

**Main Engine Parameters**

Engine type	SC20M163Q5A	SC20M218Q5A
Type	Common rail direct injection (CRDI) diesel engine with turbocharger and intercooler	Common rail direct injection (CRDI) diesel engine with turbocharger and intercooler
Displacement, L	1.996	1.996
Number of cylinder	4	4
Bore*Stroke, mm*mm	83*92	83*92
Volume compression ratio	15.9:1	15.9:1
Maximum net power, KW	118.5	158.5
Engine speed at rated power, rev/min	4000	4000
Max. torque, Nm	375	500
Engine speed at maximum torque, rev/min	1500 ~ 2400	1500 ~ 2400
Idle speed, rev/min	750±25	750±25
Fuel type and grade	Diesel, conform to Euro V or above standard	Diesel, conform to Euro V or above standard
Fuel tank capacity, L	73	73

**Chassis Technical Parameters**

Items	Parameter values
Front suspension structure	Double wishbone independent suspension
Rear suspension structure	Vertical type spring non-independent suspension
Form specifications of steel plate spring	Five leaf spring
Requirements for steel wheel dynamic balance	Both sides of the remaining dynamic imbalance is less than 10 grams (main tire )/ 15 grams (spare tire)
Requirements for aluminum wheel dynamic balance	Both sides of the remaining dynamic imbalance is less than: 8g
Rational range of brake pedal free stroke	within 10 mm
Rational use range of brake friction pair	The thickness of friction material is more than 2 mm

**Engine Mechanical System SC20M163Q6A**

**Specification**

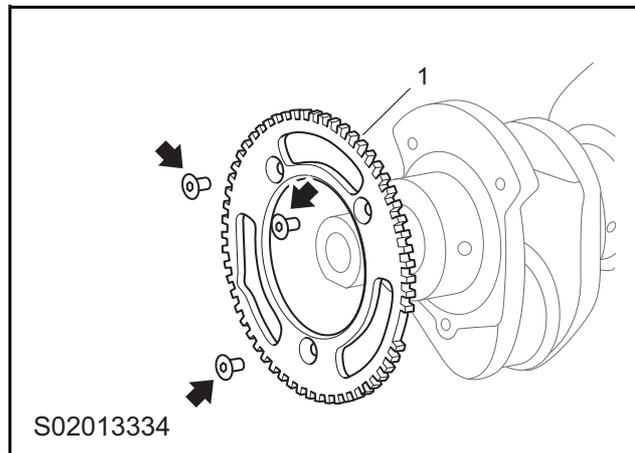
**Torque**

Tightening Torque for Fasteners	
Item Name	Torque, Nm
Bolt - Vacuum Pump Parts	10±1 Nm
Bolt - Crankshaft Shock Absorber	18 Nm + 40°
Bolt - Steering Pump	33±3 Nm
Bolt - Camshaft Timing Pulley	31±1 Nm
Bolt - Timing Tension Pulley	25±1 Nm
Bolt - Crankshaft Timing Pulley	135 Nm + 120°
Bolt - High-pressure Fuel Pump Timing Pulley	30±1 Nm
Bolt - Timing Idler I	40±1 Nm
Bolt - Timing Idler II	50±1 Nm
Bolt - Timing Idler III	40±1 Nm
Bolt - Engine Belt Tension Pulley	50±1 Nm
Bolt - Belt Idler	50±1 Nm
Bolt - Camshaft Timing Pulley Intermediate Flange	65 Nm ± 90°
Nut - High-pressure Fuel Pump Timing Pulley Intermediate Flange	80±1 Nm
Bolt - A/C Compressor Bracket	35±3 Nm
Bolt - Accessory Bracket	35±3 Nm
Bolt - Steering Pump Bracket	25±2 Nm
Cold Start Glow Plug	13±2 Nm
Bolt - Camshaft	11±1 Nm
Bolt - Camshaft Position Sensor Bracket	11±1 Nm
Bolt - Valve Chamber Cover	11±1 Nm
Bolt - Fuel Injector Clamp	33±3 Nm
Bolt - Water-Air Intercooler Bracket	45±3 Nm
Bolt - Timing Cover (Lower)	8±1 Nm
Bolt - Timing Pulley Chamber	11±1 Nm
Bolt - Camshaft Frame	11±1 Nm
Bolt - Front Engine Mount to Plane	110±10 Nm
Nut - Rear Mount Pad Assembly to Crossmember	65±5 Nm
Bolt - Rear Mount Pad Assembly to Transmission	65±5 Nm

## Crankshaft Signal Plate Replacement

### Removal

- 1 Remove the crankshaft. Refer to "Crankshaft Replacement".
- 2 Remove 3 bolts fixing the crankshaft signal plate to the crankshaft assembly.
- 3 Remove the crankshaft signal plate (1).



### Installation

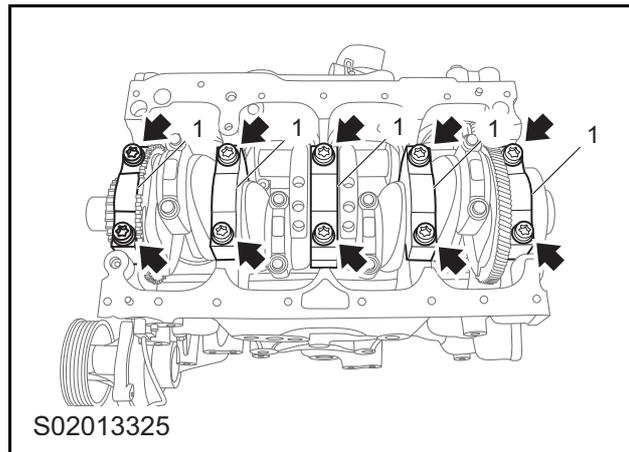
- 1 Install the crankshaft signal plate.
- 2 Install 3 bolts fixing the crankshaft signal plate to the crankshaft assembly, tighten them to  $11 \pm 1$  Nm, and check the torque.
- 3 Install the crankshaft. Refer to "Crankshaft Replacement".

## Crankshaft Assembly Replacement

### Removal

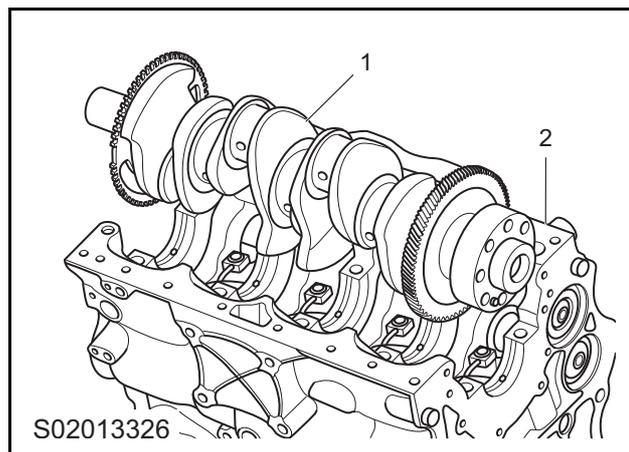
- 1 Remove the piston connecting rod assembly. Refer to "Piston Connecting Rod Assembly Replacement".
- 2 Remove 10 bolts fixing the main bearing cap to the engine block, and discard them.
- 3 Remove the main bearing cap (1).

**Caution: Do not screw the bolt out at once.**



- 4 Remove the crankshaft assembly (1) from the engine block (2).

**Caution: Lift the crankshaft up in parallel to avoid bumps.**

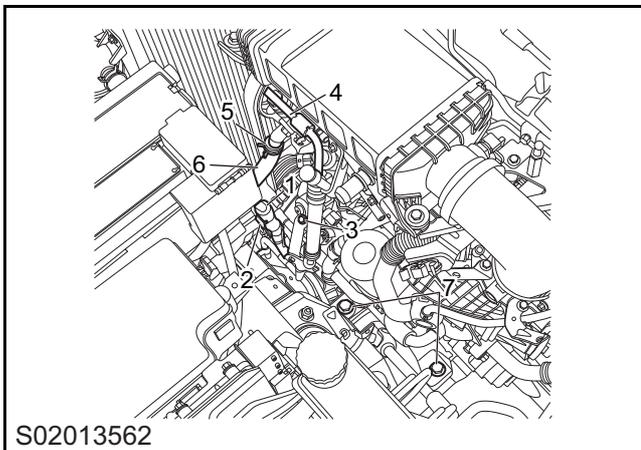


- 5 Remove the crankshaft main bearing shell from the engine block.

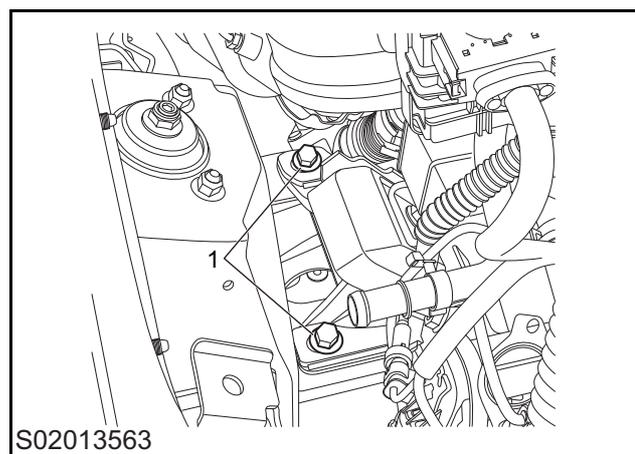
## Engine Mechanical System SC20M163Q6A

48 Loosen the clamp (5) and disconnect the reservoir from the steering pump oil suction hose (6) and the power steering pump assembly.

49 Remove 2 retaining bolts (7) on the left front engine mount.



50 Remove 2 retaining bolts (1) on the right front engine mount.



51 Lift the engine assembly out of the engine compartment with proper lifting tools.

### Installation

1 Lift the engine assembly into the engine compartment with proper lifting tools.

2 Install 2 retaining bolts on the right front engine mount, tighten them to  $110 \pm 10$  Nm, and check the torque.

3 Install 2 retaining bolts on the left front engine mount, tighten them to  $110 \pm 10$  Nm, and check the torque.

4 Remove the lifting tool from the engine.

5 Connect the reservoir to the steering pump oil suction hose and the power steering pump assembly, and secure it with clamps.

6 Connect the steering high-pressure oil pipe assembly with the power steering pump assembly, and install the oil pipe joint.

7 Install and tighten 1 retaining bolt on the bracket of steering high-pressure oil pipe assembly.

8 Install the clip on the battery harness.

9 Install the positive terminal of the battery harness.

10 Reset the engine grounding wire and install the clip on the engine grounding wire.

11 Install 2 retaining nuts on the engine grounding wire and tighten them.

12 Connect the water-air intercooler to the hose of the electronic water pump and the water-air intercooler, and secure it with clamps.

13 Install the fuel line.

14 Connect the electrical connectors of the engine harness.

15 Connect the front heater water outlet hose and the front heater water outlet hard pipe and secure it with clamps.

16 Connect the vacuum tube assembly and the vacuum pump assembly.

17 Reset the urea supply pipe and install the clip on the urea supply pipe.

18 Connect the urea supply pipe and the urea nozzle.

19 Install the heat insulation sleeve of urea nozzle, and press the clip of the heat insulation sleeve of urea nozzle.

20 Install the A/C inlet pipe assembly.

21 Install the A/C compressor exhaust pipe assembly.

22 Connect the hose of engine exhaust pipe to the hard pipe of engine exhaust pipe, and secure it with clamps.

23 Connect the front heater water inlet pipe assembly and the low-pressure EGR assembly, and secure it with clamps.

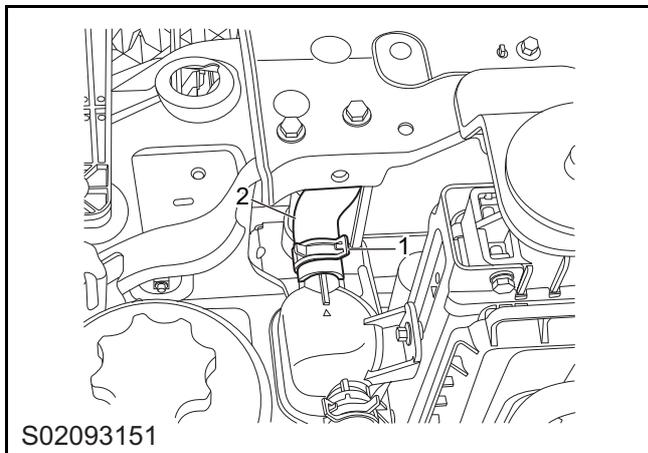
24 Connect the expansion tank compensation pipe and the water pump inlet pipe, and secure it with clamps.

25 Connect the hose of low-temperature radiator water inlet pipe with the hard pipe of low-

## Low Temperature Radiator Outlet Pipe Replacement

### Removal

- 1 Remove the front grille cover plate. Refer to "Front Grille Cover Plate Replacement".
- 2 Drain the coolant of the water-air intercooler. Refer to "Intercooler Coolant Drain and Refill".
- 3 Loosen the clamp and disconnect the low-temperature radiator water outlet pipe from the low-temperature radiator assembly.
- 4 Loosen the clamp (1), disconnect the low-temperature radiator water outlet pipe (2) from the liquid-gas separator, and remove the low-temperature radiator water outlet pipe (2).



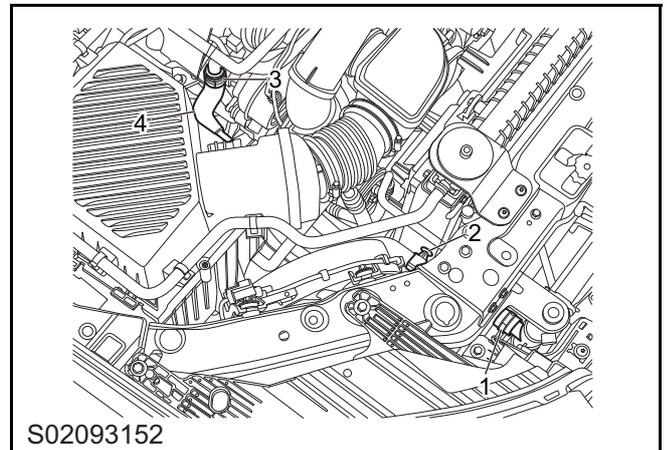
### Installation

- 1 Connect the low-temperature radiator water outlet pipe to the liquid-gas separator, and secure it with clamps.
- 2 Connect the low-temperature radiator water outlet pipe to the low-temperature radiator assembly, and secure it with clamps.
- 3 Refill coolant for the water-air intercooler. Refer to "Intercooler Coolant Drain and Refill".
- 4 Install the front grille cover plate. Refer to "Front Grille Cover Plate Replacement".

## Low Temperature Radiator Inlet Pipe Replacement

### Removal

- 1 Remove the front grille cover plate. Refer to "Front Grille Cover Plate Replacement".
- 2 Drain the coolant of the water-air intercooler. Refer to "Intercooler Coolant Drain and Refill".
- 3 Loosen the clamp (1), and disconnect the low-temperature radiator water inlet pipe from the low-temperature radiator assembly.
- 4 Remove the clip (2) fixing the low-temperature radiator water inlet pipe to the radiator assembly.
- 5 Loosen the clamp (3), disconnect the low-temperature radiator water inlet pipe from the turbocharger water outlet pipe, and remove the low-temperature radiator water inlet pipe (4).

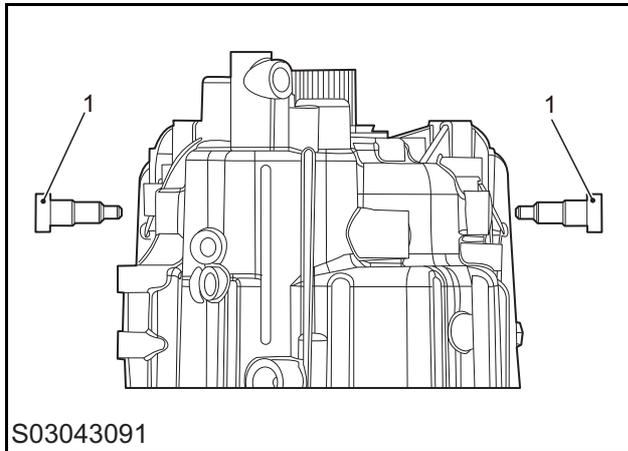


### Installation

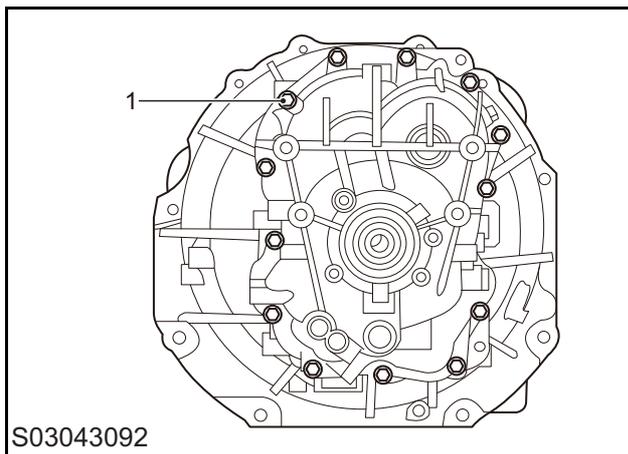
- 1 Connect the low-temperature radiator water inlet pipe to the turbocharger water outlet pipe, and secure it with clamps.
- 2 Install the clip fixing the low-temperature radiator water inlet pipe to the radiator assembly.
- 3 Connect the low-temperature radiator water inlet pipe to the low-temperature radiator assembly, and secure it with clamps.
- 4 Refill coolant for the water-air intercooler. Refer to "Intercooler Coolant Drain and Refill".
- 5 Install the front grille cover plate. Refer to "Front Grille Cover Plate Replacement".

**Caution:** Engage the 3rd gear before closing the rear housing.

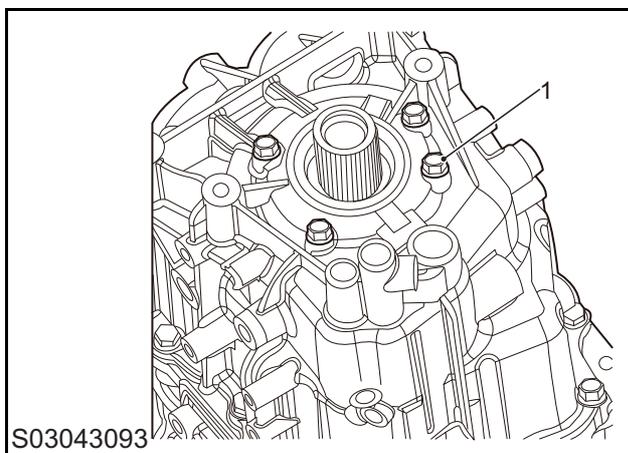
31 Install 2 shift fork pin shafts (1).



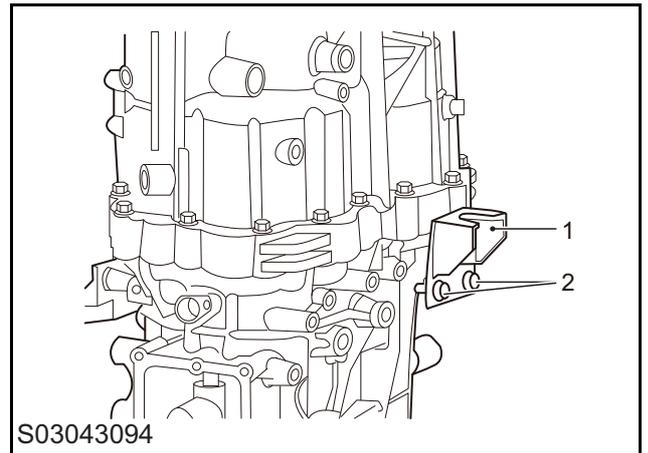
32 Tighten the connecting bolt (1) to 23.5-26.5 Nm.



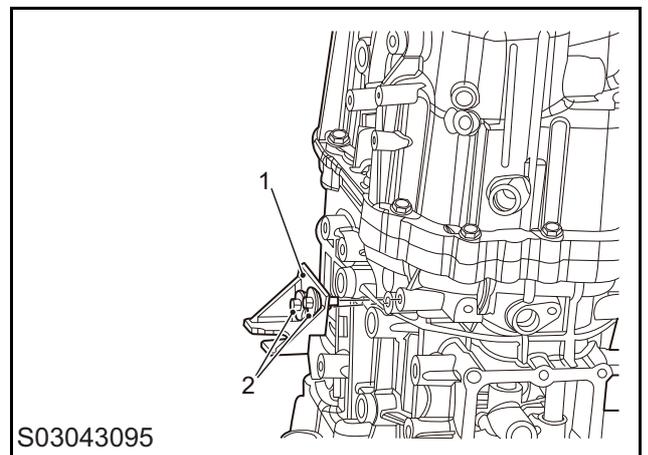
33 Tighten 4 bolts (1) to 23.5-26.5 Nm.



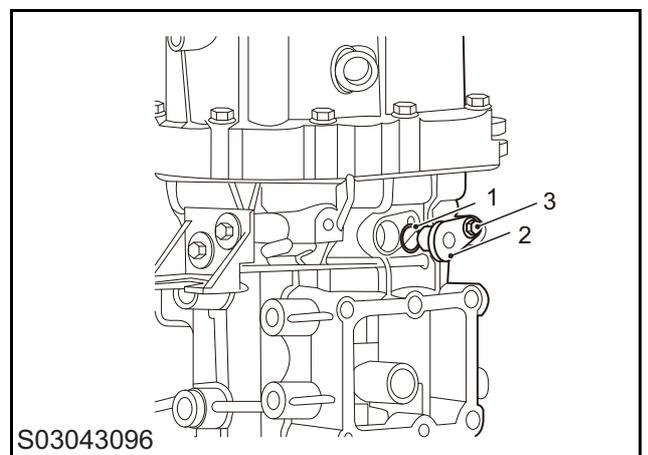
34 Install the gear selecting cable bracket (1), tighten 2 bolts (2) to 23.5-26.5 Nm.



35 Install the gear shifting cable bracket (1), and tighten 2 hexagon head flat washer combined bolts (2) to 23.5-26.5 Nm.



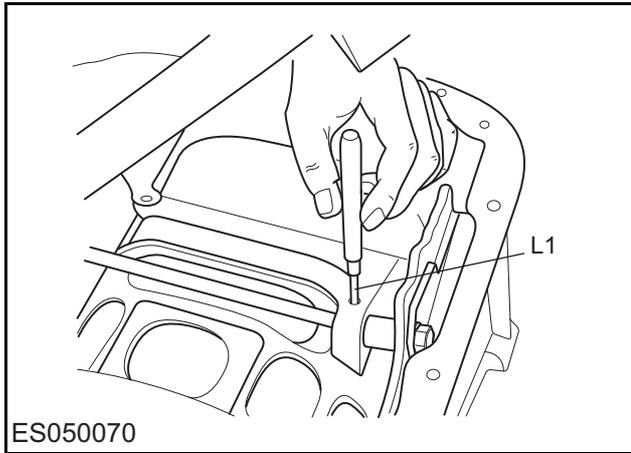
36 Install the O-ring (1) and the plug (2), fix with reverse lamp bracket bolt (3), and tighten it to 9-11 Nm.



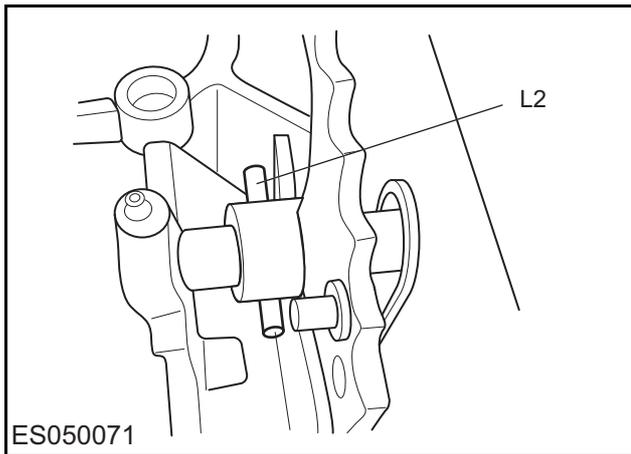
37 Install 4 fork shaft locating pins (1) and tighten the 整 ã-shaped slot guide pin (2).

## 6AT Automatic Transmission – SC20M163Q6A

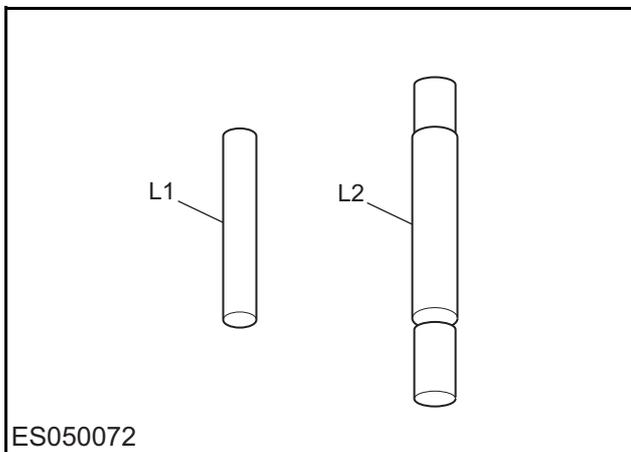
- 4 Install the spring pin (L1) of the shift shaft with a hammer.



- 5 Align the pin hole of the stop shaft with that of the shift shaft, and install a new spring pin (L2) with a hammer.

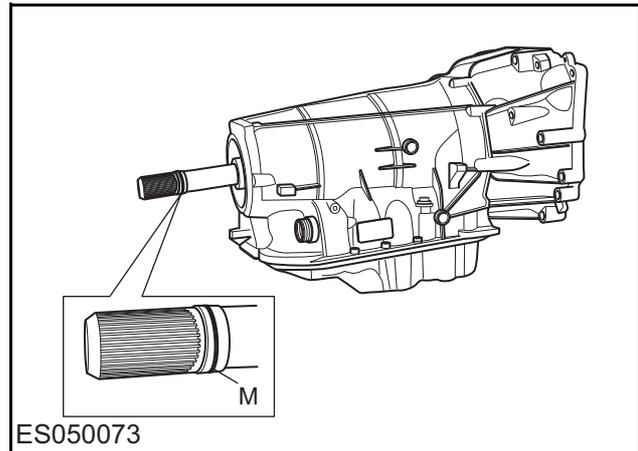


**Caution:** The two sides of the spring pin shall have a same exposed length.



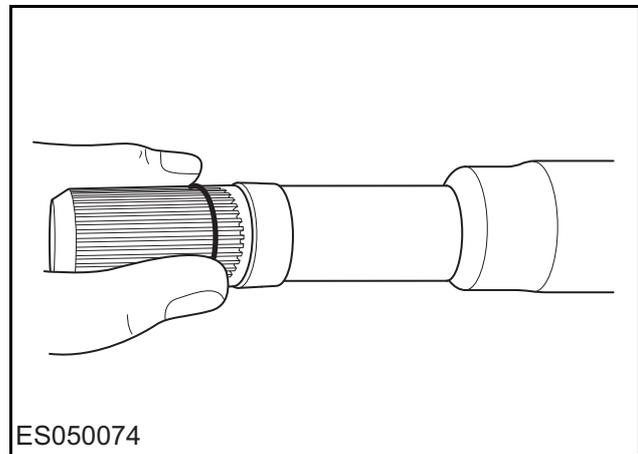
### AWD Output Shaft O-ring Removal/Installation

- 1 Drain the transmission fluid, please refer to Oil Drain and Oil Pan Removal.
- 2 Remove the transmission, please refer to Transmission Removal.
- 3 Pry up and remove the O-ring (M) with a screwdriver.



**Caution:** Discard the ring, and do not reuse it.

- 4 Apply transmission fluid to the new ring.



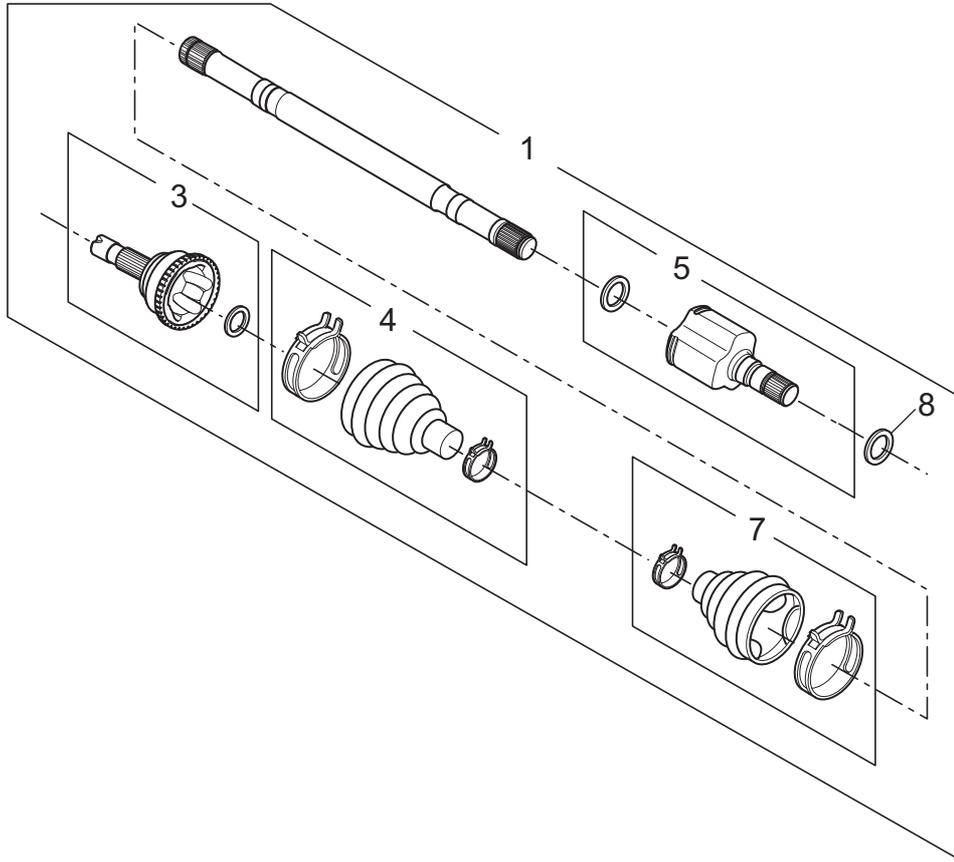
## Transfer Case

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14	Transfer Case Input Shaft Inner Bearing	45	Front Transfer Case Housing Magnet
15	Clip - Transfer Case Sun Gear	46	Transfer Case Front Output Shaft
16	Transfer Case Sun Gear Thrust Plate	47	Transfer Case Front Output Shaft Driven Sprocket
17	Thrust Plate Sun Gear at Transfer Case Input End	48	Transfer Case Front Output Shaft Spacer Bush
18	Planet Carrier Component at Transfer Case Input End	49	Transfer Case Sprocket Chain
19	Clip - Transfer Case Sun Gear	50	Rear Transfer Case Housing
20	Deceleration Shift Gear Sleeve of Transfer Case Planet Mechanism	51	Clip - Rear Transfer Case Housing
21	Transfer Case Rear Output Shaft	52	Rear Transfer Case Housing Bearing
22	Transfer Case Rear Output Shaft Oil Pump Component	53	Front Transfer Case Housing Transitional Housing
23	Clamp - Transfer Case Rear Output Shaft (elastic)	54	Screw - Transfer Case Transitional Housing
24	Transfer Case Rear Output Shaft Oil Pipe	55	Rear Transfer Case Housing Bush
25	Transfer Case Rear Output Shaft Oil Filter Component	56	Clip - Transfer Case Transitional Housing
26	Rear Transfer Case Housing Solenoid Coil Component	57	Rear Transfer Case Housing Oil Seal
27	Clutch Coil Housing Assembly of Transfer Case Rear Output Shaft	58	Clip - Rear Transfer Case Housing
28	Clip - Transfer Case Shift Gear Sleeve	59	Bolt - Rear Transfer Case Housing
29	Transfer Case Shift Gear Sleeve Armature	60	Transfer Case Rear Output Shaft Oil Seal
30	Transfer Case Shift Gear Sleeve Return Spring	61	Gasket - Transfer Case Input End
31	Transfer Case Shift Gear Sleeve/Hub	62	Nut - Transfer Case Front Output Shaft
32	Transfer Case Shift Gear Sleeve Return Spring	63	Transfer Case Rear Output Shaft Plate
33	Transfer Case Shift Gear Hub/Sleeve	64	Nut - Rear Transfer Case Housing
34	Transfer Case Rear Output Shaft Drive Sprocket	65	Bolt - Transfer
35	Transfer Case Shift Shaft Return Spring	66	Bolt - Transfer
36	Front Transfer Case Housing Shift Shaft	67	Clip - Rear Transfer Case Housing
37	Transfer Case Shift Shaft 4WD Shift Fork	68	Clip - Transfer Case Motor
38	Transfer Case Shift Shaft Deceleration Shift Fork Subassembly	69	Clip - Transfer Case Motor Connector
39	Transfer Case Shift Shaft/Cam	70	Clip - Transfer Case Solenoid Connector
40	Transfer Case Shift Shaft Torsional Spring	71	Bolt - Transfer Motor
41	Transfer Case Shift Shaft Bush	72	Rear Transfer Case Housing Shift Motor Subassembly
42	Transfer Case Shift Shaft	73	Rear Transfer Case Housing Oil Plug
43	Front Transfer Case Housing Air Nozzle	74	Transfer Case Motor Bracket
44	Transfer Case Front Output Shaft Plate	75	Transfer Case Rear Dust Shield
		76	Transfer Case Assembly
		77	Transfer Case Control Module
		78	Transfer Case Breather Pipe
		79	Nut - Transfer Case Controller

# Drive Shaft

## Exploded View of Front Axle Shaft Assembly

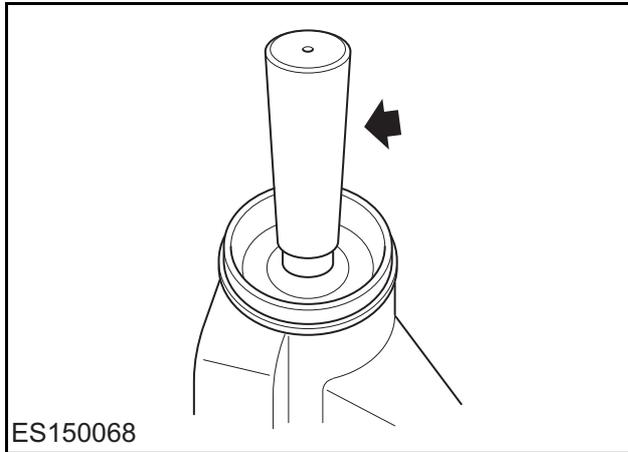


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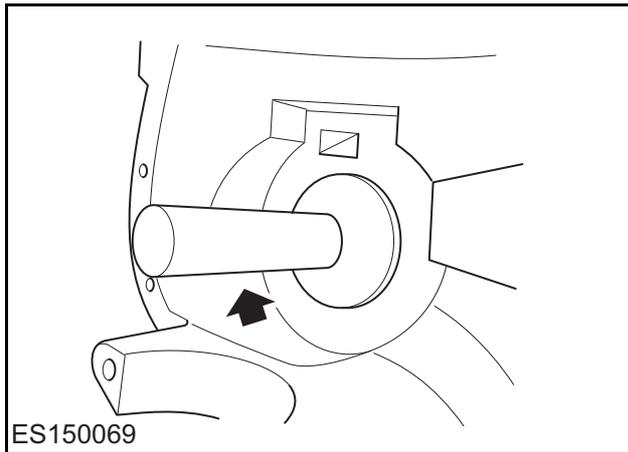
- |   |  |    |                                       |
|---|--|----|---------------------------------------|
| 1 | Constant-velocity Joint Assembly                 | 7  | Clamp (small)                         |
| 2 | Snap Ring  | 8  | Dust Shield of Tripod Universal Joint |
| 3 | Clamp (large)                                    | 9  | Clamp (large)                         |
| 4 | Dust Shield of Constant-velocity Universal Joint | 10 | Circlip                               |
| 5 | Clamp (small)                                    | 11 | Tripod Universal Joint Assembly       |
| 6 | Intermediate Solid Shaft                         | 12 | Connecting Ring                       |

## Assembly

- 1 Install the outer bearing outer ring of drive gear with the special tool C0008993.



- 2 Install the inner bearing outer ring of drive gear with the special tool C00089936.

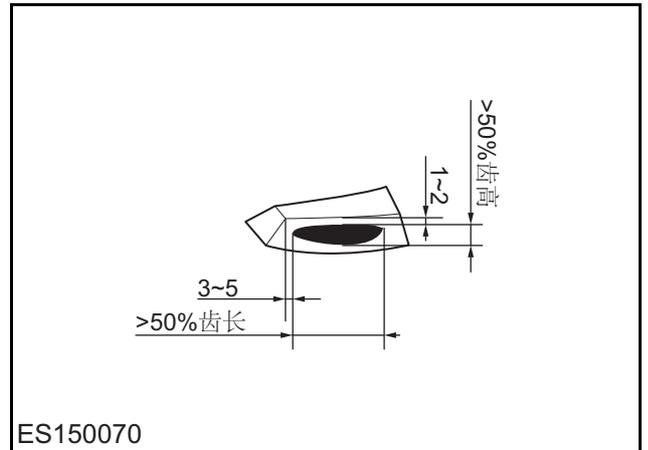


- 3 Select the drive gear adjusting gasket. Drive gear adjusting height range: 1.4-1.95mm. Use two gaskets if the adjusting height is more than 1.65mm.

Generally the thickness of drive gear adjusting gasket is 1.5-1.6mm. The specifications of gaskets include:

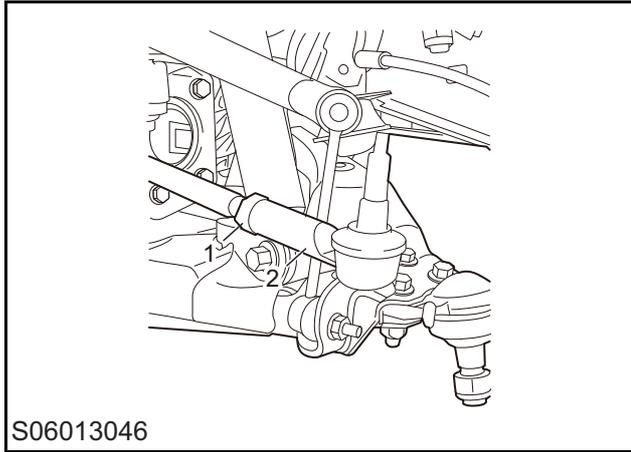
0.30mm/1.44mm/1.47mm/1.50mm/1.53mm/1.56mm/1.59mm/1.62mm/1.65mm

Standard even engaging mark



In Step 4 of differential assembly disassembly, select the thickness of new gasket according to this engaging mark when checking the overall final drive assembly. In Step 13 of differential assembly disassembly, the thickness of original adjusting gasket has been measured.

Gear surface contacting condition	Causes	Adjustment method: A - gear surface contact area adjustment B - backlash adjustment
<p>Bias addendum</p> <p>ES150031</p>	The drive gear is too far from the driven gear	The drive gear adjusting gasket is thicker than the drive gear gasket removed
<p>Bias dedendum</p> <p>ES150032</p>	The drive gear is too close to the driven gear	The drive gear adjusting gasket is thinner than the drive gear gasket removed



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### Installation

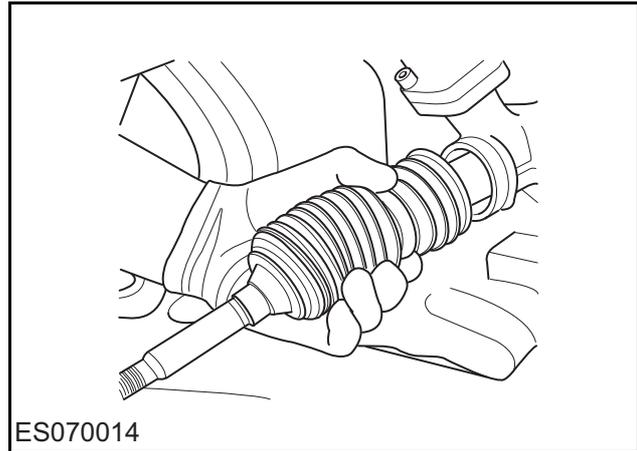
- 1 Tighten the steering gear outer tie rod to the marked position on the inner tie rod thread, and make the steering gear outer tie rod ball joint upward. Do not tighten the locking nut of the steering gear outer tie rod.
- 2 Connect the ball joint of the steering gear outer tie rod to the steering knuckle, install a new retaining nut, tighten it to  $90\pm 5$  Nm, and check the torque.
- 3 Install the wheels. Refer to "Wheel Replacement".
- 4 Align four wheels.
- 5 Tighten the locking nut of the steering gear outer tie rod to 65 Nm, and check the torque.

## Steering Gear Dust Shield Replacement

### Removal

- 1 Remove the steering gear outer tie rod. Refer to "Steering Gear Outer Tie Rod Replacement".
- 2 Loosen the clamp and remove the steering gear dust shield (1).

**Caution: After disassembly, the clamps must be replaced with new ones.**



ES070014

### Installation

- 1 Clean the mating face of the dust shield on the steering gear.
- 2 Apply silicone oil around the mating face of the dust shield and the steering gear.
- 3 Install the dust shield and rotate it manually 3 turns and above.
- 4 Install a new clamp and tighten it.
- 5 Install the steering gear outer tie rod. Refer to "Steering Gear Outer Tie Rod Replacement".

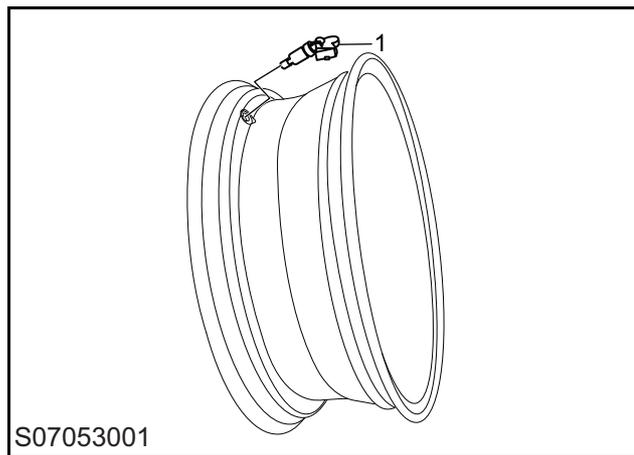
# Tire Pressure Monitoring System

## Service Guide

### Tire Pressure Monitoring Sensor Replacement

#### Removal

- 1 Remove wheels. Refer to "Wheel Replacement".
- 2 Remove the tires. Refer to "Wheel Replacement".
- 3 Remove the tire pressure monitoring sensor (1).



#### Installation

- 1 Install the tire pressure monitoring sensor, and tighten it to 4-6Nm.
- 2 Install the tires. Refer to "Wheel Replacement".
- 3 Install wheels. Refer to "Wheel Replacement".

## Hand-held TPMS Matching Tool Operation

### I. Introduction to Hand-held TPMS Matching Tool

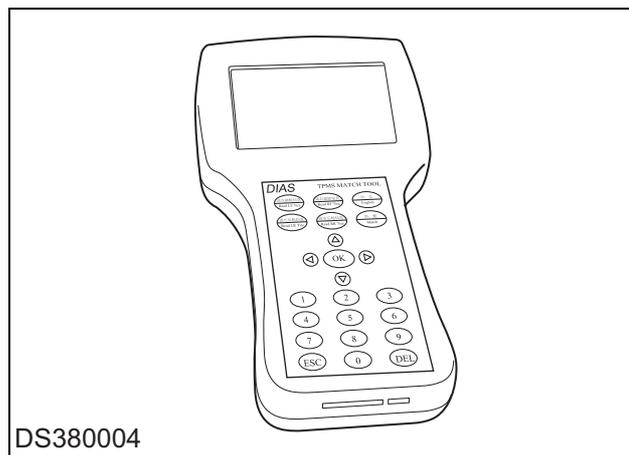
#### Overview

Hand-held TPMS matching tool is used for factory matching and fault diagnosis of TPMS tire pressure monitoring sensor and tire pressure monitoring controller, so as to make sure that the TPMS is in the normal working state.

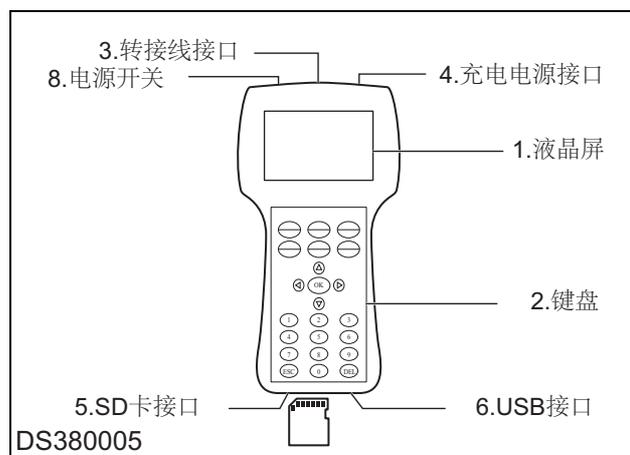
#### Package Contents

- 1 A set of hand-held TPMS matching tool.
- 2 A SD card.
- 3 An OBDII patch cable.
- 4 A battery charger.

#### Equipment Appearance

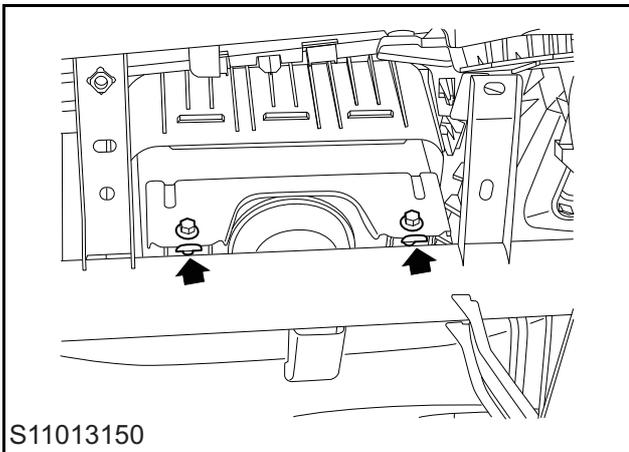


#### Equipment Diagram

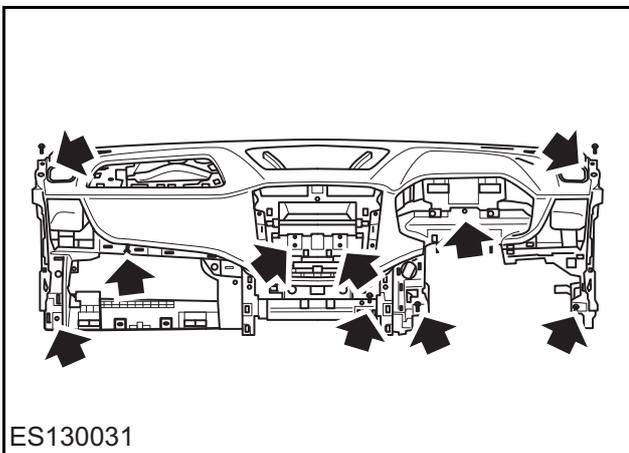


## Instrument Panel and Console

- 15 Remove the combination switch base. Refer to "Combination Switch Base Replacement".
- 16 Remove the instrument pack. Refer to "Instrument Pack Replacement".
- 17 Remove the instrument panel driver side lower guard plate assembly. Refer to "Instrument Panel Driver Side Lower Guard Plate Assembly Replacement".
- 18 Remove the glove box assembly. Refer to "Glove Box Assembly Replacement".
- 19 Remove the bolt fixing the front passenger airbag assembly to the beam.



- 20 Disconnect the harness connector of the front passenger airbag assembly.
- 21 Remove the auxiliary fascia console body assembly. Refer to "Auxiliary Fascia Console Body Assembly Replacement".
- 22 Remove the bolt fixing the instrument panel body assembly.

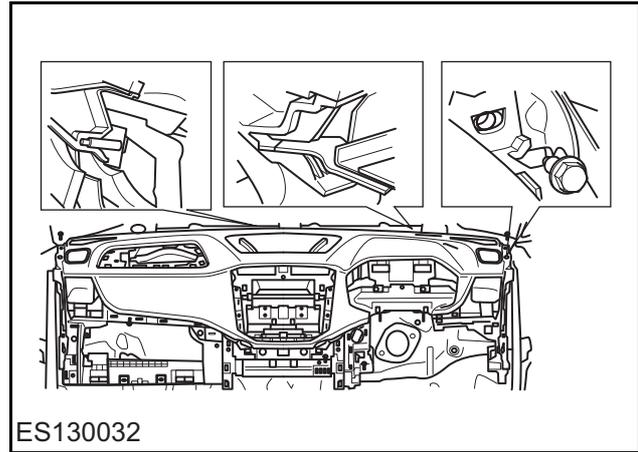


- 23 Remove the instrument panel body assembly (3).

### Installation

- 1 Install the instrument panel body assembly.

**Caution:** Connect the instrument panel body to the dash panel with one pin in the middle and each insert slice on both sides, and fasten it to the side wall inner plate by each bolt on both ends respectively.



- 2 Install the bolt fixing the instrument panel body assembly, tighten it to  $5\pm 1$  Nm, and check the torque.
- 3 Install the auxiliary fascia console body assembly. Refer to "Auxiliary Fascia Console Body Assembly Replacement".
- 4 Install the bolt fixing the front passenger airbag assembly to the beam, tighten it to  $9\pm 1$  Nm, and check the torque.
- 5 Install the glove box assembly. Refer to "Glove Box Assembly Replacement".
- 6 Install the instrument panel driver side lower guard plate assembly. Refer to "Instrument Panel Driver Side Lower Guard Plate Assembly Replacement".
- 7 Install the instrument pack. Refer to "Instrument Pack Replacement".
- 8 Install the combination switch base. Refer to "Combination Switch Base Replacement".
- 9 Install the clock spring assembly and the clock spring returning ring. Refer to "Clock Spring Assembly and Clock Spring Returning Ring Replacement".

# Door

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## Service Guide

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### Front Door Assembly Adjustment

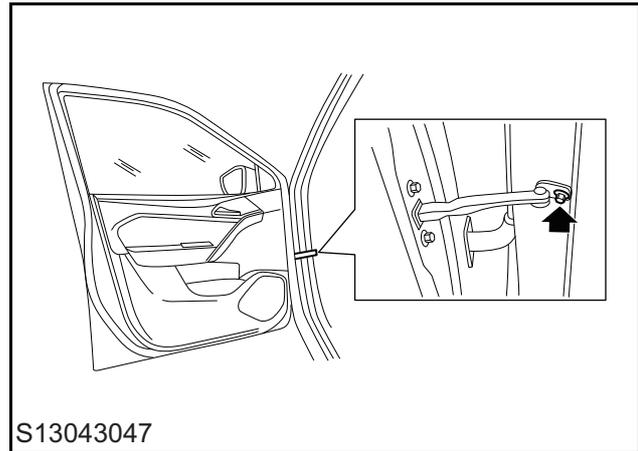
#### Adjustment

- 1 Loosen the hinge bolts of the front door assembly to adjust the front door assembly.
- 2 Adjust the gap between the front door and the A-pillar, front fender, rear sliding door and sill panel evenly, and make the front door flush with the A-pillar, front fender, rear sliding door and sill panel.
- 3 Tighten the bolts fixing the hinge to the door to  $26\pm 3$  Nm, and the bolts fixing the hinge to the vehicle body to  $33\pm 3$  Nm, and check the torque.

### Front Door Assembly Replacement

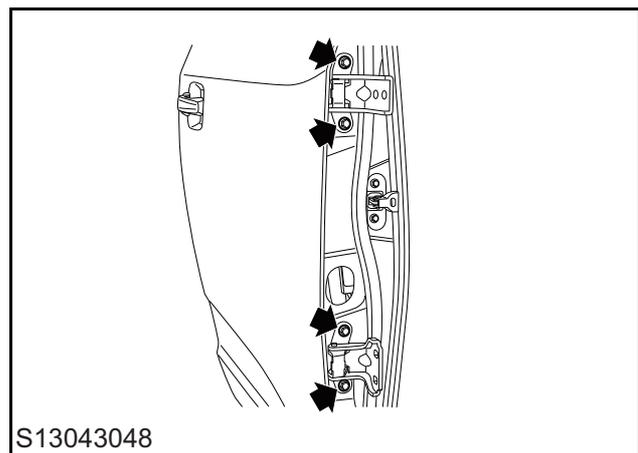
#### Removal

- 1 Disconnect the negative battery cable.
- 2 Open the front door.
- 3 Put the wooden block on the jack, and then place the jack under the front door to provide support.
- 4 Remove the mounting bolts fixing the door check to the body side.



- 5 With the help of an assistant, hold the door and remove the bolts fixing the upper and lower hinges to the door side.

**Caution:** Do not scratch the paint when removing or installing the door assembly.



- 6 With the help of an assistant, hold the door, pry off the rubber seal ring on the body side, and pull out the harness connector to disconnect it.

