

Brake System (06.00)

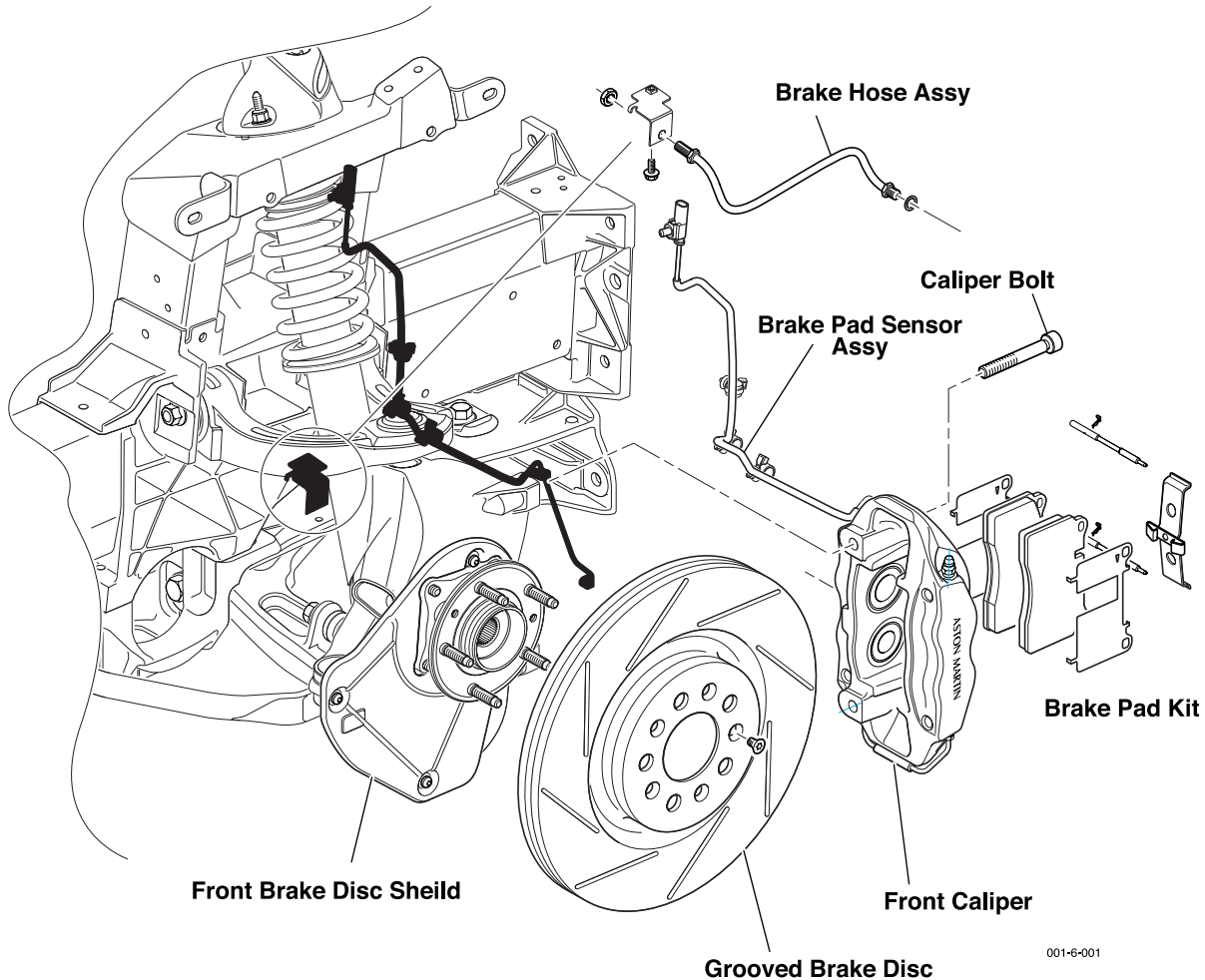
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Brake Systems (06.00)

Front Disc Brake (06.03)

Description



The front, four piston, brake caliper is bolted directly to the vertical link by two bolts. The caliper is a monobloc assembly. The steel brake discs are ventilated and grooved. They are secured to the hub by two retaining bolts.

The two-pairs of opposed pistons act directly on the brake pads mounted one each side of the disc.

Specifications

Oils/Greases

Brake Fluid	Castrol Super Response DOT 4 (Not silicon based brake fluid).
Qty.	2.5 ltrs

Brake discs

	Front
Initial thickness	32 mm
Min. thickness	30 mm
Brake Disc 'Runout'	<70 μm measured @ 2 mm in from the brake disc edge.

Brake pads

New pad thickness	9.4 mm
Minimum lining thickness	2.5 mm

Torque Figures

Description	Nm.	lb. / ft.
Brake hose unions	22	16.5
Brake Caliper to Vertical Link	20 + 66°-70°	15 + 66°-70°
Handbrake Caliper to Vertical Link	15 + 90°-94°	11.5 + 90°-94°
Brake Disc Screws	10.5	8

Maintenance

Brake Caliper (Front and Rear)

Repair Operation Time (ROT)		
Item		Code
Brake Caliper Renew	(LH)	TBA
	(RH)	TBA
	(LH)	TBA
	(RH)	TBA

Removal

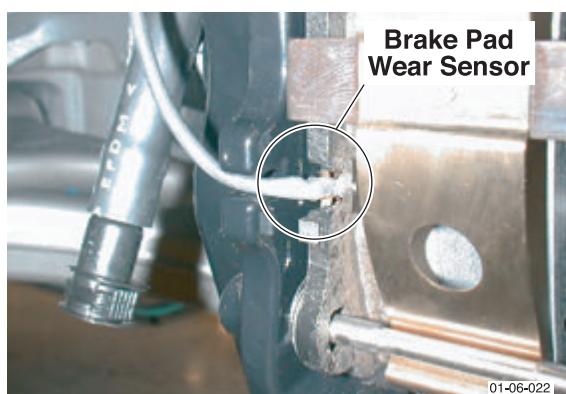
Front calipers shown.

Place a cloth around the brake reservoir filler neck to absorb any possible brake fluid spillage.

1. Raise the vehicle and make safe.
2. For each affected wheel station remove the road wheel(s).

Retract the caliper pistons (allowing easier removal of caliper). Retracting the caliper pistons may cause the brake fluid reservoir to overflow.

3. Disconnect the brake pad wear sensor.



Consider renewing the brake pads when less than $\frac{1}{3}$ of the friction material remains, especially if the vehicle is regularly used and some time remains before next service.

⚠ Warning ⚠

Always use a vacuum brush or aqueous brake cleaner to remove brake lining dust. Never use compressed air.

⚠ Warning ⚠

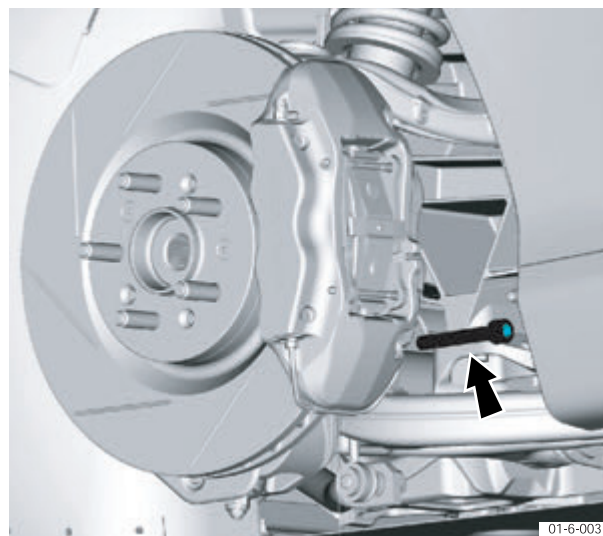
Avoid skin / eye contact or ingestion of brake fluid. If skin or eyes are splashed with brake fluid, rinse the affected area immediately with plenty of water and obtain medical attention. If brake fluid is ingested, obtain immediate medical attention.

Caution

Brake fluid must not be allowed to contact the vehicle paint work. Remove spilt brake fluid from the paint work by rinsing away with running water.

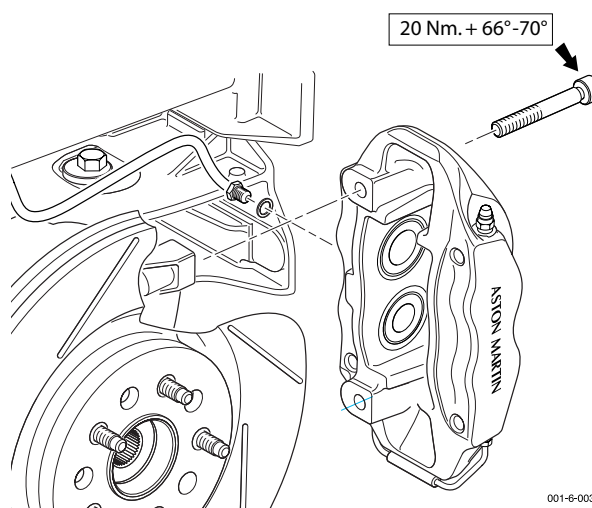
4. Disconnect the brake hose union. 'Cap' the union bolt and plug the hose aperture in the caliper.

5. Remove bolts (x2) that secure the caliper to the vertical link. Withdraw the caliper.



Installation

1. Install the caliper to the vertical link. Torque bolts (x2) to **20 Nm. + 66°-70°**.



2. **Front Caliper Brake pipes.**

Caution

Ensure that the alignment line on the flexible brake pipe remains in a straight line.

Caution

On LH and RH calipers the brake pipe must route towards the front of the car.

- 2.1 Insert the brake pipe union to the caliper.
 - Ensure that the flex hose alignment line is straight
 - Ensure that the brake pipe faces forward and locates correctly in the alignment tool
 Torque to **22 Nm**.

- 2.2 Install the brake pipe alignment tool. Check that the brake pipe orientation is correct:
- The flex hose alignment line is straight
 - The brake pipe faces forward and locates correctly in the alignment tool

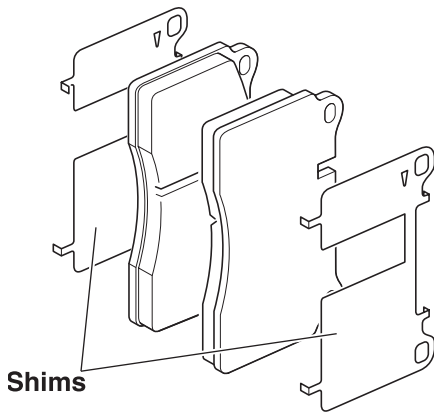


- 2.3 If the alignment is **not** correct, carefully back off the pipe union at the brake calliper until the pipe can be rotated backwards to allow forward movement when being re-torqued. Re torque the brake pipe union to **22 Nm** then re check alignment as detailed above.

3. Rear Caliper brake pipes.

- 3.1 Insert the brake pipe union to the caliper. Torque to **22 Nm**.
- 3.2 Check that the brake pipe orientation is correct.
- Flex hose alignment line is straight
- 3.3 If the alignment is **not** correct, carefully back off the pipe union at the brake calliper until the pipe can be rotated backwards to allow forward movement when being re-torqued. Re torque the brake pipe union to **22 Nm** then re check alignment as listed above.
4. Install the brake pads and brake pad wear sensor. Note LH and RH shims from removal.

When installing new brake pads, install a new brake pad wear sensor.



01-06-021

5. Bleed the brakes (Refer to 'Brake Bleed - Manual', page 6-4-4).
6. Install the road wheels (Refer to 'Road Wheel Nut Torque Tightening', page 4-5-7).
7. 'Bed-In' the brakes (Refer to 'Brake Pad 'Bedding-in'', page 6-1-6).

Brake Discs (Front and rear)

Repair Operation Time (ROT)		
Item	Code	
Brake Disc Renew	(Front)	06.03.CB
	(Rear)	06.04.CB

Removal

Place a cloth around the brake reservoir filler neck to absorb any possible brake fluid spillage.

1. Raise the vehicle and make safe.
2. For each affected wheel station remove the road wheel(s).

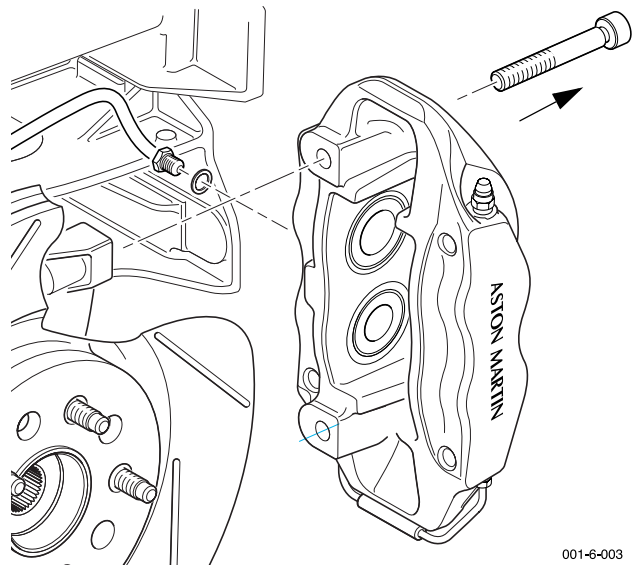
Retract the caliper pistons (allowing easier removal of caliper). Retracting the caliper pistons may cause the brake fluid reservoir to overflow.

3. Rear Road Wheels Only.

Remove the parking brake caliper (Refer to 'Brake Caliper', page 6-3-2).

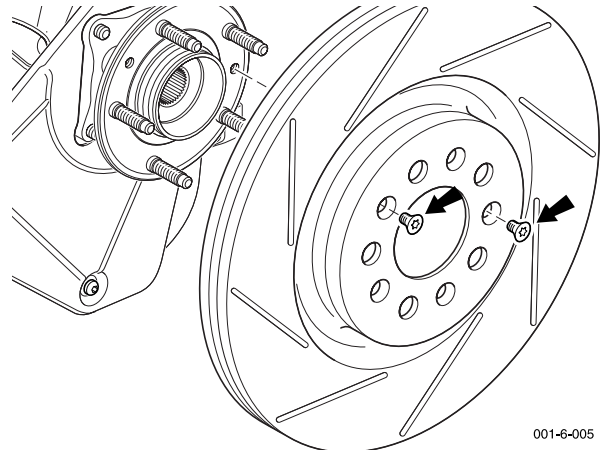
4. Remove bolts (x2) and withdraw the caliper.

Support the caliper to prevent excessive strain on flexible hose.



001-6-003

5. Remove retaining screws. Withdraw the brake disc.



001-6-005

Installation

1. Install the brake disc to the road wheel hub. Ensure that the surfaces of the disc and hub are clean and free from debris.
Torque screws (x2) to **10.5 Nm**.
2. Check brake disc 'runout' (Refer to 'Specifications', page 6-1-2).
3. Install the caliper. Torque bolts (x2) to **20 Nm. + 66°-70° Nm**.
4. **Rear Road Wheels Only.**
5. Install the handbrake caliper. Torque bolts (x2) to **15 Nm. + 90°-94°**.
6. Install the road wheels (Refer to 'Road Wheel Nut Torque Tightening', page 4-5-7).

⚠ Warning ⚠

Before moving off, pump the foot brake pedal 2 or 3 times to ensure the foot brake works correctly. Brake caliper pistons may require travel to contact the brake pads and disc.

7. 'Bed-in' the brake pads (Refer to 'Brake Pad 'Bedding-in'', page 6-1-6).

Brake Pads (Front and rear)

Repair Operation Time (ROT)		
Item		Code
Brake Pads Renew	(Front)	06.03.DB
	(Rear)	06.04.DB

Removal

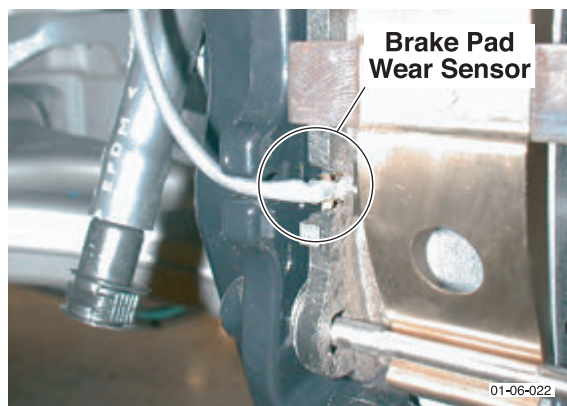
Front calipers shown.

Place a cloth around the brake reservoir filler neck to absorb any possible brake fluid spillage.

1. Raise the vehicle and make safe.
2. For each affected wheel station remove the road wheel(s).

Retract the caliper pistons (allowing easier removal of caliper). Retracting the caliper pistons may cause the brake fluid reservoir to overflow.

3. Disconnect the brake pad wear sensor.



4. Remove the brake pads. Note LH and RH shims for installation.

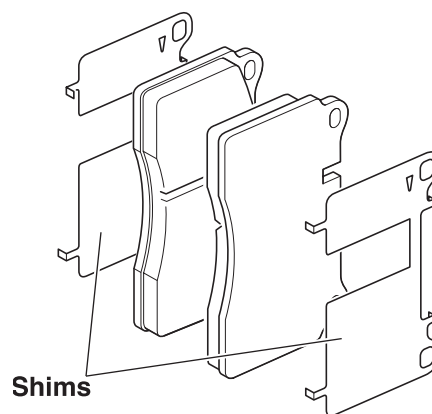
⚠ Warning ⚠

Always use a vacuum brush or aqueous brake cleaner to remove the brake lining dust. Never use an air line.

5. Clean the caliper area using approved brake cleaning equipment.

Installation

1. Install the brake pads. Note LH and RH shims from removal. Install the pad locating pins.



01-06-021

When installing new brake pads, install a new brake pad wear sensor.

2. Connect the brake pad wear sensor to the brake pads.
3. Install the road wheels (Refer to 'Road Wheel Nut Torque Tightening', page 4-5-7).

⚠ Warning ⚠

Before moving off, pump the foot brake pedal 2 or 3 times to ensure the foot brake works correctly. Brake caliper pistons may require travel to contact the brake pads and disc.

4. 'Bed-in' the brake pads (Refer to 'Brake Pad 'Bedding-in'', page 6-1-6).



Brake Pad 'Bedding-in'

Repair Operation Time (ROT)	
Item	Code
Bedding-in	TBA
Caution Failure to 'bed-in' new brake pads will result in reduced brake performance and possible brake judder or squeal.	

After the installation of new brake pads, brake performance will be limited, as the brake discs and pads need to be 'Bedded-in'.

Procedure

This procedure, in a controlled environment, requires approximately 17 minutes to complete. It is recommended that an analogue decelerometer be used for this procedure.

Ensure the brakes are cold (Less than 80° C) before starting this procedure.

Use light brake applications only, if possible, when the vehicle is driven to a suitable location to carry out this procedure.

Use light brake applications only, if possible, during all cooling down periods.

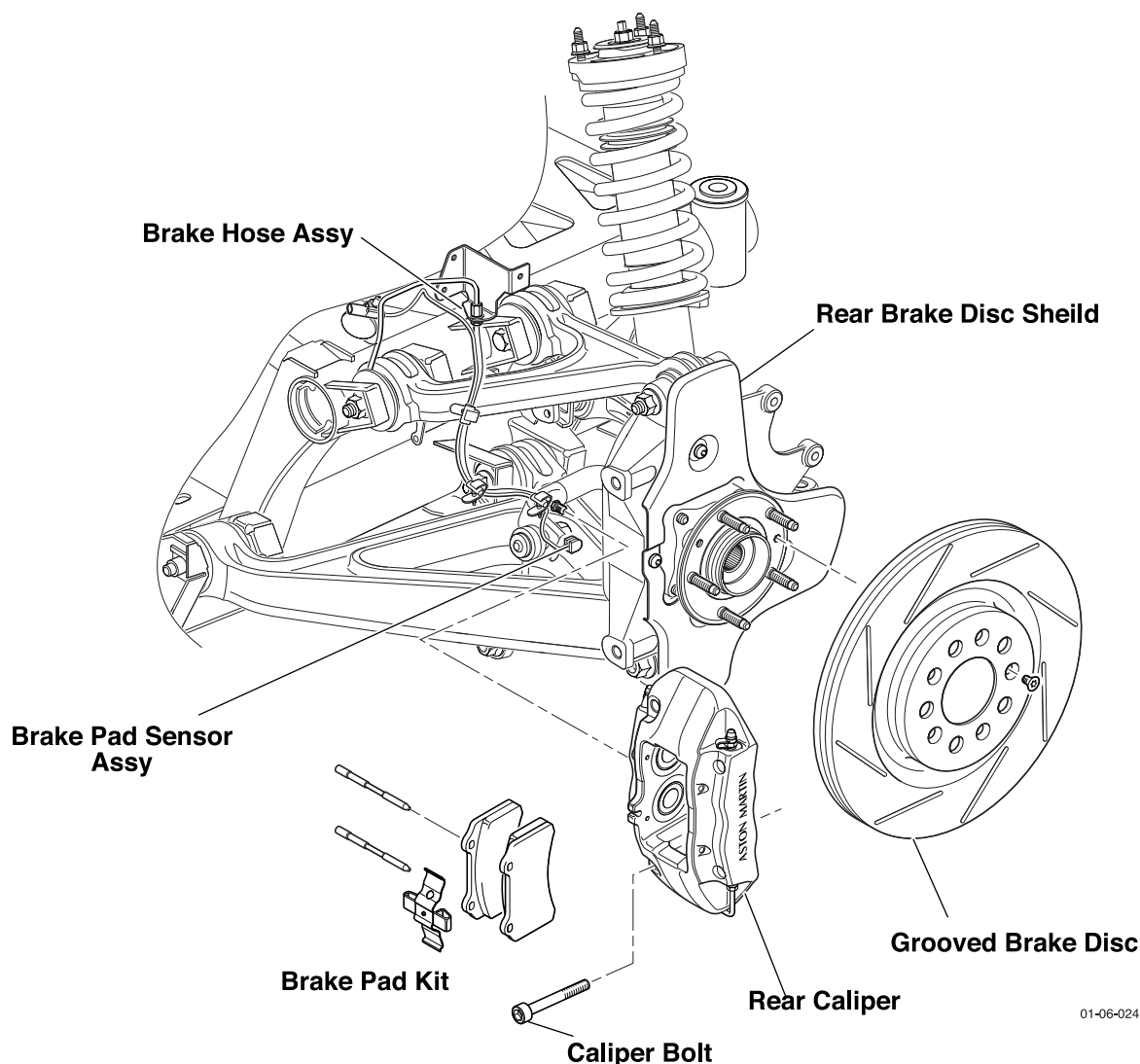
The cool down periods are the minimum required and can be extended.

1. Decelerate the vehicle three times from 100 km/h to 32 km/h at 0.3g accelerating normally in between each deceleration.
2. Drive 3 km (allowing the brakes to cool).
3. Decelerate the vehicle three times from 100 km/h to 32 km/h @ 0.5g accelerating normally in between each deceleration.
4. Drive 4 km (allowing the brakes to cool).
5. Decelerate the vehicle three times from 100 km/h to 0 km/h using the ABS, accelerating normally in between each deceleration.
6. Drive 8 km (allowing the brakes to cool).

Brake system (06.00)

Rear Disc Brakes (06.04)

Description



01-06-024

The rear, four piston, brake caliper is bolted directly to the vertical link by two bolts. The caliper is a monobloc assembly. The steel brake discs are ventilated and grooved. They are secured to the hub by two retaining bolts.

Specifications

Oils/Greases	
Brake Fluid	Castrol Super Response DOT 4 (Not silicon based brake fluid)
Brake discs	
Brake disc initial thickness	28.0 mm
Brake disc Min. thickness	26.0 mm
Brake Disc 'Runout'	<70 μ m measured @ 2 mm in from the brake disc edge.
Brake pads	
Minimum lining thickness	2.5

Torque Figures

Description	Nm.	lb. / ft.
Brake hose unions	22	16.5
Service brake Caliper to Vertical Link	20 + 66°-70°	15 + 66°-70°
Handbrake Caliper to Vertical Link	15 + 90°-94°	11.5 + 90°-94°



Maintenance

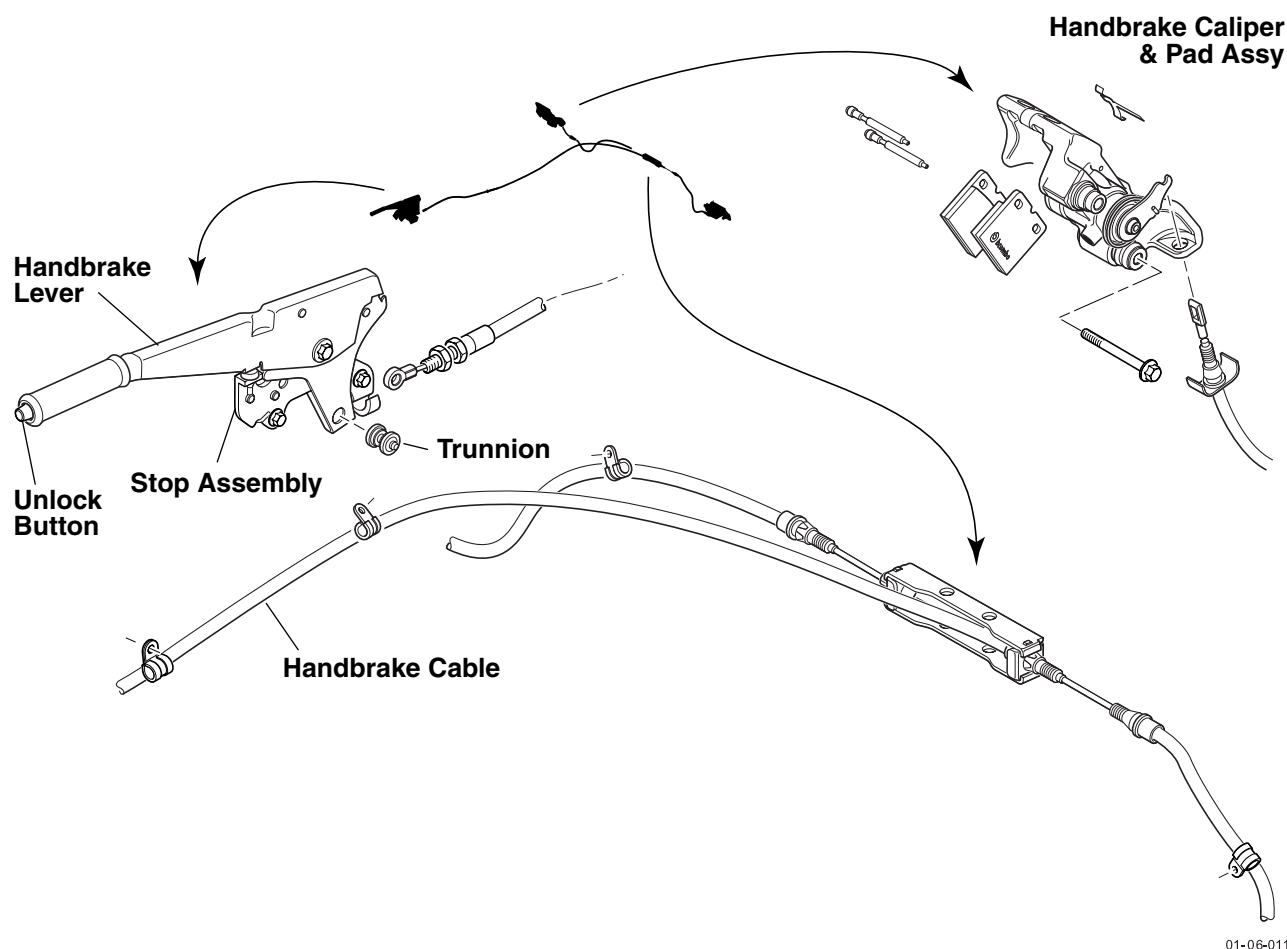
For symptoms and maintenance of the rear brake system (Brake Discs, Pads and Calipers) follow the same procedures as detailed for the front brake system.

- Brake Calipers** (Refer to 'Brake Caliper (Front and Rear)', page 6-1-3)
- Brake Discs** (Refer to 'Brake Discs (Front and rear)', page 6-1-4)
- Brake pads** (Refer to 'Brake Pads (Front and rear)', page 6-1-5)

Brake Systems (06.00)

Hand Brake (06.05)

Description



01-06-011

The hand brake control lever is located on the outside of the drivers seat and brakes the rear road wheels through a cable system and two mechanical handbrake calipers. Hand brake pads are applied by the mechanical brake calipers (x2), one acting on each rear road wheel brake disc. The calipers are bolted to the vertical links. Return springs on each caliper retract the pads when the parking brake is released.

Wear in the parking brake pads is compensated for automatically by a mechanism within the calipers. Cable stretch is compensated by cable adjusters.

A hand brake switch is wired normally closed. The switch is held open whilst the hand brake is 'off' and closes when the hand brake is applied. The hand brake warning lamp on the instrument panel is illuminated when the hand brake is applied.

Specifications

Brake pads

Minimum lining thickness 6 mm

Torque Figures

Description	Nm.	lb. / ft.
Brake Caliper to Vertical Link	15 + 92°	11.5 + 92°

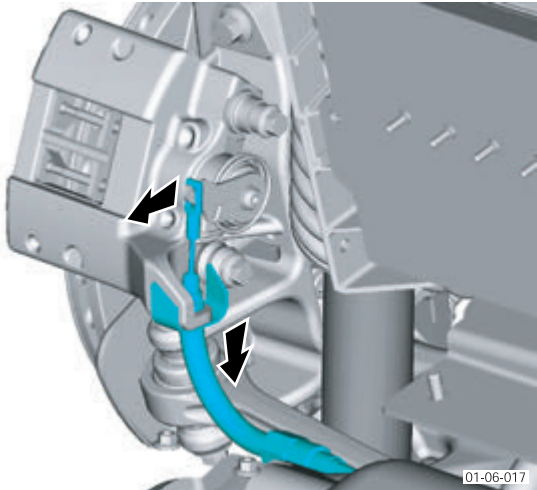
Maintenance

Brake Caliper

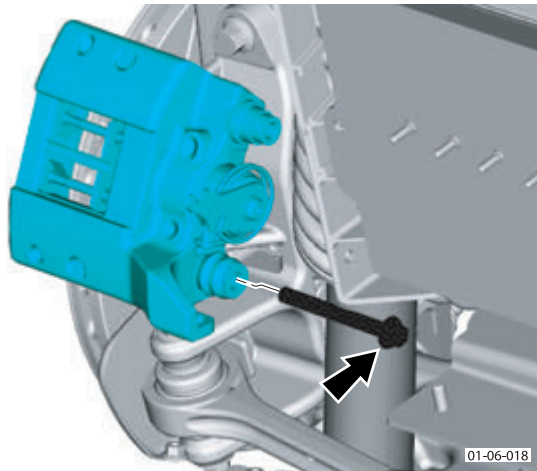
Repair Operation Time (ROT)		
Item		Code
Handbrake Caliper Renew	LH	06.05.AB
	RH	06.05.BB

Removal

1. Raise the vehicle and make safe.
2. For each affected wheel station remove the road wheel(s).
3. Remove the handbrake cable from the caliper.
 - 3.1 Screw in the cable adjustment on both handbrake calipers.
 - 3.2 Remove the handbrake cable 'eyelet' from the caliper actuator arm.
 - 3.3 Withdraw the handbrake cable.



4. Remove the caliper from the vertical link. Discard the mounting bolts (x2).



⚠ Warning ⚠

Always use a vacuum brush or aqueous brake cleaner to remove brake pad dust. Never use compressed air.

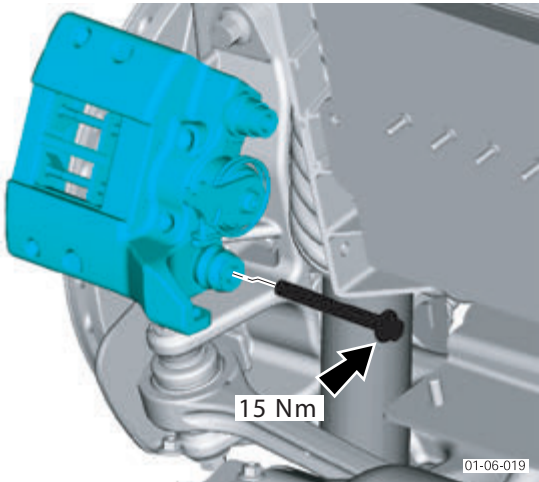
5. Carefully remove brake dust or dirt from the parking brake system components.
6. If required, remove the handbrake pads (Refer to 'Brake Pads', page 6-3-3)
7. Check the caliper is free on its mounting pins. Service as required.

Installation

1. If removed, install the handbrake pads (Refer to 'Brake Pads', page 6-3-3).

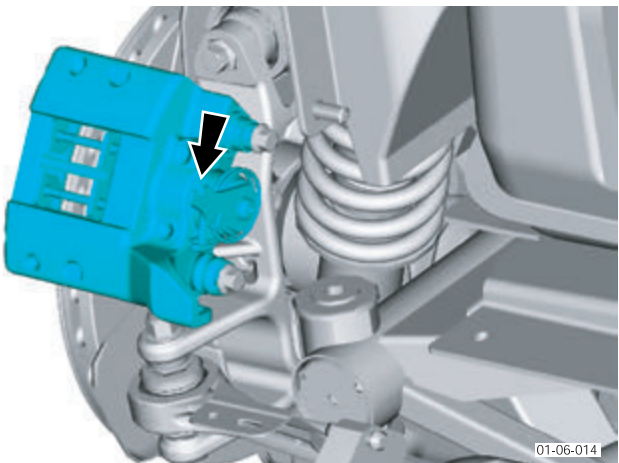
Always replace handbrake pads in axle sets.

2. Using new bolts, install the caliper to the vertical link. Torque bolts (x2) to **15 Nm + 92°**.



3. Operate the caliper lever several times by hand.

This will take up the free play between the piston / pads and the brake disc.



4. Install the handbrake cable to the caliper.
 - 4.1 Install the handbrake cable through the mount on the caliper.
 - 4.2 Locate the handbrake cable 'eyelet' over the caliper actuator arm.

- Adjust the handbrake cable (Refer to 'Adjustment', page 6-3-5).
- Install the brake pads.

⚠ Warning ⚠

Before moving off, operate the handbrake 2 or 3 times to ensure the handbrake works correctly. Handbrake caliper pistons may require travel to contact the brake pads and disc.

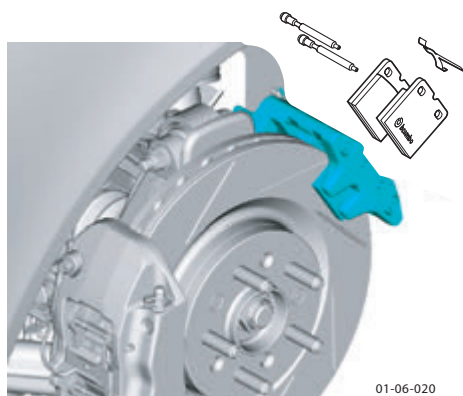
- Install the road wheels (Refer to 'Road Wheel Nut Torque Tightening', page 4-5-7).

Brake Pads

Repair Operation Time (ROT)	
Item	Code
Handbrake Pads Renew	06.05.DB

Removal

- Raise the vehicle and make safe.
- For each affected wheel station remove the road wheel(s).
- Remove the handbrake brake pads.



⚠ Warning ⚠

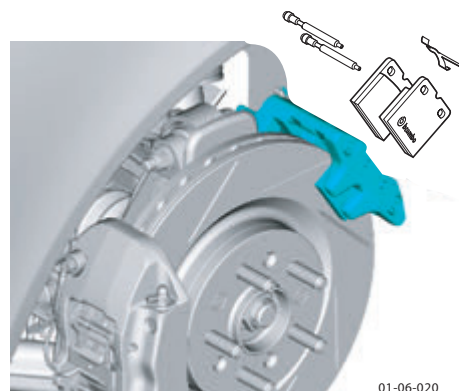
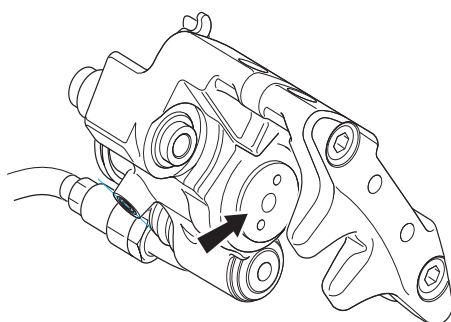
Always use a vacuum brush or aqueous brake cleaner to remove brake pad dust. Never use compressed air.

- Carefully remove brake dust or dirt from the handbrake system components.

Installation

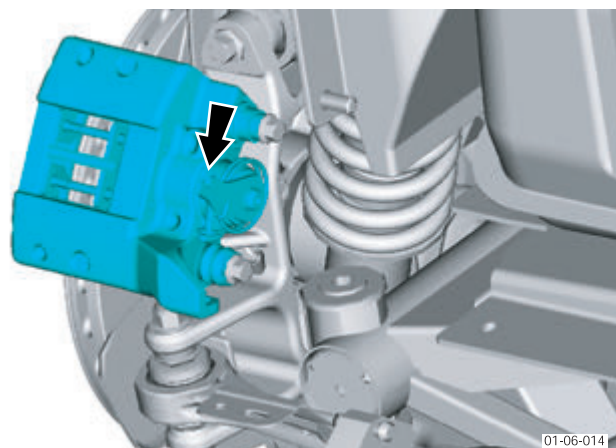
- Screw back the caliper pistons.

Use a proprietary service tool to screw back the piston.



- Operate the caliper lever several times by hand.

This will take up the free play between the piston / pads and the brake disc.



- Adjust the handbrake cable (Refer to 'Adjustment', page 6-3-5).

⚠ Warning ⚠

Before moving off, operate handbrake 2 or 3 times to ensure the handbrake works correctly. Handbrake caliper pistons may require travel to contact the brake pads and disc.

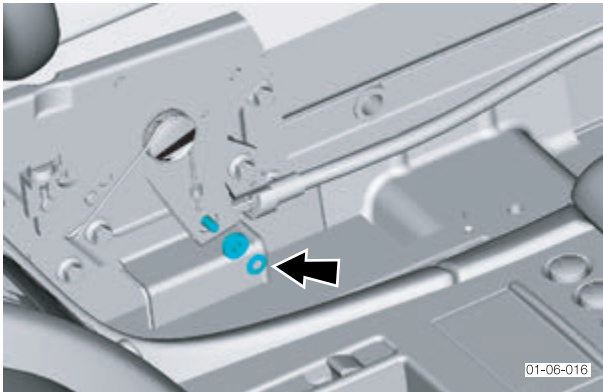
- Install the road wheels (Refer to 'Road Wheel Nut Torque Tightening', page 4-5-7).

Handbrake Cable

Repair Operation Time (ROT)	
Item	Code
Handbrake Cable Renew	06.05.DB

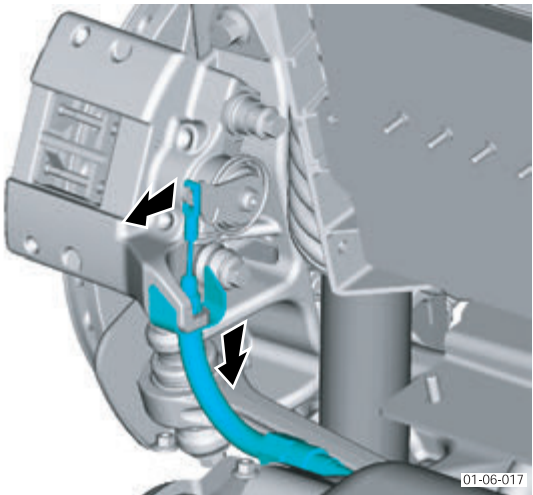
Removal

1. Back off the cable adjustment from each caliper.
2. Remove the drivers seat (Refer to 'Seating (01.10)', page 1-7-1).
3. Remove the clevis pin and washers. Withdraw the handbrake cable from the vehicle body. Discard the clevis pin and spring clip.



4. Remove the handbrake cable from the calipers.

Use service tool 206-103 (Refer to '206-103 (Handbrake Cable Removal)', page 20-1-4) to disconnect the handbrake cable outer from the caliper mount.



5. Disconnect the cable from the subframe.

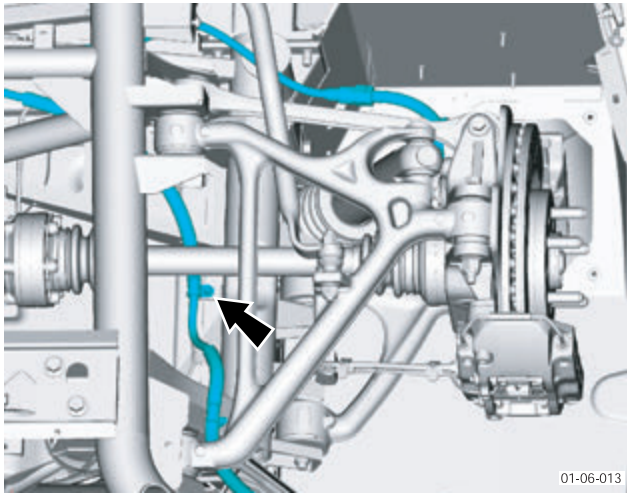
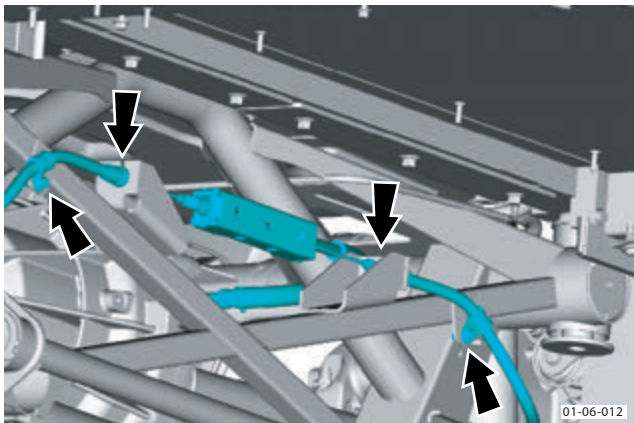


Image - RH drive vehicle

Caution

Do not attempt to disconnect the handbrake cables from the equaliser unit.

Use service tool 206-103 (Refer to '206-103 (Handbrake Cable Removal)', page 20-1-4) to disconnect the handbrake cable outer from the subframe mounts.



6. Withdraw the cable through the vehicle body and the subframe.

Installation

1. Feed the handbrake cable through the vehicle body and the subframe.

Ensure that all snap install clips are correctly located.

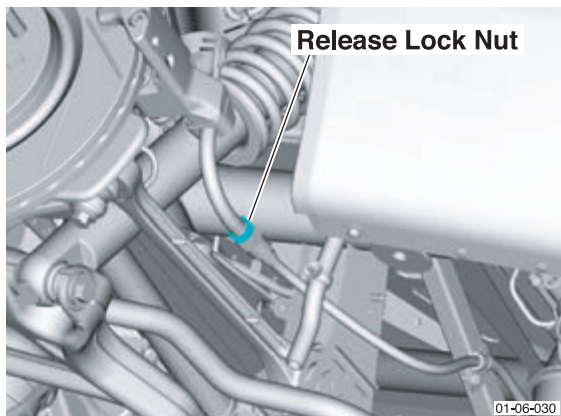
2. Engage the operator cable 'eyelets' to the calipers.

Ensure that the handbrake lever is fully released.

3. Using a new clevis pin, washers and spring clip, connect to the handbrake lever.
4. Adjust the handbrake cable.

Adjustment

1. Ensure the handbrake lever is fully released.
2. Release the handbrake cable lock nuts and screw the adjustment fully in.



3. Screw the adjustment 'out' or 'in' on each caliper, in equal amounts, to obtain a rise 4 clicks on the handbrake lever.

⚠ Warning ⚠

Before moving off, operate parking brake 2 or 3 times to ensure the parking brake works correctly. Parking brake caliper pistons may require travel to contact the brake pads and disc.

4. Check the functionality of the handbrake system:
 - 4.1 When handbrake lever is in the fully down position (handbrake released), the brake warning light should be extinguished.
If the brake warning light does not extinguish, adjust the handbrake cable until correct function of brake warning light occurs.
 - 4.2 Check the handbrake pads for binding by driving the vehicle.

If the pads are binding a squeal will be emitted from the rear brakes)

If the pads are binding the handbrake cable adjusters are over adjusted. Slacken the adjusters as necessary, then check brake warning light functionality.



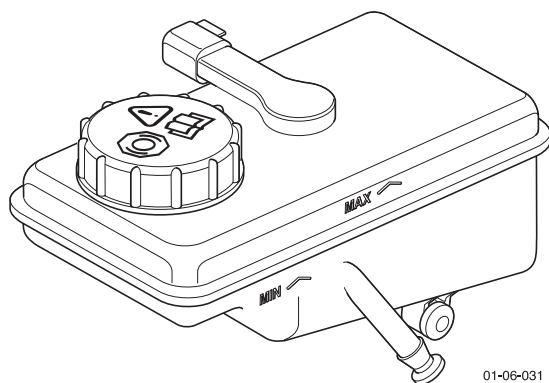
ASTON MARTIN

Brake System (06.00)

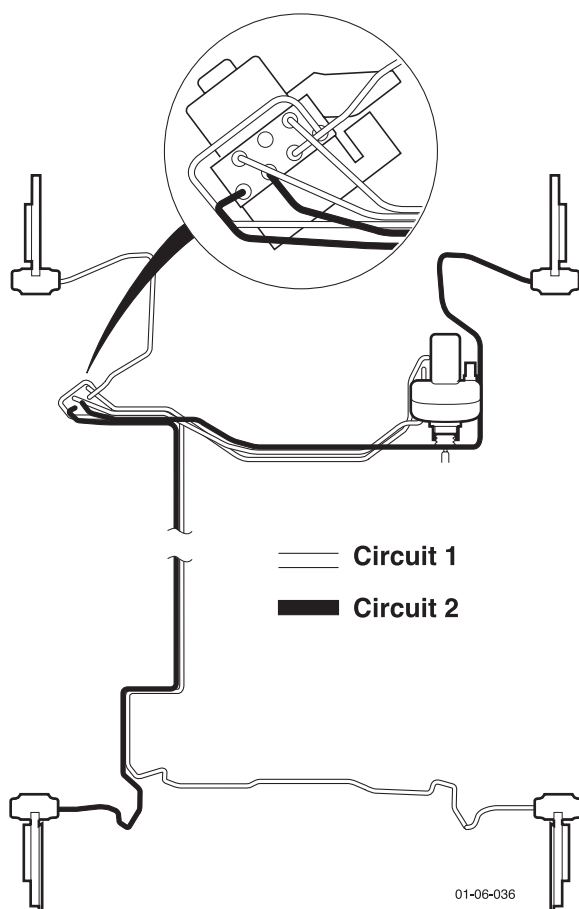
Brake Actuation System (06.06)

Description

Tandem Master Cylinder



The short-stroke tandem master-cylinder controls two separate brake circuits which are jointly activated by the brake pedal. In the event of a major leak in one system, the other will still function. The two systems are supplied by a common brake fluid reservoir.

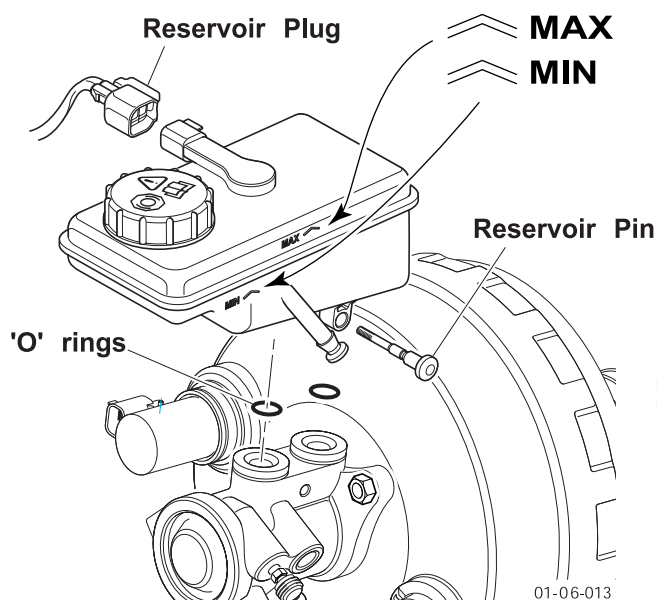


A pressure sensor attached to the master-cylinder provides the ABS / DSC module with brake pressure information. This information informs the system how hard the driver is braking and is used as an aid for the ABS / DSC to achieve accurate brake pressure control.

Brake Fluid Reservoir

The brake fluid reservoir is mounted directly on the tandem master cylinder and secured with a pin. Two stub pipes, on the base of the reservoir, locate into the primary and secondary chambers of the tandem master cylinder.

An integral fluid-level switch is incorporated in the reservoir. If the brake fluid level is low, the brake warning lamp in the Driver Information Module (DIM) will illuminate and 'LOW BRAKE FLUID' will be displayed in the message center right.



Specifications

Oils/Greases

Brake Fluid Castrol Super Response Dot 4

Torque Figures

Description	Nm.	lb. / ft.
Master Cylinder Mount	25 (+/- 4)	18.5 (+/- 3)
Brake Pipe Unions	17	13
Brake fluid reservoir securing pin	4	3
Pressure Sensor	35 (+/- 2)	26 (+/- 1.5)

Maintenance

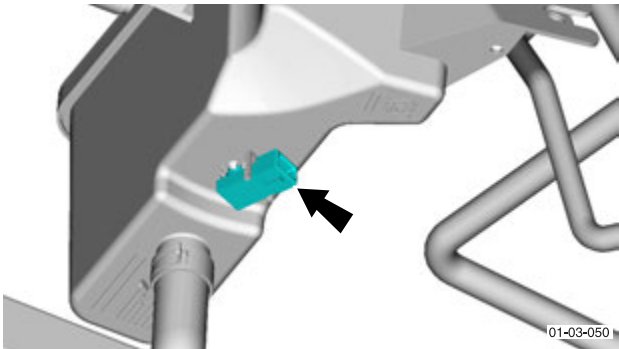
Master Cylinder

Repair Operation Time (ROT)	
Item	Code
Master Cylinder Renew	06.06.EB

Removal

1. Remove the coolant reservoir (LH drive only).

To give better access. Be aware that there is a wiring harness plug connected to the header tank on the under side.



⚠ Warning ⚠

Avoid skin / eye contact or ingestion of brake fluid. If skin or eyes are splashed with brake fluid, rinse the affected area immediately with plenty of water and obtain medical attention. If brake fluid is ingested, obtain immediate medical attention.

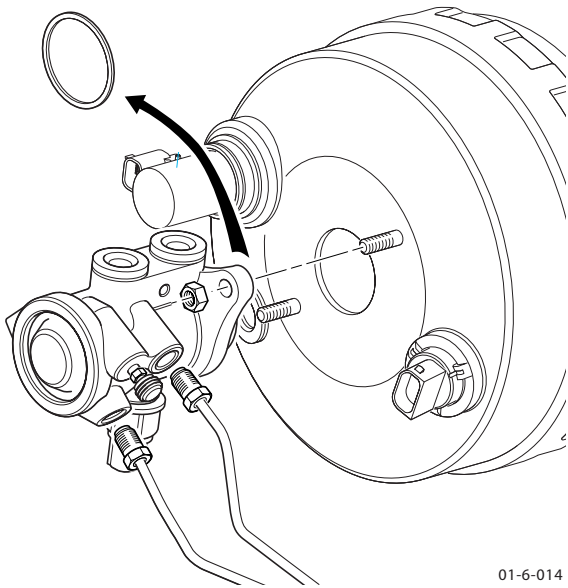
Caution

Brake fluid must not be allowed to contact the vehicle paint work. Remove spilt brake fluid from the paint work by rinsing away with running water.

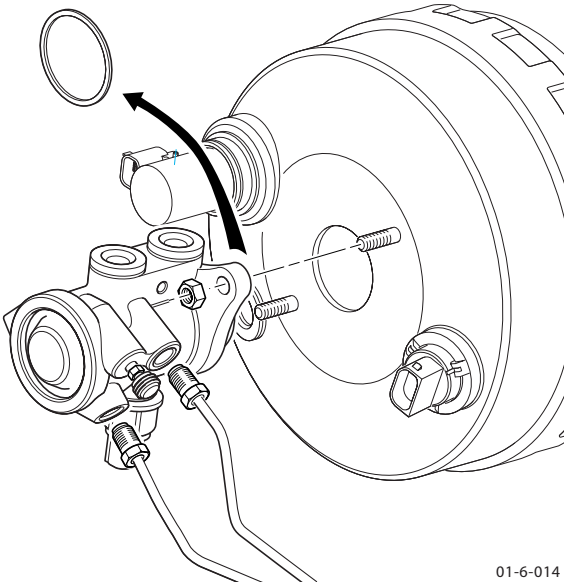
Place suitable absorbent material around the brake fluid reservoir area to catch any spilt brake fluid.

2. Disconnect the two outlet pipes. Install blanking plugs to all ports and pipe ends to prevent brake fluid leakage.

Mark each pipe - for correct installation.

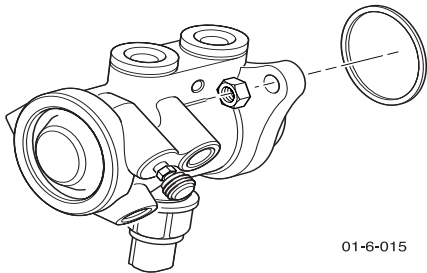


3. Disconnect the pressure sensor wiring harness plug.
4. Remove the two nyloc nuts that secure the master cylinder to the brake booster. Withdraw the master cylinder. Discard the 'O' ring and nyloc nuts.

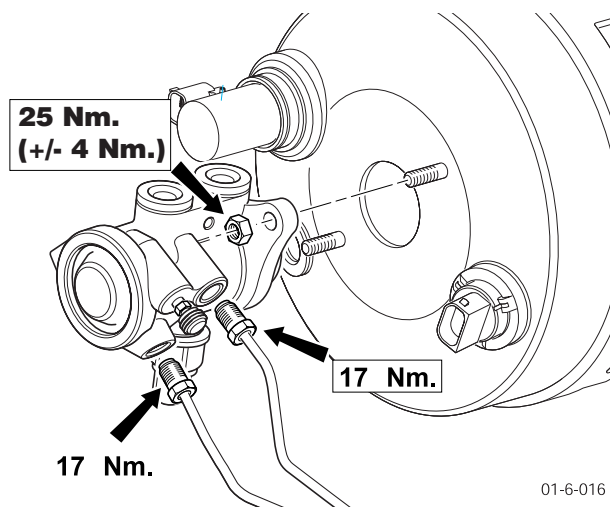


Installation

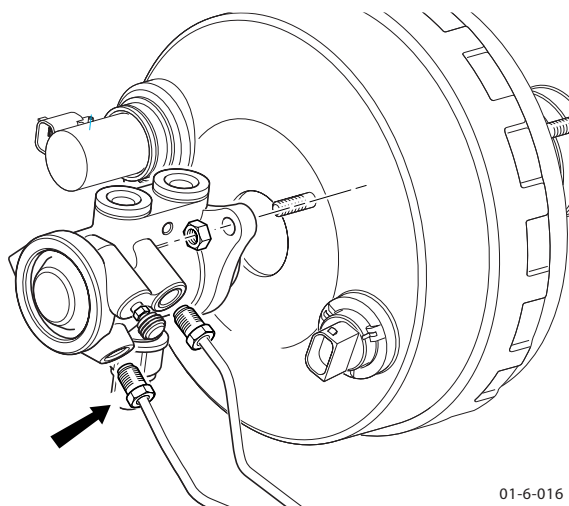
1. Install a new 'O' ring.



- Secure the master cylinder with new nyloc nuts (x2). Torque to **25 Nm (+/- 4 Nm.)**.



- Install the two outlet pipe unions to their original positions on the tandem master cylinder.
- Connect the pressure sensor wiring harness plug.



- Install the coolant reservoir (LH drive only). Top up the coolant system if required.
- Bleed the brake system (Refer to 'Brake Bleeding - WDS', page 6-4-4).

Caution
Do not bleed the brake system at the brake master cylinder.

Brake Fluid Reservoir

Repair Operation Time (ROT)

Item	Code
Brake Fluid Reservoir Renew	06.06.AB

Removal

Warning

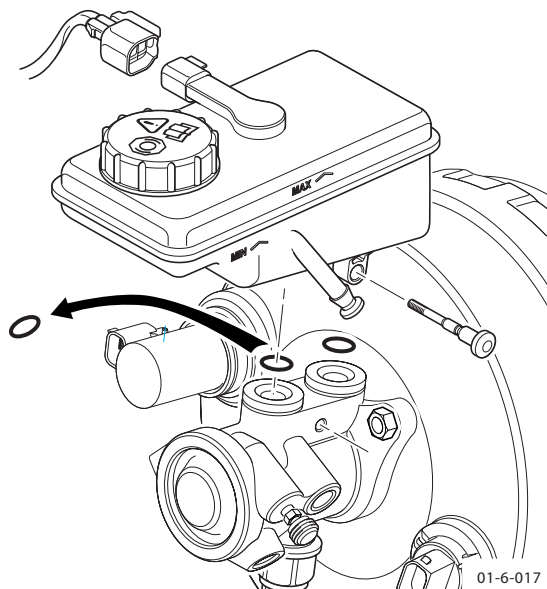
Avoid skin / eye contact or ingestion of brake fluid. If skin or eyes are splashed with brake fluid, rinse the affected area immediately with plenty of water and obtain medical attention. If brake fluid is ingested, obtain immediate medical attention.

Caution

Brake fluid must not be allowed to contact the vehicle paint work. Remove spilt brake fluid from the paint work by rinsing away with running water.

Place suitable absorbent material around the brake fluid reservoir area to catch any spilt brake fluid.

- Remove the master cylinder (Refer to 'Master Cylinder', page 6-4-2).
- Drain as much brake fluid as possible from the brake fluid reservoir.
- Remove the brake fluid reservoir securing pin.
- Withdraw the brake fluid reservoir. Take care to minimise brake fluid spill. Clear any spilt brake fluid immediately.
- Discard the brake fluid reservoir 'O' rings.



Installation

1. Install new 'O' rings to the brake fluid reservoir.

Lightly lubricate 'O' rings with brake fluid.

2. Install the brake fluid reservoir to the master cylinder.
Ensure correct location of the 'O' rings.
3. Install the brake fluid reservoir securing pin.
Torque to **4 Nm. (+/- 0.5 Nm.)**.

Warning

Brake fluid is hygroscopic. If kept in opened containers, it will absorb water vapour. Use only brake fluid from freshly opened containers when topping up the brake fluid reservoir.

4. Fill the brake fluid reservoir with the specified brake fluid from a new, unopened container (Refer to 'Specifications', page 6-1-2).
5. Bleed the brake system (Refer to 'Brake Bleeding - WDS', page 6-4-4).

Brake Bleeding - WDS

Warning

Avoid skin / eye contact or ingestion of brake fluid. If skin / eyes are splashed with brake fluid, rinse the affected area immediately with plenty of water and obtain medical attention. If brake fluid is ingested, obtain immediate medical attention.

Caution

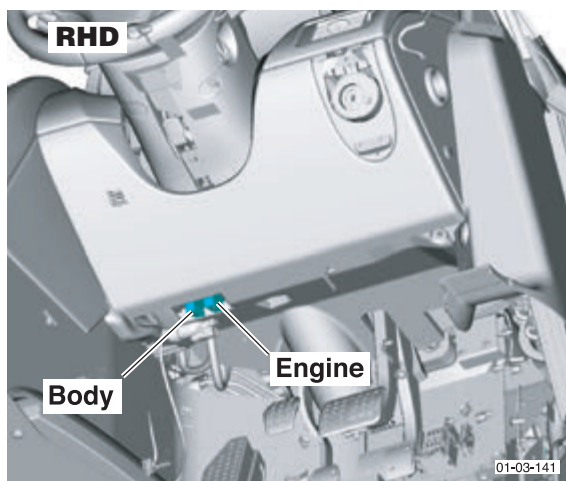
Brake fluid must not be allowed to contact the vehicle paint work. Remove spilt brake fluid from the paint work by rinsing away with running water.

Use the WDS to bleed the brakes if bleeding the brake system after installing a major component, i.e. a modulator or master cylinder or when filling from empty.

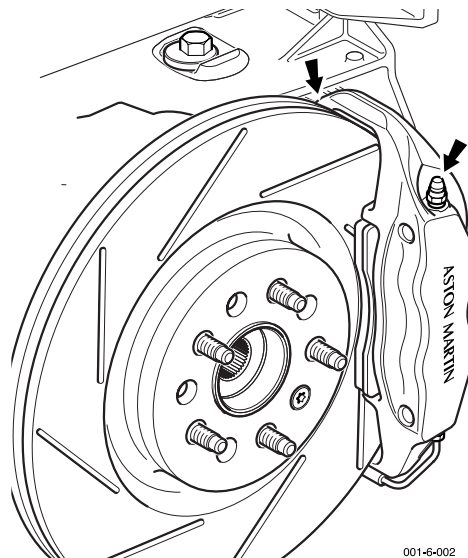
If bleeding a caliper a manual brake bleed procedure can be used.

1. Connect the WDS.

The diagnostic sockets, Body and Engine, differ for LHD and RHD vehicles (Refer to 'Diagnostic Ports', page 20-1-2).



2. Clean each caliper in the area of the bleed screws.
Remove the dust caps.



Warning

Brake fluid is hygroscopic. If kept in opened containers, it will absorb water vapour. Use only brake fluid from freshly opened containers when topping up brake fluid reservoir.

3. Prepare a bleed tube and a bottle containing a small quantity of clean brake fluid.
4. If necessary, top up the brake fluid reservoir with brake fluid from a freshly opened container.
5. Switch on the WDS and load the 'Anti-lock braking diagnostics' software.

When bleeding a brake caliper always bleed the inner bleed screw first, followed by the outer bleed screw, then bleed the inner bleed screw once again.

6. Select 'Brake Bleed' and follow the WDS instructions.

Brake Bleed - Manual

After a Caliper Replacement

Preparation

1. Connect the bleed bottle tube to the bleed screws of front LH and rear LH calipers. Open the front LH and rear LH calipers bleed screws.
2. Actuate the brake pedal (>60mm) and secure it by using a pedal support.

This closes the TMC central valves and prevents fluid flowing out of the opened brake system.

3. Close the front LH and rear LH calipers bleed screws and remove the bleed bottle tubes.
4. Remove the caliper. Install the new caliper.
5. Remove the pedal support.
6. Remove the brake fluid reservoir cap and fill the reservoir to 'MAX' with **new** DOT 4 brake fluid.

7. Bleed the brake system.

Only the new caliper has to be bled. Ensure that there is always sufficient brake fluid in the reservoir.

Procedure

8. Connect a bleed bottle tube to the caliper inner bleed screw.
9. Actuate the brake pedal firmly to the floor and hold down. Open the inner bleed screw until pressure is released. Close the inner bleed screw, then release the brake pedal.

Wait 2 seconds between brake pedal actuations for the brake fluid level to settle.

Repeat this procedure till clear, air free brake fluid streams out of the inner bleed screw (10 to 20 times).

Watch the brake fluid level of the reservoir and refill if necessary.

10. Once satisfied that no air is in the brake fluid, push down on the brake pedal, hold down and tighten the inner bleed screw. Remove the bleed bottle tube.
11. Complete the same procedure on the outer bleed screw.
12. Once satisfied that no air is in the brake fluid from the outer bleed screw, check, once more, the inner bleed screw for air.

Disconnection

13. Fill the reservoir to the 'MAX' level and install the reservoir cap.

Take note of brake pad wear.

14. Start the engine to generate a vacuum in the booster.
15. Check brake pedal travel and pedal 'feel'.

If the pedal travel is too long after bleeding, check the brake system for leaks. If no leaks, repeat the brake bleed procedure.

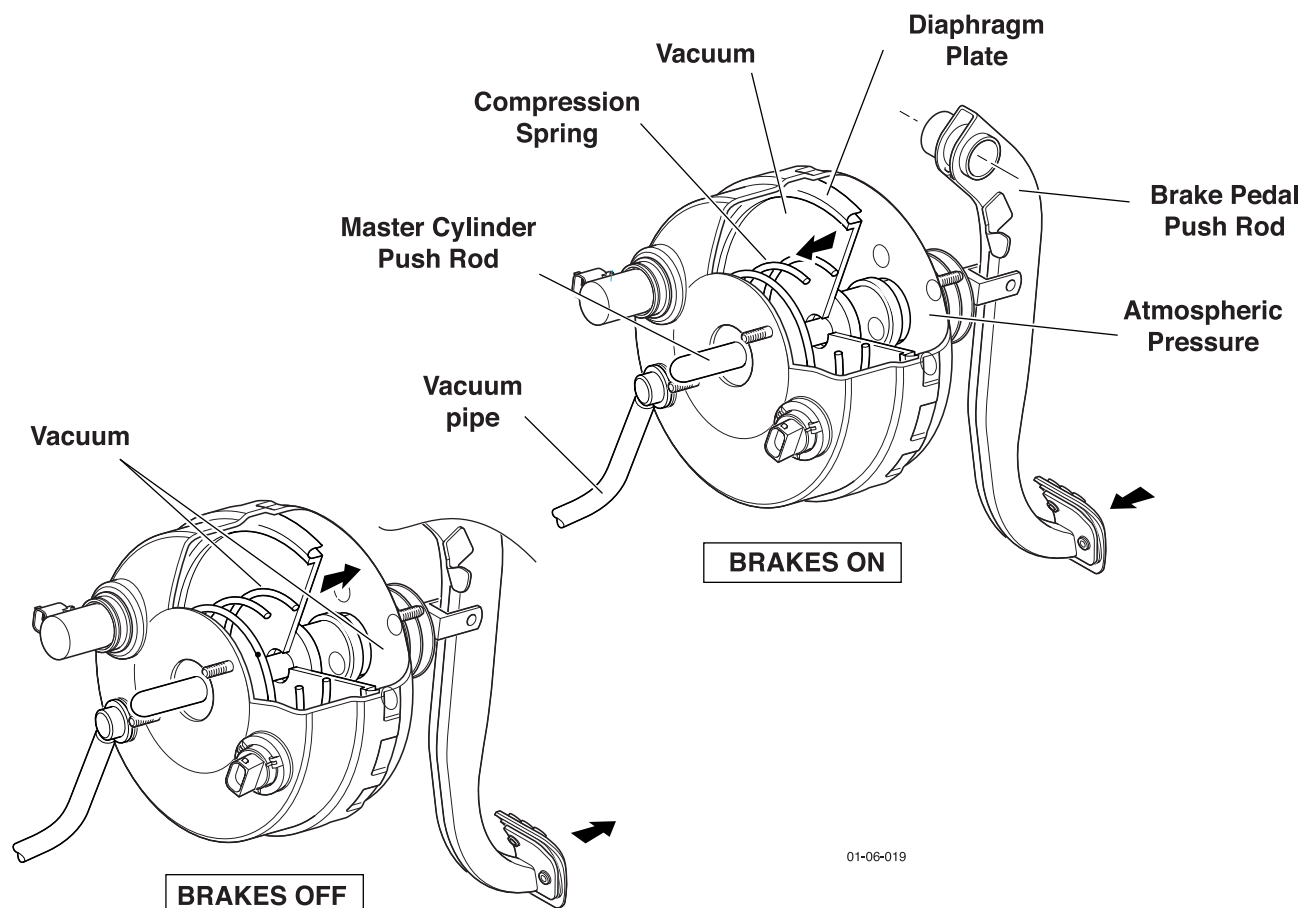


ASTON MARTIN

Brake System (06.00)

Power Brake System (06.09)

Brake Booster



The brake booster comprises a chamber divided by a diaphragm plate and is secured to the brake pedal housing.

As the brake pedal is pressed, a poppet valve opens allowing atmospheric pressure into the drivers side of the diaphragm. Atmospheric pressure builds up on the drivers side of the diaphragm and pushes against the partial vacuum on the other side. This additional force boosts the applied brake pedal force up to 6.5 times.

When the brake pedal is released, the poppet valve closes. The pressure on the diaphragm reduces and the compression spring returns the diaphragm to the release position.

Panic Brake Assist

In an emergency braking situation, a driver presses down on the brake pedal much faster than in normal braking conditions, but often without sufficient force. The initial application of the brake pedal is a reflex reaction. After the initial application, many drivers do not brake hard enough because of concerns that they might cause the vehicle to skid. To aid the driver, the panic brake assist (PBA) intervenes in bringing the vehicle to a halt, sooner and in a controlled manner, in emergency braking situation. The PBA system monitors the speed of brake pedal activation, and at a calibrated pedal activation speed, the PBA provides maximum brake force and makes full use of the ABS.

PBA is controlled by the ABS / DSC module, which monitors a travel sensor attached to the internal vacuum diaphragm of the brake booster. The sensor determines the position of the diaphragm and the speed of the diaphragm movement. If the sensor's signal indicates an emergency braking situation, the

ABS / DSC module will open an electric solenoid on the brake booster. The solenoid directs atmospheric pressure into the rear of the brake booster, causing the booster diaphragm to move forward to fully apply the brakes. PBA takes full benefit of ABS to stop the vehicle in a controlled manner and in the shortest distance possible. When the brake pedal is released the ABS / DSC module instantly releases the brakes.

Specifications

Torque Figures		
Description	Nm.	lb. / ft.
Brake Booster Mount	21-24	15.5-18

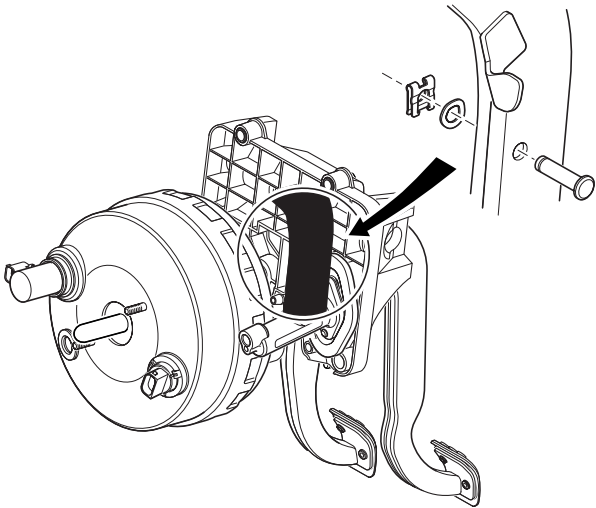
Maintenance

Brake Booster

Repair Operation Time (ROT)	
Item	Code
Brake Booster Renew	RHD 06.07.AB

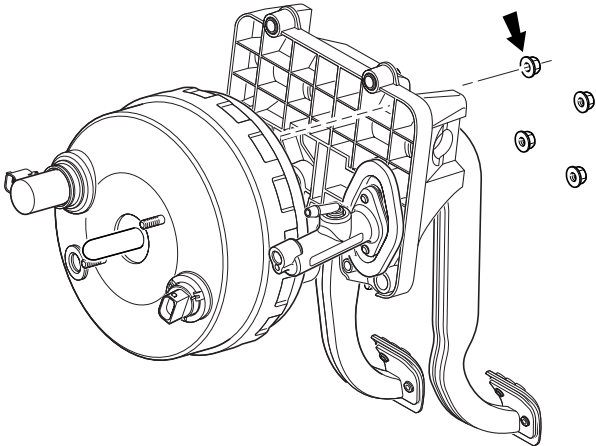
Removal

1. Remove the master cylinder (Refer to 'Master Cylinder', page 6-4-2).
2. Remove the oil dip sick.
3. Remove the clevis pin.



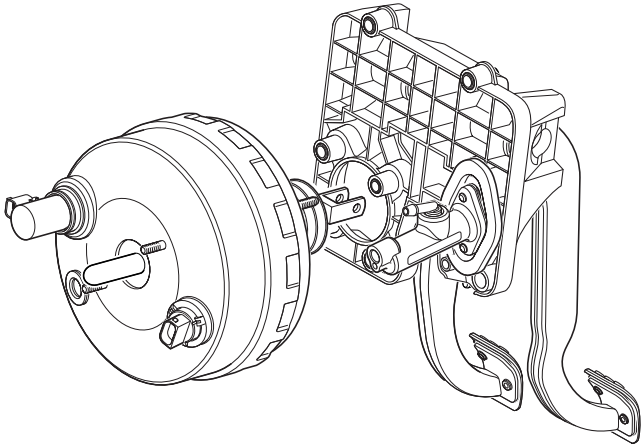
01-6-020

4. Remove nuts (x4).



01-6-021

5. Disconnect the wiring harness plugs (x2).
6. Withdraw the brake booster.



01-6-022

7. Remove and discard the brake light switch (mounted on the brake pedal block).

Installation

1. Install a new brake light switch.

After installing a new brake booster a new brake light switch, mounted on the brake pedal block, must be installed.

2. Place the brake booster through the bulkhead.
3. Secure using bolts (x4). Torque to **21-24 Nm**.
4. Install the clevis pin.
5. Connect the wiring harness plugs (x2).
6. Install the master cylinder (Refer to 'Master Cylinder', page 6-4-2).
7. Bleed the brake system (Refer to 'Brake Bleeding - WDS', page 6-4-4).

Brake system (06.00)

Anti-lock Braking System (ABS) (06.09)

The anti-lock braking system (ABS) is a four-channel system having independent inputs from all four-wheel speed sensors.

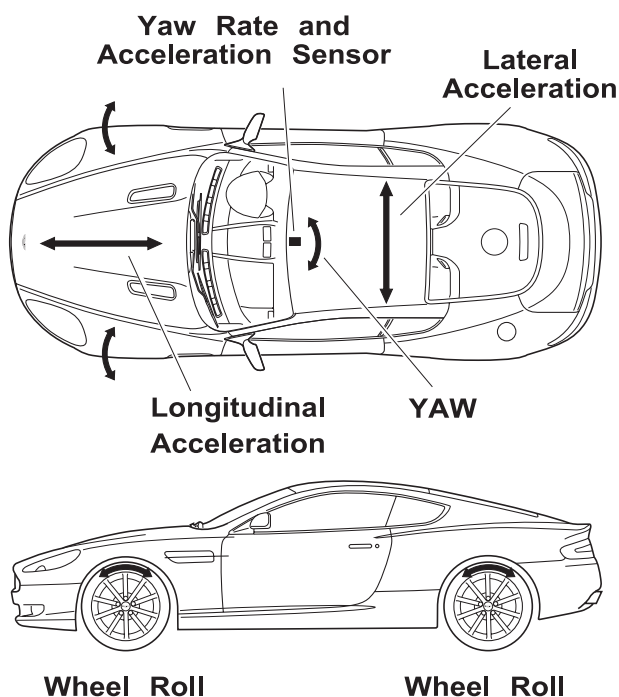
The ABS module, monitors signals from the sensors to calculate, brake slip and the acceleration / deceleration of individual wheels. When the brake pedal is depressed, and the ABS module detects incipient wheel lock-up from the incoming signals, it triggers the re-circulation pump inside the module's hydraulic modulator, and the solenoid valves for the wheel(s) concerned. Brake pressure, is then modulated to increase / decrease or remain constant at the wheel(s) concerned until wheel lock-up is eliminated. The ABS provides self-diagnosis and any malfunction within the system will be indicated to the driver by the illumination of the brake warning light and 'ABS FAULT' displayed in the message centre right. Should a fault develop within the ABS, the brake system will operate conventionally and with the same standard of performance as a vehicle not equipped with ABS.

Dynamic Stability Control

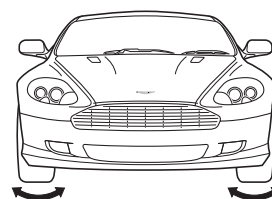
Dynamic Stability Control (DSC) is a closed-loop system designed to enhance driving safety by improving vehicle handling when the tyres are at the limits of their grip capabilities. This is achieved through instantaneous, electronically controlled, reduction of engine torque and strategic application of the brakes at individual wheels.

By using the principle that by controlling the brakes individually it is possible, to an extent, to steer the vehicle.

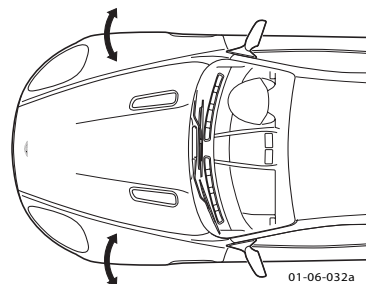
This principle can be used to enhance driving safety by correcting the vehicle's yaw moment (turning force), when the vehicle fails to follow the driver's steering inputs.



01-06-032



Steering Motion



Concept

Satisfactory handling is determined according to whether a vehicle maintains a path, which accurately reflects the driver's input (steering wheel angle) while at the same time remaining stable.

The ABS / DSC module measures the vehicle's motion using the sensors below and processes the information to maintain vehicle control and stability within its ultimate control limits, which are determined by the physical limits set by the tyre's grip.

Wheel speed sensors - Longitudinal acceleration.

lateral acceleration sensor - Lateral acceleration.

Yaw rate sensor - Yaw rate, defined as the rotation around the vertical axis.

When there is insufficient tyre grip for the driving situation (for example, the driver has entered a corner too fast) the DSC will maintain stability and optimise the cornering and stopping performance, but cannot always prevent the vehicle from running wide.

Driver demand is measured by using the steering wheel angle sensor and vehicle speed to calculate the optimum yaw rate. This is compared to the actual measured yaw-rate and a yaw-rate calculated from the lateral acceleration and the vehicle speed. If the deviation between these measurements is too great, an understeer or oversteer correction is made.

The first step in this process is to determine how the vehicle should respond to driver demand (ideal response) and how it actually does respond (actual response). Hydraulic control valves can then be activated to generate brake pressure and / or engine torque reduction can be used to maintain the difference between the ideal and actual response within a tolerance band. This directly influences the forces on the tires to generate a corrective yaw moment to reduce the side forces of the tires where appropriate



System Overview

The DSC system embraces capabilities far beyond that of ABS, or ABS and traction control combined, while relying on the components of these systems. It also incorporates these additional sensors for measuring the vehicle's motion and brake system pressure:

Yaw rate sensor - located centrally on the transmission tunnel.

Lateral acceleration sensor - integrated with the yaw rate sensor.

Steering angle sensor - located on the upper steering column.

Pressure transducer - located on master cylinder.

The ABS / DSC module supports data exchange with other vehicle electronic systems via the CAN network; the module also enables diagnostic interrogation using WDS.

The following components register driver demand and the ABS / DSC module processes their signals as a basis for defining an ideal response:

PCM - position of accelerator pedal.

Brake master cylinder pressure transducer - driver's braking effort.

Steering angle sensor - position of steering wheel.

There are many supplementary parameters also included in the processing calculations these include the coefficient of friction and vehicle speed. The ABS / DSC module monitors these factors based on signals transmitted by the sensors for:

- Wheel speed
- Lateral acceleration
- Brake pressure
- Yaw rate

Using these parameters, the function of the ABS / DSC module is to determine the current vehicle status based on the yaw-rate signal and the slip as estimated by the ABS / DSC module. It then maintains the vehicle response within a tolerance of the 'normal' behaviour, which is easily controlled by the driver.

In order to generate the desired yaw behaviour the ABS / DSC module controls the selected wheels using the ABS hydraulic system and engine control system. In the event of engine intervention, the ABS / DSC module calculates the torque which should be supplied by the engine to the wheels, and relays this request signal to the PCM which implements the torque request.

The PCM receives signals from the DSC system via the CAN bus and reduces engine torque as follows:

- The throttle is positioned to provide the requested engine target torque.
- During the transient phase of torque reduction caused by mechanical and combustion delays, other alternative torque reduction methods are used to provide a quicker response.

- The ignition is retarded and / or the fuel is cut-off at the injectors at selected cylinders.
- Ignition and fuelling are reinstated when the engine torque reaches the requested value

Operation Summary

- DSC is switched 'On' when the engine is started
- When the system is operating, the DSC light in the instrument cluster will flash, at the rate of twice a second
- DSC can be switched 'Off / On' by pressing the DSC switch
- The DSC light in the instrument cluster will illuminate continuously when the system is switched 'Off'.
- 'DSC OFF' will be displayed in the message centre right to indicate the system has been switched 'Off'
- A malfunction in the traction control system will be indicated to the driver by the following:
 - The DSC light in the instrument cluster will illuminate continuously
 - The message 'DSC NOT AVAILABLE' will be displayed in the message centre right
- If vehicle speed control is engaged it will automatically disengage when traction control is operating.

Traction Control

Traction control is a function of DSC, and is operated in association with DSC. Traction control prevents excessive wheel-spin at standing starts, or during acceleration. Wheel-spin is usually caused by excessive use of the accelerator pedal, or slippery, loose or bumpy road surfaces. To prevent excessive wheel-spin and maintain vehicle stability such situations are overcome by the intervention of the traction control system by:

- Braking the driven-wheel when it starts to slip
- And / or adapting the engine torque to a level corresponding to the traction available on the road surface.

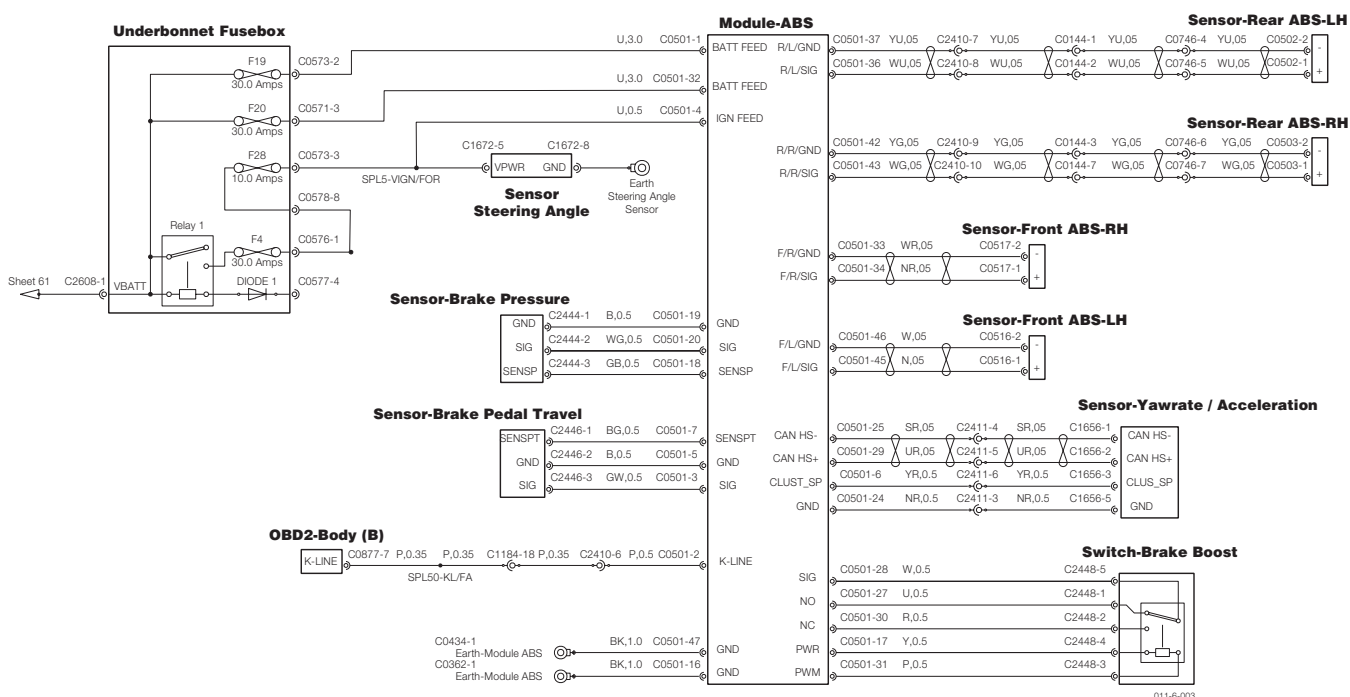
Functional Description

Traction control uses the ABS electronic and mechanical / hydraulic hardware with additional valves to control the braking pressure at the calipers. An engine interface also enables the engine to respond to torque reduction requests from the traction control. As with ABS, the signals from the wheel-speed sensors are supplied to the ABS module, where they are used to calculate the wheel-slip of the individual wheels. Traction control intervention is initiated if the slip at one of the wheels is excessive.

Engine Intervention

In the event of wheel-slip the ABS / DSC module calculates the torque, which should be applied by the engine to reduce the wheel-slip (this torque does not exceed driver demand). Engine torque reduction is then requested from the PCM via the CAN bus. The PCM, in response to these signals, reduces engine torque by controlling the ignition and fuelling. A traction control gearshift pattern is automatically selected within the automatic transmission software whenever traction control is active.

ABS / DSC Circuit



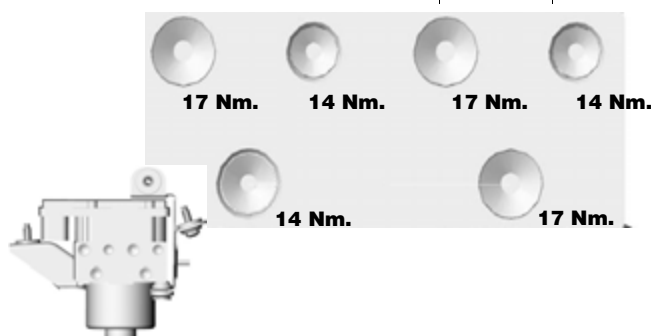
Specifications

Oils/Greases

Brake Fluid Castrol Response Super Dot 4

Torque Figures

Description	Nm.	lb. / ft.
Modulator to Bracket	5	4
Modulator / Bracket to body	9	7
Brake hose unions	17	13
	14	10.5





Maintenance

ABS Modulator

Repair Operation Time (ROT)	
Item	Code
ABS Modulator Renew	RHD 06.06.CB

Removal

Warning

Avoid skin / eye contact or ingestion of brake fluid. If skin or eyes are splashed with brake fluid, rinse the affected area immediately with plenty of water and obtain medical attention. If brake fluid is ingested, obtain immediate medical attention.

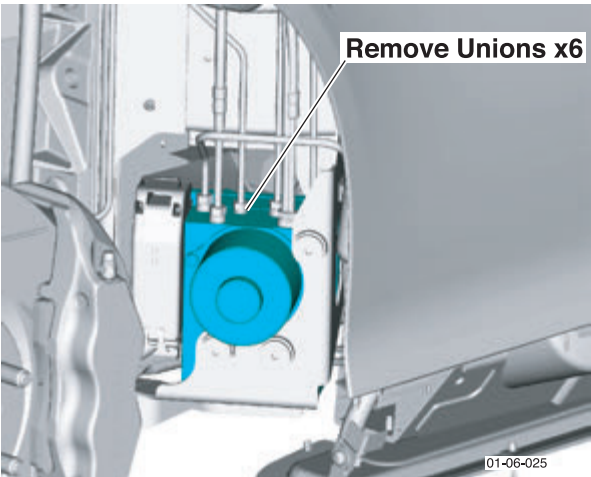
Caution

Brake fluid must not be allowed to contact the vehicle paint work. Remove spilt brake fluid from the paint work by rinsing away with running water.

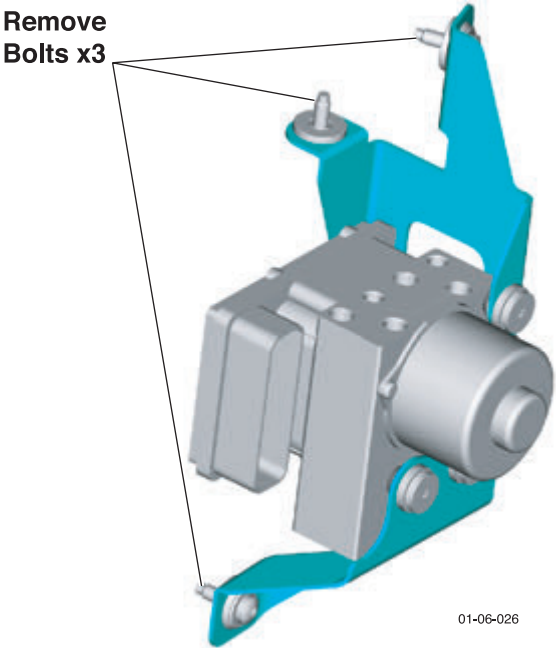
1. Disconnect the vehicle battery.
2. Raise the vehicle and make safe.
3. Remove the passenger side road wheel and road wheel arch liner.

Place suitable absorbent material around the modulator valve block area to catch any spilt brake fluid.

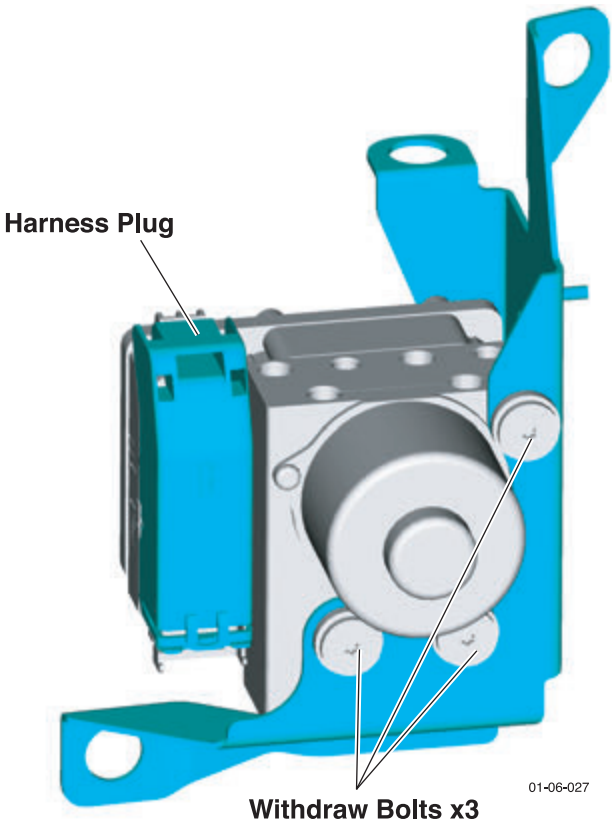
4. Remove the brake pipe unions (x6) from the top of the modulator valve block. Cap each pipe and plug each valve block outlet to prevent leakage.
Note pipe locations for installation.



5. Release bolts (x3) that secure the modulator mounting.



6. Disconnect the modulator wiring harness plug.

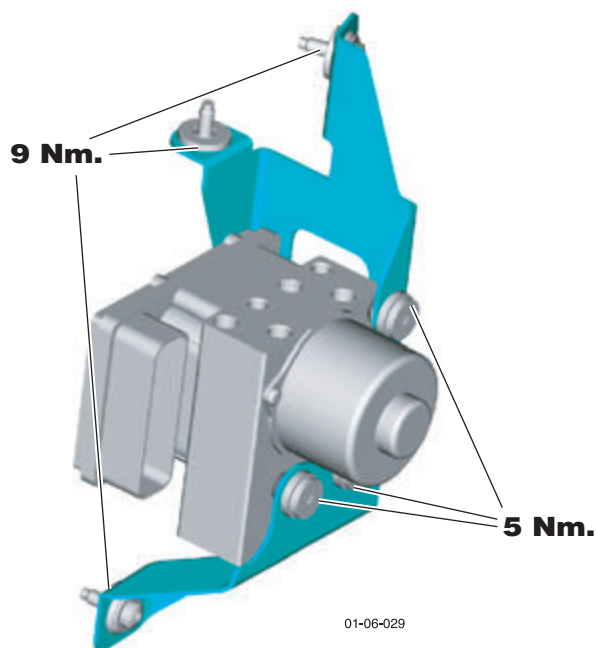


7. Remove bolts (x3) that secure the modulator to its bracket.

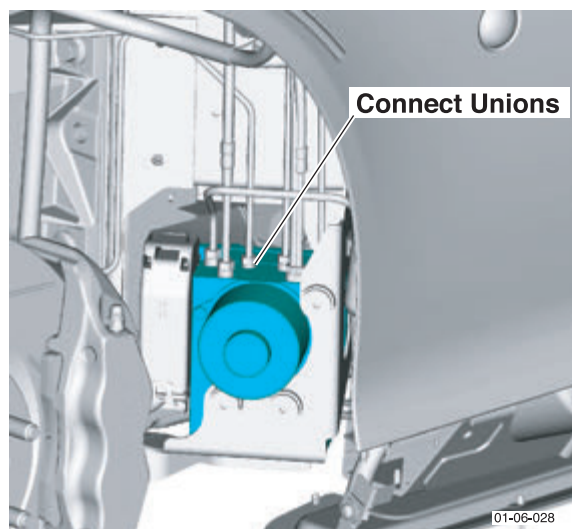
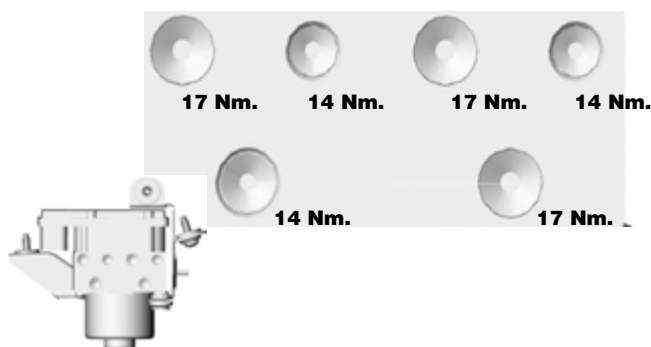
The ABS / DSC control module can be renewed separately from the modulator and can be removed from the vehicle without disturbing the hydraulic circuit.

Installation

1. Install the modulator to its mounting bracket. Secure with bolts (x3). Torque to **5 Nm.**



2. Connect the wiring harness plug.
3. Install the modulator and bracket assembly. Secure using bolts (x3). Torque to **9 Nm.**
4. Remove the sealing caps and plugs from the brake pipes and the valve block. Install the brake pipes (x6) to their matching outlets on the valve block.
5. Torque the unions to:



6. Remove any traces of brake fluid from the modulator and surrounding area.
7. Install the road wheel arch liner and road wheel.
8. Bleed the brake system (Refer to 'Brake Bleeding - WDS', page 6-4-4).
9. Install the road wheel arches and road wheels (Refer to 'Road Wheel Nut Torque Tightening', page 4-5-7).
10. Connect the vehicle battery.



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