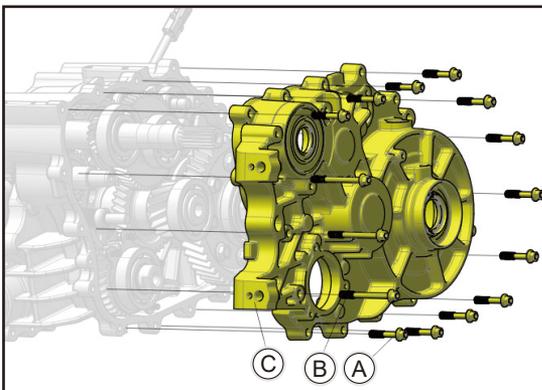
- ◆ Unscrew the bolt [K] counterclockwise and remove [J][I][H][F][E][D][B][C][A].

## DISASSEMBLE THE LEFT GEARBOX CONNECTOR

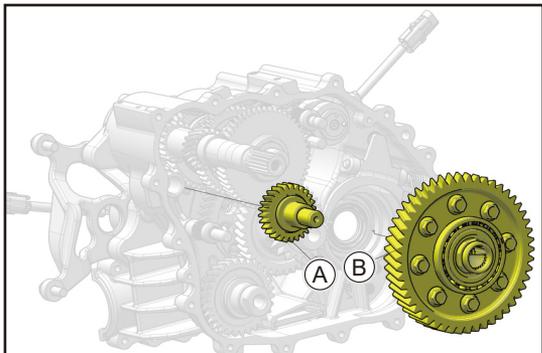


- ◆ Disassembly
- [A] Bolt M6×16
- [B] Gear sensor assembly
- [C] O-ring
- [D] O-ring 19.4×2.3
- [E] Speed sensor assembly
- ◆ Tools: 8mm socket, open-end wrench.
- ◆ Unscrew the bolts counterclockwise [ A ], remove [ B ], open-end wrench counterclockwise [ D ], [ E ].

## DISASSEMBLE THE RIGHT GEARBOX ASSEMBLY



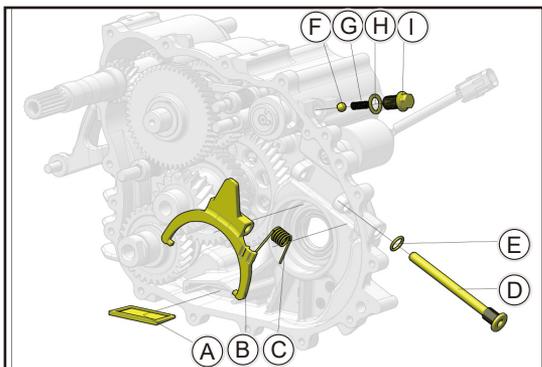
- ◆ Disassembly
- [A] Bolt M8×40
- [B] Bolt M8×70
- [C] Right gearbox assembly
- ◆ Tool: 10mm socket.
- ◆ Unscrew the bolts [ A ] and [ B ] counterclockwise and remove [ C ].
- ◆ Separate the right case assembly and use a rubber mallet to strike the case periphery at the bonding surface if necessary.



## DISASSEMBLE THE REVERSE IDLER SHAFT ASSEMBLY AND REAR OUTPUT ASSEMBLY

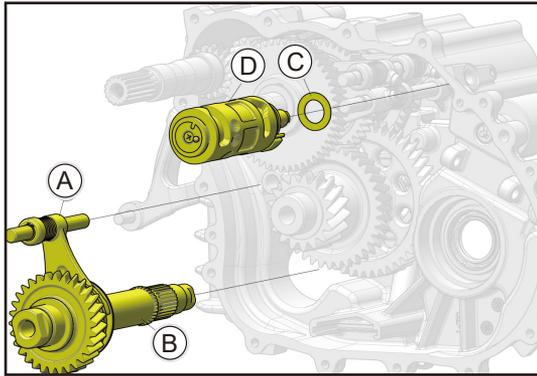
- ◆ Disassembly
- [A] Reverse idler shaft assembly
- [B] Rear output assembly
- ◆ Remove [A] and then [B].

## DISASSEMBLE THE GEARSHIFT LOCATING BOLT, DIFFERENTIAL FORK AND OIL FILTER



- ◆ Disassembly
- [A] Oil filter
- [B] Differential fork
- [C] Return torsion spring
- [D] Differential fork shaft
- [E] O-ring 13.8×2.5
- [F] Steel ball 9.5
- [G] Shift locating spring
- [H] Aluminum washer 14×21×1.5
- [I] Shift locating bolt

- ◆ Tools: 14mm socket, 8mm hexagonal wrench
- ◆ Use the socket to unscrew the bolt counterclockwise [I] and take out [F] [G] [H], and use the Allen wrench to unscrew counterclockwise [D] and take out [B] [C]



## DISASSEMBLE THE SHIFT HUB AND FRONT DRIVE ASSEMBLY

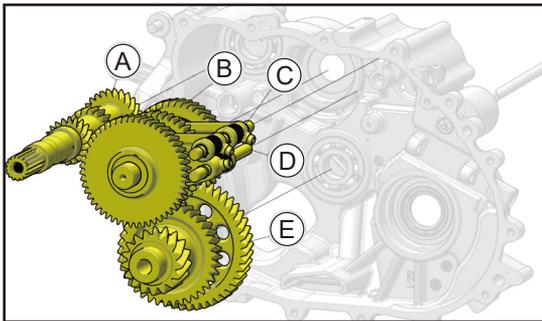
- ◆ Disassembly
- 【A】 2/4WD fork assembly
- 【B】 Drive assembly
- 【C】 Washer 15×28×1
- 【D】 Shift hub assembly

◆ Remove [ A ], [ B ], [ C ] and [ D ] in turn.

## DISASSEMBLE THE GEAR TRANSMISSION PARTS

- ◆ Disassembly
- A] Main shaft
- B] Countershaft assembly
- C] HR fork assembly
- D] L fork assembly
- E] Third shaft assembly

◆ Take out [ E ] first, then [ B ], [ C ], [ D ] and finally [ A ].

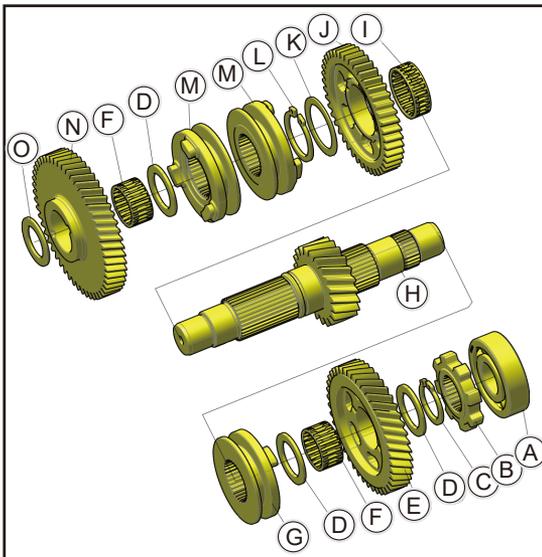


## DISASSEMBLE THE SECONDARY SHAFT ASSEMBLY

- ◆ Disassembly
- 【A】 Bearing 6305
- 【B】 Parking ratchet
- 【C】 Shaft retaining ring 28×2.5
- 【D】 Washer 28×40×2.5
- 【E】 H-gear follower gear
- 【F】 Needle bearing K28×33×17
- 【G】 H-gear coupling sleeve
- 【H】 Countershaft
- 【I】 Needle roller bearing K35×40×13
- J] R-gear driven gear
- K] Washer 35×46×1.5
- L] Shaft retaining ring 35×2.5
- M] RL-gear coupling sleeve
- N] L-gear driven gear
- O] Washer 25×38×2.5

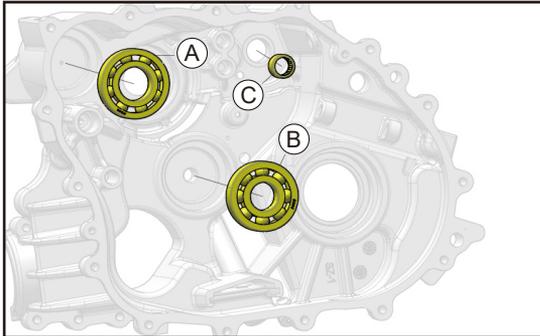
◆ Tool: Circlip plier.

◆ Remove [ A ] [ B ], use the circlip plier to remove [ C ], then remove [ D ], [ E ], [ F ], [ G ], and take out the other end of [ O ] [ N ] [ F ] [ D ] [ M ] in turn, and use the circlip plier to remove [ L ], and then take out [ K ] [ J ] [ I ] in turn.



## ASSEMBLE THE GEAR BOX

### INSTALL THE LEFT CASE BEARING



◆ Installation

【A】 Bearing 6206

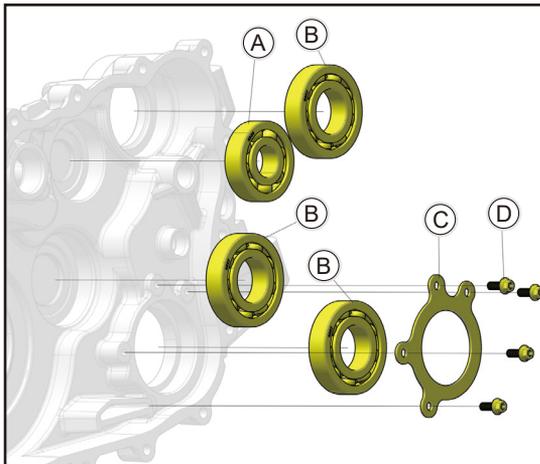
【B】 Bearing 6305

【C】 Needle roller bearing HK1516

◆ Tools: Bearing tooling 6305, bearing tooling 6206, needle roller bearing press fitting-HK121612.

◆ Lay the left case flat, the inner cavity faces up, press in the bearing [ A ] [ B ] [ C ].

### INSTALL THE RIGHT GEARBOX COMBINATION BEARING



◆ Installation

【A】 Bearing 6305

【B】 Bearing 6207

【C】 Bearing pressure plate

【D】 Bolt M6×16

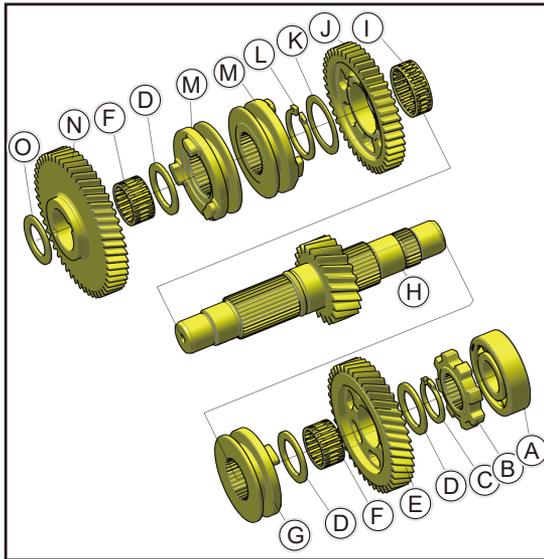
◆ Tools: 8mm socket, bearing tooling 6305, bearing tooling 6207

◆ Lay the right case flat, the inner cavity faces up, press in the bearing [ A ] [ B ], install [ C ], apply thread adhesive and tighten the bolt clockwise [ D ].

Tighten torque of bolts M6

12N·m(1.22kgf·m,8.86ft·lb)

## INSTALL THE SECONDARY SHAFT ASSEMBLY

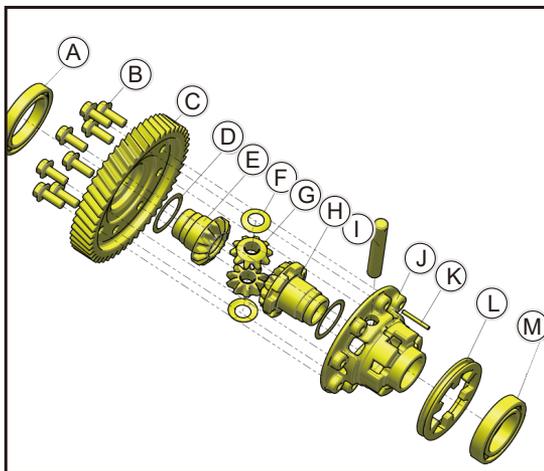


◆ Installation

- 【A】 Bearing 6305
- 【B】 Parking ratchet
- 【C】 Shaft retaining ring 28×2.5
- 【D】 Washer 28×40×2.5
- 【E】 H-gear driven gear
- 【F】 Needle roller bearing K28×33×17
- 【G】 H-gear coupling sleeve
- 【H】 Countershaft
- 【I】 Needle roller bearing K35×40×13
- 【J】 R-gear driven gear
- 【K】 Washer 35×46×1.5
- 【L】 Shaft retaining ring 35×2.5
- 【M】 RL gear coupling sleeve
- 【N】 L-gear driven gear
- 【O】 Washer 25×38×2.5

Tool: Circlip plier.

- ◆ Install [G], [D], [F], [E], [D], [C], [B] into [H] in order, then press [A] into the journal, and install other parts in order at the other end.



## ASSEMBLED OUTPUT COMPONENTS

◆ Installation

- 【A】 Bearing 61912
- 【B】 Bolt M10×1.25×25
- 【C】 Rear output gear
- 【D】 Adjustment washer
- 【E】 Left rear half shaft bevel gear
- 【F】 Bowl shims
- 【G】 Gearbox planetary gears
- 【H】 Bevel gear for right rear half shaft
- 【I】 Planetary gear shaft
- 【J】 Rear output differential case
- 【K】 Elastic cylindrical pin
- 【L】 Rear differential output sleeve
- 【M】 Bearing 6010

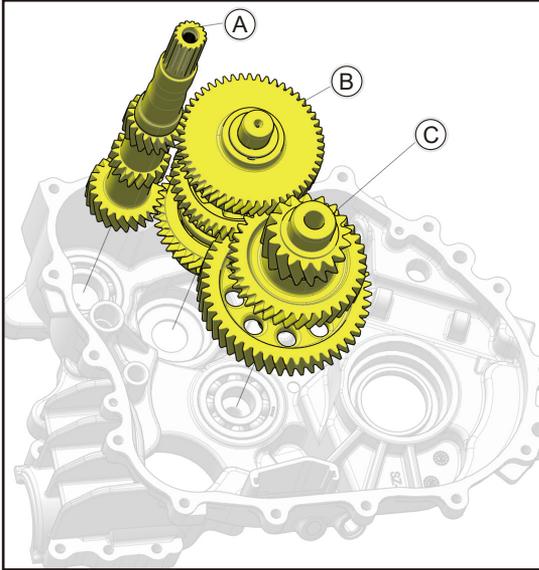
- ◆ Tools: Bearing tooling 61912, bearing tooling 6010, 17mm socket.

- ◆ Install [H] [D] into the center hole of [J] respectively, and then insert [I] from the side, pay attention to the orifice of the shaft end opposite to the pin hole of [J], and at the same time, put in two pairs of [F] [G] placed on the upper and lower sides of [H] respectively. Insert [D] and [E] into the center hole of [C] in turn, and then connect it with [J], and tighten [B] clockwise after applying thread fastening glue. Insert [L] and press in [A] and [M].

Bolts M10×1.25×25

45N·m(4.59kgf·m,33.3ft·lb)

## INSTALL THE GEAR UNIT



◆ Installation

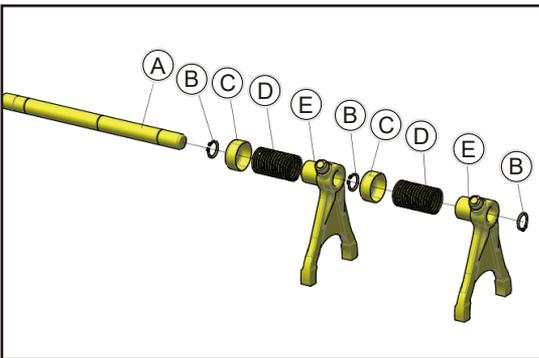
【A】 Main shaft

【B】 Countershaft

【C】 Third shaft

- ◆ Install [A] into the left case first, and then install [B] and [C] together into the right case as shown in the illustration.

## ASSEMBLE THE HR-GEAR FORK SHAFT ASSEMBLY



◆ Installation

[A] HR-gear fork shaft

[B] Shaft retaining ring 12

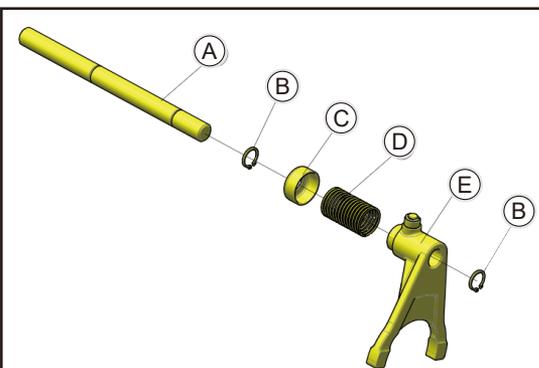
[C] Fork spring holder

[D] Fork spring

[E] HR-gear fork assembly

- ◆ Tool: Circlip plier.

- ◆ Install the parts in order as shown in the illustration [A].



## ASSEMBLE THE L-GEAR FORK SHAFT ASSEMBLY

◆ Installation

【A】 L-gear fork shaft

【B】 Shaft retaining ring 12

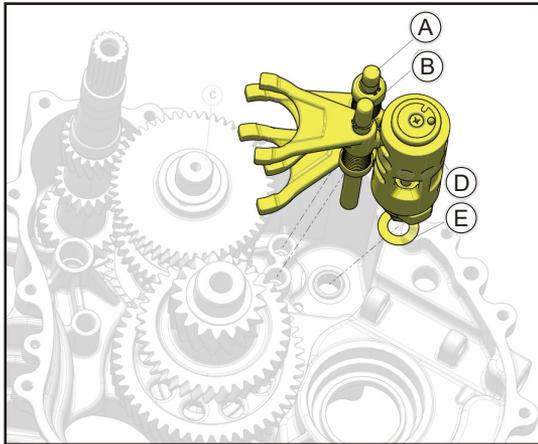
【C】 Fork spring holder

【D】 Fork spring

【E】 L-shift fork assembly

- ◆ Tool: Circlip plier.

- ◆ Install the parts in order as shown in the illustration [A].

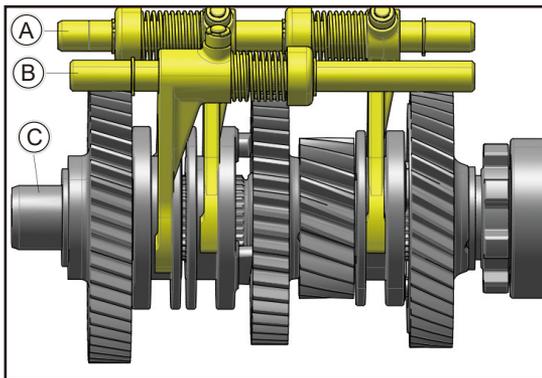


## INSTALL THE HR-GEAR FORK ASSEMBLY, L-GEAR FORK ASSEMBLY, AND SHIFT HUB ASSEMBLY

◆ Installation

- [A] HR-gear fork assembly
- [B] L-gear fork assembly
- [C] Right case assembly
- [D] Shift hub assembly
- [E] Washer 15×28×1

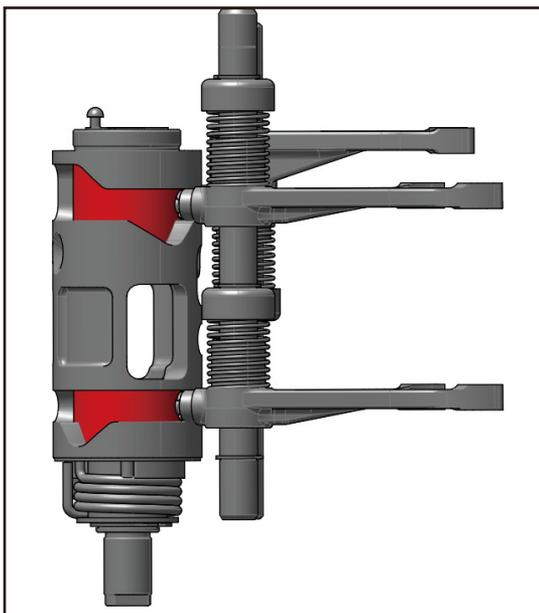
◆ Assemble [A] [B] [D] [E] as shown in the illustration, and then install it into the right case [C] to connect it.



◆ ◆ Installation

- [A] L-gear fork assembly
- [B] HR-gear fork assembly
- [C] Countershaft assembly

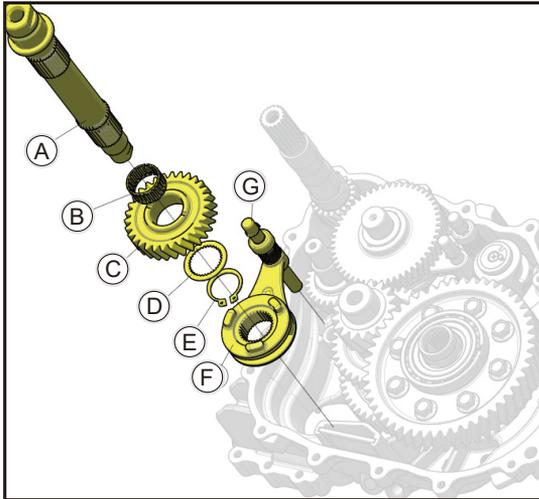
◆ ◆ Assemble [ A ] [ B ] into the right case and connect it to [ C ] as shown in the illustration.



**⚠ CAUTION**

When installing, check that the roller portion of the HR-gear fork and L-gear fork should be in the lead groove of the red painted portion of the shift drum.

## INSTALL THE DRIVE SHAFT ASSEMBLY AND THE 2/4 WD FORK ASSEMBLY



◆ Installation

【A】 Output gear shaft

【B】 Split needle roller bearing 30×34×17

【C】 Output driven gear

【D】 Spline washer

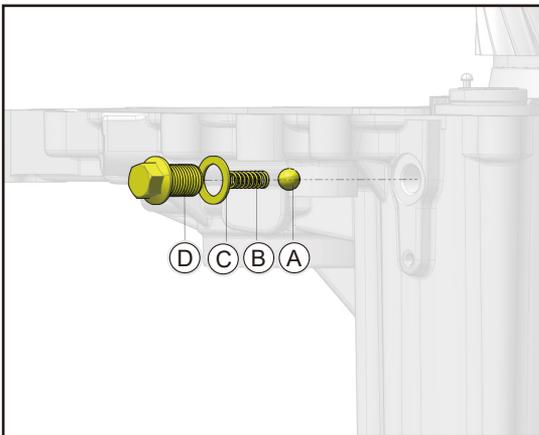
【E】 Shaft elastic retaining ring 32×2

【F】 Coupling sleeve for 2/4WD

【G】 2-4WD fork assembly

◆ Tool: Circlip plier.

◆ Assemble 【A】 【B】 【C】 【D】 【E】 【F】 as shown in the illustration and put it into the right case together with 【G】.



## INSTALL THE GEAR LOCATING ASSEMBLY

◆ Installation

【A】 Steel ball 9.5

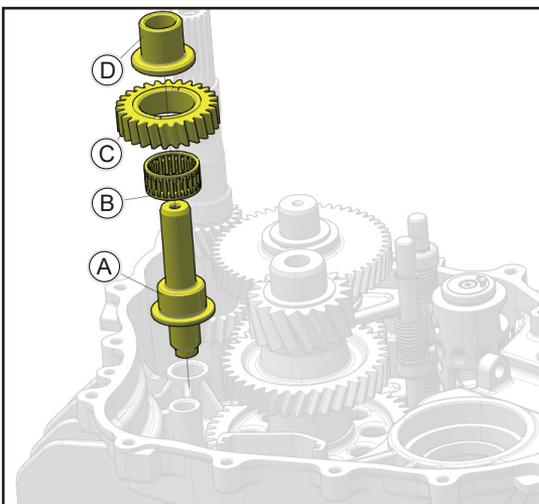
【B】 Shift locating spring

【C】 Aluminum washer 14×21×1.5

【D】 Shift locating bolt

◆ Tool: 14mm socket.

◆ Install 【A】 , 【B】 , 【C】 into 【D】 and then into the right case in order as shown in the illustration.



## ASSEMBLE THE REVERSE IDLER SHAFT ASSEMBLY

◆ Installation

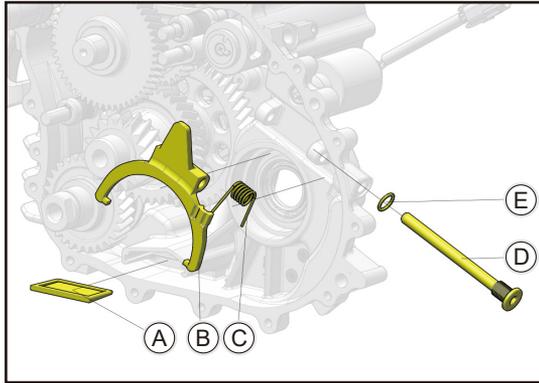
【A】 Reverse idler shaft

【B】 Needle bearing K30×35×17

【C】 Reverse idler pulley

【D】 Reverse idler shaft bushing

◆ Install 【B】 【C】 【D】 into 【A】 and then install all to right case as shown in the illustration, paying attention to the direction of the flat side of the right case and 【A】.



## INSTALL THE DIFFERENTIAL FORK ASSEMBLY AND OIL FILTER

◆ Installation

【 A 】 Oil filter

【 B 】 Differential fork

【 C 】 Differential fork return torsion spring

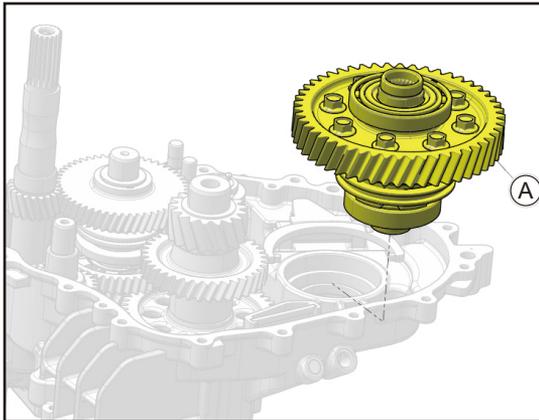
【 D 】 O-ring 13.8×2.5

【 E 】 Screw plug M14

◆ Tools: 8mm hexagonal wrench

◆ Insert the [ A ] to right case as shown in the illustration, and then insert the [ D ] [ E ] through the [ B ] [ C ] into the position shown in the illustration.

|  |
|--|
| Tightening torque of screw plug M14 assembly |
| 15N·m(1.53kgf·m,11.1ft·lb)                   |

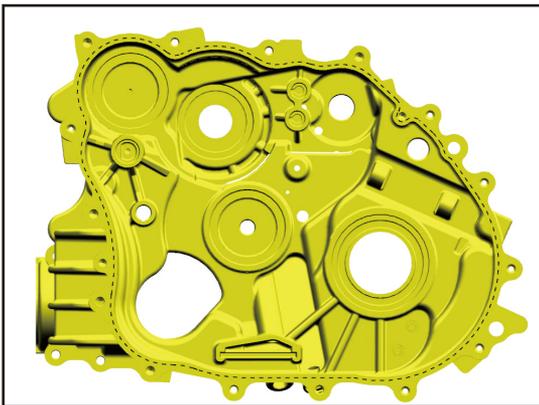


## INSTALL THE REAR OUTPUT GEAR ASSEMBLY

◆ Installation

【 A 】 Rear output gear assembly

◆ Install [ A ] into the right case first as shown in the illustration.



## INSTALL THE LEFT CASE COMBINATION

◆ Installation

【 A 】 Left gearbox combination

【 B 】 Bolt M8×40

【 C 】 Bolt M8×70

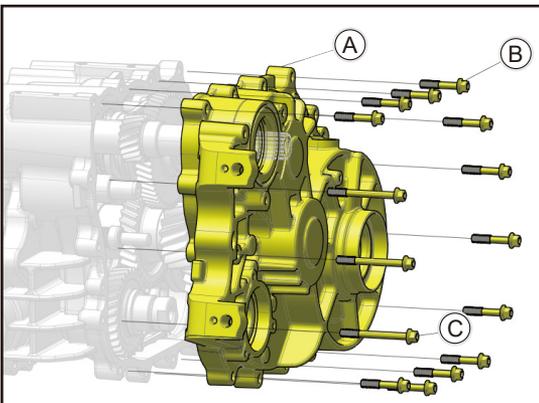
◆ Tool: 10mm socket.

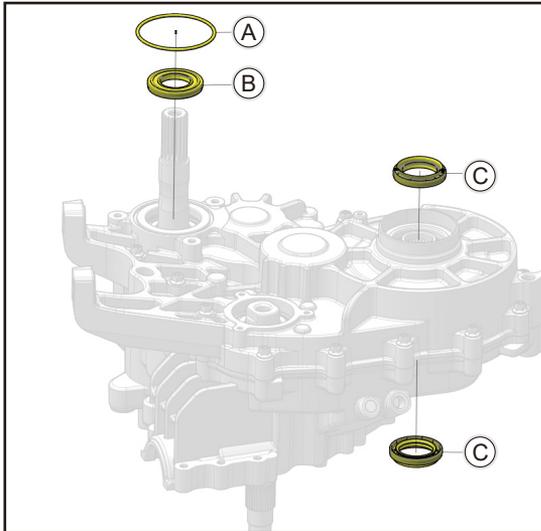
◆ Apply sealant according to the gluing track shown in the drawing. The glue should be applied evenly and continuously, and the width of the glue line should be about 1.5-2mm.

◆ Align the left box body locating pin hole, install [ A ] and tighten the bolts in order.

|                            |
|----------------------------|
| Bolt M8×40                 |
| 12N·m(1.22kgf·m,8.86ft·lb) |

|                            |
|----------------------------|
| Bolt M8×70                 |
| 12N·m(1.22kgf·m,8.86ft·lb) |





## INSTALL THE OIL SEALS AND O-RINGS

◆ Installation

【A】 O-ring 73×3

【B】 Oil seal 30×55×7

【C】 Oil seal 35×52×7/11

◆ Tool: Oil seal press fit tooling

◆ Install [B] and [C] into the gearbox in sequence with the oil seal press fitting tool according to the position shown in the illustration, and put [A] in the O-ring groove.

## INSTALL THE DRIVEN BEVEL GEAR SHAFT

◆ Installation

【A】 Elastic retaining ring

【B】 Bolt M6×30

【C】 Nut cover plate

【D】 Oil window assembly

【E】 Hexagonal flange nut M33×1.5

【F】 Bolt M6×16

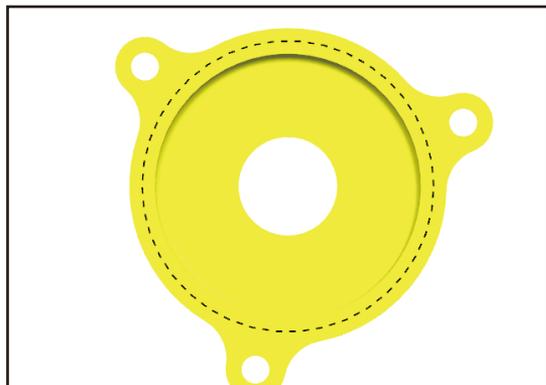
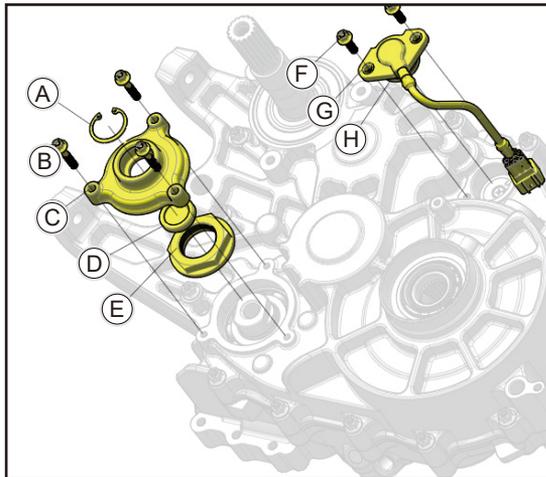
【G】 Gear sensor assembly

【H】 O-ring

◆ Tools: 46mm socket, 8mm socket, circlip plier

◆ Apply thread tightening glue to [ E ] in the order shown in the drawing and then lock it clockwise on the output shaft with a tightening torque of 240 N·m. Install [ A ] and [ D ] into [ C ], and after applying glue to the bonding surface of [ C ], tighten it clockwise to the case with [ B ].

◆ Apply the sealant according to the gluing track shown in the diagram. The glue application should be even and continuous, and the width of the glue line should be about 1.5-2mm.



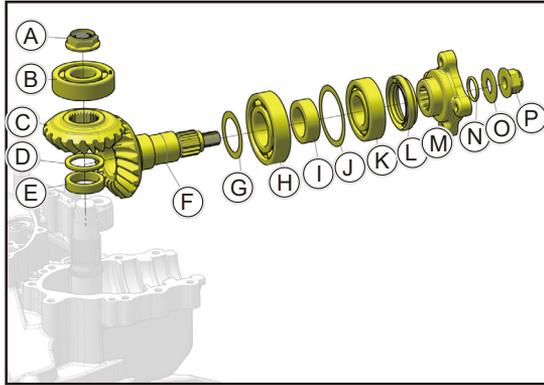
Bolt M6

12N·m(1.22kgf·m,8.86ft·lb)

Bolt M33

240N·m(1.22kgf·m,8.86ft·lb)

## INSTALL THE DRIVE BEVEL GEAR AND FRONT OUTPUT ASSEMBLY



◆ ◆ Installation

- 【A】 Hexagonal flange face nut M22×1
- 【B】 Bearing 6305    【C】 Front output drive bevel gear
- 【D】 Adjustment pads for front output drive gear
- 【E】 Front output driven gear bushing
- 【F】 Front output driven bevel gear shaft
- 【G】 Adjustment shims
- 【H】 Bearing 7207
- 【I】 Front output bearing spacer
- 【J】 Front output adjusting spacer
- 【K】 Bearing 7206    【L】 Oil seal 38×55×7
- 【M】 Front output flange    【N】 O-ring 20×2.65
- 【O】 Washer 15×34×2    【P】 Nut M14×1.5

◆ Tool: 21mm socket

◆ Install [G] [H] [I] [J] [K] [L] [M] [N] [O] [P] into [F] and then install all to the case, and then install [E] and [D] in the order as shown in the illustration, and then apply thread tightening adhesive and then lock counterclockwise [P].

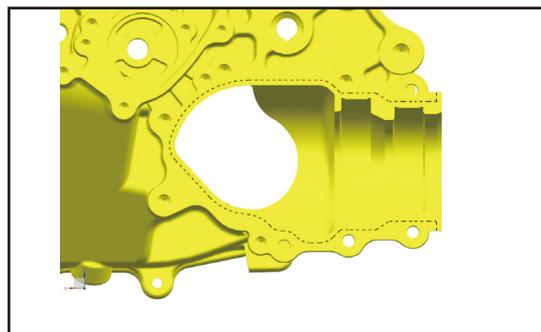
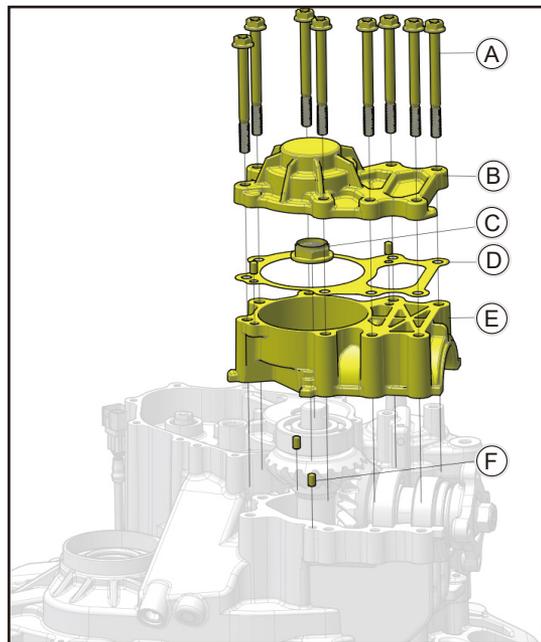
|                            |
|----------------------------|
| Nut M14×1.5                |
| 145N·m(21.4kgf·m,155ft·lb) |

## INSTALL THE DRIVEN BEVEL GEAR COVER

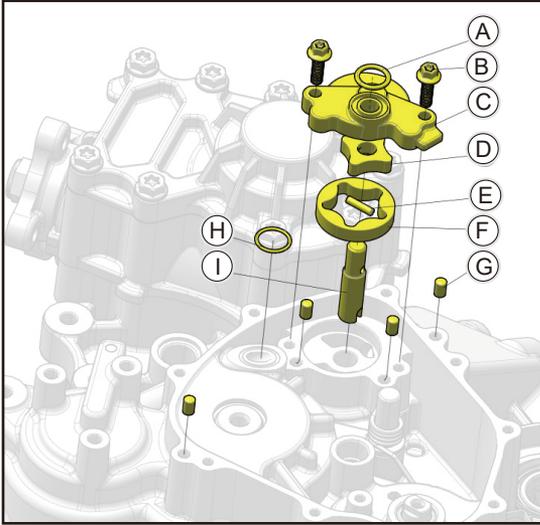
◆ Installation

- 【A】 Bolt M8×90    【B】 Cover plate of drive gear nut
- 【C】 Hexagonal flange nut M22×1
- 【D】 Driven bevel gear cover gasket
- 【E】 Driven bevel gear bearing housing
- 【F】 Cylindrical pin 6×10

- ◆ Tools: 10mm socket, 27mm socket, copper hammer.
- ◆ Tap in [F] at the position shown in the drawing.
- ◆ Apply sealant to the right case according to the gluing track shown in the illustration. The glue should be applied evenly and continuously, and the width of the glue line should be about 1.5-2mm.
- ◆ Align the box locating pin holes, install [E], put in the drive bevel gear and bearing 6305, tighten [C] clockwise after applying thread tightening glue, tighten the bolts [A] in order after installing [D] [B].



|                            |
|----------------------------|
| Nut M22×1                  |
| 145N·m(14.8kgf·m,107ft·lb) |
| Bolt M8×90                 |
| 25N·m(2.55kgf·m,18.5ft·lb) |



### INSTALL THE OIL PUMP ASSEMBLY

◆ Installation

【A】 O-ring 13.8×2.5

【B】 Bolt M6×16

【C】 Oil pump cover

【D】 Oil pump outer rotor

【E】 Needle roller P4×15.8

【F】 Oil pump outer rotor

【G】 Cylindrical pin 6×10

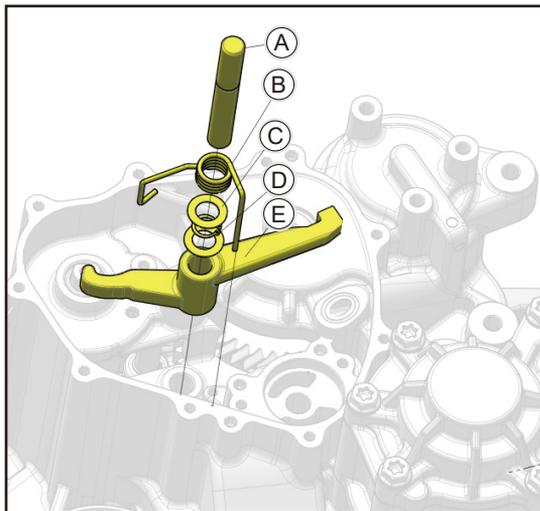
【H】 O-ring 15.6×1.78

【I】 Oil pump shaft

◆ Tool: 8mm socket

◆ Put [H] into the right case O-ring groove as shown in the illustration and tap in [G].

◆ Install [ I ], [ F ], [ E ], [ D ], [ C ], [ A ] in turn, and finally lock the bolt [ B ].



### INSTALL THE PARK ARM ASSEMBLY

◆ Installation

[A] Parking arm shaft

[B] Parking arm return torsion spring

[C] Flat spacer 12×20×1

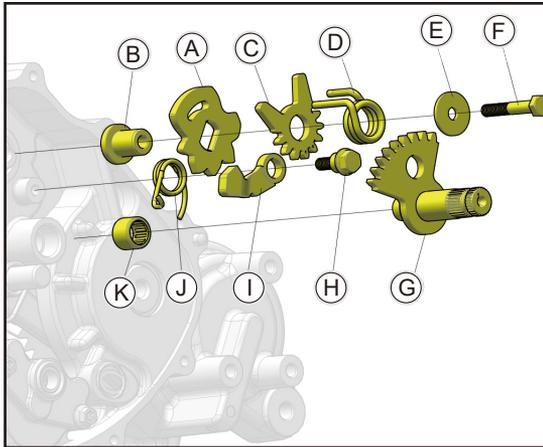
[D] Shaft retaining ring 12

[E] Parking arm

◆ Install the parts into the right case in the position shown in the illustration.

Nut M6×16

12N·m(1.22kgf·m,8.86ft·lb)

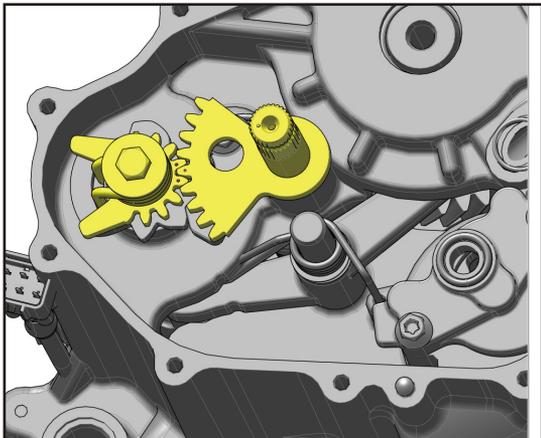
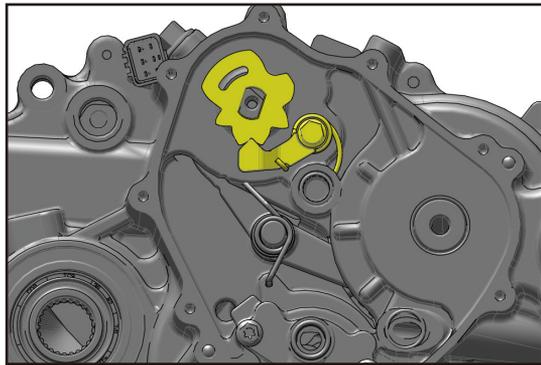


## INSTALL THE SHIFT MECHANISM

◆ Installation

- 【A】 Shift locating gear
- 【B】 Bushing
- 【C】 Shift driven gear
- 【D】 Shift torsion spring
- 【E】 Washer 6.5×22×2
- 【F】 Hexagonal head bolt M6×40
- 【G】 Shift shaft assembly
- 【H】 Locating plate bolts M6×21
- 【I】 Locating plate
- 【J】 Shift locating plate spring
- 【K】 Needle roller bearing HK121612

- ◆ Tools: Needle roller bearing press fitting-HK121612, brass hammer, 10mm socket.
- ◆ Press [A] into the case, install [J] into the case and then install [I] and [H], then install [A] into the case and snap it to [I] as shown.
- ◆ Load [B], [C], [D], [E], [F] in order.
- ◆ Install the [B], [C], [D], [E], [F] into the case and tighten them.
- ◆ Finally, install [G] to align the points as shown in the illustration.



|                            |
|----------------------------|
| Bolt M6×40                 |
| 15N·m(1.53kgf·m,11.1ft·lb) |

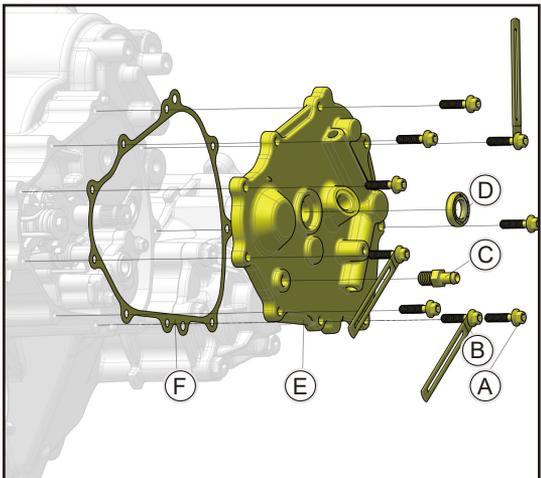
|                            |
|----------------------------|
| Bolt M6×21                 |
| 15N·m(1.53kgf·m,11.1ft·lb) |

## INSTALL THE SHIFT COVER

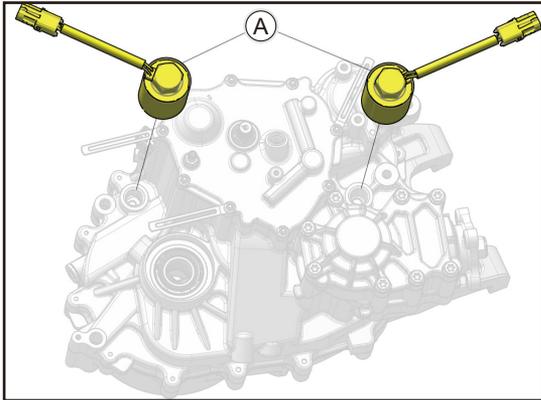
◆ Installation

- 【A】 Bolt M6×25
- 【B】 Plastic-coated wire clip
- 【C】 Breathing connector
- 【D】 Oil seal 15×25×5
- 【E】 Right case shift cover
- 【F】 Right case gearshift cover gasket

- ◆ Tools: Shift cover oil seal indenter, 8mm socket.
- ◆ Press [D] into [E], then install [F] [E] according to the position of the locating pin, and then install [A] [B] in turn and tighten the bolts in order.



|                            |
|----------------------------|
| Bolt M6×25                 |
| 12N·m(1.22kgf·m,8.86ft·lb) |



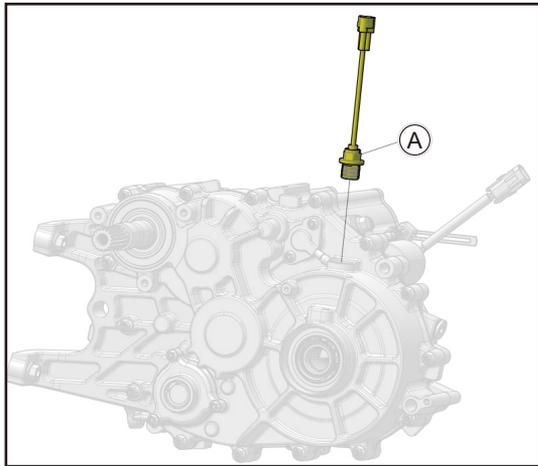
## INSTALL THE SOLENOID VALVE ASSEMBLY

◆ Installation

[A] Solenoid valve assembly

◆ Tool: Torque wrench

- ◆ Install the [A] solenoid valve assembly into the right case in the position shown in the illustration, and tighten with a torque of 35Nm.



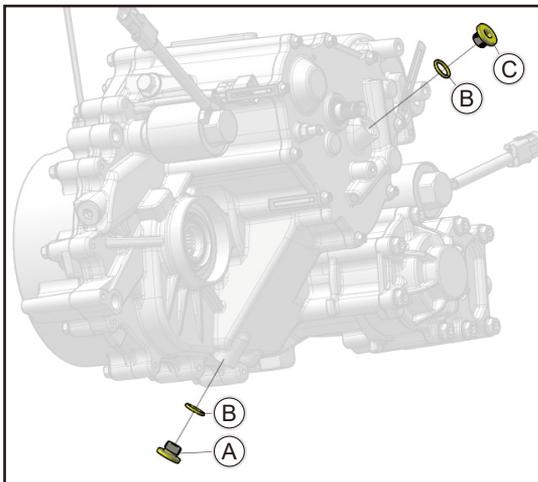
## INSTALL THE SPEED SENSOR ASSEMBLY

◆ Installation

[A] Speed sensor assembly

◆ Tool: Torque wrench

- ◆ Install [A] into the right case according to the position shown in the illustration, and tighten it with a torque of 15Nm.



## INSTALL THE OIL FILLER PLUG AND DRAIN PLUG ASSEMBLY

◆ Installation

[A] Screw plug M14 assembly

[B] O-ring 13.8×2.5

[C] Screw plug M14

- ◆ Tools: 8mm allen wrench.
- ◆ Assemble [A] and [B], tighten [B] clockwise.
- ◆ Assemble [C] and [B], tighten [C] clockwise.

Tightening torque of screw plug M14 assembly

15N·m(1.53kgf·m, 11.1ft·lb)

Tightening torque of screw plug M14

15N·m(1.53kgf·m, 11.1ft·lb)

# FUEL SYSTEM

|   |            |
|---|------------|
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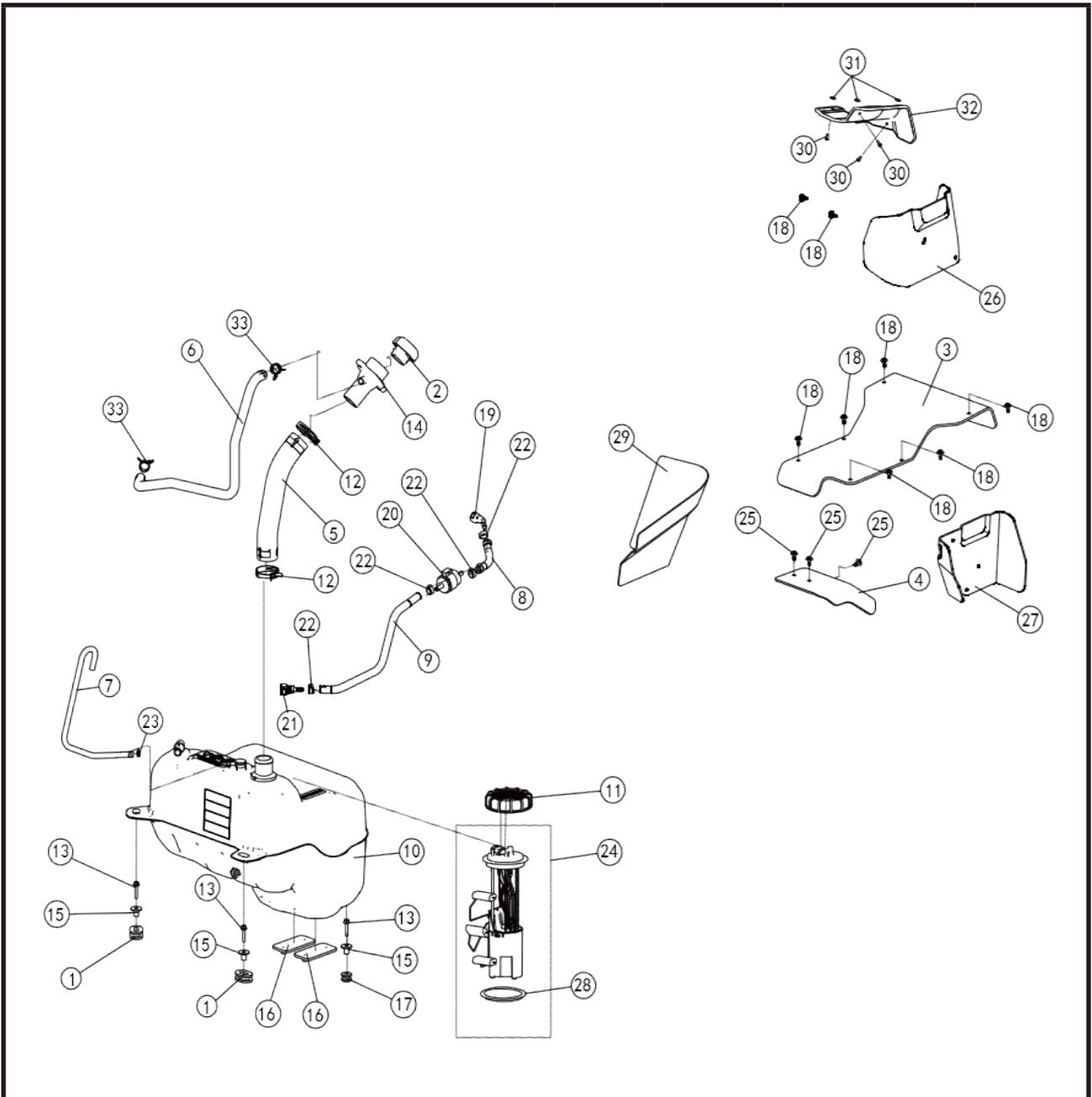
## GENERAL INFORMATION

### FUEL SYSTEM MAINTENANCE CONSIDERATIONS

#### **WARNING**

- ◆ Under certain conditions, gasoline is extremely flammable and explosive. Never disassemble the emissions fuel system while the engine is hot. Severe burns may result. Do not overfill the fuel tank. The tank is at full capacity when fuel reaches the bottom of the filler tube. Allow room for expansion of the fuel. Never start the engine or allow it to run in an enclosed area. Gasoline engines emit exhaust fumes that are toxic and can cause injury or death, consciousness and death in urban areas within a short period of time. Do not smoke or allow open flames or sparks in or near a fueling or gasoline storage de-oil. If you get gasoline in your eyes or if you accidentally swallow gasoline, get medical attention immediately.

FUEL TANK EXPLODED VIEW OF FUEL SYSTEM



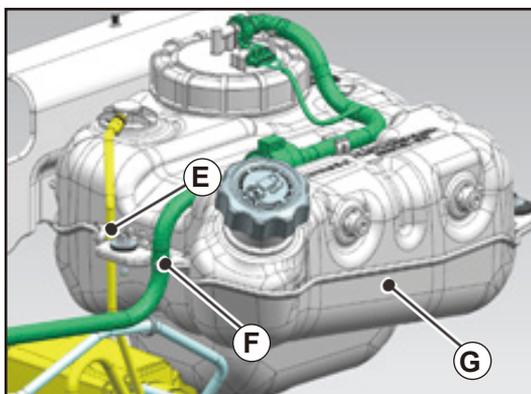
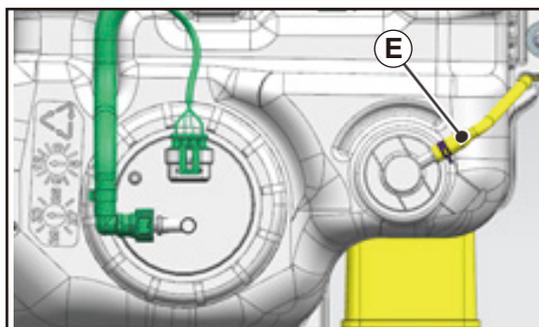
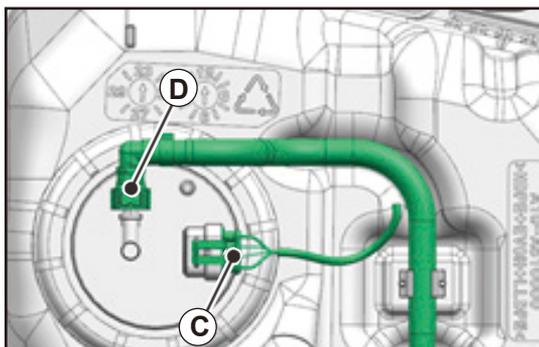
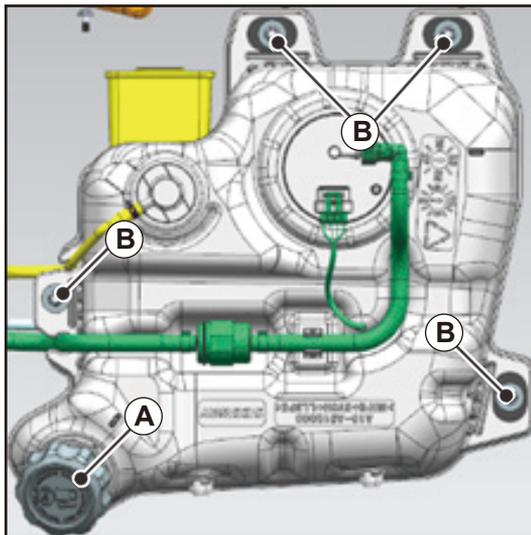
| No. | Fastener                    | Torque |       |       | Remarks |
|-----|-----------------------------|--------|-------|-------|---------|
|     |                             | N·m    | kgf·m | ft·lb |         |
| 1   | TANK INSTALL RUBBER SLEEVE  |        |       |       |         |
| 2   | FUEL TANK COVER             |        |       |       |         |
| 3   | REAR HEAT SHIELD            |        |       |       |         |
| 4   | TRANSMISSION HEAT SHIELD    |        |       |       |         |
| 5   | FUEL FILLER CONNECTION HOSE |        |       |       |         |
| 6   | VENT PIPE                   |        |       |       |         |
| 7   | BREATHING VALVE HOSE        |        |       |       |         |
| 8   | HIGH PRESSURE FUEL TUBE     |        |       |       |         |

# FUEL SYSTEM

SEGWAY AT10

|    |   |      |         |                |  |
|----|---|------|---------|----------------|--|
| 9  | HIGH PRESSURE FUEL PIPE                   |      |         |                |  |
| 10 | FUEL TANK                                 |      |         |                |  |
| 11 | FUEL PUMP RETAINER RING                   | 75   | 7.5     | 55             |  |
| 12 | CLAMP 49                                  |      |         |                |  |
| 13 | HEXAGON FLANGE BOLT M6×30                 | 8~12 | 0.8~1.2 | 69~103.6 IN·LB |  |
| 14 | FUEL FILLER                               |      |         |                |  |
| 15 | T BUSHING                                 |      |         |                |  |
| 16 | FUEL TANK GASKET                          |      |         |                |  |
| 17 | FUEL TANK RUBBER GASKET                   |      |         |                |  |
| 18 | SCREW M6×16                               | 8~12 | 0.8~1.2 | 69~103.6 IN·LB |  |
| 19 | 7.89 QUICK CONNECTION PLUG                |      |         |                |  |
| 20 | FUEL FILTER                               |      |         |                |  |
| 21 | 9.49 QUICK CONNECTION PLUG<br>(0 DEGREES) |      |         |                |  |
| 22 | CLAMP 16.5                                |      |         |                |  |
| 23 | CLAMP 13                                  |      |         |                |  |
| 24 | FUEL PUMP                                 |      |         |                |  |
| 25 | BOLT M6×10                                |      |         |                |  |
| 26 | REAR RIGHT HEAT SHIELD                    |      |         |                |  |
| 27 | REAR LEFT HEAT SHIELD                     |      |         |                |  |
| 28 | FUEL PUMP SEALING RING                    |      |         |                |  |
| 29 | RIGHT HEAT SHIELD                         |      |         |                |  |
| 30 | CROSS HEAD SCREWS ST4.2×13                |      |         |                |  |
| 31 | 4.2 SELF-TAPPING SCREW                    |      |         |                |  |
| 32 | REAR TAIL LIGHT HEAT SHIELD               |      |         |                |  |
| 33 | CLAMP 22                                  |      |         |                |  |

## FUEL TANK REMOVAL/INSTALLATION

**! WARNING**

- ◆ Whenever the gasoline line is removed, the battery connection must be disconnected to prevent the accidental startup of the fuel pump.
- ◆ Whenever any repairs or inspections are made to the fuel system, there is a possibility that a fuel leaks may occur. No welding, smoke, open flames, etc., should be allowed in the area.

**DISASSEMBLY**

- 【A】** Fuel pump mounting screw cap
- 【B】** Fuel tank mounting bolts M6×30
- 【C】** Fuel pump cable plug
- 【D】** High pressure fuel hose plug
- 【E】** Breathing valve vent hose/carbon canister adsorption hose
- 【F】** High-pressure fuel hose
- 【G】** Fuel tank assembly

- ◆ Remove the fuel pump mounting screw cap **【A】** .
- ◆ Remove the body plastic parts and the seat and rear shelf assembly (see Body section for details).
- ◆ Disconnect the battery cable.
- ◆ Disconnect the fuel pump cable plug **【C】** and the high pressure fuel hose plug **【D】** .
- ◆ Remove the breather valve vent hose/carbon canister adsorption hose **【E】** .
- ◆ Remove the high pressure fuel hose **【F】** .
- ◆ Remove the 3 fuel tank mounting bolts **【B】** with appropriate tools.
- ◆ Remove the fuel tank **【G】** .

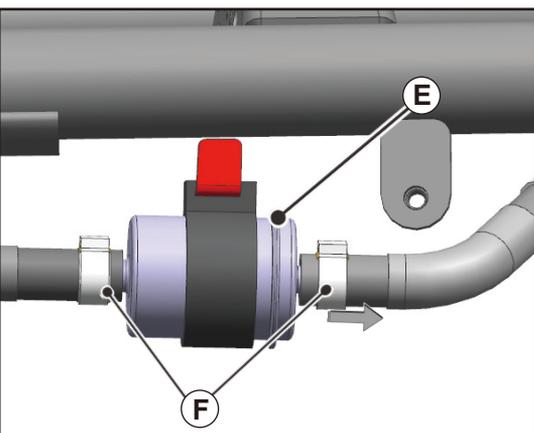
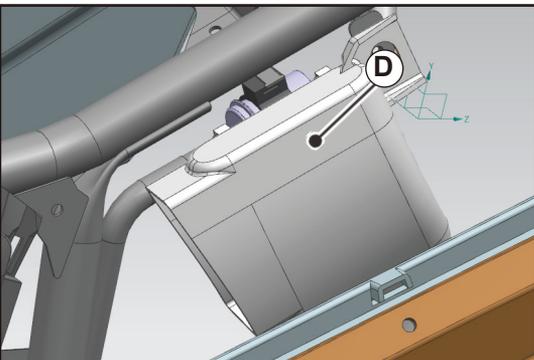
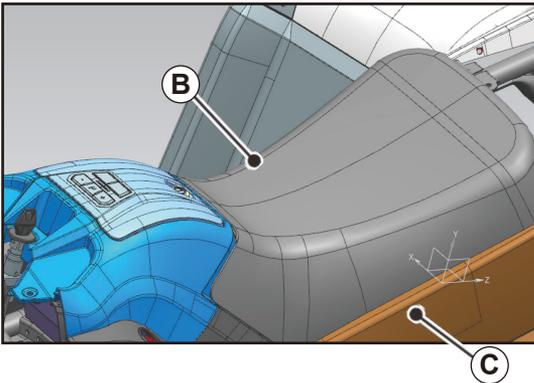
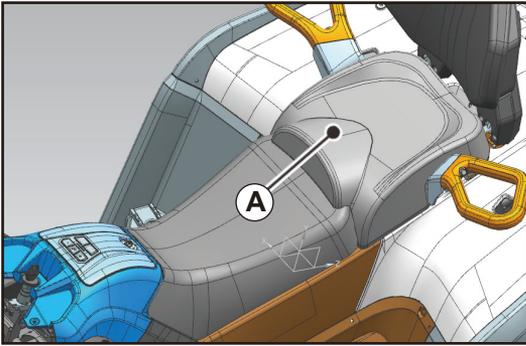
**! CAUTION**

Fuel leakage may occur during the removal of any fuel system components phenomenon, wipe off the residual oil with a cloth.

**INSTALLATION**

- ◆ When assembling, assemble in the reverse order of disassembly.
- ◆ When assembling the high-pressure fuel pipe plug, make sure it is assembled correctly and reliably.

### FUEL FILTER REMOVAL / INSTALLATION



#### ⚠ WARNING

- ◆ Whenever the gasoline line is removed, the battery must be disconnected to prevent the accidental startup of the fuel pump.
- ◆ Whenever any repairs or inspections are made to the fuel system, fuel leaks may occur. No welding, smoke, open flames, etc., should be allowed in the area. Welding, smoke, open flames, etc. must not be allowed in this area.

#### DISASSEMBLY

- ◆ Fuel filter under the cushion, inside the left guard
- 【A】 Rear seat combination
- 【B】 Front seat cushion combination
- 【C】 Left guard
- 【D】 CVT intake pipe
- 【E】 Fuel filter assembly
- 【F】 Single-ear stepless clamp 16.5
- ◆ Remove the rear seat combination 【A】 (see body section for details).
- ◆ Front seat cushion combination 【B】 .
- ◆ Left guard 【C】 (see body section for details)
- ◆ CVT intake pipe 【D】 (see body section for details)
- ◆ Use a suitable tool to remove the clamp 【F】 and take out the fuel filter 【E】 .

#### ⚠ CAUTION

Fuel leakage may occur during the removal of any fuel system components phenomenon, wipe off the residual oil with a cloth.

#### INSTALLATION

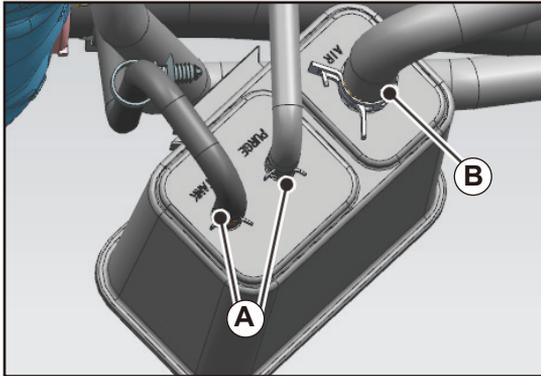
- 【F】 Single-ear stepless clamp 16.5
- 【E】 Fuel filter
- ◆ When assembling the fuel filter, make sure that the arrow is facing (as shown on the left) in the direction of the fuel filter.
- ◆ Replace the clamp 【F】 with a new one, and clamp it with a specialized tool.
- ◆ To assemble the remaining parts, reverse the order of disassembly.

#### ⚠ CAUTION

When replacing and assembling the fuel filter, please carefully check whether the fuel hose is intact to avoid fuel leakage, and then use professional tools to clamp the clamp after confirming that there is no error.

## CARBON CANISTER ASSEMBLY REMOVAL/INSTALLATION

### DISASSEMBLY



- ◆ Carbon canister assembly is mounted in front of the fuel tank, upper front differential

【A】 Steel belt type elastic hose clamp 11

【B】 Steel belt type elastic hose clamp 20

【C】 Carbon canister mounting bolts M6×10

【D】 Carbon canister assembly

【E】 Carbon canister desorption hose

【F】 Adsorption hose

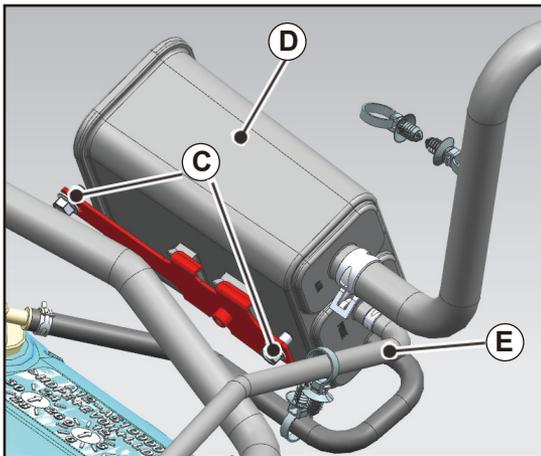
【G】 Carbon canister vent hose

- ◆ Remove the right front fender (see Body section for details).

- ◆ Remove the clamp 【A】 with the appropriate tool, and pull out the carbon canister desorption hose 【E】 and the adsorption hose 【F】 .

- ◆ Remove the clamp 【B】 and pull out the carbon canister vent hose 【G】 with the appropriate tool.

- ◆ Remove the bolts 【C】 with the appropriate tools and take out the carbon canister assembly 【D】 .



### ⚠ CAUTION

Fuel leakage may occur during the removal of any fuel system components phenomenon, wipe off the residual oil with a cloth.

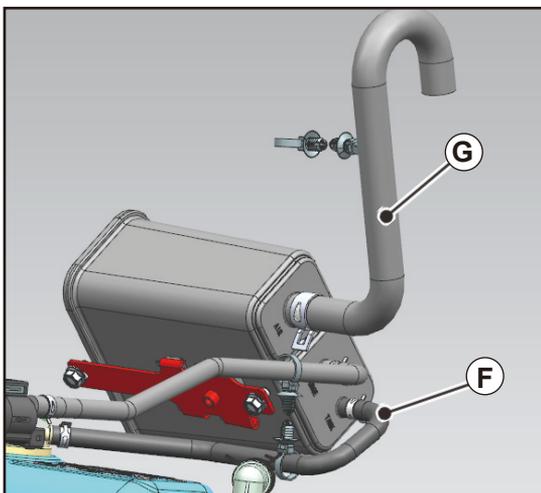
### INSTALLATION

When assembling, reverse the order of disassembly.

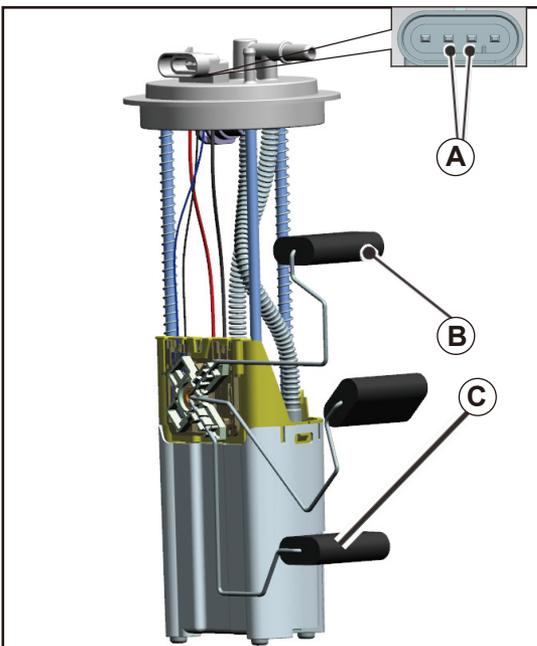
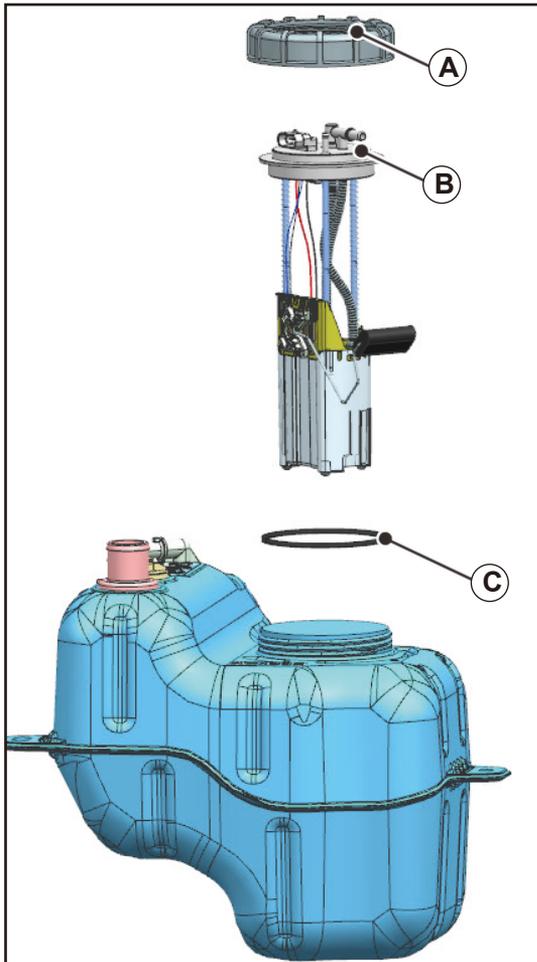
When assembling hose and clamps, make sure they are assembled correctly and reliably.

### ⚠ CAUTION

When replacing and assembling the carbon canister, please carefully check whether the fuel hose is intact to avoid fuel leakage, and then use professional tools to clamp the clamp after confirming that there is no error.



### FUEL PUMP



#### ⚠ WARNING

Whenever any maintenance or inspection of the fuel system is carried out, fuel leakage may occur, and there must be no welding, smoke, open flames, etc. in this area.

#### DISASSEMBLY

【 A 】 Fuel pump mounting screw cap

【 B 】 Fuel pump

【 C 】 Seal ring

◆ Remove the fuel pump mounting screw cap counterclockwise 【 A 】 .

◆ Mark the orientation of the fuel pump on the tank and remove the fuel pump 【 B 】 .

◆ Keep the seal ring 【 C 】 well to prevent loss.

#### ⚠ CAUTION

After removing the fuel pump, please protect the fuel tank opening effectively to avoid debris falling into the fuel tank, thus damaging the fuel pump

#### INSPECTION

【 A 】 cable plug

【 B 】 Position 1

【 C 】 Position 2

【 D 】 Pressure gauge

◆ Move the float rod to check if it is free to move. Float components should be free to return to lower positions. If not, replace the fuel pump.

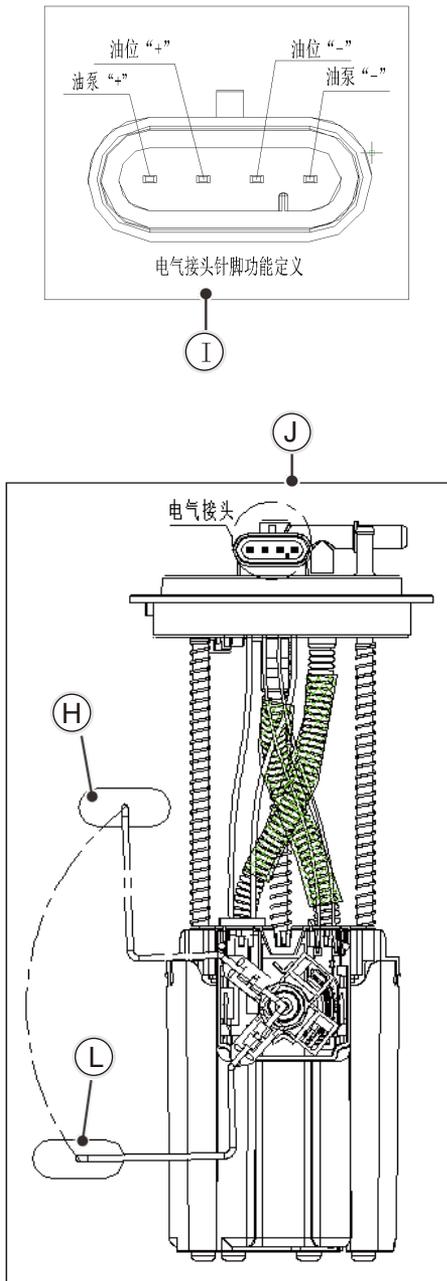
◆ Test the fuel position sensor by connecting the multimeter to the two middle pins of the cable plug 【 A 】 . Displayed on the multimeter in full fuel position 1 to  $160 \pm 5 \Omega$ , displayed on the empty fuel position 2 to  $40 \pm 5 \Omega$ .

◆ The fuel pump outlet pressure was measured through the pressure gauge 【 D 】 , and the measured pressure value was  $330 \pm 20 \text{Kpa}$  in the electrified state.

#### ⚠ CAUTION

◆ If the resistance reading is unstable, clean the resistance scraper with alcohol and retest. If it is still incorrect, replace the fuel pump.

◆ If the fuel pump supply pressure test does not meet the required value, then replace the pump.



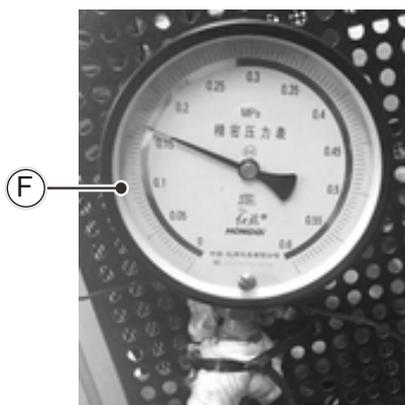
FUEL PUMP ASSEMBLY INSPECTION

- ◆ Structural diagram of the front view of the fuel pump assembly 【J】 .
- ◆ Diagram defining the function of the fuel pump electrical connector pins 【I】 .
- ◆ Remove the driver's seat assembly and the lower cover of the driver's seat. then, using a multimeter set to the resistance ohms position, check the fuel level sensor of the fuel pump as follows.
- ◆ Move the float rod to check for free movement. The float assembly should return freely to a lower position. If not, replace the fuel pump.
- ◆ Test the fuel position sensor by connecting a multimeter to the center two pins of the cable plug 【D】 . The multimeter shows  $245\pm 5\Omega$  on the full fuel position 【H】 and  $40\pm 2\Omega$  on the empty fuel position 【L】 .

|            |               |       |
|------------|---------------|-------|
| Bottom (L) | Height (mm)   | 13±3  |
|            | Resistance(Ω) | 40±2  |
| Top (H)    | Height (mm)   | 139±4 |
|            | Resistance(Ω) | 245±5 |

- ◆ Test the fuel pump supply port pressure by means of pressure gauge 【F】 , and the test pressure value is  $330\pm 17\text{Kpa}$  under energized condition.

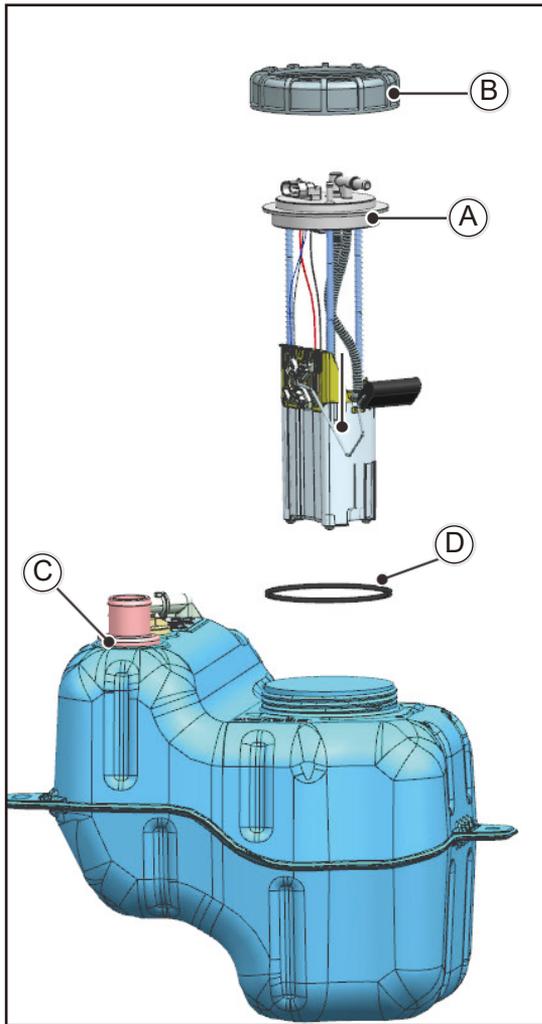
| Model       | Test pressure(Kpa) | Flow (L/h) | Electric current(A) | Sealing pressure (Kpa) |
|-------------|--------------------|------------|---------------------|------------------------|
| W380224A-JK | 300                | 110-140    | 5.5                 | 550-850                |
| A882CHT     | 300                | ≥100       | ≤5.8                | 330±5%                 |



**CAUTION**

- ◆ If the resistance reading shows unstable, please clean the resistance wiper with alcohol and retest. If it is still incorrect, please replace the fuel pump.
- ◆ If the fuel pump supply pressure test fails, please replace the fuel pump.

### INSTALL THE OIL PUMP ASSEMBLY



- ◆ Confirm that the seal 【D】 is installed on the fuel tank port.
- ◆ Confirm that the fuel pump is installed on the fuel tank in the facing position.
- ◆ Tighten the fuel pump mounting screw cap 【B】 clockwise.

Fuel pump mounting screw cap

75 N·m (7.6 kgf·m , 55 ft·lb)

### ⚠ CAUTION

When disassembling the fuel pump, note that the vehicle must be turned off and left for more than 30min to ensure that the pressure of the high pressure fuel hose is relieved to avoid danger.

# FUEL SYSTEM

|   |            |
|---|------------|
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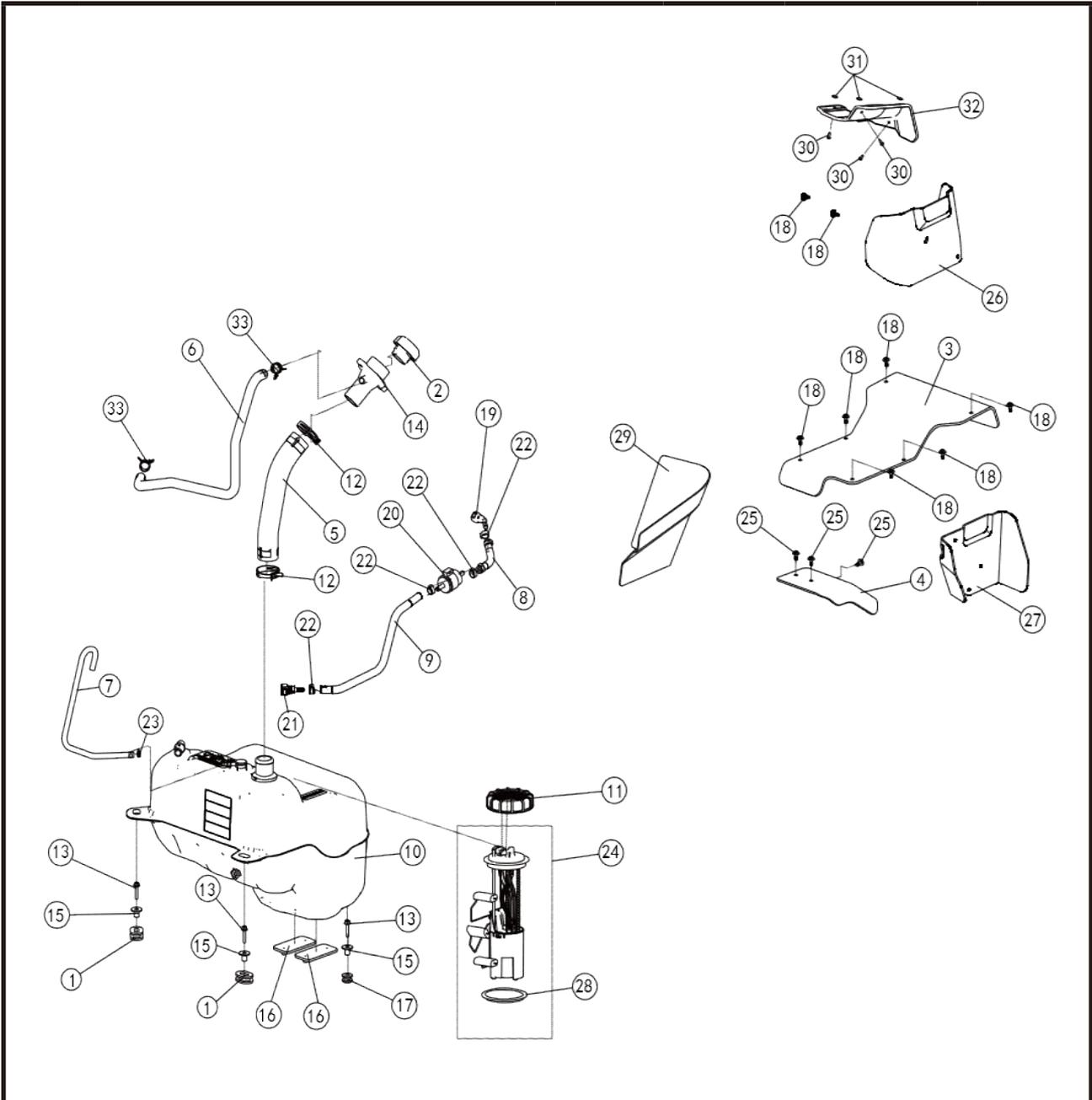
## GENERAL INFORMATION

### FUEL SYSTEM MAINTENANCE CONSIDERATIONS

#### **WARNING**

- ◆ Under certain conditions, gasoline is extremely flammable and explosive. Never disassemble the emissions fuel system while the engine is hot. Severe burns may result. Do not overfill the fuel tank. The tank is at full capacity when fuel reaches the bottom of the filler tube. Allow room for expansion of the fuel. Never start the engine or allow it to run in an enclosed area. Gasoline engines emit exhaust fumes that are toxic and can cause injury or death, consciousness and death in urban areas within a short period of time. Do not smoke or allow open flames or sparks in or near a fueling or gasoline storage de-oil. If you get gasoline in your eyes or if you accidentally swallow gasoline, get medical attention immediately.

FUEL TANK EXPLODED VIEW OF FUEL SYSTEM



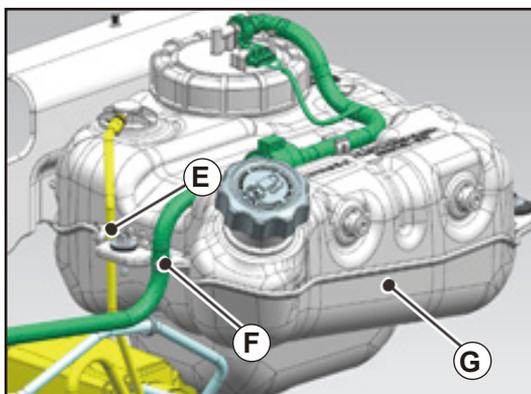
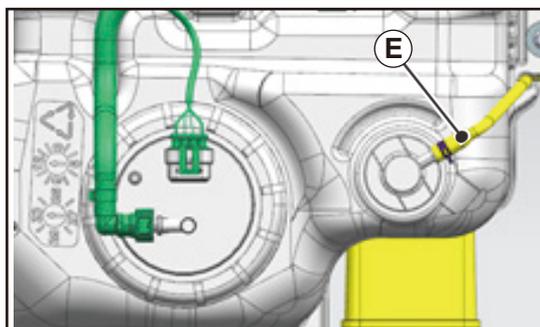
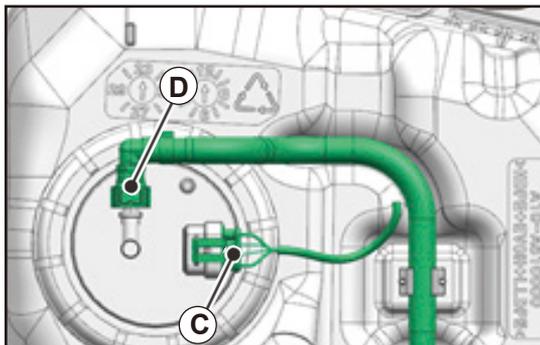
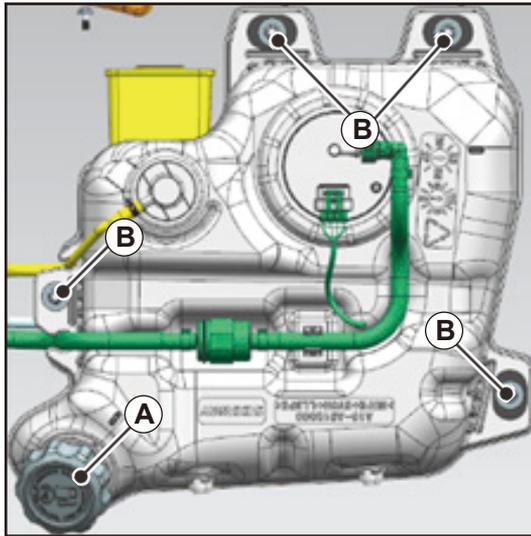
| No. | Fastener                    | Torque |       |       | Remarks |
|-----|-----------------------------|--------|-------|-------|---------|
|     |                             | N·m    | kgf·m | ft·lb |         |
| 1   | TANK INSTALL RUBBER SLEEVE  |        |       |       |         |
| 2   | FUEL TANK COVER             |        |       |       |         |
| 3   | REAR HEAT SHIELD            |        |       |       |         |
| 4   | TRANSMISSION HEAT SHIELD    |        |       |       |         |
| 5   | FUEL FILLER CONNECTION HOSE |        |       |       |         |
| 6   | VENT PIPE                   |        |       |       |         |
| 7   | BREATHING VALVE HOSE        |        |       |       |         |
| 8   | HIGH PRESSURE FUEL TUBE     |        |       |       |         |

# FUEL SYSTEM

SEGWAY AT10

|    |   |      |         |                |  |
|----|---|------|---------|----------------|--|
| 9  | HIGH PRESSURE FUEL PIPE                   |      |         |                |  |
| 10 | FUEL TANK                                 |      |         |                |  |
| 11 | FUEL PUMP RETAINER RING                   | 75   | 7.5     | 55             |  |
| 12 | CLAMP 49                                  |      |         |                |  |
| 13 | HEXAGON FLANGE BOLT M6×30                 | 8~12 | 0.8~1.2 | 69~103.6 IN·LB |  |
| 14 | FUEL FILLER                               |      |         |                |  |
| 15 | T BUSHING                                 |      |         |                |  |
| 16 | FUEL TANK GASKET                          |      |         |                |  |
| 17 | FUEL TANK RUBBER GASKET                   |      |         |                |  |
| 18 | SCREW M6×16                               | 8~12 | 0.8~1.2 | 69~103.6 IN·LB |  |
| 19 | 7.89 QUICK CONNECTION PLUG                |      |         |                |  |
| 20 | FUEL FILTER                               |      |         |                |  |
| 21 | 9.49 QUICK CONNECTION PLUG<br>(0 DEGREES) |      |         |                |  |
| 22 | CLAMP 16.5                                |      |         |                |  |
| 23 | CLAMP 13                                  |      |         |                |  |
| 24 | FUEL PUMP                                 |      |         |                |  |
| 25 | BOLT M6×10                                |      |         |                |  |
| 26 | REAR RIGHT HEAT SHIELD                    |      |         |                |  |
| 27 | REAR LEFT HEAT SHIELD                     |      |         |                |  |
| 28 | FUEL PUMP SEALING RING                    |      |         |                |  |
| 29 | RIGHT HEAT SHIELD                         |      |         |                |  |
| 30 | CROSS HEAD SCREWS ST4.2×13                |      |         |                |  |
| 31 | 4.2 SELF-TAPPING SCREW                    |      |         |                |  |
| 32 | REAR TAIL LIGHT HEAT SHIELD               |      |         |                |  |
| 33 | CLAMP 22                                  |      |         |                |  |

## FUEL TANK REMOVAL/INSTALLATION

**! WARNING**

- ◆ Whenever the gasoline line is removed, the battery connection must be disconnected to prevent the accidental startup of the fuel pump.
- ◆ Whenever any repairs or inspections are made to the fuel system, there is a possibility that a fuel leaks may occur. No welding, smoke, open flames, etc., should be allowed in the area.

**DISASSEMBLY**

- 【A】 Fuel pump mounting screw cap
- 【B】 Fuel tank mounting bolts M6×30
- 【C】 Fuel pump cable plug
- 【D】 High pressure fuel hose plug
- 【E】 Breathing valve vent hose/carbon canister adsorption hose
- 【F】 High-pressure fuel hose
- 【G】 Fuel tank assembly

- ◆ Remove the fuel pump mounting screw cap 【A】 .
- ◆ Remove the body plastic parts and the seat and rear shelf assembly (see Body section for details).
- ◆ Disconnect the battery cable.
- ◆ Disconnect the fuel pump cable plug 【C】 and the high pressure fuel hose plug 【D】 .
- ◆ Remove the breather valve vent hose/carbon canister adsorption hose 【E】 .
- ◆ Remove the high pressure fuel hose 【F】 .
- ◆ Remove the 3 fuel tank mounting bolts 【B】 with appropriate tools.
- ◆ Remove the fuel tank 【G】 .

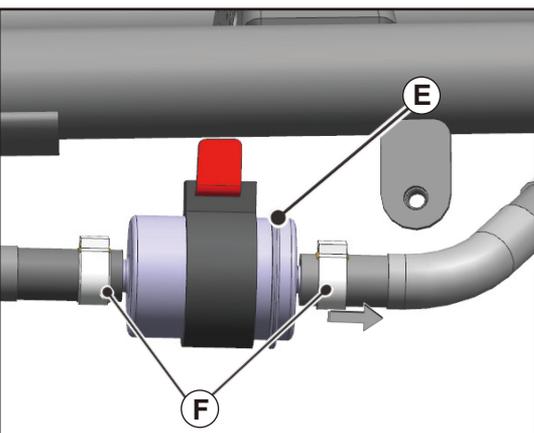
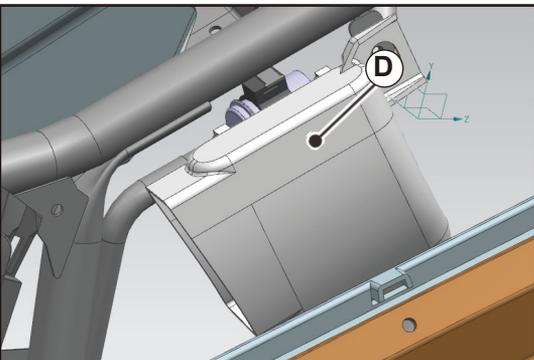
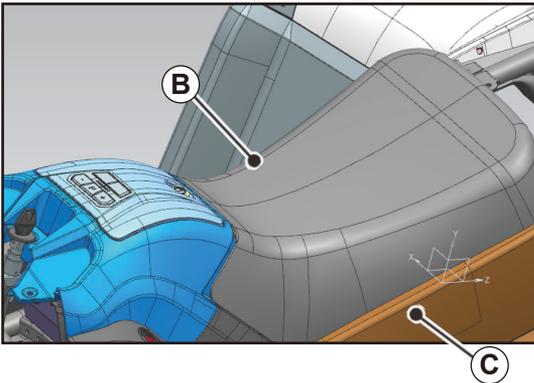
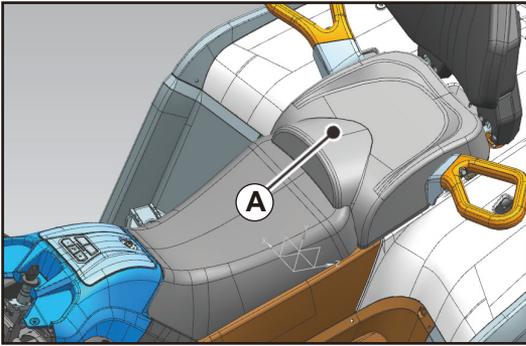
**! CAUTION**

Fuel leakage may occur during the removal of any fuel system components phenomenon, wipe off the residual oil with a cloth.

**INSTALLATION**

- ◆ When assembling, assemble in the reverse order of disassembly.
- ◆ When assembling the high-pressure fuel pipe plug, make sure it is assembled correctly and reliably.

### FUEL FILTER REMOVAL / INSTALLATION



#### ⚠ WARNING

- ◆ Whenever the gasoline line is removed, the battery must be disconnected to prevent the accidental startup of the fuel pump.
- ◆ Whenever any repairs or inspections are made to the fuel system, fuel leaks may occur. No welding, smoke, open flames, etc., should be allowed in the area. Welding, smoke, open flames, etc. must not be allowed in this area.

#### DISASSEMBLY

- ◆ Fuel filter under the cushion, inside the left guard
- 【A】 Rear seat combination
- 【B】 Front seat cushion combination
- 【C】 Left guard
- 【D】 CVT intake pipe
- 【E】 Fuel filter assembly
- 【F】 Single-ear stepless clamp 16.5
- ◆ Remove the rear seat combination 【A】 (see body section for details).
- ◆ Front seat cushion combination 【B】 .
- ◆ Left guard 【C】 (see body section for details)
- ◆ CVT intake pipe 【D】 (see body section for details)
- ◆ Use a suitable tool to remove the clamp 【F】 and take out the fuel filter 【E】 .

#### ⚠ CAUTION

Fuel leakage may occur during the removal of any fuel system components phenomenon, wipe off the residual oil with a cloth.

#### INSTALLATION

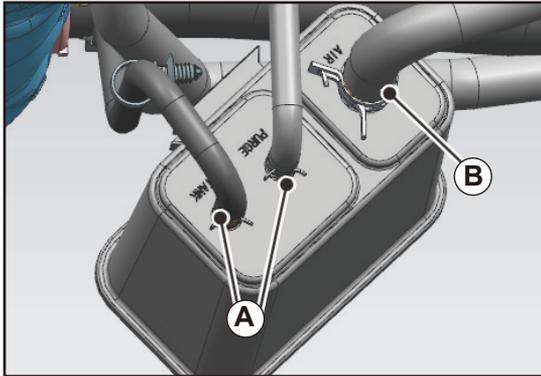
- 【F】 Single-ear stepless clamp 16.5
- 【E】 Fuel filter
- ◆ When assembling the fuel filter, make sure that the arrow is facing (as shown on the left) in the direction of the fuel filter.
- ◆ Replace the clamp 【F】 with a new one, and clamp it with a specialized tool.
- ◆ To assemble the remaining parts, reverse the order of disassembly.

#### ⚠ CAUTION

When replacing and assembling the fuel filter, please carefully check whether the fuel hose is intact to avoid fuel leakage, and then use professional tools to clamp the clamp after confirming that there is no error.

## CARBON CANISTER ASSEMBLY REMOVAL/INSTALLATION

### DISASSEMBLY



- ◆ Carbon canister assembly is mounted in front of the fuel tank, upper front differential

【A】 Steel belt type elastic hose clamp 11

【B】 Steel belt type elastic hose clamp 20

【C】 Carbon canister mounting bolts M6×10

【D】 Carbon canister assembly

【E】 Carbon canister desorption hose

【F】 Adsorption hose

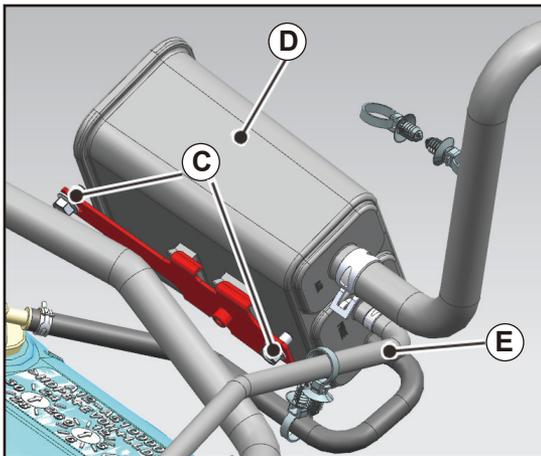
【G】 Carbon canister vent hose

- ◆ Remove the right front fender (see Body section for details).

- ◆ Remove the clamp 【A】 with the appropriate tool, and pull out the carbon canister desorption hose 【E】 and the adsorption hose 【F】 .

- ◆ Remove the clamp 【B】 and pull out the carbon canister vent hose 【G】 with the appropriate tool.

- ◆ Remove the bolts 【C】 with the appropriate tools and take out the carbon canister assembly 【D】 .



### ⚠ CAUTION

Fuel leakage may occur during the removal of any fuel system components phenomenon, wipe off the residual oil with a cloth.

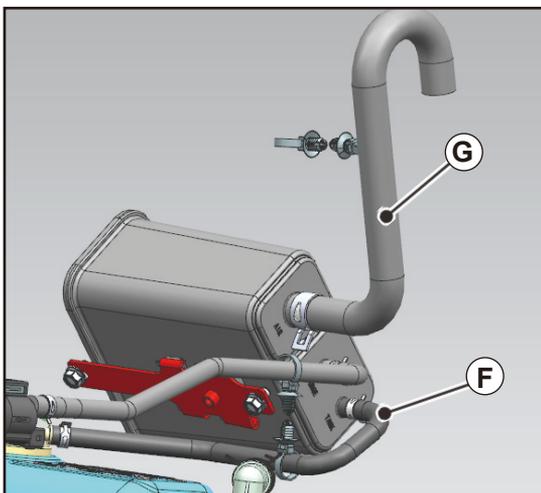
### INSTALLATION

When assembling, reverse the order of disassembly.

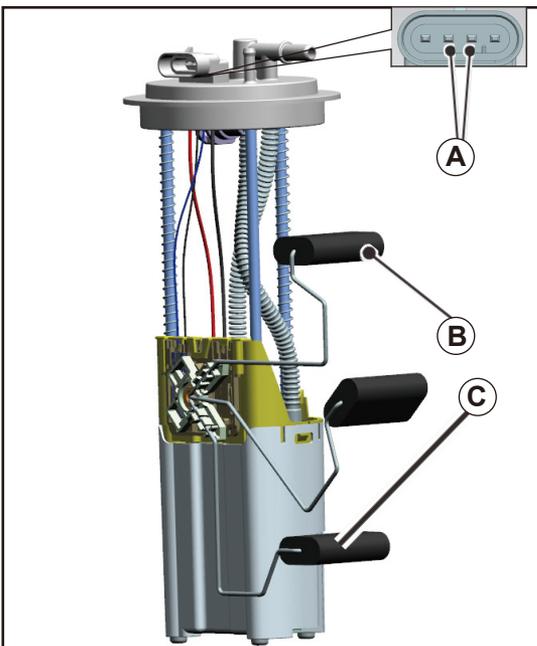
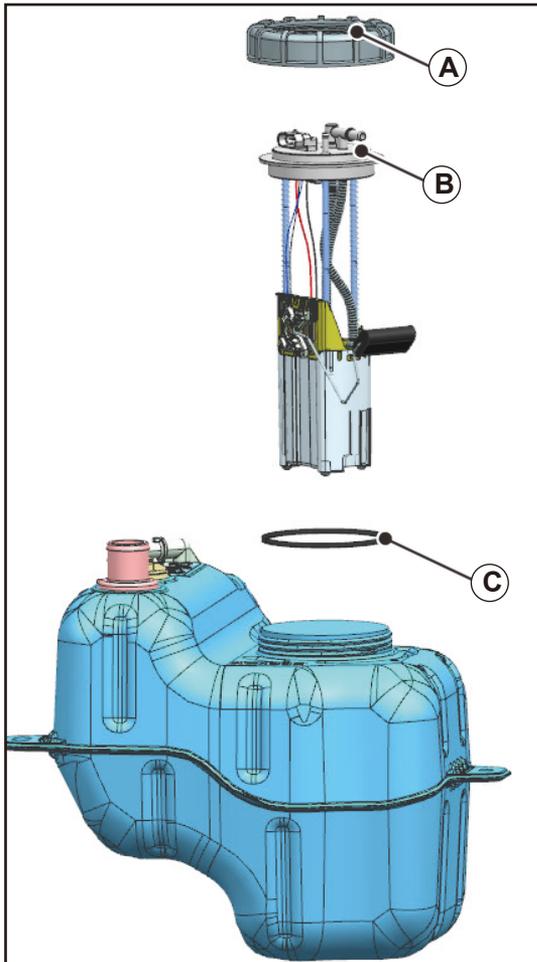
When assembling hose and clamps, make sure they are assembled correctly and reliably.

### ⚠ CAUTION

When replacing and assembling the carbon canister, please carefully check whether the fuel hose is intact to avoid fuel leakage, and then use professional tools to clamp the clamp after confirming that there is no error.



### FUEL PUMP



#### ⚠ WARNING

Whenever any maintenance or inspection of the fuel system is carried out, fuel leakage may occur, and there must be no welding, smoke, open flames, etc. in this area.

#### DISASSEMBLY

【 A 】 Fuel pump mounting screw cap

【 B 】 Fuel pump

【 C 】 Seal ring

◆ Remove the fuel pump mounting screw cap counterclockwise 【 A 】 .

◆ Mark the orientation of the fuel pump on the tank and remove the fuel pump 【 B 】 .

◆ Keep the seal ring 【 C 】 well to prevent loss.

#### ⚠ CAUTION

After removing the fuel pump, please protect the fuel tank opening effectively to avoid debris falling into the fuel tank, thus damaging the fuel pump

#### INSPECTION

【 A 】 cable plug

【 B 】 Position 1

【 C 】 Position 2

【 D 】 Pressure gauge

◆ Move the float rod to check if it is free to move. Float components should be free to return to lower positions. If not, replace the fuel pump.

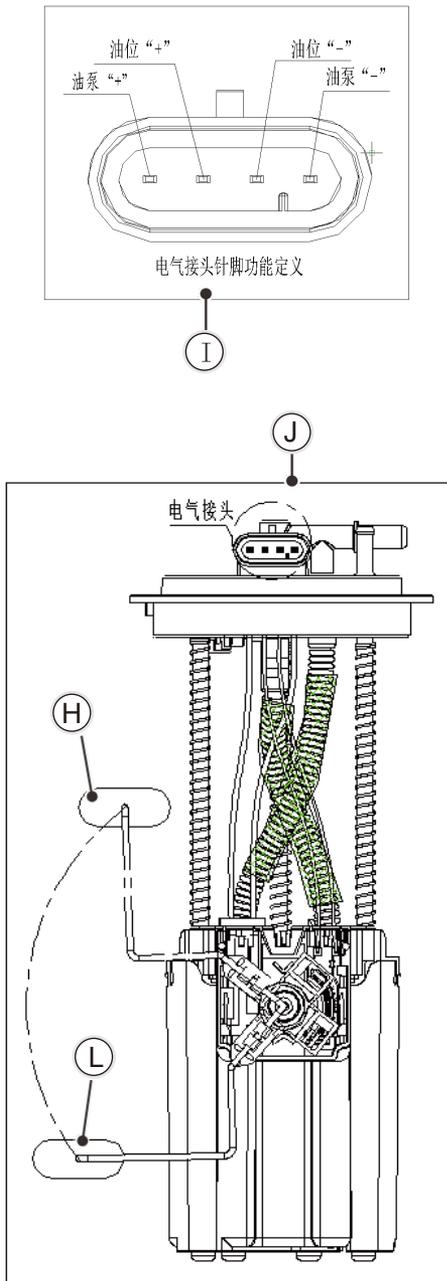
◆ Test the fuel position sensor by connecting the multimeter to the two middle pins of the cable plug 【 A 】 . Displayed on the multimeter in full fuel position 1 to  $160 \pm 5 \Omega$ , displayed on the empty fuel position 2 to  $40 \pm 5 \Omega$ .

◆ The fuel pump outlet pressure was measured through the pressure gauge 【 D 】 , and the measured pressure value was  $330 \pm 20 \text{Kpa}$  in the electrified state.

#### ⚠ CAUTION

◆ If the resistance reading is unstable, clean the resistance scraper with alcohol and retest. If it is still incorrect, replace the fuel pump.

◆ If the fuel pump supply pressure test does not meet the required value, then replace the pump.



FUEL PUMP ASSEMBLY INSPECTION

- ◆ Structural diagram of the front view of the fuel pump assembly 【J】 .
- ◆ Diagram defining the function of the fuel pump electrical connector pins 【I】 .
- ◆ Remove the driver's seat assembly and the lower cover of the driver's seat. then, using a multimeter set to the resistance ohms position, check the fuel level sensor of the fuel pump as follows.
- ◆ Move the float rod to check for free movement. The float assembly should return freely to a lower position. If not, replace the fuel pump.
- ◆ Test the fuel position sensor by connecting a multimeter to the center two pins of the cable plug 【D】 . The multimeter shows  $245\pm 5\Omega$  on the full fuel position 【H】 and  $40\pm 2\Omega$  on the empty fuel position 【L】 .

|            |               |       |
|------------|---------------|-------|
| Bottom (L) | Height (mm)   | 13±3  |
|            | Resistance(Ω) | 40±2  |
| Top (H)    | Height (mm)   | 139±4 |
|            | Resistance(Ω) | 245±5 |

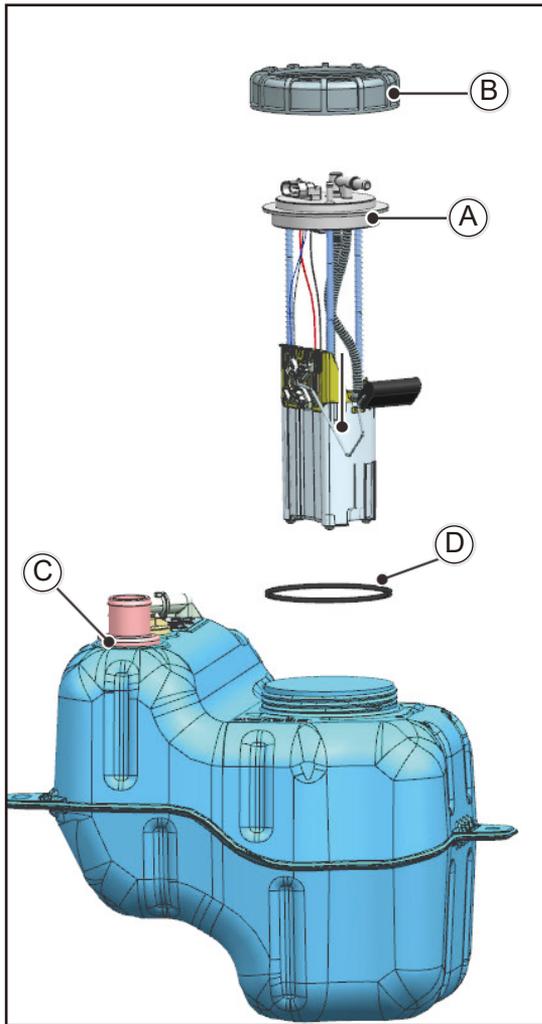
- ◆ Test the fuel pump supply port pressure by means of pressure gauge 【F】 , and the test pressure value is  $330\pm 17\text{Kpa}$  under energized condition.

| Model       | Test pressure(Kpa) | Flow (L/h) | Electric current(A) | Sealing pressure (Kpa) |
|-------------|--------------------|------------|---------------------|------------------------|
| W380224A-JK | 300                | 110-140    | 5.5                 | 550-850                |
| A882CHT     | 300                | ≥100       | ≤5.8                | 330±5%                 |

**CAUTION**

- ◆ If the resistance reading shows unstable, please clean the resistance wiper with alcohol and retest. If it is still incorrect, please replace the fuel pump.
- ◆ If the fuel pump supply pressure test fails, please replace the fuel pump.

### INSTALL THE OIL PUMP ASSEMBLY



- ◆ Confirm that the seal 【D】 is installed on the fuel tank port.
- ◆ Confirm that the fuel pump is installed on the fuel tank in the facing position.
- ◆ Tighten the fuel pump mounting screw cap 【B】 clockwise.

Fuel pump mounting screw cap

75 N·m (7.6 kgf·m , 55 ft·lb)

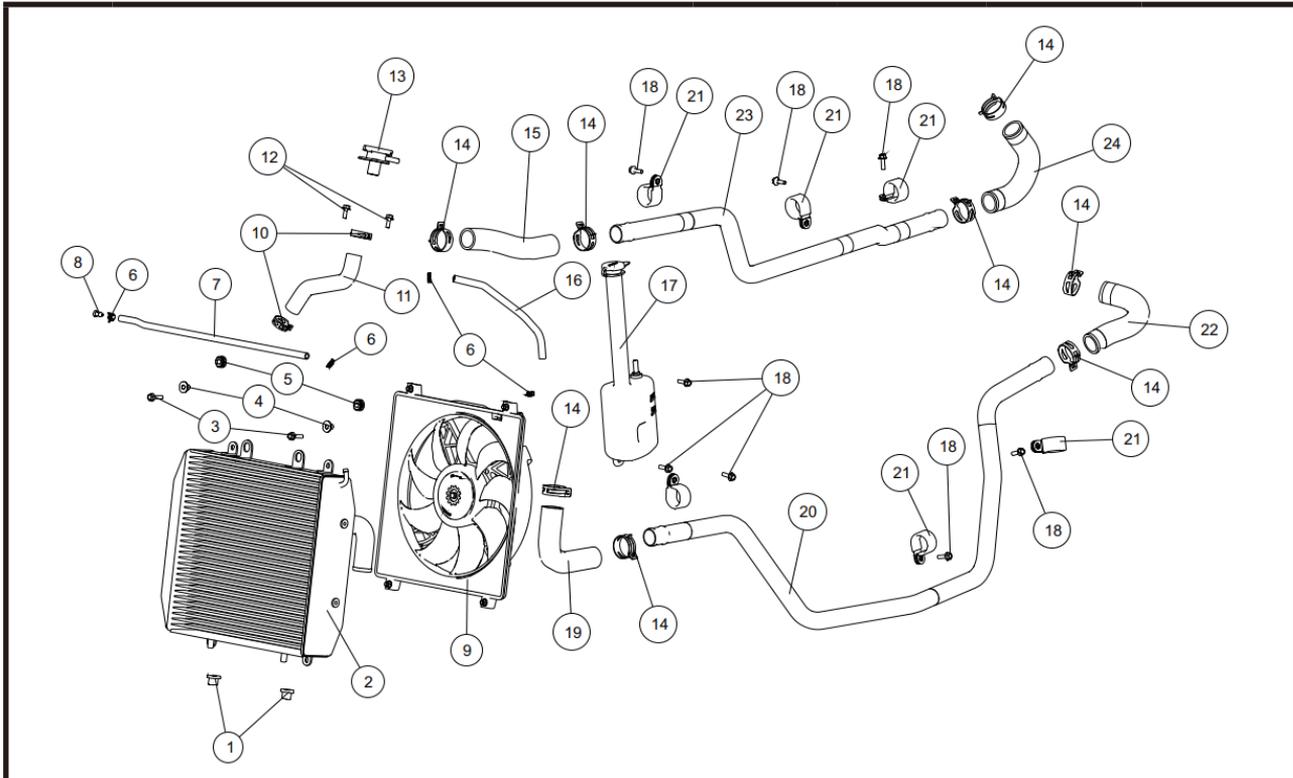
### ⚠ CAUTION

When disassembling the fuel pump, note that the vehicle must be turned off and left for more than 30min to ensure that the pressure of the high pressure fuel hose is relieved to avoid danger.

## COOLING SYSTEM

|  |     |
|--|-----|
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| RADIATOR FAN REMOVAL/INSTALLATION..... | 6-9 |

## EXPLODED VIEW OF COOLING SYSTEM



| No. | Fastener                          | Torque |         |       | Remarks |
|-----|-----------------------------------|--------|---------|-------|---------|
|     |                                   | N·m    | kgf·m   | ft·lb |         |
| 1   | RADIATOR BUSHING                  |        |         |       |         |
| 2   | RADIATOR BODY                     |        |         |       |         |
| 3   | HEXAGON FLANGE BOLT M6×25         | 8 ~ 12 | 0.8~1.2 | 6~9   |         |
| 4   | T BUSH V                          |        |         |       |         |
| 5   | I-SHAPED RUBBER RING V            |        |         |       |         |
| 6   | CLAMP 11                          |        |         |       |         |
| 7   | Engine Radiator Breather          |        |         |       |         |
| 8   | CVT DRAIN PLUG                    |        |         |       |         |
| 9   | RADIATOR FAN                      |        |         |       |         |
| 10  | STEEL BELT ELASTIC HOSE CLAMP 28  |        |         |       |         |
| 11  | WATER FILLING HOSE                |        |         |       |         |
| 12  | BOLT M6×16                        | 8 ~ 12 | 0.8~1.2 | 6~9   |         |
| 13  | WATER FILLER                      |        |         |       |         |
| 14  | CLAMP 38                          |        |         |       |         |
| 15  | RADIATOR OUTLET HOSE              |        |         |       |         |
| 16  | OVERFLOW PIPE                     |        |         |       |         |
| 17  | AUXILIARY WATER TANK              |        |         |       |         |
| 18  | HEXAGON FLANGE BOLT M6×20         |        |         |       |         |
| 19  | RADIATOR INLET HOSE               |        |         |       |         |
| 20  | ENGINE WATER OUTLET ALUMINUM PIPE |        |         |       |         |
| 21  | 32 CLAMPS                         |        |         |       |         |
| 22  | ENGINE WATER OUTLET HOSE          |        |         |       |         |
| 23  | ENGINE WATER INLET ALUMINUM PIPE  |        |         |       |         |
| 24  | ENGINE WATER INLET HOSE           |        |         |       |         |

**COOLANT FLOW**

Select permanent antifreeze as the coolant to prevent rust and corrosion of the cooling system. When the engine starts, the water pump rotates and the coolant circulates.

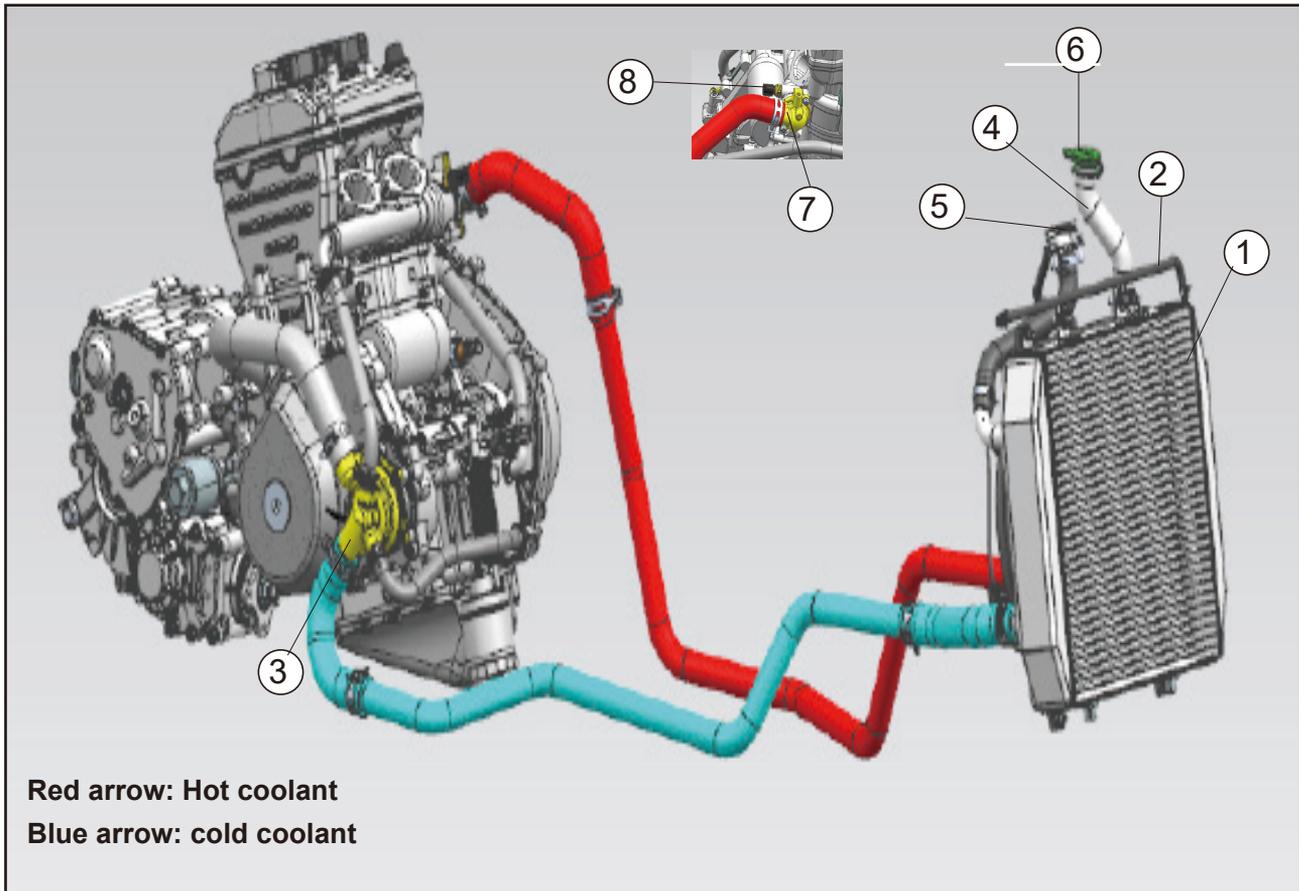
The thermostat is a wax particle type, which opens or closes with the change of the coolant temperature. The thermostat continuously changes its valve opening to keep the coolant temperature at an appropriate level. When the coolant temperature is lower than  $79 \sim 82^{\circ}\text{C}$  ( $174.2 \sim 179.6^{\circ}\text{F}$ ), the thermostat is closed. Therefore, the flow of coolant through the exhaust hole is restricted, which makes the engine warm up faster. When the coolant temperature exceeds  $79 \sim 82^{\circ}\text{C}$  ( $174.2 \sim 179.6^{\circ}\text{F}$ ), the thermostat will open and the coolant will flow. When the coolant temperature reaches  $88^{\circ}\text{C}$  ( $190.4^{\circ}\text{F}$ ), the radiator fan switch is turned on and the radiator fan works. When there is not enough airflow (for example, at low speeds). The radiator fan sucks in air through the radiator core. This increases the cooling effect of the radiator. When the temperature is lower than  $83^{\circ}\text{C}$  ( $181.4^{\circ}\text{F}$ ), the fan switch is turned off and the radiator fan stops working.

In this way, the system controls the engine temperature within the narrow range of engine operation. Even if the engine load changes, the engine has the highest working efficiency.

The system is pressurized through the radiator cap to suppress boiling and the resulting bubbles that may cause the engine to overheat. When the engine warms up, the coolant in the radiator and water circuit expands. The excess coolant flows into the water storage tank through the radiator cover and hoses. Conversely, when the engine cools, the coolant in the radiator and water circuit shrinks, and the stored coolant flows from the storage tank back to the radiator.

The radiator cover has two valves. One is a pressure valve, which maintains the pressure in the system when the engine is running. When the pressure exceeds  $93 \sim 123\text{kPa}$  ( $0.95 \sim 1.25 \text{ kgf/c m}^2$ ,  $14 \sim 18\text{psi}$ ), the pressure valve opens and releases the pressure to the water storage tank. Once the pressure overflows, the valve is closed and the pressure is maintained at  $93 \sim 123\text{kPa}$  ( $0.95 \sim 1.25\text{kgf/c m}^2$ ,  $14 \sim 18\text{psi}$ ). After the engine has cooled down, another small valve (vacuum valve) on the cover opens. When the coolant cools, the coolant shrinks, creating a vacuum in the system. The vacuum valve opens and allows the coolant to enter the radiator from the storage tank.

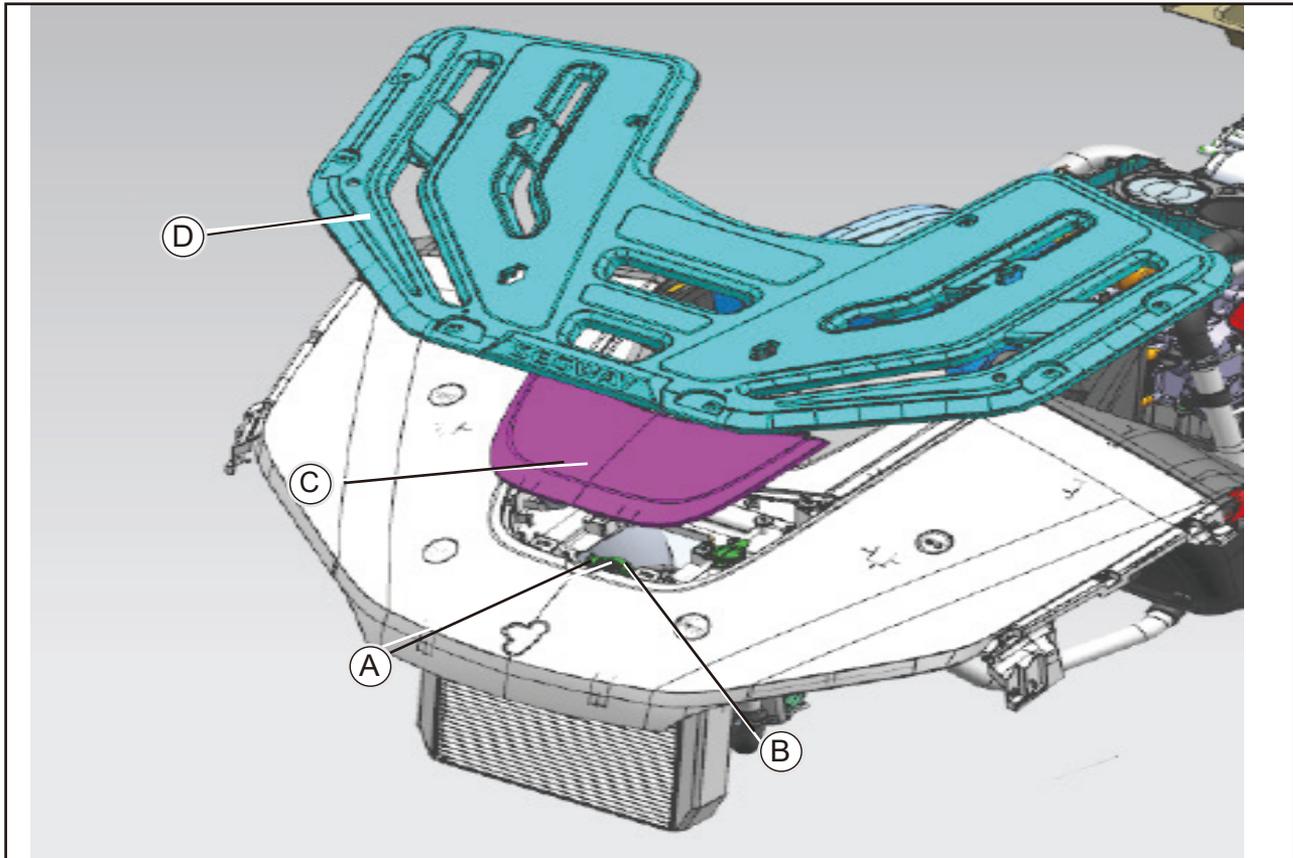
## COOLANT FLOW



1. Radiator
2. Radiator vent hose
3. Water pump cover
4. Auxiliary radiator
5. Radiator cap
6. Auxiliary radiator cap
7. Thermostat cover
8. Coolant temperature sensor

| ITEM   | STANDARD   | SERVICE LIMIT |
|--|--|---------------|
| <b>Coolant provided during transportation :</b>          |  |               |
| <b>Type</b>  | Permanent antifreeze (soft water and glycol for aluminum engines and radiators plus corrosion inhibitors and rust inhibitor chemicals) | - - -         |
| <b>Color</b>   | Green  | - - -         |
| <b>Mixing ratio</b>                                      | Soft water 50%, cooling water 50%  | - - -         |
| <b>Total</b>   | 5.5 L (full reservoir level, including radiator and engine)  | - - -         |
| <b>Radiator cover</b>                                    |  |               |
| <b>Pressure relief</b>                                   | 93 ~ 123 KPA (0.95 ~ 1.25 KGF /CM <sup>2</sup> , 14 ~ 18PSI)   | - - -         |
| <b>Thermostat</b>  |  |               |
| <b>Valve opening temperature</b>                         | 79 ~ 82°C (174.2 ~ 179.6°F)  | - - -         |
| <b>Valve fully open lift</b>                             | 8~12mm or over 85°C (185°F)  | - - -         |
| <b>Coolant filter/valve</b>                              |  |               |
| <b>Cooling valve closing temperature (For reference)</b> | 83°C (181.4°F) OR OVER 24.5KPA (0.25KGF/CM <sup>2</sup> , 3.6 PSI)   | - - -         |

## COOLING SYSTEM PRESSURE TEST



A. Radiator filler port    B. Radiator cap    C. Front service cover    D. Front shelf

- ◆ Remove front shelf D, front service cover C and radiator cap B, then install a cooling system pressure tester on radiator filler port A.

### ⚠ CAUTION

Wet the cap sealing surface with water or coolant to prevent pressure leakage.

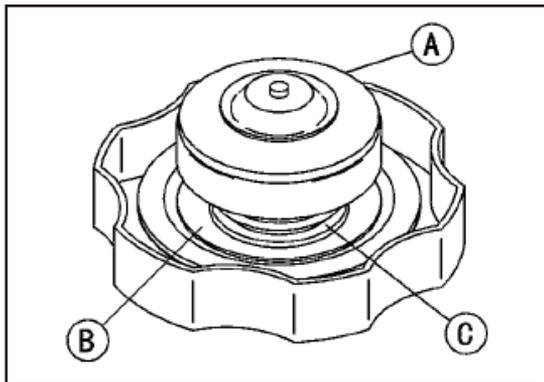
Pressurize slowly until the pressure rises to 123 kPa (1.25 kgf/cm<sup>2</sup>, 18 psi).

### ⚠ WARNING

Do not exceed the design pressure of the system during the pressure test. The maximum value pressure is 123kPa (1.25kgf/cm<sup>2</sup>, 18psi).

- ◆ Observe the pressure gauge for at least 6 seconds.
- ◆ If the pressure remains steady, the system is normal. If pressure drops quickly, check for leaks.

## RADIATOR CAP PRESSURE TEST



- ◆ Check the condition of the radiator cap top and bottom seals.
- ◆ Replace the radiator cap if either of them appears damaged.

【A】 Bottom seal

【B】 Top seal

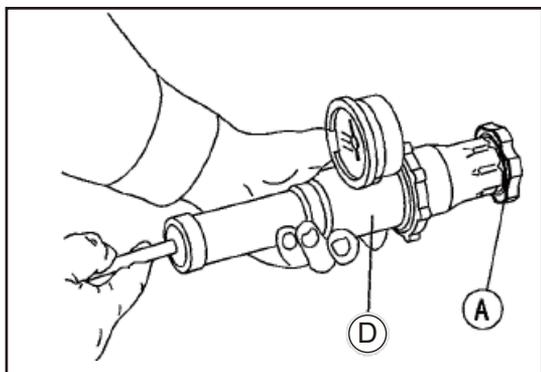
【C】 Pressure valve spring

- ◆ Install the radiator bottom seal 【A】 on the cooling system pressure tester 【D】 for testing.
- ◆ Install the radiator bottom seal 【A】 on the cooling system pressure tester 【D】 for testing.

**⚠ CAUTION**

Wet the radiator cap sealing surface with water or coolant to prevent pressure leakage.

- ◆ Observe the pressure gauge and slowly press the pressure tester to increase the pressure.
- ◆ The radiator cap must open within the safe pressure range and the gauge needle must remain within the specified range for at least 6 seconds.



- ◆ Observe the pressure gauge and slowly press the pressure tester to increase the pressure.
- ◆ The radiator cap must open within the safe pressure range and the gauge needle must remain within the specified range for at least 6 seconds.

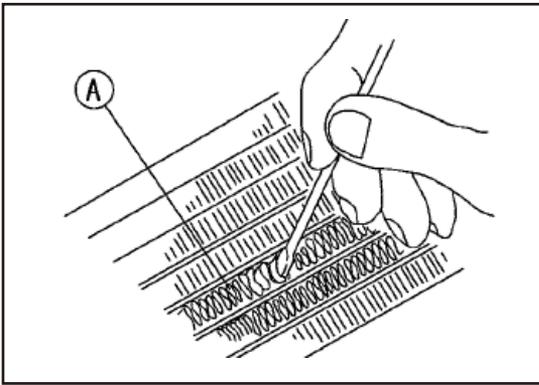
**Radiator cap pressure relief value standard :**

**93~123kPa (0.95~1.25 kgf /cm<sup>2</sup>, 14~18psi)**

**⚠ WARNING**

Do not exceed the design pressure of the system during the pressure test. The maximum value pressure is 123kPa (1.25kgf/cm<sup>2</sup>, 18psi).

If the radiator valve fails to hold the specified pressure, or the pressure is too high, replace the radiator cap with a new one.



### RADIATOR CHECK

- ◆ Check the radiator core.
- ◆ If there is an obstruction to air flow, remove the radiator and clear the obstruction.
- ◆ If the corrugated fins **【A】** are deformed, carefully straighten them.
- ◆ If the air path of the radiator core is blocked more than 20%, but the obstruction cannot be removed or the heat sink cannot repair the deformation, dismantle the radiator and remove the obstruction.

### RADIATOR REMOVAL / INSTALLATION

#### **⚠ WARNING**

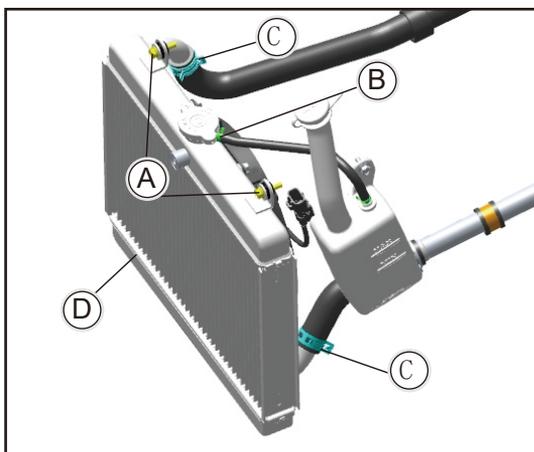
1. The opening and stopping of the radiator fan is controlled by the ECU of the whole vehicle, when the engine head water temperature reaches 90°C, the fan will be opened automatically.

When the cylinder head water temperature reaches 90°C, the fan will automatically turn on. until the cylinder head water temperature drops below 85°C, the radiator fan will automatically stop.

When the cylinder head water temperature drops below 85°C, the radiator fan stops automatically. Do not touch the radiator fan while it is running.

Do not touch the radiator fan while it is running as this may cause injury.

2. When disassembling the radiator, be sure to do it when the car is cold and the engine is off.



#### REMOVING THE ENGINE RADIATOR

**【A】** Mounting bolts on engine radiator (M6X25)

**【B】** Radiator overflow hose clamps

**【C】** Engine inlet and outlet hose clamps

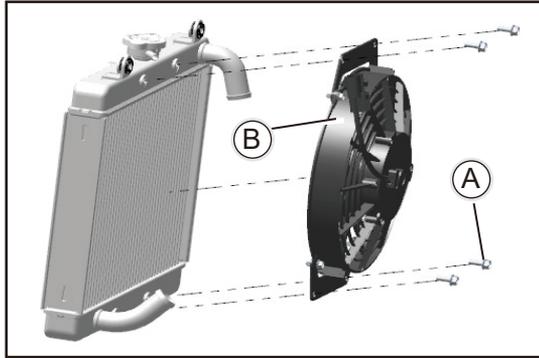
**【D】** Engine radiator

**【E】** Water filler connection hose clamps

- ◆ Remove the rear body plastic parts (see Body section for details)
- ◆ Remove the overflow hose clamp **【B】**, the engine radiator inlet and outlet hose clamp **【C】** and the water filler connection hose clamp **【E】** with a suitable tool, and pull out the overflow hose, the engine radiator inlet and outlet hoses and the water filler connection hose.
- ◆ remove the two radiator mounting bolts (m6x25).
- ◆ remove the engine radiator.

#### **⚠ WARNING**

Do not touch the heat sink core. This may damage the heatsink and result in a cooling efficiency.



## RADIATOR FAN REMOVAL/INSTALLATION

Radiator (see Radiator Removal)

- ◆ Radiator fan assembly bolts 【A】
- ◆ Fan assembly 【B】

### ⚠ WARNING

1. The opening and stopping of the radiator fan is controlled by the ECU of the whole vehicle, when the engine head water temperature reaches 90°C, the fan will be opened automatically.

When the cylinder head water temperature reaches 90°C, the fan will automatically turn on. until the cylinder head water temperature drops below 85°C, the radiator fan will automatically stop.

When the cylinder head water temperature drops below 85°C, the radiator fan stops automatically. Do not touch the radiator fan while it is running.

Do not touch the radiator fan while it is running as this may cause injury.

2. When disassembling the radiator, be sure to do it when the car is cold and the engine is off.

- ◆ Heatsink Fan Mounting Nut 【A】
- ◆ Radiator Fan 【B】
- ◆ Heat sink fan installation and removal in reverse order
- ◆ Tighten

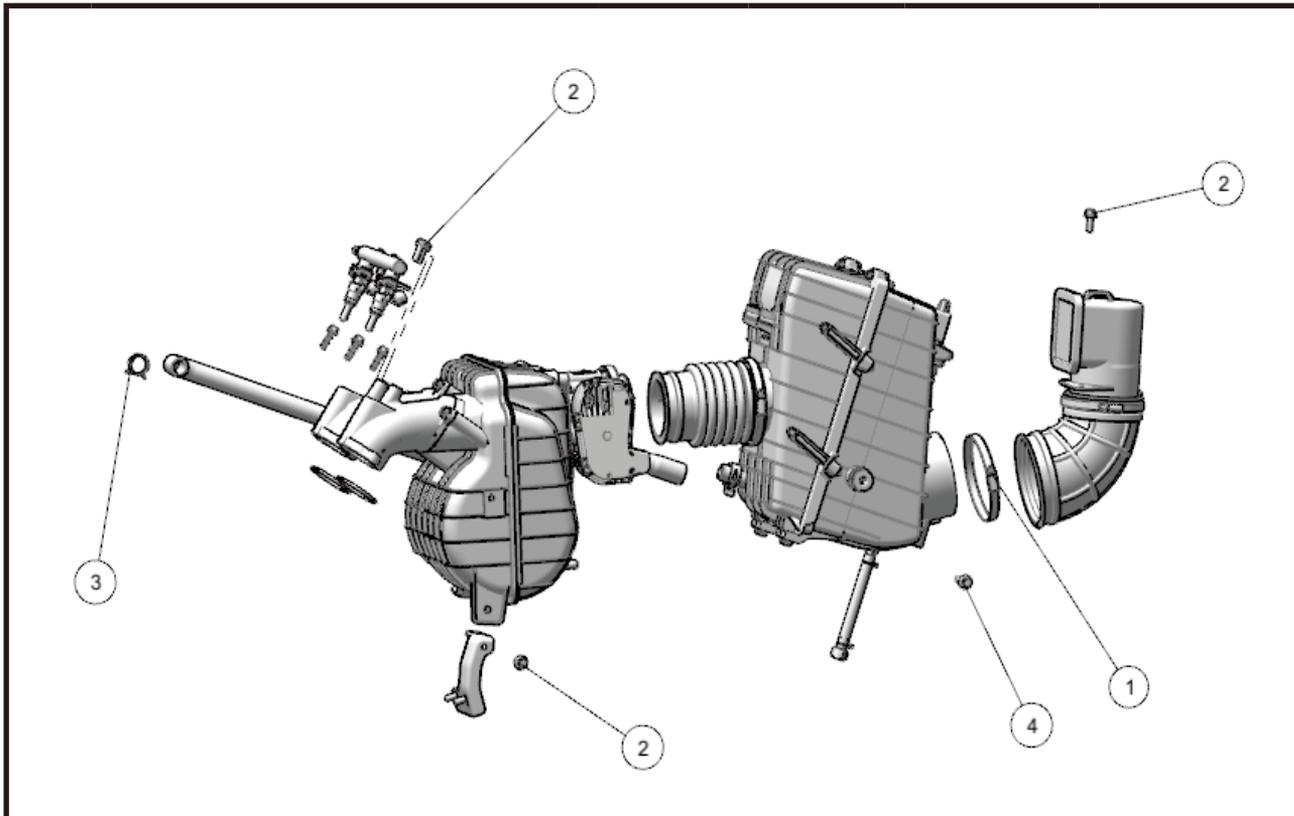
Radiator fan assembly bolt torque 【A】

8.8 N·m (0.9 kgf·m, 78 in·lbs)

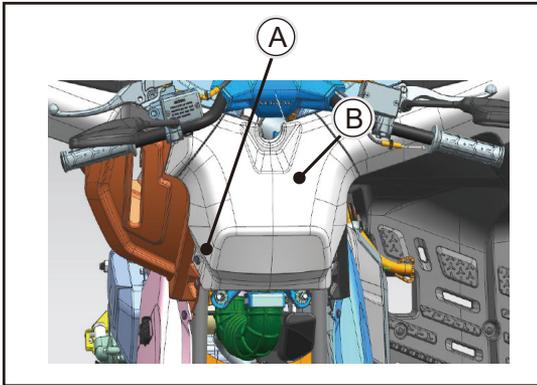
# INTAKE / EXHAUST SYSTEM

|                                      |     |
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## EXPLODED VIEW OF INTAKE SYSTEM



| No. | Fastener                  | Torque |         |       | Remarks |
|-----|---------------------------|--------|---------|-------|---------|
|     |                           | N·m    | kgf·m   | ft·lb |         |
| 1   | HOOP 9                    |        |         |       |         |
| 2   | HEXAGON FLANGE BOLT M6×30 | 8 ~ 12 | 0.8~1.2 | 6~9   |         |
| 3   | CLAMP,SPRINGBAND 20       |        |         |       |         |
| 4   | BOLT M6×35                | 8 ~ 12 | 0.8~1.2 | 6~9   |         |

**AIR FILTER REMOVAL**

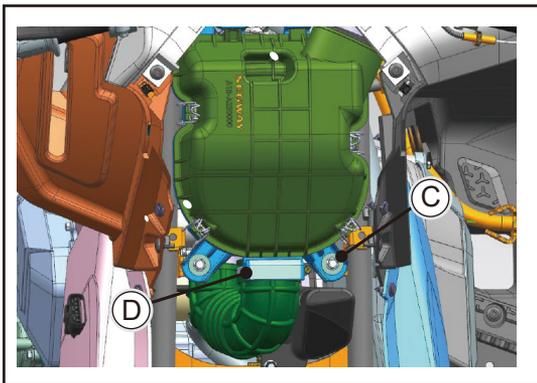
First place the vehicle body in a horizontal position

**【A】** Air filter cover

**【B】** Hexagon screw

◆ Remove the two hexagon screws **【B】**

◆ Remove the air filter cover **【A】**



**【C】** Air filter mounting bolts

**【D】** A-type hose 70

◆ Remove the 2 mounting bolts **【C】**

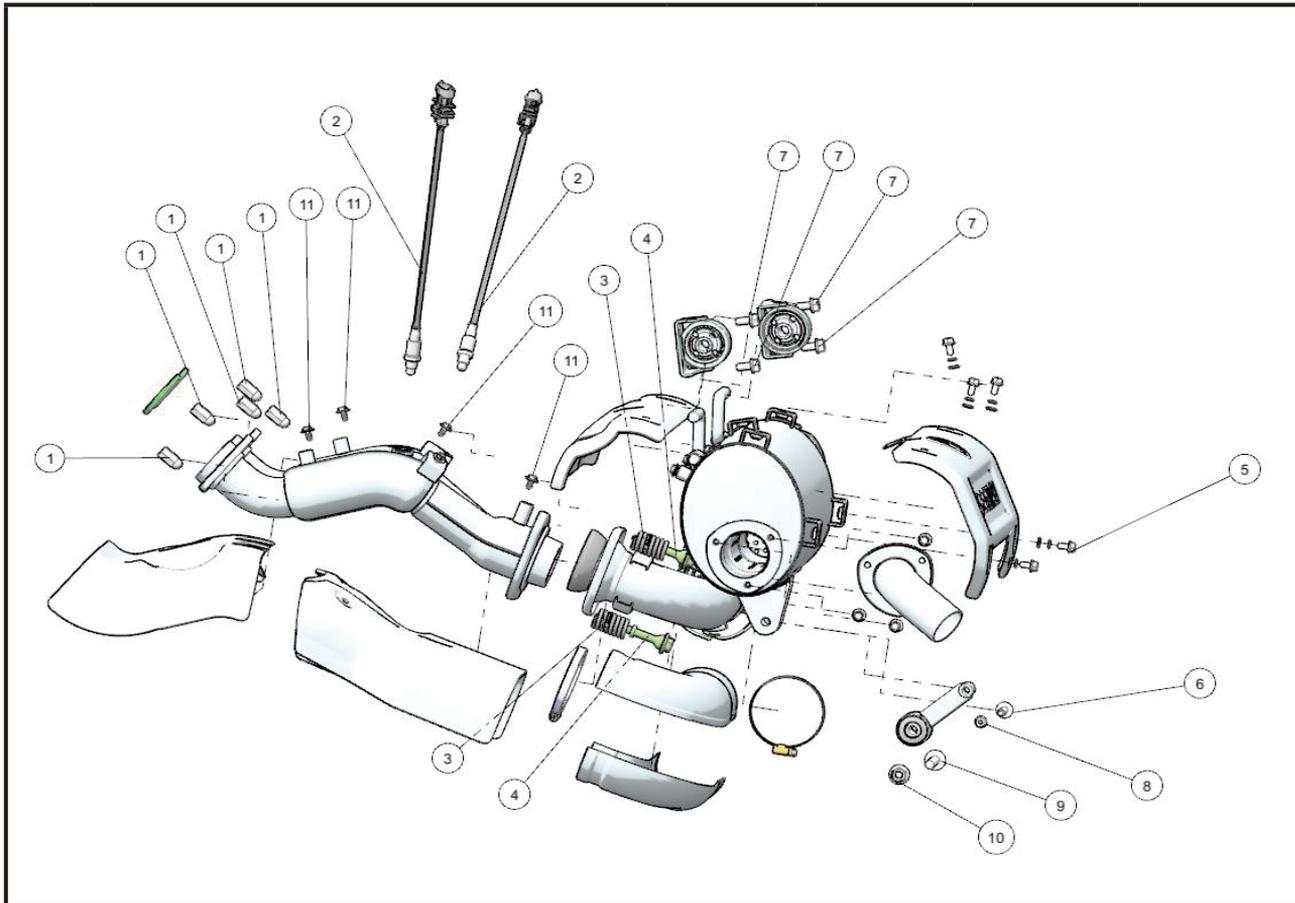
◆ Remove the hose **【D】**

◆ Remove the entire air filter

**MOUNTING**

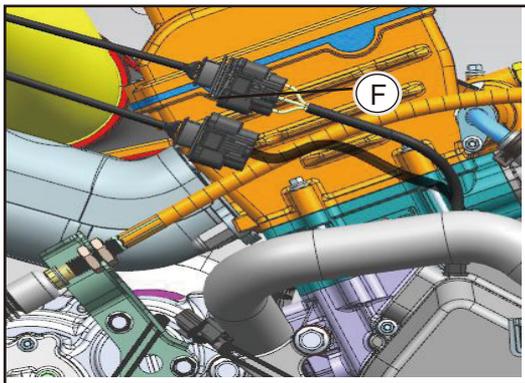
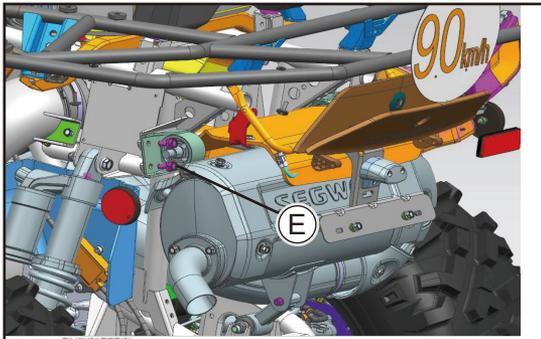
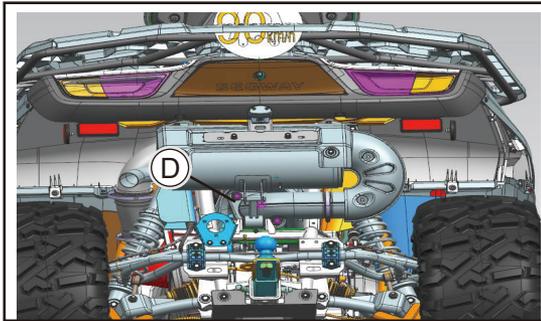
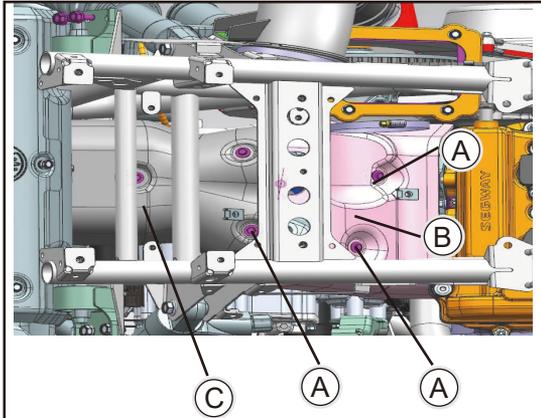
◆ Please assemble in reverse order of disassembly.

## EXPLODED VIEW OF EXHAUST SYSTEM



| No. | Fastener                        | Torque  |         |           | Remarks |
|-----|---------------------------------|---------|---------|-----------|---------|
|     |                                 | N·m     | kgf·m   | ft·lb     |         |
| 1   | CAP NUT                         |         |         |           |         |
| 2   | OXYGEN SENSORS                  |         |         |           |         |
| 3   | EXHAUST PIPE INSTALLTION SPRING |         |         |           |         |
| 4   | EXHAUST PIPE BOLT               |         |         |           |         |
| 5   | HEXAGON FLANGE BOLT M6×12       | 8 ~ 12  | 0.8~1.2 | 6~9       |         |
| 6   | BOLT M6×40×10                   |         |         |           |         |
| 7   | HEXAGON FLANGE BOLT M8×16       | 20 ~ 25 | 2.0~2.5 | 14.7~18.4 |         |
| 8   | NUT M6                          | 10      | 1       | 7.5       |         |
| 9   | BOLT M10×1.25×70                | 50      | 5.1     | 37        |         |
| 10  | HEXAGON FLANGE BOLT 8×25        | 20 ~ 25 | 2.0~2.5 | 14.7~18.4 |         |
| 11  | BOLT M6×12                      |         |         |           |         |

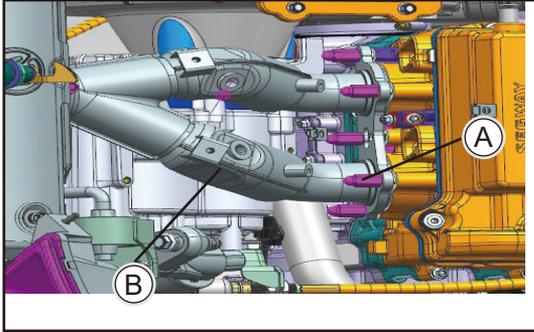
## MUFFLERS AND EXHAUST PIPES

**⚠ WARNING**

Whenever checking or maintaining components of the exhaust system, it is necessary to inspect whether each part of the exhaust system is overheated to avoid being scalded by high temperatures.

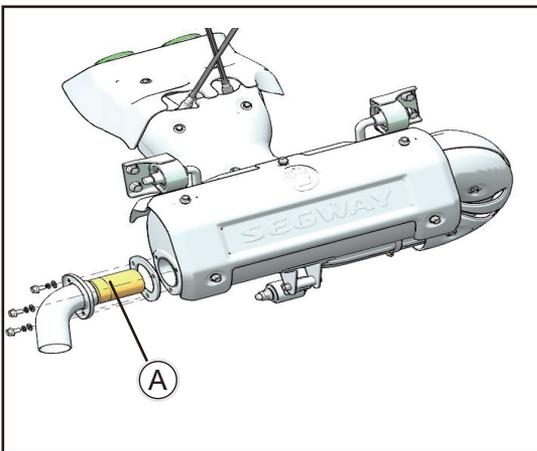
**MUFFLER DISASSEMBLY**

- ◆ Remove 5 bolts 【A】 . remove heat shields 【B】 and 【C】
- ◆ Remove 2 connecting bolts 【D】
- ◆ Remove the four M8 left and right side bolts 【E】
- ◆ Remove the muffler 【E】
- ◆ Disconnect the oxygen sensor cable plug 【F】 .



### EXHAUST PIPE REMOVAL

- ◆ Remove the exhaust pipe nuts **【A】** 5 pieces
- ◆ Remove the exhaust pipe **【B】**



### PROBE

- ◆ Check externally for cracks, holes or ruptures in the muffler, as this can affect engine performance and emissions. Replace corresponding parts if necessary.
- ◆ Check for looseness, rattles, debris, etc. inside the muffler by rocking the muffler back and forth.
- ◆ Check for air leaks at the connection between the exhaust pipe and the engine cylinder head, if so tighten the nut or replace the gasket.
- ◆ Check for air leaks at the connection between the exhaust pipe and the muffler, if so, tighten the bolts or replace the muffler spring and sealing sleeve.
- ◆ Check if there is carbon buildup on the screen of the spark arrester **【A】**, if so clean it with a suitable brush, if the screen or gasket is damaged, it must be replaced.

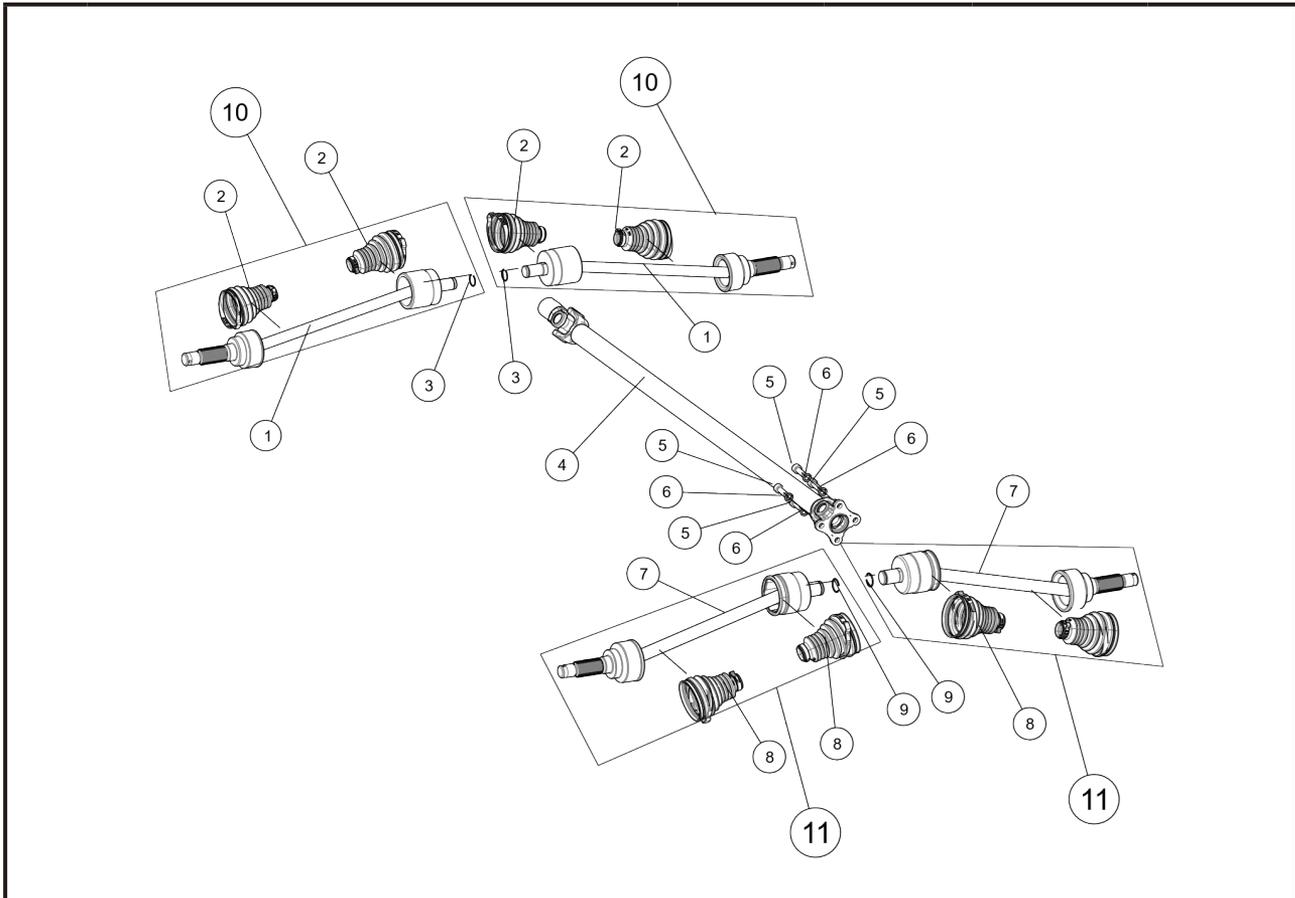
### MOUNTING

- ◆ Please assemble in reverse order of disassembly.

## DRIVE SYSTEM

|  |     |
|--|-----|
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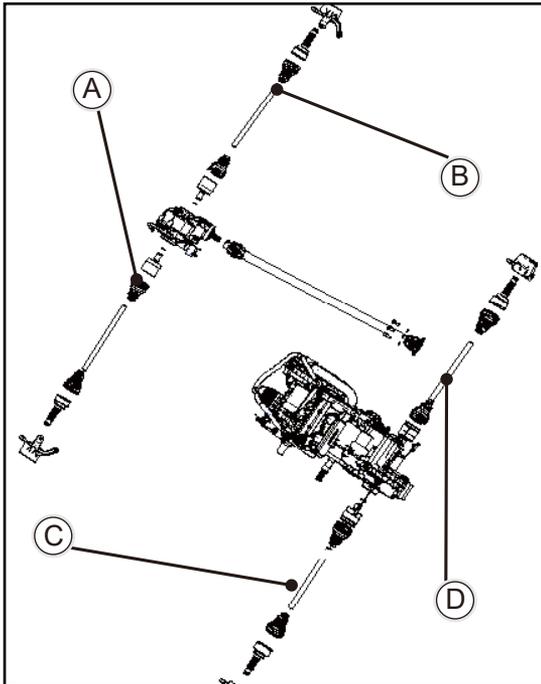
## EXPLODED VIEW OF DRIVESHAFT



| No. | Fastener                                    | Torque |       |       | Remarks |
|-----|---|--------|-------|-------|---------|
|     |   | N·m    | kgf·m | ft·lb |         |
| 1   | INNER SHAFT AND CAGE - FRONT                |        |       |       |         |
| 2   | DUST COVER ASSY                             |        |       |       |         |
| 3   | INNER CAGE RETAINING RING                   |        |       |       |         |
| 4   | FRONT TRANSMISSION SHAFT                    |        |       |       |         |
| 5   | HEXAGON SOCKET HEAD CAP BOLT<br>M10×1.25×25 | 45     | 4.5   | 33    |         |
| 6   | WASHER 10                                   |        |       |       |         |
| 7   | INNER SHAFT AND CAGE - REAR                 |        |       |       |         |
| 8   | DUST COVER ASSY                             |        |       |       |         |
| 9   | INNER CAGE RETAINING RING                   |        |       |       |         |
| 10  | FRONT CV SHAFT                              |        |       |       |         |
| 11  | REAR CV SHAFT                               |        |       |       |         |

A: Apply a non-permanent locking agent.

DRIVE SHAFT REMOVAL

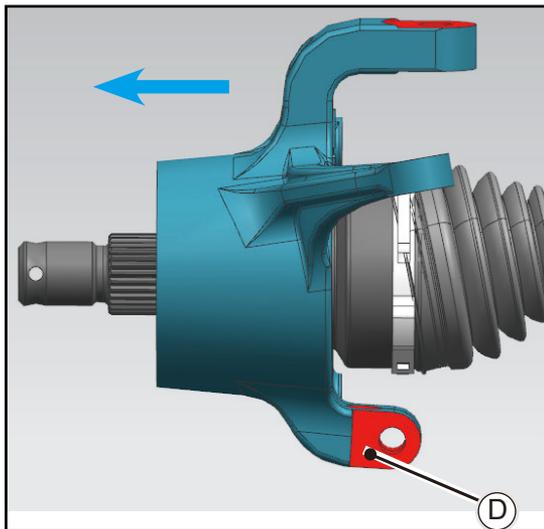


**! WARNING**

Do not remove the dust boot when removing the drive shaft, it is filled with grease.

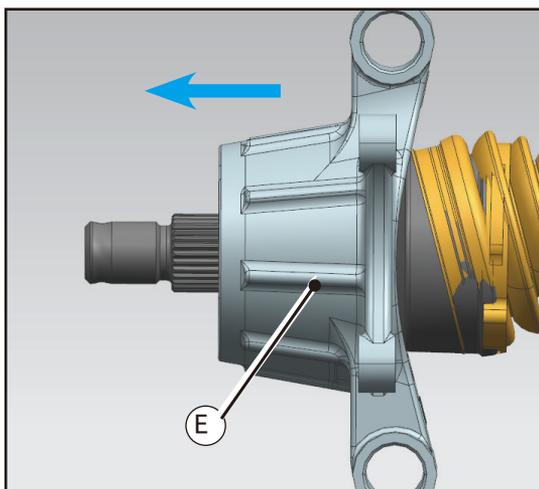
- 【A】 Front left constant velocity drive shaft assembly
- 【B】 Front right constant velocity drive shaft assembly
- 【C】 Rear left constant velocity drive shaft assembly
- 【D】 Rear right constant velocity drive shaft assembly

- ◆ To remove the drive shaft, start from the fixed end of the drive shaft (wheel end)
- ◆ Remove the wheel train components and suspension components first (see the Wheels and Tires and Suspension sections for details)



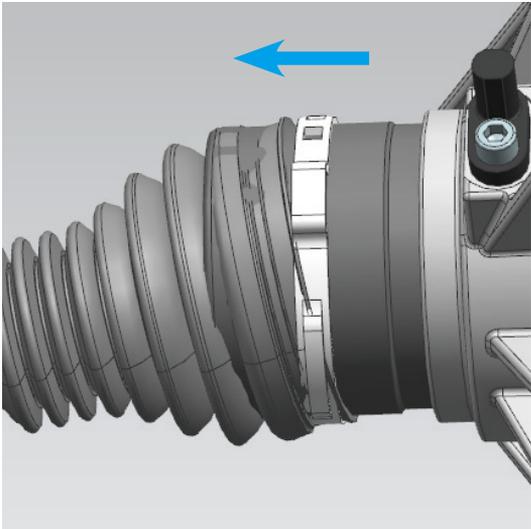
【D】 Steering knuckle

- ◆ Use a tool to remove the wheel axle support from the drive shaft in the direction indicated by the arrow in the left figure.



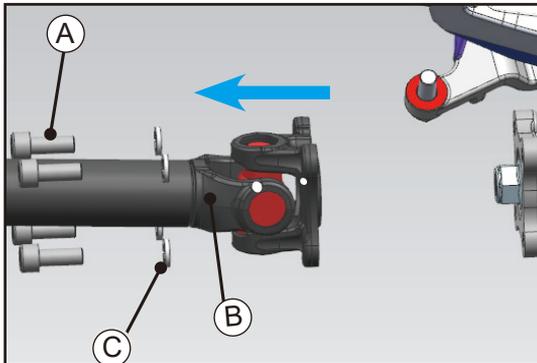
【E】 Axle support

- ◆ Use a tool to remove the axle support from the drive shaft in the direction indicated by the arrow in the left figure.



Pull the drive shaft out from the inside of the bridge in the direction of the arrow in the left figure until the drive shaft is loose and can be pulled out.

## FRONT DRIVE SHAFT ASSEMBLY REMOVAL



【A】 Hexagon socket head screw M10×1.25×25

【B】 Front drive shaft assembly

【C】 10mm diameter spring washer

【D】 Right side pipe assembly

【E】 Hexagon flange bolt M10×1.25×100

【F】 Rear upper right welding assembly

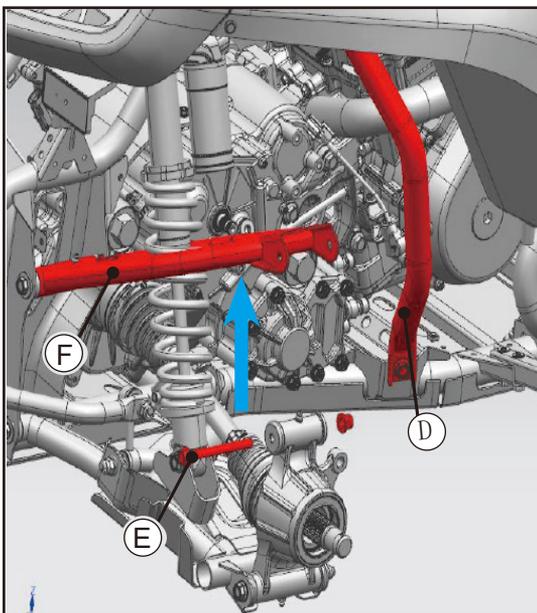
Disassembly of the front drive shaft assembly should start from (wheel end)

- ◆ Remove the wheel train components and suspension components first (see the wheel and tire section for details)

- ◆ Loosen and remove the screws 【A】 (4 pieces)

- ◆ Remove the spring washers 【C】 (4 pieces)

- ◆ Move the 【B】 front drive shaft assembly back in the direction of the arrow until it is separated from the engine flange

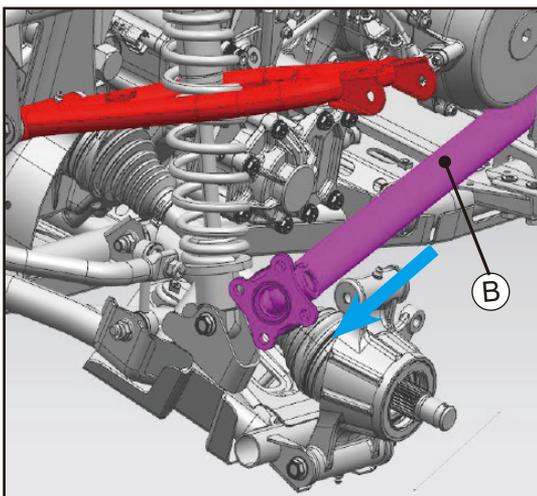


- ◆ Remove the right side pipe assembly 【D】

- ◆ Loosen and remove the screw 【E】 (1 screw)

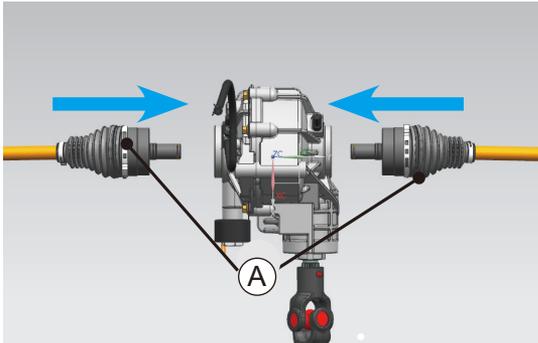
- ◆ Rotate the upper right rear welding assembly 【F】 in the direction of the arrow

- ◆ Remove the front drive shaft assembly 【B】 in the direction of the arrow until it is removed



- ◆ Pull out the front drive shaft assembly 【B】 in the direction of the arrow until it is removed.

## FRONT AND REAR DRIVE SHAFT ASSEMBLY INSTALLATION



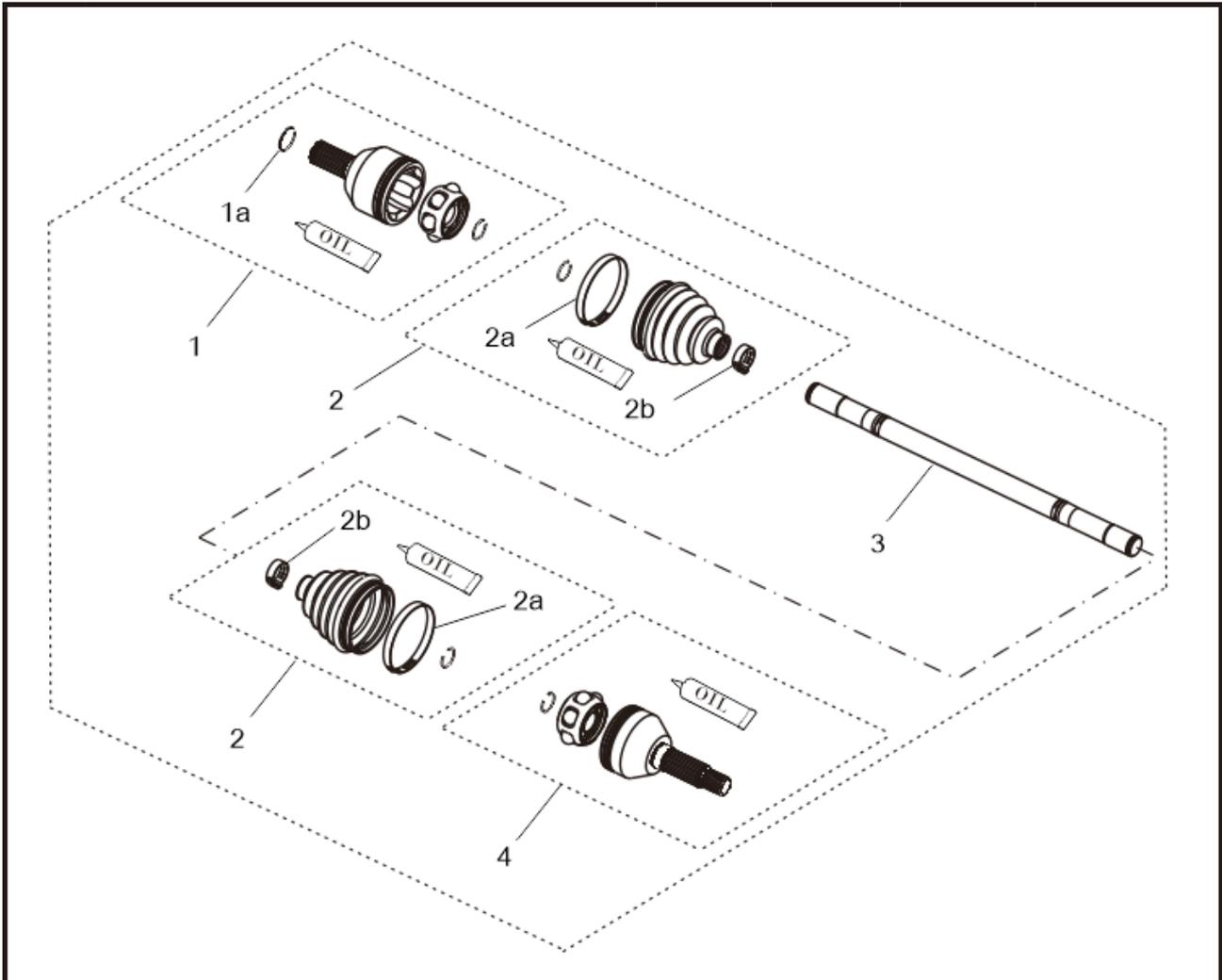
**【A】** Front and rear left and right constant speed drive shaft assembly

The front and rear equal speed drive shaft assembly is installed by pushing it into the bridge spline hole in the direction of the arrow in the figure until it stops, and then install the upper and lower rocker arms and wheel supports to see the suspension part and wheel system part.

Installation of front and rear drive shaft assemblies

Operate in reverse order according to the removal steps.

EXPLODED VIEW OF FRONT AND REAR LEFT/RIGHT CONSTANT VELOCITY DRIVE SHAFTS



| No. | Fastener  | Torque |       |       | Remarks |
|-----|---|--------|-------|-------|---------|
|     |   | N·m    | kgf·m | ft·lb |         |
| 1   | Front and rear left/right inner ball cage assemblies        |        |       |       |         |
| 1a  | Retaining ring  |        |       |       |         |
| 2   | Front and rear axle left/right corrugated sleeve repair kit |        |       |       |         |
| 2a  | large clamp   |        |       |       |         |
| 2b  | Small clamp   |        |       |       |         |
| 3   | Intermediate shaft  |        |       |       |         |
| 4   | Front and rear left/right outer cage assemblies             |        |       |       |         |

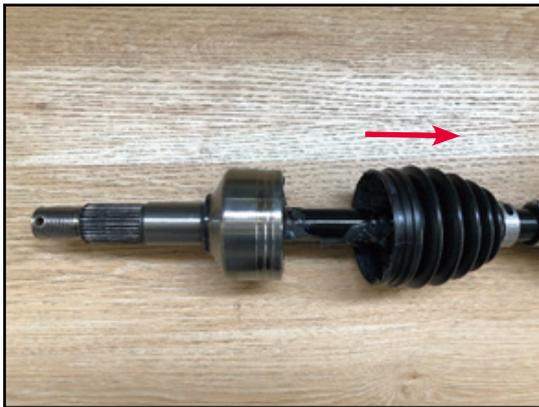
### DOJ DRIVE SHAFT REPAIR

#### ⚠ CAUTION

The drive shaft is a precision part. Cleanliness must be ensured when replacing and installing, and the operation must be strictly followed the instructions. Do not use a hammer or sharp objects for disassembly and installation, which will affect the performance and service life of the half shaft.



- ◆ Use clamp pliers to clamp the clamp, then place a small screwdriver on the end of the clamp, lift the clamp up and release the clamp at the same time, and remove the clamp.



- ◆ Remove the clamps at both ends of the dust cover, and pull the dust cover out for a certain distance along the direction of the middle axis.



- ◆ Use a sharper tool to take out the retaining ring in the universal joint.



- ◆ After taking out the retaining ring, you can directly pull out the intermediate shaft, pay attention not to drop the steel balls on the cage and the star sleeve, and clean the grease in the universal joint and the dust cover.

#### ⚠ CAUTION

If only the lubricating grease is replaced, the remaining lubricating grease inside the universal joint needs to be cleaned up, and it is forbidden to mix different lubricating greases or use other lubricating greases instead.



- ◆ Use retaining ring pliers to remove the retaining ring of the star sleeve, after replacing the universal joint or dust cover, install the star sleeve in situ, and finally install the retaining ring.

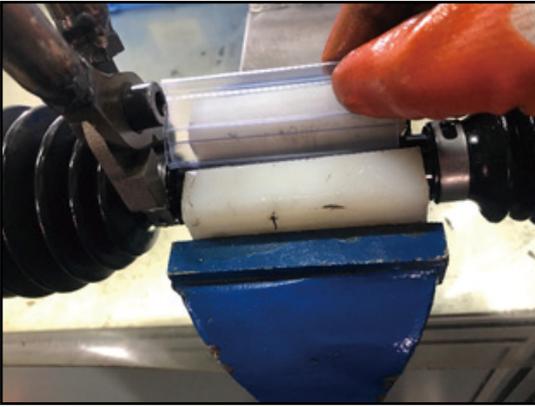
#### ⚠ CAUTION

The interior of the star sleeve is a precision component, and it is not recommended to disassemble and repair it separately. If it is damaged or the internal grease is polluted or liquefied, the universal joint needs to be replaced as a whole.

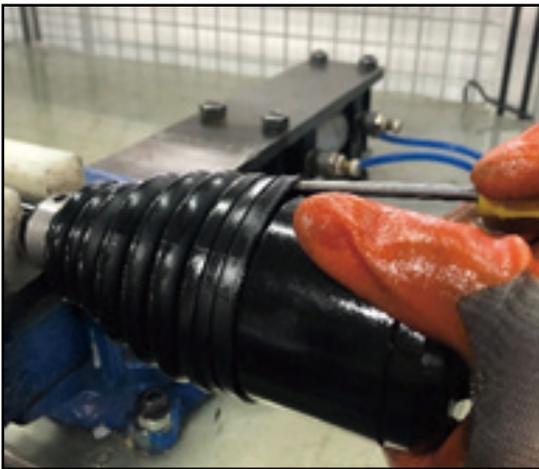
- ◆ Inject lubricating grease into the universal joint and dust cover, and then install the star-shaped sleeve assembly into the universal joint. Pay attention to the number of steel balls in the star-shaped sleeve. If the number is wrong, it is not allowed to install.

#### ⚠ CAUTION

If only the lubricating grease is replaced, the remaining lubricating grease inside the universal joint needs to be cleaned up, and it is forbidden to mix different lubricating greases or use other lubricating greases instead.



- ◆ First install the small clamp, adjust the position of the dust cover to ensure that the dust cover is stuck in the groove of the intermediate shaft, and then use the clamp pliers to clamp the small clamp.



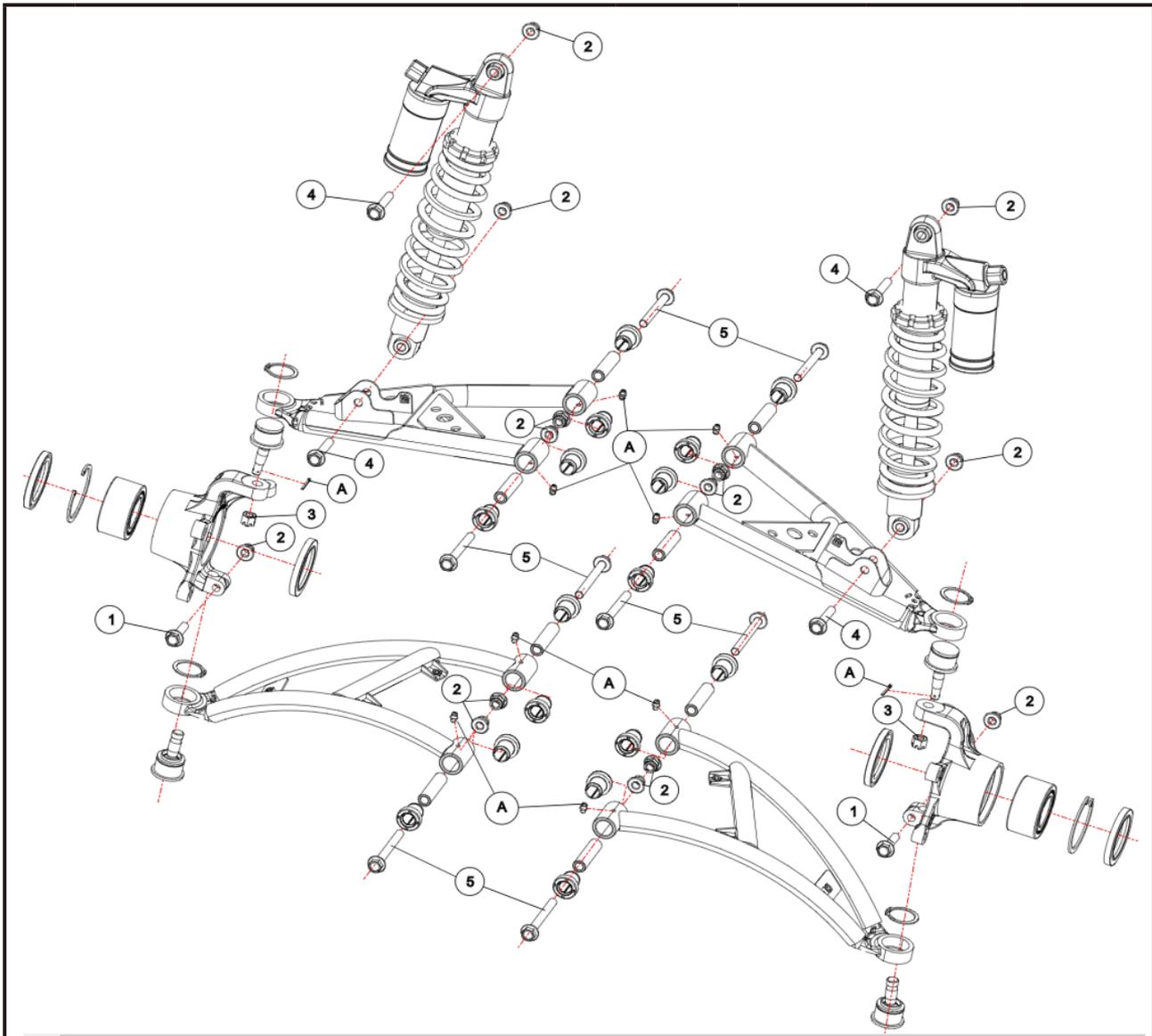
- ◆ When installing the large clamp, first clamp the dust cover in the groove of the universal joint, then discharge the gas in the dust cover, use a screwdriver to lift a corner of the dust cover, be careful not to puncture the dust cover, and then back and forth Push and pull the universal joint, you can hear the sound of gas flow, stop the universal joint in the middle position, take out the screwdriver and clamp the big clamp.

- ◆ Wipe the grease on the universal joint and the intermediate shaft before use.
- ◆ The above maintenance procedures are applicable to the inner and outer ball cages of the front and rear left/right equal drive shafts.

# INTAKE / EXHAUST SYSTEM

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## EXPLODED DIAGRAM OF FRONT SUSPENSION



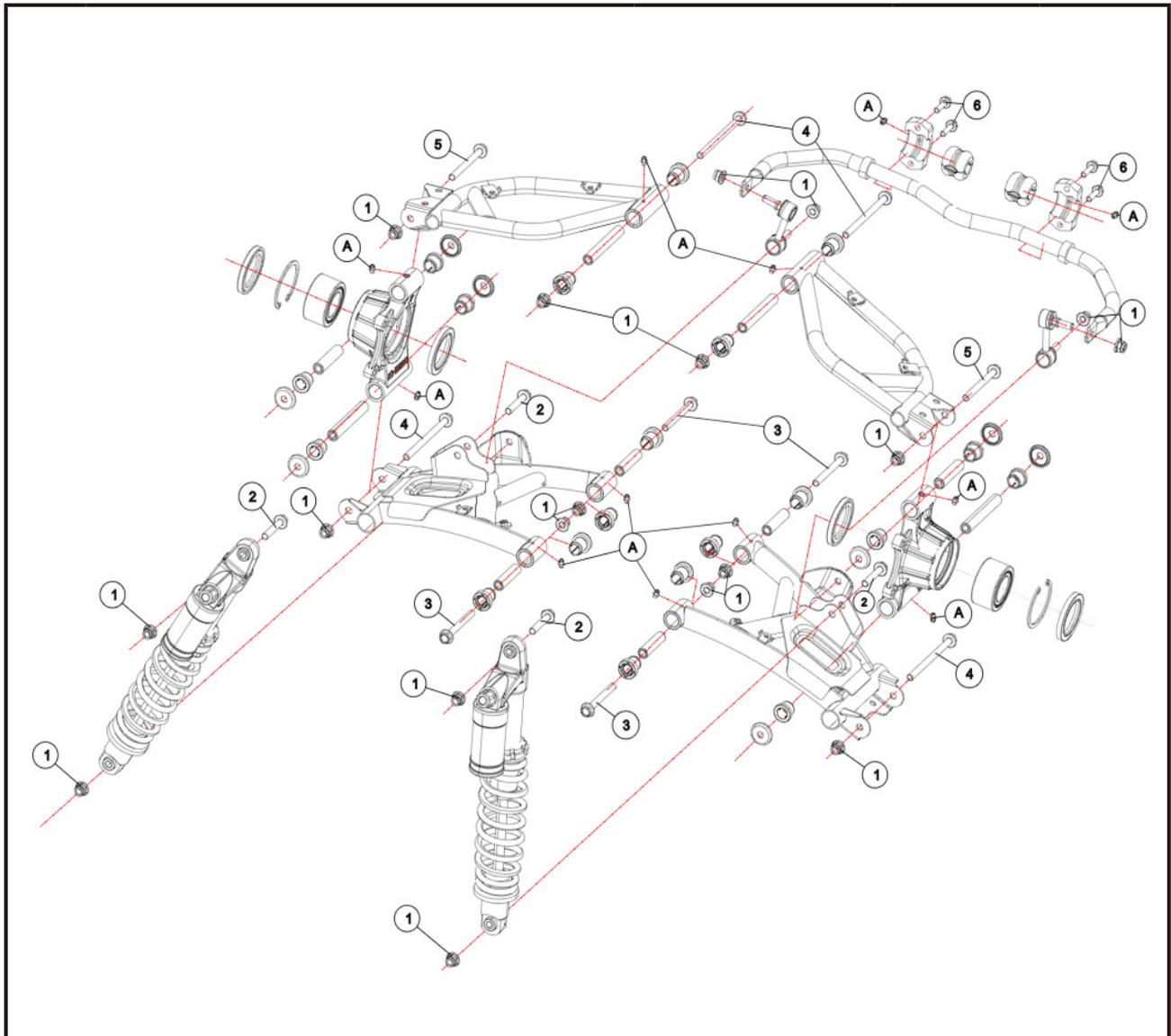
| No. | Fastener                        | Torque |         |           | Remarks |
|-----|---------------------------------|--------|---------|-----------|---------|
|     |                                 | N·m    | kgf·m   | ft·lb     |         |
| 1   | HEXAGON FLANGE BOLT M10×1.25×40 | 65~75  | 6.6~7.6 | 46.2~53.3 |         |
| 2   | 2-NON-METALLIC HF NUT M10×1.25  | 65~75  | 6.6~7.6 | 46.2~53.3 |         |
| 3   | 1-HEXAGON SLOTTED NUT M10       | 35~45  | 3.6~4.6 | 24.9~32   |         |
| 4   | HEXAGON FLANGE BOLT M10×1.25×55 | 65~75  | 6.6~7.6 | 46.2~53.3 |         |
| 5   | HEXAGON FLANGE BOLT M10×1.25×90 | 65~75  | 6.6~7.6 | 46.2~53.3 |         |

**Remarks:**

A - Add lubricating grease through the oil cup nozzle (1000Km/time)

C - Replace parts

REAR SUSPENSION EXPLOSION DIAGRAM



| No. | Fastener                         | Torque |         |           | Remarks |
|-----|----------------------------------|--------|---------|-----------|---------|
|     |                                  | N·m    | kgf·m   | ft·lb     |         |
| 1   | 2-NON-METALLIC HF NUT M10×1.25   | 65~75  | 6.6~7.6 | 46.2~53.3 |         |
| 2   | HEXAGON FLANGE BOLT M10×1.25×55  | 65~75  | 6.6~7.6 | 46.2~53.3 |         |
| 3   | HEXAGON FLANGE BOLT M10×1.25×90  | 65~75  | 6.6~7.6 | 46.2~53.3 |         |
| 4   | HEXAGON FLANGE BOLT M10×1.25×140 | 45~60  | 4.6~6.4 | 32~42.7   |         |
| 5   | HEXAGON FLANGE BOLT M10×1.25×100 | 65~75  | 6.6~7.6 | 46.2~53.3 |         |
| 6   | HEXAGON FLANGE BOLT M8×30        | 22~29  | 2.2~2.9 | 15.6~20.6 |         |

Remarks:

A - Add lubricating grease through the oil cup nozzle (1000Km/time)

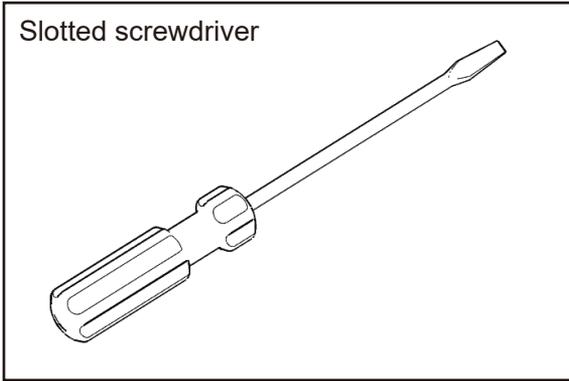
C - Replace parts

## TECHNICAL PARAMETER

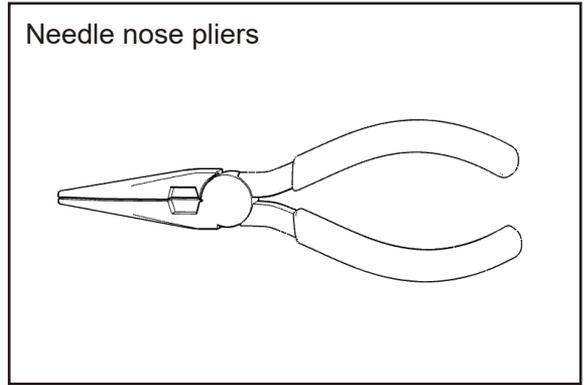
| ITEM  | SETTING                            | AVAILABLE RANGE   |
|---|------------------------------------|---|
| Front Shock Absorber: (Optional) <ul style="list-style-type: none"> <li>• Ordinary hydraulic damping shock absorber spring preload setting position</li> <li>• Type A: air pressure adjustable damping shock spring preload setting position (from the bottom of the upper mounting base to the position of the adjusting nut)</li> </ul> | 2 gear                             | 1st gear to 6th gear  |
|   | 24mm(1.42in.)                      | 10~44mm   |
| Rear Shock Absorber: (Optional) <ul style="list-style-type: none"> <li>• Ordinary hydraulic damping shock absorber spring preload setting position</li> <li>• Air pressure adjustable damping shock spring preload setting position (from the bottom of the upper mount to the position of the adjustment nut)</li> </ul>                 | 2 gear                             | 1st gear to 5th gear  |
|   | 65mm                               | 45~85mm   |
| Barometric damping <ul style="list-style-type: none"> <li>• Compression damping adjustment (adjust from clockwise)</li> <li>• Return damping adjustment (adjust from clockwise)</li> <li>• Gas pressure</li> </ul>  | Type A: 4 gears<br>Type B: 9 gears | Type A: 1st gear to 7th gear<br>Type B: 1st gear to 18th gear |
|   | Type A: 4 gears<br>Type B: 9 gears | Type A: 1st gear to 7th gear<br>Type B: 1st gear to 18th gear |
|   | 1Mpa                               |   |

### DEDICATED TOOLS

Slotted screwdriver

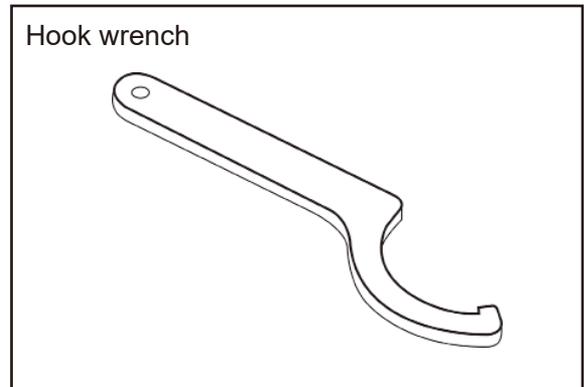


Needle nose pliers

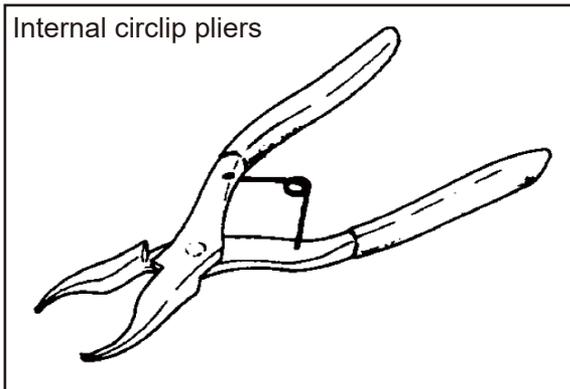


Grease gun

Hook wrench



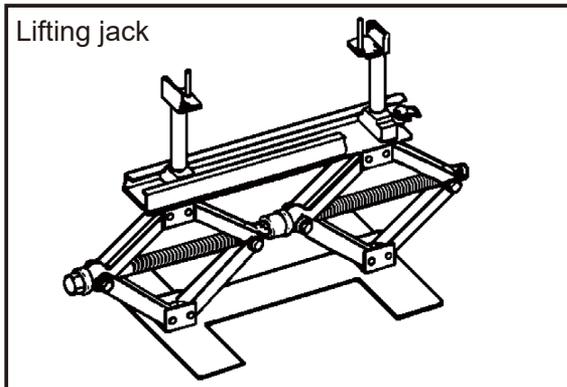
Internal circlip pliers



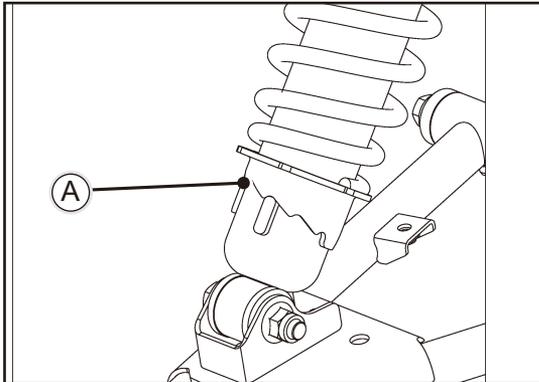
Bearing drive kit



Lifting jack



## SHOCK ABSORBER



### SHOCK ABSORBER INSPECTION

Since the front shocks are sealed units, they cannot be disassembled, only external inspection is required. If one unit is damaged, replace both shock absorbers as a set. If only one unit is replaced and both are not balanced, it may result in vehicle instability at high speeds or poor overall comfort.

### ORDINARY HYDRAULIC DAMPING AND SHOCK ABSORPTION PRELOAD ADJUSTMENT

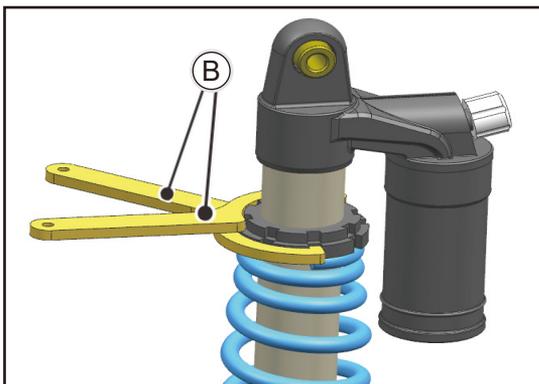
**【A】** Spring adjustment sleeve

The spring adjustment sleeve **【A】** of the hydraulic shock absorber has 5 adjustment gears, and the spring can be adjusted according to different terrain and loading conditions. If the spring action feels too soft or too hard, it can be adjusted according to the spring adjustment table.

### SPRING ADJUSTMENT TABLE

| Position | Spring | Environment | Load  | Terrain | Speed |
|----------|--------|-------------|-------|---------|-------|
| 1        | Soft   | Soft        | Light | Flat    | Low   |
| 2 (STD)  | ↑      | ↑           | ↑     | ↑       | ↑     |
| 3        |        |             |       |         |       |
| 4        | ↓      | ↓           | ↓     | ↓       | ↓     |
| 5        | Hard   | Hard        | Heavy | Bumpy   | High  |

- ◆ Use a tool to turn the adjustment sleeve on the shock absorber to the required gear.

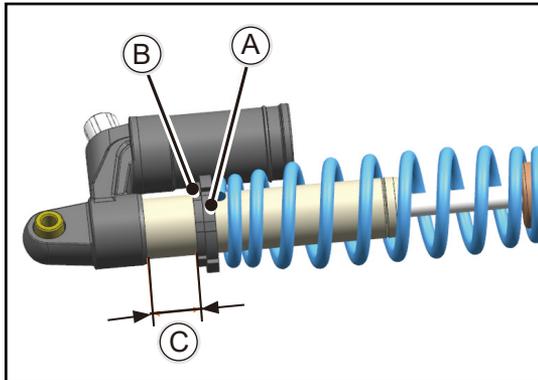


### AIR DAMPING SHOCK PRELOAD ADJUSTMENT

**【B】** Hook wrench

- ◆ The spring adjusting nut of the gas pressure damping shock absorber is on the upper end of the spring, use tool **【B】** to loosen the locking nut. Then turn the adjusting nut to loosen.

## MEASURE THE FREE LENGTH OF THE SPRING



【A】 Adjusting nut

【B】 Lock Nut

【C】 Spring preload position

◆ Screw the adjusting nut 【A】 to the desired position, then tighten the lock nut 【B】 , adjust the nut position 【C】

**Spring preload position 【C】 setting**

**Standard: Front shock 24mm(0.94in.),**

**Use range 10mm(0.39in.) ~ 44mm(1.73in.)**

**Rear shock 65mm(2.56in.),**

**Use range 45mm(1.77in.) ~ 85mm(3.35in.)**

| Spring lock nut torque |
|------------------------|
| 30 N·m                 |

If the spring action feels too soft or too hard, tune it to:

| position          | spring | setting | load  | terrain | speed |
|-------------------|--------|---------|-------|---------|-------|
| ↑                 | soft   | soft    | light | smooth  | low   |
| standard position | ↑      | ↑       | ↑     | ↑       | ↑     |
| ↓                 | hard   | hard    | heavy | bumpy   | high  |



## SHOCK ABSORBER DAMPING ADJUSTMENT

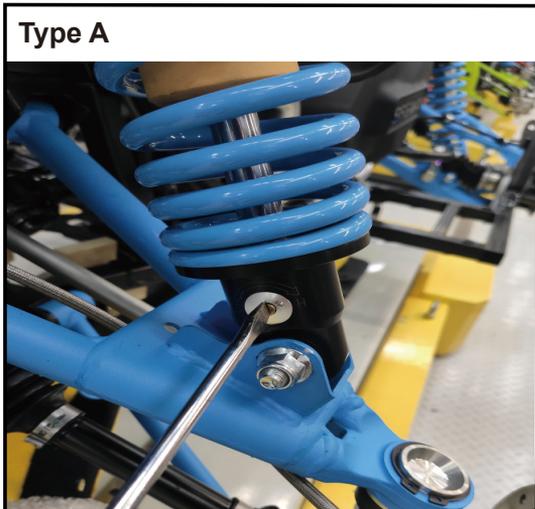
In order to adapt to various riding conditions, the spring preload can be adjusted on the shock absorber or the spring can be replaced. The damping force can also be easily adjusted without changing the oil viscosity.

## COMPRESSION DAMPING ADJUSTMENT

◆ Turn the upper compression damping adjuster 【A】 by hand, clockwise to increase the damping, counterclockwise to decrease the damping.

**Type A:** The compression damping adjuster has a total of 7 gears, and the factory setting gear is the 4th gear.

**Type B:** The compression damping adjuster has a total of 18 gears, and the factory setting gear is the 9th gear.



## RECOVERY DAMPING ADJUSTMENT

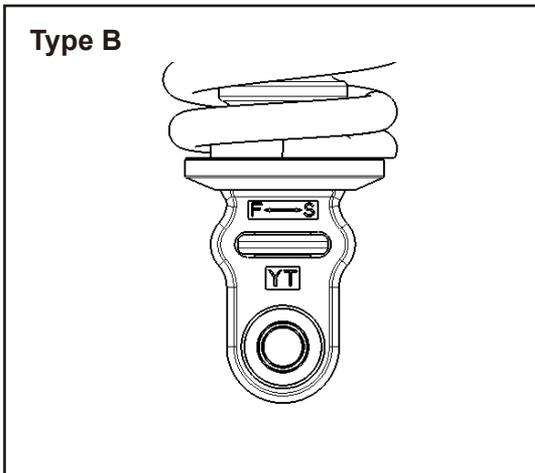
**Type A:** Use a flat-blade screwdriver to turn the damping adjuster at the bottom. Instantly increase the damping in the needle direction (H) and decrease the damping in the counterclockwise direction (S).

The recovery damping adjuster has 7 gears in total, and the factory setting gear is the 4th gear.

Utensils: Slotted screwdriver

**Type B:** Turn the damping adjuster at the bottom by hand to increase the damping in the clockwise direction (S) and the damping in the counterclockwise direction (F).

The recovery damping adjuster has 18 gears in total, and the factory setting gear is 9 gears.



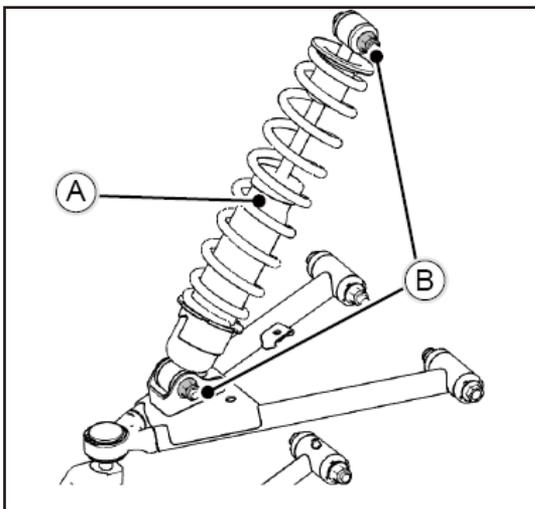
## SHOCK ABSORBER REMOVAL

【A】 Front shock absorber

【B】 Mounting bolt

Use a jack or stand to prop up the vehicle so the wheels don't touch the ground.

- ◆ Use tools to remove the mounting bolts and nuts on the upper and lower parts of the shock absorber 【B】
- ◆ Take out the front shock absorber 【A】



## FRONT SHOCK ABSORBER INSTALLATION

- ◆ Install the upper end of the front shock absorber into the mounting seat of the frame, and put on the bolts and nuts
- ◆ Insert the lower end of the front shock absorber into the front rocker arm mounting base, and install the bolts and nuts
- ◆ Use tools to tighten the upper and lower mounting bolts and nuts.

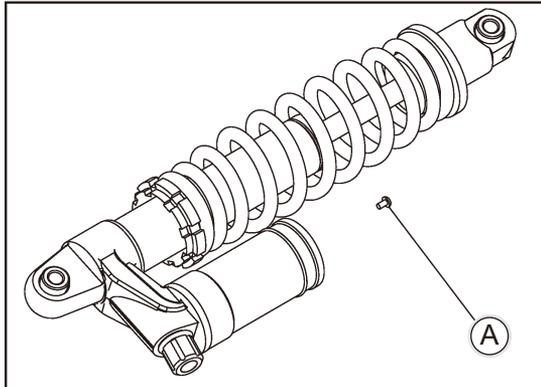
Shock absorber fixing nut torque

45 N·m (4.4kgf·m, 32ft·lb)

REAR SHOCK ABSORBER SCRAPPED

**⚠ WARNING**

Since the rear shock absorber reservoir contains nitrogen gas, do not incinerate any unreleased gas in the container or it may explode.

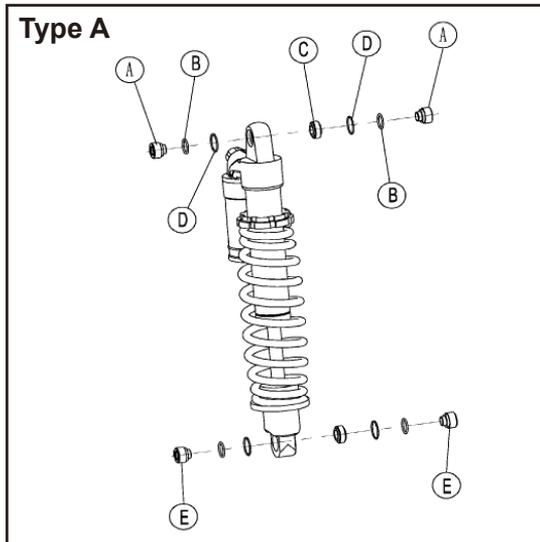


**【A】 Valve cover**

- ◆ Remove the shock absorber (see Shock Absorber Removal)
- ◆ Remove the valve cover **【A】** and release nitrogen
- ◆ Remove the valve

**⚠ WARNING**

Because high-pressure gas is dangerous, do not point the valve toward your face or body.

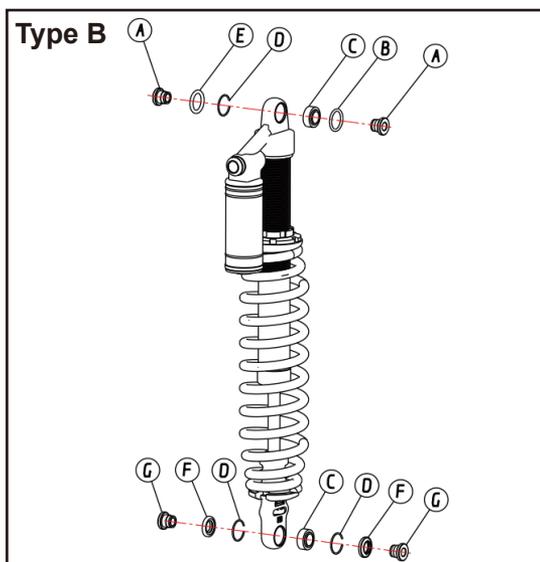


ADJUSTABLE GAS SHOCK ABSORBER INSPECTION

**Type A**

- ◆ Check the upper and lower mounting bases
- ◆ If spacer rings, joint bearing assemblies and oil seals are damaged, replace them.

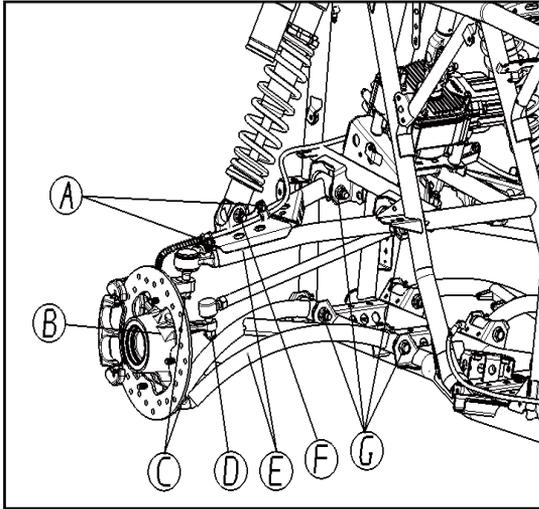
- 【A】** upper spacer ring
- 【B】** O-ring
- 【C】** Joint bearing combination
- 【D】** Retaining ring
- 【E】** Lower spacer ring



**Type B**

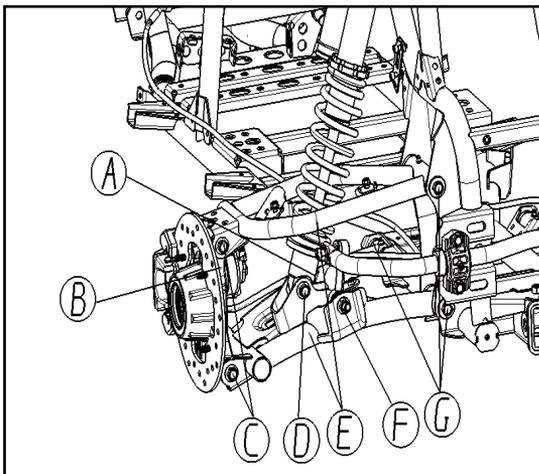
- 【A】** upper spacer ring
- 【B】** O-ring I
- 【C】** Joint bearing combination
- 【D】** Retaining ring
- 【E】** O-ring II
- 【F】** Sealing rubber sleeve
- 【G】** Lower spacer ring

## SUSPENSION



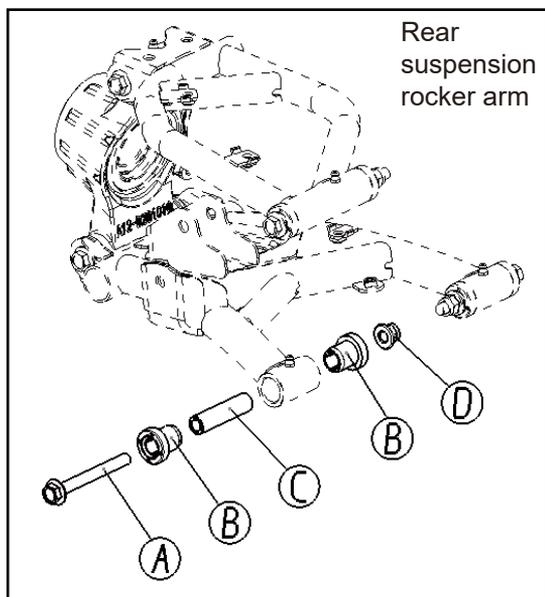
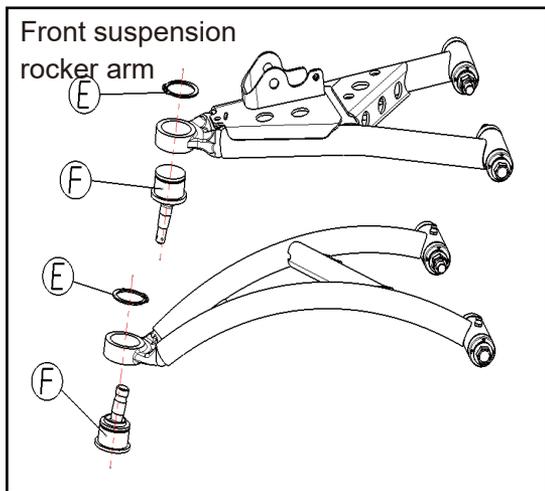
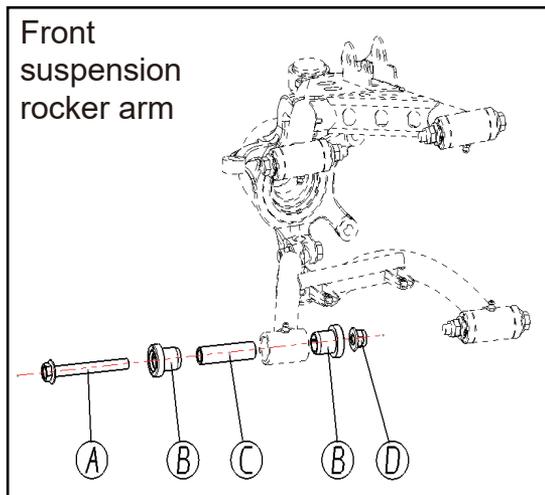
### REMOVAL OF FRONT SUSPENSION ROCKER ARM

- 【A】 Brake hose fixing bolt
- 【B】 Steering knuckle assembly
- 【C】 Rocker arm mounting nut
- 【D】 Steering tie rod nut
- 【E】 Rocker arm assembly
- 【F】 Shock absorber mounting fastener
- 【G】 Rocker arm mounting fastener
- ◆ Remove brake hose fixing bolt 【A】
- ◆ Remove steering knuckle assembly 【B】
- ◆ Remove rocker arm mounting nut 【C】
- ◆ Remove steering tie rod nut 【D】
- ◆ Remove shock absorber mounting fastener 【F】
- ◆ Remove rocker arm mounting fastener 【G】
- ◆ Remove rocker arm assembly 【E】



### REMOVAL OF REAR SUSPENSION ROCKER ARM

- 【A】 Brake hose fixing bolt
- 【B】 Axle support assembly
- 【C】 Rocker arm mounting fastener
- 【D】 Shock absorber mounting fastener
- 【E】 Rocker arm assembly
- 【F】 Ball pin connecting rod mounting nut
- 【G】 Rocker arm mounting fastener
- ◆ Remove brake hose fixing bolt 【A】
- ◆ Remove the wheel axle support assembly 【B】
- ◆ Remove the rocker arm mounting nut 【C】
- ◆ Remove the shock absorber mounting fastener 【D】
- ◆ Remove the ball pin connecting rod mounting nut 【F】
- ◆ Remove the rocker arm mounting fastener 【G】
- ◆ Remove the rocker arm assembly 【E】



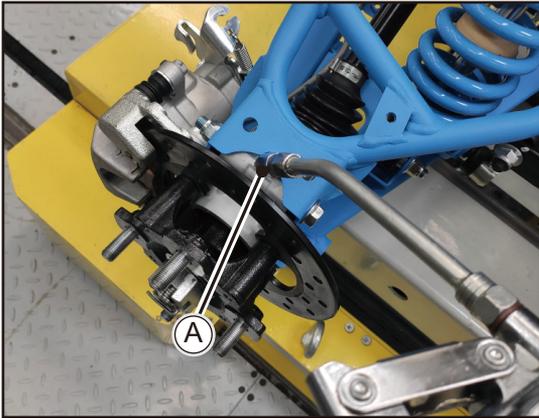
**DISASSEMBLY OF FRONT AND REAR ROCKER ARMS**

- 【A】 Rocker arm assembly mounting bolts
- 【B】 Rocker arm dust cover
- 【C】 Rocker arm buffer bushing
- 【D】 Nut
- 【E】 Shaft circlip
- 【F】 Upper and lower kingpin assembly

- ◆ Remove the rocker arm assembly mounting bolts 【A】 and nuts 【D】
- ◆ Remove the rocker arm dust cover 【B】
- ◆ Press out the rocker arm buffer bushing 【C】
- ◆ Use circlip pliers to remove the shaft circlip 【E】
- ◆ Press out the upper and lower kingpin assembly 【F】

### ROCKER ARM MAINTENANCE

【A】 Straight-through oil cup



- ◆ Use a grease gun to fill the straight-through oil cup with grease
- ◆ When the inspection finds that the lubricating grease in the hub of the axle support is reduced, or after the vehicle travels 1000Km, use a grease gun to fill the straight-through oil cup in the suspension system (including the rear axle support and rear stabilizer bar).

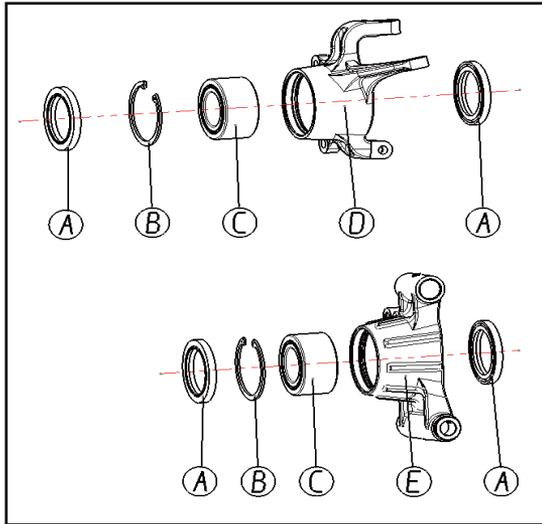
**Special tools: grease gun**

#### **⚠ WARNING**

If the suspension joints do not have adequate lubrication, they need to be lubricated and maintained regularly to avoid excessive wear of the bushings.

**WHEEL HUB BEARING REPLACEMENT**

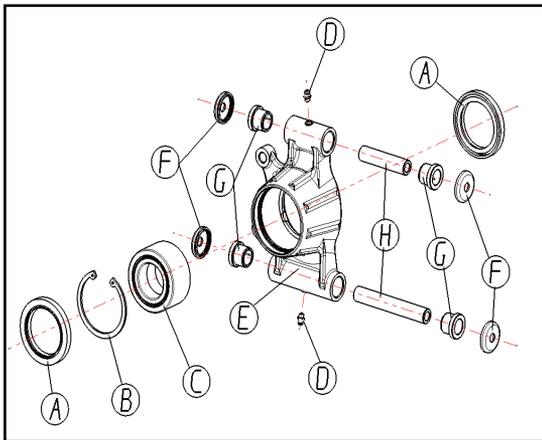
If the wheel hub bearing in the steering knuckle assembly or rear axle support assembly is damaged, it needs to be replaced.



- 【A】 Half-axle oil seal
- 【B】 Open retaining ring
- 【C】 Wheel hub bearing
- 【D】 Steering knuckle
- 【E】 Half-axle oil seal
- 【F】 Rear axle support

Special tools: circlip pliers, bearing driver assembly

**DISASSEMBLY OF REAR AXLE SUPPORT ASSEMBLY**



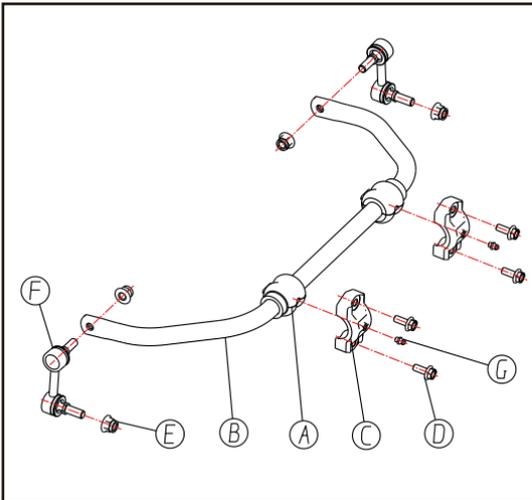
- 【A】 Half-axle oil seal
- 【B】 Open retaining ring
- 【C】 Wheel hub bearing
- 【D】 Straight-through oil cup (grease nipple)
- 【E】 Rear axle support
- 【F】 Oil seal cover
- 【G】 Buffer sleeve
- 【H】 Axle support bushing

Special tools: circlip pliers, bearing driver assembly

**⚠ CAUTION**

Check the buffer sleeve 【B】. If the inner hole is severely worn, it needs to be replaced and refilled with grease after assembly.

## REAR BALANCE BAR



### REAR STABILIZER BAR DISASSEMBLY

- 【A】 Stabilizer bar buffer sleeve
- 【B】 Rear stabilizer bar
- 【C】 Stabilizer bar mounting base
- 【D】 Mounting base fixing bolts
- 【E】 Connecting rod assembly mounting nut
- 【F】 Connecting rod assembly
- 【G】 Straight-through oil cup

#### Mounting seat fixing bolt torque

35N·m (3.5 kgf·m, 25.8 ft·lb)

#### Connecting rod assembly mounting nut torque

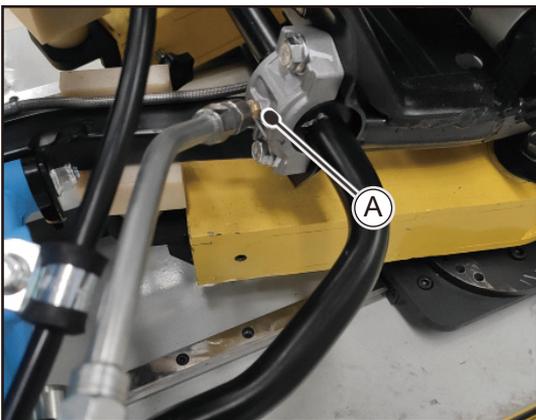
45 N·m (4.5 kgf·m, 33 ft·lb)

### REAR STABILIZER BAR MAINTENANCE

- 【A】 Straight-through oil cup

Every time the vehicle travels 1000KM, it is necessary to add an appropriate amount of grease to the buffer sleeve installed on the stabilizer bar through the straight-through oil cup 【A】 .

**Special tools: grease gun**



# WHEELS AND TIRES

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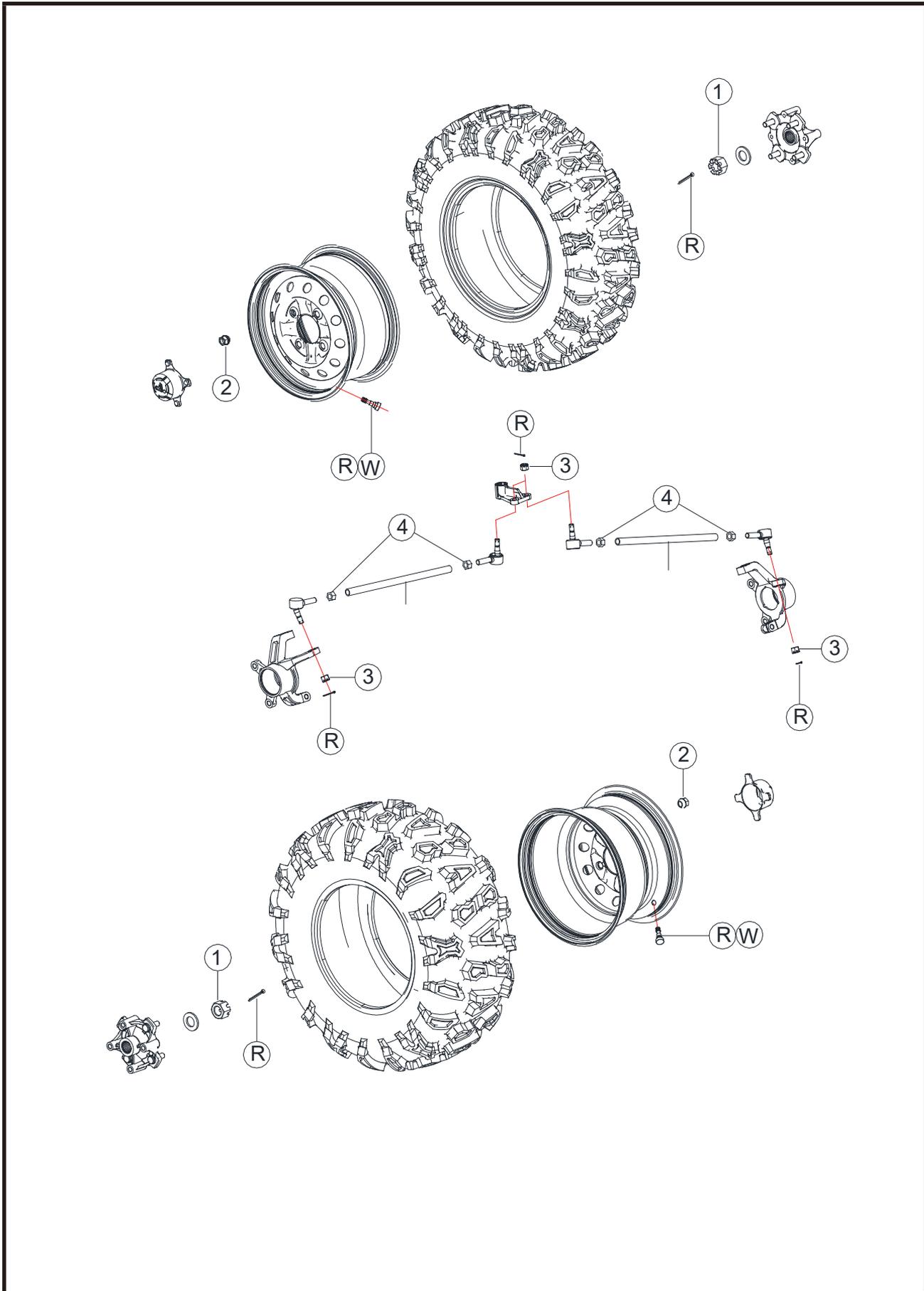
**WHEEL HUB .....10-15**

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## EXPLODED VIEW OF WHEELS AND TIRES



| No. | Fastener                        | Torque    |           |         | Remarks |
|-----|---------------------------------|-----------|-----------|---------|---------|
|     |                                 | N·m       | kgf·m     | ft·lb   |         |
| 1   | Half shaft nut M24              | 250       | 25        | 184     |         |
| 2   | Wheel nut M12                   | 110 ~ 120 | 11.0~12.0 | 74~88   |         |
| 3   | Tie rod end nut M10             | 40~50     | 4.0~5.0   | 30~36.9 |         |
| 4   | Tie rod adjustment lock nut M12 | 40~50     | 4.0~5.0   | 30~36.9 |         |

**W: Water or soapy water solution.**

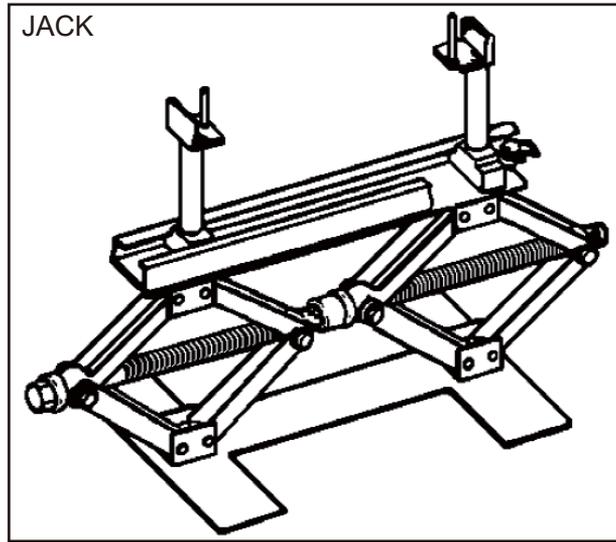
**R: Replacement parts**

### TECHNICAL PARAMETERS

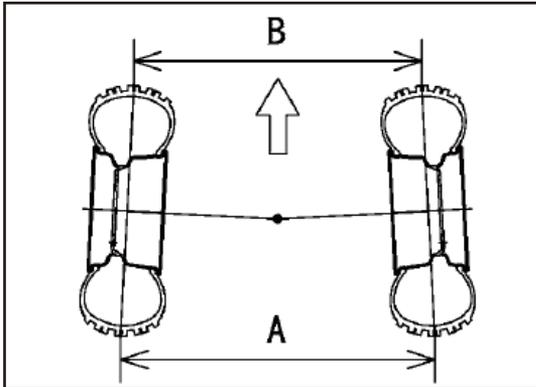
| Item  | Standard   | Use Limit      |
|---|--|----------------|
| Wheel positioning:<br>Front wheel and front bundle: | 10±10mm (0.39±0.39inch)                                    | ---            |
| Tires:  |  |                |
| Standard tire: <b>front</b>                         | 27×9.00-14/27×9.00R14/30×10.00R14 (AT10 W)Tubeless Nylon   | ---            |
| <b>rear</b>   | 27×11.00-14/27×11.00R14/30×10.00R14 (AT10 W)Tubeless Nylon | ---            |
| Tire pressure (in cold state) :                     |  |                |
| <b>front</b>  | 48.3kPa (0.49 kgf/cm <sup>2</sup> , 7.0 psi)               | ---            |
| <b>rear</b>   | 48.3kPa (0.49 kgf/cm <sup>2</sup> , 7.0 psi)               | ---            |
| Maximum tire pressure<br>(In cold state)            | 250 kPa (2.5 kgf/cm <sup>2</sup> , 36 psi)                 | ---            |
| Tread height of tire:                               |  |                |
| <b>front</b>  | ---  | 3mm (0.12inch) |
| <b>rear</b>   | ---  | 3mm (0.12inch) |

| Item                     | AT10    | AT10 W  |
|--------------------------|---------|---------|
| Wheel alignment          |         |         |
| Front wheel front beam:  | -5~20mm | -5~20mm |
| Main pin rear camber (°) | 5       | 3       |
| Wheel Camber (°)         | -0.1    | -0.1    |
| Main pin camber (°)      | 8       | 8       |
| Main pin offset (mm)     | 3.5     | -0.5    |

## SPECIAL TOOLS



## WHEEL ALIGNMENT



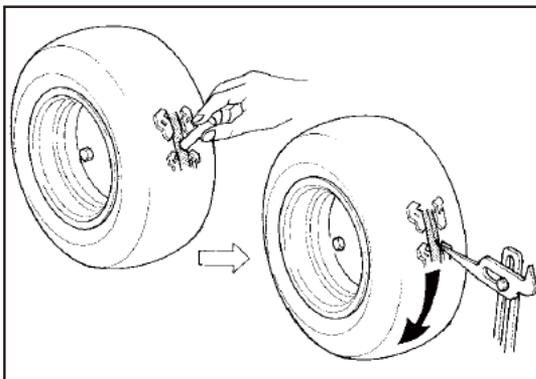
### FRONT BEAM INSPECTION

- ◆ The front beam is the distance between the front wheels at axle height and the rear. The difference in distance is called the anterior beam value. When there is A front beam, viewed from the top of the car, the distance A (rear) is greater than B (front), as shown in the figure.
- ◆ The function of the front beam is to prevent the front wheel from running off at any time and reduce the sliding friction between the tire and the ground. If the front beam is not correct, the front wheels will rub against the ground, causing tread damage or abnormal wear.

The caster and camber angles of the kingpin are built-in and do not require adjustment.

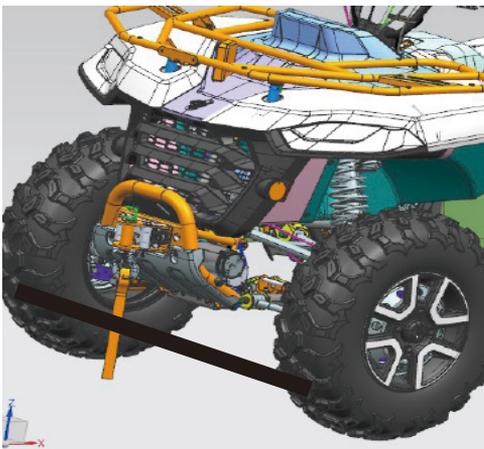
$$A \text{ (rear)} - B \text{ (front)} = \text{toe value}$$

(The distances A and B are measured at the height of the axle when the vehicle is parked on a flat surface.)

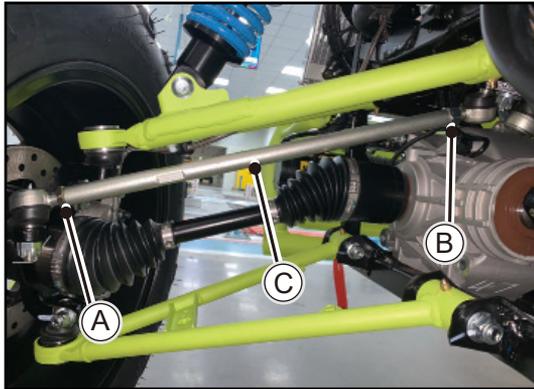


- ◆ Apply thick chalk or paint line near the center of the front tire.
- ◆ When turning a wheel, make a small mark near the center of the chalk coating with a needle marker.
- ◆ Place the front wheel on the ground and fix the handlebars.
- ◆ At axle height, measure the distance between front tire front and rear marking or paint line.
- ◆ The front beam is obtained by subtracting the measured value at the rear from the measured value at the front. If the forebeam is not within the specified range, continue the forebeam adjustment procedure.

**Standard:  $10 \pm 10\text{mm}$  ( $0.39 \pm 0.39\text{inch}$ )**



**FRONT BEAM ADJUSTMENT**

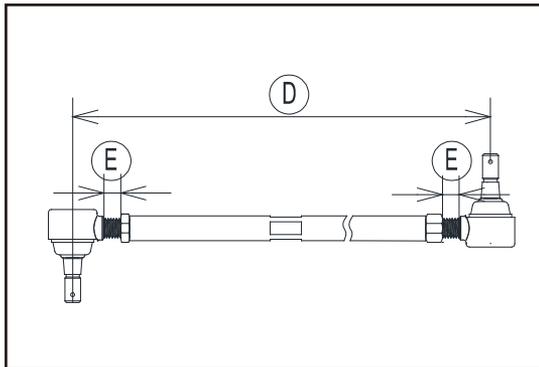


- 【A】 Locknut
- 【B】 Locknut
- 【C】 Pull rod

◆ Loosen the locknuts 【A】 【B】 and turn the adjusting rod 【C】 the same number of turns on both sides to achieve the specified toe-in.

**TIPS**

- ◆ The lock nut 【A】 on the tie rod is a left-hand thread. Turn the locknut clockwise to loosen.
- ◆ If the toe-in reaches the specified value, the length 【D】 of each tie rod is 416~419mm (16.4~16.5 inches)



**⚠ WARNING**

Adjust the length of the horizontal pull rod so that the visible thread length 【E】 at both ends of the horizontal pull rod is even. Uneven thread length will cause damage to the end of the horizontal pull rod

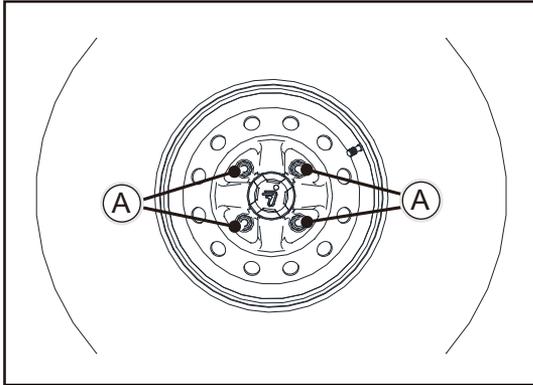
**CHECK THE FRONT BEAM**

- ◆ Tighten:

|  |
|--|
| Lock nut torque of Tie Rod               |
| 50~60 N.m (5.0~6.0kgf·m, 36.9~44.3ft·lb) |

- ◆ Test drive

## WHEEL (RIM)



### WHEEL DISASSEMBLY

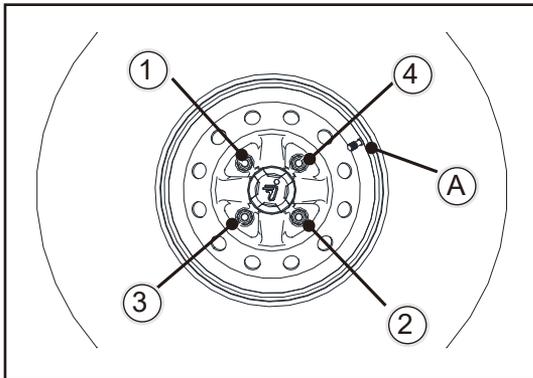
#### 【A】 WHEEL NUT

- ◆ Loosen the wheel nut 【A】
- ◆ Support the vehicle with a bracket or jack to lift the wheels off the ground.

**Special tool: Jack.**

Tear down:

- ◆ Wheel nut
- ◆ wheel

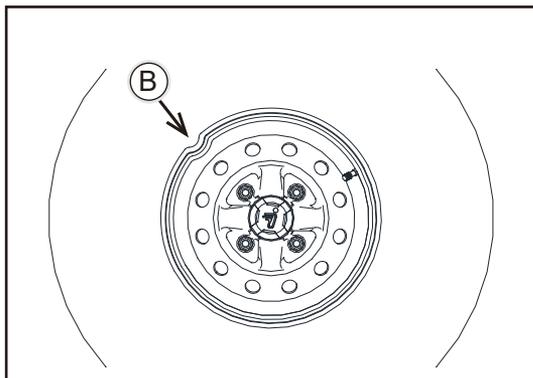


### WHEEL ASSEMBLY

- ◆ Position the wheels so that the air valve 【A】 faces the outside of the vehicle
- ◆ Tighten the wheel nuts in a cross way

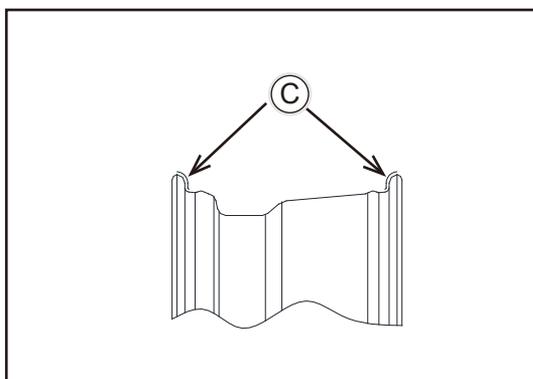
Tightening bolt torque

110 ~ 120N.M



### WHEEL CHECK

- ◆ Check whether there are depressions on both sides of the rim 【B】 . If there are depressions, please replace them.



- ◆ Remove the tire and check the air sealing surface 【C】 of the rim for scratches or scratches. If necessary, use a fine emery cloth to polish the air sealing surface.

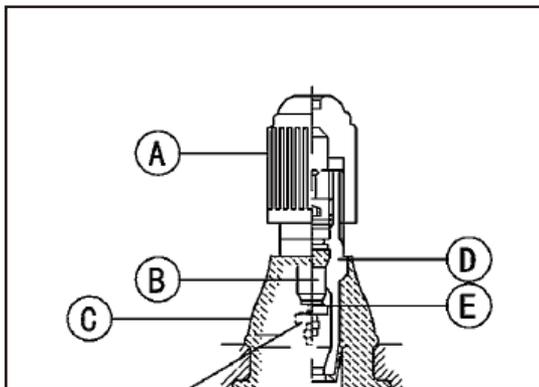
## WHEEL (RIM) REPLACEMENT



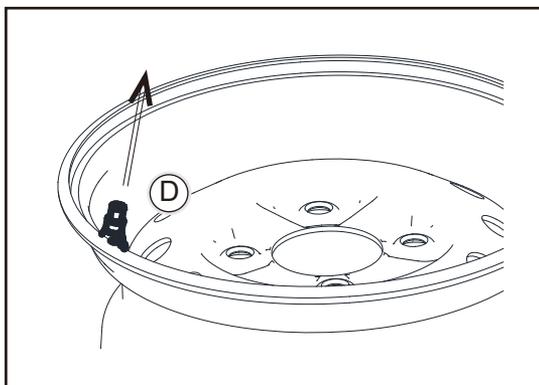
- ◆ Shake the wheel with both hands for excessive or abnormal movement, check whether the hub bearing is loose or damaged, if necessary, please replace the hub bearing.
- ◆ Remove the wheel (see Wheel removal).
- ◆ Remove tire from rim (see Tire removal).
- ◆ Remove the valve mouth assembly and throw away.

### ⚠ CAUTION

Replace the air valve every time you change the tire. Do not reuse the air valve.



- 【A】 Plastic cover
- 【B】 Spool
- 【C】 Stem seal
- 【D】 Stem
- 【E】 Seat



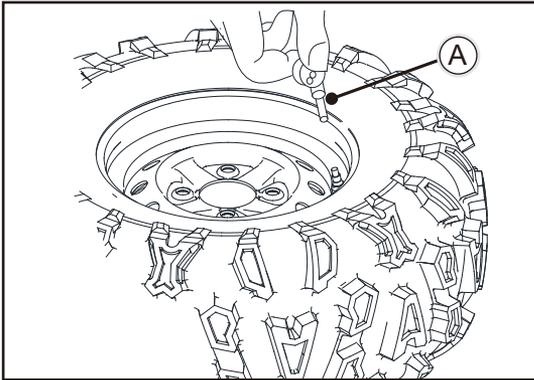
- ◆ Install new air valve on new rim.
- ◆ Remove bonnet, moisten stem with soap solution, and pull stem 【D】 from inside out through rim until it gets stuck in place.

### ⚠ CAUTION

Do not use oil or petroleum distillate to moisten the stem as it degrades rubber.

- ◆ Install the tire on the new rim (see Tire installation).
- ◆ Wheel mounting (please refer to wheel mounting)

### TIRE



#### TIRE DISASSEMBLY

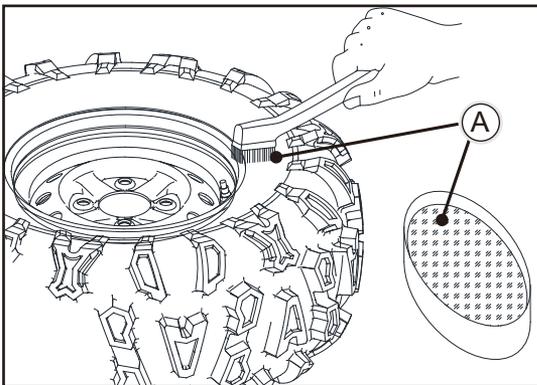
- ◆ Remove the Tire
- ◆ Loosen the valve to deflate the tire.

#### USE THE APPROPRIATE SPOOL TOOL 【A】

- ◆ Lubricate the tires and rims on both sides of the wheel with soap solution or water 【B】. This helps the tires slide off the rim flange.

#### ⚠ CAUTION

Do not lubricate rim and tire rims with oil or petroleum fractions as they can spoil the tire.



- ◆ Remove the tire from the rim using a suitable commercial tire changer.

#### TIPS

Tires cannot be removed manually because they fit tightly to the rim.

#### TIRE ASSEMBLY

- ◆ Inspect the rim (see Wheel (Rim) Inspection).
- ◆ Replace the valve core with a new one.

#### ⚠ WARNING

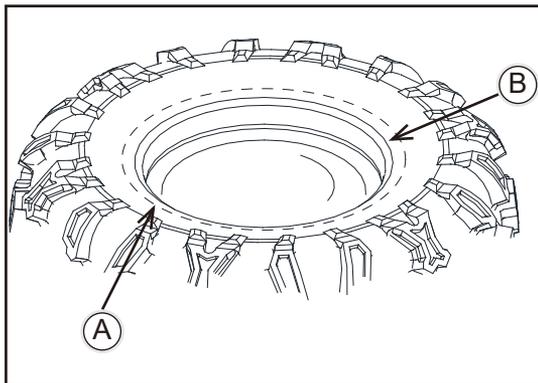
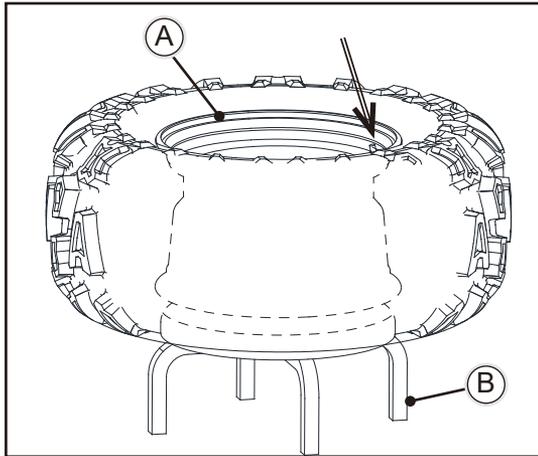
Whenever the tire is changed, the valve core must be replaced.

Do not reuse the valve core.

- ◆ Inspect tires for wear and damage (see Tire Inspection).
- ◆ Lubricate tire beads and rim flanges with a soap solution or water.

#### ⚠ CAUTION

Do not use lubricants other than a water-soap solution, and do not lubricate the beads and rims with water, as this may cause the tire to separate.



- ◆ Support the rim **【A】** on a suitable bracket **【B】** to prevent the tire from slipping off.

- ◆ Inflate the tire until the rim is fixed to the tire rim.

**Maximum air pressure of tire (fixed on wheel when cold)**

**front and rear: 250 kPa (2.5 kgf /cm<sup>2</sup>, 36 psi)**

### ⚠ WARNING

Do not inflate the tire above the maximum tire pressure. Overinflated air can cause a tire to explode, potentially causing injury and death.

- ◆ Check whether the rim lines **【C】** on both sides of the tire are parallel to the rim flange **【D】**.
- ◆ If the rim lines are not parallel to the rim flange, bleed the tire, moisten the sealing surface again, and inflate it again.
- ◆ Check whether there is air leak after the tire is in place correctly.
- ◆ Apply soap solution around the tire tire rim, and then check for air bubbles.
- ◆ Bleed the tire to the specified pressure.

### TIPS

Segway offers tire pressure gauges and user kits.

**Tire pressure (in cold state)**

**Front: 48.3 kPa (0.49 kgf /cm<sup>2</sup>, 7.0 psi)**

**Rear: 48.3 kPa (0.49 kgf /cm<sup>2</sup>, 7.0 psi)**

- ◆ Wheel mounting (see Wheel mounting).
- ◆ Wipe the soap and water solution from the tire and dry the tire before operation.

### ⚠ WARNING

Do not operate the vehicle while soap and water are still around the wheel rim, it can cause tyre separation and can lead to dangerous conditions.

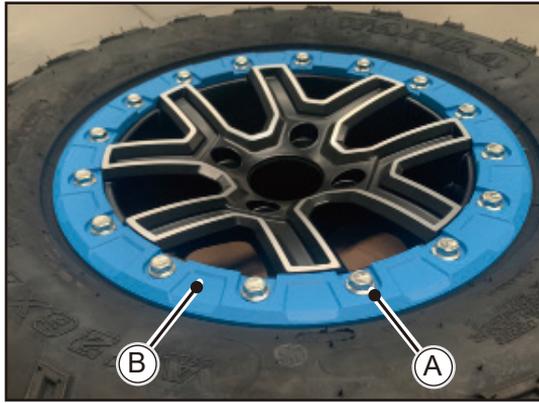
### TIRE INSPECTION

- ◆ Refer to the "Wheels/Tires" section of the Regular Maintenance section.

### TIRE DISASSEMBLY (FOR ANTI-DROP RIMS)

【A】 detachable ring fastening bolts

【B】 detachable coil



- ◆ Take off the wheel.
- ◆ Remove all detachable ring fastening bolts 【A】 .
- ◆ Remove the detachable coil 【B】 .

- ◆ Lubricate tires and rims on both sides of the wheel with soap solution or water 【C】 .This helps the tires slide off the rim flange.

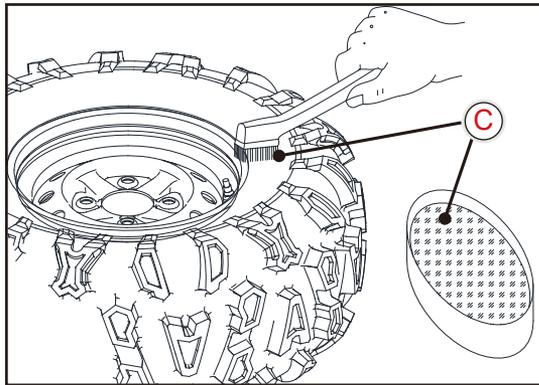
#### ⚠ CAUTION

Do not lubricate rim and tire rims with oil or petroleum ingredients as they can spoil the tire.

- ◆ Remove the tire from the rim using a suitable commercial tire changer.

#### TIPS

Tires cannot be removed manually because they fit tightly to the rim.



### TIRE ASSEMBLY

- ◆ Check rim (refer to wheel check)
- ◆ Replace the valve mouth with a new one.

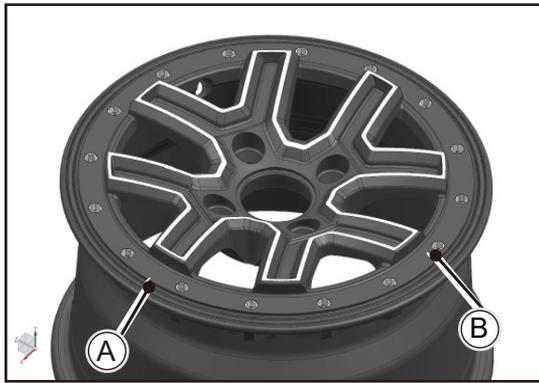
#### ⚠ WARNING

Whenever you change a tire, change the valve port. Do not reuse valve mouth.

- ◆ Check the tire for wear and damage (refer to tire inspection).
- ◆ Lubricate the tire rim and tire rim with soap solution or water.

#### ⚠ CAUTION

Do not use lubricants other than aqueous soap and water.

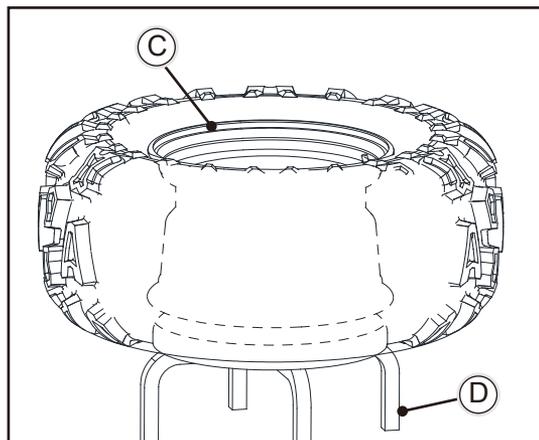


## TIRE INSTALLATION (FOR BEADLOCK RIMS)

- ◆ Fasten the beadlock screw sleeve **【A】** to the rim **【B】**.
- ◆ If the beadlock rim screw sleeve **【A】** is damaged, replace the beadlock rim screw sleeve. If necessary, replace the rim **【B】** and the screw sleeve **【A】** as a whole.

beadlock rim sleeve torque

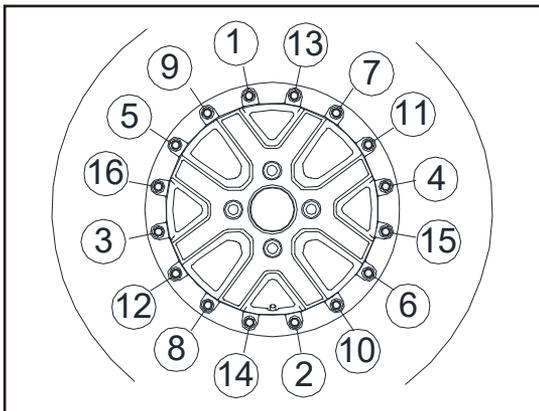
22 ~ 25N.M



- ◆ Support the rim **【C】** on a suitable support **【D】** to prevent the tire from slipping.
- ◆ Apply tire mounting compound to the inner bead of the tire and the wheel on the side opposite to the beadlock to ensure that the tire is properly positioned when inflated and the inner bead is installed on the wheel.
- ◆ Place the outer bead of the tire on the shoulder of the inner ring of the beadlock and the center of the tire.
- ◆ Install all beadlock rim bolts.

### ! WARNING

Never use an impact wrench to install the captive bolt. There is a risk of the bolt slipping or breaking when using an impact wrench.



- ◆ Note: In order to ensure uniform force when locking the beadlock rim, tighten the torque diagonally manually for the first time.

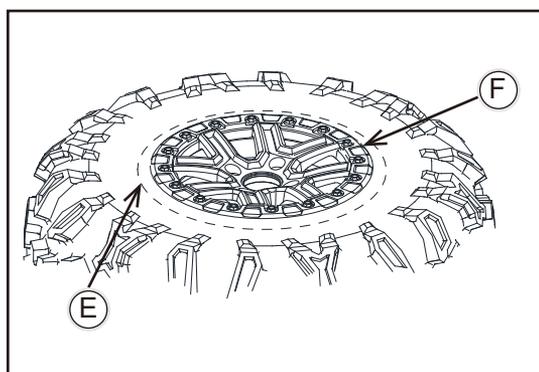
Initial tightening torque of beadlock rim bolts

$14 \pm 1N \cdot M$

- ◆ For the second time, use a torque wrench to tighten the beadlock rim fastening bolts in a cross pattern as shown in the left figure.

Second tightening torque of beadlock rim bolt

$25 \pm 1N \cdot M$



- ◆ Check whether the rim line **【E】** on both sides of the tire is parallel to the edge of the beadlock/rim flange **【F】** and the relative clearance around the perimeter is uniform.

- ◆ If the rim line and the edge of the beadlock/rim flange are not parallel or the relative clearance around the perimeter is uneven, deflate the tire, lubricate the sealing surface again, and then re-inflate.

- ◆ Use a torque wrench for the last time and tighten in a clockwise direction.

The third tightening torque of the beadlock rim bolt

$25 \pm 1N \cdot M$

### ! CAUTION

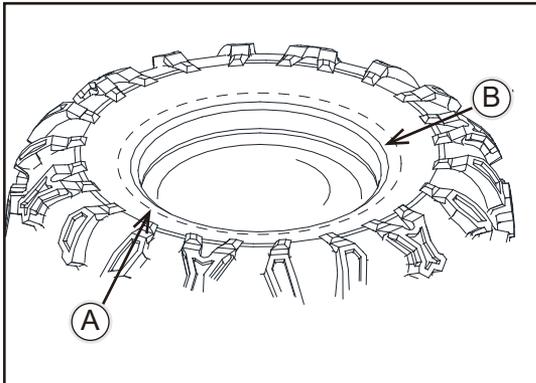
The beadlock rim bolts should be checked and retightened every 450 km the vehicle travels.

- ◆ Inflate the tire until the tire bead is fixed on the rim.
- ◆ Maximum tire inflation pressure (can be fixed on the rim when cold)

**Front and rear: 250 kPa (2.5kgf/cm<sup>2</sup>, 36 psi)**

### ⚠ WARNING

Do not inflate tires above the maximum tire pressure. Overinflation can cause the tire to explode, potentially resulting in personal injury and death.



- ◆ After the tire is properly in place, check for leaks.
- ◆ Apply a soapy water solution around the tire bead, and then check for bubbles.
- ◆ Deflate the tire to the specified pressure.
- ◆ Use an air pressure gauge to check tire pressure.

### TIPS

Segway offers a tire pressure gauge and a user tool kit.

#### Tire pressure (when cold)

**Front: 48.3 kPa (0.49 kgf /cm<sup>2</sup>, 7.0 psi)**

**Rear: 48.3 kPa (0.49 kgf /cm<sup>2</sup>, 7.0 psi)**

- ◆ Install the wheel (see Wheel Installation).
- ◆ Wipe off the soap and water solution on the tire and dry the tire before operation.

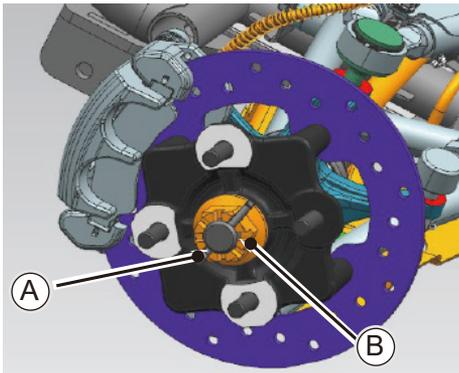
### ⚠ WARNING

Do not operate your vehicle with the soap and water solution still around the rims, it can cause the tire to separate and could result in a dangerous situation.

### TIRE INSPECTION

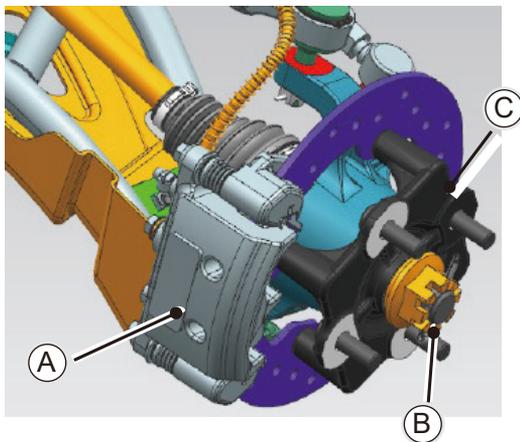
- ◆ Please refer to the "Wheels/Tires" chapter in the Periodic Maintenance section.

WHEEL HUB

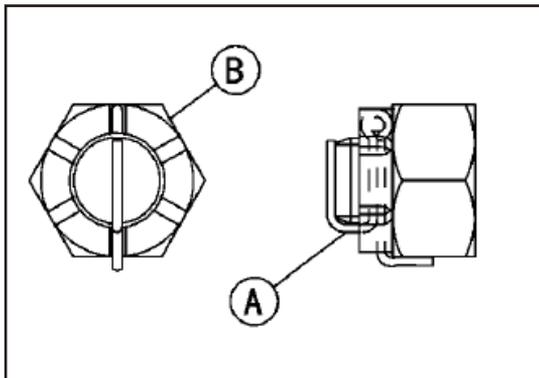


TAKE THE WHEELS APART

- ◆ Remove the wheel (see Wheel removal).
- ◆ Remove cotter pin 【A】
- ◆ Loosen half shaft nut 【B】



- ◆ Unscrew the mounting bolts, remove the calipers 【A】 , and do not let the calipers hang freely.
- ◆ Remove the axle nut 【B】 and then pull down the hub assembly 【C】 and brake disc.
- ◆ Separate the brake disc from the hub.



WHEEL HUB ASSEMBLY

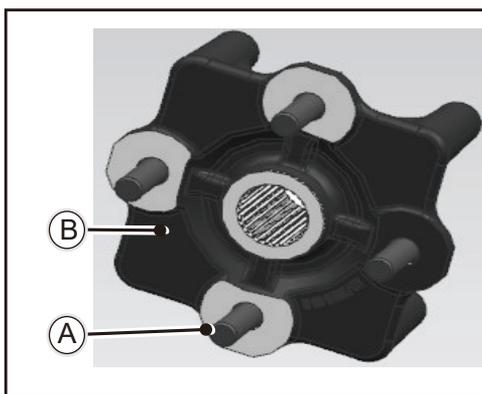
- ◆ Installing a brake disc (see "Braking" chapter)

|                                 |
|---------------------------------|
| Tighten axle nut torque         |
| 250 N.m ( 25 kgf·m, 184 ft·lb ) |

- ◆ Insert the new cotter 【A】 and bend it to the nut 【B】 .

**CAUTION**

- ◆ When inserting the cotter, if the slotted nut does not align with the open pin hole in the half shaft, tighten the nut clockwise until the next hole is aligned.
- ◆ Loosen once and tighten again as the slot passes through the nearest hole.



WHEEL HUB DISASSEMBLY/ASSEMBLY

- ◆ No need to press out hub bolts 【E】 .
- ◆ If any hub bolts are damaged, please replace hub mounting seat 【F】 and bolt 【E】 totally.

# BRAKE SYSTEM

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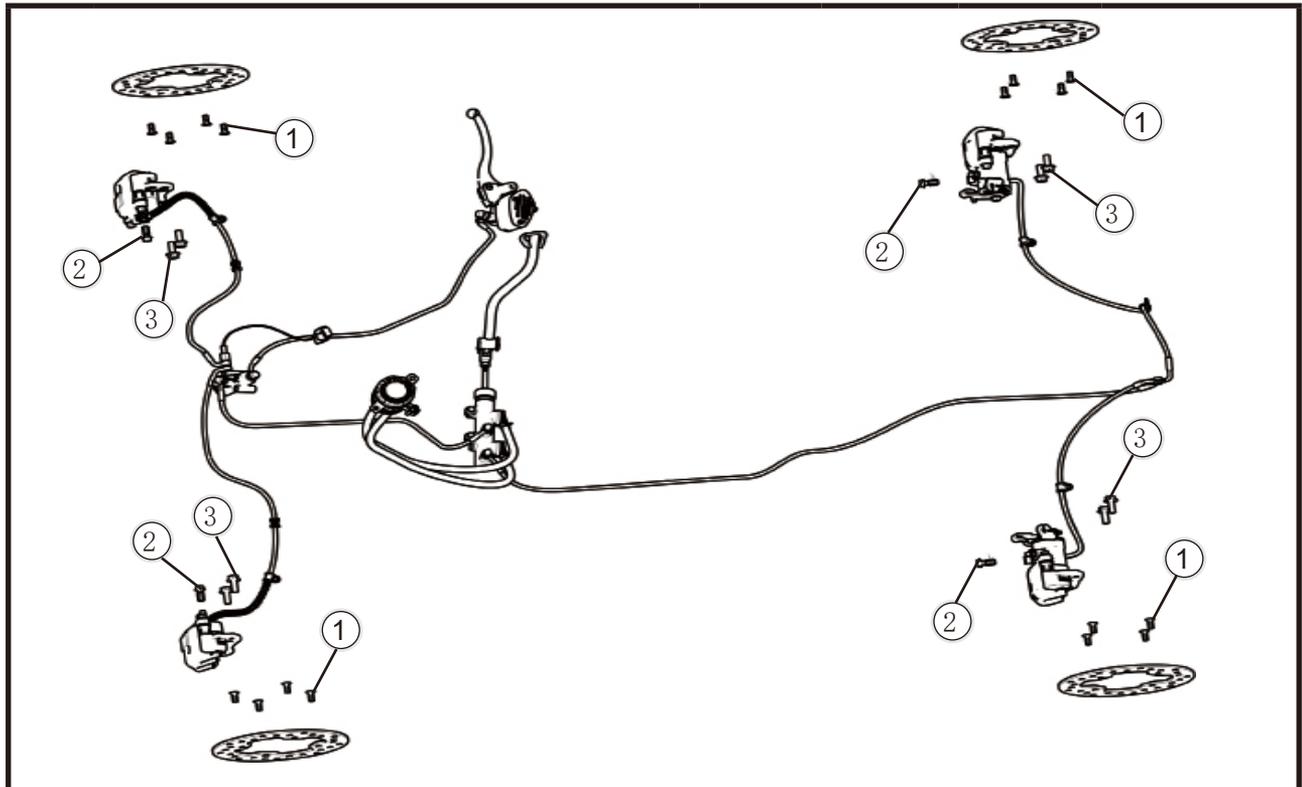
Disc brake systems are lightweight, low-maintenance and perform well in conditions commonly encountered by vehicles. When replacing disc brake pads or performing brake system repairs, there are a few things to remember to ensure proper system function and maximum brake pad life.

- ◆ Do not overfill the master cylinder reservoir.
- ◆ Make sure the brake pedal moves freely and is not stuck.
- ◆ After replacing or repairing the brake pads, check and adjust the fluid level in the master cylinder reservoir.
- ◆ Make sure the atmospheric vent on the reservoir is clear.
- ◆ Test brake drag after any brake system repairs and, if brake drag is evident, investigate the cause.
- ◆ Make sure the caliper moves freely on the guide pins (if applicable).
- ◆ Inspect the caliper piston seal for foreign matter that may prevent the caliper piston from returning freely.
- ◆ After installing new brake pads, perform a brake break-in procedure to extend service life.
- ◆ Do not use aerosols or petroleum products to lubricate or clean brake components. Use only approved brake cleaning products.

The braking system consists of the following components or assemblies: brake pedal, master cylinder, hydraulic brake lines, brake calipers, brake pads and brake discs.

When braking is initiated, pressure is applied to the piston in the master cylinder by pressing the brake pedal. As the master cylinder piston moves inward, it closes the small opening in the cylinder (the compensating port) and begins to build pressure within the braking system. When the pressure in the system increases, the piston in the brake caliper moves outward to push the brake pad into contact with the brake disc and apply clamping pressure to the brake disc. This creates a gap between the brake pad and the brake disc. Friction to achieve the purpose of deceleration or braking. The friction exerted on the brake pads causes the brake pads to wear. As these brake pads wear, the pistons in the calipers move further outward and adjust themselves to automatically compensate. As the brake caliper piston moves outward, fluid from the reservoir fills the increased amount of fluid in the lines required due to wear on the brake pads or discs. Brake fluid level is critical to the proper operation of the system. Too little fluid can allow air to enter the system and make the brakes feel spongy. Excess fluid can cause the brakes to drag due to fluid expansion. The compensation port is located in the master cylinder and opens and closes according to the movement of the master cylinder piston. This port compensates for the expansion or contraction of the fluid as the temperature within the hydraulic system changes. Since high temperatures are generated within the braking system during braking, it is important that the master cylinder reservoir has enough space to allow the fluid to expand. Never overfill the reservoir! Do not fill the reservoir above the maximum level line!

**EXPLODED VIEW OF BRAKING SYSTEM**

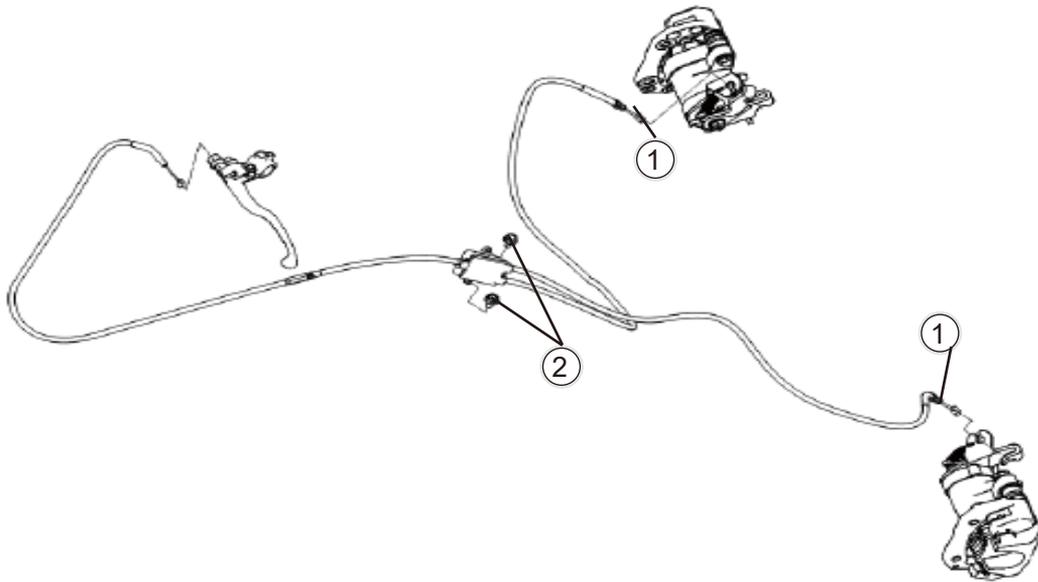


| NO. | FASTENER                  | TORQUE |       |       | REMARKS |
|-----|---------------------------|--------|-------|-------|---------|
|     |                           | N·M    | KGF·M | FT·LB |         |
| 1   | Brake disc mounting bolts | 25     | 2.5   | 18    | L       |
| 2   | brake hose mounting bolts | 25     | 2.5   | 18    |         |
| 3   | Brake fastening bolt      | 45     | 4.5   | 33    | L       |

L: Use non-permanent locking agent

1. Brake disc bolts, brake main pump bolts, and brake fastening bolts need to be inspected and tightened regularly.
2. The dust cover of the brake sliding rod needs to be coated with silicone oil to ensure flexible movement.

## PARKING BRAKE EXPLOSION DIAGRAM



| No. | Fastener                     | Torque |       |         | Remarks |
|-----|------------------------------|--------|-------|---------|---------|
|     |                              | N·m    | kgf·m | ft·lb   |         |
| 1   | Parking Brake Lever Screw    | 8.8    | 0.9   | 78in.lb |         |
| 2   | Junction box fastening bolts | 8.8    | 0.9   | 78in.lb |         |

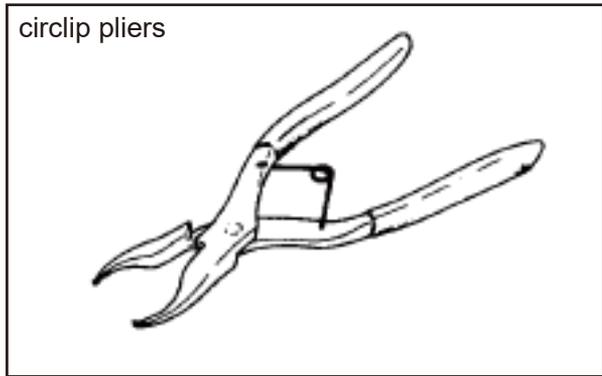
## SPECIFICATIONS

| Item   | Standard                        | Service Limit          |
|--|---------------------------------|------------------------|
| Brake Fluid:<br>Type   | DOT 4                           | ---                    |
| Front Disc Brake:<br>Pad lining thickness                        | 4.0 mm (0.16 in.)               | 1.5mm (0.04 in.)       |
| Disc thickness   | 4.8~5.2mm (0.19~ 0.205 in.)     | 4 mm (0.16 in.)        |
| Disc runout  | TIR 0.08 mm (0.003 in.) or less | TIR 0.1 mm (0.004 in.) |
| Rear Brake Lever, Pedal and Cables:<br>Rear brake pedal position | 35 ~ 40 mm (1.38 ~ 1.57 in.)    | ---                    |
| Rear parking handle working stroke                               | 10~20 mm (0.4~ 0.8 in.)         | ---                    |
| Rear brake pedal working stroke                                  | 25~30 mm (1.0~1.2in.)           | ---                    |

**TECHNICAL PARAMETERS**

| Item  | Standard                        | Use Limit             |
|---|---------------------------------|-----------------------|
| Brake fluid:<br>type  | Total DOT 4                     | ---                   |
| Front and rear brake pad parameters:<br>Brake pad thickness   | 5.0 mm (0.19 in)                | 1.5 mm (0.06 in)      |
| Front and rear brake disc parameters:<br>Brake disc thickness | 4.8~5.2mm (0.19~ 0.205 in)      | 4 mm (0.16 in)        |
| Brake disc jump   | TIR 0.08 mm (0.003 in.) or less | TIR 0.1 mm (0.004 in) |
| Rear brake pedal:<br>Parking handle working stroke            | 20~25 mm (0.8~ 0.98in.)         | ---                   |
| Rear brake pedal working stroke                               | 25~30 mm (1.0~1.2in.)           | ---                   |

**SPECIAL TOOLS**

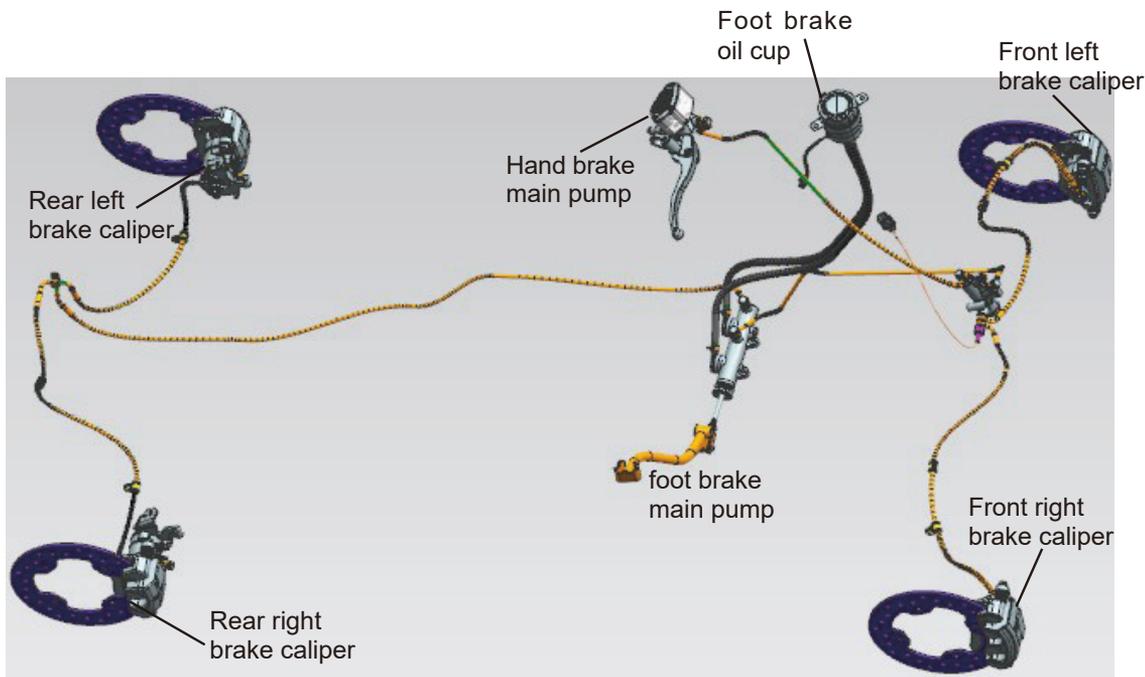


## BRAKE FLUID

### ⚠ WARNING

1. When using disc brakes, please observe the following precautions.
2. 1. Never reuse old brake fluid.
3. 2. Do not use brake fluid that is not sealed or has been opened for a long time.
4. 3. Do not mix two brands of brake fluid. This lowers the boiling point of the brake fluid and may cause the brakes to become ineffective. It may also cause rubber brake components to deteriorate.
5. 4. Do not open the brake fluid reservoir cap for a long time to prevent the brake fluid from being contaminated by moisture.
6. 5. Do not change brake fluid on rainy days or when there is strong wind.
7. 6. Only use isopropyl alcohol or ethanol to clean brake parts except brake pads and discs. Do not use any other liquid to clean these parts
8. point. Gasoline, engine oil, or any other petroleum extract can cause rubber parts to deteriorate. Oil spilled anywhere is difficult to clean completely and will eventually deteriorate the rubber in your disc brakes.
9. 7. When handling the brake pads and brake discs, be careful not to let brake fluid or any oil get on the brake pads and brake discs. Do not use products that leave an oily residue. If it cannot be cleaned, replace the brake pads with new ones.
10. 8. Brake fluid will quickly damage the paint. any spilled fluid should be flushed immediately and completely

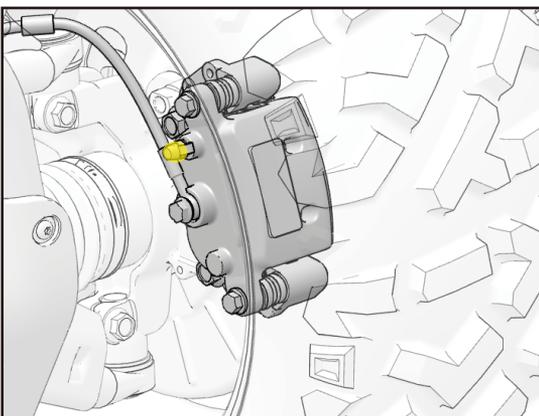
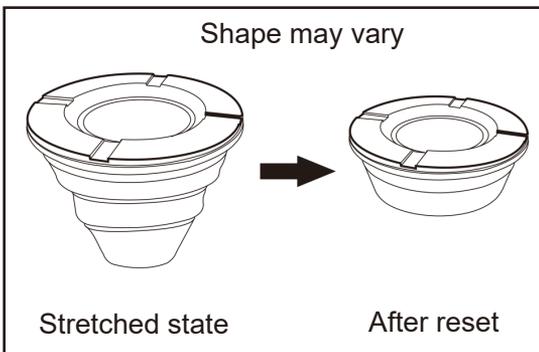
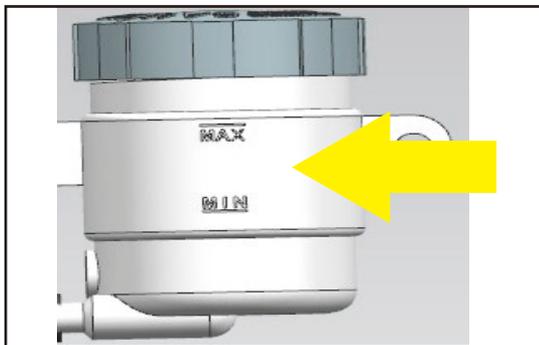
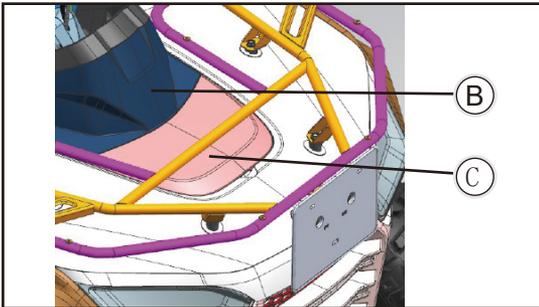
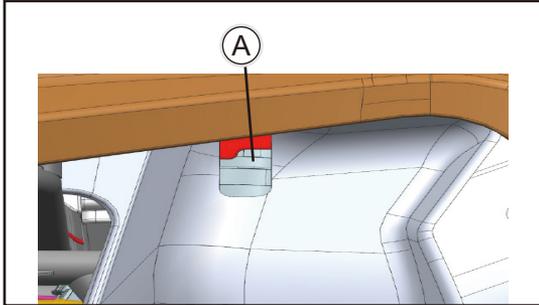
## BRAKE FLUID REPLACEMENT/BRAKE BLEEDING



When bleeding your brakes or changing your brake fluid, always start with the caliper furthest from the master cylinder. Use this procedure to change the brake fluid or bleed the brakes during scheduled maintenance.

### ⚠ WARNING

Always wear safety glasses. Brake fluid can damage the surface of parts. Do not let brake fluid come into contact with the surface of the part.



1. The foot brake oil cup **【A】** is located under the front access cover and in front of the front right shock absorber. The fluid level can be observed through the window in front of the front right shock absorber.
2. Remove the cap from the reservoir.
3. If changing the fluid, use a vacuum can or similar tool to drain the brake fluid from the oil cup.
4. Add brake fluid to the maximum reservoir level shown.

**⚠ CAUTION**

After adding or replacing brake fluid, check whether the oil coaster under the oil cup cover is in an extended state. If the oil coaster is in an extended state, the oil coaster needs to be reset (as shown in the figure). If the oil cup gasket is not reset, the brake fluid will overflow the oil cup when the oil cup cap is tightened.

Brake fluid can damage plastics and painted surfaces, so use caution when adding it.

If brake fluid comes into contact with skin or eyes, please rinse immediately with plenty of water. If you still feel unwell, please seek medical attention immediately.

5. When starting the exhaust procedure, start with the caliper farthest from the master cylinder.
6. Place the open-end wrench on the bleeder screw on the caliper to be bled.
7. Reliably connect one end of the transparent hose to the head of the bleed screw, and place the other end into the waste liquid recovery container to facilitate the recovery of waste liquid.
8. Continuously add new brake fluid to the brake fluid cup, and always ensure that the fluid level in the oil cup is between the "MAX" and "MIN" scale lines.
9. Have your assistant slowly depress the brake pedal until pressure builds up, and then hold it there.
10. Quickly open and close the bleeder screw while maintaining pressure on the brake pedal

**⚠ WARNING**

Do not release the brake pedal until the bleeder screw is tightened, otherwise air may be sucked into the master cylinder.

11. Release brake pedal pressure. Check the fluid level in the reservoir and add if necessary.
12. Repeat steps 9-11 until the brake pedal is firm and no air can be seen passing through the clear hose. Add fluid as needed to maintain the level in the reservoir.
13. Tighten the bleed screw and remove the bleed hose. Tighten the bleed screw to the specified torque.

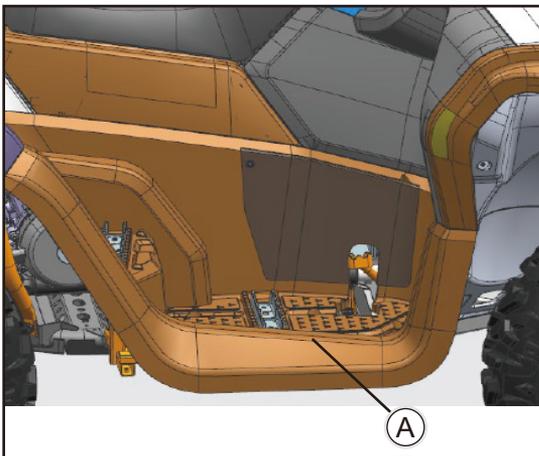
Master pump liquid level:  
between min and max lines

### ⚠ CAUTION

Maintain at least a minimum level of brake fluid in the reservoir to prevent air from entering the master cylinder.

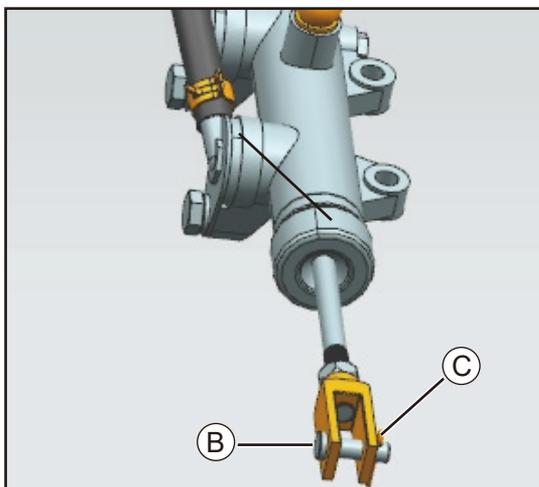
14. Repeat steps 9-13 for the remaining brake calipers.
15. Install the master cylinder reservoir cap.
16. Before putting into use, conduct on-site testing of the complete vehicle at low speed. Check that rear brake action and pedal free travel are correct. After firmly stepping on the pedal, the free travel of the pedal should be no less than 1/2" (1.3cm).
17. Check the brake system for oil leakage

## FOOT BRAKE MASTER CYLINDER REPAIR



### FOOT BRAKE MAIN CYLINDER REMOVAL

- ◆ Remove a right foot pedal assembly **【a】** .

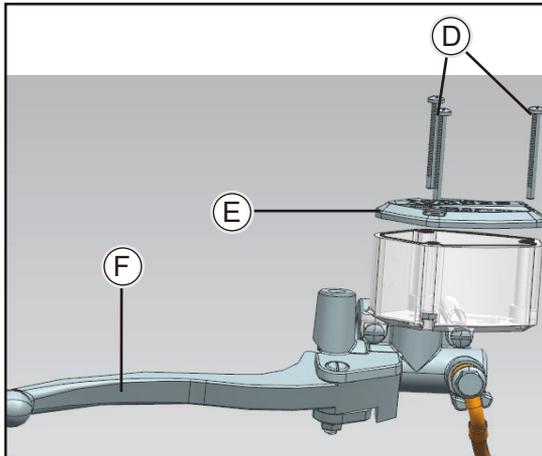


- ◆ Remove the pin **【b】** and cotter pin **【c】** connecting the main cylinder to the brake pedal lever from above.
- ◆ Remove the main cylinder and place a tank for collecting waste liquid under the brake pipe of the main cylinder.

### ⚠ CAUTION

Brake fluid can damage the surface of parts.  
Do not let brake fluid come into contact with the surface of the part.

### HANDBRAKE MAIN PUMP BRAKE FLUID FILLING



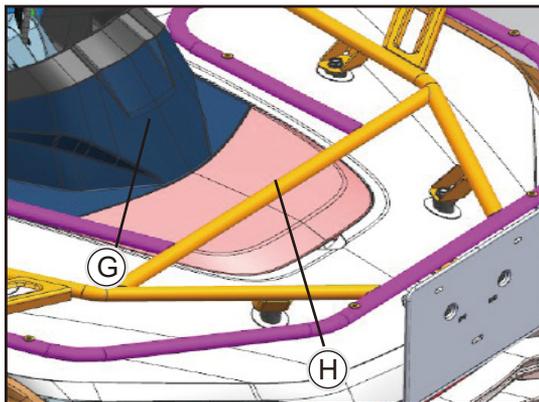
Master pump liquid level:  
between the min and max lines.

#### ⚠ CAUTION

Maintain at least a minimum level of brake fluid in the reservoir to prevent air from entering the master cylinder.

1. Oil cup cover fastening screw **【A】**
  2. Oil cup cover **【B】**
  3. Front brake handle **【F】**
- ◆ Before tightening the oil cup cap, the oil cup gasket must be reset.
  - ◆ Before being put into use, conduct field tests on the complete vehicle at low speed. Check whether the front brake action and front brake handle free travel are correct. After the brake handle is pinched and released, the free travel of the brake handle should be no less than 1/2" (1.3cm).
  - ◆ Check the brake system for fluid leaks

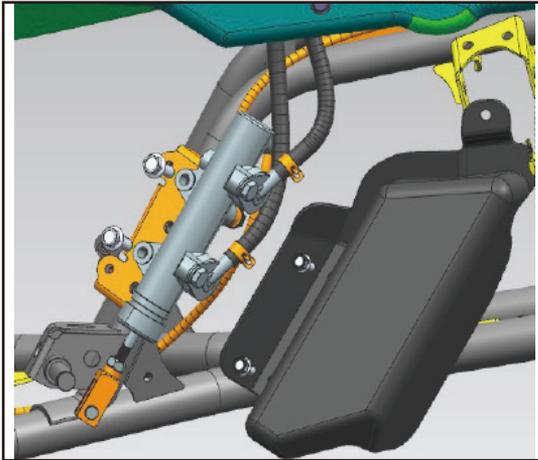
### FOOT BRAKE MASTER PUMP BRAKE FLUID FILLING



1. Remove the instrument cover assembly **【G】** and the front access cover **【H】**
  2. Unscrew the oil cup cover **【I】** of the foot brake main pump.
- ◆ Before tightening the oil cup cap, the oil cup gasket must be reset.
  - ◆ Check the brake system for fluid leaks.



### MASTER PUMP INSTALLATION



- ◆ Install the brake line to the master cylinder with a new gasket.
- ◆ Install the brake lines correctly.
- ◆ Tighten the front brake oil pipe **【E】** and rear brake oil pipe **【F】**.

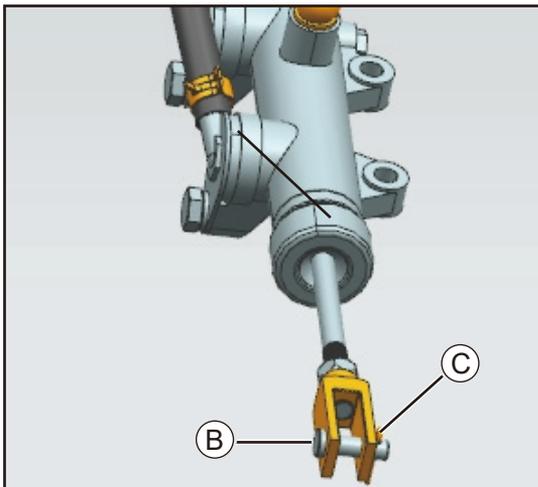
Front and rear brake oil pipe fastening bolts

25 N·m (2.5 kgf·m, 18 ft·lbs)

- ◆ Attach the master cylinder to the frame and tighten the mounting fasteners according to specifications **【A】**

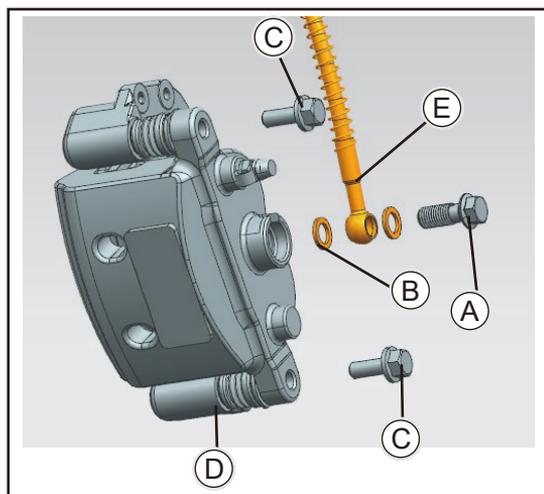
Hexagonal flange bolt M8×25 **【A】**

30 N·m (3.0 kgf·m, 22 ft·lbs)



- ◆ Connect the master cylinder to the brake pedal lever by installing pin **【B】** and cotter pin **【C】**.
- ◆ Follow the previous brake fluid change/brake bleeder procedures.
- ◆ Field test the device for proper braking before putting it into use. Check for fluid leaks and brake tightness.

## FRONT BRAKE ASSEMBLY



## REMOVAL OF FRONT BRAKE ASSEMBLY

- ◆ Remove the front wheel .
- ◆ Loosen the fixing bolt 【A】 at the lower part of the brake hose 【E】 , but do not completely remove it yet.
- ◆ Unscrew the brake assembly mounting bolt 【C】 .
- ◆ Remove the brake caliper body assembly 【D】 .
- ◆ Unscrew the oiled bolt 【a】 and remove the gasket 【b】 from the caliper.

**! WARNING**

Flush any spilled brake fluid immediately. Brake fluid can damage the surface of parts. Do not let brake fluid come into contact with the surface of the part.

**! CAUTION**

- ◆ When removing the brake caliper, be careful not to damage the brake lines.
- ◆ Support the brake caliper to avoid kinking or bending the brake lines.

## FRONT BRAKE ASSEMBLY INSTALLATION

- ◆ Install the front brake assembly and the lower end of the brake oil pipe.
- ◆ When installing the hose, replace the sealing gaskets on both sides of the brake hose with new ones.
- ◆ Tighten:

|                               |
|-------------------------------|
| Brake assembly mounting bolts |
| 45 N·m (4.5 kgf·m, 33 ft·lbs) |

|                                 |
|---------------------------------|
| brake hose fixing bolt          |
| 25 N·m (2.5 kgf·m, 18.4 ft·lbs) |

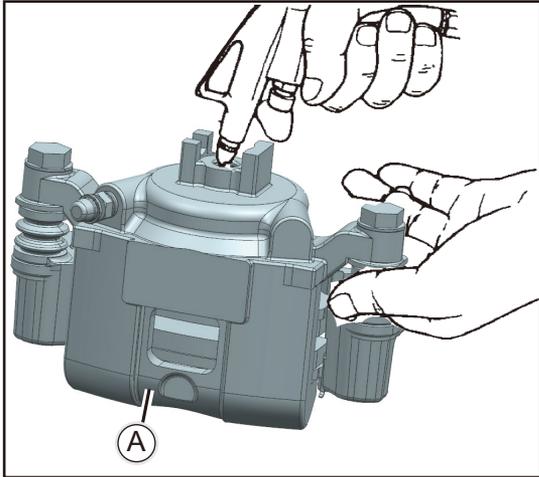
- ◆ Check the fluid level in the brake fluid cup.
- ◆ Bleed the brake lines.
- ◆ Check whether the brakes have good braking force, there is no drag on the vehicle, and there is no leakage in the brake lines.

**! WARNING**

Before driving the vehicle, lightly press the brake pedal a few times to make the brake pads and brake discs fit effectively to reduce the idle travel during the initial braking.

- ◆ After the front brake assembly is installed on the vehicle and the pipes are connected, steps 9-11 of brake fluid replacement/brake bleeding are required.

## FRONT BRAKE CALIPER BODY



### FRONT BRAKE CALIPER BODY REMOVAL

- ◆ Remove the front brake assembly first (see Front Brake Assembly Removal)
- ◆ Remove the brake pad (see front brake pad removal)
- ◆ Using special tools, remove the piston.

Cover the brake caliper housing 【A】 with a clean thick cloth.

Clean the caliper body, piston and retaining bracket with brake cleaner or alcohol.

#### ⚠ WARNING

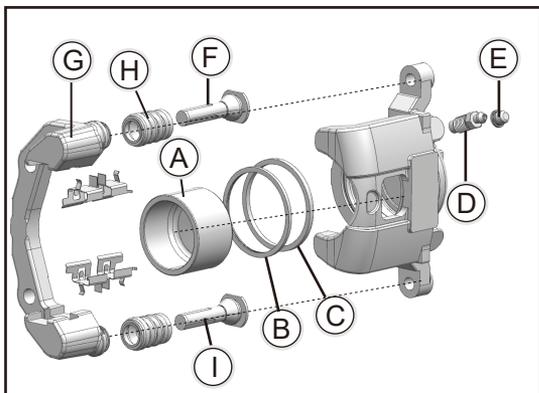
To avoid serious injury, never place your fingers or palms inside the caliper opening as the piston may crush your hands or fingers.

Make sure the sealing groove of the clamp body is clean.

#### ⚠ CAUTION

If compressed air is not available, follow these steps:

- ◆ Brake hose connected to caliper
- ◆ Prepare brake fluid container
- ◆ Use special tools



Dismantle in order:

Piston 【A】

Dust ring 【B】

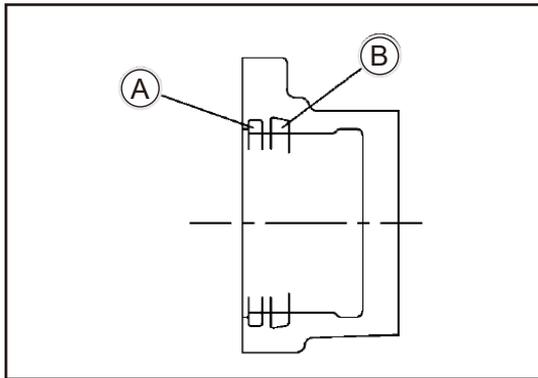
Rectangular circle 【C】

Exhaust nozzle 【D】 and rubber cover 【E】

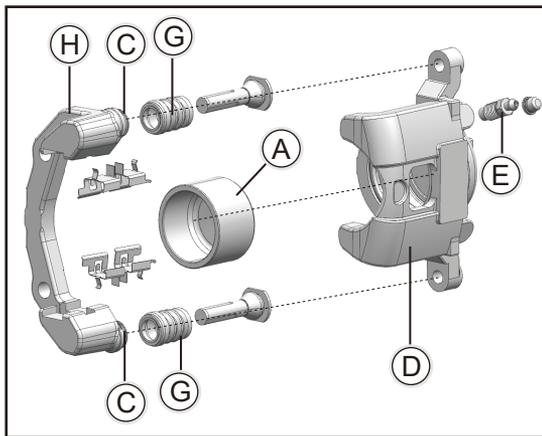
Upper guide rod 【F】 and caliper bracket 【G】

Dust cover 【H】 and lower guide rod 【I】

**FRONT BRAKE CALIPER BODY INSTALLATION**



- ◆ Replace with a new rectangular circle **【B】** .
- ◆ Apply a thin layer of silicone grease to the rectangular ring and install it into the brake card
- ◆ Clamp.
- ◆ Replace with new dust ring **【A】** ,
- ◆ Apply a thin layer of silicone grease to the wiper and install it into the brake caliper.

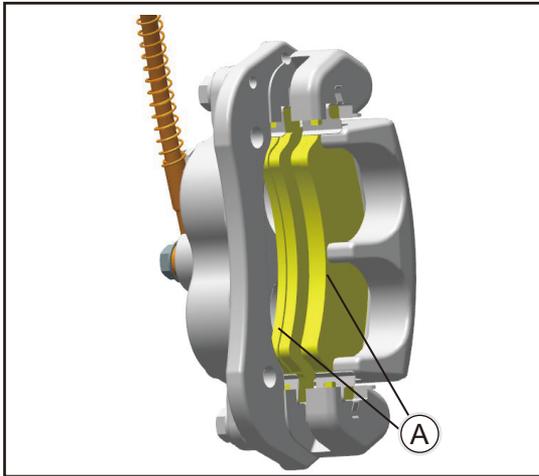


- ◆ Apply a thin layer of silicone grease to the outside of the piston **【F】** and push the piston into the brake caliper **【D】** by hand. Be careful of scratches on the piston and piston skirt.
- ◆ If the dust cover **【G】** is damaged, replace it with a new one.
- ◆ Apply a thin layer of silicone grease to the upper guide rod, lower guide rod and the guide rod installation inner hole **【C】** of the caliper bracket for lubrication (silicone grease is a special high-temperature-resistant and water-resistant grease).
- ◆ Install the caliper bracket **【H】** and exhaust tip **【E】**

Exhaust nozzle **【E】**

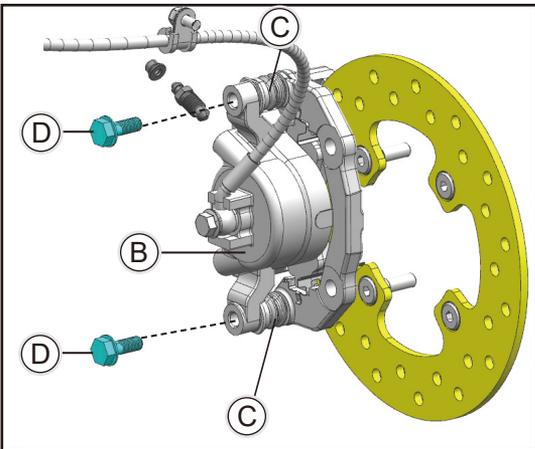
7.9 N·m (0.8 kgf·m, 5.8 ft·lbs)

## FRONT BRAKE PAD



### FRONT BRAKE PAD REMOVAL

- ◆ Remove the front rim assembly.
- ◆ Loosen the fastening bolt 【D】 from the front brake assembly guide rod 【C】. During the process of loosening the bolt 【D】, it is required that the head of 【C】 is always in contact with the brake caliper body 【B】. Otherwise, 【C】 will rotate with 【D】 because it is not limited, making 【D】 unable to be disassembled.
- ◆ Rotate the brake caliper body at least 90 degrees so that the brake pad 【A】 can be easily removed from the spring holder 【E】 on the inside and outside of the brake disc.

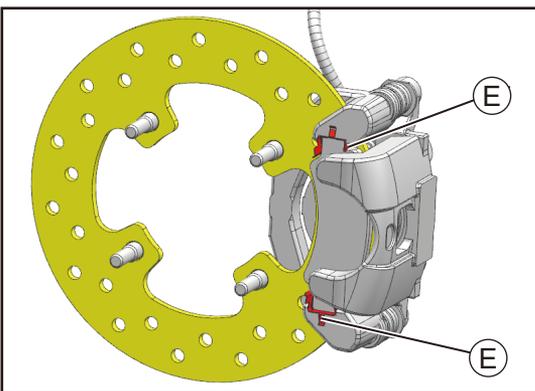


### FRONT BRAKE PAD INSTALLATION

- ◆ Push the caliper piston all the way in with your hand.
- ◆ Install the brake pads in the upper and lower spring holders 【E】 on the inner (or outer) side, and fit them into the brake discs respectively.
- ◆ Unscrew the front brake caliper so that its installation hole coincides with the hole of the brake assembly guide rod 【C】, and the front brake assembly guide rod 【C】 must be limited to the brake caliper 【B】 and aligned with the brake assembly guide rod 【C】. Brake calipers 【B】 fit snugly.
- ◆ Apply thread glue to the newly loosened fastening bolt 【D】.
- ◆ Tighten the caliper mounting bolts 【D】

Caliper mounting bolt 【D】

25N·m(2.5kgf·m, 18 ft·lb)



### ⚠ WARNING

Do not attempt to drive the vehicle until the brakes are tightened. Braking force is obtained by depressing the brake pedal several times until the brake pads contact each brake disc. If you don't do this, the brakes will not work the first time they are applied.

### FRONT BRAKE PAD WEAR INSPECTION

- ◆ Refer to the Brake Pad Maintenance chapter in Scheduled Maintenance

### ⚠ WARNING

Do not use brake pads if they are contaminated with grease, oil, or soaking fluid. Use only new cleaning pads.

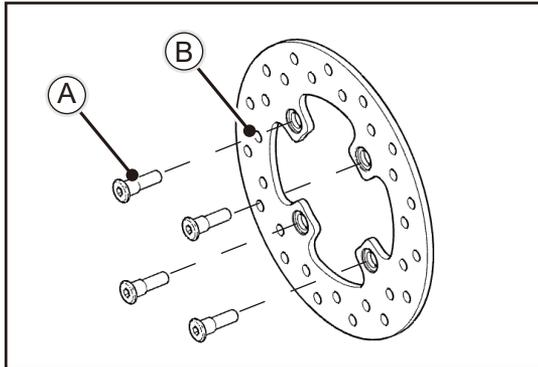
**FRONT BRAKE DISC**

**FRONT BRAKE DISC CLEANING**

Poor braking can be caused by dirt on the brake discs. Stains on brake discs must be cleaned with an oil-free cleaning fluid such as trichlorethylene or acetone.

**⚠ WARNING**

These cleaning fluids are often highly flammable and can be harmful to humans if inhaled over a prolonged period of time. Always heed the manufacturer's warnings.



**FRONT BRAKE DISC REMOVAL**

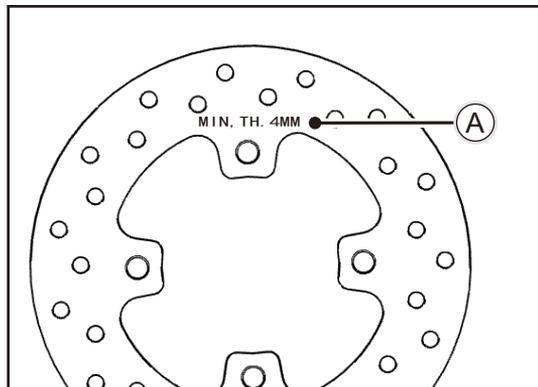
- ◆ Remove the front wheel hub (see Wheels/Tires chapter pages 9-15)
- ◆ Remove the front brake disc mounting bolt **【A】**
- ◆ Remove the front brake assembly (see Front Brake Assembly Removal)
- ◆ Remove the front brake disc **【B】**

**FRONT BRAKE DISC INSTALLATION**

- ◆ The front brake disc must be installed with the marked side
- ◆ **【A】** Toward the steering knuckle.
- ◆ Non-permanent locking agents should be used:
- ◆ Tighten:

|   |
|---|
| <b>Brake disc mounting bolts</b><br>25 N·m (2.5 kgf·m, 18 ft·lbs) |
|---|

- ◆ After installing the disc brake rotor, check the front brake rotor for runout. Thoroughly remove any accumulated grease and coat both sides of the disc brake rotor with oil-free solvent. Do not use products that leave an oily residue.



**FRONT BRAKE DISC INSPECTION**

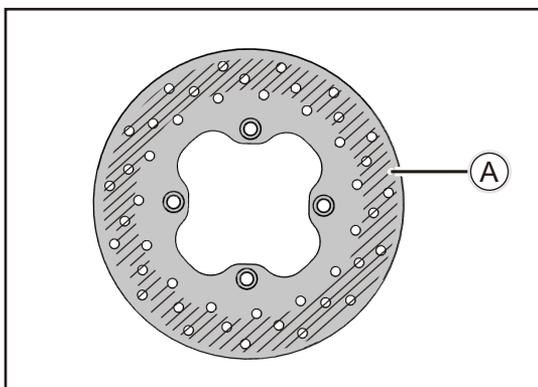
- ◆ Measure the thickness of each point
- ◆ **【A】** The place with the most wear.
- ◆ If the front brake disc wear exceeds the thickness limit, please replace the brake disc.

**Brake disc thickness**

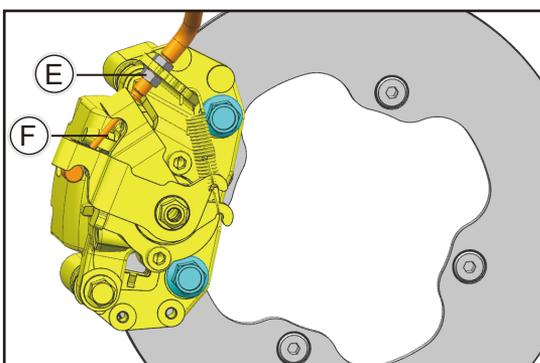
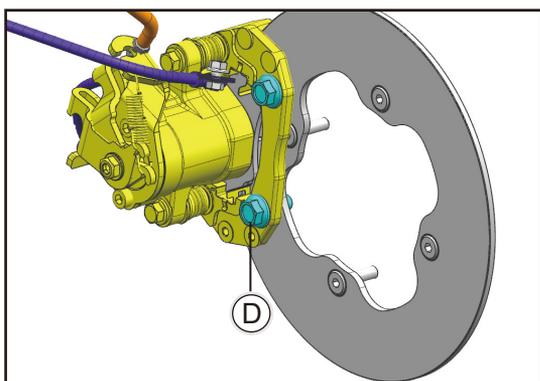
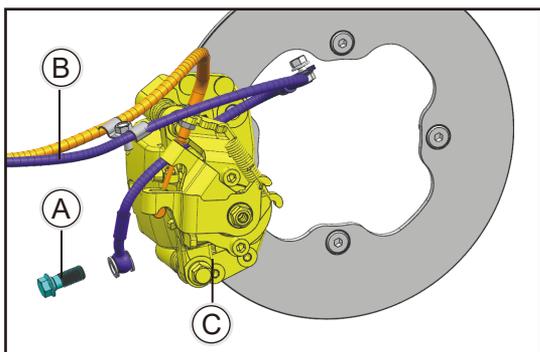
Standard thickness:: 4.8~5.2mm (0.19 ~ 0.205 in.)  
 Maximum thickness : 4mm (0.16 in.)

**⚠ WARNING**

Be sure to use new brake disc mounting bolts. Bolts come with pre-applied locking compound that is destroyed when disassembled.



## REAR BRAKE ASSEMBLY



### REAR BRAKE ASSEMBLY REMOVAL

- ◆ Remove the rear wheel (see Wheels/Tires section).
- ◆ Loosen the fixing bolt **【A】** of the brake hose **【B】** without completely removing it yet.
- ◆ Loosen the two mounting bolts **【D】** of the rear brake assembly.
- ◆ Loosen the parking cable bolt **【E】** and remove the parking cable assembly **【F】** from the brake.
- ◆ Remove the rear brake caliper body assembly **【C】**

#### ⚠ WARNING

Flush any spilled brake fluid immediately. Brake fluid can damage the surface of parts. Do not let brake fluid come into contact with the surface of the part.

#### ⚠ CAUTION

When removing the brake caliper, be careful not to damage the brake lines.

Support the brake caliper to avoid kinking or bending the brake lines.

### REAR BRAKE ASSEMBLY INSTALLATION

- ◆ Install the rear brake assembly, brake oil pipe and parking oil pipe.
- ◆ When installing the hose, replace the sealing gaskets on both sides of the brake hose with new ones.
- ◆ Tighten:

Brake assembly mounting bolts

45 N·m (4.5 kgf·m, 33 ft·lbs)

brake hose fixing bolt

25 N·m (2.5 kgf·m, 18.4 ft·lbs)

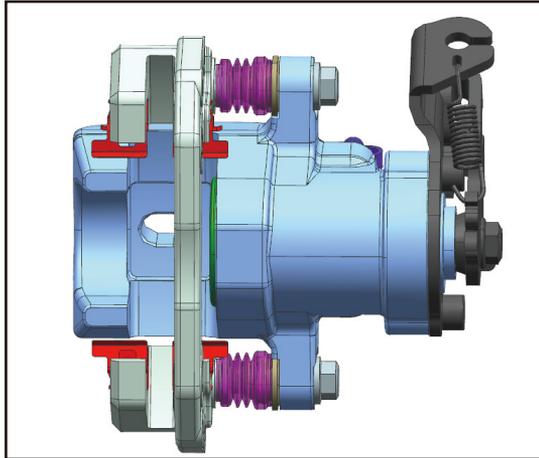
- ◆ Check the fluid level in the master cylinder oil cup.
- ◆ Bleed the brake lines.
- ◆ Check whether the brakes have good braking force, there is no drag on the vehicle, and there is no leakage in the brake lines.

#### ⚠ WARNING

Before driving the vehicle, lightly press the brake pedal a few times to make the brake pads and brake discs fit effectively to reduce the idle travel during the initial braking.

- ◆ After the rear brake assembly is installed on the vehicle and the pipeline is connected, steps 9-11 of brake fluid replacement/brake bleeding are required.

## REAR BRAKE CALIPER BODY



### REAR BRAKE CALIPER BODY REMOVAL

- ◆ Remove the rear brake assembly first (see Brake Assembly Removal 11-6)
- ◆ Remove the rear brake pad (see Rear Brake Pad Removal)
- ◆ Using special tools, remove the piston.

Cover the brake caliper housing **【A】** with a clean thick cloth.

Clean the caliper body, piston and retaining bracket with brake cleaner or alcohol.

#### ⚠ WARNING

To avoid serious injury, never place fingers or palms inside caliper openings.

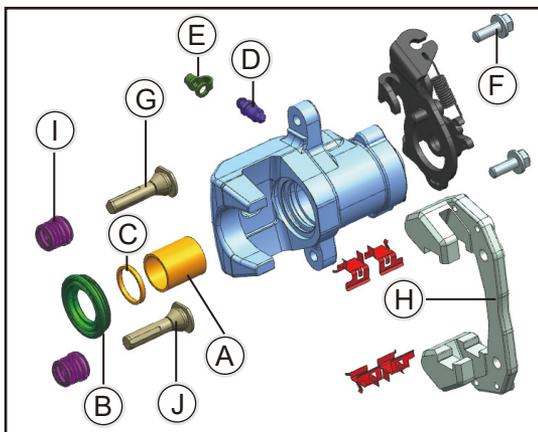
This prevents the piston from crushing your hands or fingers.

Make sure the sealing groove of the clamp body is clean.

#### ⚠ CAUTION

If compressed air is not available, follow these steps:

- ◆ Brake hose connected to caliper
- ◆ Prepare brake fluid container
- ◆ Use special tools



Dismantle in order:

Piston **【A】**

Dust ring **【B】**

Rectangular circle **【C】**

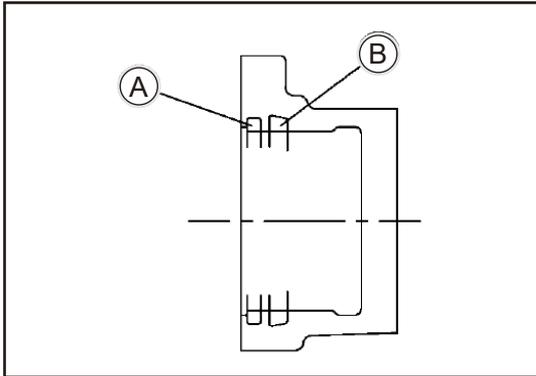
Exhaust nozzle **【D】** and rubber cover **【E】**

Hexagonal flange bolt M8\*20 **【F】**

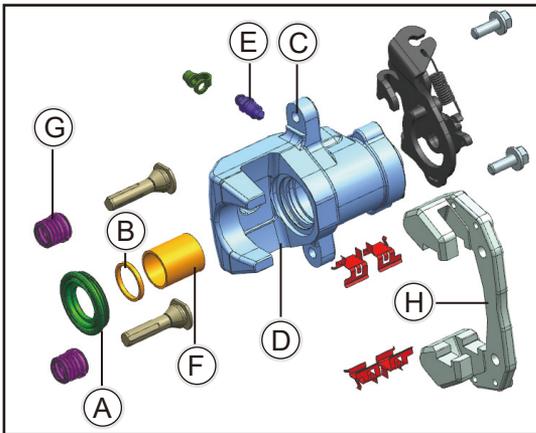
Upper guide rod **【G】** and caliper bracket **【H】**

Dust cover **【I】** and lower guide rod **【J】**

### REAR BRAKE CALIPER BODY INSTALLATION



- ◆ Replace with a new rectangular circle **【B】** .
- ◆ Apply a thin layer of silicone grease to the rectangular ring and install it into the rear brake caliper.
- ◆ Replace with new dust ring **【A】** ,
- ◆ Apply a thin layer of silicone grease to the wiper and install it into the rear brake caliper.

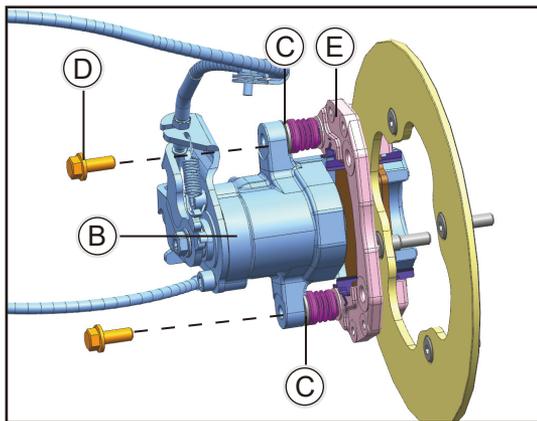
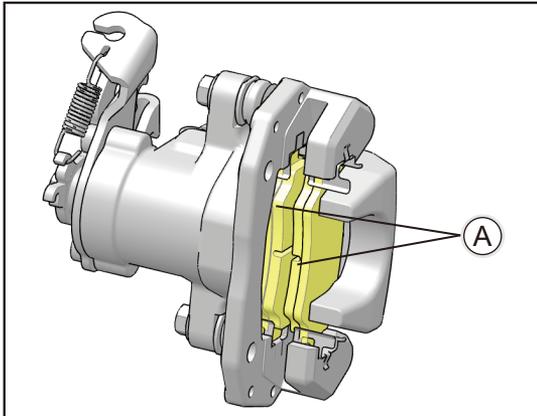


- ◆ Apply a thin layer of silicone grease to the outside of the piston **【F】** and push the piston into the brake caliper **【D】** by hand. Be careful of scratches on the piston and piston skirt.
- ◆ If the dust cover **【G】** is damaged, replace it with a new one.
- ◆ Apply a thin layer of silicone grease to the upper guide rod, lower guide rod and the guide rod installation inner hole **【C】** of the caliper bracket for lubrication (silicone grease is a special high-temperature-resistant and water-resistant grease).
- ◆ Install the caliper bracket **【H】** and exhaust tip **【E】**

Exhaust nozzle **【E】**

7.9 N·m (0.8 kgf·m, 5.8 ft·lbs)

## REAR BRAKE PAD



### REAR BRAKE PAD REMOVAL

Remove the rear rim assembly or rear rim assembly.

- ◆ Loosen the fastening bolt 【D】 from the brake assembly guide rod 【C】. During the process of loosening the bolt 【D】, it is required that the head of 【C】 is always in contact with the brake caliper body 【B】. Otherwise, 【C】 will rotate with 【D】 because 【C】 is not limited, making 【D】 unable to be disassembled.
- ◆ Rotate the brake caliper body at least 90 degrees so that the brake pad 【A】 can be easily removed from the spring holder 【E】 on the inside and outside of the brake disc.

### REAR BRAKE PAD INSTALLATION

- ◆ Push the caliper piston all the way in with your hand.
- ◆ Install the brake pads in the upper and lower spring holders 【E】 on the inner (or outer) side, and fit them into the brake discs respectively.
- ◆ Unscrew the brake caliper so that its installation hole coincides with the hole of the brake assembly guide rod 【C】, and the brake assembly guide rod 【C】 must be limited to the brake caliper 【B】 and aligned with the brake caliper 【B】. Caliper 【B】 fits.
- ◆ Apply thread glue to the newly loosened fastening bolt 【D】.
- ◆ Tighten the caliper mounting bolts 【D】

Caliper mounting bolt 【D】

25N·m(2.5kgf·m, 18 ft·lb)

### ⚠ WARNING

Do not attempt to drive the vehicle until the brakes are tightened. Braking force is obtained by depressing the brake pedal several times until the brake pads contact each brake disc. If you don't do this, the brakes will not work the first time they are applied.

### REAR BRAKE PAD WEAR INSPECTION

- ◆ Refer to the Brake Pad Maintenance chapter in Regular Maintenance

### ⚠ WARNING

If the brake pads are contaminated with grease, oil or soaking fluid, do not use brake pads. Use only new cleaning pads.

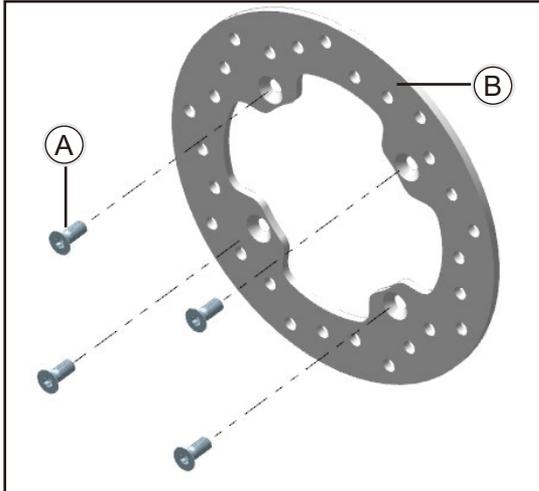
## REAR BRAKE DISC

### REAR BRAKE DISC CLEANING

Poor braking can be caused by dirt on the brake discs. Stains on brake discs must be cleaned with an oil-free cleaning fluid such as trichlorethylene or acetone.

**⚠ WARNING**

These cleaning fluids are often highly flammable and can be harmful to humans if inhaled over a prolonged period of time. Always heed the manufacturer's warnings.



### REAR BRAKE DISC REMOVAL

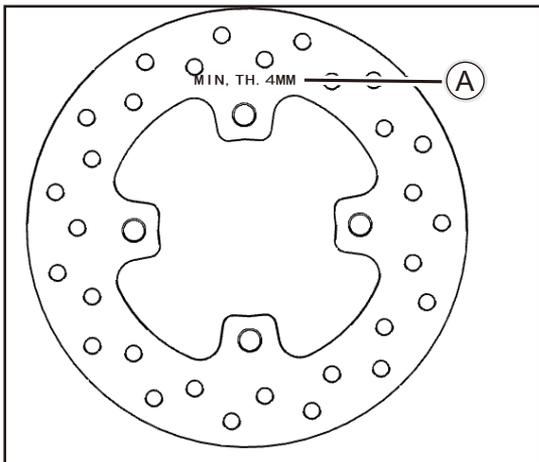
- ◆ Remove the rear hub (see Wheels/Tires section)
- ◆ Remove the rear brake disc mounting bolt **【A】**
- ◆ Remove the rear brake assembly (see Rear Brake Assembly Removal)
- ◆ Remove the rear brake disc **【B】**

### REAR BRAKE DISC INSTALLATION

- ◆ Brake discs must be installed with the marked side
- ◆ **【A】** Toward the steering knuckle.
- ◆ Non-permanent locking agents should be used:
- ◆ Tighten:

|                               |
|-------------------------------|
| Brake disc mounting bolts     |
| 45 N·m (4.5 kgf·m, 33 ft·lbs) |

- ◆ After installing the disc brake disc, check the disc brake disc runout. Thoroughly remove any accumulated grease and coat both sides of the disc brake rotor with oil-free solvent. Do not use products that leave an oily residue.



### REAR BRAKE DISC INSPECTION

- ◆ Measure the thickness of each point
- ◆ **【A】** The place with the most wear.
- ◆ If the rear brake disc is worn beyond the thickness limit, please replace the rear brake disc.

#### Brake disc thickness

Brake disc standard thickness: 4.8~5.2mm (0.19~0.205 in.)

Brake disc maximum thickness: 4 mm (0.16 in.)

**⚠ WARNING**

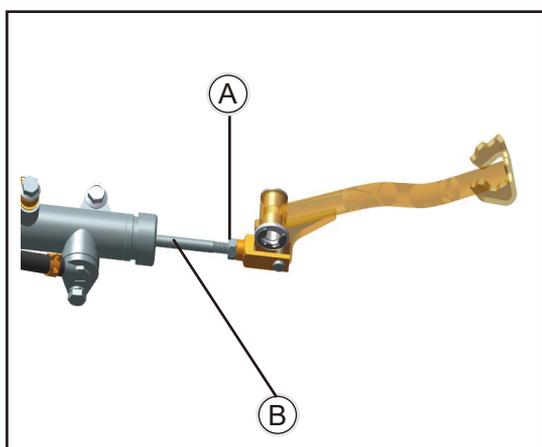
Be sure to use new brake disc mounting bolts. Bolts come with pre-applied locking compound that is destroyed when disassembled.

## BRAKE HOSES

## BRAKE HOSE INSPECTION

- ◆ Refer to the Brakes in the Periodic Maintenance chapter.
- ◆ Brake Hose Replacement
- ◆ Refer to the Brakes in the Periodic Maintenance chapter.

## REAR BRAKE PEDAL

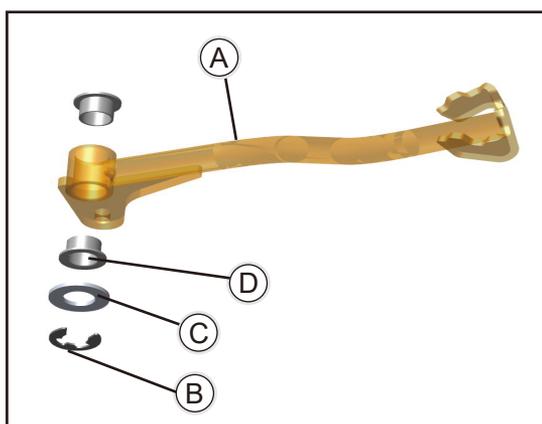


## BRAKE PEDAL POSITION ADJUSTMENT

- ◆ Loosen the locknut **【A】**, and turn the adjusting bolt **【B】** until the brake pedal is correctly positioned.
- ◆ Tighten the locknut.
- ◆ Check the brake pedal free play .

## REAR BRAKE PEDAL REMOVAL

- 【A】** Brake pedal
- 【B】** Retaining ring
- 【C】** Large flat pad
- 【D】** Brake pedal flanged bushing
- ◆ Use pliers to remove the retaining ring **【B】**
- ◆ Remove the large flat pad **【C】**
- ◆ Remove the brake pedal **【A】** assembly
- ◆ Remove Remove piece **【D】** from the brake pedal

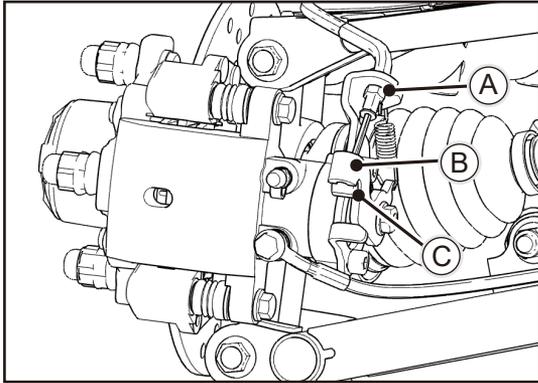


## INSTALLATION OF REAR BRAKE PEDAL

Grease the end of the brake pedal shaft.

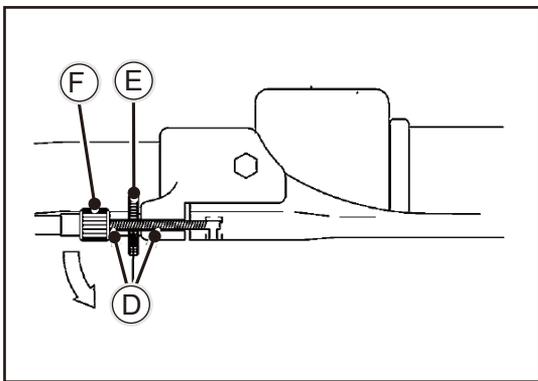
- ◆ Install the 2 pieces of brake pedal flange bushing **【D】** into the brake pedal **【A】**
- ◆ Install the large flat pad **【C】**
- ◆ Then install the elastic retaining ring **【B】** in place.

## PARKING CABLE



### PARKING CABLE REMOVAL

- ◆ Take the parking cable head 【C】 out of the swivel arm 【B】 in the rear brake.
- ◆ Disassemble 2 pieces of M8 nuts 【A】 .
- ◆ Loosen the knurled locknut 【E】 on the parking handle and screw in the adjuster 【F】 .
- ◆ Align the slot 【D】 in the parking handle with the knurled lock nut and adjust card slot.
- ◆ Remove the parking cable from the parking handle.



### INSTALLATION OF PARKING CABLE

Follow the reverse order of the "Parking Cable Removal" above to complete the installation of the parking cable.

### BRAKE SYSTEM TROUBLESHOOTING

#### TROUBLESHOOTING BRAKE NOISE

Dirt or dust buildup on the brake pads and discs is the most common cause of brake noise (squealing caused by vibration).

It is necessary to strengthen the cleaning of the contact surfaces of the brake pads and the brake discs to reduce the noise caused by dust or other particles existing between the two working surfaces.

#### TROUBLESHOOTING BRAKE NOISE

| Reason  | Solution  |
|---|---|
| Dirt, dust or embedded material on the pad or disc  | Non-flammable aerosol brake cleaner.<br>Remove the brake pad and/or brake disc hub seat to clean the embedded material on the brake pad or disc.  |
| Brake pad dragging on brake disc (noise or premature pad wear),<br>Because of improper adjustment<br>Master pump reservoir overfilled<br>Master cylinder compensation port is restricted<br>The master cylinder piston does not return completely<br>Brake caliper piston does not return<br>Operator error (brake applied) | Adjust pad stop<br><br>Set the cleaning compensation port between the highest liquid level and the lowest liquid level of the oil cup.<br><br>Check. Repair and clean the piston seal if necessary.<br><br>Training operators |
| Loose wheel hub or bearing  | Check the wheels and hubs for any unusual movement.   |
| Brake discs are warped or excessively worn  | Replace brake disc  |
| Brake discs are misaligned or loose   | Inspect and repair when necessary   |
| Noise coming from other sources (axle, hub, brake disc or wheel)  | If the noise does not change when braking, check for other sources. Inspect and repair when necessary   |

**Brake squealing/poor braking performance, please check the following components or systems**

- ◆ air intake system
- ◆ There is water in the system (brake fluid is contaminated)
- ◆ Caliper/disc misalignment
- ◆ Dirty or damaged calipers
- ◆ Damaged brake line or broken brake pad
- ◆ Worn brake discs and/or friction pads
- ◆ Improper adjustment of fixed pad
- ◆ Worn or damaged master cylinder or components
- ◆ Damaged brake pad sound insulation material

**Pedal vibration, please check the following components or systems**

- ◆ Damaged brake disc
- ◆ Brake disc wear (runout or thickness change beyond service limit)

**Caliper overheating (brake resistance), please check the following components or systems**

- ◆ Compensation port clogged
- ◆ Brake pad gap setting is incorrect
- ◆ Brake pedal is stuck or won't return all the way
- ◆ Residue buildup under caliper seal
- ◆ Driver high frequency service brake

**Brake drag, please check the following components or systems**

- ◆ Alignment of calipers and brake discs
- ◆ caliper piston stuck
- ◆ Improper assembly of brake system components

# STEERING SYSTEM

**EXPLODED VIEW OF STEERING SYSTEM ..... 12-2**

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    STEERING WHEEL INSTALLATION ..... 12-3

**STEERING COLUMN ..... 12-4**

    STEERING COLUMN REMOVAL ..... 12-4

    STEERING COLUMN MOUNTING ..... 12-4

**EPS ..... 12-5**

    EPS TOTAL DISASSEMBLY ..... 12-5

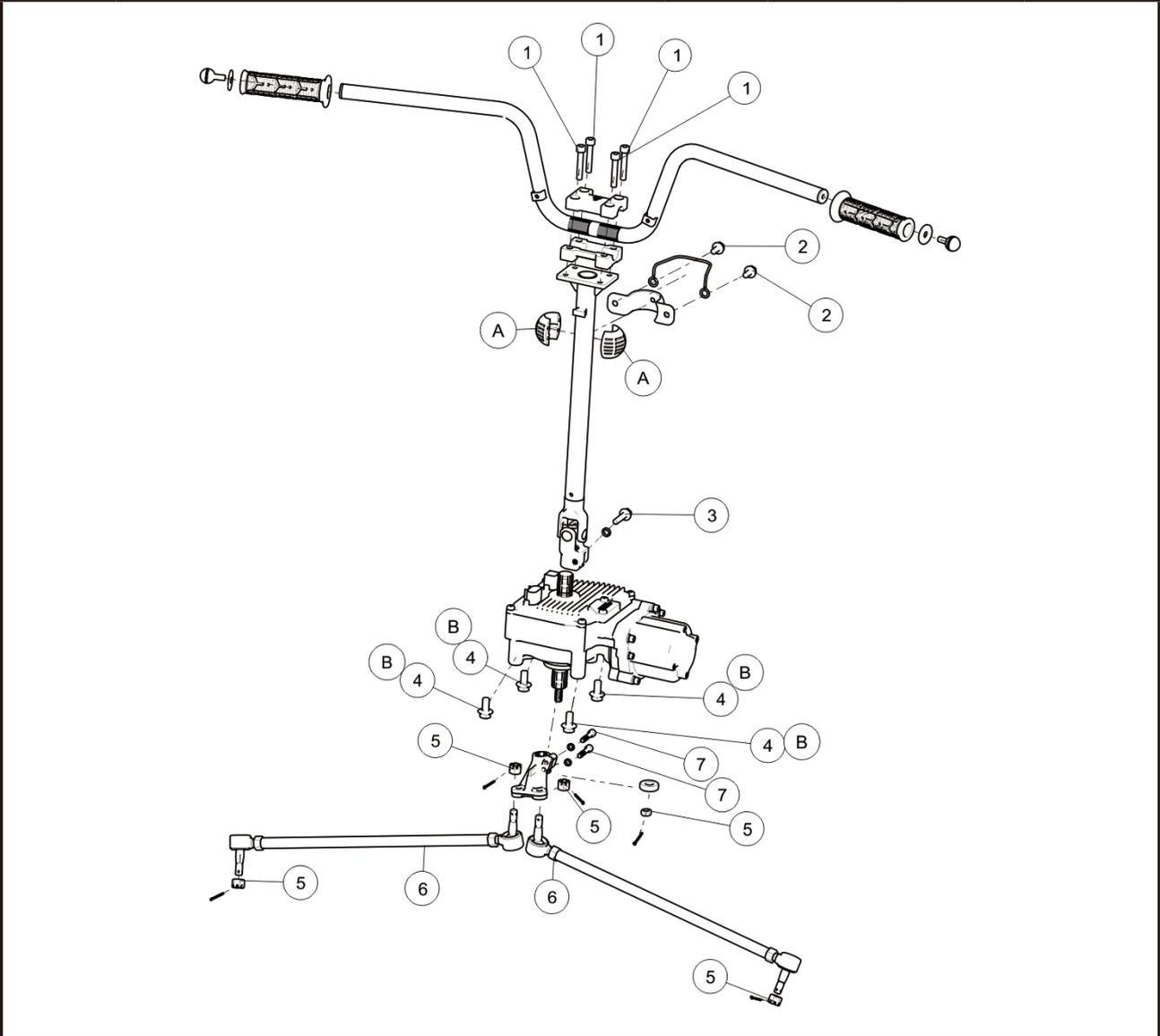
    EPS ASSEMBLY MOUNTING ..... 12-5

**STEERING TIE ROD ..... 12-6**

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    STEERING TIE ROD INSTALLATION ..... 12-6

## EXPLODED VIEW OF STEERING SYSTEM

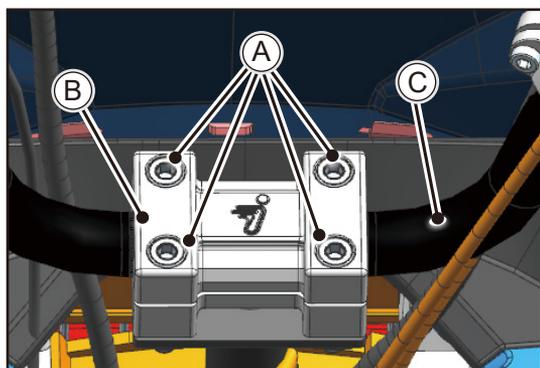


| No. | Fastener                                | Torque |       |       | Remarks    |
|-----|---|--------|-------|-------|------------|
|     |   | N·m    | kgf·m | ft·lb |            |
| 1   | Hexagon socket cheese head screws M8×65 | 35     | 3.6   | 25.8  |            |
| 2   | Hexagonal flange face bolts M8×16       | 35     | 3.6   | 25.8  |            |
| 3   | Hexagonal flange face bolts M8×30       | 35     | 3.6   | 25.8  |            |
| 4   | Hexagonal flange face bolts M10×1.5×20  | 45     | 4.6   | 33.2  |            |
| 5   | Hexagonal flange face bolts M8×35       | 35     | 3.6   | 25.8  | Level 10.9 |
| 6   | 1Hexagon slotted nuts type 1 M10        | 45     | 4.6   | 33.2  |            |
| 7   | Hexagon nuts type 1 M12×1.25            | 55     | 5.6   | 40.5  |            |

**A:** grease.

**B:** Apply a non-permanent locking agent

## STEERING WHEEL



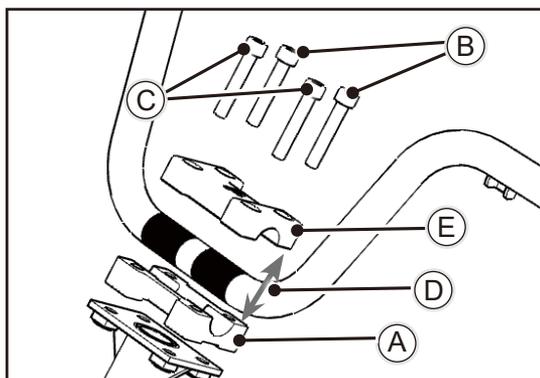
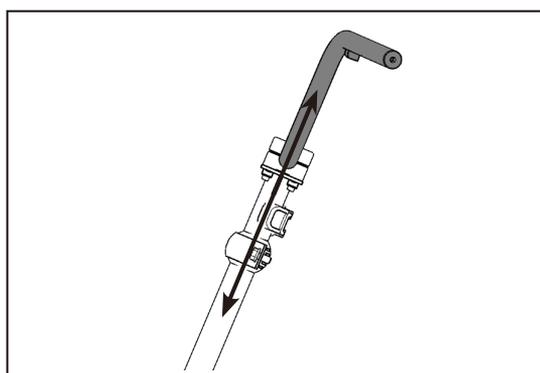
### STEERING WHEEL FOLDING

- 【A】 locking bolt
- 【B】 Steering handle gland
- 【C】 steering wheel
- ◆ Handlebar locking bolt 【A】 loose
- ◆ Take off the handlebar gland 【B】 .
- ◆ Remove the steering wheel 【C】 .

### STEERING WHEEL INSTALLATION

**! CAUTION**

Install the steering handle so that the angle of the steering handle matches the angle of the steering column, keeping it parallel. parallel to the steering column, as shown in the figure on the left.



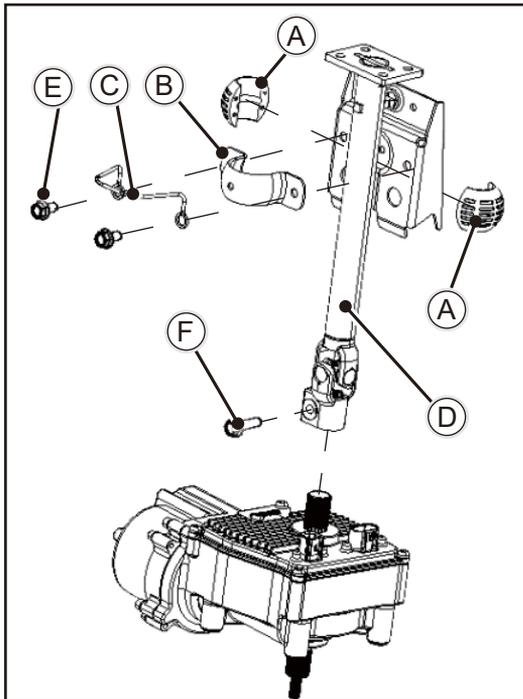
- 【A】 Steering Wheel Lower Gland
- 【B】 locking bolt
- 【C】 locking bolt
- 【D】 clearance
- 【E】 Steering handle gland
- ◆ Place the steering handle lower gland 【A】 on the steering column with the holes aligned
- ◆ Centre the steering wheel in the lower cover of the steering wheel, cover the upper cover of the steering wheel 【E】 , align the holes with the lower cover.
- ◆ Tighten the front locking bolts 【B】 , and then tighten the rear locking bolts 【C】 .

| Locking bolt torque          |
|------------------------------|
| 35 N·m (3.5 kgf·m, 25 ft·lb) |

**! CAUTION**

If the locking bolts are installed in the wrong order it will cause the gap between the top and bottom cover to be 【D】 uneven

## STEERING COLUMN

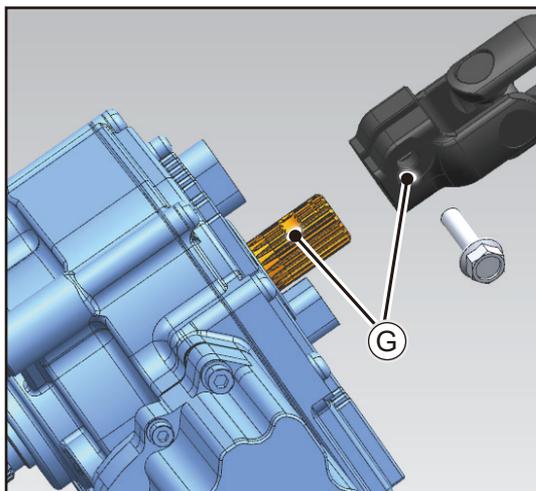


### STEERING COLUMN REMOVAL

First remove the instrument housing cover and the left front upper inner fender, see Body Disassembly section

- 【A】 Steering Spherical Seat
- 【B】 Spherical seat locking plate
- 【C】 Wire Harness Storage Wire
- 【D】 Steering Column Assembly
- 【E】 Bolt M8×16
- 【F】 Bolt M8×30

- ◆ Remove 2 hexagonal flange face bolts M8 x 16 【E】
- ◆ Remove the wire harness storage wire 【C】 , rotating spherical seat locking plate 【B】 and rotating spherical seat 【A】 . Rotating sphere seat 【A】
- ◆ Remove two hexagon flange bolts (half thread) M8×30 【F】
- ◆ Pull out the steering column assembly 【D】



### STEERING COLUMN MOUNTING

Install in reverse order of steering column removal

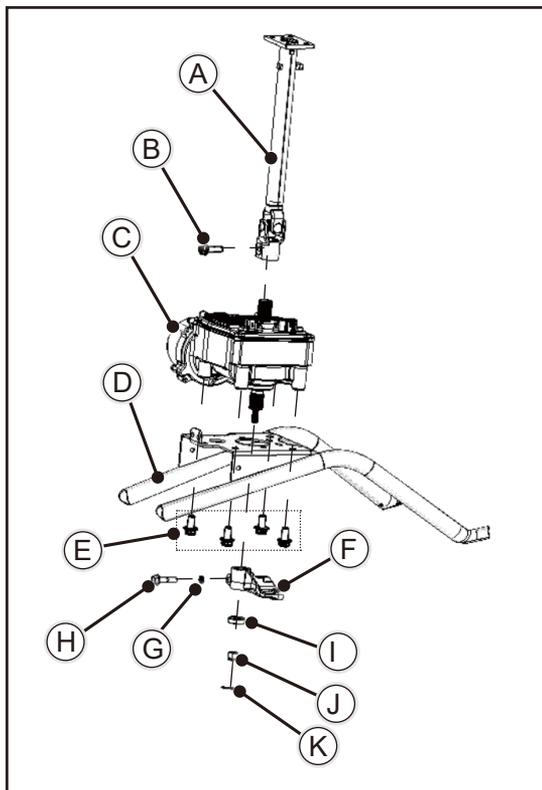
#### ⚠ CAUTION

If the locking bolt spline groove left figure 【G】 position is not aligned will result in bolt rotten teeth and incorrect directional grip.

**Bolt M8×16/Bolt M8×30 Torque**

35 N·m (3.5 kgf·m, 25 ft·lb)

## EPS



## EPS TOTAL DISASSEMBLY

- 【A】 Steering Column Assembly
- 【B】 Bolt M8×30
- 【C】 EPS assembly
- 【D】 chassis
- 【E】 Bolt M10×1.5×20
- 【F】 Steering rocker arm
- 【G】 Spring washers 8
- 【H】 Bolt M8×35
- 【I】 Steering rocker arm spacer
- 【J】 Slotted nut M10
- 【K】 cotter pin

- ◆ Disconnect the power to the whole vehicle and remove the connector on the EPS assembly 【C】 .
- ◆ Remove hexagonal flange face bolts M8 x 30 【B】
- ◆ Pull the steering column assembly 【A】 upwards and separate it from the EPS assembly 【C】 .
- ◆ Remove cotter pin 【K】 , slotted nut M10 【J】 and steering rocker arm spacer 【I】 in turn. arm spacer 【I】 .
- ◆ Remove bolt M8 x 35 【H】 and spring washer 8 【G】 .
- ◆ Remove the steering rocker arm 【F】
- ◆ Remove 4 bolts M10 x 1.5 x 20 【E】 .
- ◆ Remove the EPS assembly 【C】

**⚠ CAUTION**

Be careful not to operate with electricity during disassembly or installation, and protect the EPS connector to avoid damage to the EPS. EPS from being damaged.

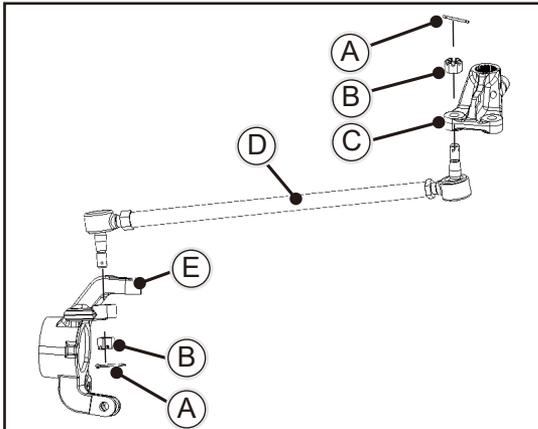
Bolt M8×16/Bolt M8×30 Torque

35 N·m (3.5 kgf·m, 25 ft·lb)

## EPS ASSEMBLY MOUNTING

Install in reverse order of EPS assembly removal.

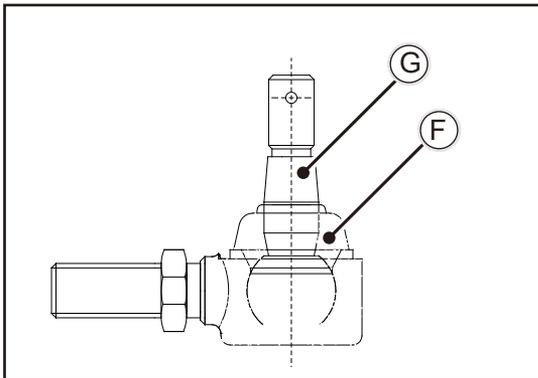
## STEERING TIE ROD



### STEERING ROD FOLDING

- 【A】 cotter pin
- 【B】 Slotted nut M10
- 【C】 Steering rocker arm
- 【D】 Tie rods
- 【E】 knuckle

- ◆ Remove the split pin 【A】 and slotted nut M10 【B】
- ◆ Remove the steering tie rods 【D】 from the steering rocker arms 【C】 and steering knuckles 【E】 .



### ⚠ WARNING

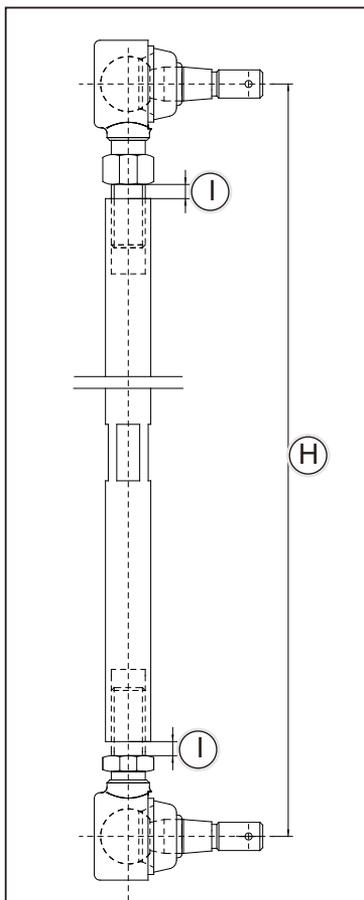
Pay attention to protect the ball thread and dust cover when taking the steering tie rod to avoid damage.

### STEERING TIE ROD INSTALLATION

Install in reverse order of steering tie rod removal.

### ⚠ WARNING

Do not remove the dust cover 【F】 , which is filled with grease.

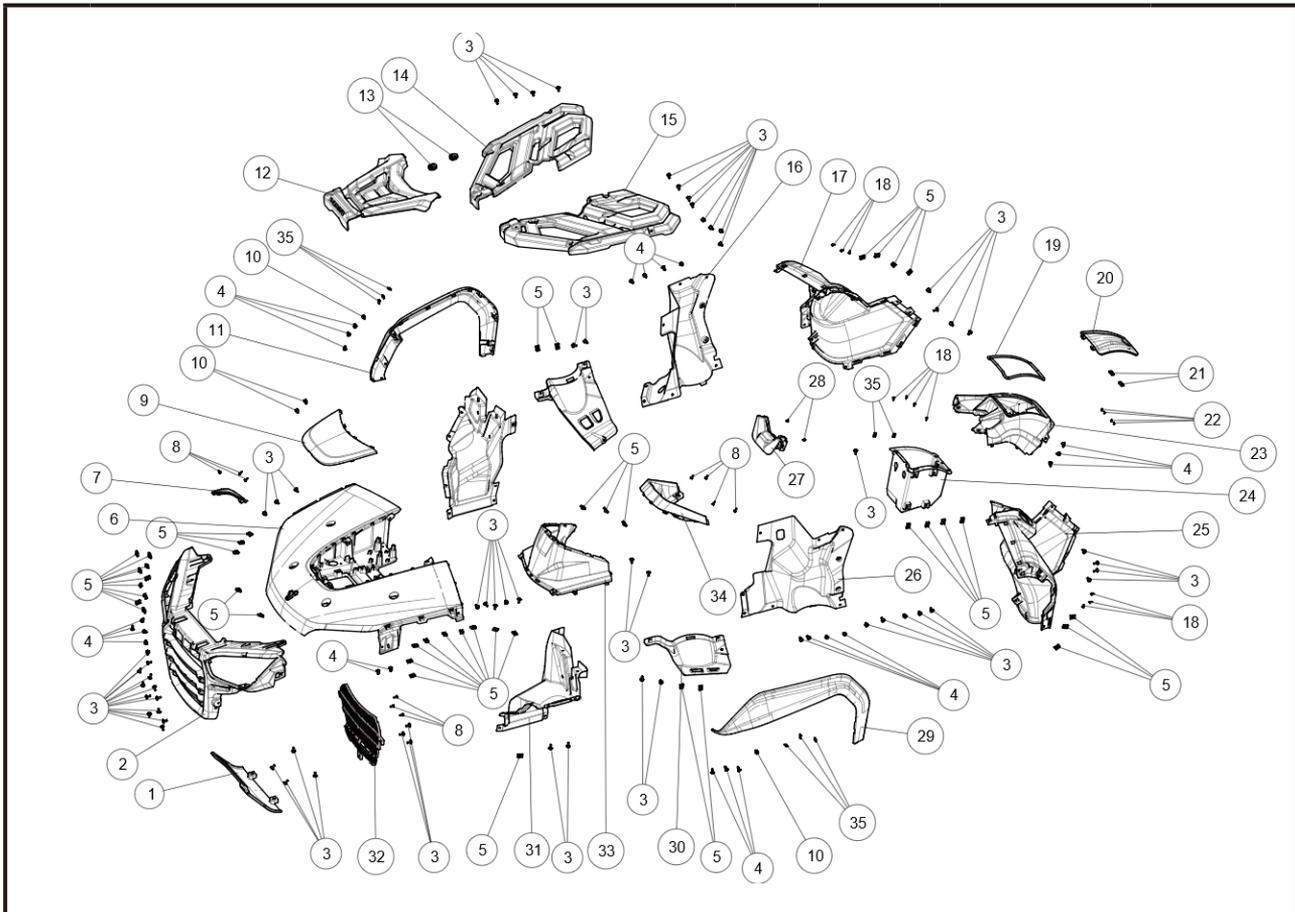


The small end of the taper on the steering tie rod is mounted towards the steering knuckle and steering rocker arm taper holes. The cross tie rod has the correct length 【H】 and the two visible thread lengths 【I】 are approximately equal. Steering tie rod length 【H】 398±1.5 mm.

## BODY AND FRAME

|  |              |
|--|--------------|
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## EXPLOSION DIAGRAM OF FRONT BODY PARTS



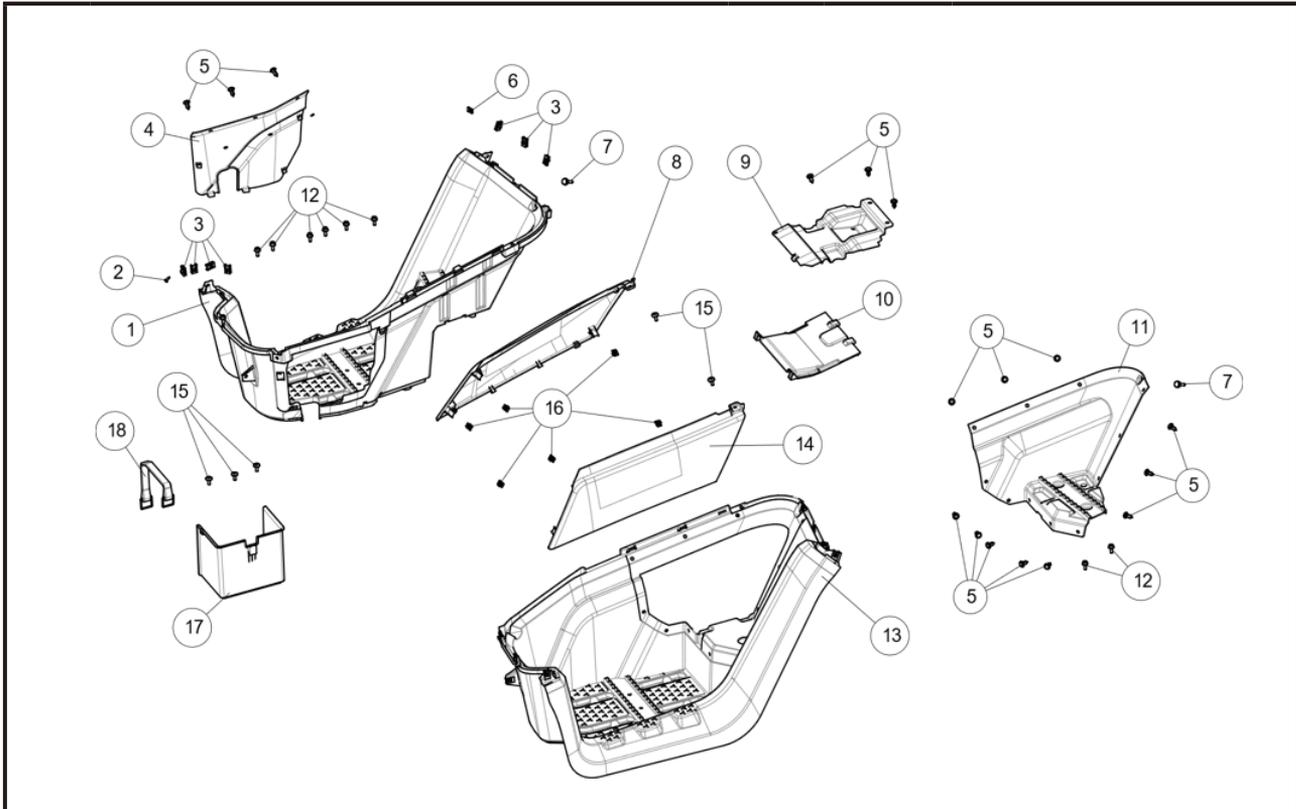
| No. | Fastener                              | Torque |         |                | Remarks |
|-----|---------------------------------------|--------|---------|----------------|---------|
|     |                                       | N·m    | kgf·m   | ft·lb          |         |
| 1   | FRONT GUARD                           |        |         |                |         |
| 2   | FRONT FASCIA                          |        |         |                |         |
| 3   | LARGE PAN HEAD HEX SOCKET BOLT M6×16  | 8~12   | 0.8~1.2 | 69~103.6 in·lb |         |
| 4   | EXPANSION BUCKLE COMPONENT            |        |         |                |         |
| 5   | M6 NUT CLAMP                          |        |         |                |         |
| 6   | FRONT PANEL - TAN                     |        |         |                |         |
| 7   | SHIFT RUBBER                          |        |         |                |         |
| 8   | CROSS RECESSED HEXAGON SCREW ST4.8×16 |        |         |                |         |
| 9   | FRONT REPAIR COVER                    |        |         |                |         |
| 10  | SPRING BUCKLE                         |        |         |                |         |
| 11  | FRONT RIGHT SIDE PANEL                |        |         |                |         |
| 12  | FRONT SHELF MIDDLE COVER PLATE        |        |         |                |         |
| 13  | RUBBER RING                           |        |         |                |         |
| 14  | FRONT SHELF RIGHT COVER               |        |         |                |         |
| 15  | FRONT SHELF LEFT COVER                |        |         |                |         |
| 16  | RIGHT FRONT UPPER MUDGUARD            |        |         |                |         |

# BODY AND FRAME

## SEGWAY AT10

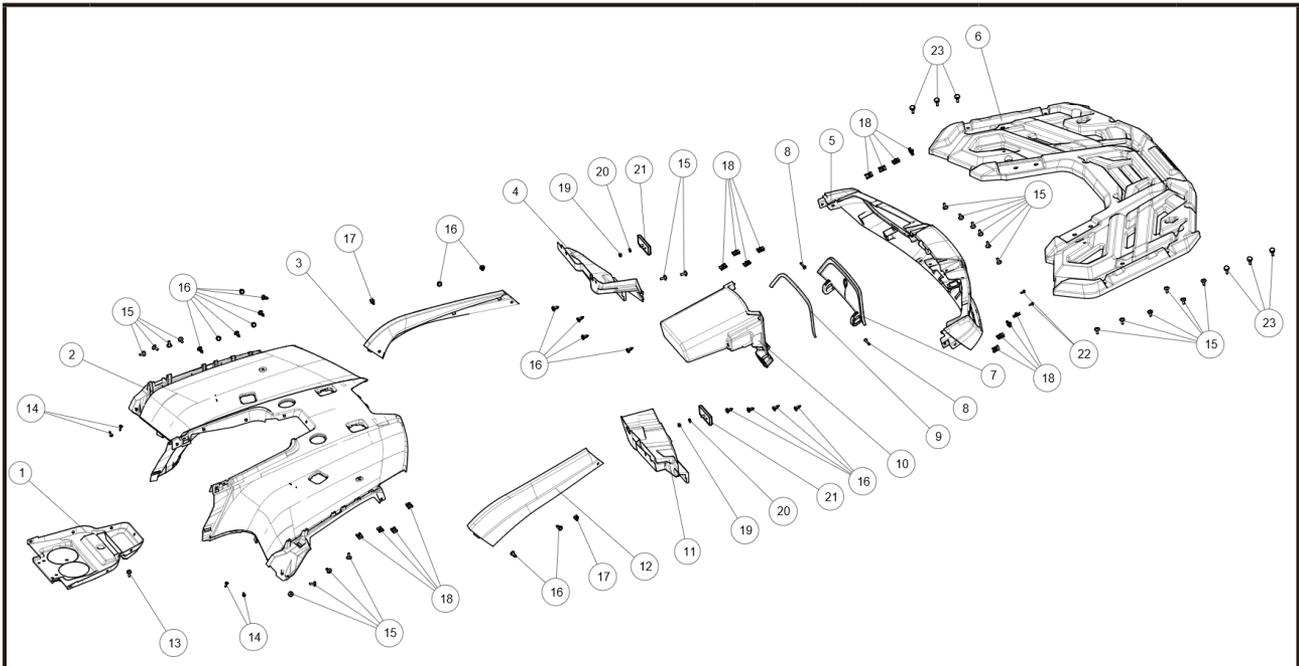
|    |                                   |  |  |  |  |
|----|-----------------------------------|--|--|--|--|
| 17 | FRONT RIGHT FENDER                |  |  |  |  |
| 18 | CROSS HEAD SCREWS ST4.2×13        |  |  |  |  |
| 19 | SEAL STRIP                        |  |  |  |  |
| 20 | FRONT STORAGE BOX SMALL COVER     |  |  |  |  |
| 21 | LOWER FENDER LR LOF               |  |  |  |  |
| 22 | SCREW ST2.9×9.5                   |  |  |  |  |
| 23 | FRONT STORAGE BOX UPPER COVER     |  |  |  |  |
| 24 | FRONT STORAGE BOX                 |  |  |  |  |
| 25 | FRONT LEFT FENDER                 |  |  |  |  |
| 26 | LEFT FRONT UPPER MUDGUARD         |  |  |  |  |
| 27 | HANDLEBAR COVER                   |  |  |  |  |
| 28 | CROSS RECESSED HEXAGON BOLTS M5×8 |  |  |  |  |
| 29 | FRONT LEFT SIDE PANEL             |  |  |  |  |
| 30 | LEFT FRONT LOWER MUDGUARD         |  |  |  |  |
| 31 | FRONT LEFT HEADLIGHT COVER        |  |  |  |  |
| 32 | BLACK FRONT GRILLE                |  |  |  |  |
| 33 | LOWER COVER,INSTRUMENT            |  |  |  |  |
| 34 | COVER,INSTRUMENT                  |  |  |  |  |
| 35 | 4.2 SELF-TAPPING SCREW            |  |  |  |  |
| 36 | ALUMINUM LOGO(60×45)              |  |  |  |  |

## EXPLOSION DIAGRAM OF MID BODY PARTS



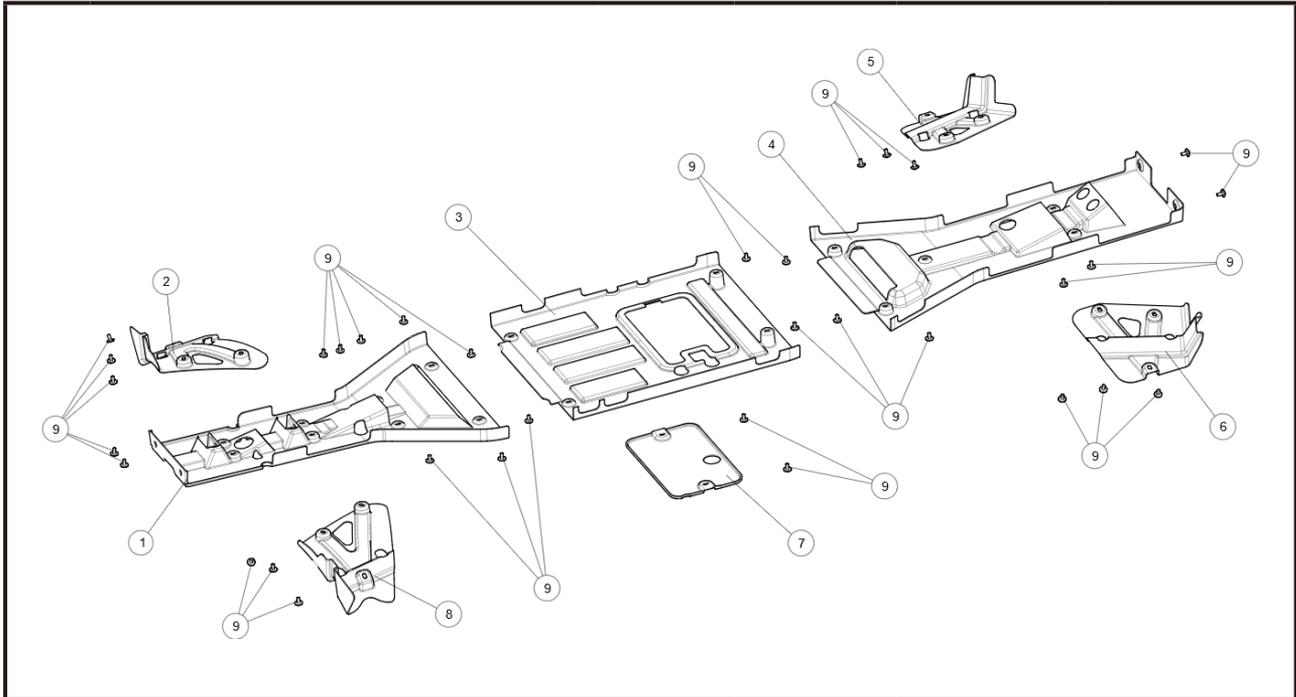
| No. | Fastener                             | Torque |         |                | Remarks |
|-----|--------------------------------------|--------|---------|----------------|---------|
|     |                                      | N·m    | kgf·m   | ft·lb          |         |
| 1   | RIGHT FOOT PEDAL                     |        |         |                |         |
| 2   | CROSS HEAD SCREWS ST4.2×13           |        |         |                |         |
| 3   | M6 NUT CLAMP                         |        |         |                |         |
| 4   | BATTERY MAINTENANCE COVER            |        |         |                |         |
| 5   | EXPANSION BUCKLE COMPONENT           |        |         |                |         |
| 6   | 4.2 SELF-TAPPING SCREW               |        |         |                |         |
| 7   | LARGE PAN HEAD HEX SOCKET BOLT M6×20 | 8~12   | 0.8~1.2 | 69~103.6 in·lb |         |
| 8   | RIGHT GUARD                          |        |         |                |         |
| 9   | BOTTOM WIND DEFLECTOR                |        |         |                |         |
| 10  | BOTTOM WIND DEFLECTOR                |        |         |                |         |
| 11  | CVT MAINTENANCE COVER                |        |         |                |         |
| 12  | BOLT M6×16                           |        |         |                |         |
| 13  | LEFT FOOT PEDAL                      |        |         |                |         |
| 14  | LEFT GUARD                           |        |         |                |         |
| 15  | LARGE PAN HEAD HEX SOCKET BOLT M6×16 | 8~12   | 0.8~1.2 | 69~103.6 in·lb |         |
| 16  | SPRING BUCKLE                        |        |         |                |         |
| 17  | BATTERY BOX                          |        |         |                |         |
| 18  | BATTERY STRAP                        |        |         |                |         |

EXPLOSION DIAGRAM OF TAIL BODY PARTS

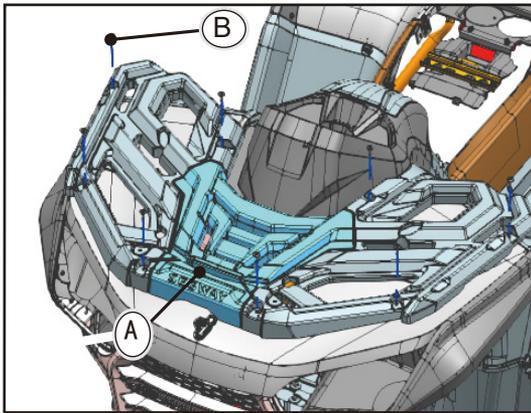


| No. | Fastener                              | Torque |         |                | Remarks |
|-----|---------------------------------------|--------|---------|----------------|---------|
|     |                                       | N·m    | kgf·m   | ft·lb          |         |
| 1   | MIDDLE STORAGE BOX                    |        |         |                |         |
| 2   | REAR PANEL - BLACK                    |        |         |                |         |
| 3   | RIGHT REAR SIDEBAR                    |        |         |                |         |
| 4   | RR TAIL LIGHTS MASKS                  |        |         |                |         |
| 5   | REAR TAILLIGHT PANEL                  |        |         |                |         |
| 6   | REAR SHELF COVER                      |        |         |                |         |
| 7   | REAR STORAGE BOX COVER                |        |         |                |         |
| 8   | TAIL BOX COVER PIN SHAFT              |        |         |                |         |
| 9   | SEAL STRIP                            |        |         |                |         |
| 10  | REAR STORAGE BOX                      |        |         |                |         |
| 11  | RL TAIL LIGHTS MASKS                  |        |         |                |         |
| 12  | LEFT REAR SIDEBAR                     |        |         |                |         |
| 13  | BOLT M6×16                            | 8~12   | 0.8~1.2 | 69~103.6 in·lb |         |
| 14  | CROSS RECESSED HEXAGON SCREW ST4.8×16 |        |         |                |         |
| 15  | LARGE PAN HEAD HEX SOCKET BOLT M6×16  | 8~12   | 0.8~1.2 | 69~103.6 in·lb |         |
| 16  | EXPANSION BUCKLE COMPONENT            |        |         |                |         |
| 17  | SPRING BUCKLE                         |        |         |                |         |
| 18  | M6 NUT CLAMP                          |        |         |                |         |
| 19  | NUT M6                                |        |         |                |         |
| 20  | GASKET 6                              |        |         |                |         |
| 21  | SQUARE REFLECTOR                      |        |         |                |         |
| 22  | CROSS HEAD SCREWS ST4.2×13            |        |         |                |         |
| 23  | BOLT M8×16                            | 8~12   | 0.8~1.2 | 69~103.6 in·lb |         |

## EXPLOSION DIAGRAM OF BOTTOM PARTS

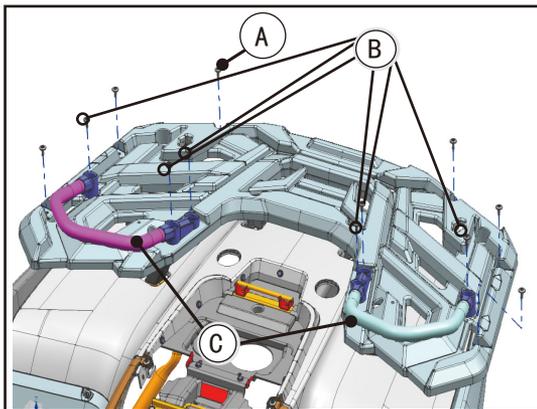


| No. | Fastener                     | Torque |         |                | Remarks |
|-----|------------------------------|--------|---------|----------------|---------|
|     |                              | N·m    | kgf·m   | ft·lb          |         |
| 1   | FRONT BOTTOM GUARD           |        |         |                |         |
| 2   | FRONT RIGHT ROCKER ARM GUARD |        |         |                |         |
| 3   | MID GUARD                    |        |         |                |         |
| 4   | REAR BOTTOM GUARD            |        |         |                |         |
| 5   | REAR RIGHT ROCKER ARM GUARD  |        |         |                |         |
| 6   | REAR LEFT ROCKER ARM GUARD   |        |         |                |         |
| 7   | MAINTENANCE COVER            |        |         |                |         |
| 8   | FRONT LEFT ROCKER ARM GUARD  |        |         |                |         |
| 9   | HEXAGON FLANGE BOLT M6×12    | 8~12   | 0.8~1.2 | 69~103.6 in·lb |         |



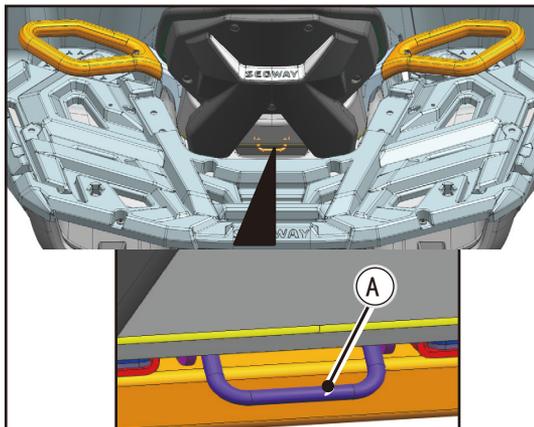
**FRONT RACK COVER**

- ◆ Place the vehicle in a horizontal position.
- ◆ Lift up the front rack center cover by force at the hand buckle **【A】**.
- ◆ Remove the 8 front rack cover bolts **【B】**.
- ◆ Remove the left and right front rack covers from the vehicle body.



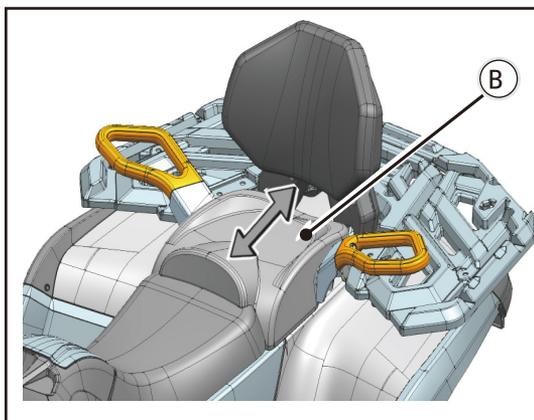
**REAR RACK COVER**

- ◆ Place the vehicle in a horizontal position.
- ◆ Remove the rear left and right handrail 6-piece fixing bolts **【B】**, remove the rear handrail.
- ◆ Remove the rear right handrail 6-piece bolts **【B】** and remove the rear handrail **【C】**.
- ◆ Take out the 6 bolts of the rear shelf cover **【A】**, and remove the rear shelf cover from the bod.

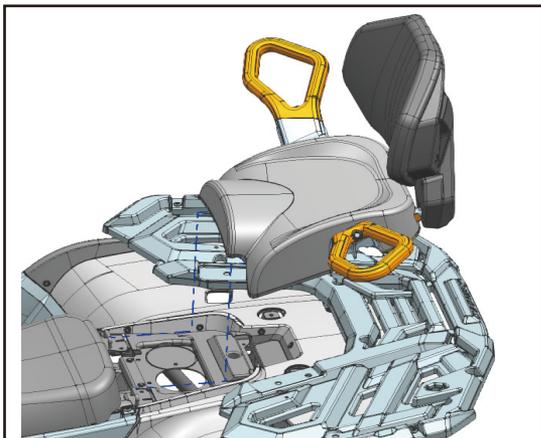


**REAR SEAT CUSHION REMOVAL**

- ◆ Remove the rear seat cushion latch by hand **【A】**.

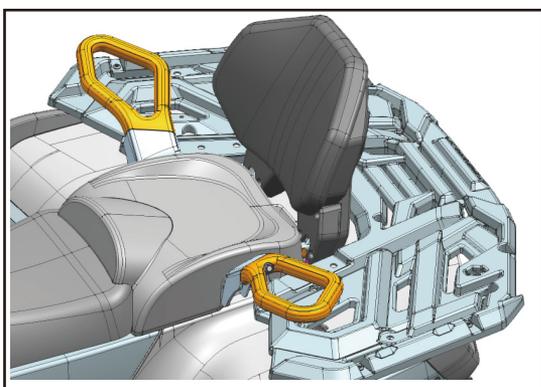


- ◆ Pull the rear seat out toward the top of the back.

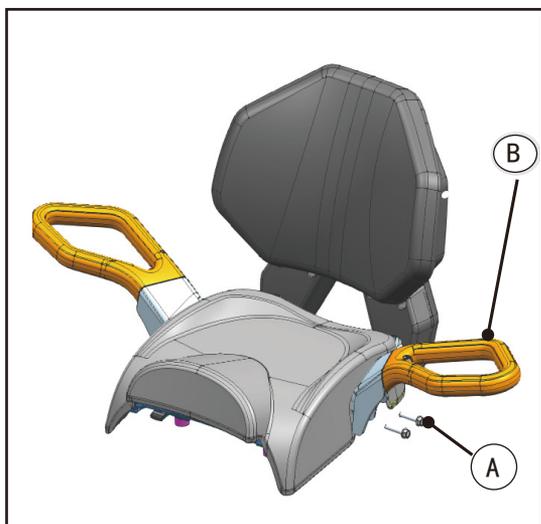


### INSTALL THE REAR CUSHION

- ◆ Align the front U cao of the rear cushion with the mounting position on the frame.



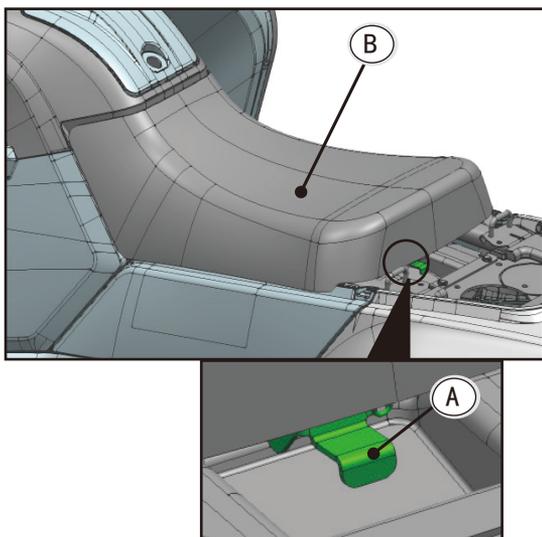
- ◆ Press the seat cushion down, hear the clicking sound, the locking hook at the back of the seat cushion locks the seat cushion hook on the frame.



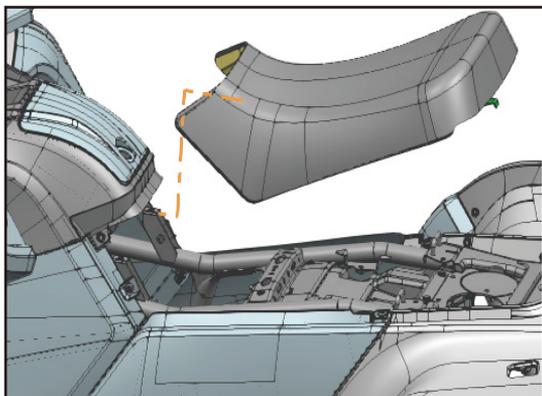
### HANDRAIL REMOVAL

- ◆ Remove the 2 bolts 【A】 , remove the handrail 【B】 .
- ◆ Remove the left and right armrests in the same way.

## FRONT CUSHION REMOVAL

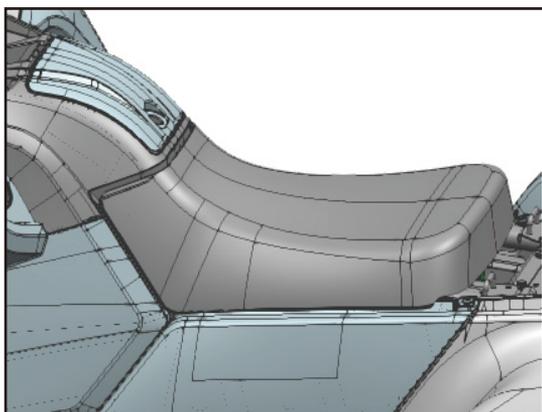


- ◆ To remove the cushion, break open the cushion locking hook 【A】 .
- ◆ To remove the cushion, pull out the cushion 【B】 toward the top of the rear.

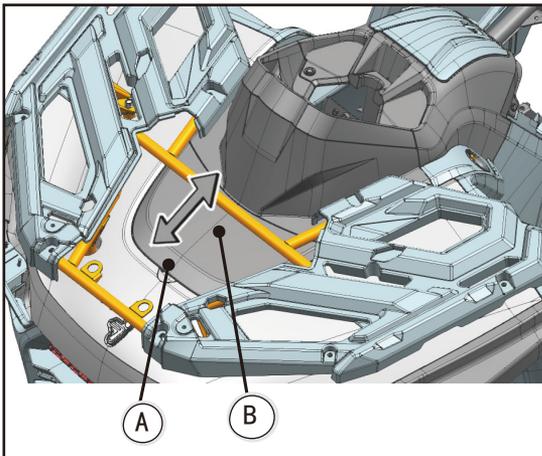


## FRONT SEAT CUSHION INSTALLATION

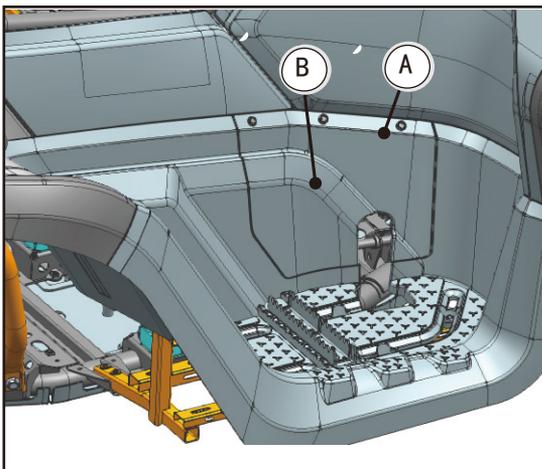
- ◆ Insert the two limit blocks at the front of the front seat cushion into the two limit slots on the frame.
- ◆ Press the front seat cushion down, hear the clicking sound, and the locking hook behind the seat cushion locks the seat cushion hook on the frame.



### FRONT SERVICE COVER REMOVAL

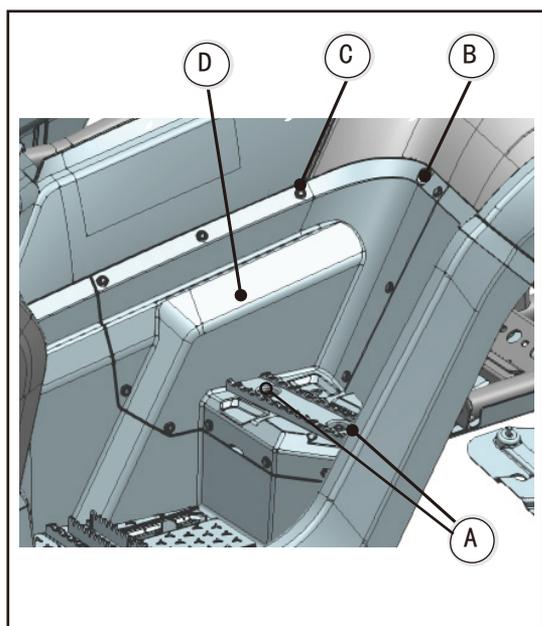


- ◆ Remove the front shelf center cover.
- ◆ Place your hand on 【A】 and pull it upwards.
- ◆ Pull out the front service cover 【B】 upward toward the rear.



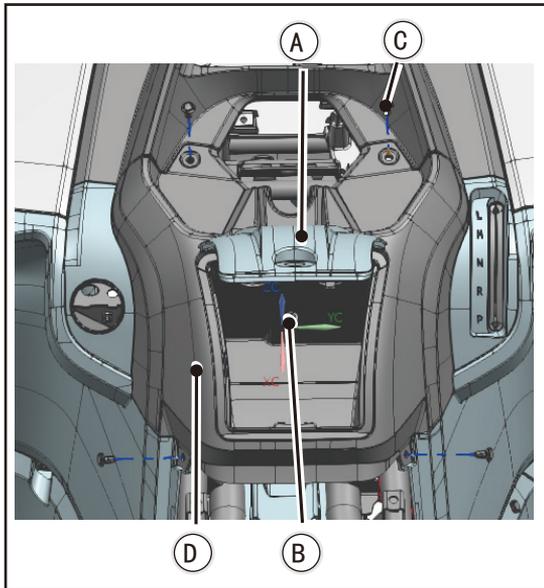
### BATTERY ACCESS COVER REMOVAL

- ◆ Remove the 3 expansion screws 【A】 .
- ◆ Pull the front access cover 【B】 upwards.



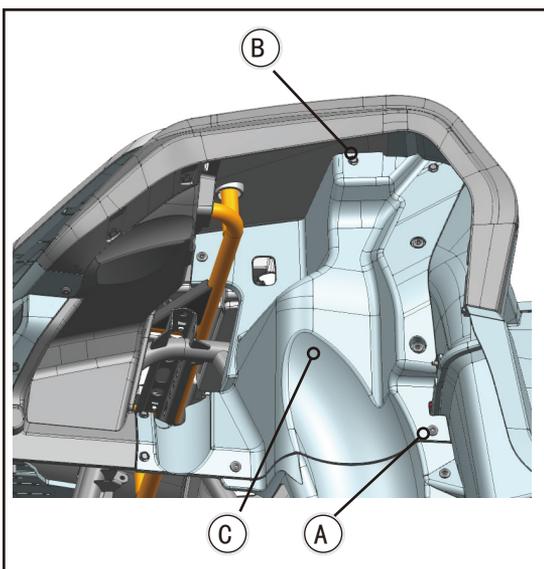
### CVT INSPECTION COVER REMOVAL

- ◆ Remove 2 bolts 【A】 .
- ◆ Remove 1 bolt 【B】 .
- ◆ Remove 11 expansion screws 【C】 .
- ◆ Pull the front access cover 【D】 upwards.



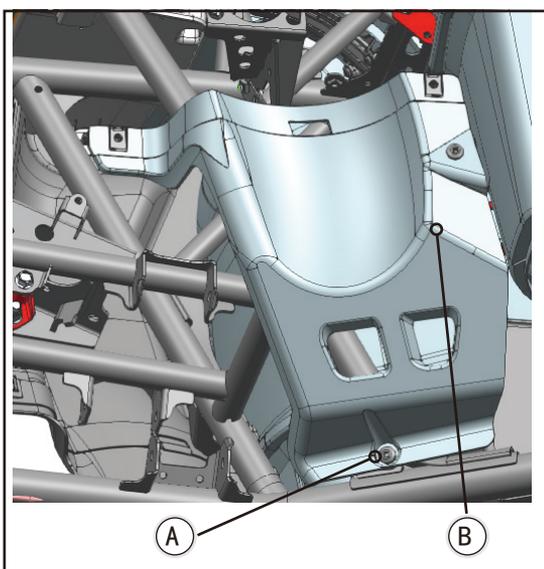
**FRONT GLOVE BOX ASSEMBLY REMOVAL**

- ◆ Remove the rear seat cushion
- ◆ Remove the front seat cushion.
- ◆ Open the small cover of the glove box with the key **【A】** .
- ◆ Remove 1 screw **【B】** .
- ◆ Remove 4 expansion screws **【C】** .
- ◆ Drag the front glove box assembly **【D】** upwards a certain distance.
- ◆ Remove the electrical parts to completely dismantle the glove box assembly **【D】** .



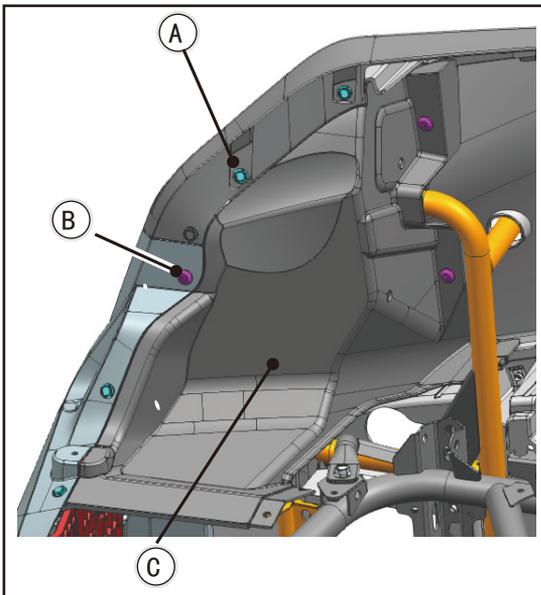
**FRONT UPPER FENDER REMOVAL**

- ◆ Remove the 5 screws **【A】** .
- ◆ Take out the 4 expansion screws **【B】** .
- ◆ Take out the front upper fender **【C】** .
- ◆ Take out 4 expansion screws **【B】** .
- ◆ Take out the front upper fender **【C】** .
- ◆ The front upper fender can be removed in the same way as the left and right.



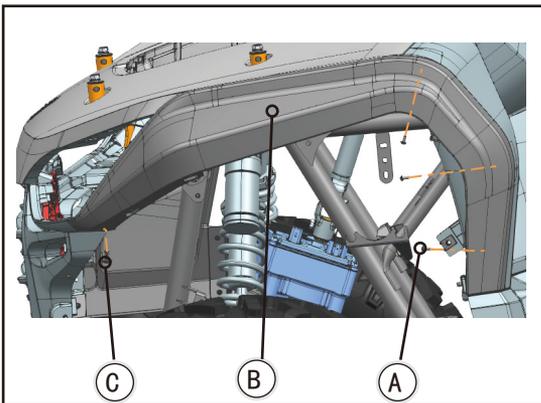
**FRONT LOWER FENDER REMOVAL**

- ◆ Remove the front upper mudguard
- ◆ Remove the 2 screws **【A】** .
- ◆ Take out the front lower fender **【B】** .
- ◆ Remove the front lower fender in the same way as the left and right.



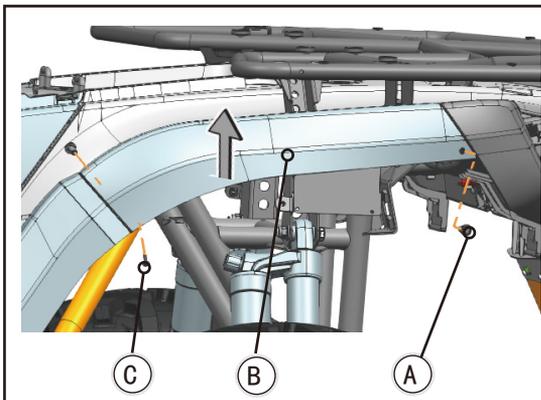
### HEADLIGHT COVER REMOVAL

- ◆ Remove the front upper mudguard.
- ◆ Remove the front upper mudguard.
- ◆ Remove 3 screws 【B】 .
- ◆ Remove 4 expansion screws 【A】 .
- ◆ Remove the front upper mudguard.
- ◆ Take out the 4 expansion screws 【A】 .
- ◆ Take out the front lower mudguard 【C】 .
- ◆ Take out the front lower mudguard 【C】 .
- ◆ Take out 3 screws 【B】 .
- ◆ Take out 4 expansion screws 【A】 .
- ◆ Remove the headlight cover in the same way as the left and right.



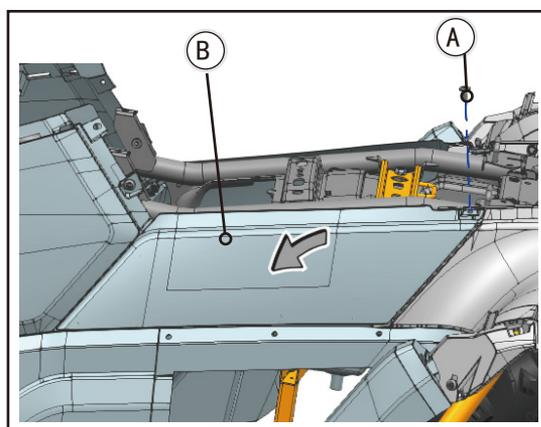
### FRONT SIDEBAR REMOVAL

- ◆ Remove the front upper mudguard.
- ◆ Remove the front upper mudguard.
- ◆ Remove the front headlight cover.
- ◆ Remove 3 screws 【A】 .
- ◆ Remove 1 expansion screw 【C】 .
- ◆ Remove the front headlight cover.
- ◆ Take out 1 expansion screw 【C】 .
- ◆ Take out the front sidebar 【B】 .
- ◆ Take out 3 screws 【A】 .
- ◆ Take out 1 expansion screw 【C】 .
- ◆ Remove the front sidebar in the same way as the left and right.



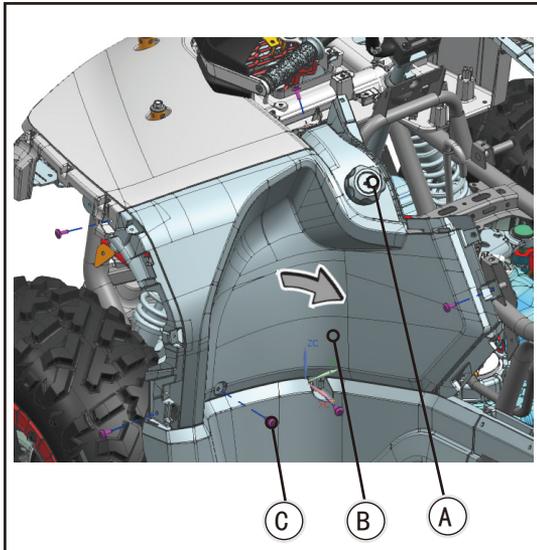
### REAR SIDEBAR REMOVAL

- ◆ Take out 1 screw 【B】 .
- ◆ Take out 2 expansion screws 【A】 .
- ◆ Drag out the front sidebar along the arrow 【B】 .
- ◆ Remove the front side bar in the same way as the left and right side.



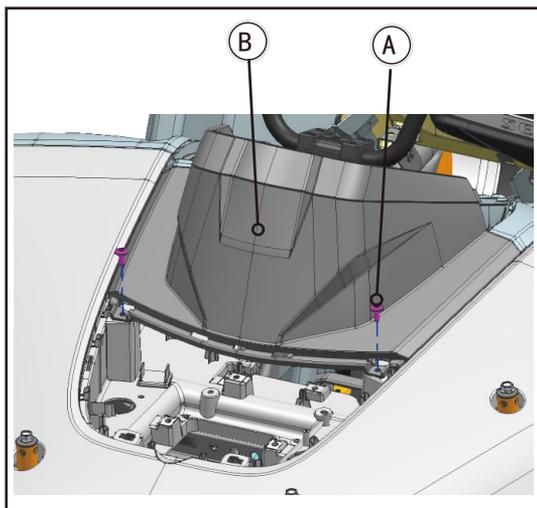
### REMOVING THE CENTER SHIELD

- ◆ Remove the rear seat cushion
- ◆ Remove the front seat cushion.
- ◆ Remove 1 screw 【A】 .
- ◆ Drag out the front edge strip along the arrow 【B】 .
- ◆ Remove the center shield in the same way as the left and right.



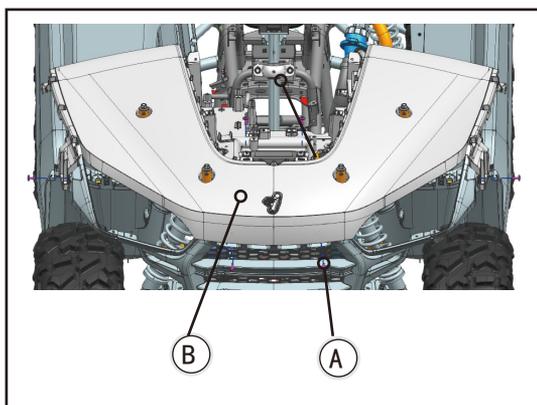
**FRONT FENDER REMOVAL**

- ◆ Remove the rear seat cushion
- ◆ Remove the front seat cushion
- ◆ Remove the front service cover.
- ◆ Remove front glove box assembly
- ◆ Remove the instrument cover.
- ◆ Remove the front upper mudguard.
- ◆ Remove the front lower mudguard.
- ◆ Remove the front headlight covers.
- ◆ Remove the front sidebar.
- ◆ Remove the fuel tank cover 【A】 .
- ◆ Remove the fuel tank cover 【A】 . Remove the 6 screws 【C】 .
- ◆ Drag out the front mudguard along the arrow 【B】 .
- ◆ The front mudguard removal method is basically the same as the left and right.



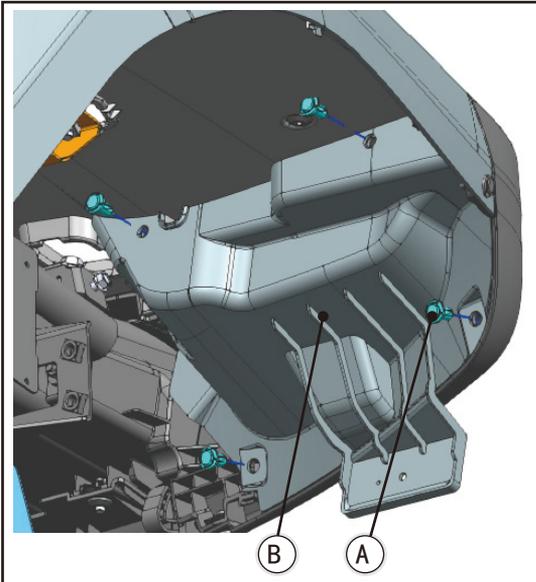
**INSTRUMENT COVER REMOVAL**

- ◆ Remove the rear seat cushion
- ◆ Remove the front seat cushion
- ◆ Remove front service cover
- ◆ Remove the front glove box assembly.
- ◆ Remove 2 screws 【A】 .
- ◆ Drag out the instrument cover along the arrow 【B】 .



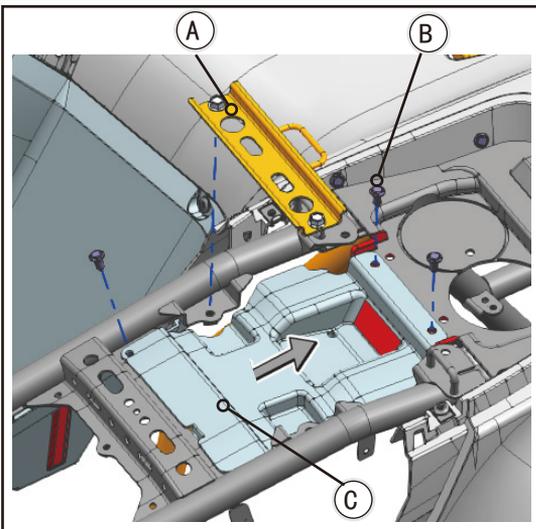
**FRONT PANEL REMOVAL**

- ◆ Remove the rear seat cushion
- ◆ Remove the front seat cushion
- ◆ Remove the front service cover.
- ◆ Remove the front glove box assembly.
- ◆ Remove the instrument cover
- ◆ Remove the front upper mudguard.
- ◆ Remove the front lower mudguard.
- ◆ Remove the front headlight covers.
- ◆ Remove the front side strips
- ◆ Remove the front mudguard.
- ◆ Remove the 6 screws 【A】 .
- ◆ Drag out the front panel along the arrow 【B】 .
- ◆ The footrest removal method is basically the same for left and right.



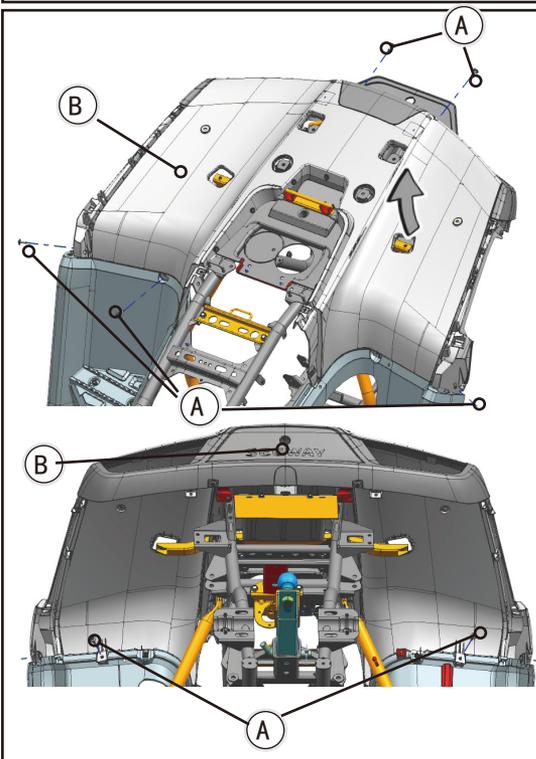
### REAR TAIL LIGHT COVER REMOVAL

- ◆ Remove the 4 expansion screws 【A】 .
- ◆ Remove the rear tail light cover 【B】 . Remove the rear tail light cover in the same way.
- ◆ Rear tail light cover disassembly method is the same as the left and right.



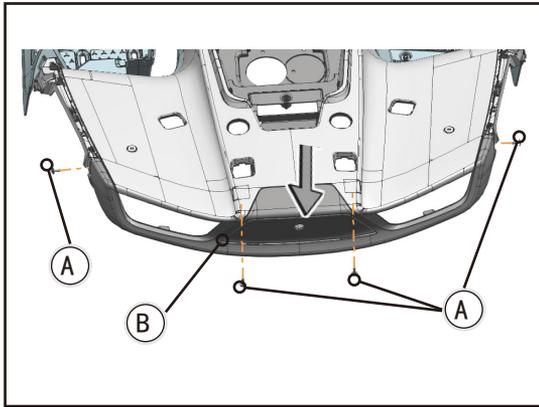
### REMOVAL OF THE WINDSHIELD AT THE BOTTOM OF THE SEAT CUSHION

- ◆ Remove the seat bracket welding assembly 【A】 .
- ◆ Remove the 4 expansion screws 【B】 .
- ◆ Drag out the windshield at the bottom of the seat cushion along the arrow 【C】 . Remove the seat bracket welding assembly 【A】 .



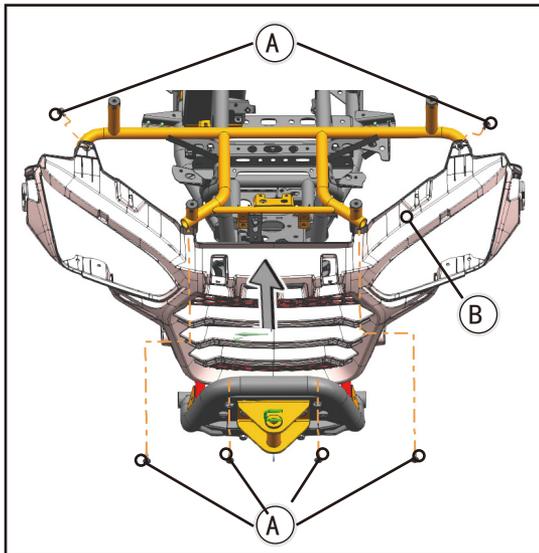
### REAR FENDER ASSEMBLY REMOVAL

- ◆ Remove the rear seat cushion.
- ◆ Remove the front seat cushion.
- ◆ Remove the rear side bar.
- ◆ Remove the center shield. Remove the seat bottom windshield. Remove the seat bottom windshield.
- ◆ Remove the windshield at the bottom of the seat.
- ◆ Remove the rear tail light cover.
- ◆ Open the rear storage box cover with the key 【B】 .
- ◆ Remove 7 screws 【A】 .
- ◆ Drag out the front panel along the arrow 【C】 .



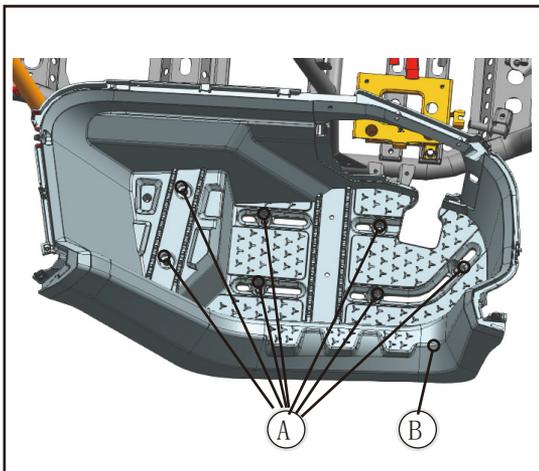
**REAR TAIL LIGHT PANEL AND REAR STORAGE BOX COMBINATION REMOVAL**

- ◆ Remove the rear seat cushion
- ◆ Remove the front seat cushion
- ◆ Remove the rear side bar
- ◆ Remove the center shield.
- ◆ Remove the windshield at the bottom of the seat.
- ◆ Remove the rear tail light cover.
- ◆ Remove the rear fender assembly.
- ◆ Remove the 4 bolts **【A】** .
- ◆ Drag out the rear taillight cover and rear storage box assembly along the arrow **【B】** .



**HEADLIGHT MASK AND FRONT GRILLE COMBINATION REMOVAL**

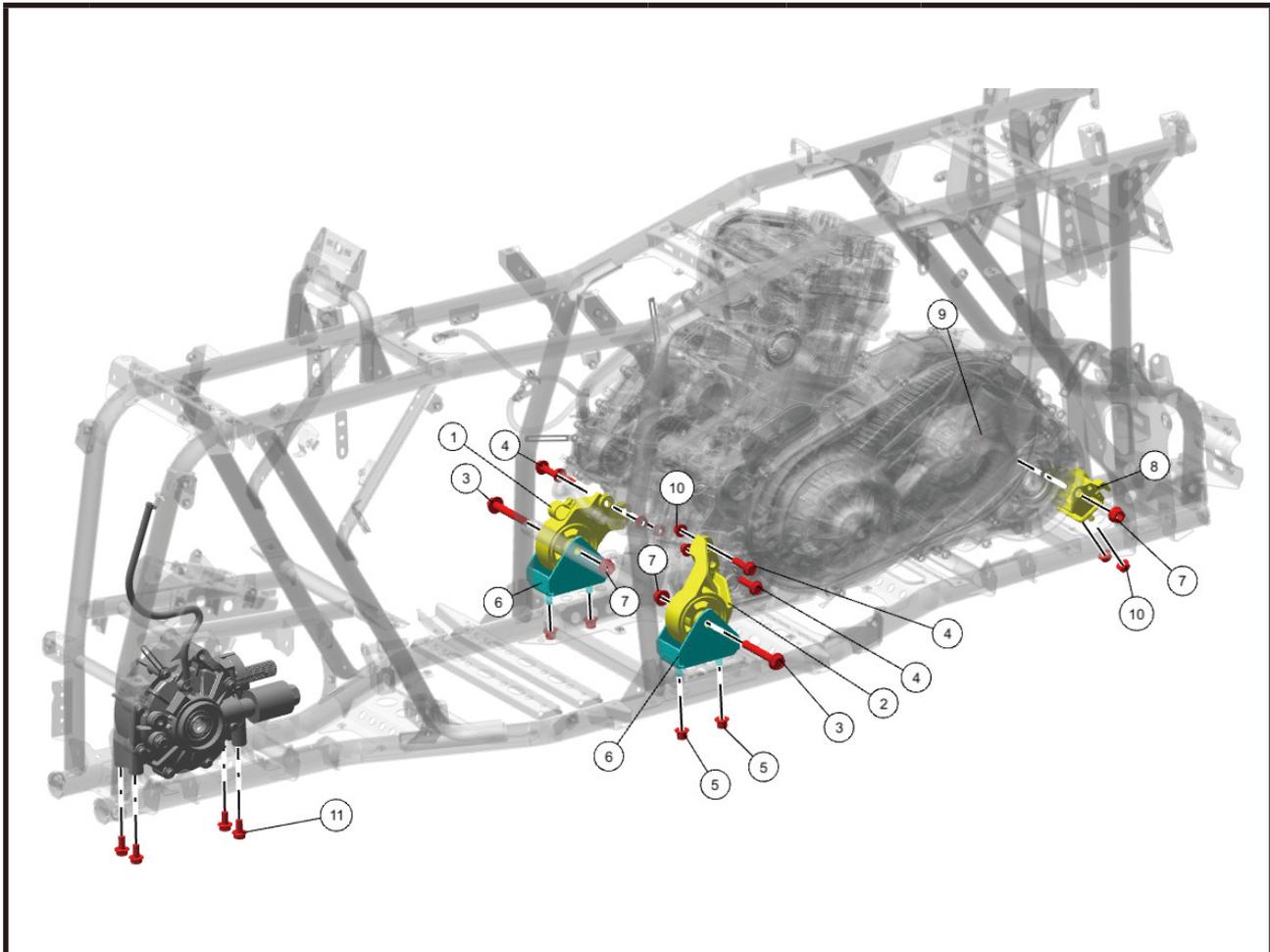
- ◆ Remove the rear seat cushion
- ◆ Remove the front seat cushion.
- ◆ Remove the front service cover.
- ◆ Remove the front glove box assembly
- ◆ Remove instrument cover
- ◆ Remove the front upper mudguard.
- ◆ Remove the front lower mudguard.
- ◆ Remove the front headlight covers.
- ◆ Remove the front side strips.
- ◆ Remove the center shield.
- ◆ Remove the front mudguard.
- ◆ Remove the 6 screws **【A】** .
- ◆ Drag out the headlight cover along the arrow **【B】** .



**HEADLIGHT MASK AND FRONT GRILLE COMBINATION REMOVAL**

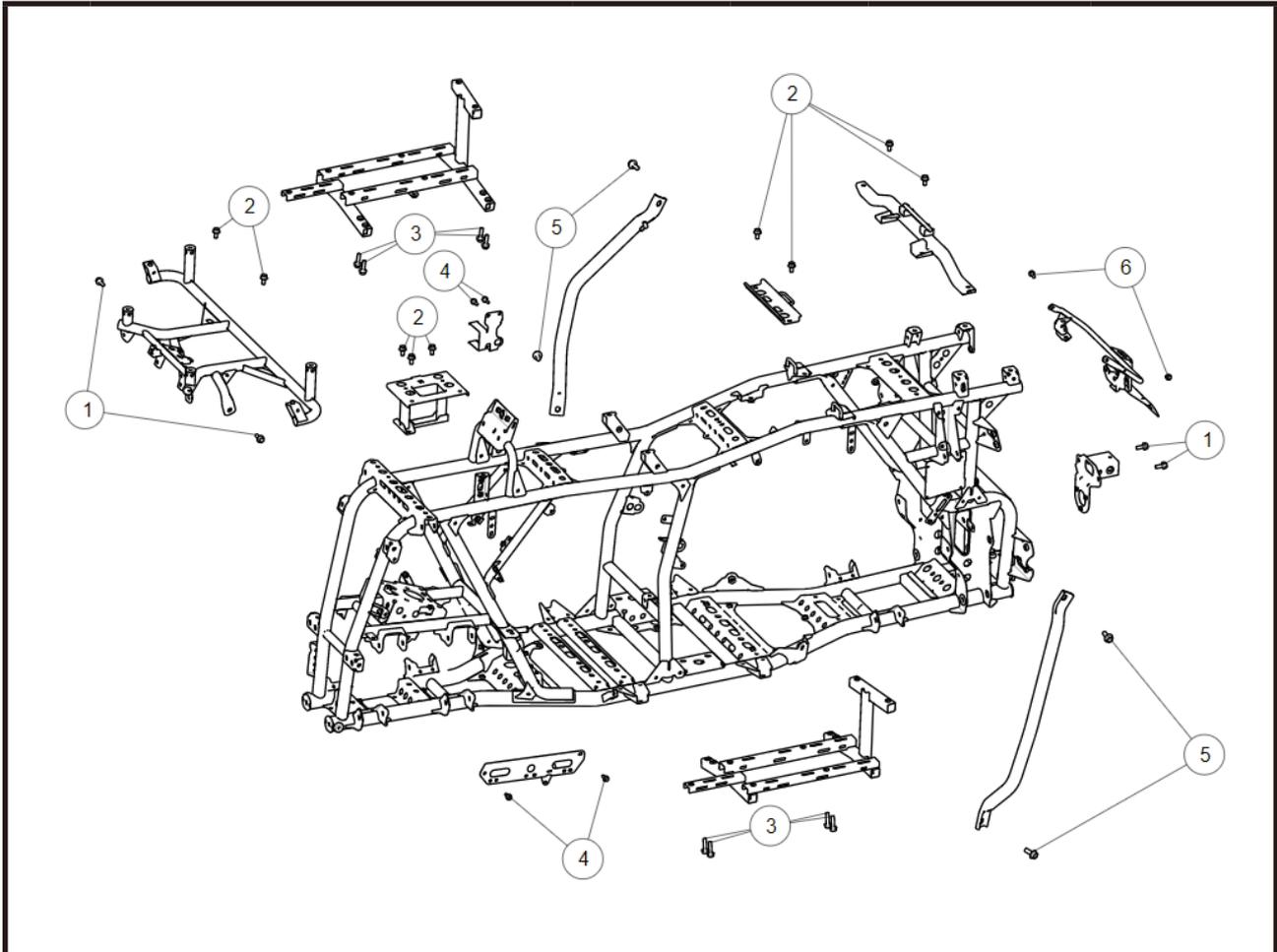
- ◆ Remove the rear seat cushion
- ◆ Remove the front seat cushion.
- ◆ Remove the front service cover.
- ◆ Remove the front glove box assembly
- ◆ Remove instrument cover
- ◆ Remove the front upper mudguard.
- ◆ Remove the front lower mudguard.
- ◆ Remove the front headlight covers.
- ◆ Remove the front side strips.
- ◆ Remove the center shield.
- ◆ Remove the front mudguard.
- ◆ Remove the front mudguard.
- ◆ Remove the rear sidebar.
- ◆ Remove the rear fender.
- ◆ Remove the 7 screws **【A】** .
- ◆ Drag out the footrest along the arrow **【B】** .

### EXPLOSION DIAGRAM OF ENGINE/GEARBOX/FRONT AXLE DISASSEMBLY



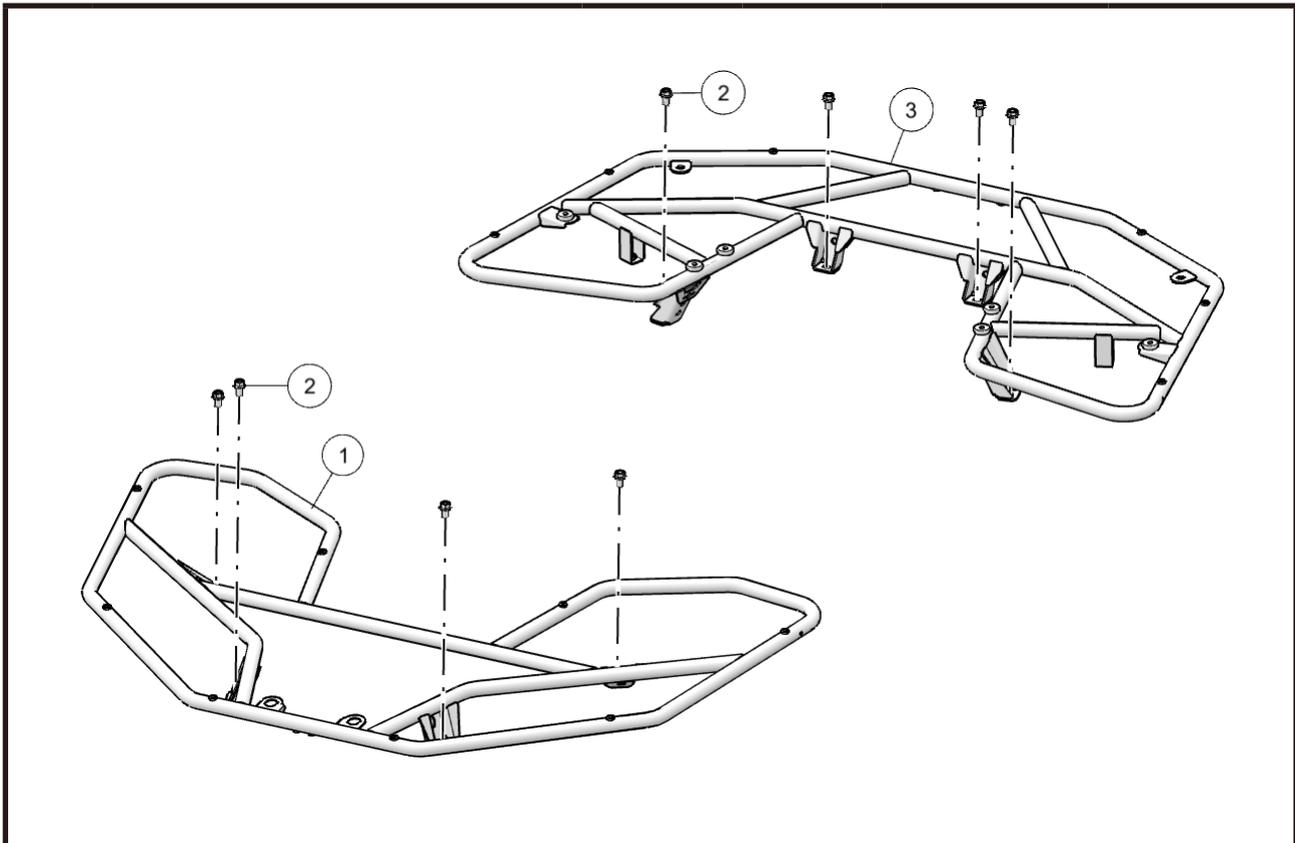
| No. | Fastener                                  | Torque |         |           | Remarks |
|-----|---|--------|---------|-----------|---------|
|     |   | N·m    | kgf·m   | ft·lb     |         |
| 1   | FRONT RIGHT SUPPORT SEAT                  |        |         |           |         |
| 2   | FRONT LEFT SUPPORT SEAT                   |        |         |           |         |
| 3   | HEXAGON FLANGE BOLT<br>M12×1.25×85(BLACK) | 50~60  | 5.0~6.0 | 36.9~44.3 |         |
| 4   | HEXAGON FLANGE BOLT M10×1.25×40           | 30~40  | 3.0~4.0 | 22.1~29.5 |         |
| 5   | NUT M10×1.25                              | 30~40  | 3.0~4.0 | 22.1~29.5 |         |
| 6   | FRONT SUSPENSION BASE                     |        |         |           |         |
| 7   | NUT M12×1.25                              | 50~60  | 5.0~6.0 | 36.9~44.3 |         |
| 8   | REAR SUPPORT SEAT                         |        |         |           |         |
| 9   | HEXAGON FLANGE BOLT M12×1.25×110          | 40~50  | 4.0~5.0 | 29.5~36.9 |         |
| 10  | NUT M10×1.25                              | 30~40  | 3.0~4.0 | 22.1~29.5 |         |
| 11  | HEXAGON FLANGE BOLT M10×1.25×20           | 30~40  | 3.0~4.0 | 22.1~29.5 |         |

**FRAME ACCESSORY EXPLOSION DIAGRAM**



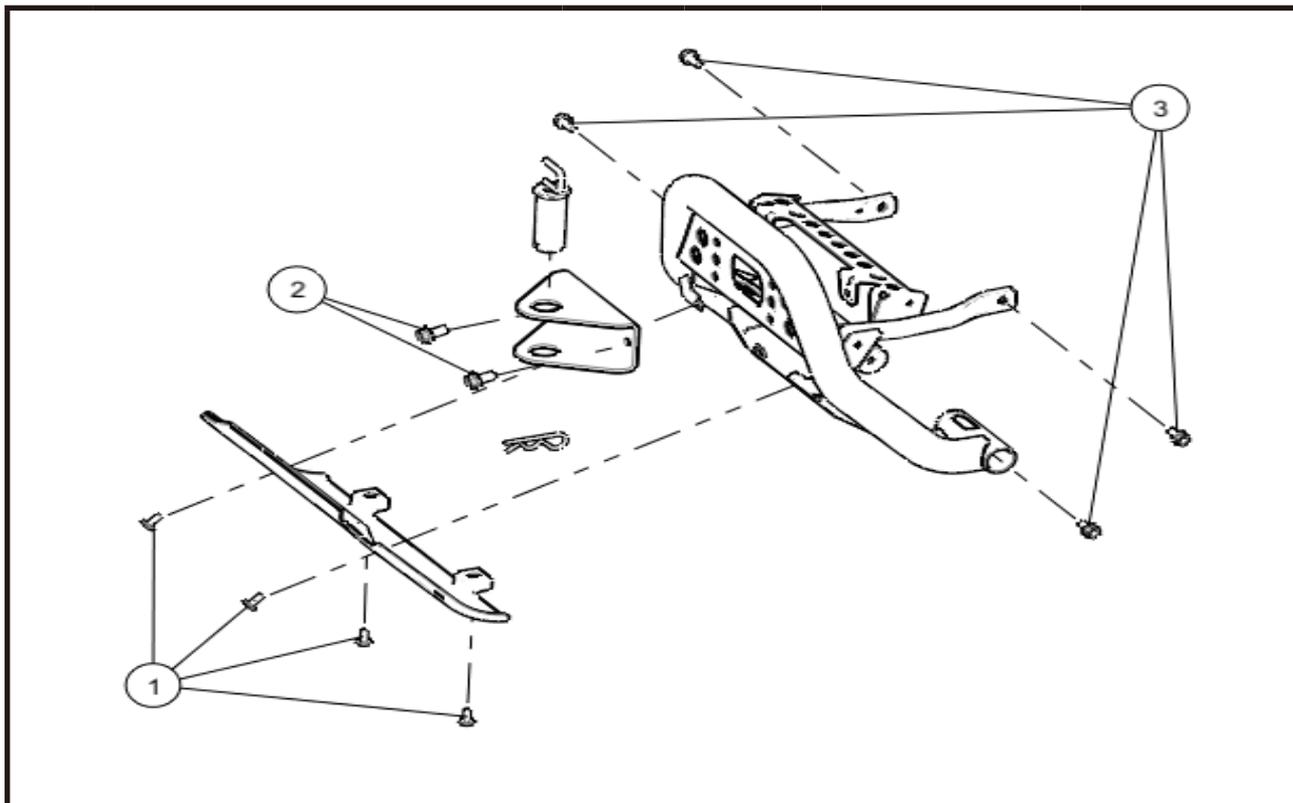
| No. | Fastener                   | Torque |         |                | Remarks |
|-----|----------------------------|--------|---------|----------------|---------|
|     |                            | N·m    | kgf·m   | ft·lb          |         |
| 1   | HEXAGON FLANGE BOLT M8×20  | 30~40  | 3.0~4.0 | 22.1~29.5      |         |
| 2   | HEXAGON FLANGE BOLT M8×16  | 30~40  | 3.0~4.0 | 22.1~29.5      |         |
| 3   | HEXAGON FLANGE BOLT M8×25  | 30~40  | 3.0~4.0 | 22.1~29.5      |         |
| 4   | HEXAGON FL ANGE BOLTM8×16  | 30~40  | 3.0~4.0 | 22.1~29.5      |         |
| 5   | HEXAGON FLANGE BOLT M10×25 | 40~50  | 4.0~5.0 | 29.5~36.9      |         |
| 6   | HEXAGON FLANGE BOLT M6×12  | 8~12   | 0.8~1.2 | 69~103.6 in·lb |         |

**FRONT AND REAR SHELF DISASSEMBLY EXPLOSION DIAGRAM**



| No. | Fastener                  | Torque |         |       | Remarks |
|-----|---------------------------|--------|---------|-------|---------|
|     |                           | N·m    | kgf·m   | ft·lb |         |
| 1   | FRONT RACK                |        |         |       |         |
| 2   | REAR RACK                 |        |         |       |         |
| 3   | HEXAGON FLANGE BOLT M8×16 | 22~30  | 2.2~3.0 | 17~22 |         |

**FRONT BUMPER EXPLOSION DIAGRAM**



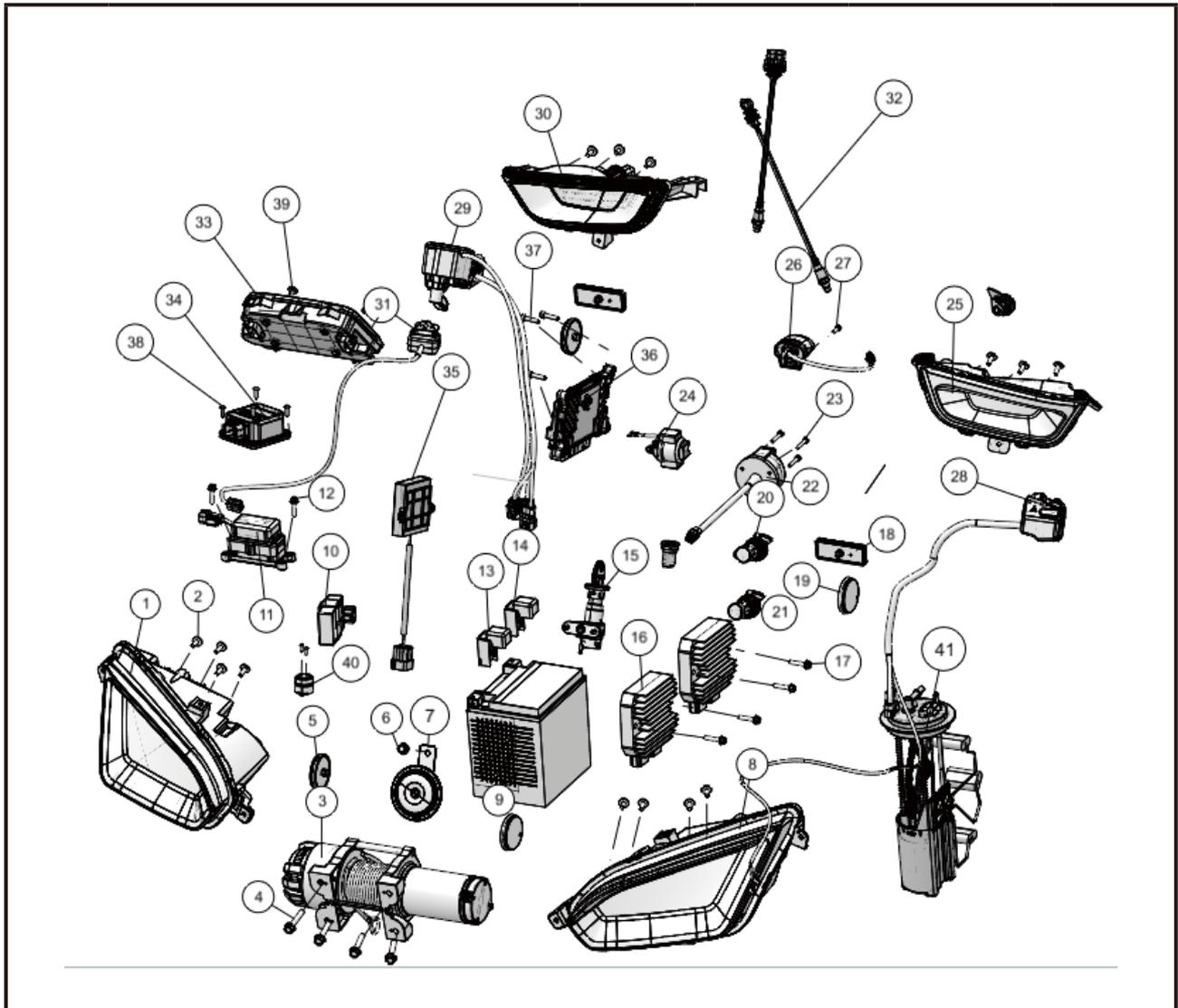
| No. | Fastener                             | Torque |         |                | Remarks |
|-----|--------------------------------------|--------|---------|----------------|---------|
|     |                                      | N·m    | kgf·m   | ft·lb          |         |
| 1   | LARGE PAN HEAD HEX SOCKET BOLT M6×16 | 8~12   | 0.8~1.2 | 69~103.6 in·lb |         |
| 2   | HEXAGON FLANGE BOLT M10×20           | 40~50  | 4.0~5.0 | 29.5~36.9      |         |
| 3   | HEXAGON FLANGE BOLT M8×20            | 22~30  | 2.2~3.0 | 17~22          |         |

## ELECTRICAL SYSTEM

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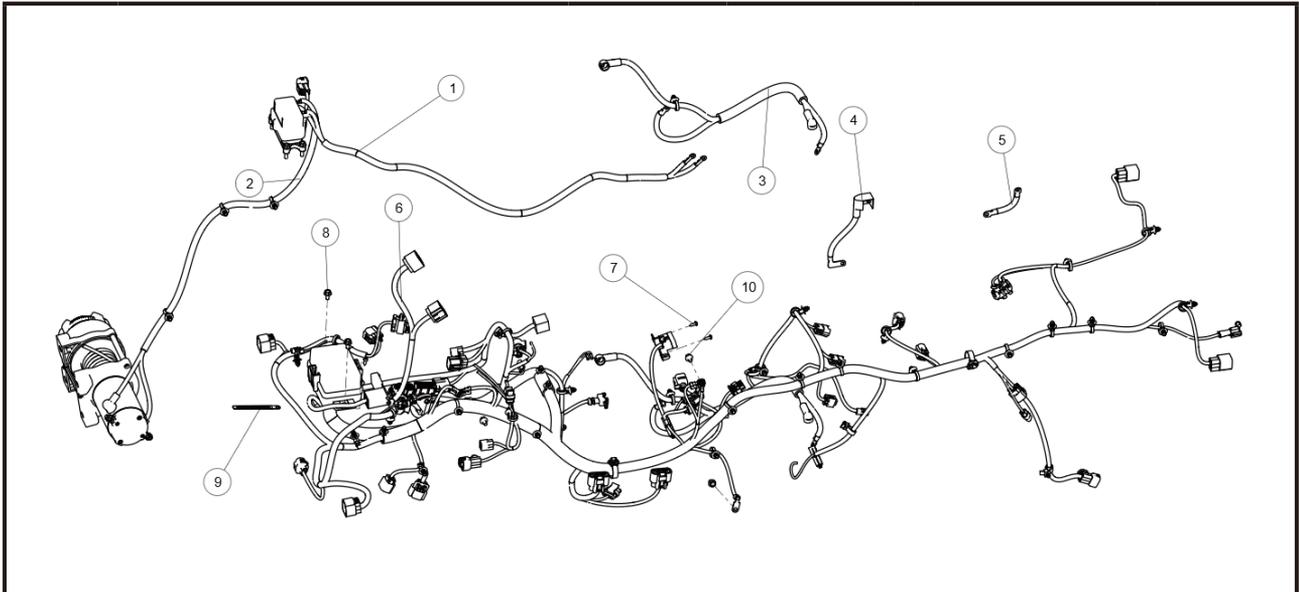
### EXPLODED VIEW



| No. | Fastener                             | Torque |         |         | Remarks |
|-----|--------------------------------------|--------|---------|---------|---------|
|     |                                      | N·m    | kgf·m   | ft·lb   |         |
| 1   | RIGHT HEADLAMPS                      |        |         |         |         |
| 2   | LARGE PAN HEAD HEX SOCKET BOLT M6×16 | 10~12  | 1.0~1.2 | 7.4~8.8 |         |
| 3   | 4500LBS WINCHWINCH RELAY             |        |         |         |         |
| 4   | HEXAGON FLANGE BOLT M8×45            |        |         |         |         |
| 5   | Circular Reflector                   |        |         |         |         |
| 6   | HEXAGON FL ANGE BOLTM8×12            |        |         |         |         |
| 7   | HORN                                 |        |         |         |         |
| 8   | LEFT HEADLAMPS                       |        |         |         |         |
| 9   | BATTERY 32AH                         |        |         |         |         |
| 10  | FLASHER                              |        |         |         |         |

|    |   |       |         |         |  |
|----|---|-------|---------|---------|--|
| 11 | WINCH RELAY                             |       |         |         |  |
| 12 | HEXAGON FLANGE BOLT M6×25               | 10~12 | 1.0~1.2 | 7.4~8.8 |  |
| 13 | BATTERY TERMINALS                       |       |         |         |  |
| 14 | BATTERY TERMINALS                       |       |         |         |  |
| 15 | POWER LOCK                              |       |         |         |  |
| 16 | RECTIFIER S                             |       |         |         |  |
| 17 | HEXAGON FLANGE BOLT M6×30               | 10~12 | 1.0~1.2 | 7.4~8.8 |  |
| 18 | SQUARE REFLECTOR                        |       |         |         |  |
| 19 | CIRCULAR REFLECTOR (RED)                |       |         |         |  |
| 20 | U01 12V POWER OUTPUT SEAT               |       |         |         |  |
| 21 | USB POWER OUTPUT                        |       |         |         |  |
| 22 | TRAILER POWER OUTPUT ASSY               |       |         |         |  |
| 23 | SCREWS M5×30                            |       |         |         |  |
| 24 | STARTING RELAY                          |       |         |         |  |
| 25 | LEFT TAIL LIGHTS                        |       |         |         |  |
| 26 | REAR LICENSE PLATE LAMP                 |       |         |         |  |
| 27 | SCREWS M5×16                            |       |         |         |  |
| 28 | LEFT HANDLE SWITCH                      |       |         |         |  |
| 29 | RIGHT HANDLE SWITCH                     |       |         |         |  |
| 30 | RIGHT TAIL LIGHTS                       |       |         |         |  |
| 31 | WINCH SWITCH                            |       |         |         |  |
| 32 | Oxygen Sensors                          |       |         |         |  |
| 33 | INSTRUMENT                              |       |         |         |  |
| 34 | T-BOX                                   |       |         |         |  |
| 35 | ELECTROMAGNETIC VALVE<br>CONTROL MODULE |       |         |         |  |
| 36 | ECU                                     |       |         |         |  |
| 37 | BOLT M6×25                              | 10~12 | 1.0~1.2 | 7.4~8.8 |  |
| 38 | LARGE PAN HEAD SCREW ST 4.2×19          |       |         |         |  |
| 39 | LARGE PAN HEAD HEX SOCKET<br>BOLT M6×16 | 10~12 | 1.0~1.2 | 7.4~8.8 |  |
| 40 | BUZZER                                  |       |         |         |  |
| 41 | FUEL PUMP                               |       |         |         |  |

EXPLODED VIEW



| No. | Fastener                      | Torque |         |         | Remarks |
|-----|-------------------------------|--------|---------|---------|---------|
|     |                               | N·m    | kgf·m   | ft·lb   |         |
| 1   | WINCH POWER CORD              |        |         |         |         |
| 2   | WINCH MOTOR LINE              |        |         |         |         |
| 3   | STARTING MOTOR WIRE           |        |         |         |         |
| 4   | BATTERY POSITIVE WIRE         |        |         |         |         |
| 5   | BATTERY NEGATIVE WIRE         |        |         |         |         |
| 6   | MAIN CABLE                    |        |         |         |         |
| 7   | CROSS HEAD SCREWS<br>ST4.2×13 |        |         |         |         |
| 8   | HEXAGON FLANGE BOLT<br>M6×12  | 10~12  | 1.0~1.2 | 7.4~8.8 |         |
| 9   | HOSE CLAMP                    |        |         |         |         |
| 10  | HEXAGON FLANGE BOLT<br>M6×10  | 10~12  | 1.0~1.2 | 7.4~8.8 |         |

## TECHNICAL PARAMETERS

| Project   | Standard   | Use limit |
|---|--|-----------|
| <b>Battery:</b><br>Type<br>Capacity   | Sealed Battery<br>12 V 32 Ah   | ---       |
| <b>Charging System:</b><br>Alternator type<br>Charging voltage<br>(Regulator/rectifier output voltage)<br>Alternator output voltage<br>Stator coil resistance         | Three-phase DC 14 ~ 15 V<br>AC 36 ~ 54 V 3 000 r/min (rpm)<br>0.33 ~ 0.49                      | ---       |
| <b>Ignition System:</b><br>Spark plug:<br>Spark plug gap<br>Spark plug cap resistance<br>Ignition coil:<br>Primary winding resistance<br>Secondary winding resistance | 0.6~0.8 mm<br>3~12kΩ<br>466~593mΩ<br>8.2~10.5kΩ  | ---       |
| <b>Electric Starter System:</b><br>Starter motor:<br>Commutator diameter<br>Brush length  | 28mm<br>11.5mm   | ---       |
| <b>Fuel Pump:</b><br>Fuel pump pressure   | 400±20KPa  | ---       |
| <b>Switch:</b><br>Brake light switch timing of pedal travel<br>Rising temperature   | ON after 10 mm (0.4 in.) of pedal travel<br>From OFF to ON at 88°C<br>From ON to OFF at 83.5°C | ---       |

### SPECIAL TOOLS

Multimeter



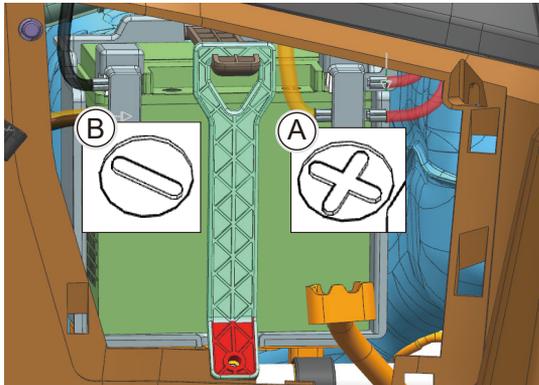
#### ⚠ CAUTION

- ◆ When the multimeter is measuring voltage, the meter pen should not be inserted into the current measuring hole
- ◆ When measuring resistance, please be sure to disconnect the battery positive pole.

Fault diagnosis instrument



## BATTERY



### REMOVE THE BATTERY

【A】 positive pole (+)

【B】 negative pole (-)

- ◆ Turn off the ignition
- ◆ Remove side plastic cover
- ◆ Loosen the bolt of the battery holder
- ◆ Remove the battery mounting bracket
- ◆ Disconnect the negative (-) battery cable first, then the positive (+) cable
- ◆ Remove the battery

### TURN OFF IGNITION SWITCH

- ◆ Place the battery in place with the battery box and retainer.
- ◆ First connect the battery positive (+) cable, then connect the negative (-) cable.
- ◆ Thin grease is applied to the terminals to prevent corrosion.
- ◆ Tighten the battery seat bolts. Match the model name of the battery. These names must be the same.

**Battery model Name: GHD32HL-BS**

### ⚠ CAUTION

This battery is a colloidal battery and does not need to add electrolyte.



### BATTERY CHARGING

In the case shown in the following table, to start the vehicle fully to start the engine, and it should be charged before use. However, if the battery voltage is higher than 12.6V after 10 minutes of charging, no initial charge is required.

| The conditions under which an initial charge is required             | charging method       |
|--|-----------------------|
| At low temperatures (below 0°C )                                     | 1.4 A x 2 _ 3 Hours   |
| Batteries have been stored at high temperatures and in high humidity | 1.4 A x 15 _ 20 Hours |
| The seal has been removed or cracked - flaked, torn or torn          |                       |
| The battery life is more than 2 years after manufacture              |                       |

**NOTE: Terminal voltage - To measure the terminal voltage of the battery, use a digital voltmeter. When measuring the terminal voltage after charging, the battery should stand still for more than 20 minutes.**

#### Preventive measures:

##### 1) Colloidal battery, no liquid filling is required

- ◆ Before normal use, there is no need to replenish the battery as long as it is not exhausted. It is very dangerous to pry open the sealing plug and add water. Never do that.

##### 2) Recharge

- ◆ If the engine fails to start, the horn becomes weaker or the indicator light goes dark, it shows the battery is exhausted.
- ◆ Charge the battery for 5 to 10 hours according to the charging current as shown in the specification.
- ◆ When it is inevitable to need quick charging, please charge in strict accordance with the maximum charging current and the time conditions indicated on the battery.

### **WARNING**

The battery is designed to withstand no abnormal damage if it is recharged as specified above. However, if charged under conditions other than those described above, the performance of the battery may degrade significantly. Do not remove the seal cover during recharging. If excess gas is generated due to overcharging, a safety valve ensures battery safety.

#### **3) When you don't use the vehicle for months**

- ◆ Charge your motorcycle before storing it and store it before removing the negative cable.
- ◆ Fully charged once a month while in storage.

#### **4) Battery life time**

- ◆ If the battery fails to start the engine after several charges, the battery has exceeded its useful life; replace it with a new one.

### **WARNING**

Keep batteries away from sparks and open flames during charging.

Explosive gas mixtures that emit hydrogen and oxygen. When using a battery charger, connect the battery to the charger before turning it on. This procedure prevents sparking at the battery terminals, which may ignite any flammable gases.

Keep ignition sources away from the battery and do not loosen the terminals. The electrolyte contains sulfuric acid. Be careful not to let it come into contact with your skin or eyes. If touched, wash it off with plenty of water. If serious, seek medical attention.

#### **Exchange service**

- ◆ Sealed batteries can only perform to their fullest extent when used in conjunction with the proper vehicle electrical equipment.
- ◆ Therefore, sealed batteries can only be replaced on vehicles originally equipped with the tool.
- ◆ If a sealed battery is installed in a vehicle with a regular battery, beware of the equipment, the life of the sealed battery will be shortened.

**CHARGING CONDITION CHECK**

The battery state of charge can be checked by measuring to check the battery terminal voltage.

- ◆ Remove the battery (refer to the section on Removing the battery).



**! WARNING**

First, make sure to disconnect the negative (-)

- ◆ Measure the battery terminal voltage.

**! CAUTION**

Measure the voltage to one decimal place with a digital voltmeter [A] that can be read.

If the reading falls below the specified value, it needs to be recharged.

**Battery terminal voltage**

**Standard: 12.6 V or higher**

- ◆ **Remove the battery (see section Removing the Battery).**
- ◆ **Recharge the battery according to the following method.**

**! WARNING**

The battery is sealed. Do not open it. Do not add water when charging.

**Charging current and time as described below.**

**Charging current and time as described below.  
Terminal Voltage: 11.5 \_ below 12.5 V Standard Charge:**

**3.2 A x 5 \_ 10 hours (see schedule)**

**Fast Charge:**

**32 A x 1.0 hour**

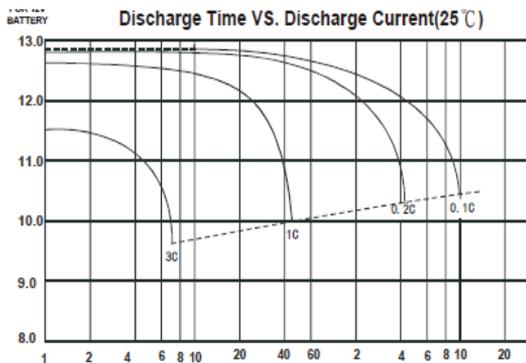
**! WARNING**

If possible, do not charge quickly. If an unavoidable situation occurs that requires rapid charging, pay attention to the ambient temperature.

**Test against the standard voltage later.**

**Terminal voltage: less than 11.5V**

**Charging method: 3.2 A x 20 hours**

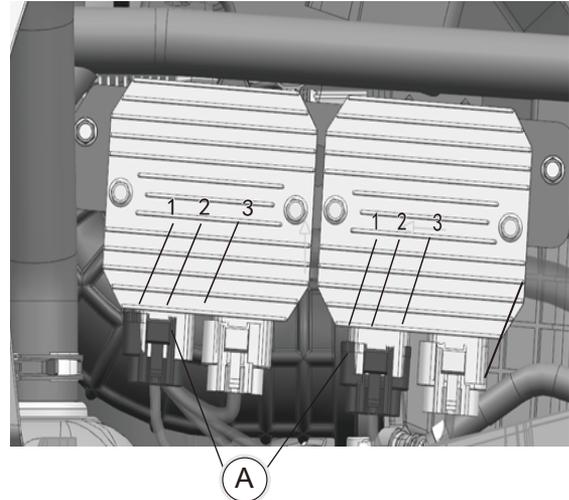


## GENERATOR INSPECTION

There are three types of alternator failures: short circuits, disconnections, or rotor magnetic losses. A shorted or disconnected wire in one of the coils will result in low output or no output at all. A loss of rotor magnetic field, which can be caused by a fall or by placing the alternator near an electromagnetic field that hits the alternator magnetic field or low output due to aging alone

To check the alternator output voltage, perform the following procedure.

- ◆ Remove the rear fenders (see chapter “Frame”).
- ◆ Disconnect the alternator connectors A (two sets) (1, 2, 3 in the connector are the magneto three-phase leads),
- ◆ (1, 2, 3 in the connector are the three-phase magneto leads).
- ◆ Connect the handheld tester as shown in the table below.
- ◆ Start the engine.
- ◆ Run it at the speed given in the table.
- ◆ Note the voltage readings (a total of 3 measurements per set). Alternator Output Voltage



| Range tester | Tester connection |                     | Reading @3000 rpm |
|--------------|-------------------|---------------------|-------------------|
|              | (+)               | (-)                 |                   |
| 250 V AC     | One Yellow wire   | Another Yellow wire | 36~54 V           |

If the output voltage is within the value in the table, the alternator is operating normally and the regulator/rectifier has been damaged. A much lower reading indicates that the AC generator is defective.

Check the stator coil resistance as follows:

- ◆ Stop the engine
- ◆ Disconnect the AC generator connector

Connect the handheld tester as shown in the table below.

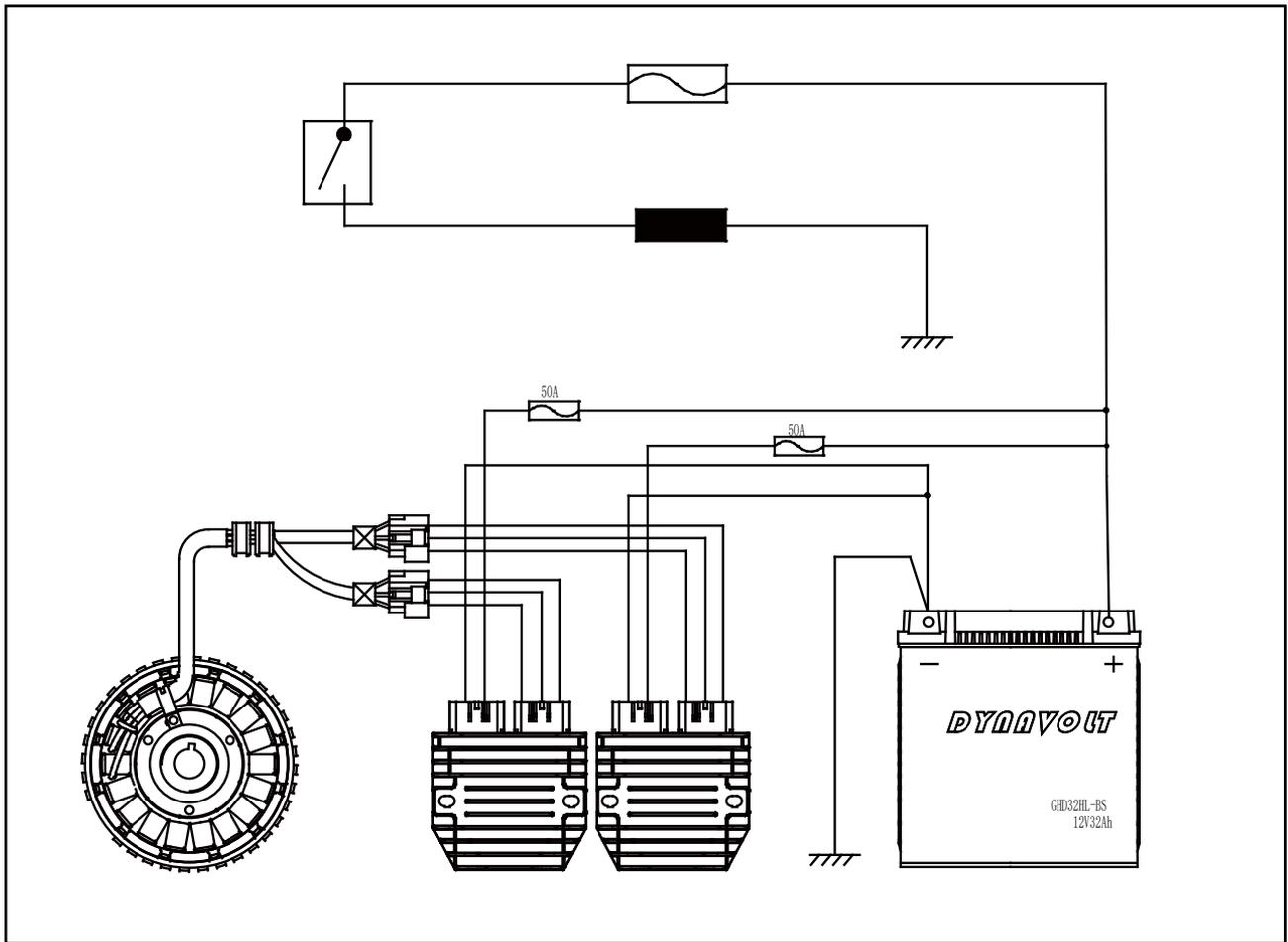
Pay attention to the readings (3 measurements in total).

Stator coil resistance

| Range tester      | Tester connection |                     | Reading @3000 rpm    |
|-------------------|-------------------|---------------------|----------------------|
|                   | (+)               | (-)                 |                      |
| $\times 1 \Omega$ | One Yellow wire   | Another Yellow wire | 0.30 _ 0.49 $\Omega$ |

- ◆ One yellow wire and the other yellow wire if the resistance is greater than that shown in the table, or show nothing. Read the (infinity) of any two wires, the stator has an open circuit and must be replaced. Less resistance means that the stator is short-circuited and must be replaced.
- ◆ Using a handheld tester, measure the resistance between each yellow lead with the engine. Any reading less than infinity must be replaced.
- ◆ If the stator coil has normal resistance, but the voltage check shows that the AC generator is faulty then the rotor magnetism may have weakened and the rotor must be replaced.

### CIRCUIT DIAGRAM OF CHARGING SYSTEM



- |               |                        |            |
|---------------|------------------------|------------|
| 1. Alternator | 2. regulator/rectifier | 3. Battery |
| 4. Main Fuse  | 5. Ignition lock       | 6. Load    |

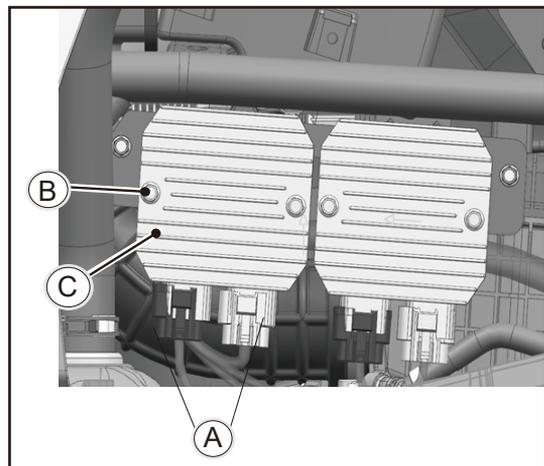
## VOLTAGE REGULATING RECTIFIER INSPECTION

Test and Judgment Method of Charging Voltage on Whole Vehicle

| Test conditions and methods   | Output voltage  |
|---|---|
| <ol style="list-style-type: none"> <li>1. Connect the product according to the normal loading state, after the vehicle started, the speed will remain above 2000rpm;</li> <li>2. Bring a fully charged battery;</li> <li>3. Use a multimeter to test the voltage at the output terminal of the regulator</li> </ol> | Output voltage:14.0-15.0V<br>Qualified; otherwise unqualified |

### REMOVE

- ◆ Connectors (two sets) [A] (disconnection)
- ◆ Four bolts [B] and regulating rectifier (two sets) [C]

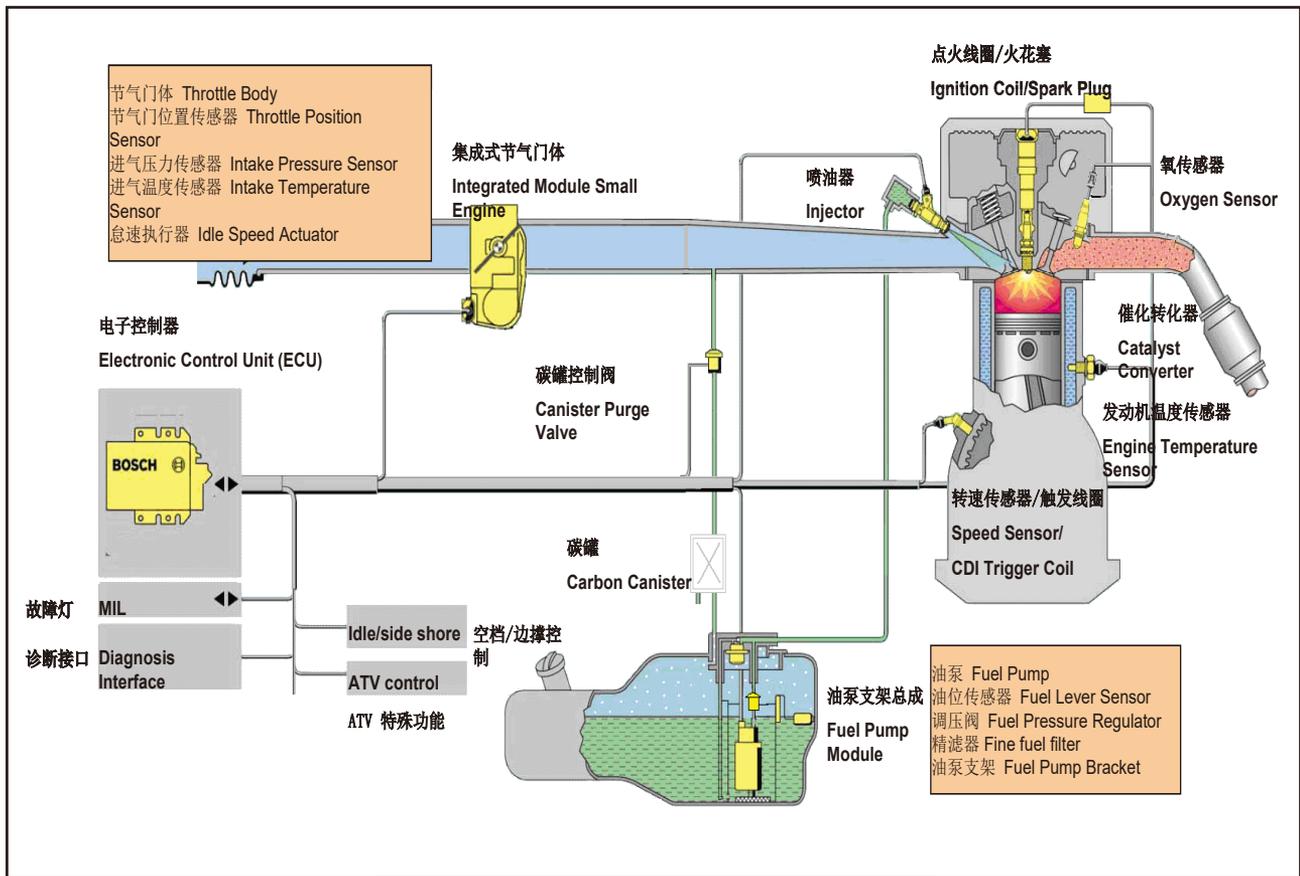


### Output resistance characteristics (unit Ω)

| Output resistance characteristics (unit Ω) |           |         |         |         |         |  |
|--|-----------|---------|---------|---------|---------|--|
|  | Output +  | Y1      | Y2      | Y3      | Output- | Digital multimeter<br>(Diode gear)   |
| Output+                                    |           | ∞       | ∞       | ∞       | ∞       | Connect the red pen to output +, and the black test pen to measure the remaining terminals |
| Y1   | 0.12-0.25 |         | ∞       | ∞       | ∞       | Connect the red pen to Y1, and the black test pen to measure the remaining terminals       |
| Y2   | 0.12-0.25 | ∞       |         | ∞       | ∞       | Connect the red pen to Y2, and the black test pen to measure the remaining terminals       |
| Y3   | 0.12-0.25 | ∞       | ∞       |         | ∞       | Connect the red pen to Y3, and the black test pen to measure the remaining terminals       |
| Output-                                    | 0.5-0.7   | 0.4-0.6 | 0.4-0.6 | 0.4-0.6 |         | Connect the red pen to output -, and the black test pen to measure the remaining terminals |

### EFI SYSTEM

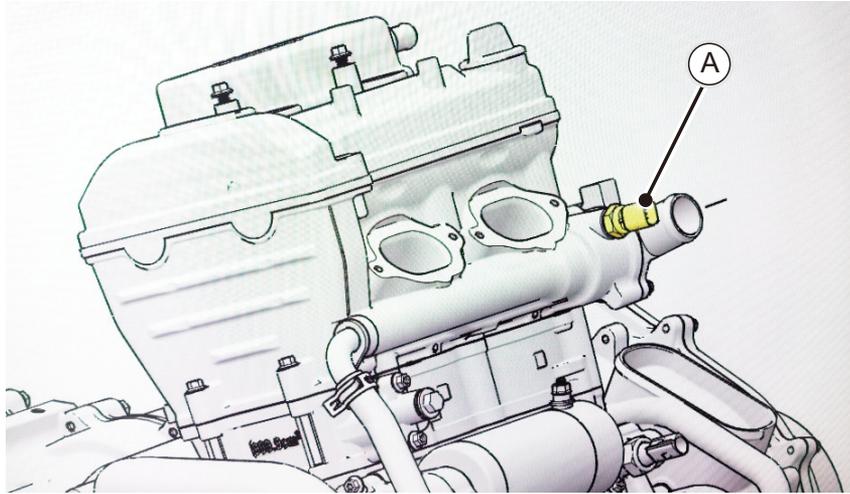
#### SCHEMATIC DIAGRAM OF EFI SYSTEM



## TEMPERATURE SENSOR

### FUNCTION INTRODUCTION

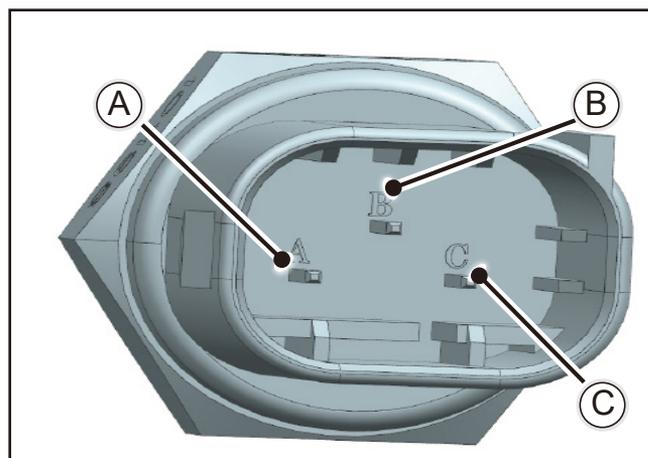
The temperature sensor function is used to monitor the temperature of the engine coolant. The sensor delivers engine temperature information to the ECU to determine engine performance and the display. The temperature sensor is generally installed on the intake side of the engine block. The cylinder temperature sensor can be seen by disassembling the left side cover and seat cushion of the whole vehicle (see 【A】 in the figure below).



### WORKING PRINCIPLE

The NTC thermistor is encapsulated in the temperature sensor, and its resistance value changes with the change of the ambient temperature, so as to accurately and timely measures the small change of the external temperature. The temperature of the contact medium can be reflected by measuring its output resistance. Where, terminal 【A】 and Terminal 【C】 output signals to the electric control unit ECU, and terminal 【B】 is suspended. The stitch definition is shown in the figure below.

【A】 Connect the signal positive      【B】 Suspended      【C】 Connect the negative positive



### PERFORMANCE PARAMETER

- ◆ **Power:** 0.25W under standard use conditions
- ◆ **Working temperature:** -30°C~+130°C
- ◆ **Vibration level:** ≤600m/s<sup>2</sup>
- ◆ **Insulation resistance:** DC voltage of 500V is applied between the A and C end circuits and the B end circuit, and the insulation resistance is greater than 10MΩ.
- ◆ **Resistance-temperature characteristics are shown in Table 1**

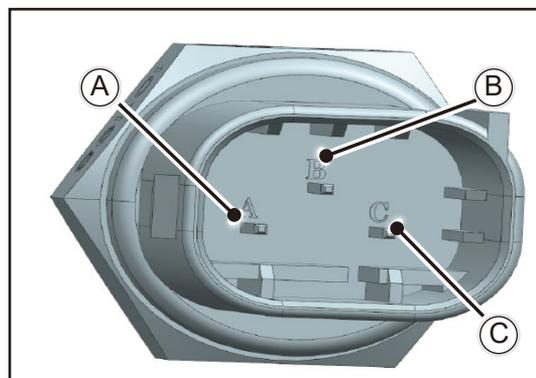
Table 1 Temperature sensor resistance-temperature characteristics

| Temperature range (°C) | A and C end resistances (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                |
|                        | B end resistances (Ω)        |
| 50±0.2                 | 176~280                      |
| 80±0.2                 | 63.4~81.4                    |
| 110±0.2                | 24.6~30.6                    |

### FAULT DIAGNOSIS

When the cylinder temperature is greater than its credible upper limit or less than its credible lower limit, the fault flag is set, and the common fault codes are shown in the fault summary table. Cylinder temperature sensor failure check:

- ◆ First check whether the sensor harness connector is well connected
- ◆ Unplug the connector, check whether the sensor and the wire harness end pins are bent or deformed, etc.
- ◆ Use M19mm open-end wrench to remove the sensor and check whether the sensor probe is deformed
- ◆ Check the resistance between pins **【A】** and **【C】**
- ◆ Connect the connector and check the voltage between pins **【A】** and **【C】**



## OXYGEN SENSOR

### FUNCTION INTRODUCTION

It is used in the feedback system of the electronic control fuel injection device to achieve closed-loop control and improve the control accuracy of the air-fuel ratio of the electronic control unit. It is installed on the exhaust pipe (see 【A】 in the figure below) close to the engine end. It determines whether the gasoline is completely burned by measuring the oxygen content in the exhaust gas to ensure that the three-way catalytic converter has the maximum of HC, CO and NOx in the exhaust gas.



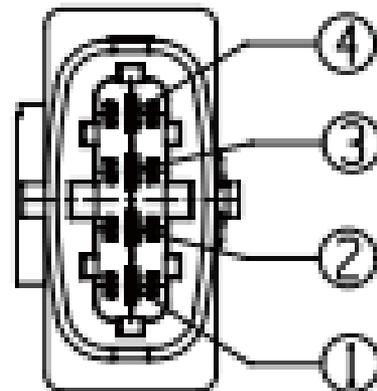
### WORKING PRINCIPLE

This is achieved by converting the difference in oxygen concentration inside and outside the sensing ceramic tube into a voltage signal output. When the temperature of the ceramic tube of the sensor reaches 350°C, the ceramic solid electrolyte has conductive properties. The oxygen molecules on both sides of the ceramic are catalyzed into oxygen ions by the platinum electrode of the sensor, and the oxygen ions can move inside the ceramic, therefore, the oxygen on both sides of the ceramic can diffuse through the ceramic itself.

It is this feature that converts the difference in oxygen concentration between the inner and outer sides of the ceramic into a potential difference, thereby forming an electrical signal output. If the mixed gas is thicker and the oxygen concentration in the exhaust gas produced by combustion is low, the oxygen ion concentration difference between the inside and outside of the ceramic tube is higher, the potential difference is higher, a large amount of oxygen ions move from the inside to the outside, and the output voltage is higher (about 800mv --1000mv); if the mixed gas is lean and the oxygen concentration in the exhaust gas produced by combustion is high, the difference in oxygen ion concentration between the inside and outside of the ceramic tube is low, the potential difference is low, the output voltage is low (about 100mv), and the signal voltage is A sudden change occurs near the theoretical equivalent air-fuel ratio ( $\lambda=1$ ).

The oxygen sensor electrical connector has 4 pins:

1. Connect to the positive pole of the heatingpower supply (red)
2. Connect to the negative pole of the heating power supply (white)
3. Connect to the negative signal of the signal (gray)
4. Connect to the positive signal of the signal (black)



### PERFORMANCE PARAMETER

| Item   | New oxygen |        | 500h Durable after oxygen |        |
|--|------------|--------|---------------------------|--------|
|  | 350°C      | 850°C  | 350°C                     | 850°C  |
| Exhaust temperature                                  | 350°C      | 850°C  | 350°C                     | 850°C  |
| $\lambda = 0.97$ when the sensor element voltage(mv) | 840±70     | 710±70 | 840±80                    | 710±70 |
| $\lambda = 1.10$ when the sensor element voltage(mv) | 20±50      | 55±30  | 20±50                     | 40±40  |
| Internal resistance of sensing element (kΩ)          | ≤1.0       | ≤0.1   | ≤1.5                      | ≤0.3   |
| Response time (ms)<br>(600mv-300mv)                  | ≤150       | ≤150   | ≤300                      | ≤200   |
| Response time (ms)<br>(300mv-600mv)                  | ≤150       | ≤150   | ≤300                      | ≤200   |

### ELECTRICAL CHARACTERISTIC PARAMETER

| Item  |   | Value | Unit |
|---|---|-------|------|
| Edge resistance between the new sensor heating element and the sensor connector   | Ambient temperature, heating element break resistance                                   | ≥30   | MΩ   |
|   | Exhaust temperature 350°C   | ≥30   | MΩ   |
|   | Exhaust temperature 850°C   | ≥30   | KΩ   |
| Power supply voltage on plug  | Rated voltage   | 12    | V    |
|   | Continuous working voltage  | 12-14 | V    |
|   | Working voltage that can maintain 1% of total life at most (exhaust temperature ≤850°C) | 15    | V    |
|   | Up to 75s working voltage can be maintained (exhaust temperature ≤350°C)                | 24    | V    |
|   | Test voltage  | 13    | V    |
| Working voltage is 13V, heating power when reaching thermal equilibrium (exhaust temperature 350°C, exhaust flow velocity is about 0.7m/s)      |   | 12    | W    |
| Working voltage is 13V, heating current when ambient temperature is -40°C (exhaust temperature is 350°C, exhaust flow velocity is about 0.7m/s) |   | 5     | A    |
| Fuse of heating circuit   |   | 8     | A    |

### TROUBLESHOOTING

The electronic control unit ECU monitors various sensors, actuators, power amplifier circuits and detection circuits. Common fault codes are shown in the fault list.

#### **⚠ CAUTION**

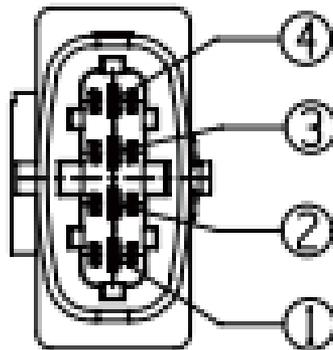
When the fault of oxygen sensor signal is checked, the engine should be run for at least 5-10min to ensure the completion of heating of oxygen sensor.

Oxygen sensor failure check:

- ◆ Check whether the oxygen sensor connector is well connected
- ◆ Unplug the connector, check whether the sensor and the wire harness end pins are bent or deformed, etc.
- ◆ Check whether the resistance between pins 1 and 4 is normal
- ◆ Check whether the voltage between pin 1 and the main relay is normal
- ◆ Connect the connector and run the engine for a period of time, check whether the voltage between pins A and C is normal.

In addition, the oxygen sensor is an indirect reflection sensor. If other sensors are faulty, the oxygen sensor will also report a fault:

- ◆ Unreliable battery voltage
- ◆ The absolute pressure signal of the intake manifold is unreliable
- ◆ The signal of the engine temperature sensor is unreliable
- ◆ Injector driver stage failure



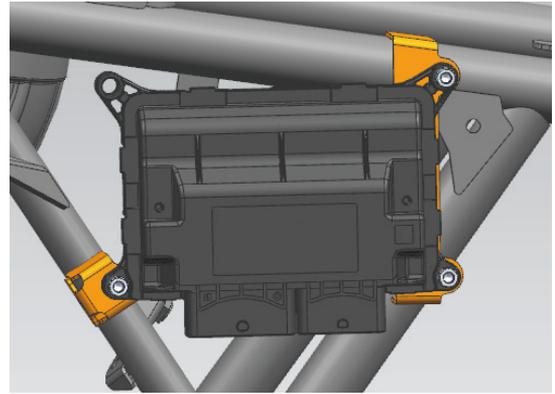
#### **⚠ WARNING**

When disassembling the oxygen sensor, be careful of the muffler and engine, and be careful of burns!

### ELECTRONIC CONTROL UNIT ( ECU )

#### FUNCTION INTRODUCTION

As a key component of the engine control management system, the electronic control unit (ECU) detects and controls the normal operation of the engine system, collects load information through sensors, predicts the driver's driving intentions, and at the same time ensures optimal fuel economy to meet the emission standards required by regulations. The engine management system is equipped with sensors and actuators necessary for the ECU's work. The ECU calculates the required air-fuel mixing ratio and the ignition advance angle of the engine according to the input data from the sensors, and controls the engine's fuel supply, fuel injection timing, high-pressure ignition timing, ignition closure angle, engine idle speed, speed closed-loop control, etc., under various operating conditions based on the measured data and the operating status of other accessory systems. Speed closed-loop control, etc.



#### ELECTRICAL CHARACTERISTICS

##### **Working voltage:**

**Rated voltage: 13.5V**

**Full functional operating voltage range: 9 V ~ 16 V**

**Function limited voltage range: 6V ~ 9V, 16V ~ 18V**

**Ensure the diagnostic function voltage range: 8V ~ 16V**

##### **Working current:**

**Working current : < 1.1 A@13.5v**

**Static current: <1 mA@13.5v**

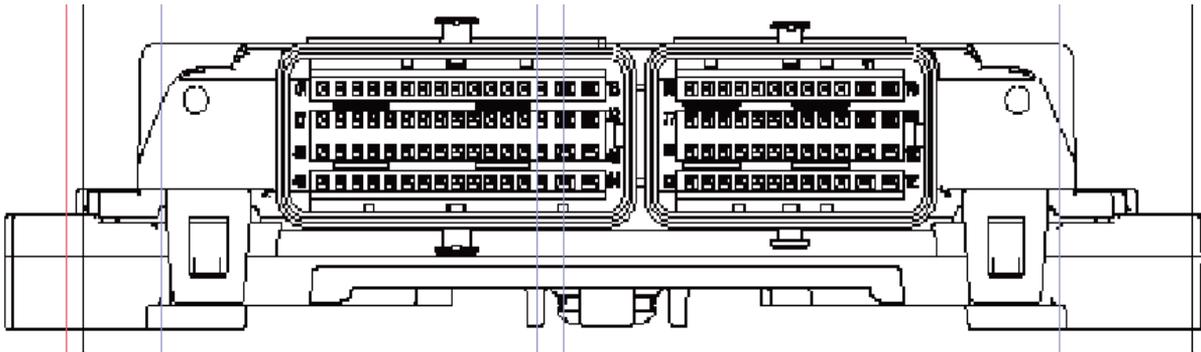
##### **Electrical protection:**

- ◆ Overvoltage protection: ECU can withstand 24V overvoltage for 60 seconds (ambient temperature is  $23^{\circ}\text{C}\pm 5^{\circ}\text{C}$ ). If the system returns to normal operating voltage within 60 seconds, ECU can still ensure normal operation.
- ◆ System reverse voltage protection: If UBR (Pin8) is powered by the main relay, the ECU can withstand a reverse voltage of 14.0 V for 60 seconds (ambient temperature is  $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ , other connections are correct), within 60 seconds If the system returns to normal working voltage, ECU can still guarantee normal operation.
- ◆ Output level protection: The controller drive level has diagnostic protection functions, such as short-circuit to ground, short-circuit to power supply and open circuit. But it needs to be pointed out that the ECU ignition pin does not have a short circuit protection function.

#### FAULT DIAGNOSIS

The No. 34 pin of the ECU is connected to the K line for fault diagnosis. The K line can be used to call up the fault information record in the ECU, or manually input some instructions such as clearing the fault information record, self-learning, etc. ECU failure inspection mainly checks whether the connectors are well connected and whether the pins are bent or deformed.

## ECU STITCH DEFINITION



| Item | Name                       | item | Name                      |
|------|----------------------------|------|---------------------------|
| 1    | CAN1H CAN (HIGH)           | 26   | NC                        |
| 2    | NC                         | 27   | NEUTRAL SWITCH SIGNAL     |
| 3    | NC                         | 28   | NC                        |
| 4    | NC                         | 29   | REVERSE GEAR SWITCH       |
| 5    | MAIN RELAY                 | 30   | ACCELERATOR PEDAL SENSOR2 |
| 6    | FOUR-WHEEL DRIVE SWITCH    | 31   | NC                        |
| 7    | GROUND FOR PEDAL 1         | 32   | NC                        |
| 8    | NC                         | 33   | NC                        |
| 9    | NC                         | 34   | NC                        |
| 10   | VEHICLE SPEED INPUT        | 35   | IGNITION SWITCH           |
| 11   | NC                         | 36   | SENSOR SUPPLY FOR PEDAL 2 |
| 12   | NC                         | 37   | SENSOR SUPPLY FOR PEDAL 1 |
| 13   | NC                         | 38   | NC                        |
| 14   | THRUST AUGMENTATION SWITCH | 39   | NC                        |
| 15   | SWITCHED BATTERY VOLTAGE   | 40   | NC                        |
| 16   | SWITCHED BATTERY VOLTAGE   | 41   | FUEL PUMP RELAY           |
| 17   | CAN1L CAN (LOW)            | 42   | HEAD LAMP RELAY           |
| 18   | NC                         | 43   | GROUND FOR LAMBDA         |
| 19   | NC                         | 44   | SPORT-MODE SWITCH         |
| 20   | CONTINOUS SUPPLY VOLTAGE   | 45   | ACCELERATOR PEDAL SENSOR1 |
| 21   | LAMBDA SENSOR2             | 46   | NC                        |
| 22   | NC                         | 47   | NC                        |
| 23   | BRAKE SWITCH               | 48   | LAMBDA SENSOR HEATING2    |
| 24   | LOW SPEED SWITCH           | 49   | NC                        |
| 25   | BRAKE LIGHT                | 50   | NC                        |

# ELECTRICAL SYSTEM

## SEGWAY AT10

| Item | Name                       | item | Name                           |
|------|----------------------------|------|--------------------------------|
| 51   | NC                         | 82   | NC                             |
| 52   | NC                         | 83   | NC                             |
| 53   | NC                         | 84   | GROUND FOR SENSOR              |
| 54   | NC                         | 85   | GROUND FOR MANIFOLD            |
| 55   | NC                         | 86   | GROUND FOR THROTTLE            |
| 56   | FAN RELAY CONTROL          | 87   | THROTTLE ACTUATOR              |
| 57   | NC                         | 88   | NC                             |
| 58   | CRANK RELAY                | 89   | NC                             |
| 59   | GROUND FOR PEDAL2          | 90   | NC                             |
| 60   | NC                         | 91   | INTAKE MANIFOLD PRESSURE1      |
| 61   | NC                         | 92   | NC                             |
| 62   | NC                         | 93   | NC                             |
| 63   | ECU MAIN GROUND 2          | 94   | CANISTER PURGE VALVE           |
| 64   | ECU MAIN GROUND 1          | 95   | NC                             |
| 65   | NC                         | 96   | ENGINE SPEED SENSOR A          |
| 66   | NC                         | 97   | ENGINE SPEED SENSOR B          |
| 67   | NC                         | 98   | NC                             |
| 68   | INJECTOR1(CYL.1)           | 99   | IGNITION COIL2                 |
| 69   | NC                         | 100  | IGNITION COIL2                 |
| 70   | NC                         | 101  | ENGINE COOLANT TEMP SENSOR     |
| 71   | NC                         | 102  | INTAKE AIR TEMPERATURE SENSOR1 |
| 72   | INJECTOR2(CYL.2)           | 103  | NC                             |
| 73   | LAMBDA SENSOR HEATING1     | 104  | LAMBDA SENSOR1                 |
| 74   | NC                         | 105  | NC                             |
| 75   | THROTTLE ACTUATOR          | 106  | PARKING SWITCH                 |
| 76   | NC                         | 107  | SENSOR SUPPLY FOR THROTTLE     |
| 77   | THROTTLE POSITION SENSOR 1 | 108  | NC                             |
| 78   | THROTTLE POSITION SENSOR 2 | 109  | SENSOR SUPPLY FOR MAINFOLD     |
| 79   | NC                         | 110  | NC                             |
| 80   | GROUND FOR LAMBDA          | 111  | ECU MAIN GROUND 4              |
| 81   | NC                         | 112  | ECU MAIN GROUND 4              |

## ELECTRONIC THROTTLE BODY DVE SELF-LEARNING PROCESS

1. After replacing either ECU or electronic throttle body, it is necessary to restart the electronic throttle body self-learning;
2. For vehicles that have completed self-learning, turn the key to the ON again, after waiting for 29 seconds, the electronic throttle body self-learning will also be started again.
3. DVE self-learning must meet the following conditions at the same time
  - ① Vehicle speed (vfzg) is 0
  - ② The engine speed (nmotll) is less than 250RPM
  - ③ The engine water temperature (tmot) is between 5.25°C-100.5°C
  - ④ The intake air temperature (tans) is not less than 5.25°C
  - ⑥ Battery voltage (ub) is more than 10V
4. Self-learning operation method:

For the first DVE self-learning, just switch the ignition key to ON and wait for 10 seconds. Do not do anything else at this time.

5. Analysis of possible failures in self-learning and their causes:

If the initial self-learning cannot be completed, the following DVE fault codes may appear:

| Fault codes | meaning   | Fault light    |
|-------------|---|----------------|
| P1565       | DVE mechanical bottom dead center first self-learning failure                   | Bright SVS/EPC |
| P1579       | Unsatisfactory environmental conditions lead to withdrawal from DVE self-study  | —              |
| P1564       | The battery voltage condition is not met, which leads to exit DVE self-learning | —              |

(Note: The above fault codes are only for DVE fault codes recommended by UAES for OEMs. If customers have their own requirements for DVE fault codes, the fault codes may be different)

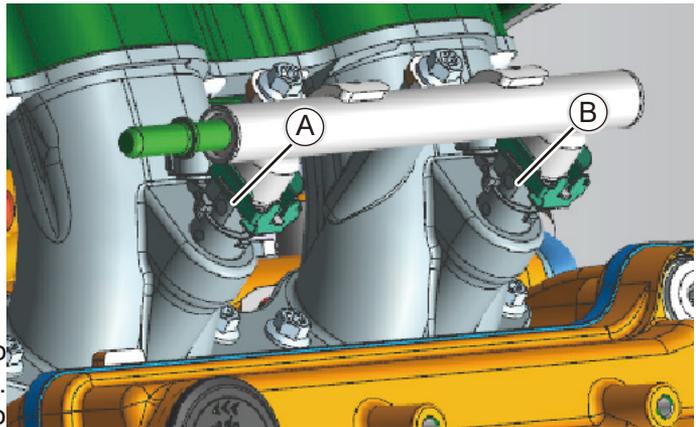
If the above faults are reported, the dveadchst variable needs to be measured by KIC to confirm what causes the DVE to fail self-learning, and the DVE self-learning can be successfully carried out only after the reasons are identified and eliminated.

| dveadchst | The following conditions are not met            |
|-----------|---|
| 24        | Engine speed (nmotll) is less than 250RPM       |
| 25        | Vehicle speed (vfzg) is 0                       |
| 26        | Electronic gas pedal (wped) is 0                |
| 27        | Battery voltage (ub) is greater than 10V        |
| 28        | 100 °C => engine water temperature (tmot)>=5 °C |
| 30        | Inlet air temperature (tans) not less than 5 °C |

### FUEL INJECTOR

The injector delivers fuel to the engine and atomizes it for a specified period of time, as commanded by the ECU.

The injector is mounted on the intake pipe and the other end is connected to the fuel line through the injector cap (see below at A and B).



### WORKING PRINCIPLE

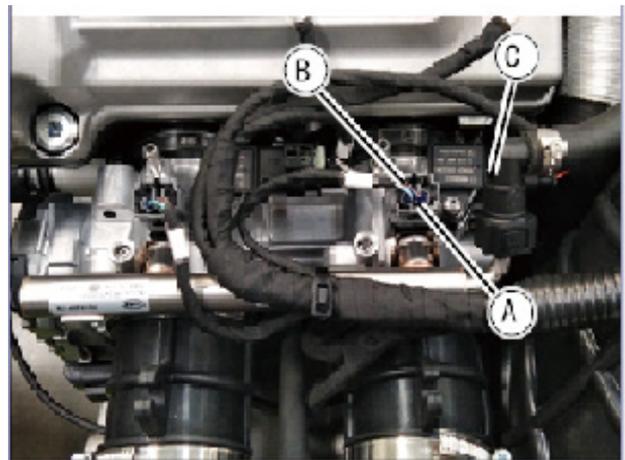
The ECU sends an electrical pulse signal to the injector coil, creating a magnetic field force. When the magnetic field force rises enough to overcome the combined force of the return spring pressure, the gravity of the needle valve and the sassafras force, the needle valve starts to rise and the injection process begins. The maximum lift of the needle valve is not more than 0.1mm, when the injection pulse cutoff, the return spring pressure makes the needle valve and then close again!

### ELECTRICAL CHARACTERISTICS

| Project      | Parameter              | Project         | Parameter               |
|--------------|------------------------|-----------------|-------------------------|
| Static flow  | 207.8g/min             | Coil resistance | 12Ω                     |
| Dynamic flow | 6.65mg/stroke (stroke) | Hydraulic leak  | 1.8mm <sup>3</sup> /min |
| Jet angle    | 23°                    |                 |                         |

### FAULT DIAGNOSIS

ECU only implements fault diagnosis for the fuel injector drive stage. When the fuel injector drive stage is short-circuited or overloaded to the battery voltage, short-circuited to the ground, or open circuit, the fault flag is set. At this time, close the closed-loop control of the oxygen sensor and its self-learning pre-control. The last self-learning data is valid. After the fault is removed, the fault flag is reset. Common fault codes are shown in the fault summary table



#### Injector failure inspection:

- ◆ Check the connectors are well connected
- ◆ Check whether the wiring harness and injector pins are bent or deformed
- ◆ Check whether the injector cap and the oil pipe are reliably connected
- ◆ Unplug the connector and check the coil resistance between pins A and B
- ◆ Check the resistance between the pins (A on the left figure) and the main relay
- ◆ Check the resistance between the pins (B in the left figure) and ECU pin 12 (see ECU pin definition)

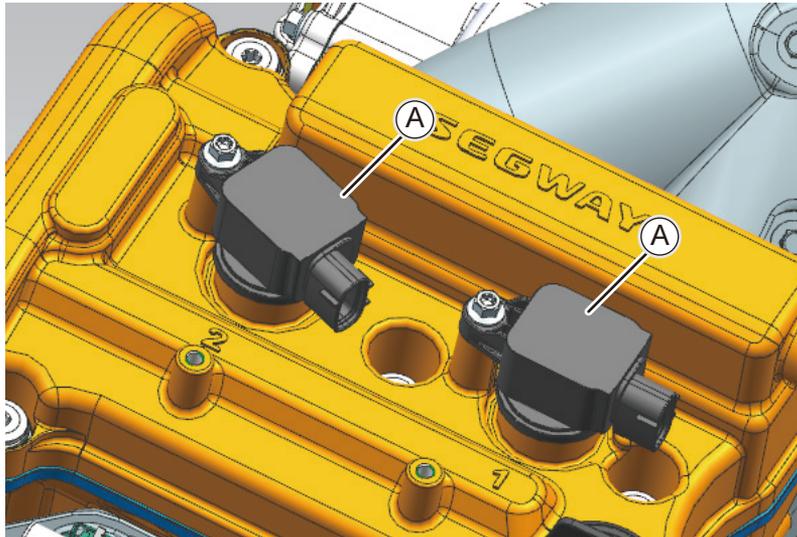
### ⚠ WARNING

When removing the fuel pipe, there is high-pressure fuel in the fuel pipe. Pay attention to fire safety and spray it into your eyes carefully.

### IGNITION COILS

The ignition coil converts the low-voltage electricity of the primary winding into the high-voltage electricity of the secondary winding, and generates sparks through the discharge of the spark plug to ignite the fuel-air mixture in the gas cylinder.

The ignition coil is installed on the engine. Remove the seat cushion to see the ignition coil installed on the engine (see **A** in the figure below).

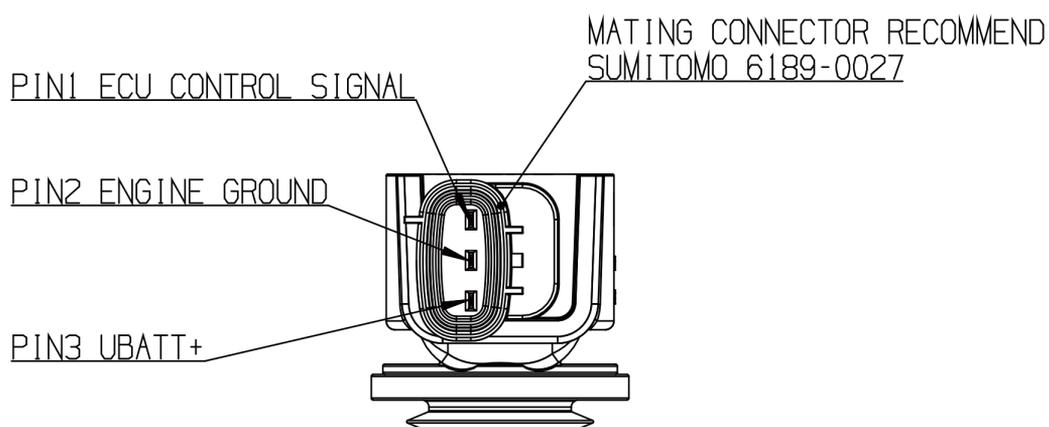


### WORKING PRINCIPLE

The ignition coil is composed of a primary winding, a secondary winding, an iron core, and a shell. When the battery voltage is applied to the primary winding, the primary winding is charged, once the ECU cuts off the primary winding loop, the charging is stopped and high voltage is induced in the secondary winding.

There are 3 pins on the low voltage side of the ignition coil:

- ◆ PIN 1: Connect to ECU control signal
- ◆ PIN 2: Pin Ground
- ◆ PIN 3: Connect to the positive terminal of the battery



### PERFORMANCE PARAMETERS

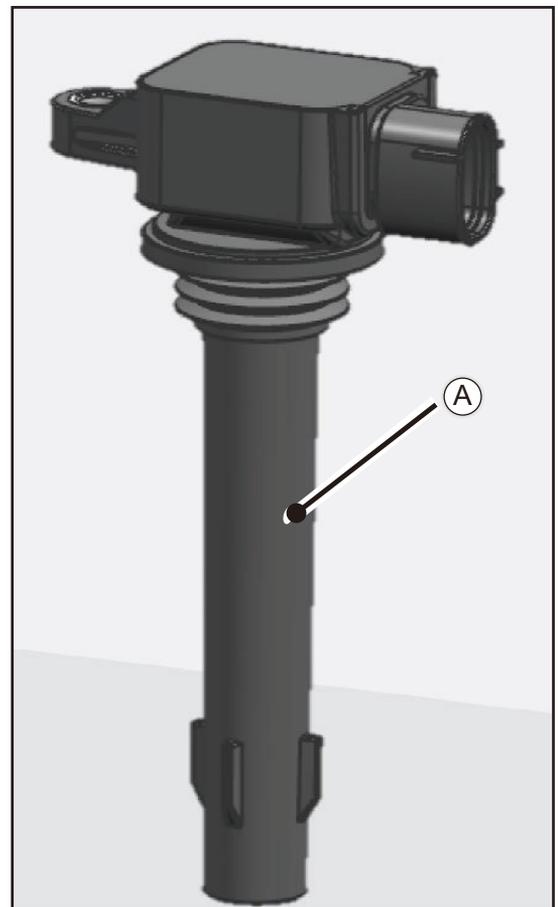
| Item                                     | Value             |       |      | Unit  |    |
|--|-------------------|-------|------|-------|----|
|  | Min               | Rated | Max  |       |    |
| Calibration voltage                      | /                 | 14    | /    | V     |    |
| Operating voltage                        | 6                 | 14    | 16.5 | V     |    |
| Resistance (20--25°C)                    | Primary winding   | 466   | 530  | 593   | mΩ |
|  | Secondary winding | 8.27  | 9.4  | 10.53 | kΩ |
| Primary current<br>(Charging time 3.9ms) | 7.4               | 8.0   | 8.6  | A     |    |
| Secondary voltage<br>(Load 35pF)         | 34                | /     | /    | kV    |    |
| Ignition energy<br>(Zener voltage 1000V) | 40                | /     | /    | mJ    |    |

### FAULT DIAGNOSIS

The ECU does not perform the fault diagnosis function for the ignition coil, so there is no ignition coil related code in the fault code list. If there is no ignition, please check whether the ignition coil connector is well connected, whether the pins are deformed, and whether the ignition coil wire and the spark plug are in good contact.

#### **⚠ WARNING**

If the spark plug wire (point **A** in the left picture) is installed incorrectly, it will cause the engine to shut down.

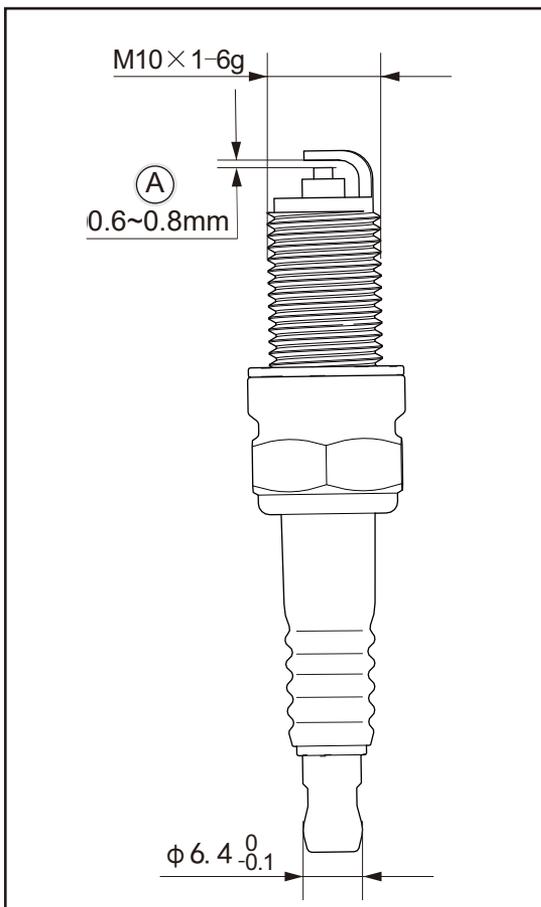


## SPARK PLUG

The spark plug introduces the pulsed high voltage electricity generated by the ignition coil into the combustion chamber, and uses the electric spark generated by the electrode to ignite the mixture to complete the combustion. The spark plug sample diagram (see the figure below).

### ⚠ WARNING

If the spark plug gap (point **A**) in the left picture) is outside the range of  $0.7\pm 0.1$ , it will lead to unreliable ignition or failure to ignite. Please adjust the gap or replace the spark plug in time



### REMOVE AND INSTALL SPARK PLUGS

- ◆ Remove the ignition coil
- ◆ Use the spark plug sleeve to remove the spark plug
- ◆ Take out the spark plug and check the state of the spark plug
- ◆ If there is no problem, please replace with a new spark plug

#### Spark plug torque

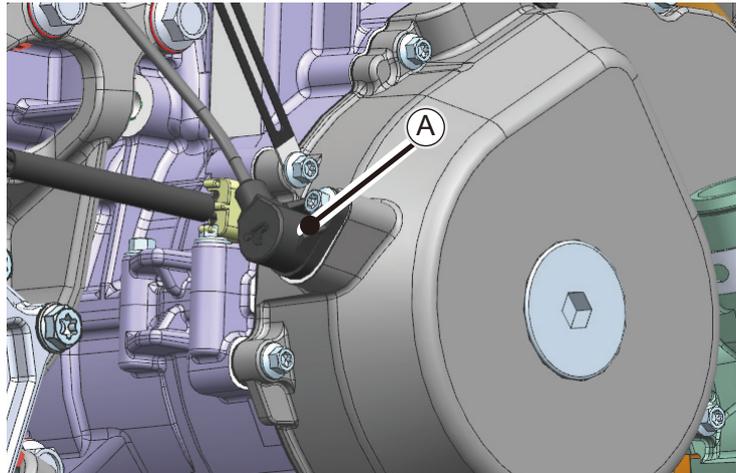
15N · m (1.5kgf·m, 11.1ft·lb)

### ⚠ CAUTION

In the process of disassembly and installation, be careful not to hit the spark plug against any hard objects such as the engine block. If so, please replace with new spark plugs in time.

### ENGINE SPEED SENSOR

The working principle of the speed sensor is to use the magnetoelectric effect. When the shaft rotates, the signal wheel is driven to rotate together, and the teeth on the signal wheel will cut the magnetic line of the sensor. This change in magnetic flux causes a certain frequency at both ends of the sensor coil. The output voltage is output to the electronic controller, and the output signal can represent the crankshaft speed and position (see A in the figure below).



### TECHNICAL PERFORMANCE TEST

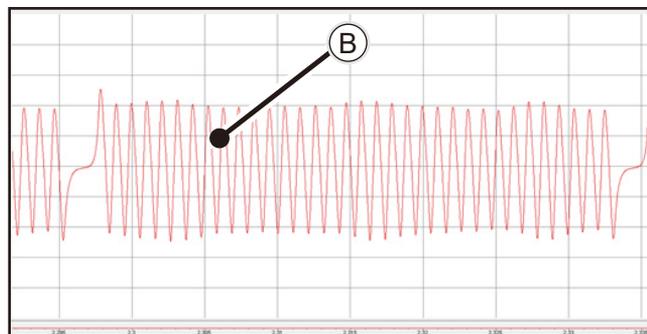
The speed sensor outputs a sinusoidal voltage signal, and the output signal (see 【B】 on the left)

**Coil resistance (23 °C) : 950±20 Ω**

**Coil inductance (1000HZ) : 450±15 mH**

### FAULT DIAGNOSIS

- ◆ When the engine cannot be started, the remaining fault points have been eliminated. Use a multimeter to test whether the coil resistance of the speed sensor is the resistance required by the technical performance.
- ◆ If the resistance value is normal, please use an oscilloscope to check whether the voltage signal output by the sensor is as shown in the figure (B in the left figure)



### ⚠ CAUTION

When the two pins of the sensor are connected reversely, the first gear signal after the missing gear in the output voltage signal is negative, which will cause the engine to be turbulent, idling unstable or unable to start.

## OIL PRESSURE SENSOR

The oil pressure sensor detects the size of the engine oil pressure when it is working, and it is usually screwed into the oil passage of the cylinder block. Its working principle is that there is a variable resistor inside the sensor, one end outputs the signal, and the other end is connected to the grounded sliding arm. When the oil pressure increases, the oil pressure pushes the diaphragm through the lubricating oil channel interface to bend, and the diaphragm pushes the sliding arm to a low resistance position, which increases the output current in the circuit, and vice versa, reduces the output current in the circuit. (See **【A】** in the figure below). The sensor is a normally open contact, the working pressure is  $250\pm 10\text{kPa}$ , and the maximum working temperature is greater than  $150^{\circ}\text{C}$ . When the oil pressure is too low, the oil pressure indicator on the instrument is always on.

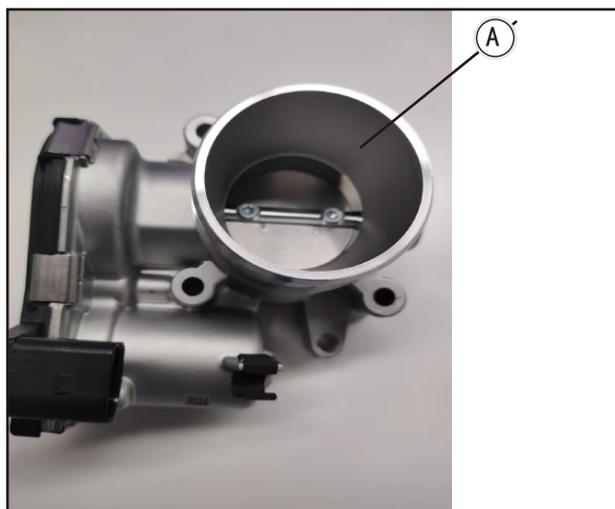


## FAULT DIAGNOSIS

1. When there is no oil pressure indicator, it is generally because the wiring harness connector is poorly connected.
2. When the wiring harness connector is well connected, the sensor itself is faulty. It is recommended to replace the sensor with a new one.

### **⚠ WARNING**

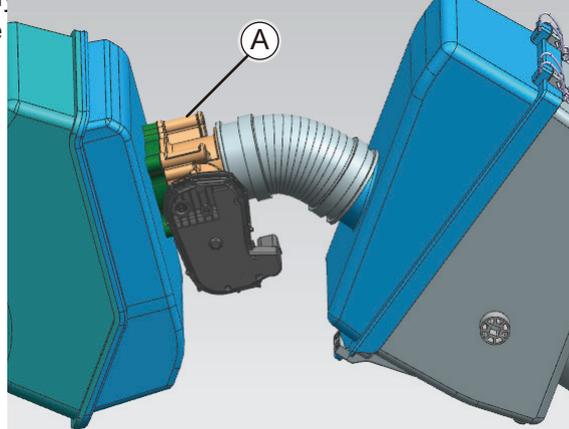
When an oil pressure failure occurs, you must troubleshoot the failure. Forcible operation will damage the engine.



### ELECTRONIC THROTTLE BODY ASSEMBLY

The electronic throttle body assembly connects the engine to the air filter, and the electronic throttle body is mounted within the engine's air intake system. The air flow into the cylinder is controlled by adjusting the angle of the throttle valve plate. Its main function is to adjust the switching angle of the throttle valve plate according to the driver's driving intention, in order to meet the air intake demand of the engine under different working conditions, and at the same time, the position signal of the throttle valve plate is fed back to the control unit to realize precise control. The valve assembly includes: throttle valve body, injector, oil rail assembly, pressure and temperature sensor, throttle position sensor and throttle actuator.

The electronic throttle body assembly can be seen by removing the left guard plate next to the seat cushion (see A in the figure



#### **⚠ CAUTION**

After the electronic throttle body is installed, you must ensure that a throttle body self-learning is carried out. After the self-learning is completed, start the vehicle and observe whether it works properly.

#### **DISASSEMBLY REQUIREMENTS**

- ◆ It is strictly prohibited to disassemble the electrically charged electronic throttle body;
- ◆ Do not disassemble the electronic throttle body until the vehicle has cooled to room temperature to prevent the overheated antifreeze from wetting the black cover plate and connectors;
- ◆ During disassembly, remove the mounting bolts diagonally and evenly, without damaging the upper and lower mounting surfaces, and make sure that the electronic throttle body is not dropped or hit.
- ◆ Make sure that the electronic throttle body is not dropped or hit;
- ◆ The force of the reset spring inside the electronic throttle body is large, so be careful to pinch your hand when gently pushing the valve plate.

#### **⚠ WARNING**

Impact with the electronic throttle body is prohibited during repair, and use of the electronic throttle body is prohibited after it has been dropped.

## THREE-IN-ONE SENSOR

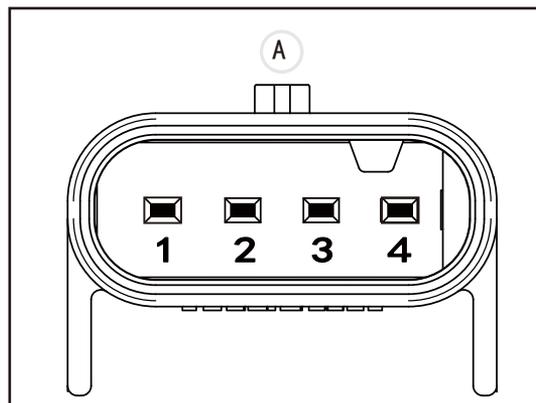
The three-in-one sensor includes: intake pressure, intake temperature and throttle position sensor. The pin diagram is shown on the left.

**Vp: intake pressure signal; Vin: 5V power supply;**

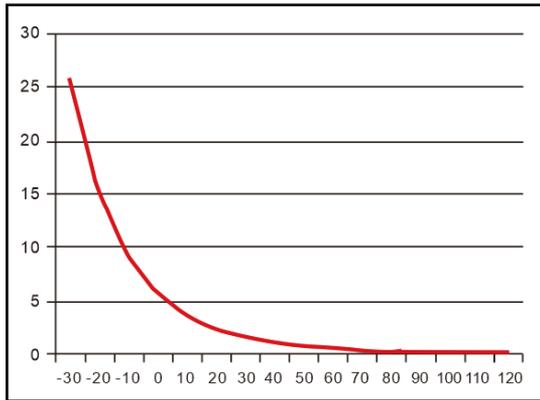
**GND: sensor ground; Vtps: throttle position signal;**

**Ts: intake air temperature signal;**

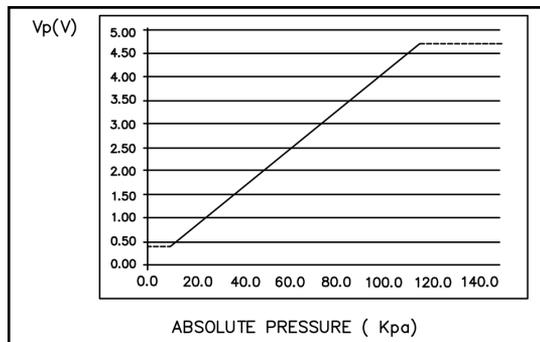
The core of the intake air temperature sensor is the thermistor that responds quickly to temperature. The intake air pressure sensor communicates with the main channel of the throttle body through the air pressure channel on the throttle body to detect the absolute pressure of the intake air. When the pressure in the main channel changes, the output voltage of the pressure chip will also change accordingly. Through the corresponding relationship between the output voltage and the absolute pressure of the main channel, the ECU can obtain the absolute pressure value of the main channel at this time. The throttle position sensor is an angle sensor with linear output, composed of two arc-shaped sliding contact resistors and two sliding contact arms. The rotating shaft of the sliding contact arm and the throttle body shaft are connected on the same axis. A voltage of 5V is applied to both ends of the sliding contact resistance. When the throttle valve rotates, the sliding contact arm rotates and moves on the sliding contact resistance at the same time, and outputs the potential of the contact as a voltage, which is actually a corner potentiometer.



### THREE-IN-ONE SENSOR PERFORMANCE CHARACTERISTICS



| Intake temperature sensor              |                      |
|--|----------------------|
| R25                                    | 2kΩ±3%               |
| B25/85                                 | 3520k±2%             |
| Temperature-resistance characteristics | See the left picture |



| Intake pressure sensor        |                      |
|-------------------------------|----------------------|
| Change sensitivity            | 40.5mv/kPa           |
| Output voltage characteristic | See the left picture |

### TROUBLESHOOTING

The ECU monitors various sensors and actuators as well as power amplifier and detection circuits. When there is a fault in the intake pressure, the engine may not start or may be difficult to start, common fault codes are listed in the fault matrix:

Intake pressure temperature sensor fault check:

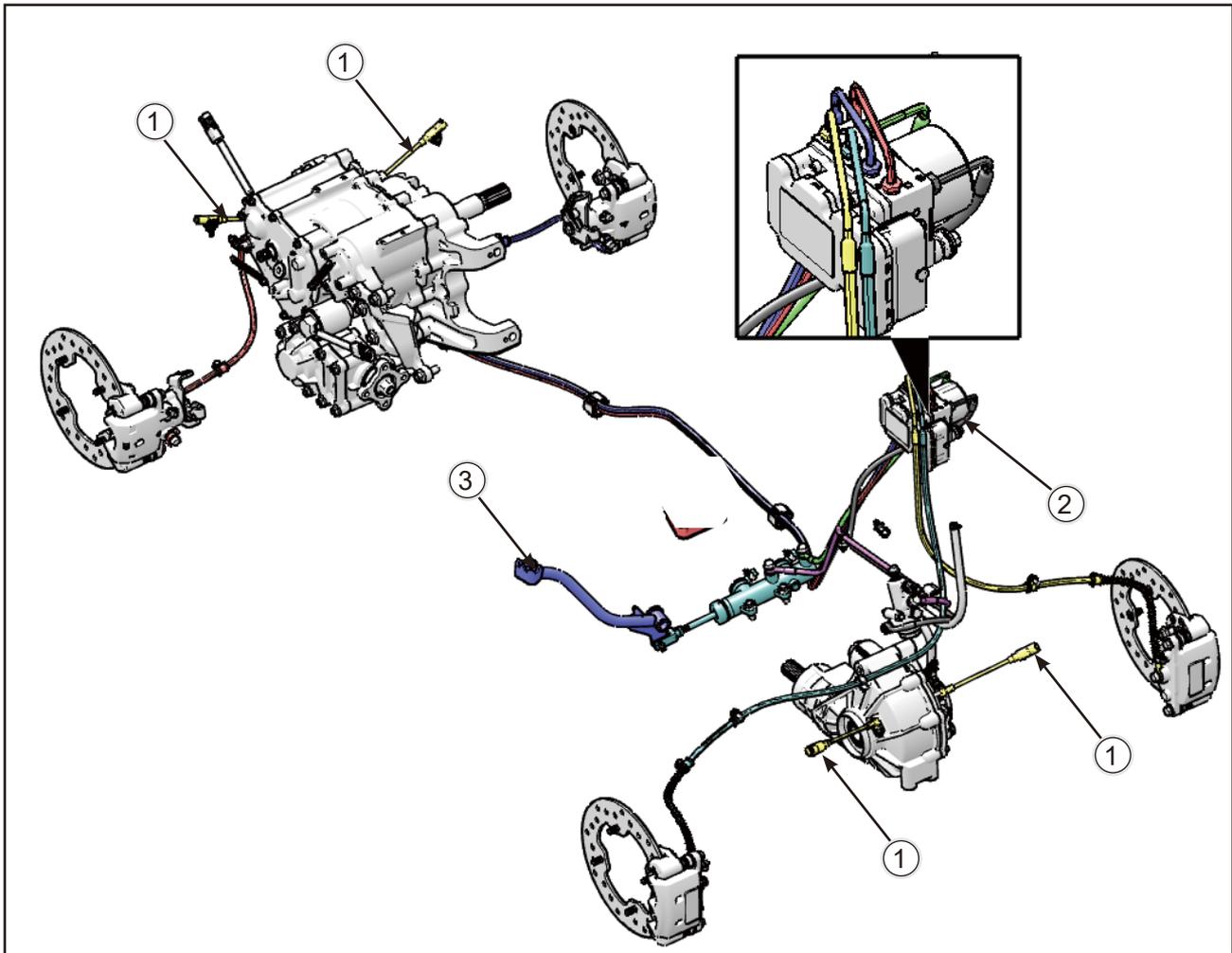
- ◆ Check that the connectors are well connected.
- ◆ Check whether the wiring harness and sensor pins are bent or deformed.
- ◆ Check whether the wiring harness and sensor pins are bent or deformed.

## ABS SYSTEM (APPLICABLE TO ABS MODELS)

### FUNCTION DESCRIPTION

The main function of ABS (Anti-lock Braking System) is to prevent the wheels from locking up during emergency braking, so as to maintain the stability and control of the vehicle. During emergency braking, ABS can automatically adjust the braking force of the brakes to keep the wheels in a rolling and sliding state, ensuring that the adhesion between the wheels and the ground is at its maximum value, thus improving braking effect and driving safety.

### ABS SYSTEM PARTS



1、 ABS Sensor

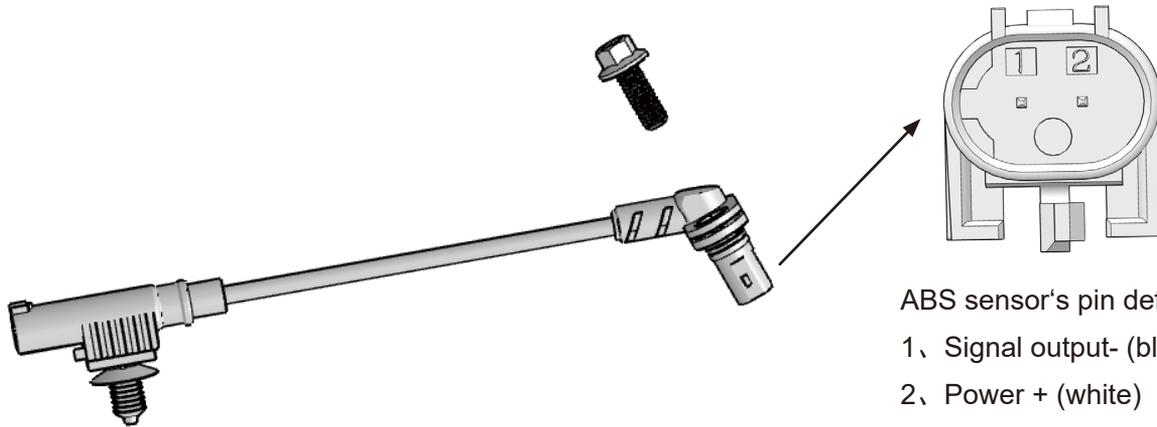
2、 ABS Control Unit

3、 Brake Pedal

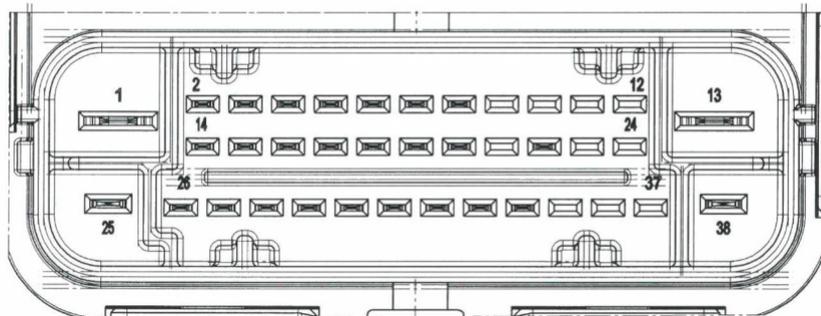
## SEGWAY AT10

### ABS SENSOR

The vehicle is equipped with four ABS sensors, two of which are located on the left and right sides of the front axle gearbox, and the other two are located on the left and right sides of the rear axle gearbox. The ABS sensors can be replaced if they fail.



### ELECTRONIC CONTROL UNIT

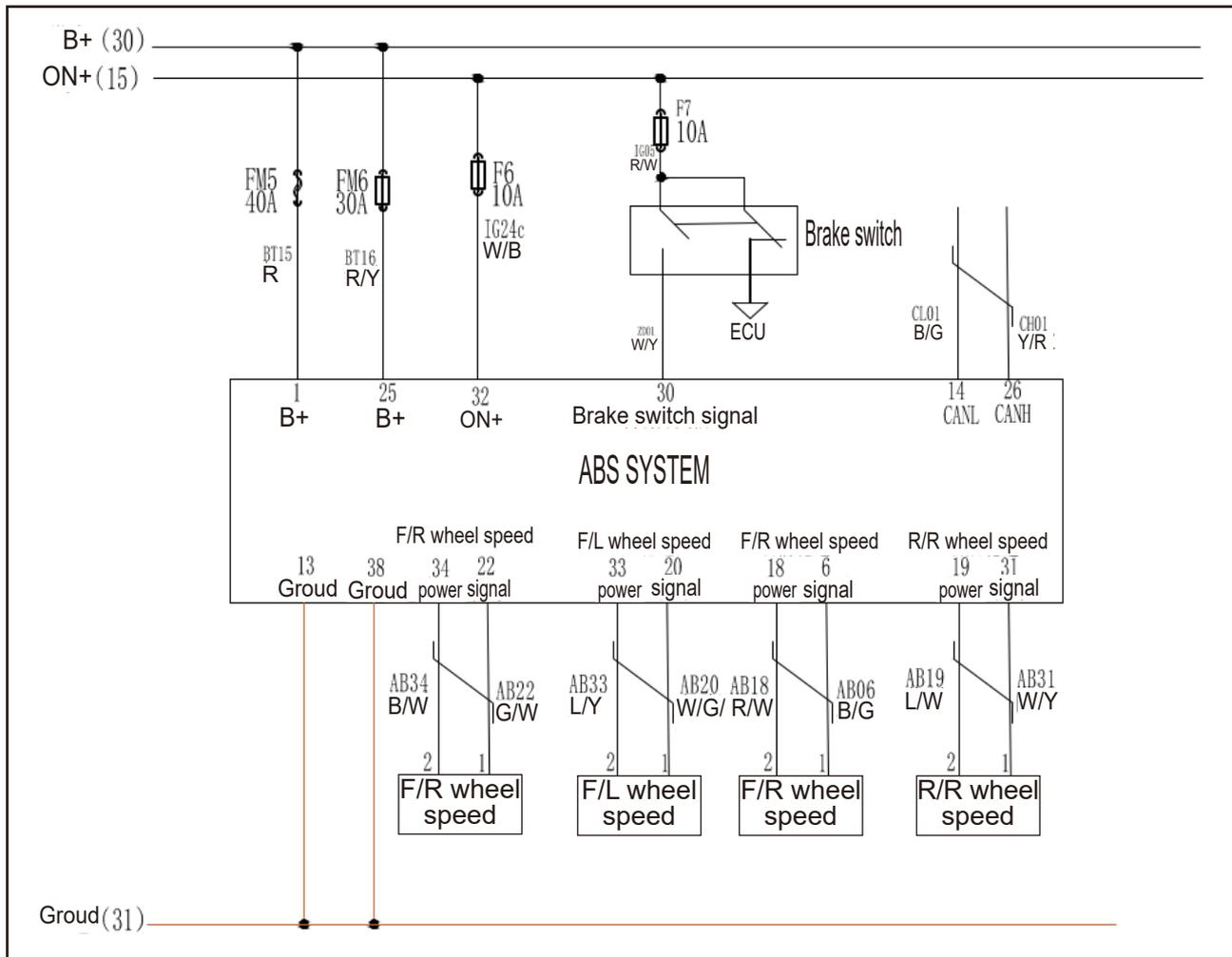


| 38-Pin Pin Definition |  |    |  |
|-----------------------|--|----|--|
| 1                     | Motor power supply                       | 25 | Valve relay sense power end (positive)   |
| 2                     | FR wheel speed signal output             | 26 | High-level CAN bus                       |
| 4                     | Active ABS                               | 27 | VSO                                      |
| 6                     | Wheel speed sensor signal end (FR)       | 28 | EBD warning light                        |
| 13                    | Motor Ground                             | 30 | Brake switch                             |
| 14                    | Low-level CAN bus                        | 31 | Wheel speed sensor signal end (RR)       |
| 17                    | Diagnostic K-Line                        | 32 | ECU power end (ignition power cable)     |
| 18                    | Wheel speed sensor power end/ground (FR) | 33 | Wheel speed sensor power end/ground (RL) |
| 19                    | Wheel speed sensor power end/ground (RR) | 34 | Wheel speed sensor power end/ground (FL) |
| 20                    | Wheel speed sensor signal end (RL)       | 38 | ECU Ground                               |
| 22                    | Wheel speed sensor signal end (FL)       |    |  |

## ABS SYSTEM WORKING PRINCIPLE DIAGRAM

ABS works by monitoring the speed signal of each wheel through the wheel speed sensor (ABS sensor), which quickly determines the state of wheel lock-up. When it detects that a wheel is about to lock up, ABS quickly adjusts the braking pressure to prevent the wheel from locking up completely. In this way, ABS is able to maintain the optimum wheel slip rate (approx. 20%) during emergency braking, thereby maximising braking effect and reducing brake consumption, extending the service life of brake components.

In addition, ABS has the advantage of improving braking efficiency, enhancing vehicle stability and strengthening driving safety. By intelligently regulating the braking pressure on the wheels, ABS makes more efficient use of braking force, optimises energy recovery and reduces the risk of loss of control due to tyre lock-up.

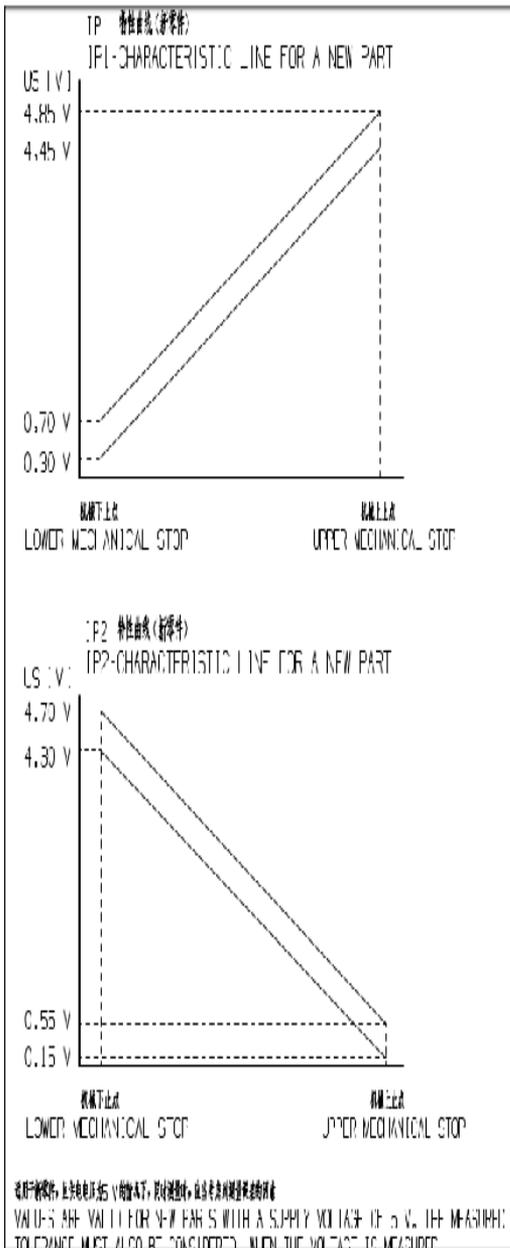
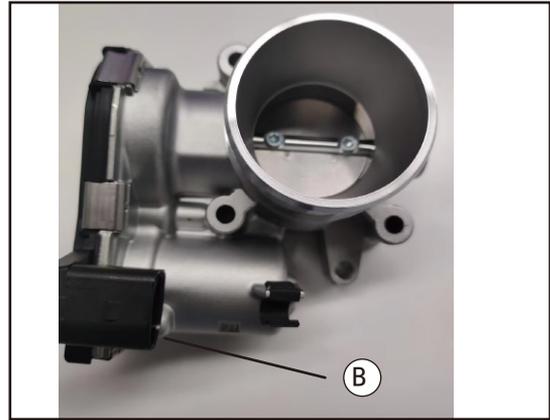


### ABS FAULT DIAGNOSIS CODE

| Fault code | Explanation (UAES)   |
|------------|--|
| A0001      | ECU Voltage:too high   |
| A0002      | ECU Voltage:too low  |
| A0003      | "Wheel-speed sensor, front left: Signal Line short to GND/Open;<br>Supply Line open"                                   |
| A0004      | Wheel-speed sensor, front left: (signal failure) out of range, jitter, Intermittent                                    |
| A0005      | Wheel-speed sensor, front left:No signal   |
| A0006      | "Wheel-speed sensor, front right: Signal Line short to GND/Open;<br>Supply Line open"                                  |
| A0007      | Wheel-speed sensor, front right: (signal failure) out of range, jitter, Intermittent                                   |
| A0008      | Wheel-speed sensor, front right: No signal from wheel speed sensor   |
| A0009      | "Wheel-speed sensor, rear left: Signal Line short to GND/Open;<br>Supply Line open"                                    |
| A0010      | Wheel-speed sensor, rear left: (signal failure) out of range, jitter, Intermittent                                     |
| A0011      | Wheel-speed sensor, rear left: No signal from wheel speed sensor   |
| A0012      | "Wheel-speed sensor, rear right: Signal Line short to GND/Open;<br>Supply Line open"                                   |
| A0013      | Wheel-speed sensor, rear right: (signal failure) out of range, jitter, Intermittent                                    |
| A0014      | Wheel-speed sensor, rear right: No signal from wheel speed sensor  |
| A0015      | Wheel-speed sensor generic error (General error of wheel speed sensor (frequency error, gear number error, tire error) |
| A0016      | Valve relay error  |
| A0017      | valve fault, inlet valve FL  |
| A0018      | valve fault, outlet valve FL   |
| A0019      | valve fault, inlet valve FR  |
| A0020      | valve fault, outlet valve FR   |
| A0021      | valve fault, inlet valve RL  |
| A0022      | valve fault, outlet valve RL   |
| A0023      | valve fault, inlet valve RR  |
| A0024      | valve fault, outlet valve RR   |
| A0025      | valve fault(overheating,overcurrent,short circuit,signal error,hadware error)  |
| A0026      | Motor error  |
| A0027      | Motor relay error  |
| A0028      | ECU error (hardware error)   |
| A0029      | CAN hardware error   |
| A0030      | CAN Bus Off error  |

**THROTTLE POSITION SENSOR AND THROTTLE ACTUATOR**

The throttle position sensor is a Hall sensor with a linear output. 5V is added to both ends of the sensor to create a Hall voltage output when the throttle is turned, similar to a corner potentiometer.



**Throttle Position Sensor Performance Characteristics**

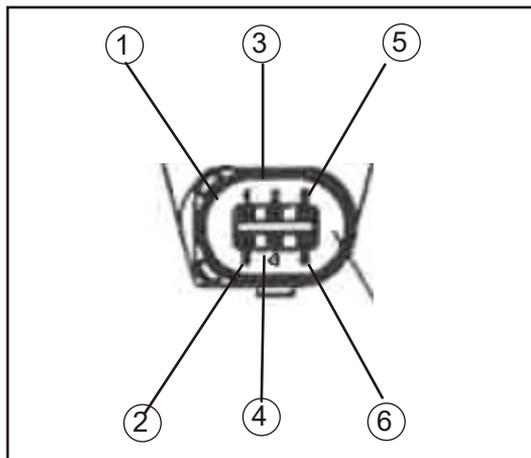
| Throttle Position Sensor |                  |
|--------------------------|------------------|
| Linearity                | see left picture |
| Working Temperature      | -30°C --+110°C   |

### THROTTLE ACTUATOR (DC MOTOR) TECHNICAL PERFORMANCE PARAMETERS

1. Nominal value of resistance between motor PIN pins on electronic throttle body connector (room temperature)  $R = 1.4\Omega \pm 0.3\Omega$
2. Inductance  $L = 1.1 \pm 0.1$  mH at 1kHz (room temperature) 3 □ Allowable force in the opposite direction of operation:  $< 200$  N.
3. Maximum continuous power loss at ambient temperature  $T = 100^\circ\text{C}$   $P = 8$  W  
Maximum permissible reversal current  $I \leq 10$  A when reversed
4. Minimum working voltage: 8V
5. Rated operating voltage: 12V
6. Overload working voltage: 17V

The throttle actuator and sensor are mounted on the throttle valve body (see left at B) with pin definitions:

- |                               |                        |                    |
|-------------------------------|------------------------|--------------------|
| 1: Throttle position signal 1 | 2: sensor power supply | 3: actuator motor+ |
| 4: Throttle position signal 2 | 5: actuator motor -    | 6: sensor ground   |

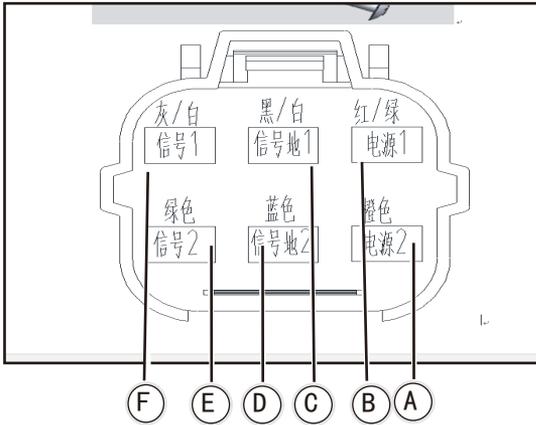


### TROUBLESHOOTING

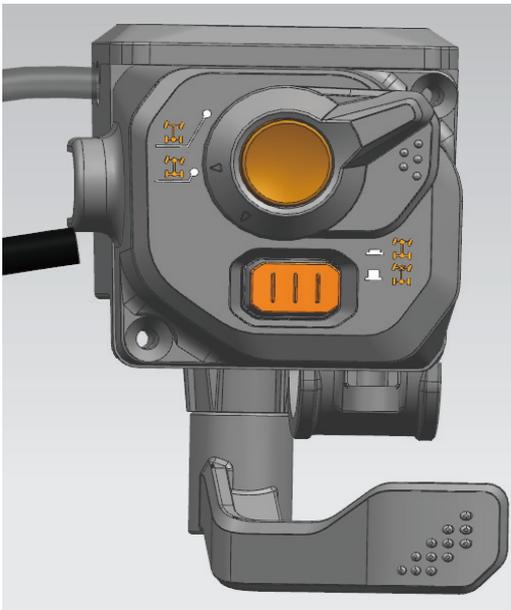
The ECU monitors various sensors and actuators as well as power amplifier circuits and detection circuits, and when there is a malfunction in the throttle position signal, the engine may not be able to start or may be difficult to start, and the commonly used malfunction codes are listed in the "Malfunction Codes Summary Table":

Throttle position sensor and actuator fault check:

- ◆ Check that the connectors are well connected.
- ◆ Check whether the wiring harness and sensor pins are bent and deformed;
- ◆ Check that each pin is energized and disconnected (see left for pin definitions);
- ◆ Check if the power supply voltage of pin 2 sensor is 5V;
- ◆ Check if the voltage of pin 3 is 12V;

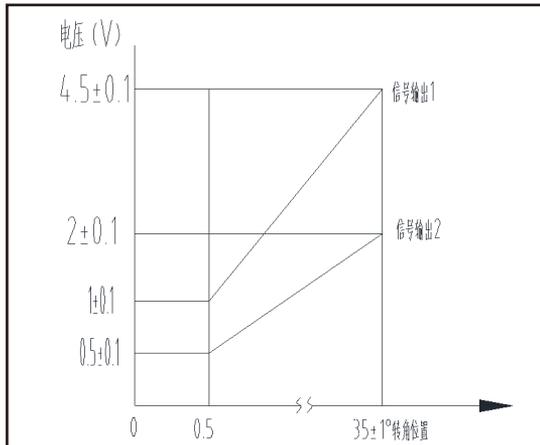


Electronic gas pedal connector pin definition:  
[A]:Accelerator pedal 2 5V power [B]:Accelerator pedal 1 5V power [C]:Accelerator pedal 1 ground [D]:Accelerator pedal 2 ground [E]:Accelerator pedal sensor 2 [F]:Accelerator pedal sensor 1



### **⚠ WARNING**

The fuel dispenser module must be mounted and secured in accordance with the drawings. It is not permitted to strike its parts or to dismantle the casing or any of the internal parts.



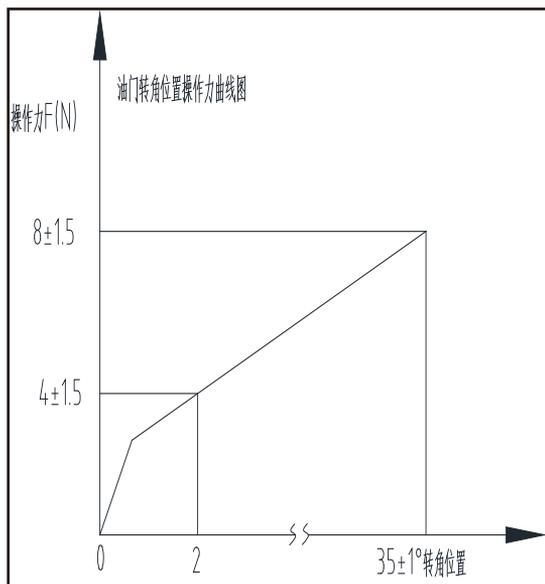
### TECHNICAL PERFORMANCE PARAMETERS

1. 1. Input voltage:  $5\pm 0.5V$ , working current:  $\leq 30mA$ .
2. 2. Linearity:  $\%2V_{cc}$  (room temperature),  $\%3V_{cc}$  (high temperature),
3. 3. Signal 1 ground disconnect, signal 1 output voltage  $5\pm 0.15V$ ,
4. 4. Signal 2 ground disconnect, signal 2 output voltage  $5\pm 0.15V$ ,
5. 5. Electronic accelerator pedal electric-displacement characteristics (see the left figure at A)

Working conditions:

Allowable working temperature:  $-40^{\circ}C \sim +85^{\circ}C$ . Storage conditions: dust-free.

Temperature:  $-30^{\circ}C \sim +60^{\circ}C$



### TROUBLESHOOTING

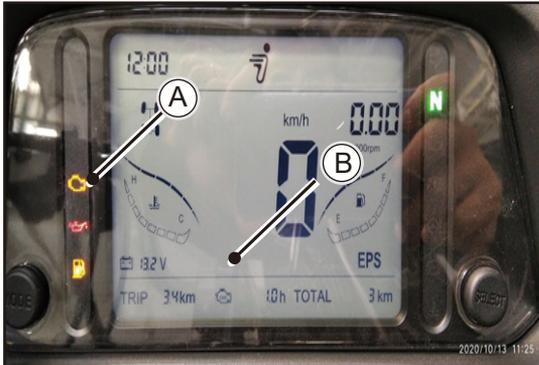
ECU monitors various sensors, actuators, and power amplifier circuits and detection circuits, and when there is a malfunction in the electronic gas pedal, the vehicle may have phenomena such as inability to accelerate, abnormal engine speed, etc. The commonly used malfunction codes are shown in the malfunction summary table:

Electronic gas pedal fault check:

- ◆ Check that the connectors are well connected.
- ◆ Check whether the wiring harness and gas pedal pins are bent or deformed.
- ◆ Measure the voltage of pin C and pin F.
- ◆ Measure the voltage of pin C and pin F.
- ◆ Measure the voltage of pin E and pin D.
- ◆ Measure the voltage of pin C, pin F
- ◆ Measure the voltage of pin E, pin D
- ◆ Measure the on-off of all pins of the wiring harness

### FAULT CODE READING

There is a fault indicator (【A】 in the left figure) in the instrument. When the key switch is turned on, the fault indicator is always on. When the engine is running, if the vehicle electronically controlled fuel injection system has no faults, the indicator light should go out; if there is a fault, the indicator light should always be on, indicating that the system is faulty. The indicator (【B】 in the left figure) can display the relevant fault code, and the specific fault information can be queried through the fault code summary table.



### TROUBLESHOOTER OPERATION

When the engine is running, the instrument fault indicator is always on, indicating that the system is faulty. At present, use a dedicated fault diagnosis instrument (bottom left) to read the corresponding fault information. Use the OBD diagnostic interface to connect to the corresponding diagnostic interface of the vehicle, and connect the other end of the device to the computer (diagnostic software and corresponding drivers should be installed on the computer), and the key switch should be turned on. Specific steps:

- ◆ Connect the device, select "Open CAN", and press the OK button.
- ◆ Enter the main interface, you can view engine operating parameters and fault information

#### ⚠ CAUTION

When the engine is not running, it is normal that the fault light is always on, and there is no need to deal with it



### SUMMARY OF FAILURE CODES (ECU)

| NO. | Pcode    | Description (UAES)   | fault indicator on |
|-----|----------|--|--------------------|
| 1   | P0108 17 | Manifold Absolute Pressure/Barometric Pressure Circuit High        | √                  |
| 2   | P0107 16 | Manifold Absolute Pressure/Barometric Pressure Circuit Low         | √                  |
| 3   | P2A0D 17 | Mass or Volume Air Flow "B" Circuit Low                            | √                  |
| 4   | P2A0C 16 | Mass or Volume Air Flow "B" Circuit High                           | √                  |
| 5   | P0113 17 | Intake Air Temperature Sensor 1 Circuit High                       | √                  |
| 6   | P0112 16 | Intake Air Temperature Sensor 1 Circuit Low                        | √                  |
| 7   | P0118 17 | Engine Coolant Temperature Sensor 1 Circuit High                   | √                  |
| 8   | P0117 16 | Engine Coolant Temperature Sensor 1 Circuit Low                    | √                  |
| 9   | P0650 11 | MIL Control Circuit Low  | √                  |
| 10  | P0650 13 | MIL Control Circuit Open   | √                  |
| 11  | P0692 12 | Fan 1 Control Circuit High   | √                  |
| 12  | P0691 11 | Fan 1 Control Circuit Low  | √                  |
| 13  | P0480 13 | Fan 1 Control Circuit  | √                  |
| 14  | P0629 12 | Fuel Pump "A" Control Circuit High                                 | √                  |
| 15  | P0628 11 | Fuel Pump "A" Control Circuit Low                                  | √                  |
| 16  | P0627 13 | Fuel Pump "A" Control Circuit /Open                                | √                  |
| 17  | P0459 12 | Evaporative Emission System Purge Control Valve Circuit High       | √                  |
| 18  | P0458 11 | Evaporative Emission System Purge Control Valve Circuit Low        | √                  |
| 19  | P0444 13 | Evaporative Emission System Purge Control Valve Circuit Open       | √                  |
| 20  | P0412 12 | Secondary Air Injection System Switching Valve "A" Circuit         | √                  |
| 21  | P0414 11 | Secondary Air Injection System Switching Valve "A" Circuit Shorted | √                  |
| 22  | P0413 13 | Secondary Air Injection System Switching Valve "A" Circuit Open    | √                  |
| 23  | P0262 12 | Cylinder 1 Injector Circuit High                                   | √                  |
| 24  | P0261 11 | Cylinder 1 Injector Circuit Low                                    | √                  |
| 25  | P0201 13 | Injector Circuit/Open – Cylinder 1                                 | √                  |
| 26  | P0265 12 | Cylinder 2 Injector Circuit High                                   | √                  |
| 27  | P0264 11 | Cylinder 2 Injector Circuit Low                                    | √                  |
| 28  | P0202 13 | Injector Circuit/Open – Cylinder 2                                 | √                  |
| 29  | P0563 17 | System Voltage High  | √                  |
| 30  | P0562 16 | System Voltage Low   | √                  |
| 31  | P0560 1C | System Voltage Not plausible                                       | √                  |
| 32  | P0501 29 | Vehicle Speed Sensor "A" Range/Performance                         | √                  |
| 33  | P0641 00 | Sensor Reference Voltage "A" Circuit/Open                          | √                  |
| 34  | P0651 00 | Sensor Reference Voltage "B" Circuit/Open                          | √                  |
| 35  | P0571 29 | Brake Switch "A" Circuit   | √                  |
| 36  | P0571 1C | Brake Switch "A" Circuit   | √                  |

| NO. | Pcode    | Description (UAES)   | fault indicator on |
|-----|----------|--|--------------------|
| 37  | P0123 17 | Throttle/Pedal Position Sensor/Switch "A" Circuit High                                       | √                  |
| 38  | P0122 16 | Throttle/Pedal Position Sensor/Switch "A" Circuit Low  | √                  |
| 39  | P0121 29 | Throttle/Pedal Position Sensor/Switch "A" Circuit Range/Performance                          | √                  |
| 40  | P0223 17 | Throttle/Pedal Position Sensor/Switch "B" Circuit High                                       | √                  |
| 41  | P0222 16 | Throttle/Pedal Position Sensor/Switch "B" Circuit Low  | √                  |
| 42  | P0221 29 | Throttle/Pedal Position Sensor/Switch "B" Circuit Range/Performance                          | √                  |
| 43  | P2106 12 | Throttle Actuator Control System Forced Limited Power  | √                  |
| 44  | P2106 19 | Throttle Actuator Control System Forced Limited Power  | √                  |
| 45  | P2106 92 | Throttle Actuator Control System Forced Limited Power  | √                  |
| 46  | P2106 13 | Throttle Actuator Control System Forced Limited Power  | √                  |
| 47  | P1568 00 | Idle Speed Contr.Throttle Pos. mechanical Malfunction  | √                  |
| 48  | P1545 00 | Throttle Pos.Contr. Malfunction  | √                  |
| 49  | P1545 22 | Throttle Pos.Contr. Malfunction  | √                  |
| 50  | P1545 21 | Throttle Pos.Contr. Malfunction  | √                  |
| 51  | P1565 00 | Idle Speed Control Throttle Position lower limit not attained                                |                    |
| 52  | P2123 17 | Throttle/Pedal Position Sensor/Switch "D" Circuit High                                       |                    |
| 53  | P2122 16 | Throttle/Pedal Position Sensor/Switch "D" Circuit Low  | √                  |
| 54  | P2138 29 | Throttle/Pedal Position Sensor/Switch "D"/"E" Voltage Correlation                            | √                  |
| 55  | P2128 17 | Throttle/Pedal Position Sensor/Switch "E" Circuit High                                       | √                  |
| 56  | P2127 16 | Throttle/Pedal Position Sensor/Switch "E" Circuit Low  | √                  |
| 57  | P0606 94 | ECM/PCM Processor  | √                  |
| 58  | P0606 92 | ECM/PCM Processor  | √                  |
| 59  | P2106 29 | Throttle Actuator Control System Forced Limited Power  | √                  |
| 60  | P0606 64 | ECM/PCM Processor  | √                  |
| 61  | P0606 61 | ECM/PCM Processor  | √                  |
| 62  | P0606 67 | ECM/PCM Processor  | √                  |
| 63  | P0606 1C | ECM/PCM Processor  | √                  |
| 64  | P0606 55 | ECM/PCM Processor  | √                  |
| 65  | P0606 00 | ECM/PCM Processor  | √                  |
| 66  | P0606 62 | ECM/PCM Processor  | √                  |
| 67  | P0606 96 | function monitoring: fault of ECU ADC - Null Load Test Pulse                                 | √                  |
| 68  | P0606 97 | function monitoring: fault of ECU ADC - test voltage   | √                  |
| 69  | P0606 47 | function monitoring: fault of ECU monitoring modul error                                     | √                  |
| 70  | P0606 17 | Reported OverVoltage of VDD5   | √                  |
| 71  | P0606 16 | Reported UnderVoltage of VDD5  | √                  |
| 72  | P0606 49 | Diagnostic fault check to report "WDA active"  | √                  |
| 73  | P0606 48 | Diagnostic fault check to report "WDA active" due to errors in query-/response communication | √                  |
| 74  | P0606 91 | Diagnostic fault check to report "WDA active" due to overvoltage detection                   | √                  |

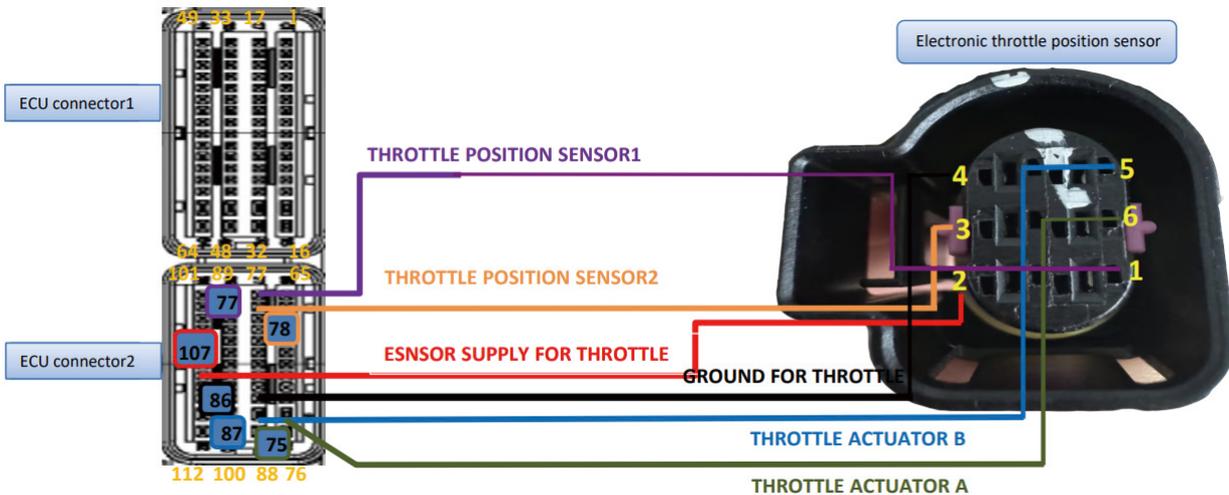
| NO. | Pcode    | Description (UAES)   | fault indicator on |
|-----|----------|--|--------------------|
| 75  | P0032 12 | O2 Sensor Heater Control Circuit High Bank 1 Sensor 1                  | √                  |
| 76  | P0031 11 | O2 Sensor Heater Control Circuit Low Bank 1 Sensor 1                   | √                  |
| 77  | P0030 13 | O2 Sensor Heater Control Circuit Bank 1 Sensor 1                       | √                  |
| 78  | P0132 17 | O2 Sensor Circuit High Voltage Bank 1 Sensor 1                         | √                  |
| 79  | P0131 16 | O2 Sensor Circuit Low Voltage Bank 1 Sensor 1                          | √                  |
| 80  | P0130 29 | O2 Sensor Circuit Bank 1 Sensor 1                                      | √                  |
| 81  | P0134 13 | O2 Sensor Circuit No Activity Detected Bank 1 Sensor 1                 | √                  |
| 82  | P0052 12 | O2 Sensor Heater Control Circuit High Bank 2 Sensor 1                  | √                  |
| 83  | P0051 11 | O2 Sensor Heater Control Circuit Low Bank 2 Sensor 1                   | √                  |
| 84  | P0050 13 | O2 Sensor Heater Control Circuit Bank 2 Sensor 2                       | √                  |
| 85  | P0152 17 | O2 Sensor Circuit High Voltage Bank 2 Sensor 1                         | √                  |
| 86  | P0151 16 | O2 Sensor Circuit Low Voltage Bank 2 Sensor 1                          | √                  |
| 87  | P0150 29 | O2 Sensor Circuit Bank 2 Sensor 1                                      | √                  |
| 88  | P0154 13 | O2 Sensor Circuit No Activity Detected Bank 2 Sensor 1                 | √                  |
| 89  | U0073 88 | Control Module Communication Bus Off                                   | √                  |
| 90  | U0140 87 | Lost Communication With Body Control Module                            | √                  |
| 91  | U0121 87 | Lost Communication With Anti-Lock Brake System (ABS) Control Module    | √                  |
| 92  | P0322 00 | Crankshaft signal loss   | √                  |
| 93  | U0155 87 | Lost Communication With Instrument Panel Cluster (IPC) Control Module  | √                  |
| 94  | U0198 87 | Lost communication with TBOX   | √                  |
| 95  | U0293 00 | Lost Communication With Hybrid/EV Powertrain Control Module            | √                  |
| 96  | P0688 16 | ECM/PCM Power Relay Sense Circuit/Open                                 | √                  |
| 97  | P0688 29 | ECM/PCM Power Relay Sense Circuit/Open                                 | √                  |
| 98  | P0650 12 | MIL Control Circuit High   | √                  |
| 99  | P2138 00 | Throttle/Pedal Position Sensor/Switch "D"/"E" Voltage Correlation      | √                  |
| 100 | P1559 00 | Idle Speed Contr.Throttle Pos. Adaptation Malfunction                  | √                  |
| 101 | P1579 00 | Idle Speed Contr.Throttle Pos. adaptation not started                  | √                  |
| 102 | P1564 00 | Idle Speed Contr.Throttle Pos. Low Voltage During Adaptation           | √                  |
| 103 | P1559 29 | Idle Speed Contr.Throttle Pos. Adaptation Malfunction                  | √                  |
| 104 | P0300 00 | Misfire detected   | √                  |
| 105 | P0301 00 | Misfire detected on cylinder 1   | √                  |
| 106 | P130A 00 | Cylinder selective fuel cutoff active due to catalyst damaging misfire | √                  |
| 107 | P0302 00 | Misfire detected on cylinder 2   | √                  |

P012216---This Trouble Code Sets if the electronic throttle position sensor 1 short circuit to ground.

P012317---This Trouble Code Sets if the electronic throttle position sensor 1 short circuit to power

P012216---This Trouble Code Sets if the Electronic throttle position sensor 1 open circuit

Can be caused by the electronic throttle position sensor 1 Relay, Damaged Wiring or Connector Terminals or a Faulty ECU/Connections

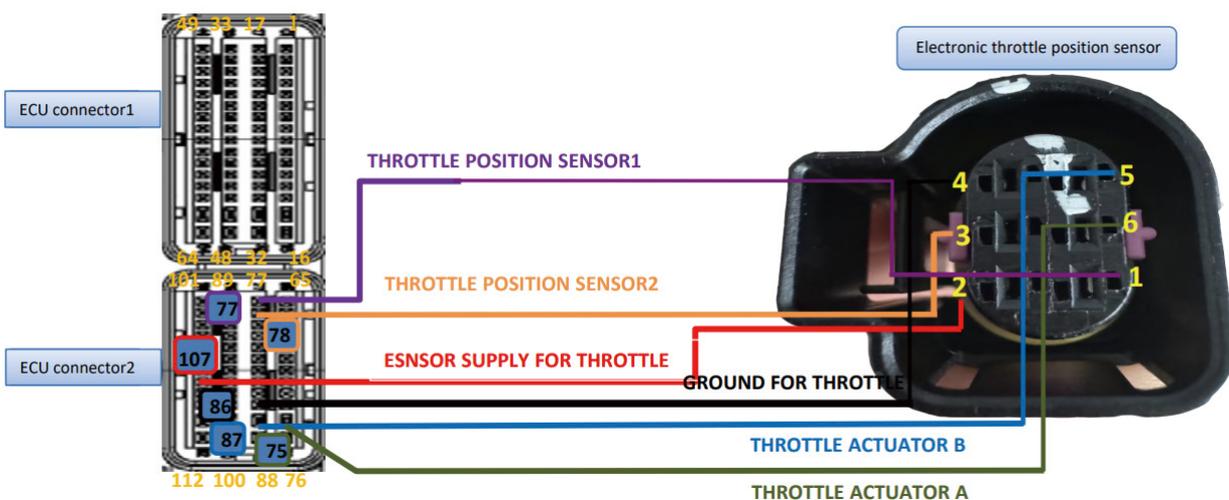


P022216---This Trouble Code Sets if the electronic throttle position sensor 2 short circuit to ground

P022216---This Trouble Code Sets if the electronic throttle position sensor 2 open circuit

P022317---This Trouble Code Sets if the electronic throttle position sensor 2 short circuit to power

Can be caused by the electronic throttle position sensor 2 Relay, Damaged Wiring or Connector Terminals or a Faulty ECU/Connections



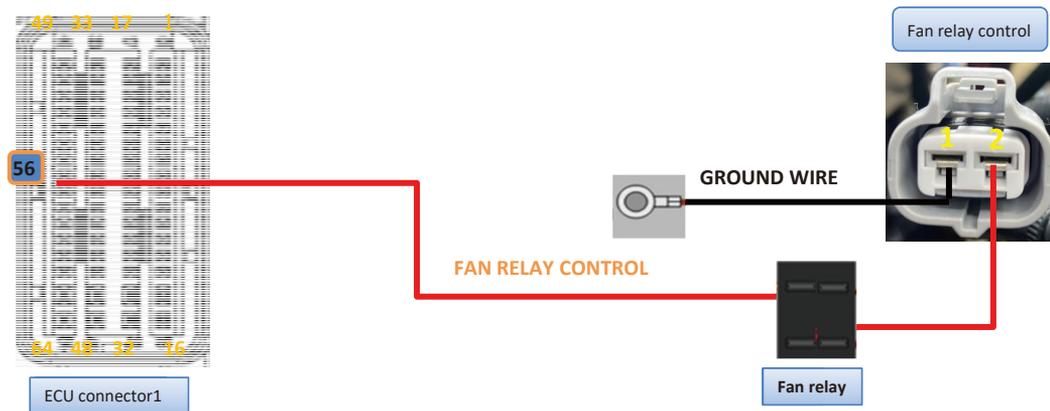
## SEGWAY AT10

P069212---Indicates that the Cooling Fan Relay Driver Circuit is Shorted to Battery Voltage.

P069111---This Trouble Code Sets if the Cooling Fan Driver Circuit is Shorted to Ground.

P048013---This Trouble Code Sets if the Cooling Fan Driver Circuit is Open.

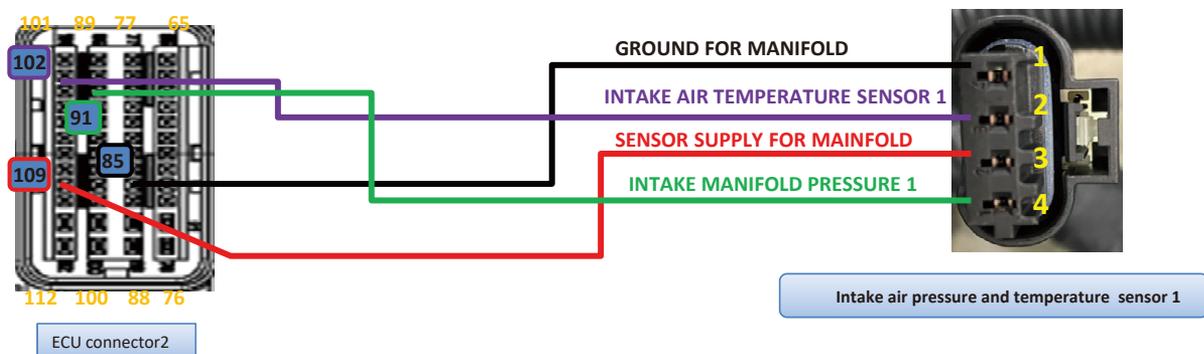
Can be caused by a Faulty Coolant Fan Relay, Damaged Wiring or Connector Terminals or a Faulty ECU/Connections



P010817--- This Trouble Code sets if the Intake pressure sensor 1 open circuit  
P010817---This Trouble Code sets if the Manifold Absolute Pressure/Barometric Pressure Sensor 1 Circuit is Shorted to Battery Voltage.

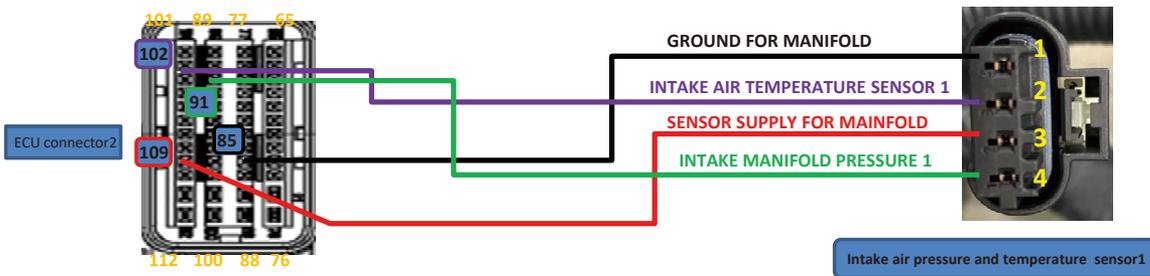
P010716---This Trouble Code sets if the Manifold Absolute Pressure/Barometric Pressure Sensor 1 Circuit is Shorted to Ground.

Can be caused by a Manifold Absolute Pressure/Barometric Pressure Sensor 1 Relay, Damaged Wiring or Connector Terminals or a Faulty ECU/Connections



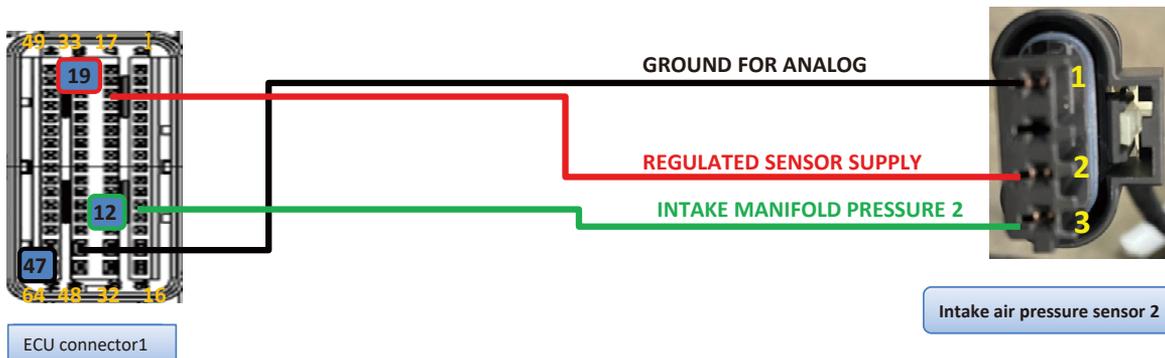
P011317---This Trouble Code sets if the Intake air temperature sensor 1 open circuit  
P011317---This Trouble Code sets if the Intake Air Temperature Sensor 1 Circuit is Shorted to Battery Voltage.  
P011216---This Trouble Code sets if the Intake Air Temperature Sensor 1 Circuit is Shorted to Ground.

Can be caused by a Intake Air Temperature Sensor 1 Relay, Damaged Wiring or Connector Terminals or a Faulty ECU/Connections



P2A0D17---This Trouble Code sets if the Intake pressure sensor 2 open circuit  
P2A0D17---This Trouble Code sets if the Manifold Absolute Pressure/Barometric Pressure Sensor 2 Circuit is Shorted to Battery Voltage.  
P2A0C16---This Trouble Code sets if the Manifold Absolute Pressure/Barometric Pressure Sensor 2 Circuit is Shorted to Ground.

Can be caused by a Manifold Absolute Pressure/Barometric Pressure Sensor 2 Relay, Damaged Wiring or Connector Terminals or a Faulty ECU/Connections



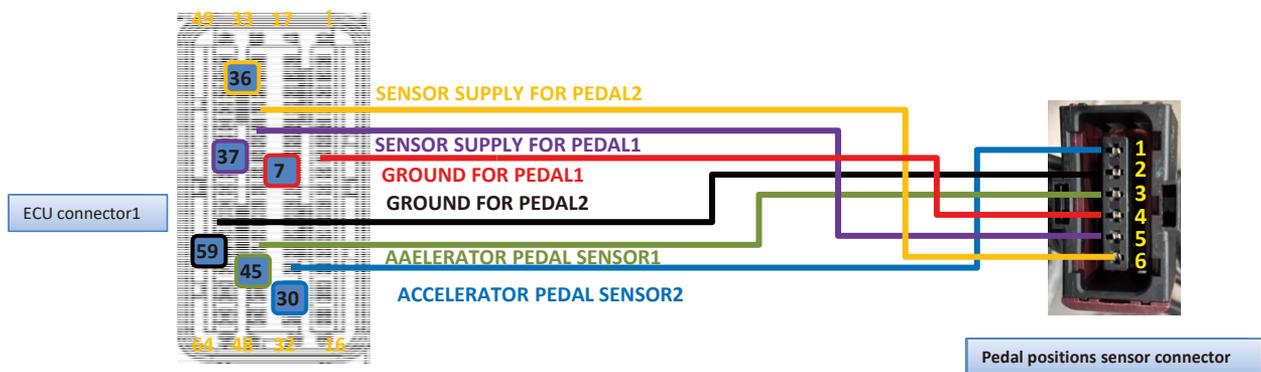
## SEGWAY AT10

P212317---This Trouble Code Sets if the electronic accelerator pedal position sensor 1 short circuit to power

P212216---This Trouble Code Sets if the electronic accelerator pedal position sensor 1 short circuit to ground

P212216---This Trouble Code sets if the electronic accelerator pedal position sensor 1 open circuit

Can be caused by the electronic accelerator pedal position sensor 1 Relay, Damaged Wiring or Connector Terminals or a Faulty ECU/Connections

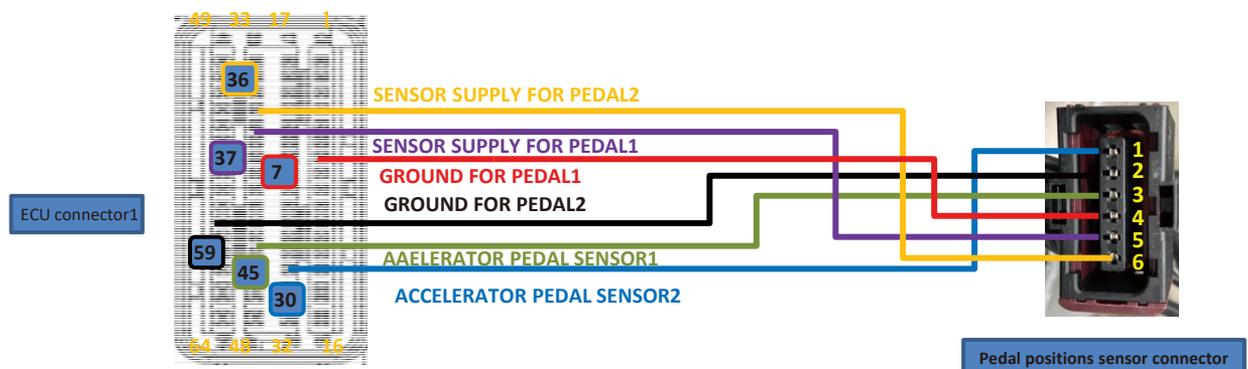


P212817---This Trouble Code Sets if the electronic accelerator pedal position sensor 2 short circuit to power

P212716---This Trouble Code Sets if the electronic accelerator pedal position sensor 2 short circuit to ground

P212716---This Trouble Code sets if the electronic accelerator pedal position sensor 2 open circuit

Can be caused by the electronic accelerator pedal position sensor 2 Relay, Damaged Wiring or Connector Terminals or a Faulty ECU/Connections

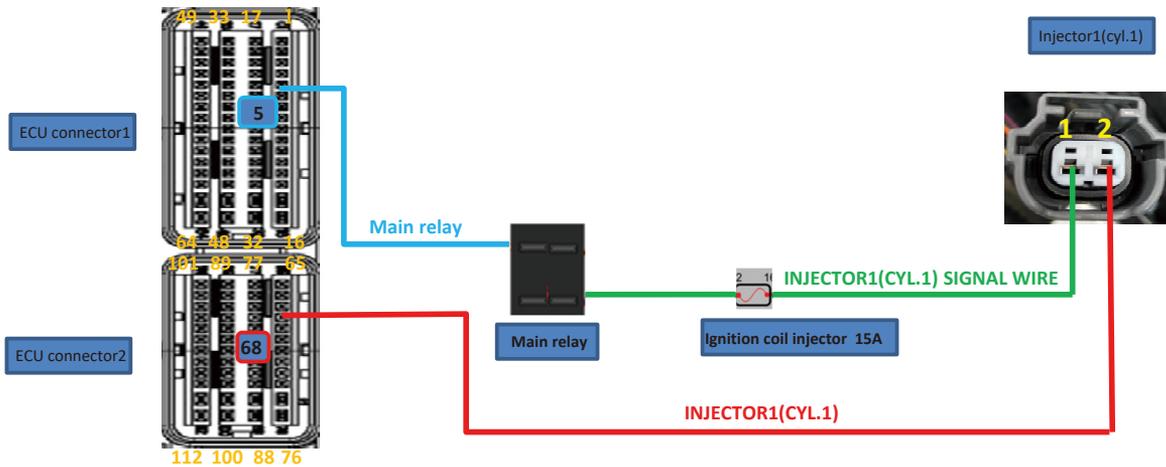


P026212---This Trouble Code Sets if the fuel injection nozzle 1(cylinder1)short circuit to power

P026111---This Trouble Code Sets if the fuel injection nozzle 1(cylinder1)short circuit to ground

P020113---This Trouble Code Sets if the fuel injection nozzle 1(cylinder1)open circuit

Can be caused by a fuel injection nozzle 1(cylinder1) Relay, Damaged Wiring or Connector Terminals or a Faulty ECU/Connections

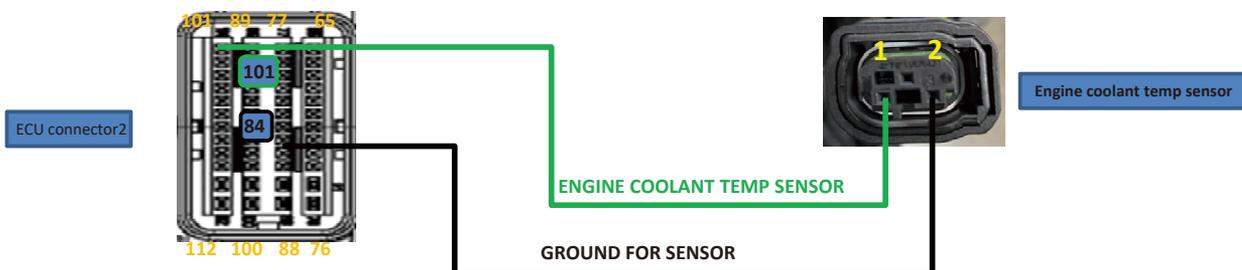


P011716---This Trouble Code sets if the Engine Temperature Sensor Circuit is Shorted to Ground.

P011817---This Trouble Code sets if the Engine Temperature sensor open circuit

P011817---This Trouble Code sets if the Engine Temperature Sensor Circuit is Shorted to Battery Voltage.

Can be caused by a Engine Temperature Sensor Relay, Damaged Wiring or Connector Terminals or a Faulty ECU/Connections



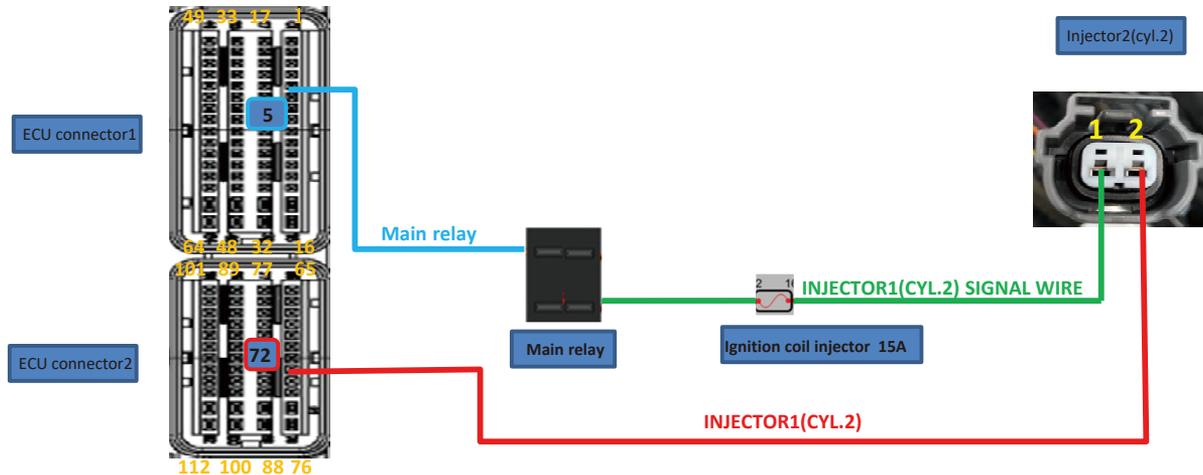
## SEGWAY AT10

P026512---This Trouble Code Sets if the fuel injection nozzle 2(cylinder2)short circuit to power

P026411---This Trouble Code Sets if the fuel injection nozzle 2(cylinder2)short circuit to ground

P020213---This Trouble Code Sets if the fuel injection nozzle 2(cylinder2)open circuit

Can be caused by a fuel injection nozzle 2(cylinder2) Relay, Damaged Wiring or Connector Terminals or a Faulty ECU/Connections



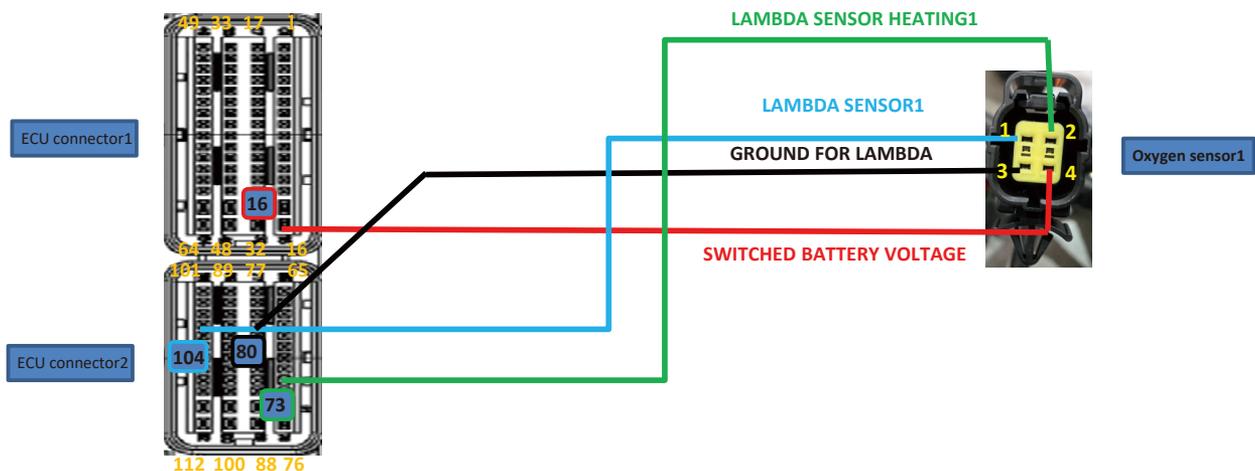
P013217---This Trouble Code Sets if the oxygen sensor 1 short circuit to power

P013116---This Trouble Code Sets if the oxygen sensor 1 short circuit to ground

P013413---This Trouble Code Sets if the oxygen sensor 1 open circuit

P013029---This Trouble Code Sets if the oxygen sensor 1 signal circuit voltage unreasonable

Can be caused by a oxygen sensor 1 Relay, Damaged Wiring or Connector Terminals or a Faulty ECU/Connections

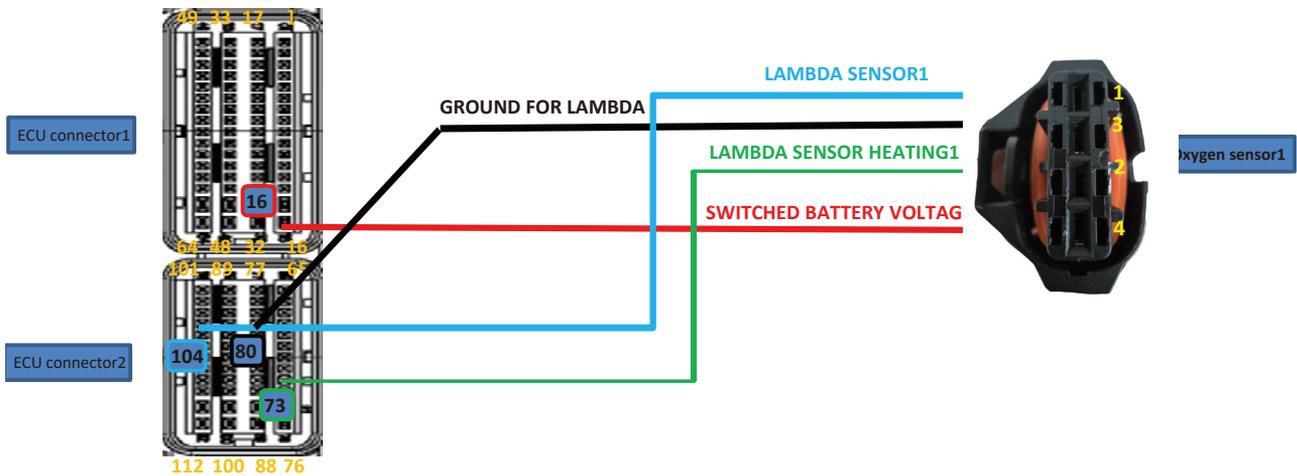


P003212---This Trouble Code Sets if the oxygen sensor heating 1 control circuit short circuit to power

P003111---This Trouble Code Sets if the oxygen sensor heating 1 control circuit short circuit to ground

P003013---This Trouble Code Sets if the oxygen sensor heating 1 control circuit open circuit

Can be caused by a oxygen sensor heating 1 control circuit Relay, Damaged Wiring or Connector Terminals or a Faulty ECU/Connections



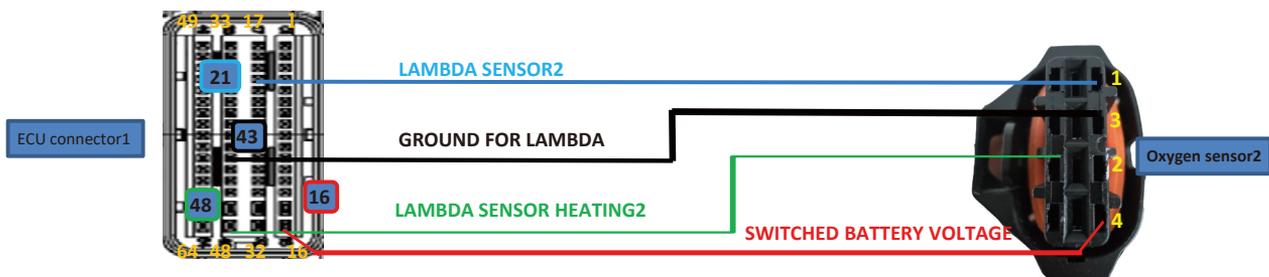
P015217---This Trouble Code Sets if the oxygen sensor signal 2 circuit short circuit to power

P015116---This Trouble Code Sets if the oxygen sensor signal 2 circuit short circuit to ground

P015413---This Trouble Code Sets if the oxygen sensor signal 2 circuit open circuit

P015029---This Trouble Code Sets if the oxygen sensor signal 2 circuit voltage unreasonable

Can be caused by a oxygen sensor signal 2 circuit Relay, Damaged Wiring or Connector Terminals or a Faulty ECU/Connections



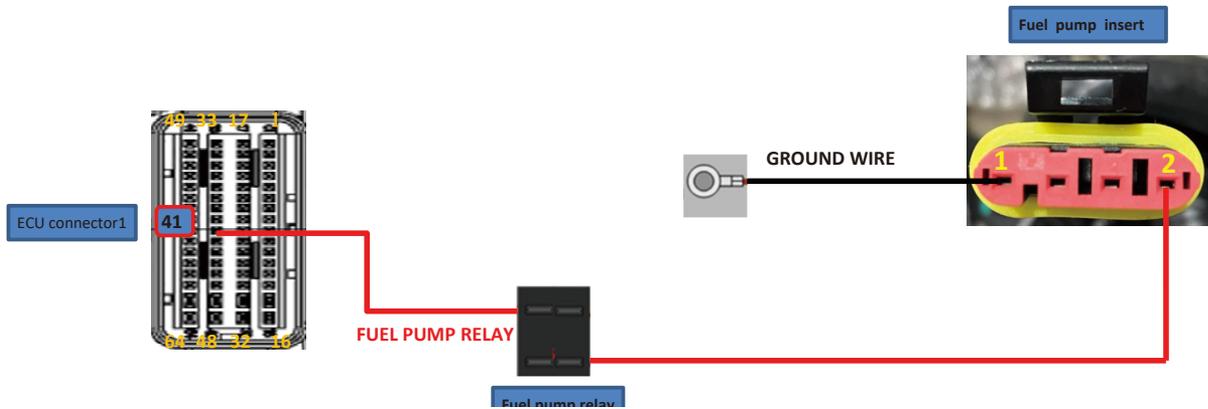
## SEGWAY AT10

P062912---This Trouble Code sets if the Fuel Pump Control Circuit is Shorted to Battery Voltage.

P062811---This Trouble Code sets if the Fuel Pump Control Circuit is Shorted to Ground.

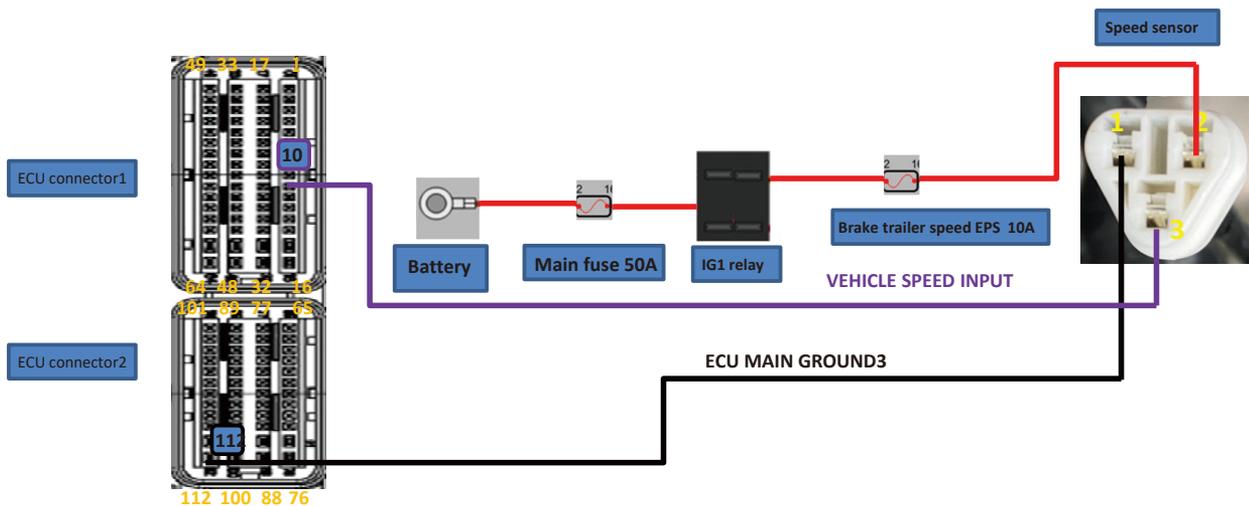
P062713---This Trouble Code sets if the Fuel Pump “A” Control Circuit is Open.

Can be caused by a Fuel Pump Relay, Damaged Wiring or Connector Terminals or a Faulty ECU/Connections



P050129---This Trouble Code sets if the Vehicle speed signal failure

Can be caused by a Vehicle speed signal Relay, Damaged Wiring or Connector Terminals or a Faulty ECU/Connections

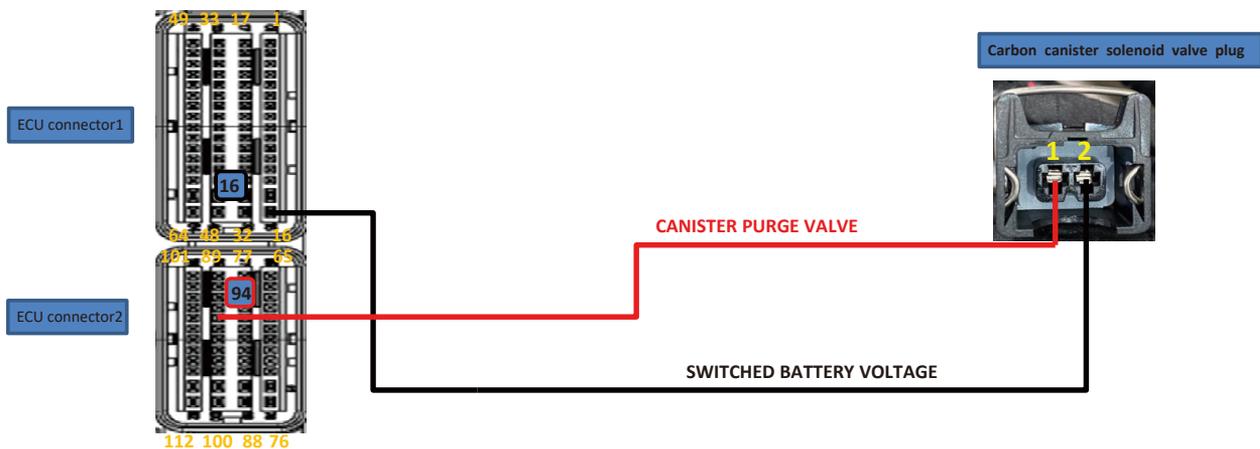


P056317---This Trouble Code sets if the System power supply voltage too high  
P056216--- This Trouble Code sets if the System power supply voltage too low  
P05601C---This Trouble Code sets if the Unreasonable system power supply voltage signal

Can be caused by a System power supply voltage Relay, Damaged Wiring or Connector Terminals or a Faulty ECU/Connections

P045912---This Trouble Code sets if the Evaporative Emission System Purge Control Valve Control Circuit is Shorted to Battery Voltage.  
P045811---This Trouble Code sets if the Evaporative Emission System Purge Control Valve Control Circuit is Shorted to Ground.  
P044413---This Trouble Code sets if the Evaporative Emission System Purge Control Valve Control Circuit is Open.

Can be caused by a Evaporative Emission System Purge Control Valve Relay, Damaged Wiring or Connector Terminals or a Faulty ECU/Connections



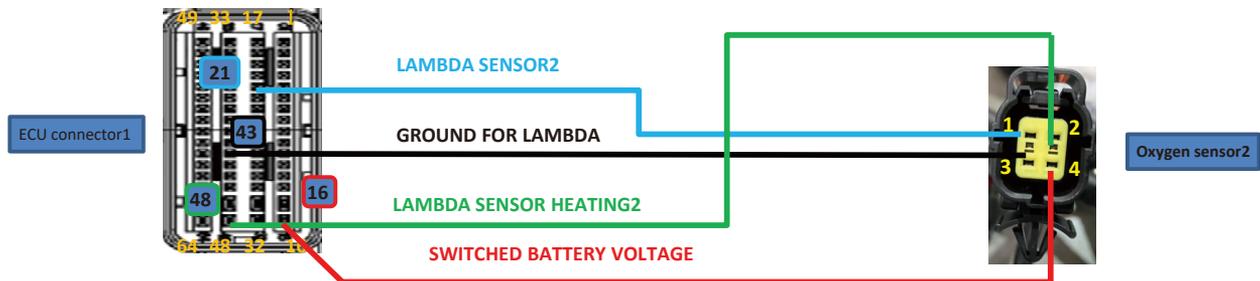
## SEGWAY AT10

P005212---This Trouble Code Sets if the oxygen sensor heating 2 short circuit to power

P005111---This Trouble Code Sets if the oxygen sensor heating 2 short circuit to ground

P005013---This Trouble Code Sets if the oxygen sensor heating 2 open circuit

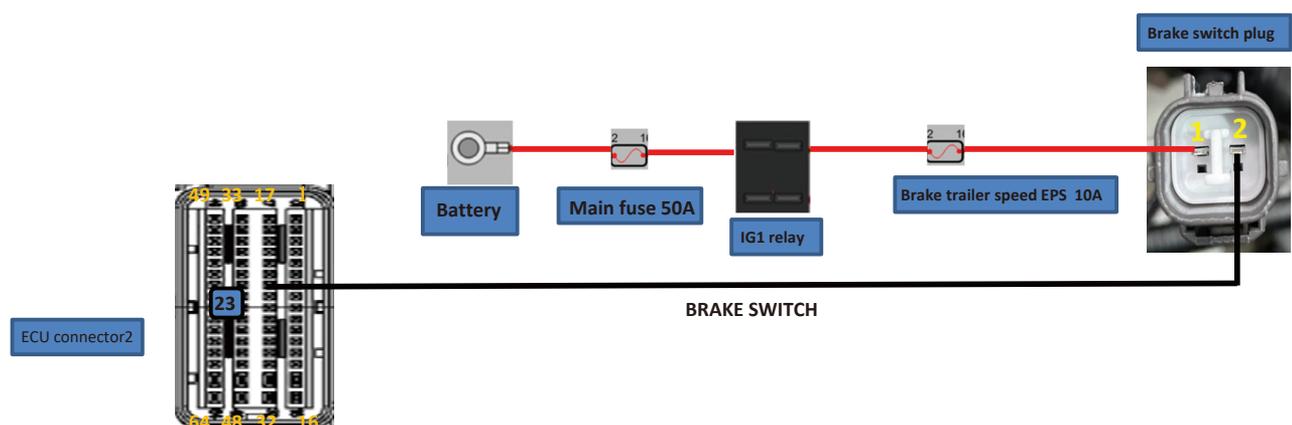
Can be caused by a oxygen sensor heating 2 Relay, Damaged Wiring or Connector Terminals or a Faulty ECU/Connections



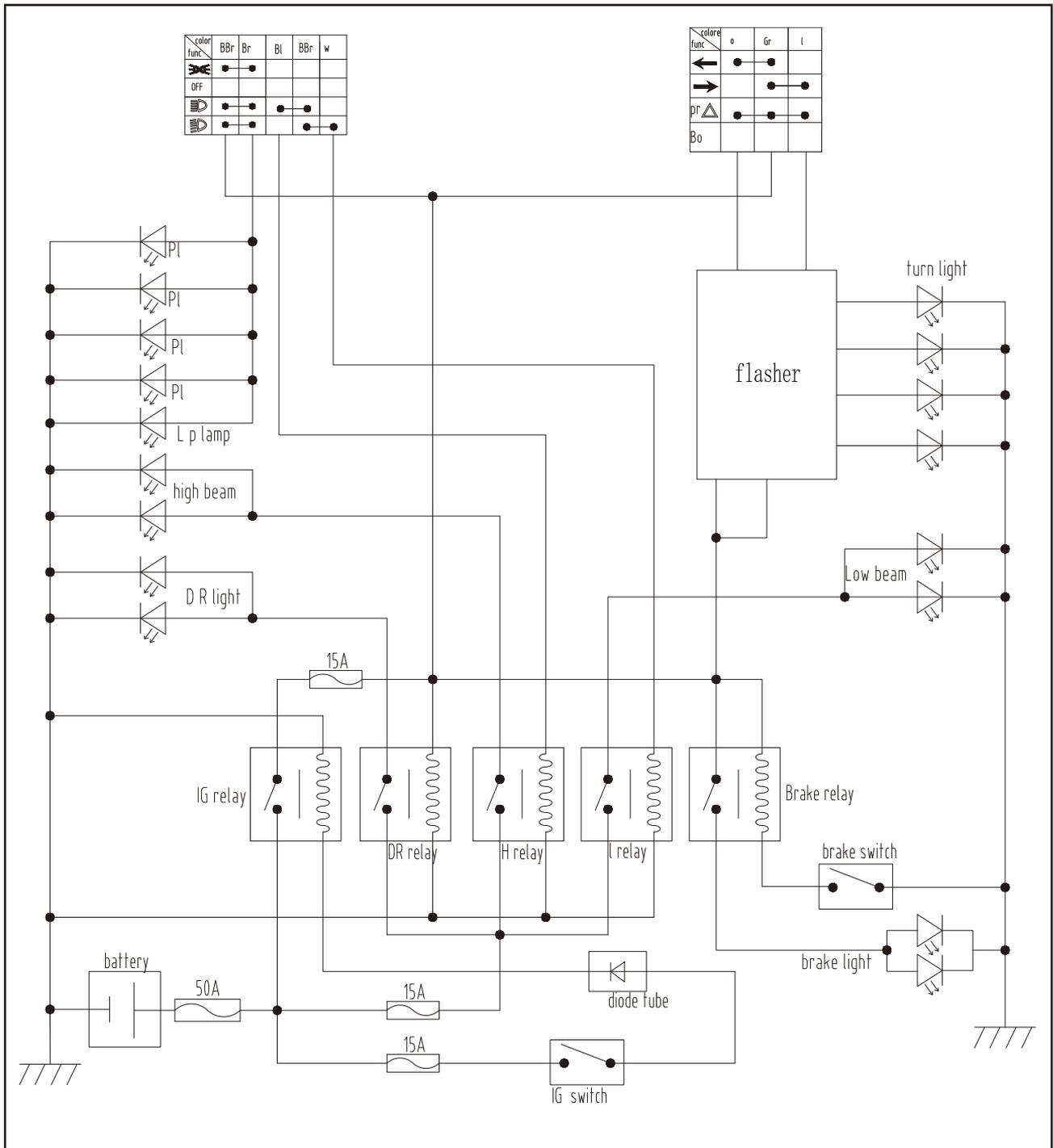
P057129---This Trouble Code Sets if the brake lamp signal circuit failure

P05711C---This Trouble Code Sets if the brake signal out of synchronization

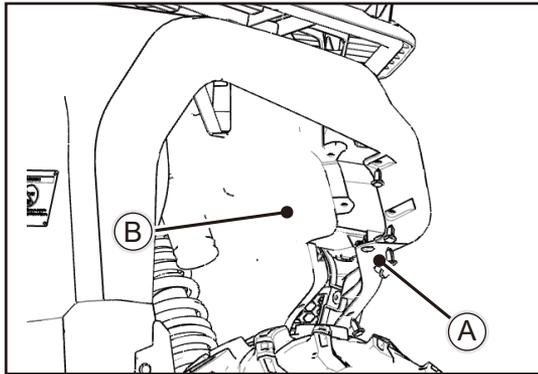
Can be caused by a brake lamp signal circuit Relay, Damaged Wiring or Connector Terminals or a Faulty ECU/Connections



## LIGHTING SYSTEM CIRCUIT



### HEADLAMPS



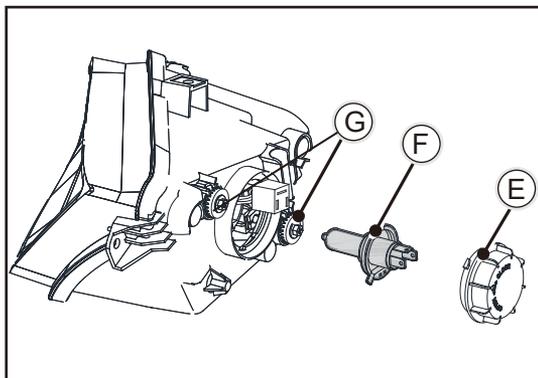
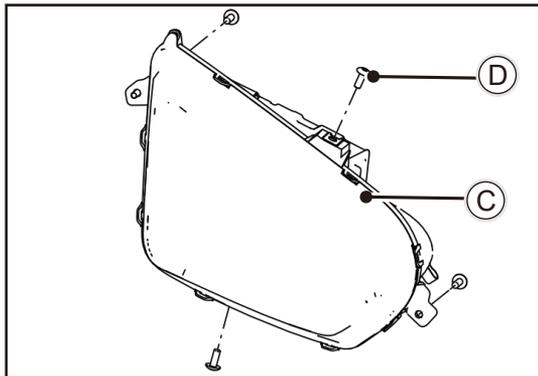
Rear headlight guard (see chapter "Frame")

- 【A】 the buckle
- 【B】 Rear headlight guard
- 【C】 Headlight body
- 【D】 Headlight bolt\*4
- 【E】 Light bulb guard
- 【F】 Headlight bulb
- 【G】 high and low light adjusting bolt

### REPLACE

#### ⚠ CAUTION

- ◆ Lamps are divided into LED lamps and halogen lamps (please confirm according to the actual vehicle)
- ◆ The high and low lights of the LED headlights are damaged, and only the headlights can be replaced;
- ◆ If the high and low beams of the halogen headlights are damaged, replace the bulbs of the same model.
- ◆ If other light sources are damaged, only replace the headlights.



- ◆ Remove the 7 buckles on the rear guard of the headlight 【A】
- ◆ Remove the front lamp rear guard 【B】
- ◆ Remove the 4 headlight bolts 【D】 with tools, and remove the headlight body 【C】 after unplugging the headlight connector

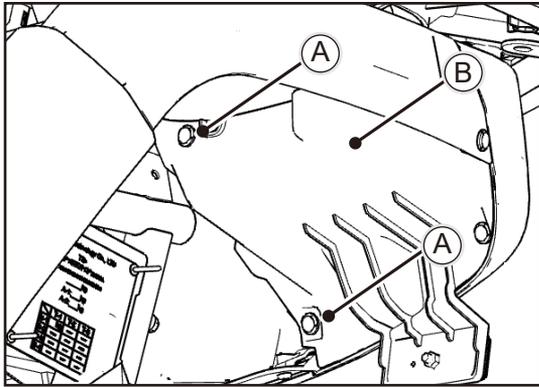
**If replacing the headlight bulb, continue the following procedure:**

- ◆ Rotate clockwise 【E】
- ◆ Take out the headlight bulb 【F】 and replace it with a new one.

**The headlight bulb number is: H4**

- ◆ After the replacement, adjust the high and low beam adjustment bolts 【G】 to adjust the headlight beam height to a suitable position.

### TAIL LAMP



Rear guard for taillights (see chapter "Frame")

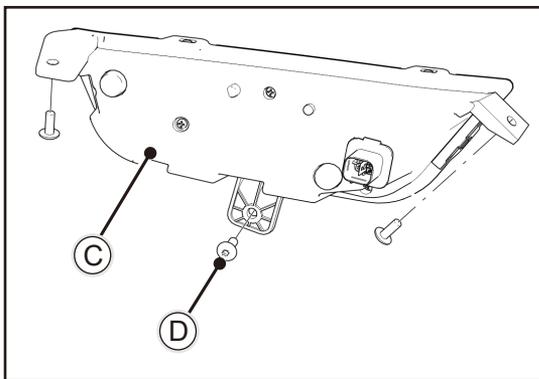
- 【A】 buckle
- 【B】 Tail lamp rear shield
- 【C】 Tail lamp body
- 【D】 Tail lamp bolt\*3
- 【E】 Tail lamp holder
- 【F】 Tail lamp bulb

### REPLACE

#### ⚠ CAUTION

The lamps are divided into LED lamps and halogen lamps (please confirm according to the actual vehicle)

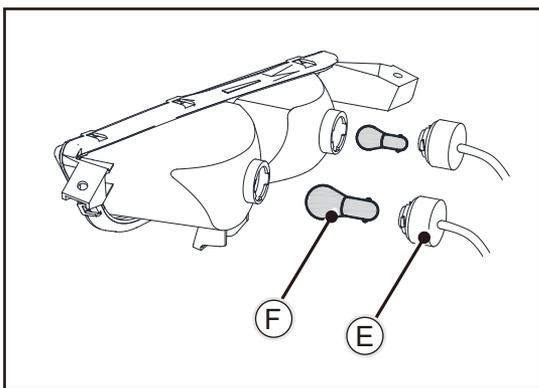
- ◆ The LED tail light source is damaged, only the tail light assembly can be replaced
- ◆ If the light source of the halogen tail lamp is damaged, the bulb of the same model can be replaced



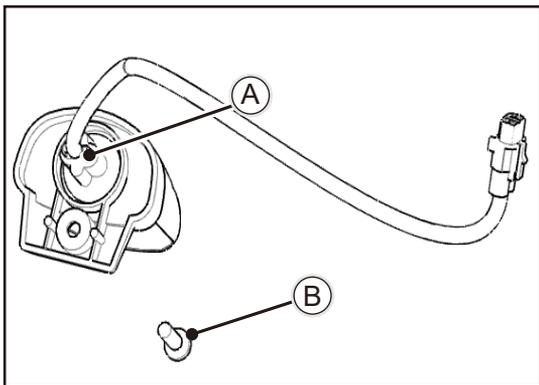
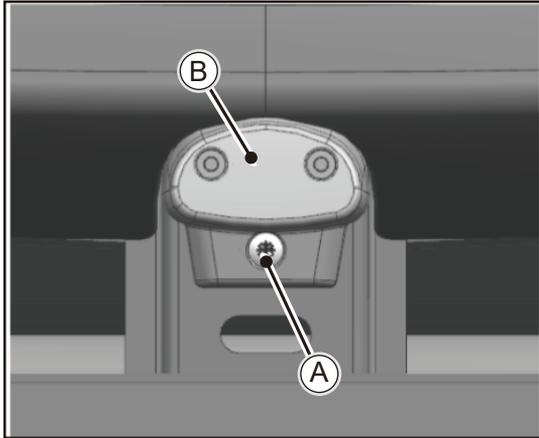
- ◆ Remove the buckle on the rear guard of the headlight\*4 【A】
- ◆ Remove the taillight guard 【B】
- ◆ Remove the tail lamp bolts and unplug the tail lamp connector to remove the tail lamp body 【C】
- ◆ **If you replace the tail light bulb, please continue to perform the following procedures:**
- ◆ Rotate the tail lamp holder clockwise 【E】 ]
- ◆ Remove the tail lamp holder 【F】 that needs to be replaced, and replace with a new bulb.

**The tail lamp bulb model is: P2/ 5W**

**The rear turning bulb number is: RY10W**



### LICENSE PLATE LAMP



【A】 License plate lamp bolt \*1

【B】 License plate lamp

【C】 Rear license plate lamp bolt \*4

【D】 Rear license plate lamp holder

#### REMOVE

- ◆ Remove the license plate lamp bolt 【A】
- ◆ Remove the license plate lamp 【B】
- ◆ Disassembly license plate lamp

#### REPLACE

- ◆ Remove the bulb holder
- ◆ Take out the license plate lamp bulb and replace the license plate bulb type: W5W

***The license plate bulb number is: W5W***

- ◆ Place the license plate lamp at the installation position of the license plate lamp
- ◆ Tighten the license plate lamp bolt\*1 【B】

#### **⚠ CAUTION**

The lamps are divided into LED lamps and halogen lamps  
(please confirm according to the actual vehicle)

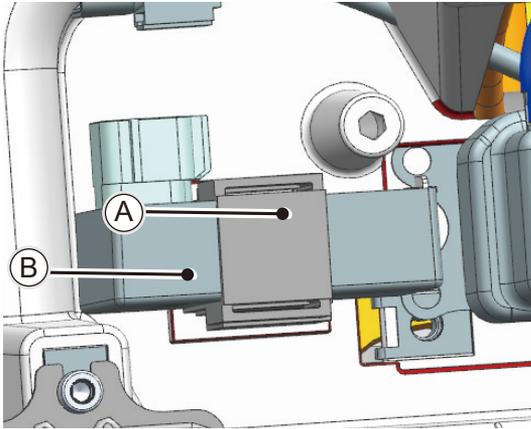
- ◆ The LED license plate lamp is damaged, only the license plate lamp can be replaced.
- ◆ If the light source of the halogen license plate lamp is damaged, the bulb of the same model can be replaced

### FLASHER

Disassembly and assembly of the front shelf and front guard (please refer to the relevant sections of the body)

【A】 rubber sleeve

【B】 Flasher



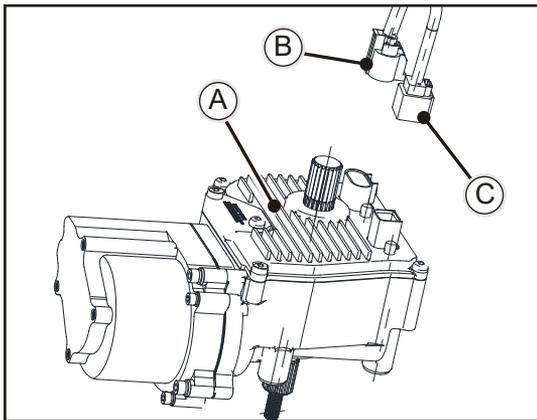
#### DISASSEMBLY

- ◆ Remove the installation rubber sleeve 【A】 from the installation bracket
- ◆ Remove the wiring harness connector
- ◆ Replace the flasher 【B】

#### → TEST

- ◆ If the turn signal does not flash or flashes abnormally on the whole vehicle (the normal turn signal flash frequency is 85/min)
- ◆ The lamp is out of light (one-side forward or backward turn light is damaged), and the turn signal flashes at a frequency of 120/min)

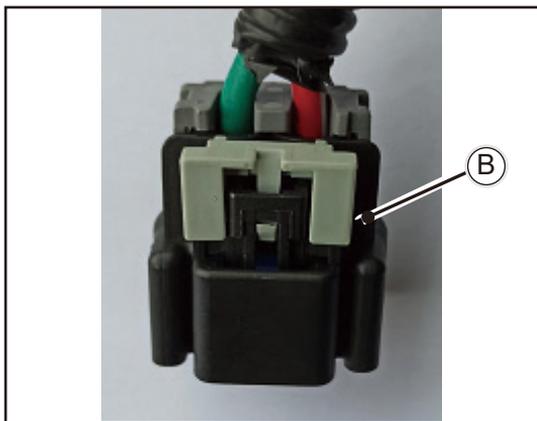
EPS-BRUSHLESS



**⚠ CAUTION**

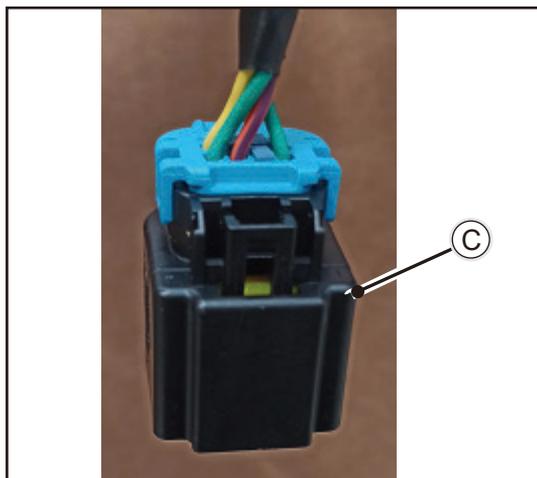
The method of disassembling the EPS assembly refers to the method of disassembling the steering assembly. Only the electrical functions of the EPS are introduced here.

Before disassembling the EPS assembly **【A】**, firstly remove the power connector **【B】** and power connector **【C】**



The interface of the plug **【B】** is defined as follows

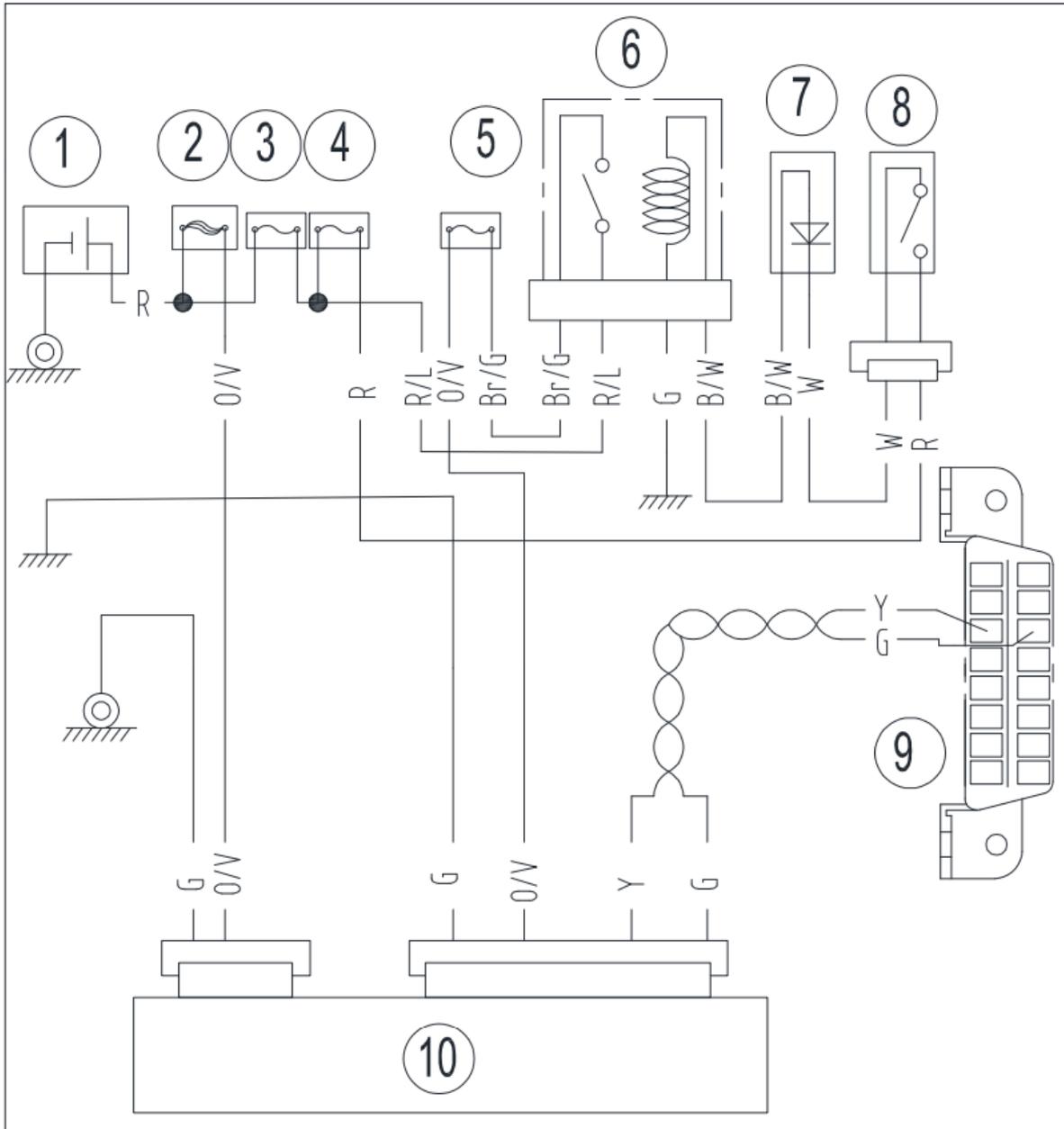
- ◆ G means green wire, wire diameter 5.0, for grounding
- ◆ RW means red white wire, wire diameter 5.0, 12V+



The interface of the plug **【C】** is defined as follows

- ◆ G means green wire, the wire diameter is 0.5, CANL
- ◆ Y means yellow wire, wire diameter 0.5, CANH
- ◆ OV means orange-purple wire, wire diameter 0.5, 12V+ for key power
- ◆ G means green wire, wire diameter 0.5, for grounding

## EPS SYSTEM WIRING SCHEMATIC DIAGRAM

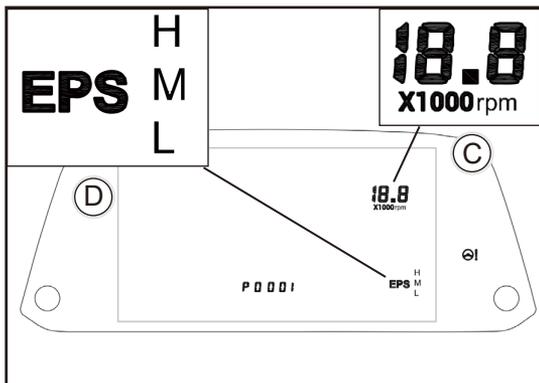
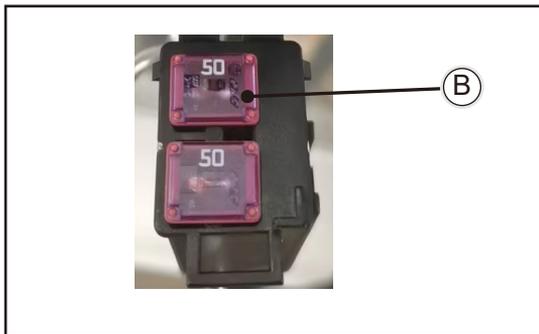
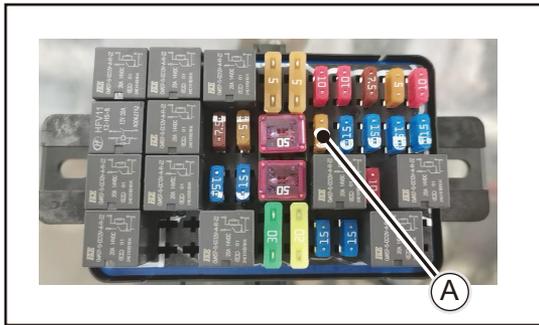


- |             |             |               |            |            |
|-------------|-------------|---------------|------------|------------|
| 1. Battery  | 2. Fuse 50A | 3. Fuse 50A   | 4. Fuse 5A | 5. Fuse 5A |
| 6. IG relay | 7. Diode    | 8. Key switch | 9. OBD     | 10. EPS    |

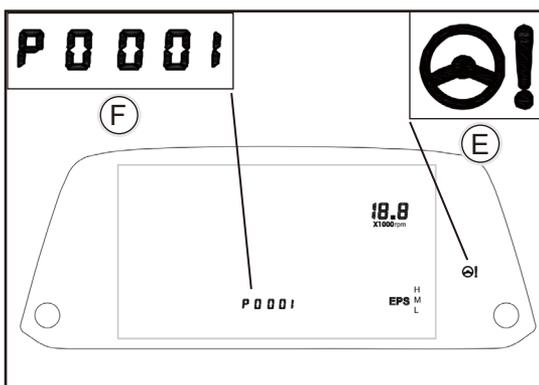
### EPS TROUBLE REMOVAL

#### → TROUBLE SHOOTING

If the EPS is not working, first check whether the EPS fault light on the meter is on. If the fault light is not on, check whether the 5A fuse **【A】** and 50A fuse **【B】** in the fuse box are blown, and check whether there is speed on the meter **【C】** display, if there is no speed display, EPS will not work, and the EPS fault light on the meter will not light up.



- ◆ The position of EPS gear in the meter, EPS is divided into three gears: H/M/L **【D】**, the default is M gear, when in four wheel drive locking mode, it will immediately switch to H gear; M gear and L gear are adjusted on the Segway Powersports APP (only vehicles with TBOX can be adjusted)



If the EPS fault light on the meter is on, it means that the EPS is malfunctioning.

- ◆ EPS fault light **【E】** and fault code **【F】** in the indicator
- ◆ The location is shown left.

The EPS fault codes displayed in the instrument are listed below:

| NO. | Fault description   | Fault grade | With or without power                                   | Recoverability within the current ignition cycle | Fault code | Fault light |
|-----|---|-------------|---|--|------------|-------------|
| 1   | Torque midpoint not written                               | 3           | Yes   | Recoverable after fault elimination              | E0001      | on          |
| 2   | Rotor angle midpoint not written                          | 1           | No  | Recoverable after fault elimination              | E0002      | off         |
| 3   | Storage read and write failure                            | 1           | Yes   | Yes  | E0003      | on          |
| 4   | The main torque sensor is disconnected                    | 1           | Vehicle speed is set to 30                              | No   | E0004      | off         |
| 5   | The main torque sensor output is abnormal                 | 1           | Vehicle speed is set to 30                              | No   | E0005      | off         |
| 6   | The secondary torque sensor is disconnected               | 1           | Vehicle speed is set to 30                              | No   | E0006      | off         |
| 7   | Secondary torque sensor output failure                    | 1           | Vehicle speed is set to 30                              | No   | E0007      | off         |
| 8   | Excessive difference between primary and secondary torque | 1           | Vehicle speed is set to 30                              | No   | E0008      | off         |
| 9   | Abnormal primary and secondary torque                     | 1           | No  | No   | E0009      | on          |
| 10  | Motor offer no assistant power                            | 1           | No  | No   | E0010      | on          |
| 11  | overcurrent   | 1           | No  | No   | E0011      | on          |
| 12  | Abnormal current  | 1           | No  | No   | E0012      | on          |
| 13  | CAN communication abnormal                                | 2           | Vehicle speed is set to 30, cancel aligning and damping | Recoverable after CAN normalization              | E0013      | on          |
| 14  | Rotor angle sensor disconnected                           | 1           | No  | No   | E0015      | on          |
| 15  | Power module failure                                      | 1           | No  | No   | E0016      | on          |
| 16  | A phase current abnormal                                  | 1           | No  | No   | E0017      | on          |
| 17  | C phase current abnormal                                  | 1           | No  | No   | E0018      | on          |

### DISPLAY AND HUMAN-COMPUTER INTERACTION

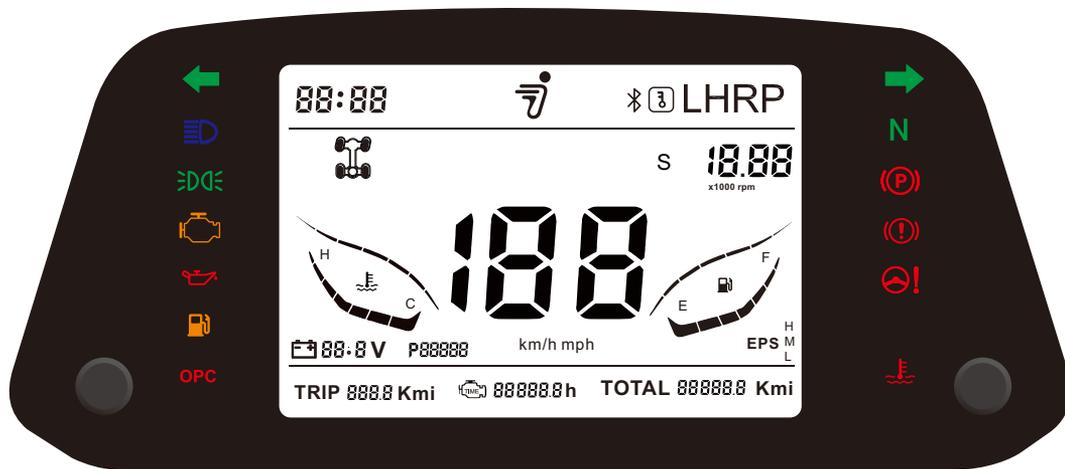
#### DASHBOARD

The dashboard displays key information to the user.

See the next page for display functions and instructions

#### **⚠ WARNING**

Using a high-pressure water gun may damage the dashboard. You should use your hands or hoses to clean the vehicle with neutral soap. Do not use alcohol or corrosive cleaning agents, such as insect repellents, to clean the dashboard.



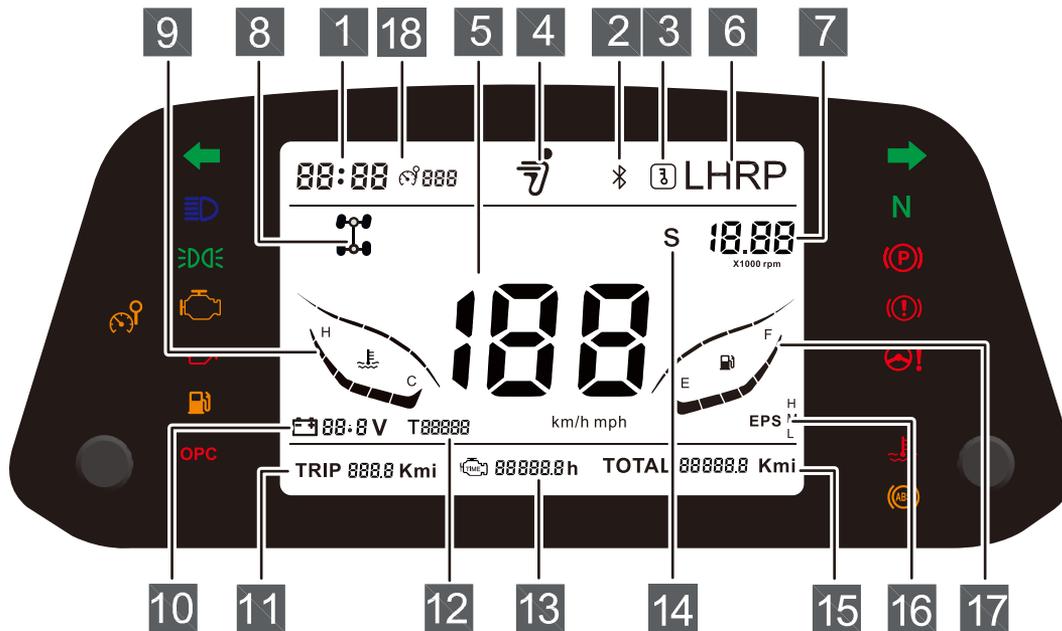
#### DASHBOARD INDICATOR LIGHT DESCRIPTION

| Item               | Icon  | Function description  | Fault phenomenon  | Analysis of cause and trouble shooting   |
|--------------------|---|---|---|--|
| Left turning       |  | This indicator will be on when turn on the left turning light                                       | This indicator not on when the left turning light is on | Check whether PIN 29 has high level input, if yes, replace the meter, if not, check the relevant electric line |
| High beam          |  | This indicator will be on when turn on the high beam  | This indicator not on when high beam is on              | Check whether PIN 30 has high level input, if yes, replace the meter, if not, check the relevant electric line |
| Position indicator |  | This indicator will be on when front light, tail light, license plate light, dashboard light are on | This indicator not on when position light is on         | Check whether PIN31 has high level input, if yes, replace the meter, if not, check the relevant electric line  |

|                                   |   |   |   |  |
|-----------------------------------|---|---|---|--|
| Fault indicator                   |    | When the fault indicator light is on, it indicates that the following systems have faults: Emission control system; Engine electronic control system; | —   | —  |
| Right turning light indicator     |    | This indicator will be on when right turning light is on  | This indicator not on when right turning light is on    | Check if PIN12 has high level input, if so ,replace the meter, if No. check the related wiring   |
| 'N' gear indicator                |    | Shift lever in 'N' gear   | Shift lever in 'N' gear and the indicator not on        | Check if PIN11 has low level input, if so, replace the meter, if No, check the related wiring, whether the wiring harness is loose or broken |
| Parking indicator                 |    | The indicator will be on when the parking switch is applied   | The indicator not on when the parking switch is applied | Check if PIN10 has low level input, if so, replace the meter, if No, check the related wiring, whether the wiring harness is loose or broken |
| Brake system alarming             |  | <ul style="list-style-type: none"> <li>• Brake fluid level too low</li> <li>• Brake system have fault</li> </ul>                                      | —   | —  |
| Electric steering system alarming |  | EPS have fault (optional)   | —   | —  |
| Parking indicator                 |  | The indicator will be on when the parking switch is applied   | The indicator not on when the parking switch is applied | Check if PIN10 has low level input, if so, replace the meter, if No, check the related wiring, whether the wiring harness is loose or broken |
| Brake system alarming             |  | <ul style="list-style-type: none"> <li>• Brake fluid level too low</li> <li>• Brake system have fault</li> </ul>                                      | —   | —  |
| Electric steering system alarming |  | EPS have fault (optional)   | —   | —  |

|   |   |  |          |  |
|---|---|--|----------|--|
| <p>Speed limit alarm Indicator</p>        |  | <p>In the speed limit mode, when the driving speed is greater than the set speed limit, the speed limit indicator (yellow) flashes and the buzzer alarms at the same time, and the alarm is lifted when the driving speed is <math>\leq 100</math> km/h.</p> | <p>—</p> | <p>—</p>   |
| <p>“ABS” Alarm light</p>                  |  | <p>The following system have fault</p> <ul style="list-style-type: none"> <li>• ABS ;</li> <li>• Brake auxiliary system (optional)</li> </ul>  | <p>—</p> | <p>Check the level of the coolant and the leakage of the coolant</p> |
| <p>Coolant high temperature indicator</p> |  | <p>This indicator show the high temperature of the engine coolant. stop the engine immediately when the indicator on</p>   | <p>—</p> | <p>—</p>   |

## INSTRUMENT INFORMATION DISPLAY



| NO. | Area                  | function description  | Fault   | Toubleshooting   |
|-----|-----------------------|---|---|--|
| 1   | Time display          | Showing current time  | —   | —  |
| 2   | Bluetooth             | When mobile Bluetooth and T-BOX are connected successfully and the light will be on.  | Power on remotely by Bluetooth, this icon not lights up | Check dashboard CAN-H,CAN-L wire harness, if not solve it , replace TBOX if still no replace dashboard |
| 3   | Power on remotely     | When power on the ATV, the APP in the mobile phone, Click the remote power on button and the light will be on. (The premise is that T-BOX networking is successful) | Power on remotely by APP, this icon not lights up       | Check dashboard CAN-H,CAN-L wire harness, if not solve it, replace TBOX if still not,replace dashboard |
| 4   | Company logo          | This icon light up when vehicle on power  | —   | —  |
| 5   | Vehicle speed display | Display actual vehicle speed  | Display wrong speed or no display                       | Check PIN4 loose check vehicle speed sensor, replace meter or speed sensor                             |
| 6   | Gear display          | Display the correctly gear<br>L -Low speed<br>H -High speed<br>R -Reverse<br>P -Parking   | No gear display   | Check gear position sensor and related electric line   |

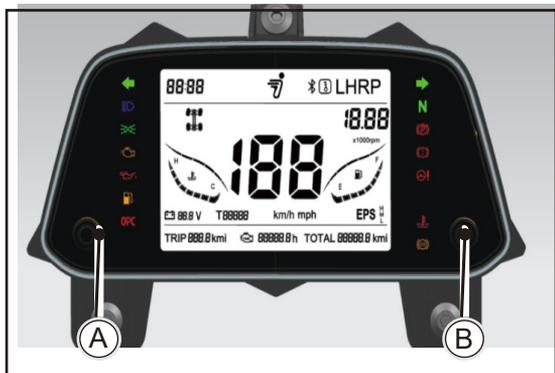
# ELECTRICAL SYSTEM

## SEGWAY AT10

|    |   |  |                                     |   |
|----|---|--|-------------------------------------|---|
| 7  | RPM                                     | Display actual engine speed  | No engine speed display             | Check CNA-H, CAN-L<br>Wire harness, check ECU, and crankshaft position  |
| 8  | Four-wheel drive full differential lock |  2 x 4 patterns<br> 4 x 4 patterns<br> 4x4 locking mode<br> 2 x 4 patterns (With differential)<br> 4 x 4 patterns (With differential)<br> 4x4 locking mode (With differential) | —                                   | —   |
| 9  | Coolant temperature indicator           | Displays current coolant temperature<br><b>H</b> -High temperature<br><b>C</b> -Low temperature  | No coolant temperature display      | Check CNA-H, CAN-L wire harness check ECU   |
| 10 | Accumulator voltage                     | Displays the current voltage of the vehicle battery  | —                                   | —   |
| 11 | Subtotal mileage                        | Single trip mileage  | —                                   | —   |
| 12 | Fault code display                      | Fault code will display when ECU、EPS、T-BOX Fails   | —                                   | —   |
| 13 | Engine operation time                   | Display engine operation time  | Display wrong engine operation time | Check if display engine operation time ,if yes, replace meter, if no ,check as the procedure of inspection engine speed |
| 14 | Mode display                            | When the vehicle is in sport mode, "S" lights up at this time  |                                     |   |
| 15 | Total mileage                           | Displays the total mileage accumulated by the vehicle  | —                                   | —   |
| 16 | EPS On                                  | EPS mode was set in the APP and the preferred mode of the rider was selected:<br>M -Normal mode, power normal<br>H -Comfort mode, power light<br>L -Motion mode, booster weight  | E P S model no display              | Check CNA-H, CAN-L<br>Wire harness<br>Check EPS<br>Check TBOX   |

|    |                          |   |                             |  |
|----|--------------------------|---|-----------------------------|--|
| 17 | Fuel meter               | Displays the current amount of fuel   | No display of the fuel mass | Check CNA-H,<br>CAN-L<br>Wire harness<br>Check fuel level sensor<br>Check TBOX |
| 18 | Speed limit setting icon | The instrument displays the speed limit icon when the speed limit is on, but not when it is off |                             |  |

DASHBOARD BUTTON FUNCTION INTRODUCTION



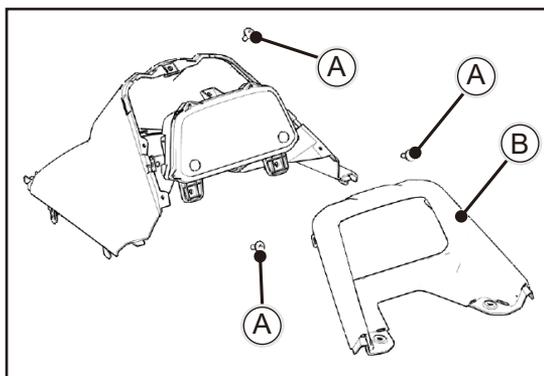
| Function                 | A button    | B button    | Display  |
|--------------------------|-------------|-------------|--|
| Brightness adjustment    | Short press |             | Adjust backlight brightness (default: brightest) |
| Subtotal Clear           | Long press  |             | Zero subtotal mileage                            |
| EPS gear switching       |             | Short press | EPS level shift signal sent                      |
| Metric or imperial units |             | Long press  | Metric or imperial units switching               |
| Clock settings           | Long press  | Long press  | Clock hour flashing                              |
|                          | Short press |             | Hour+1   |
|                          |             | Long press  | Hour continuous+1                                |
|                          | Short press |             | Clock minute flashing                            |
|                          |             | Short press | Minute+1   |
|                          |             | Long press  | Minute continuous +1                             |

- ◆ Zeroing total mileage: under power off condition, press and hold button A and B at the same time, then turn on the key and power on, the interface "CCC--" will appear, adjust by button: short press left button to shift, short press right button to adjust the current position. After adjusting "CCC--" to 226, zero the mileage, the condition of zeroing the mileage is within 200KM and the number of times of zeroing the mileage is less than 3 times.

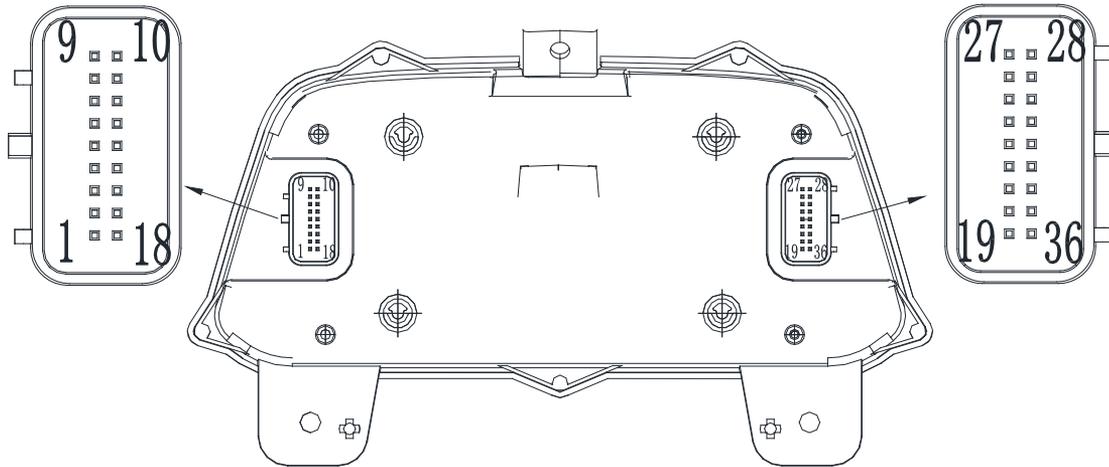
DASHBOARD DISASSEMBLY AND ASSEMBLY

**CAUTION**

Before removing the meter, be sure to power off the vehicle.



- ◆ Unplug the connector on the back of the dashboard
- ◆ Remove the plastic parts **【A】** first
- ◆ Remove the three bolts **【B】**
- ◆ Remove the plastic parts **【C】**
- ◆ Remove the three bolts **【D】**
- ◆ Remove the dashboard and replace it with a new one



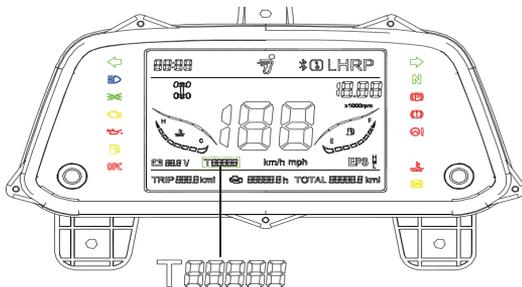
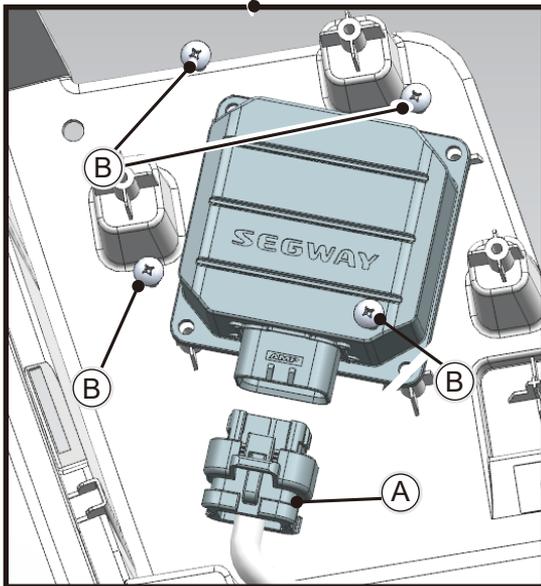
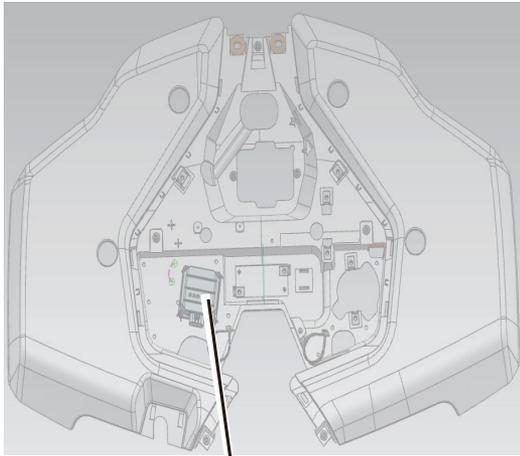
| pin | Description          | note                   | pin | Description                 | note         |
|-----|----------------------|------------------------|-----|-----------------------------|--------------|
| 1   | CAN-L                | —                      | 19  | Brake failure alarm         | Low voltage  |
| 2   | CAN-H                | —                      | 20  | 4WD lock signal             | —            |
| 3   | Sensor power         | —                      | 21  | 4WD signal                  | —            |
| 4   | Vehicle speed        | Pulse signal           | 22  | Off cushion switch          | Low voltage  |
| 5   | Power ground         | —                      | 23  | Oil pressure                | Low voltage  |
| 6   | —                    | —                      | 24  | R gear                      | Low voltage  |
| 7   | —                    | —                      | 25  | P gear                      | Low voltage  |
| 8   | Fuel signal          | Resistance signal      | 26  | H gear                      | Low voltage  |
| 9   | Fuel ground          | —                      | 27  | L gear                      | Low voltage  |
| 10  | Parking signal       | Low voltage            | 28  | 2WD signal                  | —            |
| 11  | N gear               | Low voltage            | 29  | Left turning light          | High voltage |
| 12  | Right turning light  | Low voltage            | 30  | High beam                   | High voltage |
| 13  | ABS light (reserved) | Low voltage (reserved) | 31  | Position light              | High voltage |
| 14  | B+                   | —                      | 32  | Engine Fault                | Low voltage  |
| 15  | Power ground         | —                      | 33  | —                           | —            |
| 16  | —                    | —                      | 34  | Power ground                | —            |
| 17  | Key power            | —                      | 35  | Buzzer output               | —            |
| 18  | —                    | —                      | 36  | Rear axle differential lock | —            |

### T-BOX

#### ⚠ CAUTION

If multiple vehicles are repaired at the same time, do not exchange and install the T-BOX

- ◆ Power off the whole vehicle first and remove the front shelf assembly
- ◆ Pull out the connector 【A】
- ◆ Remove the four bolts 【B】

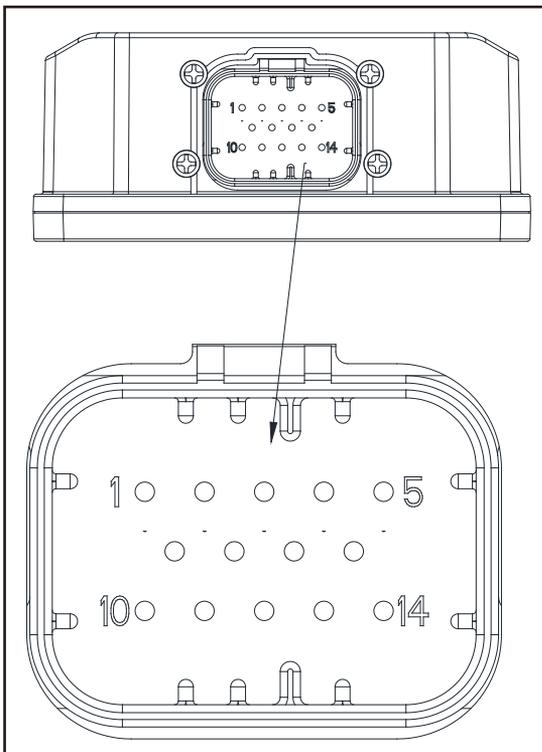


#### T-BOX FAULT CODE DISPLAY AREA

|       |                          |
|-------|--------------------------|
| T0001 | GPS module failure       |
| T0002 | 4G module failure        |
| T0003 | Bluetooth module failure |
| T0004 | Sensor failure           |
| T0005 | Power CAN failure        |
| T0006 | Body CAN failure         |

| Failure phenomenon and failure reason |                             |                                    |
|---------------------------------------|-----------------------------|------------------------------------|
| NO.                                   | Trouble                     | Solution                           |
| 1                                     | Fault code T0001            | Replace T-BOX                      |
| 2                                     | Fault code T0002            | Replace T-BOX                      |
| 3                                     | Fault code T0003            | Replace T-BOX                      |
| 4                                     | Fault code T0004            | Replace T-BOX                      |
| 5                                     | Fault code T0005            | Check PIN9 and PIN14 have signal   |
| 6                                     | Fault code T0006            | Check PIN4 and PIN5 have           |
| 7                                     | APP can not power on remote | Check signal circuit replace T-BOX |

### T-BOX INTERFACE DEFINITION



| Pin | Description    | Note   |
|-----|----------------|--|
| 1   | GND            |  |
| 2   | MIgnition      | Check if the mechanical key to power on or not |
| 3   | NG             | —  |
| 4   | CAN1+          | Body CAN+                                      |
| 5   | CAN1-          | Body CAN-                                      |
| 6   | REALY_OUT      | Power on remotely relay interface              |
| 7   | ACC            |  |
| 8   | CAN3+(Reserve) |  |
| 9   | CAN2+          | Engine CAN+                                    |
| 10  | B+             | Battery power                                  |
| 11  | OIL+           |  |
| 12  | OIL-           |  |
| 13  | CAN3-(Reserve) |  |
| 14  | CAN2-          | Engine CAN-                                    |

### SWITCH

#### POWER LOCK

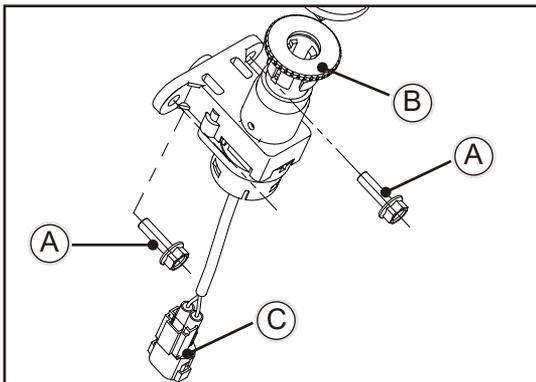
#### ⚠ CAUTION

When the indicator does not display after the key is turned on, check the circuit failure (see page xx), and replace the power lock after confirming that the power lock is broken

| FUNC \ CLR | R  | B | Key can be taken out |
|------------|----|---|----------------------|
|            | ON | ● |                      |
| OFF        |    |   | YES                  |
| LOCK       |    |   | YES                  |

#### → Check Power lock

After unplugging the connector, turn the multimeter to the conduction position. When the key is turned to the OFF position, the two wires should not be able to conduct; when the key is turned to the ON position, the two wires should be able to conduct;



When you need to replace the power lock, first remove the seat cushion and fuel tank guard (see "vehicle body and frame") .

【A】 M6 bolt

【B】 power lock

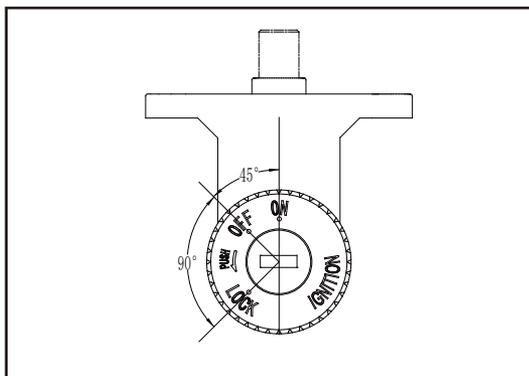
【C】 connector

◆ Remove the two M6 bolts

◆ Unplug the connector ,remove the power lock

#### NOTICE

In the normal state, the ON gear is in the forward direction, turning 45 degrees counterclockwise is the OFF gear, pressing down the key while rotating 90 degrees counterclockwise is the LOCK gear

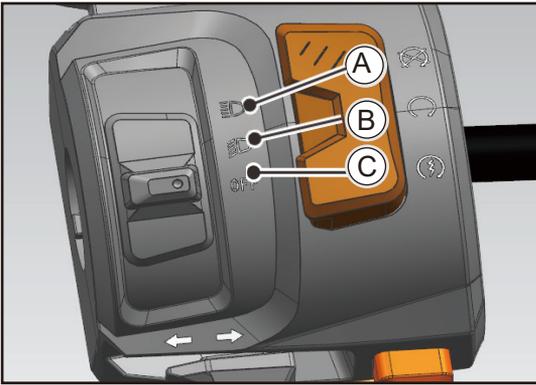


In the ON gear, the entire vehicle circuit is connected and the key cannot be removed;

In the OFF gear, the entire vehicle circuit is disconnected and the key can be removed;

In the LOCK gear, the front of the vehicle is in a locked state (see "vehicle body and frame") and the key can be removed;

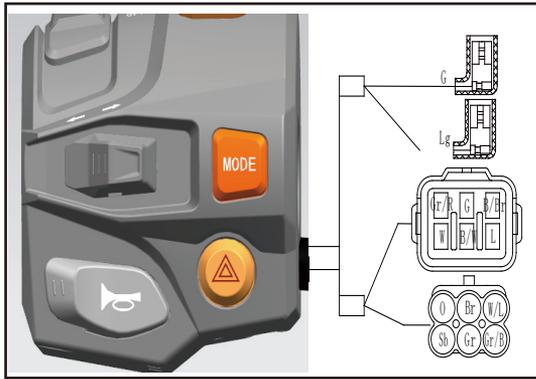
### LEFT HANDLEBAR SWITCH



**⚠ CAUTION**

The switch is valid only when the power lock is in the ON position

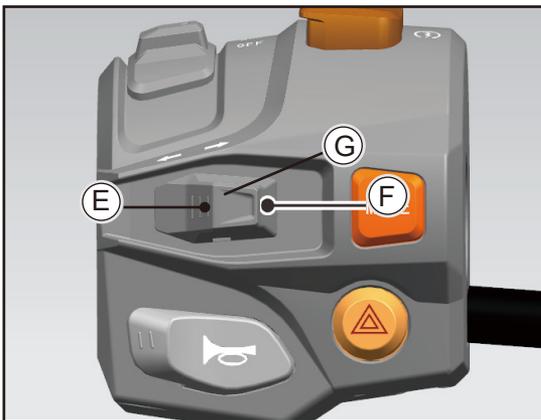
- [A] gear for high beam on
- [ B ] gear for low beam on
- [C] gear for OFF



**⚠ CAUTION**

Since the switch is an integral part, any damage to the switch requires replacement of the entire switch

| CLR \ FUNC | B/Br | Br | L | B/Br | W |
|------------|------|----|---|------|---|
| OFF        |      |    |   |      |   |
|            | ○    | ○  | ○ | ○    |   |
|            | ○    | ○  |   | ○    |   |

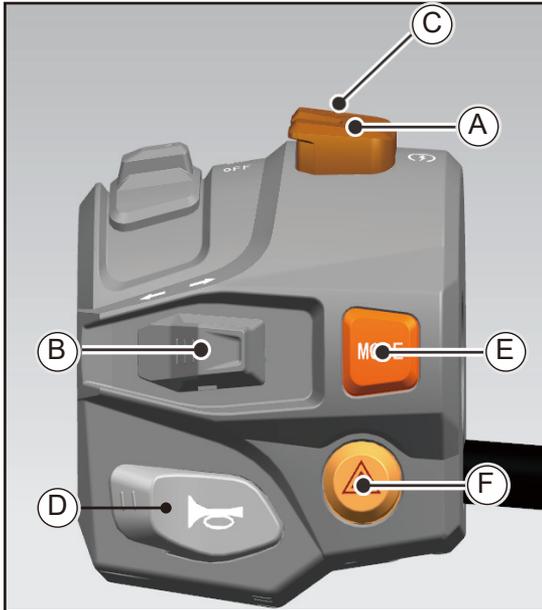


- 【E】** Turn on left turning light
- 【G】** Turn off the turning light
- 【F】** Turn on the right turning light

→ Check if the turning light switch work normally

When the switch is turned to the left steering position, gray and orange can be connected, while gray and light blue cannot be connected ; when the switch is turned to the right steering position, gray and light blue can be connected, and gray and orange cannot be connected;

| CLR \ FUNC | 0 | Gr | Sb |
|------------|---|----|----|
|            | ○ | ○  |    |
|            |   | ○  | ○  |



**【A】** Start button

**【B】** Left and right turn signal switch

**【C】** Flameout switch

When the engine is running, press the flameout switch button

to stop the engine;

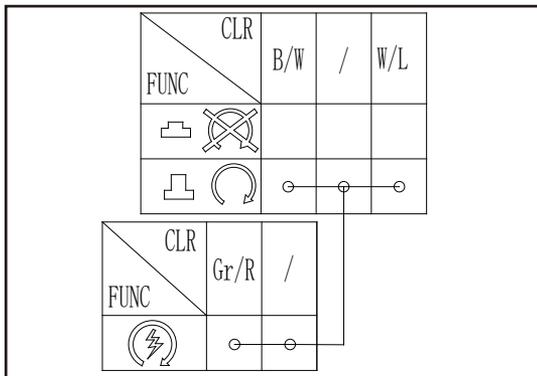
when the engine is stopped, first pop up the flameout switch button, and then press the start button to start the engine;

When the function fails, check the related circuit first;

when all circuits are checked to be OK, test the internal circuitry of the flameout switch.

### ⚠ CAUTION

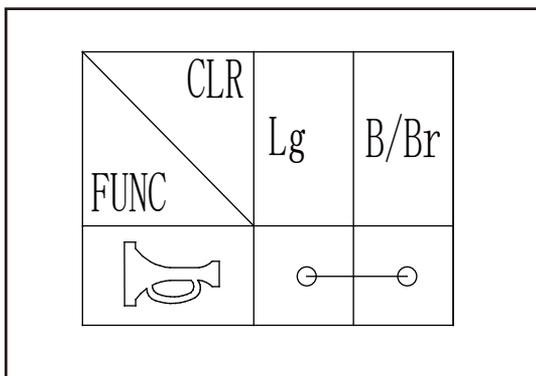
The engine can only be started by pressing the start button when the flameout switch is in the pop-up position



→ Test flameout switch for damage

When the flameout switch is popped up, black-white and white-blue should be able to conduct, and when the start button is pressed at this time, gray-red, black-white, white-blue should be able to conduct;

when the flameout switch is pressed, black-white and white-blue cannot be conducted, and when the start button is pressed at this time, the gray-red, black-white, white-blue all cannot be conducted;



**【D】** Horn Switch

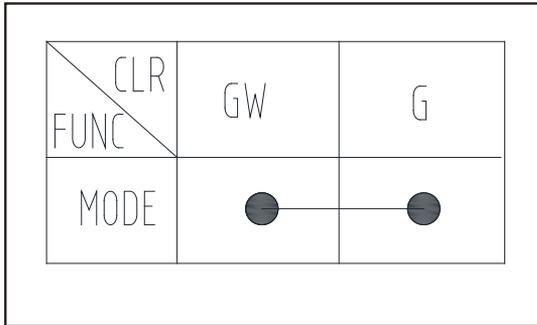
→ Test horn switch for damage

When the key is in the ON position, it should make a sound when pressing the horn switch;

when the horn cannot make a sound, first check relevant circuit;

when there is no problem with the circuit, test the internal circuit of the horn switch;

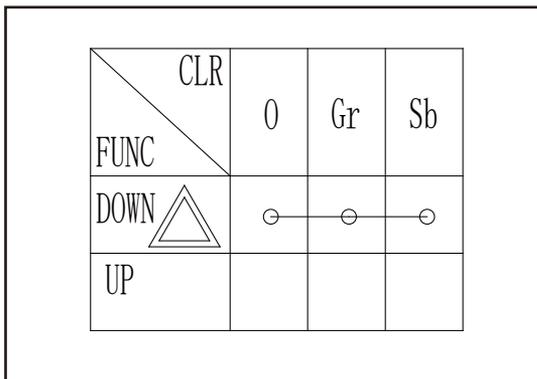
when pressing the horn switch, light-green and black-brown should be able to conduct;



### 【E】 Mode display

When the mode switch is pressed, the ECU receives the signal and the power output is in normal or sport mode;

In normal mode: power output is smooth and fuel consumption is more economical; in sport mode: co-power output is strong and fuel consumption is higher;



### 【F】 Emergency switch

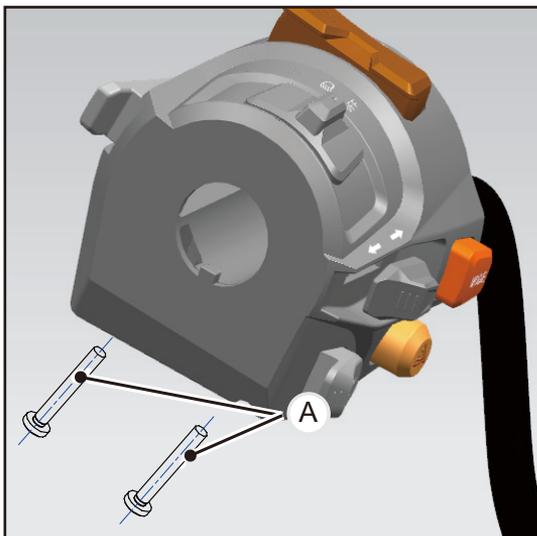
When the emergency switch is pressed, the four front and rear turning lights flash at the same time; when the emergency switch is pressed, if a single turning light does not light up, check the relevant fuse or the lamp itself.;

#### → Check emergency switch

When the emergency switch is pressed, if the four front and rear turning lights do not flash, the internal circuit of the emergency switch can be tested;

when the emergency switch bounces, the orange, gray, and light blue should not be conductive;

when the emergency switch is pressed, orange, , gray and light blue should be able to conduct;



## ASSEMBLY AND DISASSEMBLY OF LEFT HANDLEBAR SWITCH

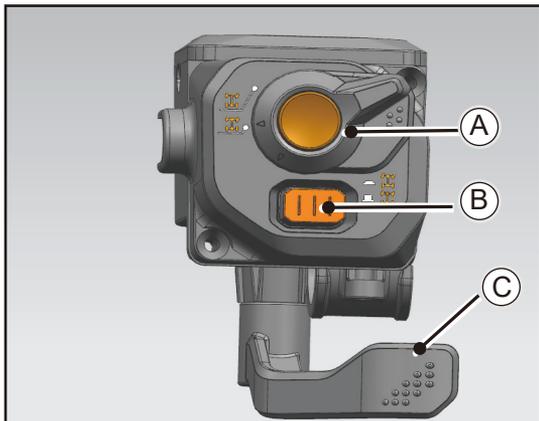
### 【A】 Fastening bolts

- ◆ Remove the two fastening bolts by tool;
- ◆ Remove the switch from the handlebar;
- ◆ When installing a new switch, take care to snap the lower cover's limit into the handlebar limit slot, then tighten the two fastening bolts with a tool;

### 【B】 limit position

- ◆ Rotate the switch around the handlebar tube after installation to confirm whether it is installed in place, and it should not be able to rotate after installation.

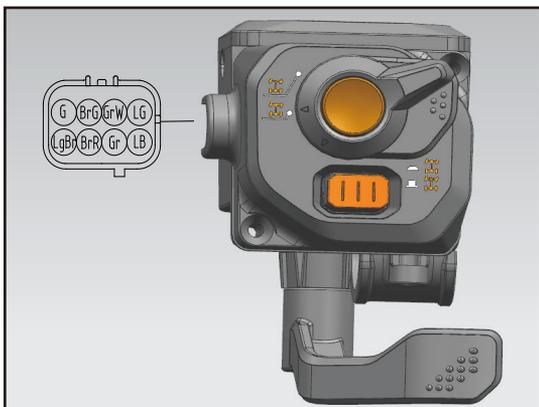
RIGHT HANDLEBAR SWITCH



**CAUTION**

The switch is valid only when the power lock is in the ON position

- 【A】 2-4WD switch
- 【B】 4WD lock switch
- 【C】 Accelerator



→ **Test 2-4WD switch for damage**

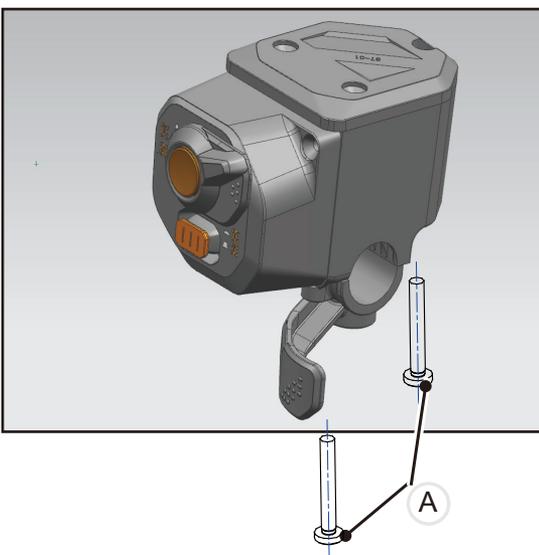
When the knob switch is turned to the 2WD position, the switch is in 2WD, at which time brown-red and blue-green and blue-black can conduct;

When the knob switch is turned to the 4WD position, the switch is in 4WD state, at this time the brown-red and brown-green, blue-green and blue-black can conduct;

When the knob switch is rotated to the 4WD position, after popping up the 4WD lock switch, at this time the gray and gray-white, brown-red and brown-green, light green-brown and green can lead through respectively.

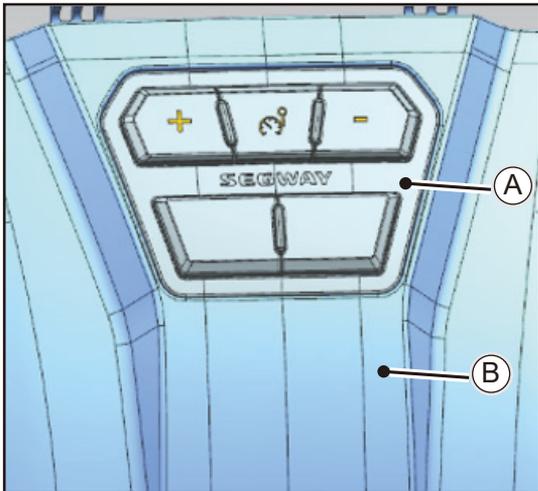
| FUNC | KNOB | BUTT     | LB    | LR | B     | GR |
|------|------|----------|-------|----|-------|----|
|      | 2WD  |          |       |    |       |    |
|      | 4WD  |          | ● — ● |    |       |    |
|      | 4WD  | LOCK<br> | ● — ● |    | ● — ● |    |

ASSEMBLY AND DISASSEMBLY OF RIGHT HANDLEBAR SWITCH



- 【A】 Fastening bolts
- ◆ Remove the two fastening bolts by tool;
- ◆ Remove the switch from the handlebar;
- ◆ When installing a new switch, tighten the two fastening bolts with a tool;
- ◆ Rotate the switch around the handlebar tube after installation to confirm whether it is installed in place, and it should not be able to rotate after installation.

### SPEED SWITCH



Detection and replacement:

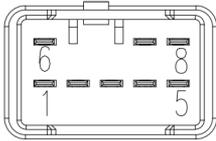
ABS switch damaged or electrical signal abnormal, identify the fault point;

Confirm that the problem is a damaged or malfunctioning ABS switch, and replace it according to the following method.

Open the small cover of the front storage box with the key

【A】 ABS speed control switch

【B】 Storage box small cover



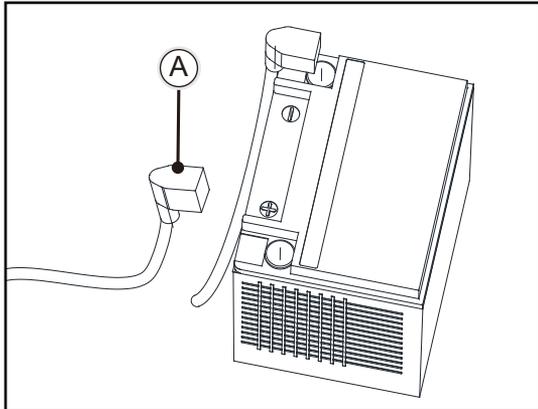
|   | 功能  | 信号        | 灯颜色 | 备注 |
|---|-----|-----------|-----|----|
| 1 | 空   | —         |     |    |
| 2 | 空   | —         |     |    |
| 3 | +   | 低电平输出     |     | 点动 |
| 4 |     | 低电平输出     |     | 点动 |
| 5 | -   | 低电平输出     |     | 点动 |
| 6 | 空   | —         |     |    |
| 7 | 电源负 | 电瓶电源地     |     |    |
| 8 | 电源正 | 电瓶电源正+12V |     |    |

- ◆ Remove the small cover of the storage box,
- ◆ Use tools to release several buckles between the ABS switch and the small cover of the storage box
- ◆ Unplug the connector
- ◆ Remove the ABS switch

#### CAUTION

When replacing the ABS switch, the wiring harness should first pass through the small hole under the storage box cover, assemble the wiring harness plug with the ABS switch, and then snap it into the storage box cover.

### WINCH ASSEMBLY

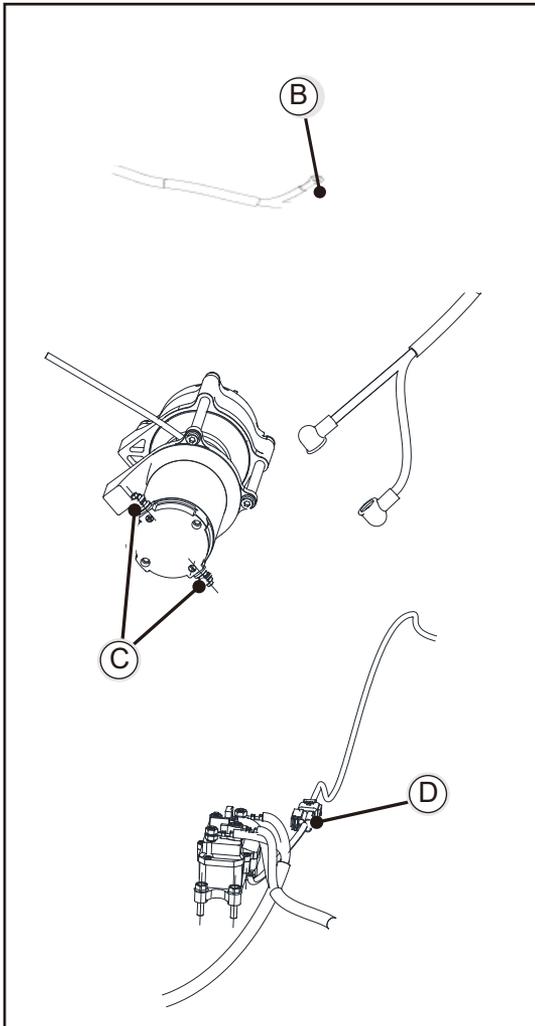


#### REMOVAL

#### ⚠ CAUTION

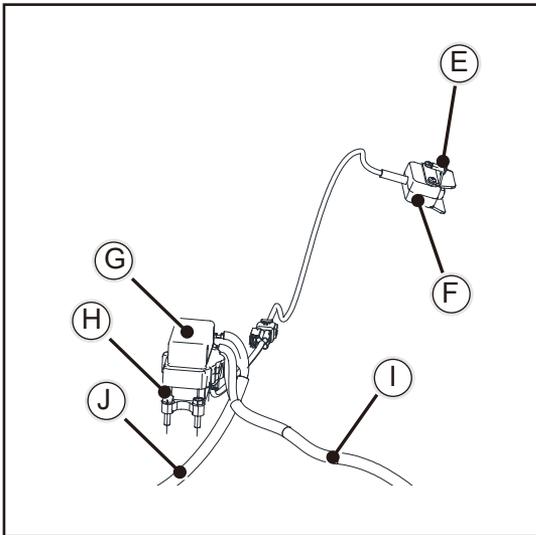
When removing the winch, first power off the vehicle power

- ◆ Remove external related plastic parts
- ◆ First remove the battery positive electrode **【A】**
- ◆ Remove the power cable of the winch **【B】**
- ◆ Remove the winch motor cable nut **【C】**
- ◆ Unplug the plug **【D】**
- ◆ Cut off the cable tie along the cable

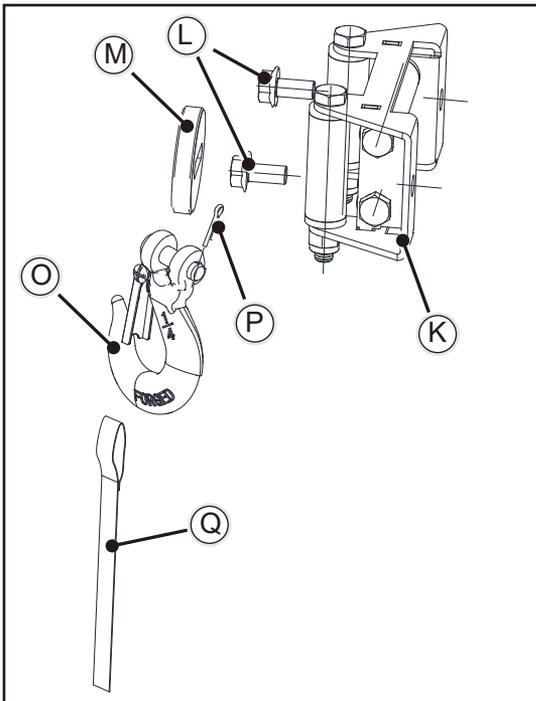


#### ⚠ WARNING

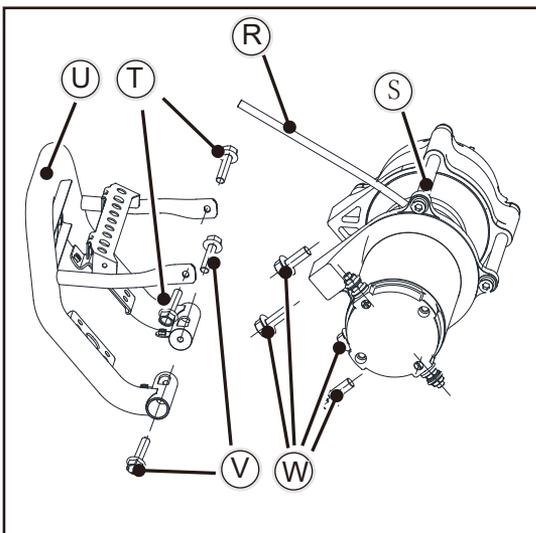
Be sure to disconnect the battery before disassembling the winch assembly to avoid short circuit



- ◆ Remove the bolt **【E】** , remove the winch switch **【F】**
- ◆ Remove the bolt **【H】** , then the winch power cord **【I】** , winch motor wire **【J】** and winch relay **【G】** can be removed together



- ◆ After disassembling the bolt **【P】** and the wire rope **【R】** , you can remove the strap **【Q】** , hook **【O】** , and rubber pad **【M】**
- ◆ Remove the bolt **【L】** , and remove the guide wheel **【K】**



- ◆ First remove bolt **【T】** and bolt **【V】**
- ◆ Disassemble the bolt **【W】** , and remove the motor **【S】**

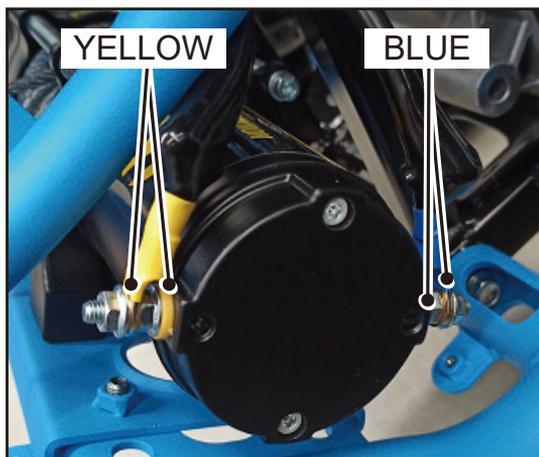
**⚠ CAUTION**

The winch work does not exceed 1min each time, and then works after an interval of 30S

- ◆ Rated working voltage DC12V
- ◆ Maximum working tension 2500LBS or 3000LBS
- ◆ The maximum working current  $\leq 185$  A, the maximum working current lasts for 1 min, and work after an interval of 30 seconds. Continue to work in this way
- ◆ The wire rope diameter is 4.8 and the wire rope length is 14.5

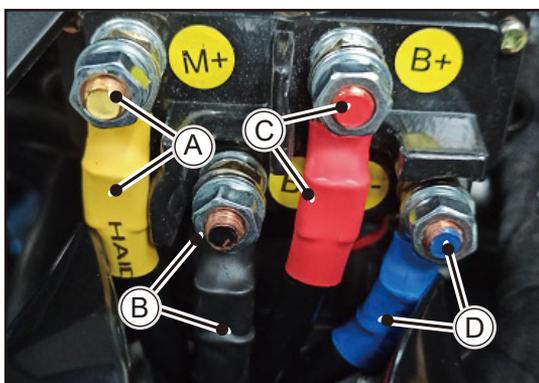
The color of the insulation pad of the winch motor terminal and the heat shrinkable tube of the cable is one-to-one correspondence

- 【A】 YELLOW
- 【B】 BLUE

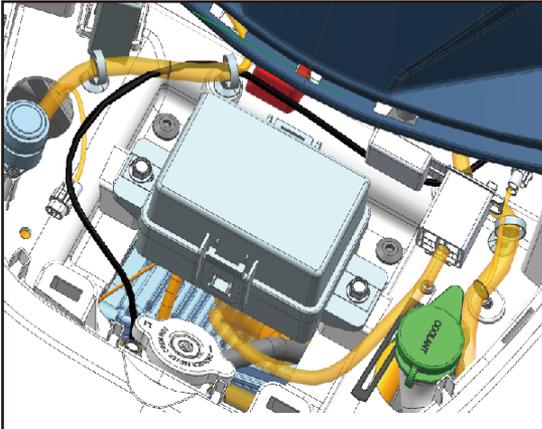


The color of the insulation pad of the winch motor terminal and the heat shrinkable tube of the cable is one-to-one correspondence

- 【C】 YELLOW
- 【D】 BLACK
- 【E】 RED
- 【F】 BLUE



## FUSE BOX



All fuses for the vehicle are in the fuse box

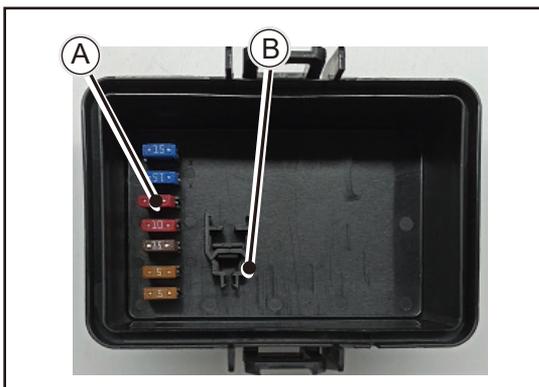
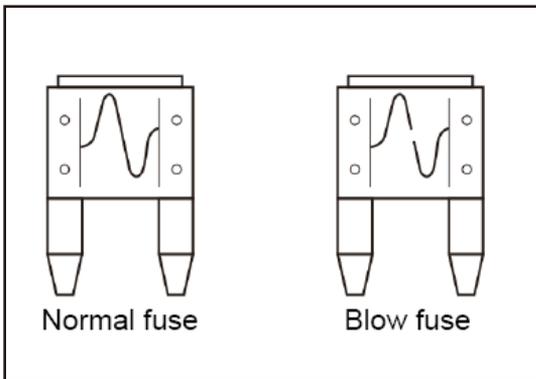
The fuse box is located under the front instrument mask.

Remove front panel repair cover

- ◆ After the front panel repair cover is removed, the fuse box located at the bottom can be seen.
- ◆ Move the clasp on the left and right sides of the fuse box cover to the outside. Loosen the clasp and open the fuse box.

### ⚠ CAUTION

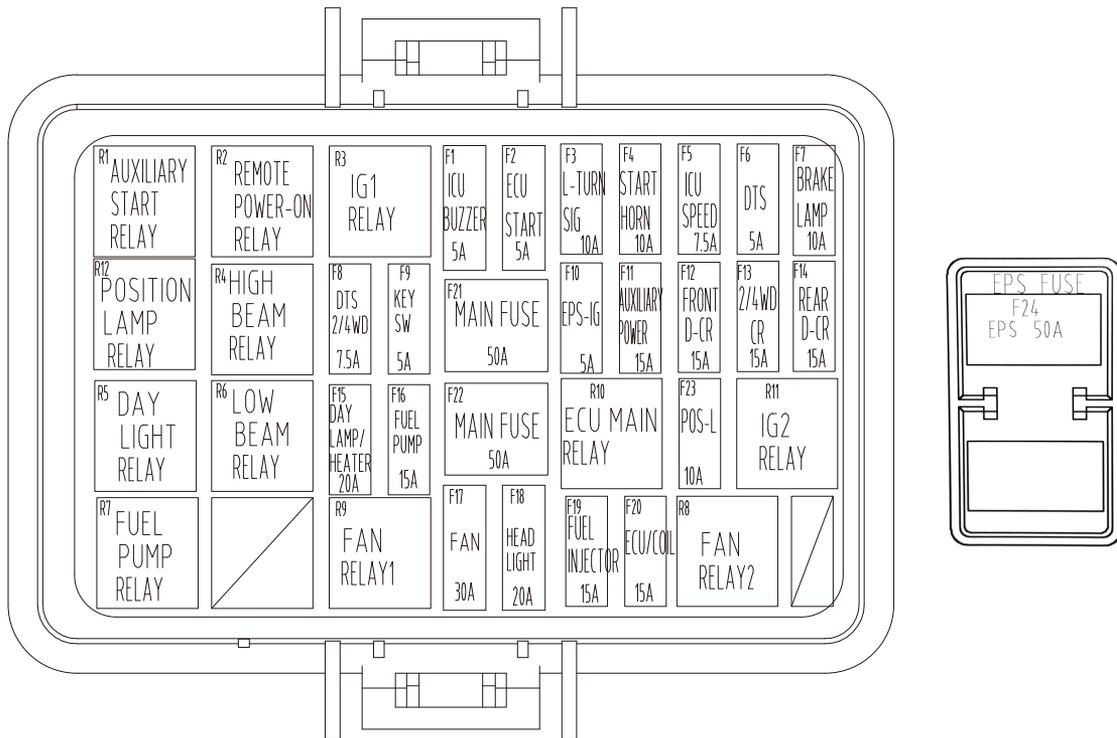
- ◆ Do not use a fuse above the rated ampere value or replace it with anything else.
- ◆ Please use the same product. Never use wires for fuses, even temporary replacements are not allowed.
- ◆ Do not modify fuses or fuse boxes.



- ◆ If a chip fuse is broken, you can replace it with a spare fuse **【A】** of the same specification in the fuse box cover. Please use a fuse clamp **【B】** to replace the fuse.

## SEGWAY AT10

### FUEL BOX LABEL



| No. | Fuse/Relay                   | Power | No. | Fuse/Relay                                | Power   |
|-----|------------------------------|-------|-----|---|---------|
| F1  | Display/Buzzer               | 5A    | F19 | Fuel Injector/Ignition Coil/Oxygen Sensor | 15A     |
| F2  | ECU Start Relay              | 5A    | F20 | Non-sustained Power Supply                | 15A     |
| F3  | Turn Signal                  | 10A   | F21 | Main Fuse                                 | 50A     |
| F4  | Start /Horn                  | 15A   | F22 | Main Fuse                                 | 50A     |
| F5  | Display/Vehicle Speed Sensor | 7.5A  | F23 | Position light fuse                       | 10A     |
| F6  | DTS                          | 5A    | F24 | EPS Fuse                                  | 50A     |
| F7  | Brake Light                  | 10A   |     |   |         |
| F8  | DTS/2-4WD Module             | 7.5A  | R1  | Auxiliary Start Relay                     | 12V 20A |
| F9  | Power Switch                 | 5A    | R2  | DTS Relay                                 | 12V 20A |
| F10 | EPS-IG                       | 5A    | R3  | IG1 Relay                                 | 12V 20A |
| F11 | Auxiliary Outlet             | 15A   | R4  | High Beam Relay                           | 12V 20A |
| F12 | Front Differential           | 15A   | R5  | Daytime Running Light Relay               | 12V 20A |
| F13 | 2WD and 4WD Switching        | 15A   | R6  | Low Beam Relay                            | 12V 20A |
| F14 | Rear Differential            | 15A   | R7  | Fuel Pump Relay                           | 12V 20A |
| F15 | Daytime Running Light        | 20A   | R8  | Cooling Fan Relay 2                       | 12V 20A |
| F16 | Fuel Pump                    | 15A   | R9  | Cooling Fan Relay 1                       | 12V 20A |
| F17 | Cooling Fan                  | 30A   | R10 | ECU Main Relay                            | 12V 20A |
| F18 | High/Low Beam                | 20A   | R11 | IG2 Relay                                 | 12V 20A |



### WIRING DIAGRAM

Color comparison table

|        |             |                 |                   |                    |                   |                  |              |               |             |
|--------|-------------|-----------------|-------------------|--------------------|-------------------|------------------|--------------|---------------|-------------|
| CODE   | R           | R/B             | R/W               | R/G                | R/Y               | R/L              | R/Br         | R/O           |             |
| COLOUR | Red         | Red/Black       | Red/White         | Red/Green          | Red/Yellow        | Red/Blue         | Red/Brown    | Red/Orange    |             |
| CODE   | P           | B               | B/R               | B/W                | B/Y               | B/L              | B/V          | B/Br          |             |
| COLOUR | Pink        | Black           | Black/Red         | Black/White        | Black/Yellow      | Black/Blue       | Black/Violet | Black/Brown   |             |
| CODE   | W           | W/R             | W/B               | W/G                | W/Y               | W/L              | W/V          | W/Gr          | W/Br        |
| COLOUR | White       | White/Red       | White/Black       | White/Green        | White/Yellow      | White/Blue       | White/Violet | White/Gray    | White/Brown |
| CODE   | Gr          | Gr/R            | Gr/B              | Gr/W               | BR                | Br/R             | Br/B         | Br/Y          |             |
| COLOUR | Gray        | Gray/Red        | Gray/Black        | Gray/White         | Brown             | Brown/Red        | Brown/Black  | Brown/Yellow  |             |
| CODE   | O           | O/R             | O/B               | O/W                | O/G               | O/L              | O/Gr         |               |             |
| COLOUR | Orange      | Orange/Red      | Orange/Black      | Orange/White       | Orange/Green      | Orange/Blue      | Orange/Gray  |               |             |
| CODE   | G           | G/R             | G/B               | G/W                | GY                | GL               | GV           | G/Br          |             |
| COLOUR | Green       | Green/Red       | Green/Black       | Green/White        | Green/Yellow      | Green/Blue       | Green/Violet | Green/Brown   |             |
| CODE   | Y           | Y/R             | Y/B               | Y/W                | Y/G               | Y/L              | Y/Gr         | Y/Br          |             |
| COLOUR | Yellow      | Yellow/Red      | Yellow/Black      | Yellow/White       | Yellow/Green      | Yellow/Blue      | Yellow/Gray  | Yellow/Brown  |             |
| CODE   | L           | L/R             | L/B               | LW                 | L/G               | LY               |              |               |             |
| COLOUR | Blue        | Blue/Red        | Blue/Black        | Blue/White         | Blue/Green        | Blue/Yellow      |              |               |             |
| CODE   | V           | V/R             | V/B               | VW                 | V/G               | V/L              | V/Br         | V/O           |             |
| COLOUR | Violet      | Violet/Red      | Violet/Black      | Violet/White       | Violet/Green      | Violet/Blue      | Violet/Brown | Violet/Orange |             |
| CODE   | Lg          | Lg/R            | Lg/G              | Lg/Y               | Lg/Br             | Lg/P             |              |               |             |
| COLOUR | Light Green | Light Green/Red | Light Green/Green | Light Green/Yellow | Light Green/Brown | Light Green/Pink |              |               |             |
| CODE   | Lb          | Lb/R            | Lb/B              | Lb/W               | Lb/Gr             |                  |              |               |             |
| COLOUR | Light Blue  | Light Blue/Red  | Light Blue/Black  | Light Blue/White   | Light Blue/Gray   |                  |              |               |             |

**Wire color instruction:**

Wire color contains main color and secondary color:

For example:R/L means the main color is red and the secondary color is blue.

