

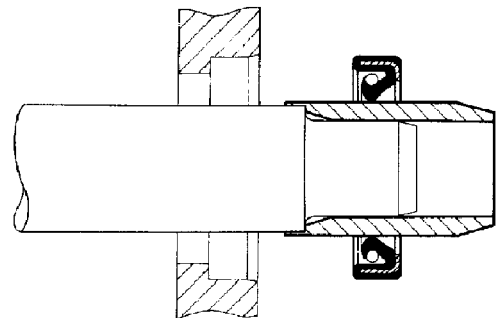
- In the case of grease lubricated bearings (eg. hub bearings) fill the space between bearing and outer seal with the recommended grade of grease before fitting seal.
- Always mark components of separable bearings (eg. taper roller bearings) when dismantling, to ensure correct reassembly. Never fit new rollers in a used outer ring; always fit a complete new bearing assembly.

Oil Seals

General

Always renew oil seals which have been removed from their working location (whether as an individual component or as part of an assembly). NEVER use a seal which has been improperly stored or handled, such as hung on a hook or nail.

- Carefully examine seal before fitting to ensure that it is clean and undamaged.
- Ensure the surface on which the new seal is to run is free of burrs or scratches. Renew the component if the original sealing surface cannot be completely restored.
- Protect the seal from any surface which it has to pass when being fitted. Use a protective sleeve or tape to cover the relevant surface.
- Lubricate the sealing lips with a recommended lubricant before use to prevent damage during initial use. On dual lipped seals, smear the area between the lips with grease.
- If a seal spring is provided, ensure that it is fitted correctly. Place lip of seal towards fluid to be sealed and slide into position on shaft. Use fitting sleeve where possible to protect sealing lip from damage by sharp corners, threads or splines. If a fitting sleeve is not available, use plastic tube or tape to prevent damage to the sealing lip.



S003041

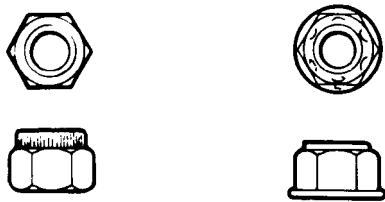
- Grease outside diameter of seal, place square to housing recess and press into position using great care, and if possible a 'bell piece' to ensure that seal is not tilted. In some cases it may be preferable to fit seal to housing before fitting to shaft. Never let weight of unsupported shaft rest in seal.

also marked and some have the metric symbol M on the flat opposite the strength grade marking.

When tightening a slotted or castellated nut, never loosen it to insert a split pin except where recommended as part of an adjustment. If difficulty is experienced, alternative washers or nuts should be selected, or the washer thickness reduced.

Where bearing preload is involved, nuts should be tightened in accordance with special instructions.

Self-locking Nuts



S003048

Self-locking nuts, e.g. nylon insert or deferred thread nuts, can be reused providing resistance can be felt when the locking portion of the nut passes over the thread of the bolt or stud.

Where self-locking nuts have been removed, it is advisable to replace them with new ones of the same type.

Don't use non self-lock nuts in the area where self-lock nuts must be used.

Flexible Pipes and Hoses

General

When removing and installing flexible hydraulic pipes and hoses, ensure that the following practices are observed to ensure component serviceability.

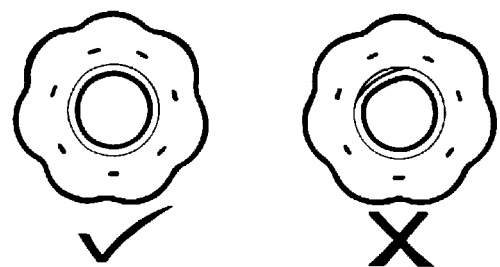
- Clean end fittings and the area surrounding them as thoroughly as possible.
- Obtain appropriate plugs or caps before detaching hose end fittings, so that the ports can be immediately covered to prevent the ingress of dirt.

Clean hose externally and blow through with airline. Examine carefully for cracks, separation of plies, security of end fittings and external damage. Reject any faulty hoses.

- When refitting a hose, ensure that no unnecessary bends are introduced, and that hose is not twisted before or during tightening of union nuts.
- Fit a cap to seal a hydraulic union and a plug to its socket after removal to prevent ingress of dirt.
- Absolute cleanliness must be observed with hydraulic components at all times.

After any work on hydraulic systems, carefully inspect for leaks underneath the vehicle while a second operator applies maximum brake pressure to the brakes (engine running) and operates the steering.

Flexible Pipes

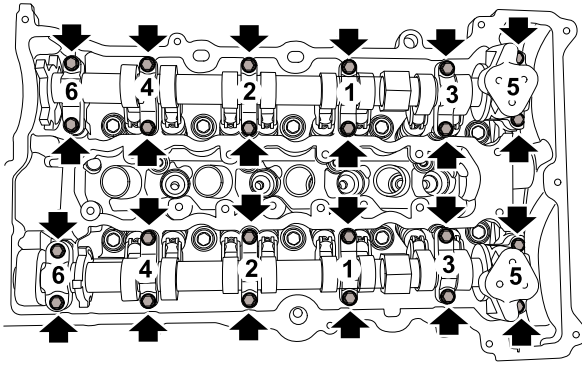


S003049

All flexible pipes are made up of two laminations, an armoured rubber outer sleeve and an inner viton core. If any of the flexible pipes have been disconnected, it is imperative that the internal bore is inspected to ensure that the viton lining has not become separated from the armoured outer sleeve. A new pipe must be fitted if separation is evident.

Cooling System Hoses

The following precautions **MUST** be followed to ensure that integrity of cooling hoses and their connections to system components are maintained.



S1114066

7. Fit the camshaft phase adjustment actuator.

 **Camshaft Phase Adjustment Actuator Refit**

8. Fit the engine oil filter.

 **Engine Oil Filter Refit**

9. Place the start switch in "ON" position, and perform "Engine Module Reset Self-learning Value" with **VDS/SIPS**.

Some projects do this function in **SIPS**.

10. Wait for 2-5 seconds, turn off the start switch, then restart the vehicle.

Hydraulic Tappets

Remove

1. Drain the engine oil.

 **Engine Oil Drain**

2. Remove the camshaft.

 **Camshaft Remove**

3. Remove the valve drive rocker arm (2).

Caution:

1 The components must be orderly isolated, marked or arranged to ensure that they are fitted in the original positions, and take preventive measures to prevent parts interchange.

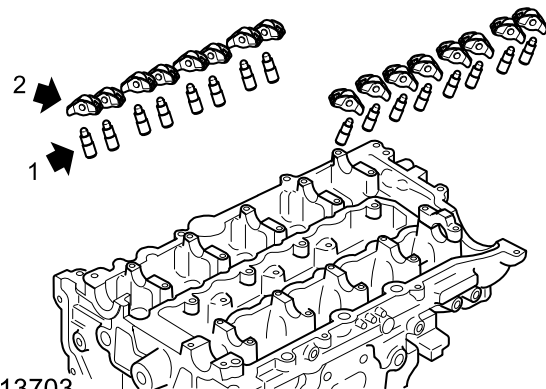
2 Mark immediately after removing the parts. Mark the position, direction or orientation as desired.

4. Remove the valve hydraulic tappet (1).

Caution:

1 The components must be orderly isolated, marked or arranged to ensure that they are fitted in the original positions, and take preventive measures to prevent parts interchange.

2 Mark immediately after removing the parts. Mark the position, direction or orientation as desired.



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Refit

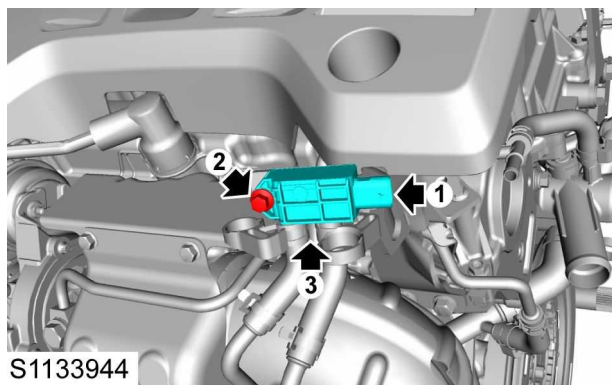
1. Clean the valve drive rocker arm, valve hydraulic tappet and seat hole, and coat the surface with clean lubricating oil.
2. Fit the valve hydraulic tappet into the seat hole in the cylinder head.
3. Fit the valve drive rocker arm to the valve tip and valve hydraulic tappet.

Caution: The used gap adjuster arm must be returned to the initial position of the camshaft. If the camshaft has been replaced, the gap adjuster arm driven by the camshaft must also be replaced.

4. Fit the camshaft.

GPF Differential Pressure Sensor**Remove**

1. Disconnect the negative battery cable.
2. Disconnect the harness (1) from the GPF differential pressure sensor.
3. Remove 1 bolt (2) fixing the GPF differential pressure sensor to the bracket.
4. Disconnect the pipeline (3) from the GPF differential pressure sensor.

**Refit**

1. Connect the pipeline to the GPF differential pressure sensor.
2. Fit 1 bolt fixing the GPF differential pressure sensor to the bracket, tighten it to **7-10Nm**, and check the torque.
3. Connect the harness to the GPF differential pressure sensor.
4. Connect the negative battery cable.
5. Place the ignition switch in "ON" position, perform "GPF Delta Pressure Sensor Adapted Value Reset" with **SIPS**.

6. Fit the manual service disconnect.

Manual Service Disconnect Refit

7. Connect the negative battery cable.

EDU Water Inlet Pipe Assembly

Remove

1. Disconnect the negative battery cable.
2. Remove the manual service disconnect.

Manual Service Disconnect Remove

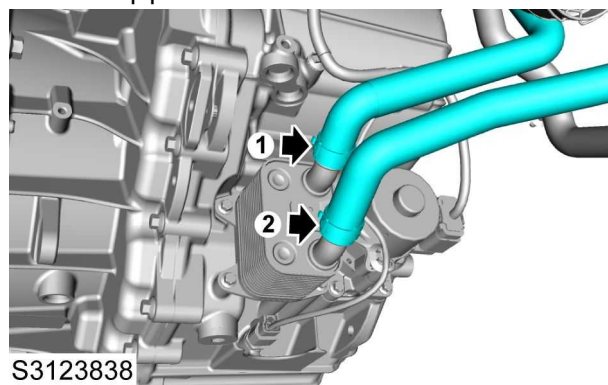
3. Drain the coolant.

Coolant - Drain - EDU

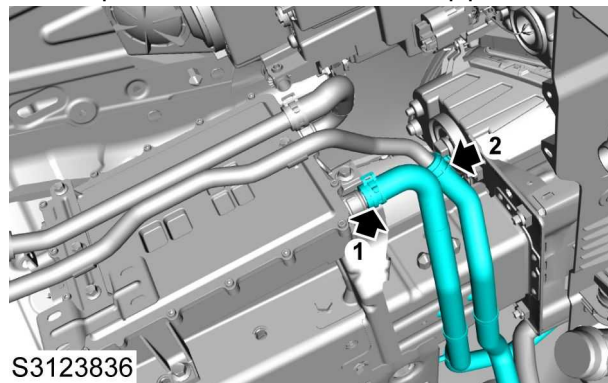
4. Remove the front bottom deflector.

Bottom Deflector Remove

5. Loosen the clamp (1), and disconnect the EDU water inlet pipe from the EDU.



6. Loosen the clamp (2), and disconnect the EDU water inlet pipe from the hose assembly - **DCDC** to EDU expansion tank/**PEB** water outlet pipe.



7. Loosen the clip and remove the EDU water inlet pipe.

Refit

1. Fit the EDU water inlet pipe and secure it with clips.
2. Connect the EDU water inlet pipe to the hose assembly - **DCDC** to EDU expansion tank/**PEB** water outlet pipe, and secure with clamps.
3. Connect the EDU water inlet pipe to the EDU, and secure with clamps.
4. Fit the front bottom deflector.

Bottom Deflector Refit

5. Refill the coolant.

Coolant - Refill - EDU

6. Fit the manual service disconnect.

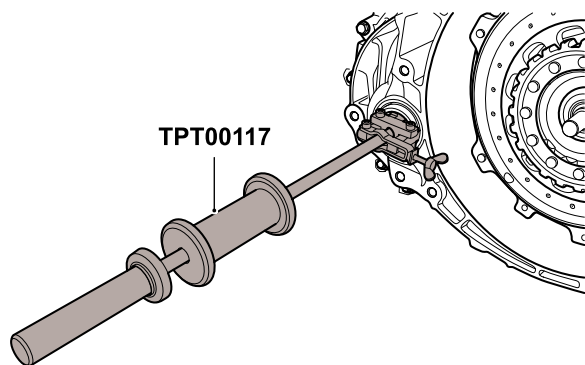
Manual Service Disconnect Refit

EDU

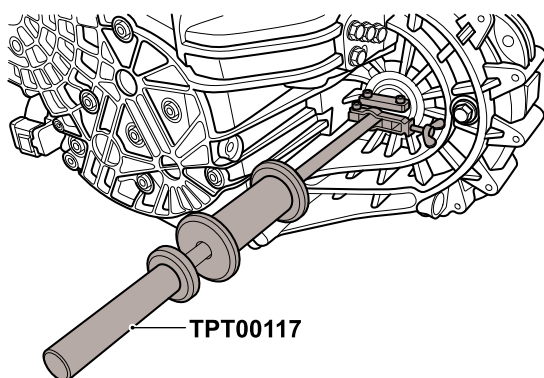
Specifications

Torque

Description	Value
Drain Plug-Gearbox housing	70-80Nm
Filler Plug-Gearbox housing	30-40Nm
Bolt-Engine to EDU assembly	55-65Nm
Bolt-Mount bracket to Gearbox housing	(63-77Nm)+(85-95)°
Bolt-Rear mount bracket to EDU assembly	(63-77)Nm+(85-95)°
Bolt-Low voltage harness bracket to Gearbox housing	7-10Nm
Bolt-Drive motor high voltage harness ground to Gearbox housing	7-10Nm
Bolt-Drive motor high voltage harness cover to Gearbox housing	7-10Nm
Bolt-Drive motor high voltage harness to Drive motor insulation block	14-16Nm
Bolt-Inspection window plate to Clutch housing	7-10Nm
Bolt-PEB bracket to Gearbox/Clutch housing	19-22Nm
Bolt-Input speed sensor	7-10Nm
Bolt-Output speed sensor	7-10Nm
Oil temperature sensor-Gearbox housing	27-33Nm
Bolt-Electrical oil pump to Gearbox housing	8-10Nm
Bolt-Oil cooler to Gearbox housing	7-10Nm
Bolt-Clutch lever actuator motor to Clutch housing	5-7Nm
Bolt-Clutch lever actuator to Clutch housing	19-25Nm
Bolt-Clutch Counter spring module of lever actuator to Clutch housing	25-28Nm
Bolt-Clutch guide tube to Clutch housing	7-10Nm
Bolt-Gear actuator to Gearbox housing	19-25Nm
Oil level tube-Gearbox housing	2.6-3.4Nm
Bolt-Suction filter to Gearbox housing	7-10Nm
Bolt-Baffle plate to Gearbox housing	7-10Nm
Bolt-Rear bearing retaining plate to Gearbox housing	19-25Nm
Detent-Gearbox housing	15-20Nm
Bolt-Lever support assembly to Gearbox housing	19-25Nm
Bolt-Drive motor assembly to Gearbox housing	19-25Nm
Bolt-Idler shaft bearing retaining plate to Drive motor bearing supporting plate	7-10Nm
Bolt-Front bearing locking plate to Clutch housing	5-7Nm
Bolt-Magnet assembly to Clutch housing	7-10Nm
Bolt-Baffle plate to Clutch housing	5-7Nm
Bolt-Clutch housing to Gearbox housing	26-34Nm
Locking Screw-Input shaft assembly	65-75Nm
Locking Screw-Intermediate shaft assembly	65-75Nm

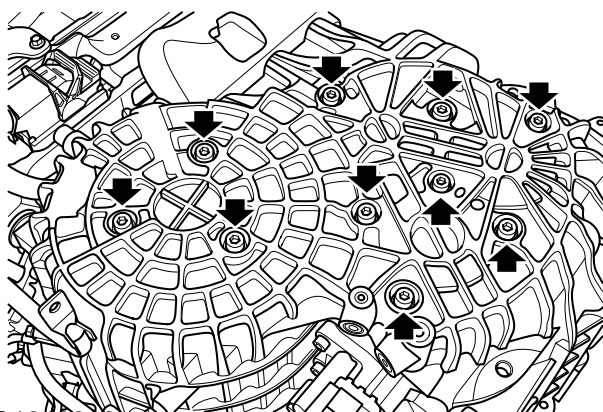


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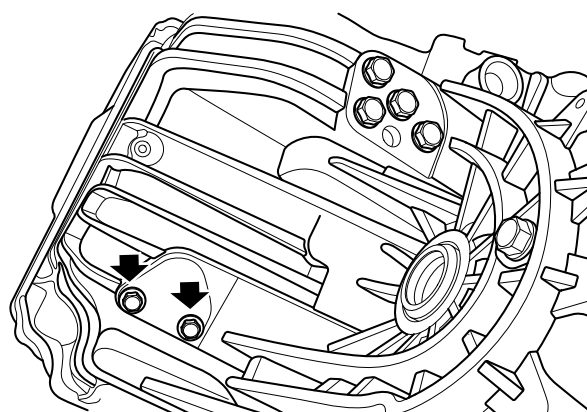
S1213834

16. Remove 7 bolts fixing the rear bearing press plate and 3 bolts fixing the rear bearing seat of drive motor to transmission housing. Discard 10 gaskets.



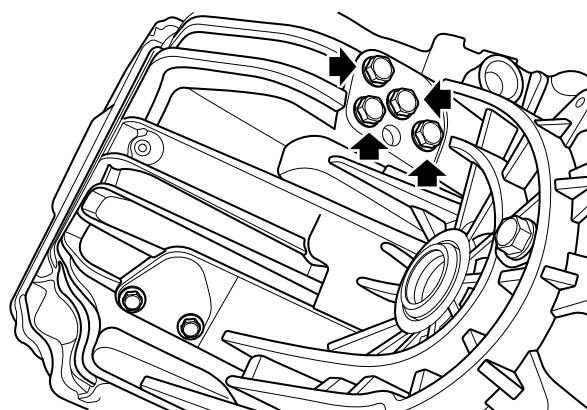
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17. Remove 2 bolts fixing the D gear lever support assembly to the transmission housing, and remove the D gear lever support assembly.



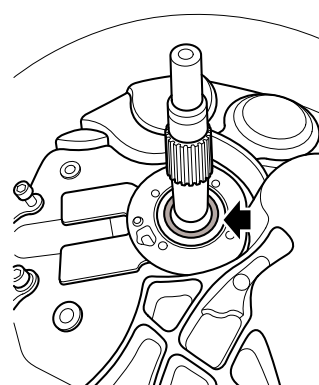
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18. Remove and discard 4 lock pins.



S1213863

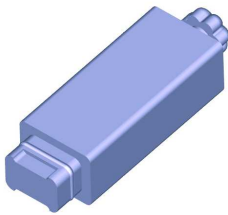
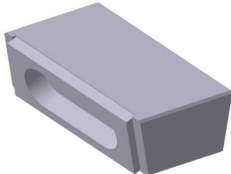
19. Keep the clutch housing side of the electric drive unit upward vertically.
20. Remove the input shaft oil seal.

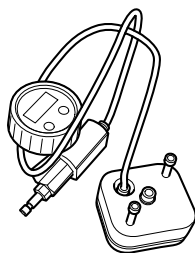
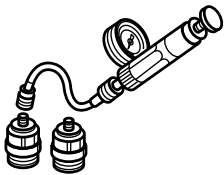


S1213979

21. Loosen 24 bolts fixing the clutch housing to the transmission housing.

Special Tools

Tool Number	Description	Picture
TEL00064	Low voltage connector plug 2	 TEL00064
TEL00080	Slow charger high voltage connector 2-2pin	 TEL00080
TEL00079	Main high voltage connector 2-2 pin	 TEL00079
TEL00081	ACP/DCDC high voltage connector-4pin	 TEL00081
TEL00085	Pressure relief valve plug 4	 TEL00085

Tool Number	Description	Picture
TEL00066	Pressure relief valve tool	 TEL00066
TEL00036	Manual service device plug	 TEL00036
TEL00034	Cooling system leak test tool	 TEL00034
T14001	Cooling system pressure test kit	 T14001

Air Outlet Temperature Sensor**Remove**

1. Disconnect the negative battery cable.
2. Remove the manual service disconnect.

 Manual Service Disconnect Remove

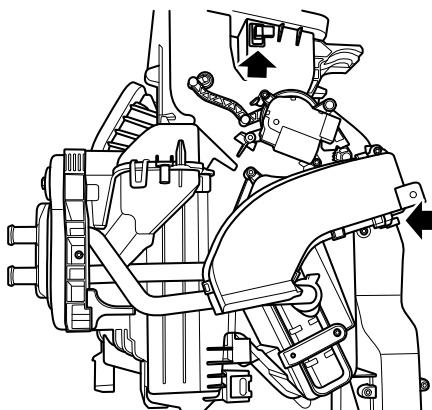
3. Remove the instrument panel lower closure panel.

 Instrument Panel Lower Closure Panel Remove

4. Remove the drive side air outlet temperature sensor.
 - a. Remove the left instrument panel end cover plate assembly.

 Instrument Panel End Cover Plate Assembly Remove

- b. Disconnect the harness connector from the temperature sensor. And remove the drive side air outlet temperature sensor.

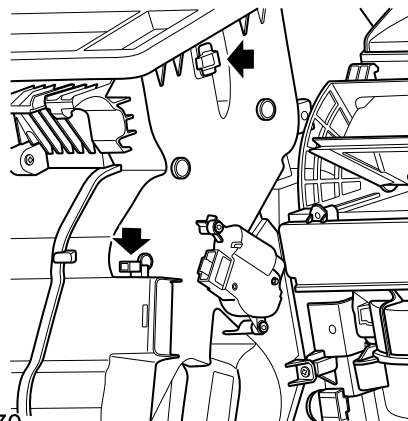


S3211094

5. Remove the passenger side air outlet temperature sensor.
 - a. Remove the glove box assembly.

 Glove Box Assembly Remove

- b. Disconnect the harness connector from the temperature sensor. And remove the passenger side air outlet temperature sensor.



S3110670

Refit

1. Fit the passenger side air outlet temperature sensor.
 - a. Align the passenger side air outlet temperature sensor, and connect the connector to the passenger side air outlet temperature sensor.
 - b. Fit the glove box assembly.

 Glove Box Assembly Refit

2. Fit the drive side air outlet temperature sensor.
 - a. Align the drive side air outlet temperature sensor, and connect the connector to the drive side air outlet temperature sensor.
 - b. Refit the instrument panel light control switch

 Instrument Panel Light Control Switch Refit

3. Fit the instrument panel lower closure panel.

 Instrument Panel Lower Closure Panel Refit

4. Fit the manual service disconnect.

 Manual Service Disconnect Refit

5. Connect the negative battery cable.

Service Procedures

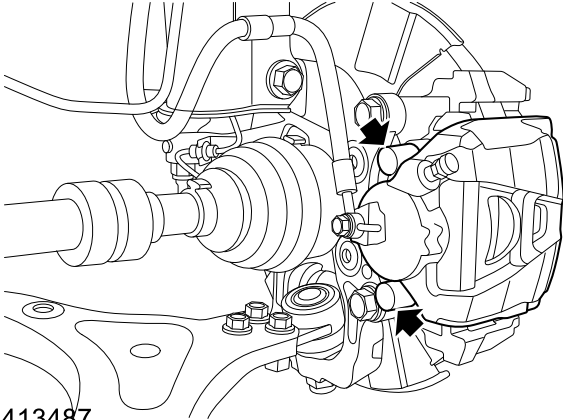
Front Brake Pad

Remove

1. Remove the front wheels.

Wheels Remove

2. Remove the stop spring from the front brake caliper.
3. Remove the guide pin cap from the front brake caliper.
4. Remove 2 guide pin bolts fixing the brake caliper housing assembly to the front brake caliper bracket.



S2413487

5. Remove the front brake caliper housing assembly from the front brake caliper bracket, and find the appropriate position to fix it.
6. Remove the front brake pad from the front brake caliper bracket.

Refit

1. Clean all dirt and corrosion contents from the edge of the front brake disc.
2. Clean the front brake caliper housing and the front brake caliper bracket, and check the front brake caliper and seals for damage.
3. Locate the new front brake pad in the front brake caliper bracket.
4. Locate the front brake caliper housing assembly on the front brake caliper bracket, fit 2 guide pin bolts, and tighten them to **25–30Nm**.
5. Fit the guide pin caps to front brake caliper.
6. Fit the stop spring in the front brake caliper.
7. Fit the front wheels.

Wheels Refit

8. Press the brake pedal for several times to adjust the front brake pad position.

Tip: Pedal travel may be longer than normal during first brake applications.

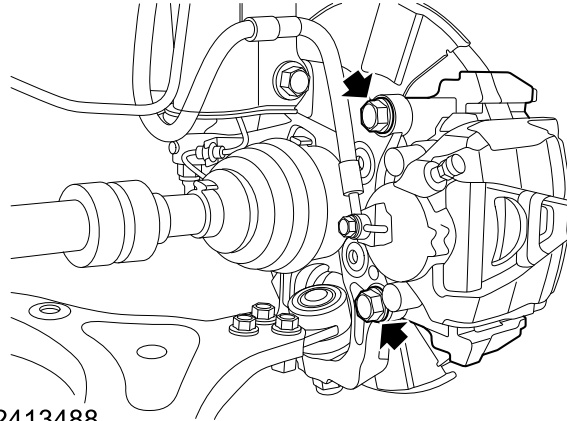
Front Brake Disc

Remove

1. Remove the front wheels.

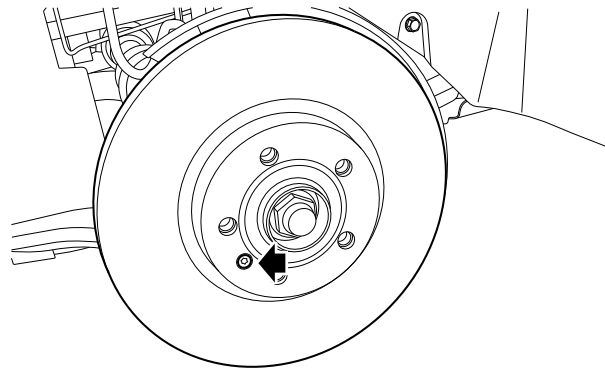
Wheels Remove

2. Remove 2 bolts fixing the front brake caliper assembly to the steering hub assembly.



S2413488

3. Remove the brake caliper, position and secure in a suitable position so as to avoid stress or damage to brake hoses and components.
4. Remove 1 countersunk head screw fixing the front brake disc to the front wheel hub.



S2413516

5. Remove the front brake disc assembly.

Refit

1. Ensure the cleanness of the mating surface between the front brake disc and the front wheel hub.
2. Locate the front brake disc to the front wheel hub, fit the countersunk head screw and tighten it to **7–10Nm**.
3. Check the thickness and circular runout of the front brake disc.

Thickness and Circular Runout Check – Front Brake Disc

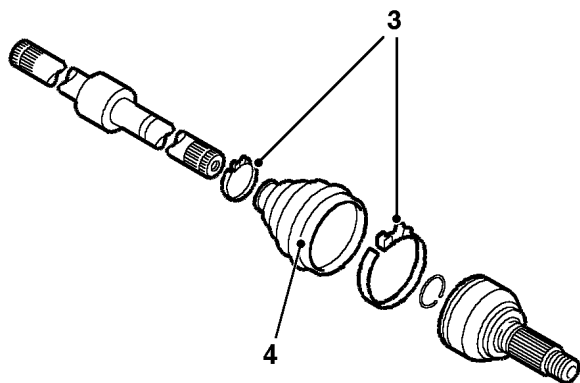
4. Check the front brake pad, replace if necessary.
5. Fix the front brake caliper assembly to the steering hub assembly, fit 2 bolts and tighten them to **190–210Nm**.

Constant Velocity Joint Assembly **Right Drive Shaft Assembly****Remove**

1. Remove the drive shaft assembly.

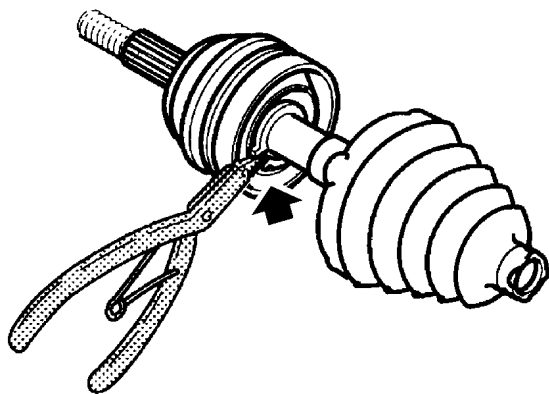
 Right Drive Shaft Assembly

2. Fix the drive shaft with the vise.
3. Release and discard 2 clips securing the gaiter.



S303013

4. Slide the gaiter along the drive shaft to reveal and access the inside of constant velocity universal joint.
5. Using suitable pliers, compress the retaining circlip, and remove the constant velocity joint assembly from the drive shaft.



S303014

6. Remove the wire circlip from the drive shaft and discard it.

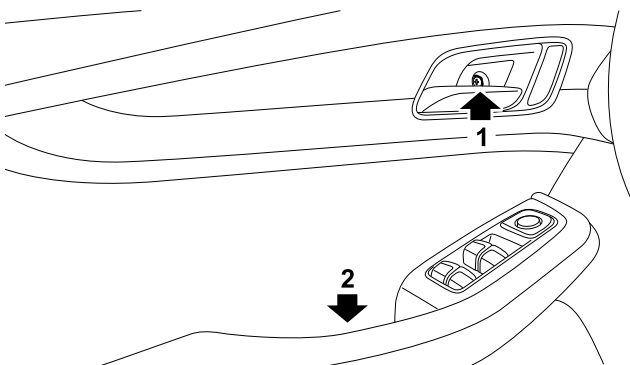
Refit

1. Clean the drive shaft and gaiter.
2. Fit new circlip to the drive shaft.
3. Locate the constant velocity joint assembly to the drive shaft, press the circlip into the groove with an appropriate tool and fully push the constant velocity joint into the drive shaft.
4. Apply grease to the constant velocity joint assembly.
5. Locate the gaiter on the constant velocity joint and secure with new clips..
6. Fit the drive shaft assembly.

Front Door Interior Handle

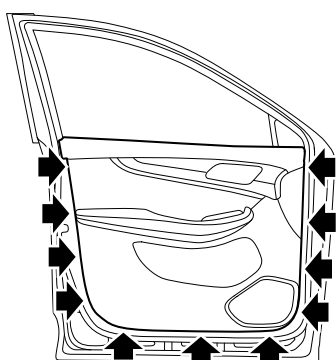
Remove

1. Open the front door.
2. Disconnect the negative battery cable.
3. Pry off the interior handle bolt cover, and remove 1 bolt (1) fixing the interior door handle to the door.
4. Pry off the front door pull cup screw cover, and remove 1 screw (2) fixing the front door pull cup to the door.



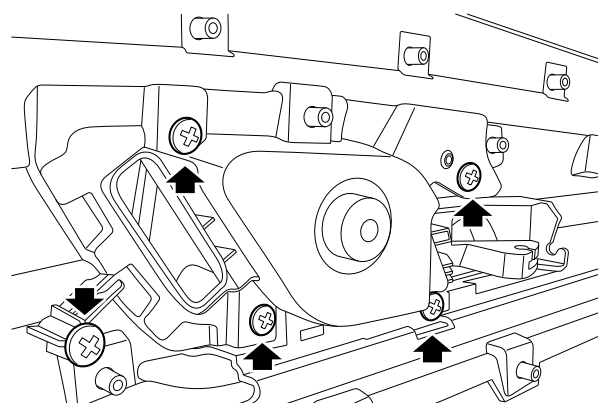
SC113880

5. Pry off the clip fixing the door trim panel to the door, and disconnect the harness connector.



SC113882

6. Disconnect the interior handle cable, disconnect the harness connector, and remove the front door interior trim panel.
7. Remove 5 screws fixing the front door interior handle to the door interior trim panel.



SC113879

8. Remove the front door interior handle from the door interior trim panel.

Refit

1. Fix the front door interior handle to the front door interior trim panel, fit and tighten 5 screws.
2. Connect the harness connector, fit the interior handle cable assembly wire, align the clip with the corresponding mounting hole in the panel, and fix the front door interior trim panel to the front door.
3. Fit and tighten 1 screw fixing the front door pull cup to the door, and fit the front door pull cup screw trim cover.
4. Fit and tighten 1 bolt fixing the front door interior handle to the door, and fit the interior handle bolt trim cover.
5. Connect the negative battery cable.
6. Close the front door.

Service Procedures

Exterior Rearview Mirror Assembly

Remove

1. Disconnect the negative battery cable.
2. Remove the front door interior trim panel.

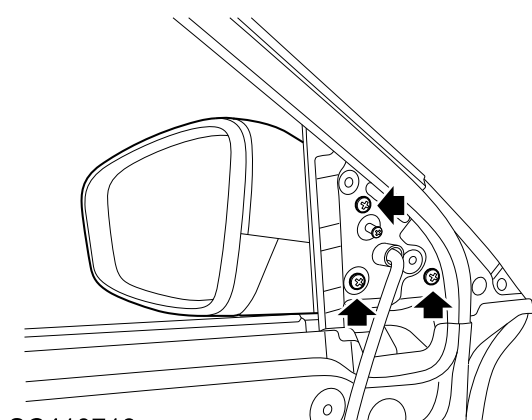
Front Door Interior Trim Panel Remove

3. Remove the exterior rearview mirror triangle trim panels on the inside of the front door.
4. Disconnect the harness connector of the exterior rearview mirror assembly.
5. Remove 3 screws fixing the exterior rearview mirror assembly to the door, and remove the exterior rearview mirror assembly.

4. Fit the front door interior trim panel.

Front Door Interior Trim Panel Refit

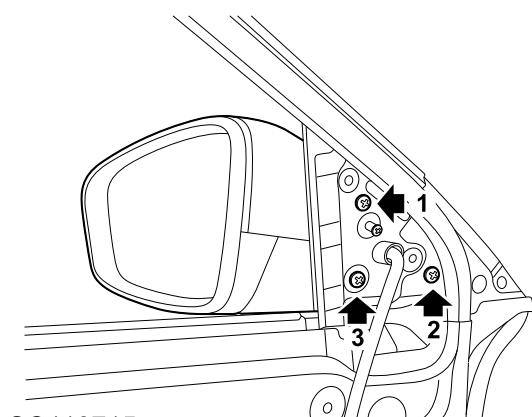
5. Connect the negative battery cable.



SC410718

Refit

1. With the locating pins on exterior rearview mirror assembly, position the assembly to the corresponding location hole on the door, fit 3 screws fixing the exterior rearview mirror assembly to the door in the sequence as shown, tighten them to **7-10Nm**, and check the torque.



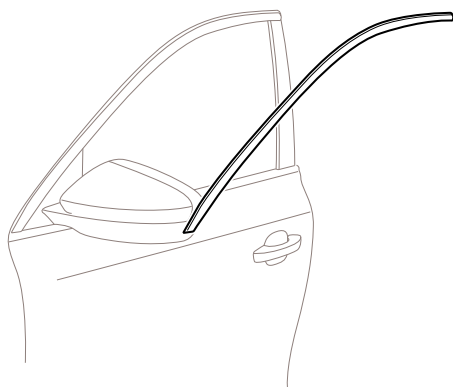
SC410715

2. Connect the harness connector of the exterior rearview mirror assembly.
3. Fit the front door interior triangle trim panel of the exterior rearview mirror.

Front Door Window Upper Moulding

Remove

1. Using a suitable plastic trim tool, pry off the clip fixing the front door window upper moulding, and remove the front door window upper moulding.



S4323822

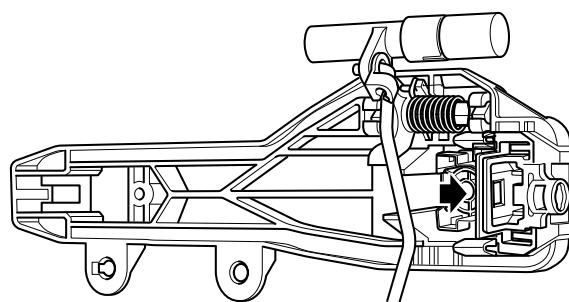
Refit

1. Locate the front door window upper moulding to the front door frame, press the clip in place, and fit the front door window upper moulding.

Rear Door Outer Handle

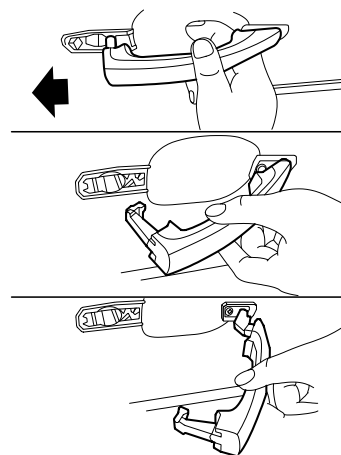
Remove

1. Open the rear door.
2. Remove the plug at the end of the rear door, to reach the plastic slide valve fixing the lock cylinder trim cover of the rear door to the outer handle bracket.
3. With a hook, pull the plastic slide valve out towards the rear body, but do not remove the plastic slide valve for it is connected to the bracket.



S4323307

4. Pulling the rear end of the outer handle, remove the rear door lock cylinder trim cover.
5. Move the outer handle towards the rear body, pull the rear of the outer handle outwards to disconnect it from the outer handle bracket, then remove it.



Refit

1. Fit the front end of the outer handle into the mounting hole, and move the outer handle towards the front of the vehicle.
2. Pulling the rear end of the outer handle, fix the lock cylinder cover to the outer handle bracket, push the plastic slide valve in and ensure it is fitted in place.
3. Press the plug into the round hole in the door side and secure the plug clip firmly so that seal can be achieved.
4. Check if the outer handle works correctly.

Panel Shaping**Panel shaping methods****Ring-pulling method for panel repair (meson machine)**

As a panel repair method introduced in recent years, the so-called ring-pulling traction repair method involves a certain number of flat-washer-based rings welded based on size of the damaged panel; the rings act as the traction medium; penetrate the wire rope into the medium, and then use manpower or machine to pull the wire rope to make the damaged panel drawn outwards via the medium to its original position and shape; the ring-pull traction repair method is more flexible especially for the deformation with a large area, double-layered panel, position not easy to be approached, corner transition, door column, etc.

Heating shrinkage method

The local heating shrinkage method is a common method for panel repair. The deformation of panel is mainly caused by tensile deformation of the related position; with the heating shrinkage method employed, the tensile stress can be eliminated to make the panel restored its original shape.

Repair method by hammer and jacking block

The repair method by hammer and jacking block is a traditional method for panel repair. Holding hammer in one hand and jacking block or other tools in the other, the sheet-metal worker will beat the panel for shaping repair. Manual operation for panel requires skill and experience of the sheet-metal worker while superb panel repair skill cannot be acquired overnight; the panel repair mainly involves shaping for deformed surface and contour correction.

Technical requirements for panel shaping

No matter which kind of repair method is employed to repair the body surface, the specified technical requirements should be met to restore the original performance and surface appearance quality of the vehicle.

Restoration of appearance

In the repair, both the smooth structure of a large area and the wedge-shaped structure at the local transitional position should be restored to their original shapes. The original shape can be appropriately tuned when it cannot be 100% restored; however, the appearance should be symmetrically beautiful and durable.

Integrity and refinement of continuous surface

Most of the car body is mass-produced by die stamping, the surface of which thus is featured by integrity and refinement. In the repair, for streamlined surface, continuous transition should be made; for surface turning point, smooth transition should be made; after being repaired, the outer surface

should be as bright as new with no ripple, wrinkle, dent, beat-caused mark, scratch or obvious flaw visible to the naked eye or perceivable by hand touch. Integrity, stream linearity, continuity and refinement of the continuous surface should be guaranteed especially for large-area repair.

Sufficient strength and stiffness

The original design gives sufficient strength and stiffness to the body; therefore, after being repaired, the body should not lose its strength and stiffness. Vibration noise of the body after being repaired should be controlled within the allowed range; no abnormal sound caused by vibration is accepted. It is required to ensure that the body will not suffer from fatigue damage in a certain driving range; the entire body should have a certain degree of stiffness to ensure that the body panel in use will have the capacity to maintain its original shape.