

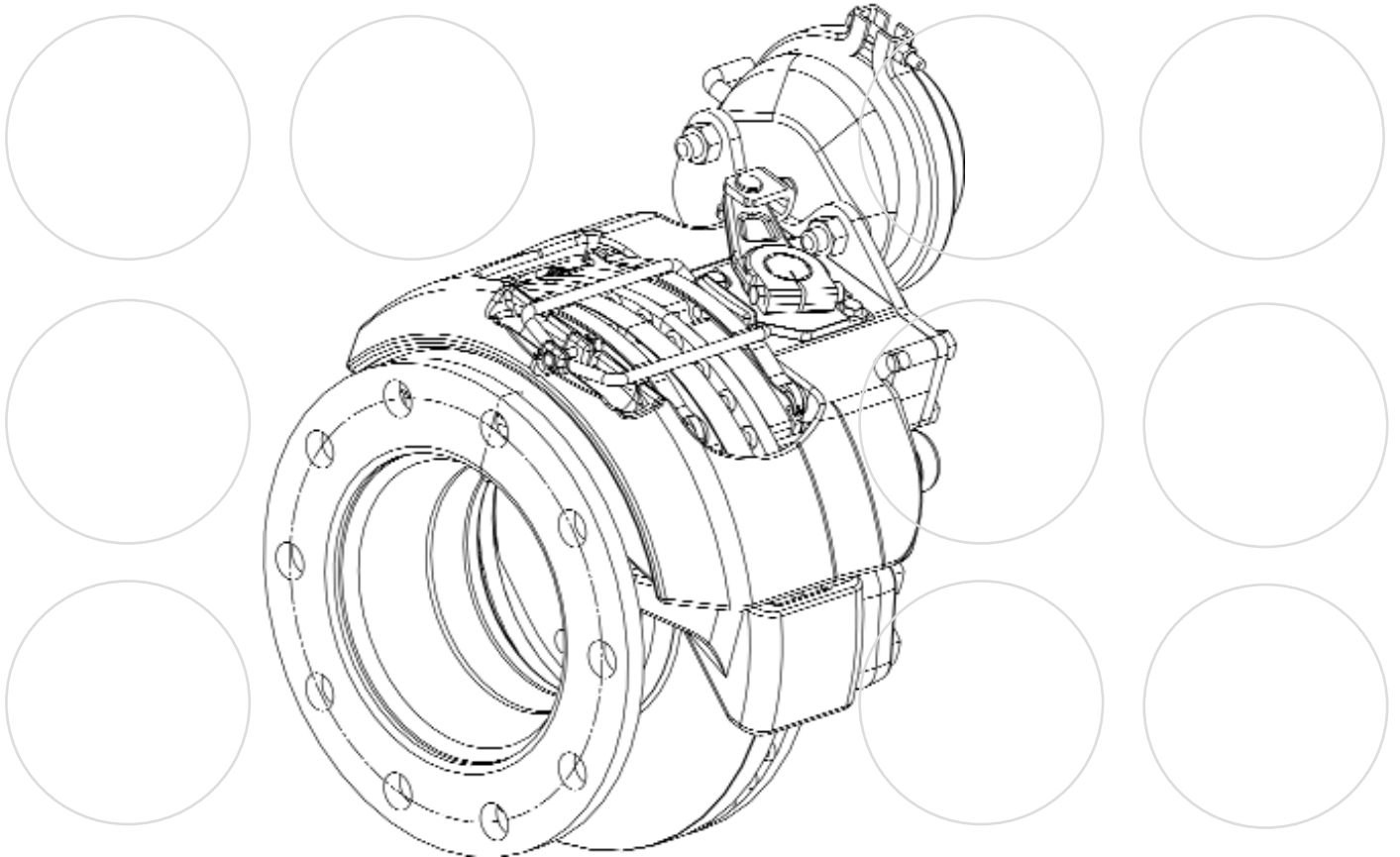


Maintenance manual no. MM-0980

DX Air Disc Brake

DX175 Air Disc Brake

Issue March 2008



Service Notes

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Document No. MM-0980

Edition: March 2008

Before You Begin

This publication provides installation and maintenance procedures for the DX 175 Air Disc Brake.

The information contained in this publication was current at the time of printing and is subject to revision without notice or liability.

You must understand all procedures and instructions before you begin maintenance and service procedures.

You must follow your company's maintenance and service guidelines.

You must use special tools, when required, to avoid serious personal injury and damage to components.

Meritor uses the following notations to alert the user of possible safety issues and to provide information that will help to prevent damage to equipment and components.

WARNING

A WARNING indicates a procedure that you must follow exactly to avoid serious personal injury.

CAUTION

A CAUTION indicates a procedure that you must follow exactly to avoid damaging equipment or components. Serious personal injury can also occur.


NOTE: A note indicates an operational, procedure or instruction that is important for proper service. A NOTE can also supply information that will help to make service quicker and easier.




This symbol indicates that you must tighten fasteners to a specific torque.

Safety Instructions

- Observe the manufacturers safety instructions for jacking up and securing the vehicle
- Only use original ArvinMeritor parts
- Use only the tools recommended
- Observe the following service instructions and notes
- When working on the brake you must ensure that it cannot be activated inadvertently
- Never use compressed air to remove brake dust or for the purpose of drying. Any type of dust can be injurious to health if inhaled. Use ArvinMeritor brake cleaner for cleaning the brake.
- When removing or fitting a complete brake, you should remember it has a dead weight of up to 117lbs (53kg). Use a lifting system, taking care not to damage the brake.
- When the servicing has been completed, it is essential that you road test the vehicle and try out the brakes.

 **CAUTION** You must always renew the brake pads on both wheels of an axle. Only use brake pads that have been approved by the vehicle manufacturer.

 **CAUTION** You must always renew the rotor on both wheels of an axle. Only use rotors that have been approved by the vehicle manufacturer.

Access Information on ArvinMeritor's Web Site

Additional maintenance and service information for ArvinMeritor's commercial vehicle systems component lineup is also available at www.meritorhvs.com

To access information go to Products & Services Icon; from drop down menu click on Literature on Demand. The screen will display an index of publications by type.

Service Notes

Terms used in this manual

Manufacturer:

ARVINMERITOR

Manual:

Maintenance manual no. MM-0980

Device:

DX 175 - Air Disc Brake.

Technician:

Qualified personnel working on brake maintenance and servicing.

Maintenance and servicing:

Maintenance and servicing refer to periodical checks and/or replacement of air disc brake parts or components. It also refers to the determining of the cause of a malfunction in order to restore the initial operating conditions.

Operator:

Any person who will use the air disc brake as part of a more complex device.

Warranty

Warranty applies to the air disc brake installed on vehicles for which it was designed. Warranty is void in the following cases:

- Improper use of the vehicle on which the air disc brake is installed (usage conditions, overloading etc.)
- Tampering with vehicle components that may affect brake performance.
- Use of non-original spare parts.
- Improper installation, adjustment, repair or modification.
- Poor or improper maintenance (including consumables other than those specified).

Further information on warranty conditions may be obtained directly from the manufacturer or by referring to the ArvinMeritor web site www.meritorhvs.com

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Introduction



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Exploded view

DX air disc brake - Pre March 2001 production

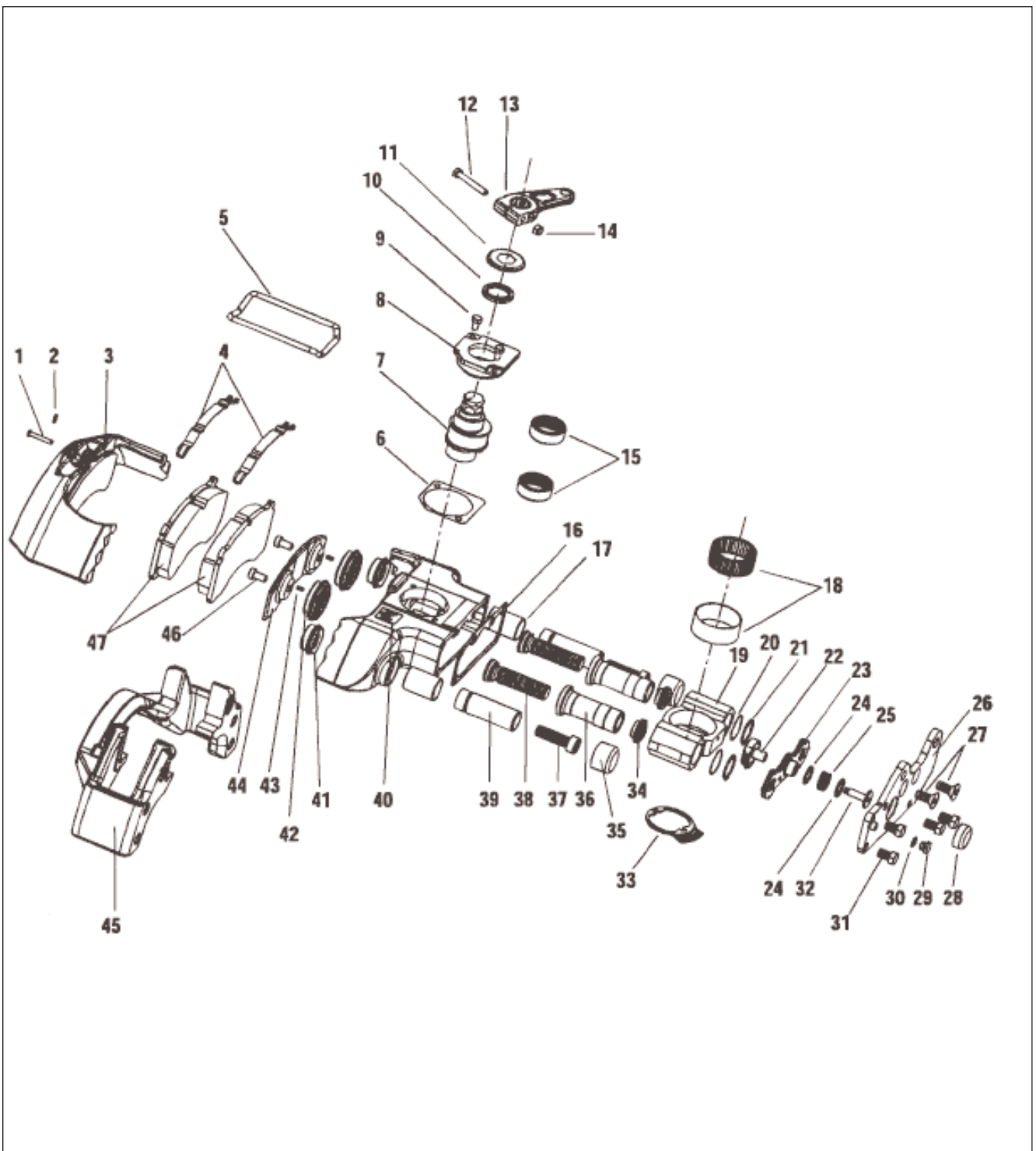


Fig 1.1a

Parts list

DX air disc brake - Pre March 2001 production

Ref	Description	Q.ty	Ref	Description	Q.ty
1	Stabiliser bar retaining pin	1	24	Damping ring	2
2	Pin clip	1	25	Compression spring	1
3	Housing	1	26	End plate and Air actuator bracket	1
4	Anti-rattle spring	2	27	Countersunk screw (end plate)	2
5	Stabiliser bar	1	28	End plate cap	1
6	Cover plate gasket	1	29	Plug screw (of adjuster port)	1
7	Eccentric shaft	1	30	Copper washer	1
8	Cover plate	1	31	Hexagonal head screw (end plate screw)	4
9	Cover plate screws	2	32	Adjuster device screw	1
10	Cover plate eccentric shaft seal	1	33	Adjuster gear segment	1
11	Eccentric shaft seal excluder	1	34	Adjuster sleeve gear *	2
12	Clamp screw (lever)	1	35	Slide pin protective cap	2
13	Lever	1	36	Adjuster sleeve **	2
14	Clamp screw nut (lever)	1	37	Slide pin locking screw	2
15	Eccentric shaft bearing unit	2	38	Actuating piston **	2
16	End plate gasket	1	39	Slide pin	2
17	Slide pin bushes	2	40	Identification label	1
18	Eccentric shaft support bearing	1	41	Slide pin seal excluder	2
19	Actuation block	1	42	Actuating piston seal excluder	2
20	Damping spring	2	43	Roll pin	2
21	Snap ring	2	44	Thrust plate	1
22	Bevel gear / torque limiter	1	45	Saddle	1
23	Adjustment box **		46	Actuating piston screw	2
	(preinstalled unidirectional bearing)	1	47	Brake pads	2

* Gear is shown separately although it is an integral part with adjuster sleeve.

** These components are different according to actuation direction (clockwise or counter - clockwise).

Exploded view

DX air disc brake - Post March 2001 production

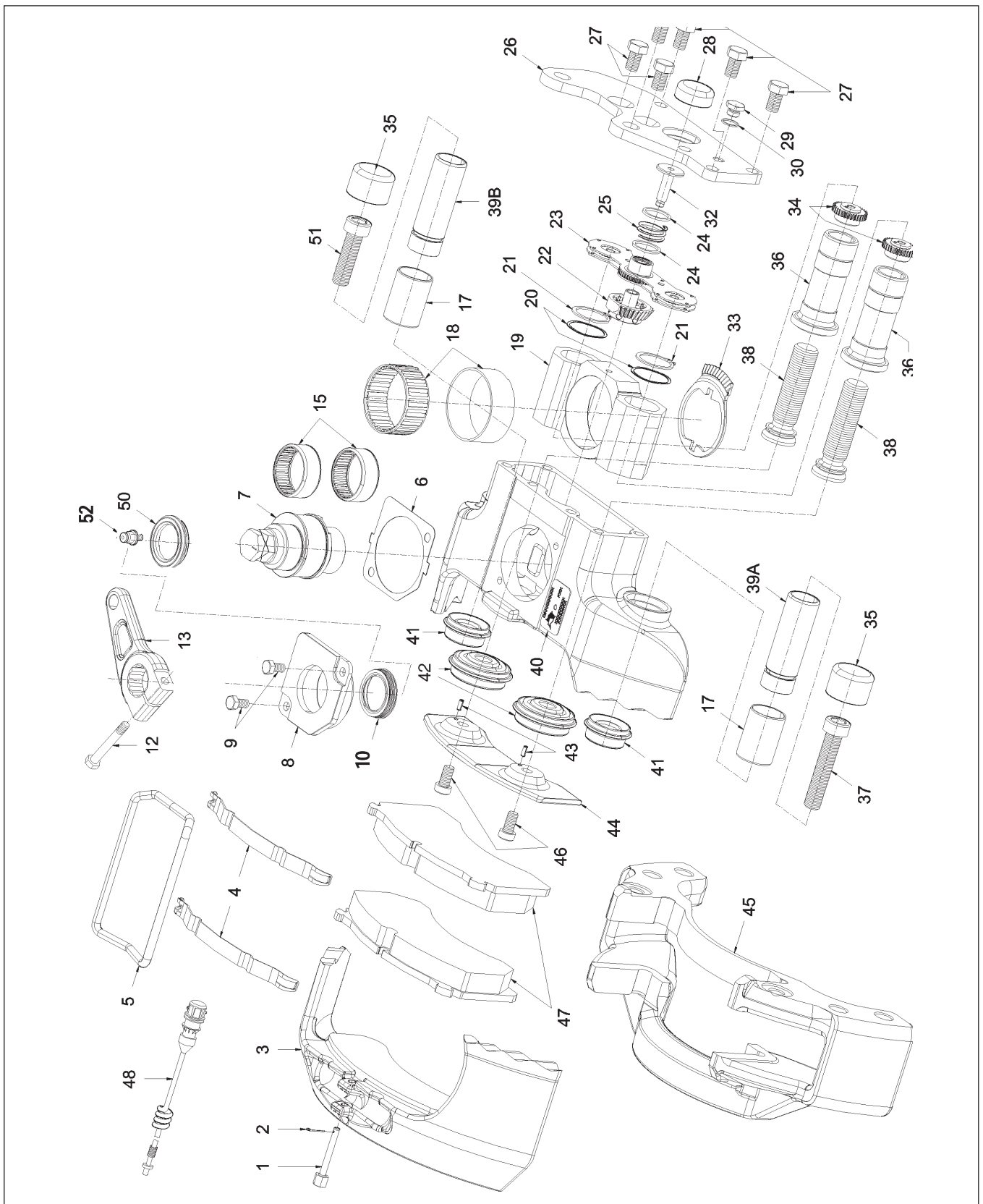


Fig 1.1b

Parts list

DX air disc brake - Post March 2001 production

Ref:	Description	Qty	Ref	Description	Qty
1	Stabiliser bar retaining pin	1	28	End plate cap	1
2	Pin clip	1	29	Plug screw (of adjuster port)	1
3	Housing	1	30	Copper washer	1
4	Anti-rattle spring	2	32	Adjuster device screw	1
5	Stabiliser bar	1	33	Adjuster gear segment	1
6	Cover plate gasket	1	34	Adjuster sleeve gear *	2
7	Eccentric shaft	1	35	Slide pin protective cap	2
8	Cover plate housing	1	36	Adjuster sleeve **	2
9	Cover plate screws	2	37	Slide pin locking screw (long)	1
10	Cover plate eccentric shaft seal	1	38	Actuating piston **	2
12	Clamp screw (lever)	1	39a	Slide pin (to suit long locking screw)	1
13	Lever	1	39b	Slide pin (to suit short locking screw)	1
15	Eccentric shaft bearing unit	2	40	Identification label	1
17	Slide pin bushing	2	41	Slide pin seal excluder	2
18	Eccentric shaft support bearing	1	42	Actuating piston seal excluder	2
19	Actuation block	1	43	Roll pin	2
20	Damping spring	2	44	Thrust plate	1
21	Snap ring	2	45	Saddle	1
22	Bevel gear / torque limiter	1	46	Actuating piston screw	2
23	Adjustment box ** (pre-installed unidirectional bearing)	1	47	Brake pads	2
24	Damping ring	2	48	Brake pad wear indicator (if fitted)	1
25	Compression spring	1	50	Eccentric shaft seal	1
26	Air actuator end plate and bracket (shape may vary due to brake part number)	1	51	Slide pin locking screw (short)	1
27	End plate screws (style may vary due to brake part number)	6	52	Grease nipple (eccentric shaft)	1

* Gear is shown separately although it is an integral part with adjuster sleeve.

** These components are different according to actuation direction (clockwise or counter - clockwise)

Automatic Adjuster Assembly

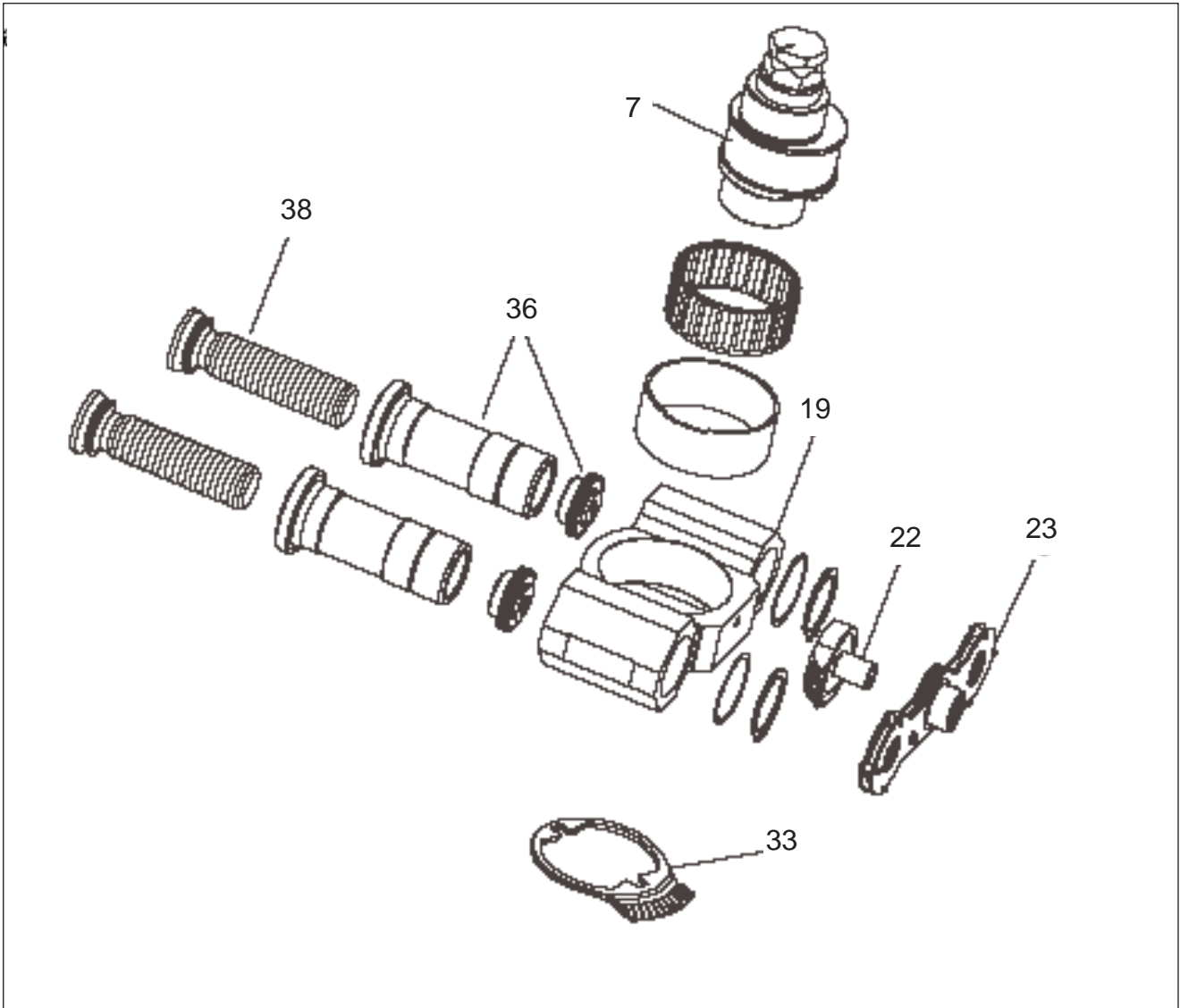


Fig 1.2

Ref	Description
38	Actuating piston
36	Adjuster sleeve and gear
7	Eccentric shaft
19	Actuation block
22	Bevel gear
23	Box (adjuster gear train)
33	Adjuster gear segment

1 Introduction

General description

The ArvinMeritor CVS DX series of air disc brakes is a family of high performance, low weight, high efficiency brakes designed for trucks, coaches, buses and other commercial vehicles requiring between 10,000 and 23,000 Nm of braking torque at each wheel.

Clamping force is produced by a globular (SG) cast iron brake (3) located above the rotor and housing two lining pads (47). The pads are pushed against the rotor by a dual piston actuating block (19) connected to an eccentric shaft (7), which is in turn driven by a lever (13) operated by a standard air actuator (air chamber).

The brake is carried on a saddle (45) which is a fixed support screwed to the axle flange. Equalised clamping action both on the inner and outer pads is generated by allowing the brake to float on the two slide pins (39) fixed to the saddle.

Clamping force generated by the primary actuation is applied to the inner pad, which forces it into contact with the rotor. Reactive force through the brake body applies equal clamping force to the outer pad applying a balanced clamping force to the rotor. The slide pins also allow the brake to freely position itself on the saddle to compensate for the reduction in lining pad thickness due to wear.

An automatic self-adjuster mechanism is incorporated in order to maintain constant clearance between pads and rotor. The automatic adjuster (23) operates on each adjuster sleeve (36) and actuating piston (38) to sense excessive pad-rotor clearance, and reduces excessive clearance by a fixed proportion with each actuation.

For brake adjustment and new lining installation, the brake incorporates provision for manual adjustment located under the plug of the adjuster port (29), easily performed by using a standard hexagonal wrench.

Brake actuation can be either clockwise or counter clockwise, depending on how the air actuator has been installed on brake unit. Regardless of which side the brake unit is installed on vehicle, the brake is referred to as:

RIGHT when actuation is clockwise - Fig. 1.3 a) and b)

LEFT when actuation is counter clockwise - Fig. 1.3 c) and d)

Clockwise actuation - Fig. 1.3 a) and b) - will always require left-hand threaded adjuster sleeves and pistons (actuation pistons marked on the bottom with the letter L) and its related right housing (R.H.).

The opposite applies for brakes with counter clockwise actuation

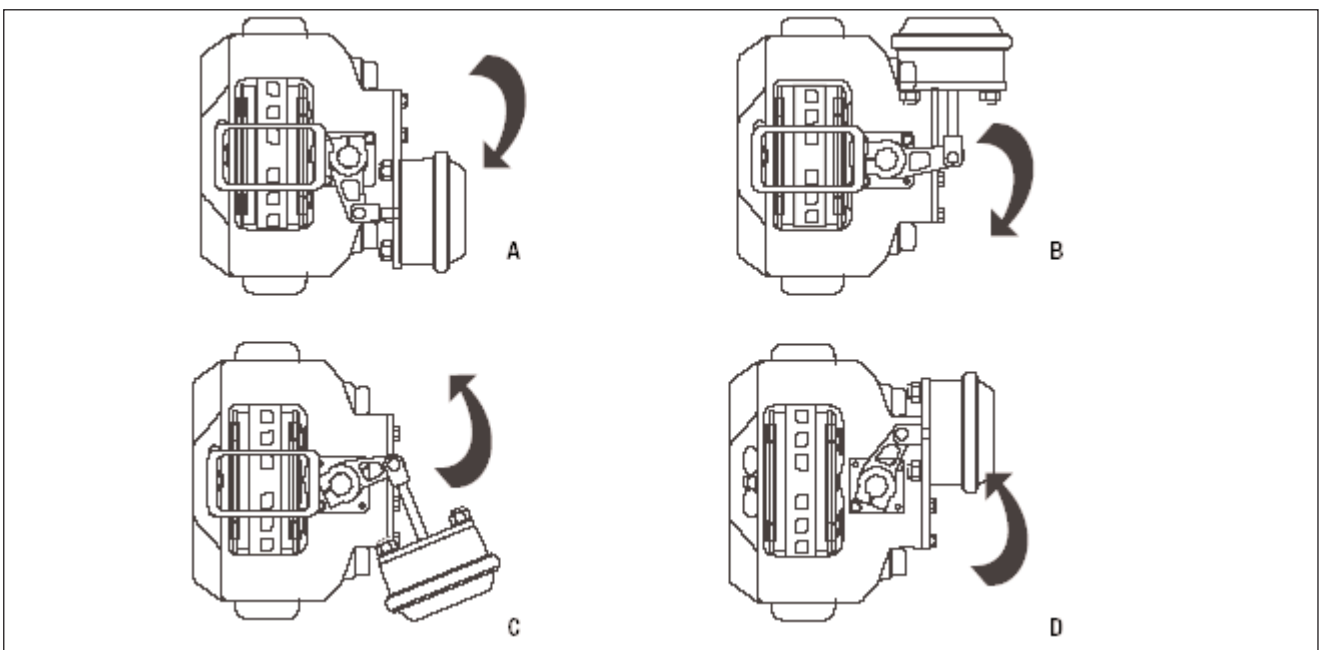


Fig 1.3

1 Introduction

Brake pad wear warning indicator

Brakes can have different types of pad wear warning indicators (PWWI) according to vehicle manufacturer's requirements. Follow vehicle manufacturer's instructions for proper installation and connecting procedures.

NOTE: Parts shown refer to standard configuration and may differ according to brake version and model. Use data on identification label (40) to order proper spare parts.

Identification label (Fig 1.4)

See the identification label attached on brake for suitable spare part and note down all spare part data indicated.

Ref.	Description
1	Brake Identification Number (ArvinMeritor)
2	Manufacturing Date
3	Brake Identification Number (Customer)
4	Brake Serial Number
5	ArvinMeritor Logo

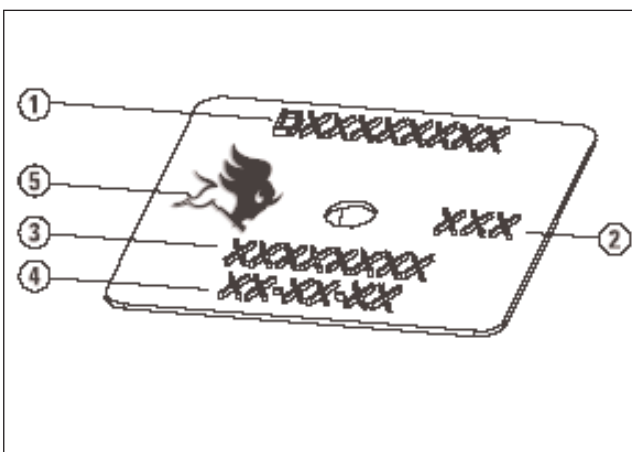


Fig 1.4

Operating principles

Actuation

Linear force from the air actuator (air chamber) is converted by lever action to rotary torque on the main eccentric shaft.

Rotation of the shaft (7), operated through a roller bearing (18), causes the block (19) to move towards the inside of the brake. The ratio between the air actuator force and force on rotor is between 12,5 and 16,2 depending on brake model. All radial loads in the eccentric shaft are absorbed by two supporting roller bearings (15) maintaining an efficiency of around 95% because of total absence of sliding friction in the system.

Clamping

The brake assembly is free to float on the slide pins (39) attached to the saddle. This exerts clamping force on the inner pad and determines a reaction through the brake body, ensuring that both pads are loaded onto the rotor by an equal force.

Automatic adjuster mechanism (clearance compensation)

This mechanism, located inside the brake, allows control of clearance caused by continuous wear of the brake pads. The action is automatic and occurs during normal brake application.

Clearance compensation is performed as indicated in the following four steps.

1 Introduction

Step 1 (actuation of eccentric shaft)

- a) Actuating lever moves and eccentric shaft rotates.
- b) Block lifts and begins to move forward, carrying the adjuster sleeves and pistons with it (Fig. 1.5).
- c) Eccentric shaft A begins turning within the gear plate segment, eliminating clearance "h" between the adjuster gear section slot B and the shaft integral tab sides (Fig. 1.6).

Step 2 (clearance compensation device)

- d) Adjuster gear segment begins to turn causing the rotation of bevel gear adjuster C (Fig. 1.6).
- e) Bevel gear rotation causes the adjuster shaft to rotate by means of the ball torque limiter and the rotation is transmitted to the box central gear through the unidirectional bearing.
- f) Central gear rotation, through the box gear train, causes the 2 adjuster sleeves to rotate.

At this stage, depending on the amount of wear of the brake pads, one of the following two conditions will occur:

Condition A: No adjustment is required as clearance between pads and rotor is correct.

Condition B: Adjustment is required as clearance between pads and rotor is excessive.

Step 3 (Condition A)

- g) At this point, when the adjusters begin to turn, the pads contact the rotor before the sleeves begin to turn and clamping force F (braking) begins to build up.
- h) Clamping force generates friction in the screw threads between the adjuster sleeves B and pistons A, and friction under the flanged head of the adjuster sleeves (Fig. 1.7).
- i) The friction build-up prevents rotation of the adjuster sleeves whilst the torque limiter allows the adjuster shaft to rotate with respect to the bevel gear. The adjuster drive train is locked by the friction in the system and no adjustment takes place. The main gear turns but does not transmit motion due to the torque limiter slipping.

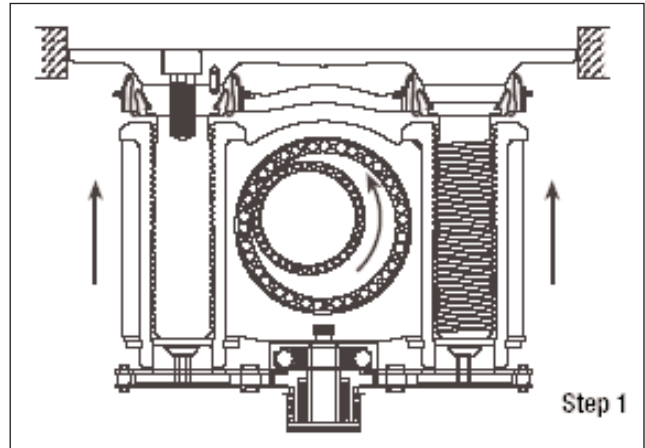


Fig 1.5

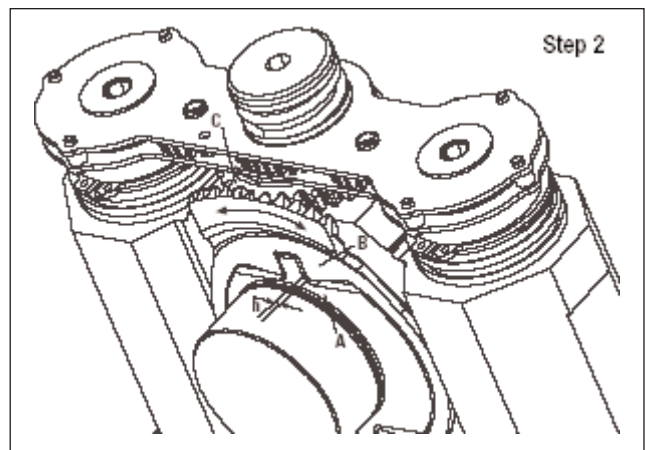


Fig 1.6

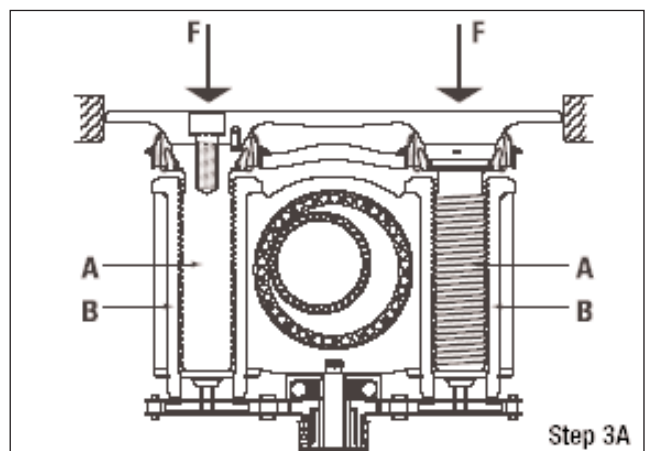


Fig 1.7

1 Introduction

Step 3 (Condition B)

j) During the first stroke stage, before the pads come into contact with the rotor, the adjuster sleeves are turned by the gear box.

k) Sleeve rotation unscrews the piston. This increases the length 'L' between the piston and the sleeve which reduces the stroke towards the rotor to bring the pads into contact. (Fig. 1.8).

i) When the pads come into contact with the rotor the conditions mentioned above in step 3 A (g-i) are repeated, thus halting the movement.

Step 4 (Brakes released)

l) When the brake pedal is released, pressure is discharged from the air actuator and the brake actuating lever returns to its rest position pulled by the returning action of the internal air actuator spring. The eccentric shaft and the adjuster gear segment rotate in reverse direction together with the bevel gear.

m) The unidirectional bearing free-wheels without transmitting motion to the gear housing, thus avoiding brake adjustment. The relative piston / sleeve adjustment position does not vary. Therefore, clearance compensation of pre-existing rotor and pads remains unchanged. (Fig. 1.9).

Damping

Compression springs are mounted in front of and behind the gearbox in order to dampen vibration caused by vehicle movement. This prevents induced vibrations from occurring, which could modify the clearance setting between rotor and pads (Fig. 1.10).

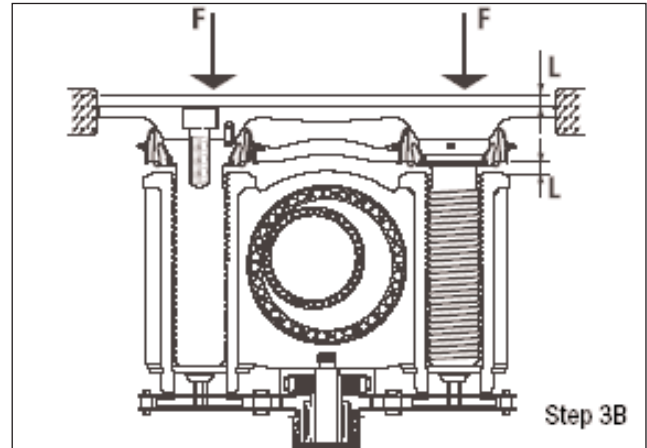


Fig 1.8

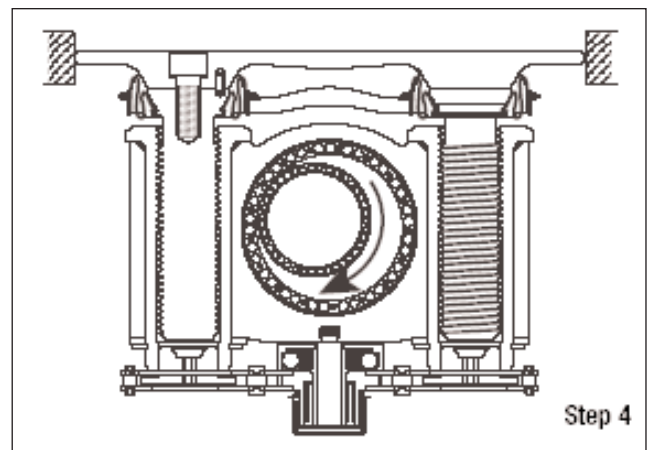


Fig 1.9

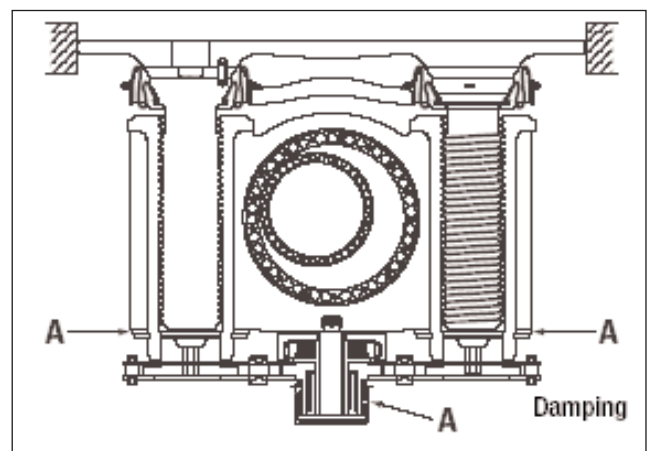


Fig 1.10

1 Introduction

Thrust plate

An important feature of the DX family of brakes is the setting of the thrust plate within the saddle abutments. Although this is factory set and provided the 2 locking screws are not removed from the thrust plate, no resetting should be necessary.

However should the screws become disturbed a procedure for resetting should be followed: see **Section 8 Piston Dust Excluder Replacement**.

Manual adjustment

It is possible to manually adjust pad to rotor clearance. Under the following conditions it will be necessary to manually adjust brake:

- a) During inspection of pad to rotor clearance.
- b) During fitting of new pads.

To manually adjust the brake first remove the manual adjustment port plug and then rotate the mechanism using a 6 mm Hexagonal wrench (Fig 1.11). The gear train will ensure that the adjuster sleeves will be turned equally.

The operation which allows pistons to be extended, thus reducing pad to rotor clearance is called adjustment. The opposite operation is called de-adjustment.

De-adjustment direction depends on eccentric rotation direction. Wrench should be turned counter clockwise on brakes with clockwise lever actuation (de-adjustment rotation direction is indicated with an arrow on end plate near the manual adjuster plug hole). (Fig. 1.11)

In general, de-adjustment or back adjustment is achieved when the wrench is turned in the direction which produces clicking feel. (This indicates that the torque limiter is slipping).

Turning the wrench in the opposite direction will result in a much smoother and quieter action, which will give positive adjustment and reduce pad to rotor clearance.

During brake de-adjustment, stop turning the wrench if resistance is felt. This indicates that the adjuster pistons are fully retracted.

Further turning of the wrench could lock the adjuster pistons in the sleeves, thus preventing auto-adjustment operation or cause damage to the adjuster mechanism.



WARNING: Always adjust/de-adjust the brake carefully by hand with a suitable wrench. Do not exceed adjustment torque of 10 Nm. Do not exceed a de-adjustment torque of 25 Nm. NEVER use power tools.

Rotate the adjustment mechanism in the direction in which clicking is not heard or felt. Continue rotation until both pads come into contact with rotor. Then in the opposite direction, turn the hexagonal until 7 torque limiter notches are heard or felt, this will set the initial pad to rotor clearance.

Remove the hexagonal wrench, replace the port plug and washer and tighten to 14 Nm.

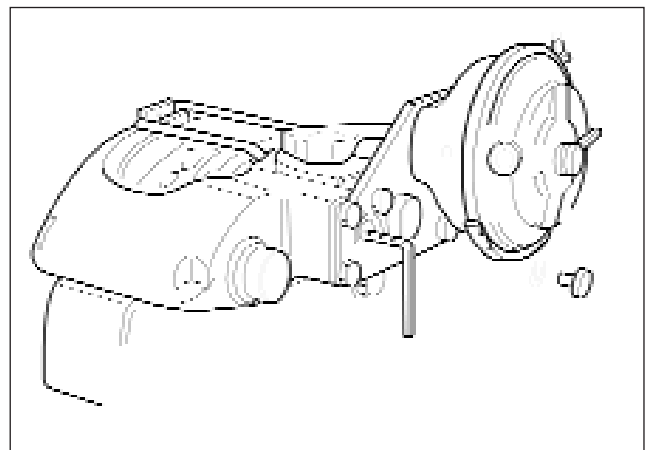


Fig 1.11

Operational Checks

2

- pg. 17 Automatic adjuster function test
- 19 Checking sliding action of housing
- 20 Checking slide pin bush wear
- 22 Pad wear
- 22 Rotor inspection & maintenance


2 Operational Checks


Automatic Adjuster Function Test


This procedure will check function of Automatic adjuster mechanism.

Park the vehicle on hard ground and chock the road wheels. Apply air pressure to release the park brake and wind off the spring brake retraction screw (where appropriate). Jack up the axle and fit suitable axle stands securely. Remove the road wheels.

Remove any dirt from the brake assembly. Ensure the rubber dust excluders fitted to the tappet heads and guide sleeves are not damaged.

 **CAUTION:** Never use an air line to blow dust from the brake/rotor area. If inhaled any form of dust can at best be an irritant, at worst dangerous. Whenever possible remove dry brake dust with a vacuum brush. Alternatively wipe the areas with a damp cloth, never try to accelerate drying time by using an air line.

 **WARNING:** Always de-adjust/adjust the brake carefully by hand with a suitable wrench. NEVER use power tools. Do not exceed adjustment torque of 10 Nm or de-adjustment torque of 25Nm. Exceeding these torque levels can result in damage to the adjuster gearbox.

 **CAUTION:** While operating the brake, DO NOT hold the wrench.

Set the pad to rotor clearance using the manual adjuster mechanism as described in Section 1 Manual Adjustment/De-adjustment until a clearance of 2 mm between outer pad and rotor is achieved (for rotors without wear ridge). The clearance should be set with a feeler gauge inserted between the outer pad and rotor. Once the inner pad touches the rotor pull the gauge out. Should the rotor have a wear ridge, 2mm clearance could be achieved as follows:

Manually adjust the brake so that both pads are in contact with rotor. Rotate the hexagonal wrench 360° in the opposite direction, i.e. 12 torque limiter notches. (Fig. 2.1)

Leave the hexagonal wrench in the adjuster port, this will allow the adjuster operation to be observed during the test.

NOTE: Ensure that the wrench is free to rotate through 360° and is not obstructed by any brake component (reverse the wrench if necessary). (Fig 2.2)

Actuate the brakes 50 times via the brake actuator.

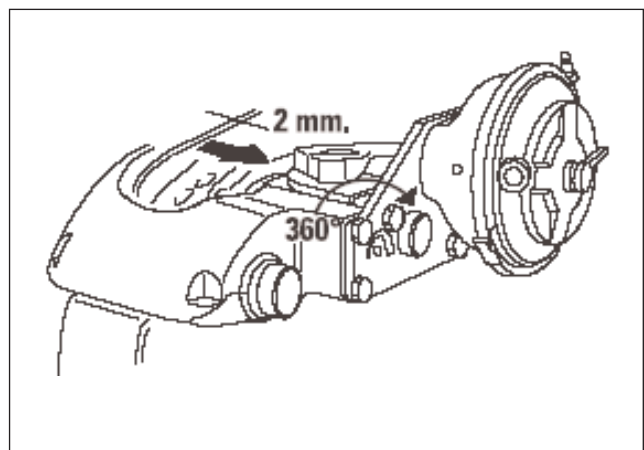


Fig. 2.1

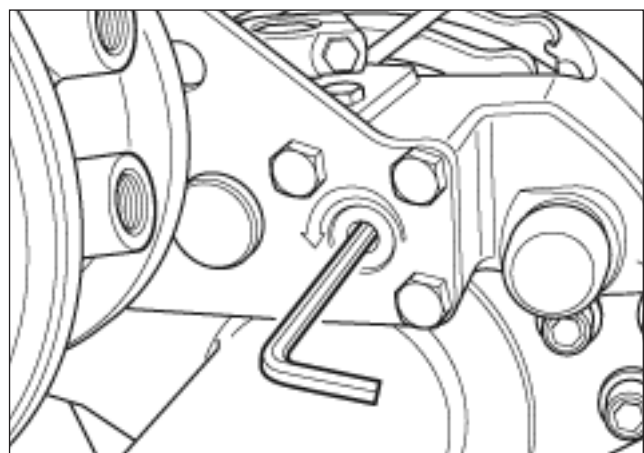


Fig. 2.2

2 Operational Checks

At the end of this operation it should have rotated between 180° & 270° from starting point in normal conditions (Fig. 2.3): If this is so the automatic adjuster is working correctly.

If the rotation is less than the stated value, Measure the pad to rotor clearance using feeler gauge.

The automatic adjuster device is operating correctly if clearance measured with a feeler gauge is between 0.6 and 1.0 mm, or if Hexagonal wrench rotation needed to adjust both pads to contact the rotor is between 90° and 180°.

NOTE: if this latter operation is carried out it should be remembered that the brake should be de-adjusted by the same rotation angle as in the above step.

The complete brake assembly must be replaced if the clearance is not within these limits.

Checking the Sliding action of the housing

Park the vehicle on hard ground and chock the road wheels. Apply air pressure to release the park brake and wind off the spring brake retraction screw (where appropriate). Jack up the axle and fit suitable axle stands securely. Remove the road wheels and exhaust all air from the system.

Remove pads as described in **Section 3**

Move the housing backwards and forwards in the direction of the arrow, as shown in Fig. 2.4. It must be possible to push/pull the housing easily by hand.



CAUTION Take care not to trap fingers whilst sliding the housing.

NOTE: Be careful not to damage the guide sleeve excluders when sliding the housing.

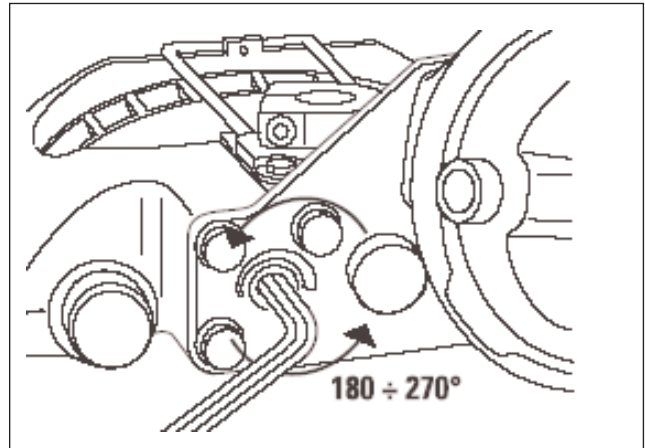


Fig. 2.3

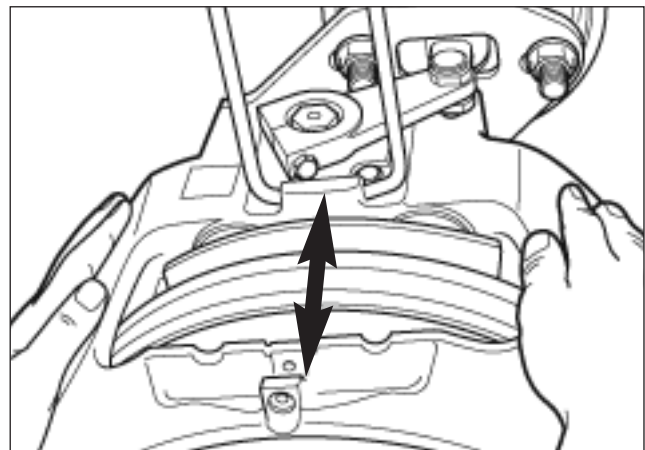


Fig. 2.4

2 Operational Checks

Checking the Slide Pin Bush Wear

Park the vehicle on hard ground and chock the road wheels. Apply air pressure to release the park brake and wind off the spring brake retraction screw (where appropriate). Jack up the axle and fit suitable axle stands securely. Remove the road wheels and exhaust all air from the system.

Remove the pads as described in **Section 3 Pad Replacement**.

Securely clamp the ArvinMeritor service tool MST 1018 (Fig. 2.5) to the lug with the retaining hole for the pad wear warning assembly in the correct position (Fig. 2.6) with a 6mm screw, nut and washers. The slot in the tool must be parallel to the rotor.

Position the brake in the new pad position. This is set by sliding the housing fully in the direction of arrow A in Fig. 2.7. (Towards the wheel hub)



CAUTION: Take care not to trap fingers whilst sliding the housing.

NOTE: Whilst sliding the housing, ensure that the Thrust plate does not become jammed within the saddle abutments.

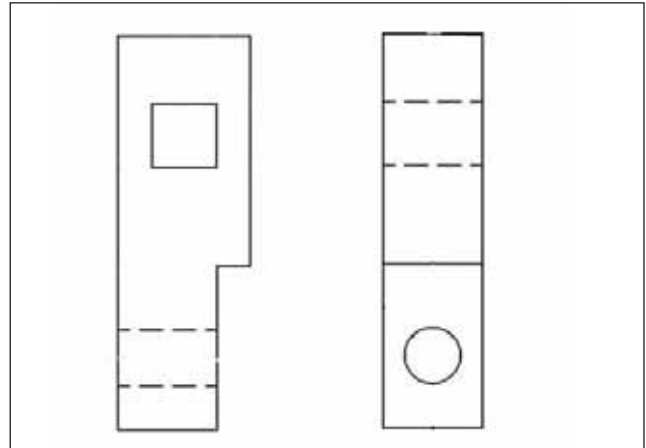


Fig. 2.5

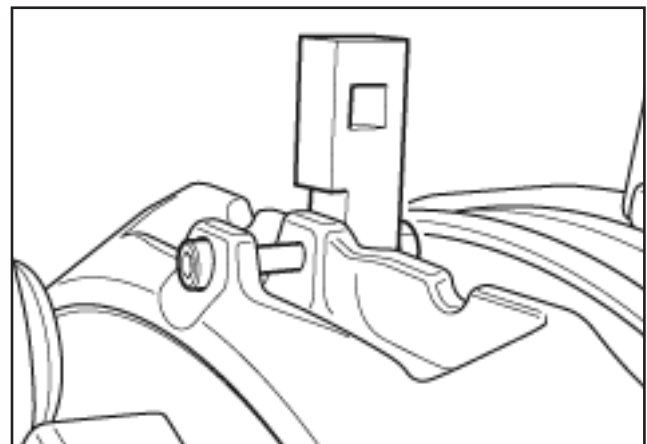


Fig 2.6

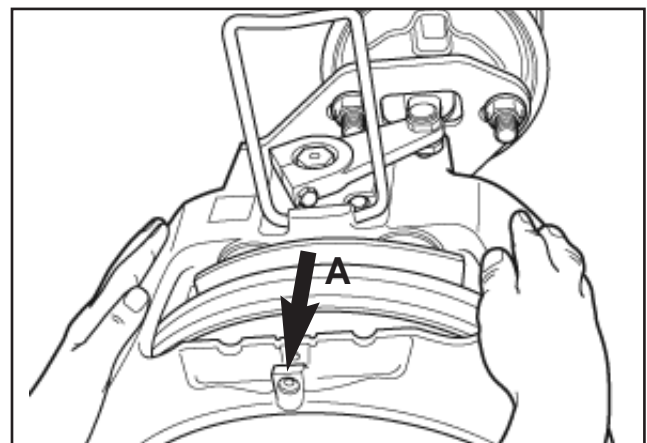


Fig 2.7

2 Operational Checks

Mount a dial gauge in position on the vehicle hub and set against the adaptor as shown in Fig. 2.8. Ensure hub will not rotate

Set the dial gauge to zero.

Fit a torque wrench to the adaptor in the position as shown in Fig. 2.9.

Apply the torque wrench in the correct direction up to the 25 Nm set without allowing the housing to slide and note the dial gauge reading.

Remove and fit the torque wrench to the opposite side socket in the adaptor as Fig 2.10.

NOTE: DO NOT RESET THE DIAL GAUGE.

Apply the torque wrench in the correct direction up to the 25 Nm set without allowing the housing to slide and note the dial gauge reading.

NOTE: Take care not to disturb the position of the dial gauge when applying the torque wrench.

Add the two dial gauge readings together to give total free play measurement.

The maximum movement of the housing should be 2mm.

If movement of the housing exceeds the above figure, then the guide sleeve pins and bushes require attention.

Using the correct service kits overhaul the slide pins as described in **Section 10 Slide Pin, Bush & Seal Replacement**.

Replace the pads as described in **Section 3 Pad Replacement**.

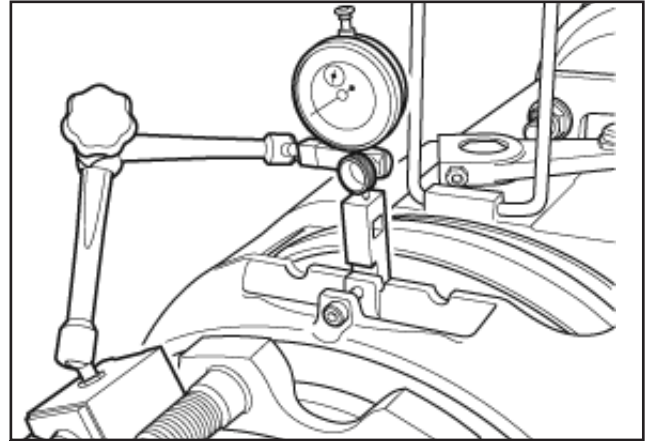


Fig 2.8

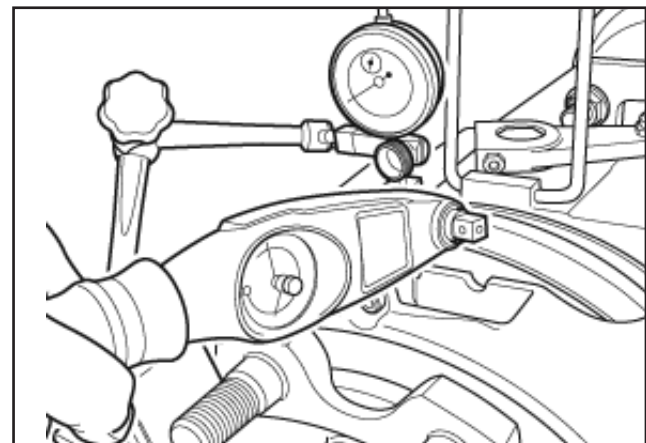


Fig 2.9

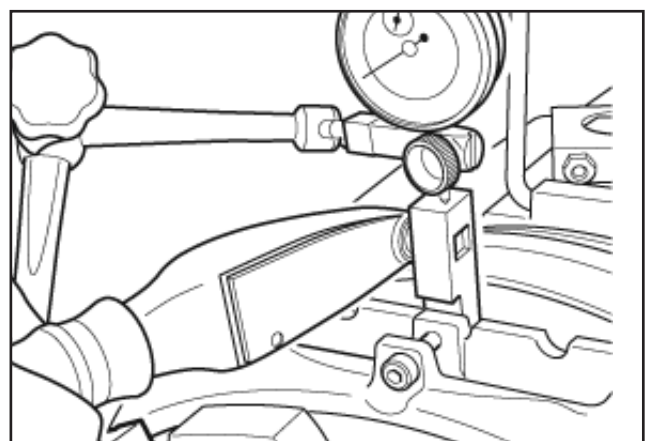


Fig 2.10

2 Operational Checks

Pad Wear



CAUTION You must always renew the brake pads on both wheels of an axle. Only use the brake pads that have been approved by the vehicle manufacturer. Brake pads must be replaced when the lining thickness has worn to 3mm minimum.

Rotor Inspection and Maintenance

Check the rotor for grooves, cracks, heat crazing, scoring and bluing.

Whilst wearing suitable eye protection remove scale, dirt and corrosion etc from around the edge of the rotor. Use an emery cloth if necessary.

NOTE: One way to remove corrosion is to support a screwdriver or scraper on the brake body and rotate the rotor.

Rotor

Check that the rotor's thickness dimension meets the manufacturer's specification and those detailed in the Rotor Wear Conditions, **Section 11**. If there is any doubt in the serviceability of the rotor refer to the vehicle manufacturer for corrective action.

NOTE: If the rotor's thickness dimension is not high enough to permit expected wear before the next brake pad change: Replace the rotor.



CAUTION: You must always renew the rotor on both wheels of an axle. Only use the rotors that have been approved by the vehicle manufacturer.

Inspect both rotor surfaces for the following conditions.

Cracks (Fig 2.11)

Cracks that extend through to the vent of a ventilated rotor or 25% through the thickness at the outer edge of a solid rotor: Replace the rotor.

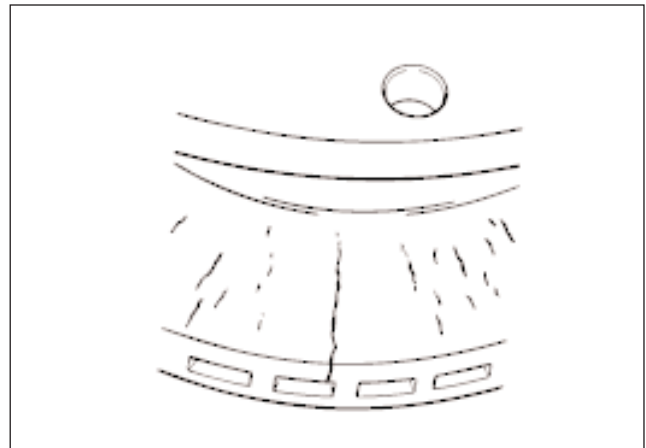


Fig 2.11

Heat Crazing (Fig 2.12)

Heat crazing is fine cracks on the rotor's surface.

This is a normal condition that results from continuous heating and cooling of the friction surface.

Braking under normal operating conditions can cause cracks to separate and deepen, increasing lining wear.

There are two types of heat crazing: light and heavy.

Light Heat Crazing (Fig 2.12)

Light heat crazing is fine, tight cracks in the rotor's surface.

Continue to use a rotor with light heat crazing.

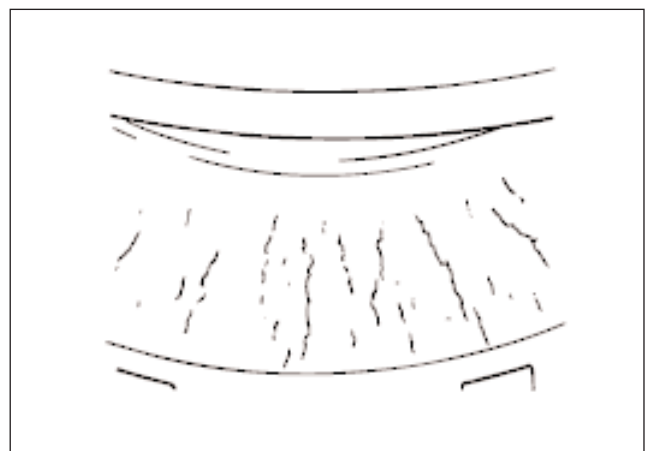


Fig 2.12

2 Operational Checks

Heavy Heat Cracking (Fig 2.13)

Heavy heat cracking is cracks in the rotor's surface that extend radially and have an individual length of up to 75% brake path width.

Refinish or replace a rotor that has heavy heat cracking.

NOTE: Surface finish after machining should be 5 microns maximum.

NOTE: Localised crazing / blue patches / cracking in only one part of the rotor could be caused by rotor run-out or thickness variation. Refer to vehicle manufacturer for tolerances.

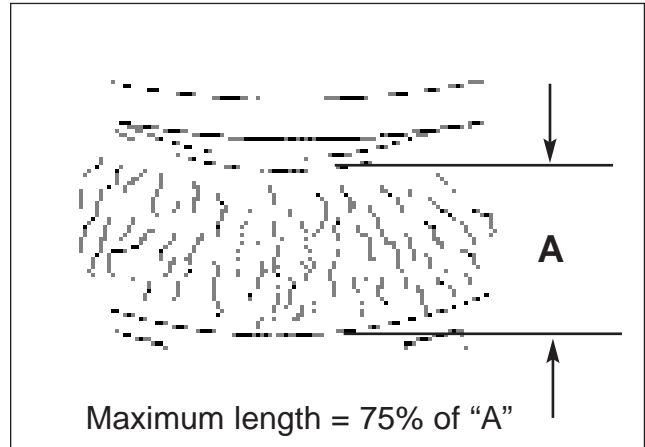


Fig 2.13

Scoring (Fig 2.14)

Scoring is deep circumferential grooves that can occur on both sides of the rotor's surface. If the groove or multiple scores are of a depth less than 0.5 mm, continue to use the rotor. If the groove / scores are greater than 0.5 mm, refinishing the rotor is recommended.

Refinishing the rotor is recommended before fitting new brake pads.

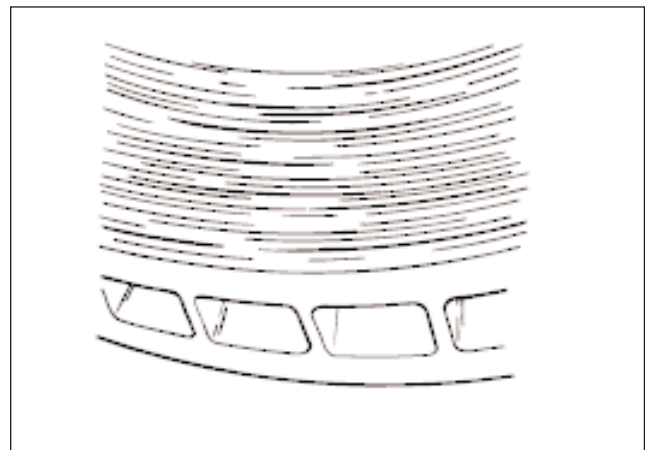


Fig 2.14

"Blue" Rotor (Fig 2.15)

Blue marks or bands on the rotor indicate that extremely high temperatures occurred during operation. Refinishing the rotor is recommended before fitting new brake pads.

CAUTION Reasons for the excessively high temperatures must be investigated as this will adversely affect brake performance and lining wear rate. Continued operation at excessively high temperatures will eventually adversely affect brake function.

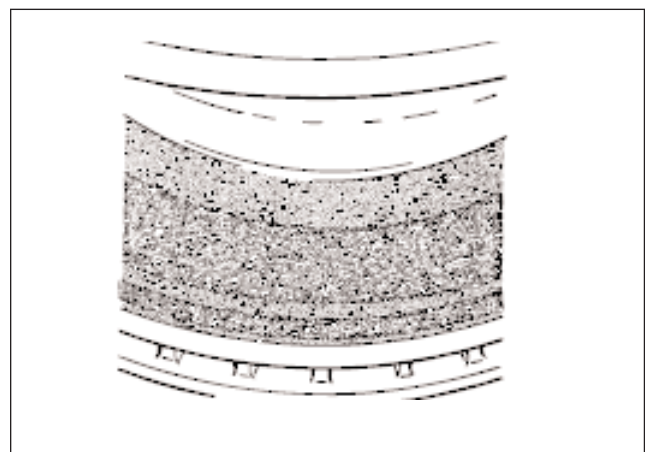


Fig 2.15

2 Operational Checks

Excessive run out may be due to incorrect rotor assembly on the hub, excessive tightening torques or incorrectly adjusted wheel bearings.

Ensure that these conditions are avoided when reassembling. Use a dial test indicator (DTI) to check both axial and radial run-out as illustrated in Fig. 2.16.

Rotor resurfacing

Remove rotor as described in vehicle's service manual. Position rotor on grinder. Eliminate all traces of defects found on rotor. Resurfacing must be done on both sides of rotor.

Wear Summary

See detailed dimensions in **Rotor Wear Conditions, Section 11**. Wear limits for rotor are visually indicated by the bevel corner 3 x 30° on each outer diameter of both braking surfaces. A maximum limit of 2 mm per each side is allowed for machining. Minimal total thickness allowed for the worn rotor is indicated on rotor outer edge (minimum thickness XY mm).

Rotors may be resurfaced up to the minimal thickness allowed (41 mm for DX225, DX225/21 and DX195 after resurfacing). During resurfacing move the grinding wheel gradually until all grinding swarf is removed.

Surface finish after machining should be max. 5 microns. In order to guarantee total braking efficiency and safety, it is recommended, when replacing one rotor, to replace the other rotor on the same axle.

Minimal total thickness allowed for the worn rotor is 28mm (Fig 2.17).

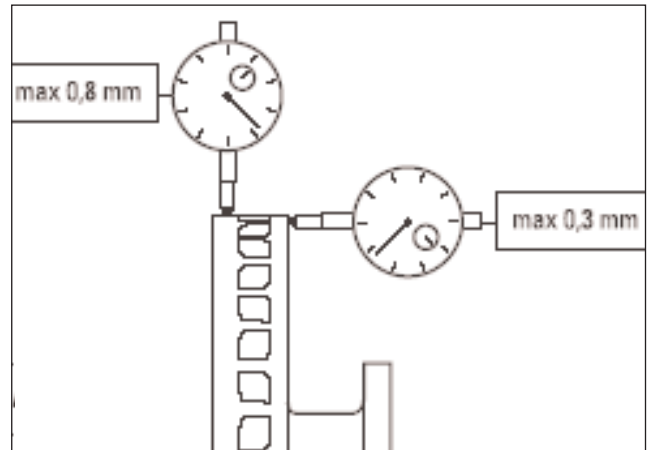


Fig 2.16

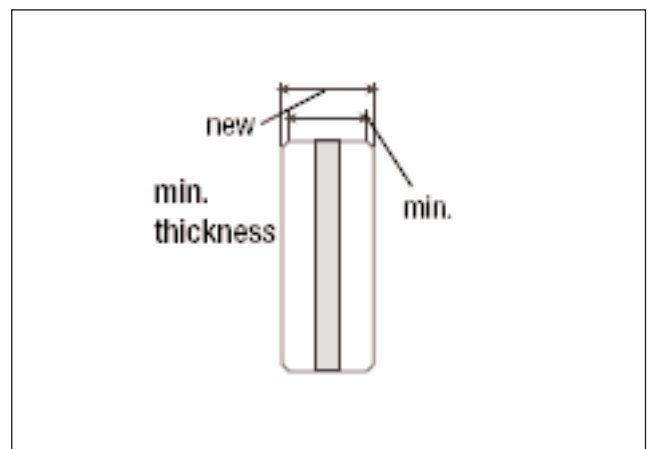


Fig 2.17

Pad Replacement

3

- pg. 26 Pad removal
- 27 Manual adjustment/de-adjustment
- 28 Cleaning & inspection
- 28 Fitting new pads

3 Pad Replacement

CAUTION You must always renew the brake pads on both wheels of an axle. Only use the brake pads that have been approved by the vehicle manufacturer. Brake pads must be replaced when the lining thickness has worn to 3mm minimum.

Park the vehicle on hard ground and chock the road wheels. Apply air pressure to release the park brake and wind off the spring brake retraction screw (where appropriate). Jack up the axle and fit suitable axle stands securely. Remove the road wheels and exhaust all air from the system.

Remove any dirt from the brake assembly. Ensure the rubber dust excluders fitted to the tappet heads and guide sleeves are not damaged.

CAUTION: Never use an air line to blow dust from the brake/rotor area. If inhaled any form of dust can at best be an irritant, at worst dangerous. Whenever possible remove dry brake dust with a vacuum brush. Alternatively wipe the areas with a damp cloth, never try to accelerate drying time by using an air line.

Always replace brake pads in axle sets.

Pad Removal

Remove the pin clip A and the pin B allowing the stabiliser bar C to rotate and be hinged to the brake on the lever's side. (Fig.3.1)

Remove the pad springs.

Where applicable disconnect the PWWI (pad wear warning indicator) as follows:

Release the connector to the vehicle system from the bracket on the brake (Fig 3.2). Carefully squeeze the tangs on the connector and pull it apart to disconnect.

Check the vehicle connector is clean and free from corrosion.

It may be necessary to de-adjust the brake initially to remove the worn brake pads. Remove the adjuster stem port plug and washer (Fig 3.3).

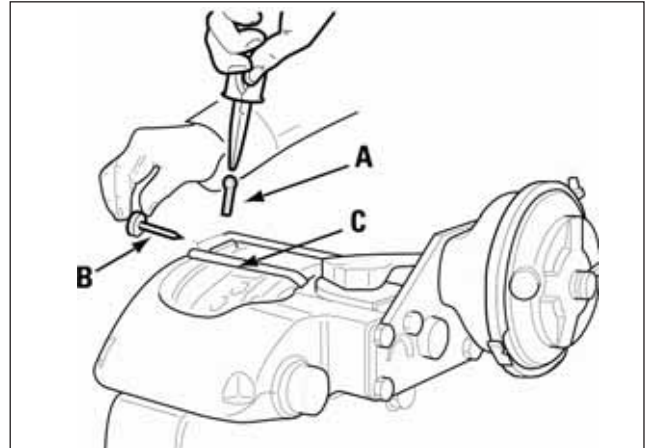


Fig 3.1

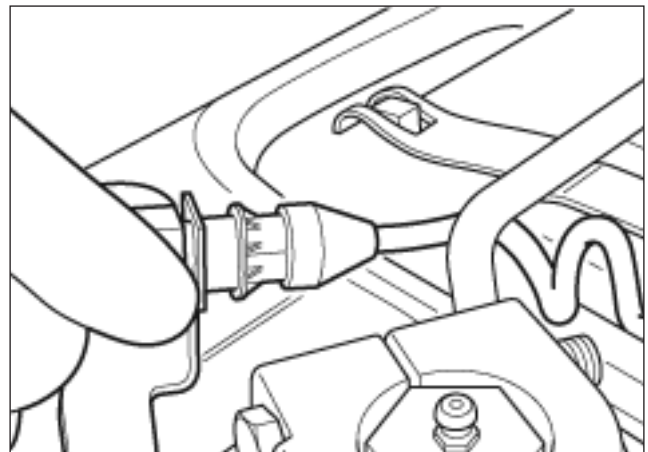


Fig 3.2

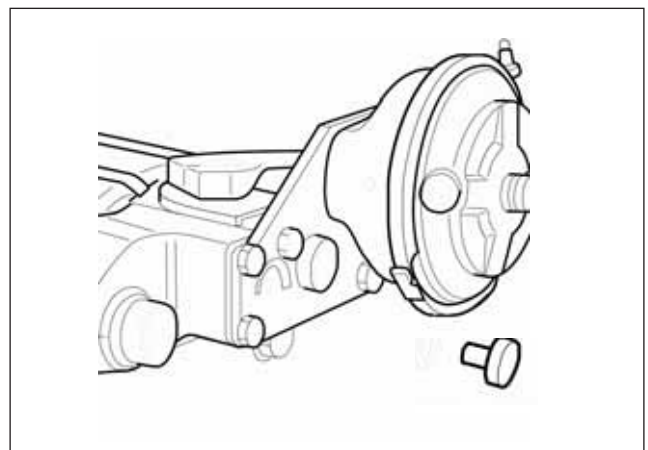


Fig 3.3

3 Pad Replacement

Locate a suitable hexagon wrench in the adjuster stem (Fig 3.4) and rotate the wrench as detailed in the manual adjustment/de-adjustment section below.

⚠ WARNING Always de-adjust/adjust the brake carefully by hand with a suitable wrench. NEVER use power tools. Do not exceed adjustment torque of 10 Nm or de-adjustment torque of 25Nm. Exceeding these torque levels can result in damage to the adjuster gearbox.

Manual adjustment/de-adjustment

De-adjustment direction depends on lever rotation direction. The wrench should be turned anti-clockwise on brakes with clockwise lever actuation and clockwise on brakes with anti-clockwise lever rotation. De-adjustment rotation direction is also indicated with an arrow on end plate near the manual adjuster plug hole (Fig. 3.5).

NOTE: In general, de-adjustment is achieved when the wrench is turned in the direction which produces a clicking feel. (This indicates that the torque limiter is slipping).

⚠ CAUTION: During brake de-adjustment, stop turning the wrench if resistance is felt. This indicates that the adjuster pistons are fully retracted. Further turning of the wrench could lock the adjuster pistons in the sleeves, thus preventing auto-adjustment operation or cause damage to the adjuster mechanism.

Turning the wrench in the opposite direction will result in a much smoother and quieter action, which will give positive adjustment and reduce pad to rotor clearance.

Remove the brake pads with the pad wear sensor attached (Fig 3.6).

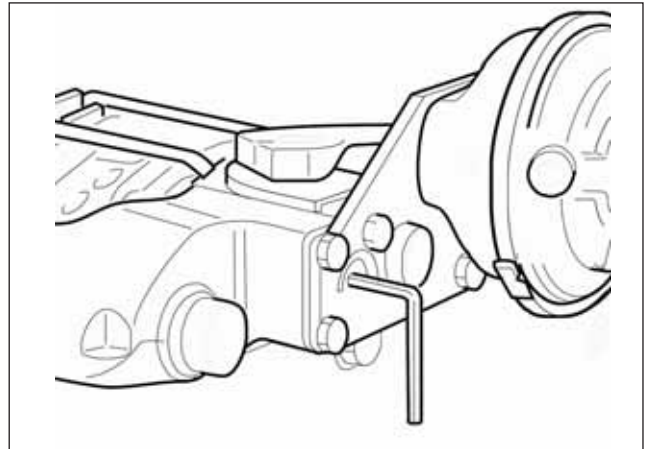


Fig 3.4

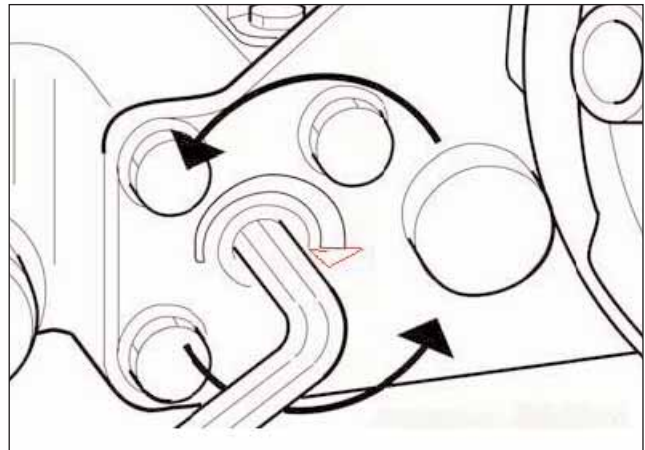


Fig 3.5

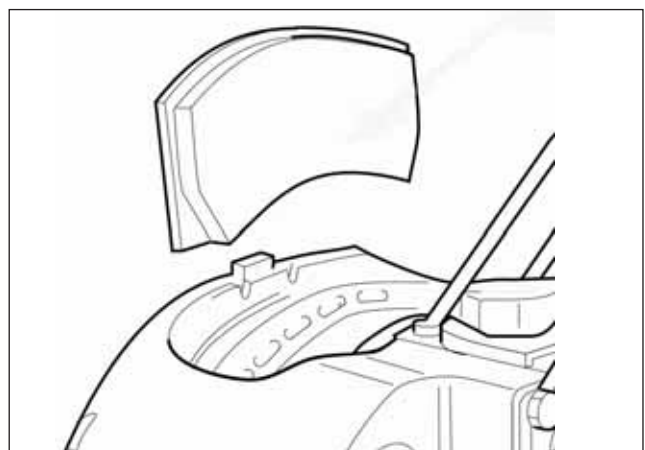


Fig 3.6

3 Pad Replacement

Cleaning and inspection

With the brake pads removed check the integrity of the guide sleeve and tappet excluders. They should be secure and free from any signs of damage. Check that the brake housing assembly slides freely on the guide sleeves.

⚠ WARNING Take care not to trap fingers whilst checking the sliding action of the brake.

Examine the brake rotor for corrosion, grooving and signs of deep cracks as described in Section 2 Operational Checks / Rotor inspection an Maintenance. If there is any doubt in the serviceability of any component refer to the vehicle manufacturer for corrective action.

Whilst wearing suitable eye protection remove all traces of scale, dirt etc, from the pad apertures /abutment faces and around the edge of the rotor, particularly that encroaching onto the braking area. A scraper or old screwdriver supported on the brake body whilst the rotor is rotated will remove most of the corrosion. Finish off if necessary with emery cloth. Remove all traces of scale, dirt etc, from pad apertures and abutment faces that may restrict the movement of the pads and, therefore, prevent sufficient adjustment of the brake. Clean the 8 pad support plates in the saddle with a wire brush (Fig 3.7) removing any build-up of debris or rust. This allows the new pads to be correctly seated in position. Inspect the stabiliser bar for signs of damage, distortion, wear or corrosion. If in doubt of bar integrity, replace it.

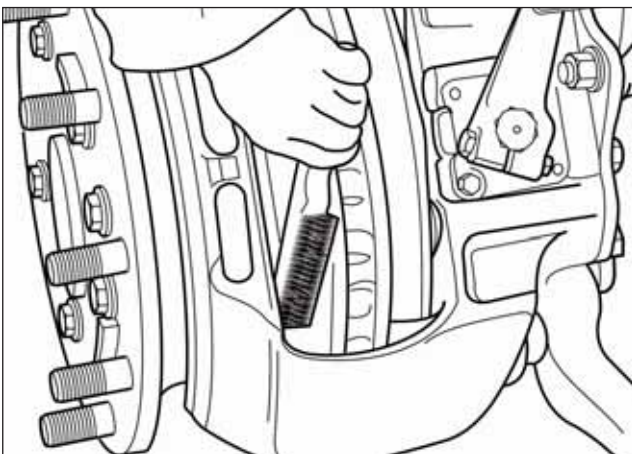


Fig 3.7

Fitting New Pads

De-adjust the brake until with the housing pulled across there is a sufficient aperture to fit the outboard pad.

Fit the new outboard pad and spring (Fig 3.8). Push the housing back towards the rotor until the new pad contacts the rotor face. Continue to de-adjust the brake until the aperture gap between the thrust plate and rotor face is large enough to accept the new inboard pad.

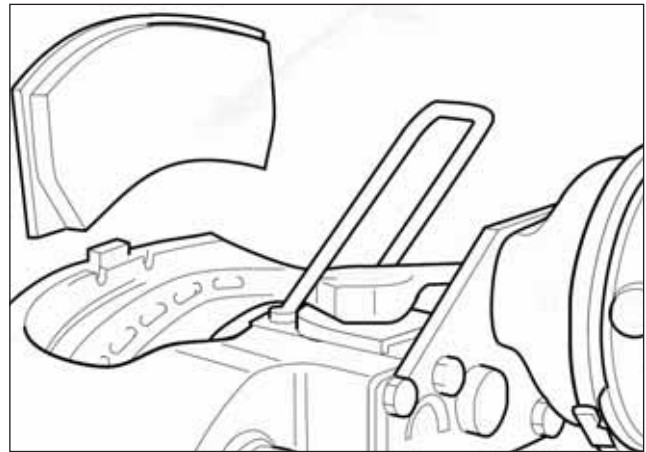


Fig 3.8

Fit the new inboard pad and spring (Fig 3.9).

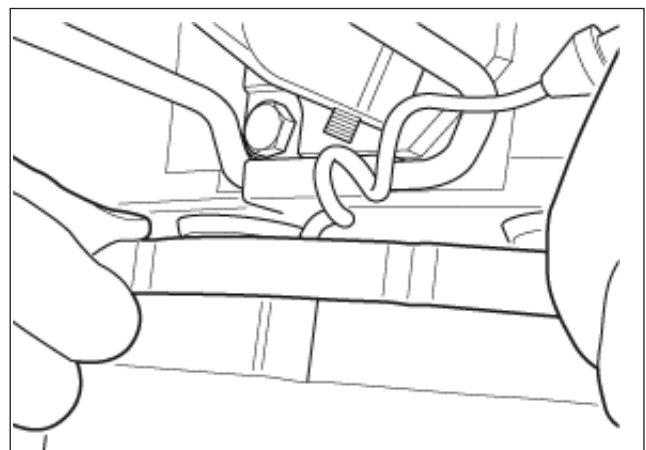


Fig 3.9

3 Pad Replacement

Where applicable connect the new PWWI (pad wear warning indicator) as follows:

Insert the new PWWI connector into the vehicle connector. Ensure the connector is fully inserted and the locking tags have engaged.

Refit the connector to the bracket on the brake (Fig. 3.10).

Hinge down the stabiliser bar C onto the springs and retain in position with pin B and new pin clip A (Fig 3.11).

Manually adjust the brakes, as described in **Section 1 Manual Adjustment**, until the new pads contact the brake rotor then turn the adjuster back until 7 torque limiter notches are heard or felt, this will set the initial pad to rotor clearance.

Remove the hexagon wrench, replace the port plug and washer (Fig 3.12) and tighten to 14 Nm.

Charge the air system and wind in the spring brake retraction screw (where applicable). Apply the brakes 10 times to settle the pads and allow the auto adjuster to set the correct running clearance. Check that the rotor is free to rotate.

Refit the road wheels, remove the axle stands and lower the vehicle to the ground.

Road test.

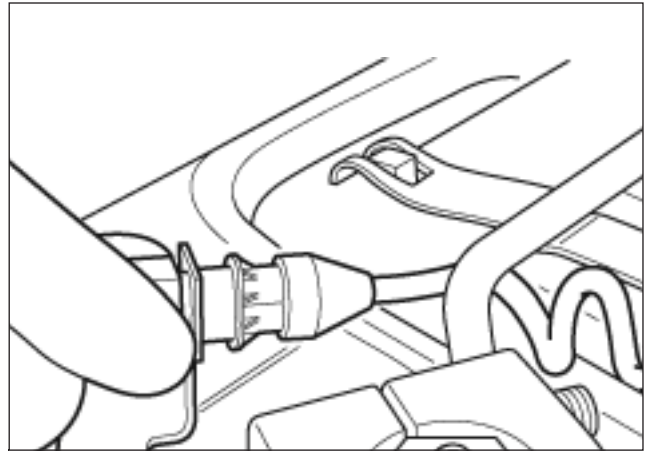


Fig 3.10

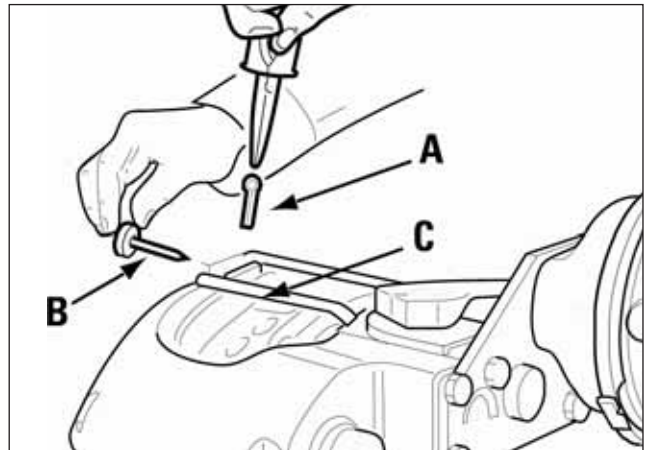


Fig 3.11

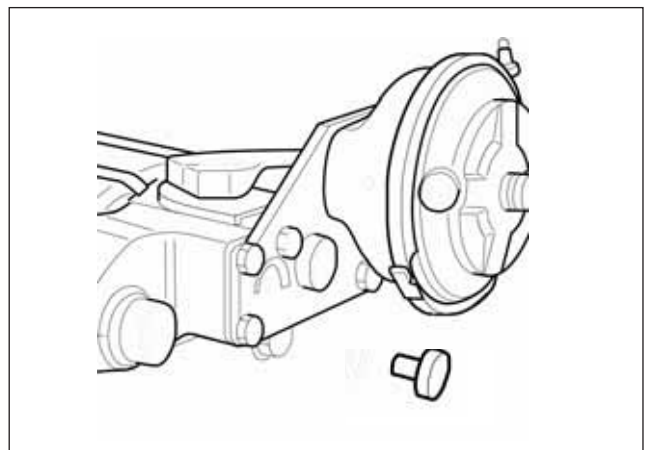


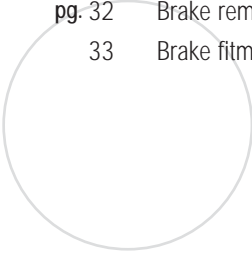
Fig 3.12

Brake Replacement

4



pg. 32 Brake removal
33 Brake fitment



4 Brake Replacement

Park the vehicle on hard ground and chock the road wheels. Apply air pressure to release the park brake and wind off the spring brake retraction screw (where appropriate). Jack up the axle and fit suitable axle stands securely.

Remove the road wheels and exhaust all air from the system. Remove any dirt from the brake assembly, ensure the rubber Dust Excluders are not damaged.

CAUTION Never use an air line to blow dust from the brake/rotor area. If inhaled any form of dust can at best be an irritant, at worst dangerous. When ever possible remove dry brake dust with a vacuum brush. Alternatively wipe the areas with a damp cloth, never try to accelerate drying time by using an air line.

IMPORTANT The brake assembly number should be noted in order to obtain the correct service kit.

Brake Removal

Remove split pin and clevis pin connecting the air actuator pushrod to the brake actuating lever (Fig 4.1).

Note or mark the relative position of the air actuator with respect to the mounting flange on the brake. This will ensure correct reassembly.

Remove the the two retaining nuts securing the air chamber to the brake mounting flange (Fig 4.2). Remove the air chamber from the brake. (Fig 4.3)

NOTE: Support the air chamber under the vehicle wheel arch in a position which does not interfere with brake removal or cause undue strain on the connected air pipe.

Remove the pads as described in **Pad Replacement Section 3.**

The brake can now be removed from the axle by removing the saddle mounting screws following the vehicle manufacturers instructions.

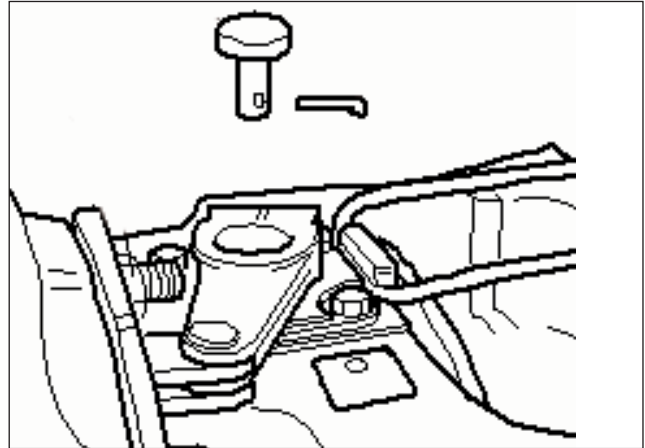


Fig 4.1

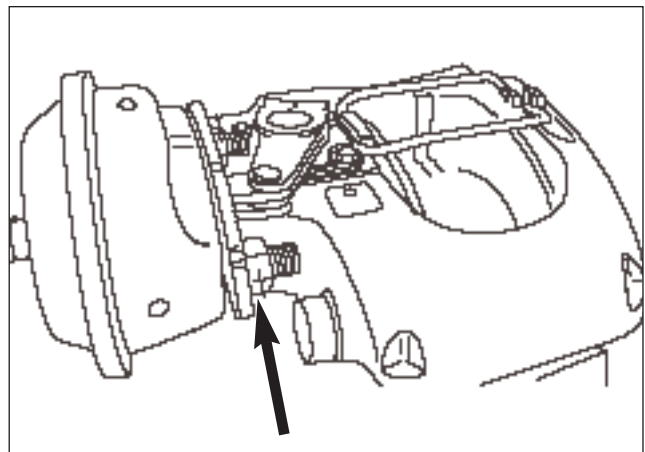


Fig 4.2

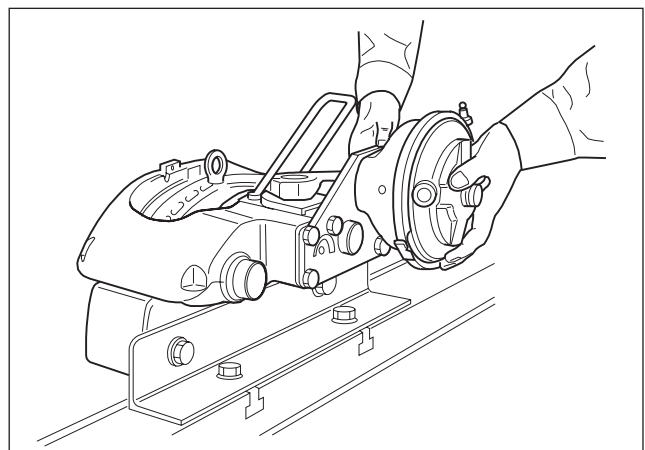


Fig 4.3

4 Brake Replacement



CAUTION The brake assembly is heavy, approximately 37kg (82lbs) . Ensure you have the help of an assistant and the weight of the brake is supported when removing the fixing screws to avoid possible damage to the threads.

When lifting the brake assembly avoid trapping fingers between the brake housing and carrier which are free to slide relative to each other. Also prevent any sudden movement which may result in rapid sliding of the components which may cause damage to rubber Dust Excluder areas.

Brake Fitment

Ensure all mounting faces are clean and free from corrosion. With the help of an assistant, carefully lower the brake assembly into position on the stub axle mounting.

Avoid excessive movement of the brake during location and do not allow the brake to drop into position on the stub axle, either action could result in damaged Dust Excluders. Fit new retaining screws Tighten the screws to the specified torque below (values refer to standard ArvinMeritor brake configuration):

DX175 - 200 Nm (M14x1.5)

For any other brake / axle configurations follow manufacturer's instructions.

Offer the air actuator to the housing assembly ensuring the mounting faces are clean. Initially tighten the 2 nuts to a pre-torque of 80 -100 Nm, (this ensures the actuator does not distort). Apply a final torque of 180 - 210 Nm

Align the air chamber clevis onto the lever and fit a new clevis pin and split pin to retain

Refit, or fit new pads as detailed in the **Section 3 Pad Replacement**.

Charge the air system and wind in the spring brake retraction screw (where applicable). Apply the brakes 10 times to settle the pads and allow the auto adjuster to set the correct running clearance. Check that the rotor is free to rotate.

Refit the road wheels, remove the axle stands and lower the vehicle to the ground and road test.

Saddle Replacement


5

pg. 36 Saddle removal
37 Saddle fitment

5 Saddle Replacement

Park the vehicle on hard ground and chock the road wheels. Apply air pressure to release the park brake and wind off the spring brake retraction screw (where appropriate). Jack up the axle and fit suitable axle stands securely. Remove the road wheels and exhaust all air from the system.

Remove any dirt from the brake assembly. Ensure the rubber dust excluders are not damaged.

 **CAUTION:** Never use an air line to blow dust from the brake/rotor area. If inhaled any form of dust can at best be an irritant, at worst dangerous. Whenever possible remove dry brake dust with a vacuum brush. Alternatively wipe the areas with a damp cloth, never try to accelerate drying time by using an air line.

Remove the brake assembly as described in **Section 4 Brake Replacement**.

Saddle Removal

To replace the saddle, it will be necessary to remove the slide pin screws. These are at a very high torque. Therefore, with the brake removed from the vehicle secure it to a bench mounted bracket (Fig. 5.1) using the same fixings as on the vehicle, Service tool (DXT 17).

Knock out and discard the two Slide Pin Covers **A**. (Fig.5.2)

Remove and discard the two Slide Pin screws. Due to the high tightening torque, use a wrench with a suitable adaptor or extension. (Fig. 5.3)

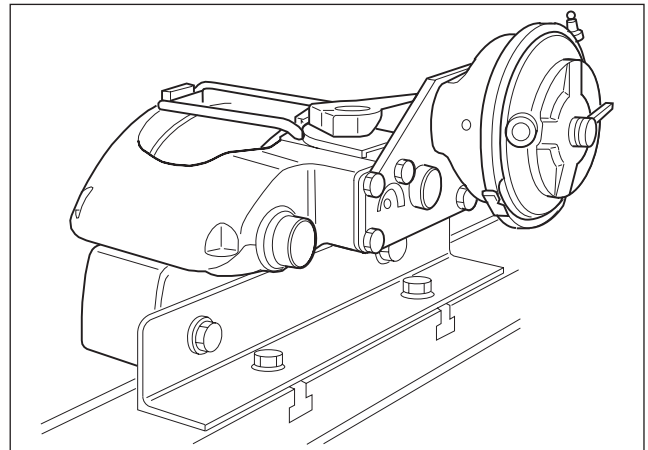


Fig 5.1

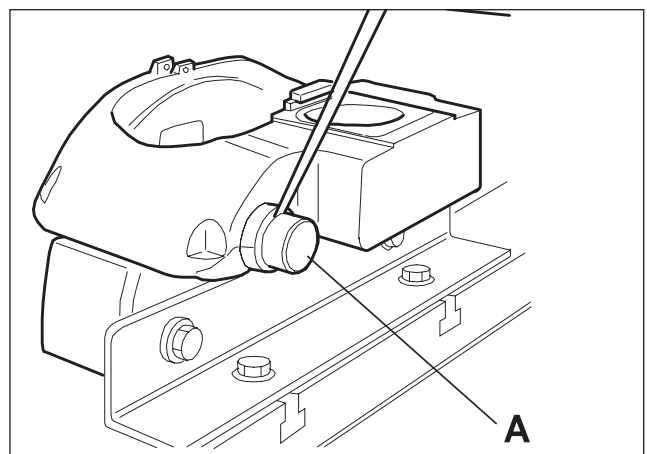


Fig 5.2

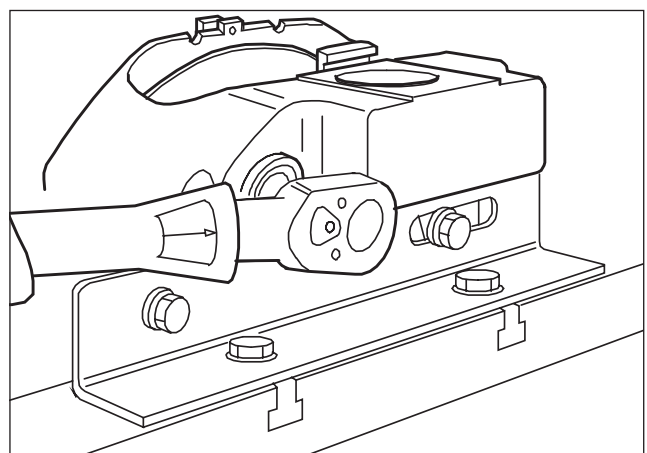


Fig 5.3

5 Saddle Replacement

NOTE: Slide Pin screws may be different in length. Make a note or mark the brake body in order to identify the screw positions for correct reassembly. (Fig. 5.4)

Remove the brake body from the saddle.

NOTE: At this time it may be appropriate to inspect the slide pins and excluders. If damaged replace. If satisfactory it may be appropriate to re-lubricate the slide pins using MBG 1004. Only use the grease supplied with replacement components/kits, that is specified above or by the vehicle manufacturer. Under no circumstance should any other type of grease be used.

Saddle Fitment

NOTE: the Slide Pin with the short screw (and outer diameter slightly oversized) should be installed on the right side (looking at the brake from the end plate) on brakes with clockwise lever actuation, the opposite applies for brakes with counter clockwise lever actuation.



WARNING Use only new screws during maintenance. The use of old screws is dangerous and can seriously affect brake performance.

For ease of assembly, offer the new saddle to the brake body and align the slide pins with the corresponding location seats in the saddle. Install the new slide pin retaining screws, with the pre-applied thread locking compound and hand tighten at this stage.

Refit the assembly to the bench mounting bracket and tighten the screws to the specified torque (Fig 5.5) : as detailed below.

DX 175 - Hexagon head	240 Nm +/- 15 Nm
Torx head	200 Nm +/- 10 Nm

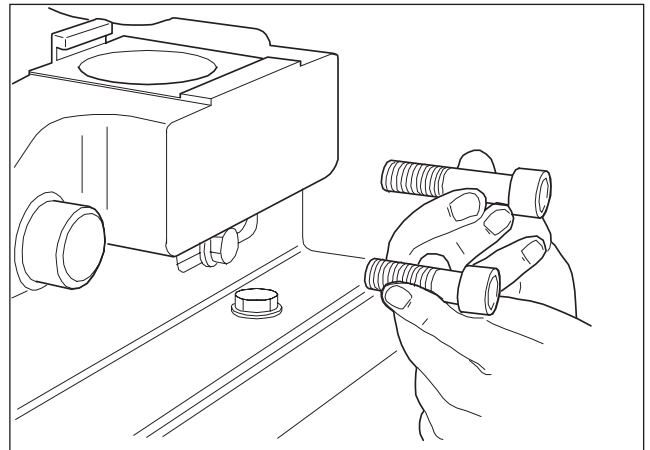


Fig 5.4

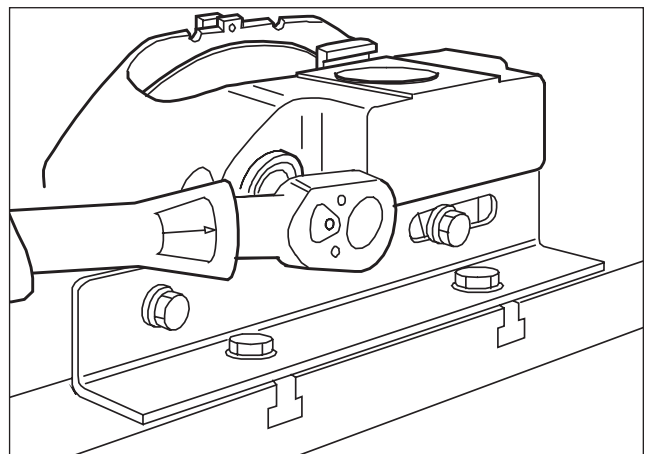


Fig 5.5

5 Saddle Replacement

After torque tightening the locking screws, ensure that the calliper slides freely on the slide pins.

Install new slide pin caps. Before assembly apply a small bead of sealant (MBG 1002) to the edge of the new Slide Pin Caps. Push or knock the end caps into position (Fig. 5.6) using service tool DXT 18.

NOTE: Only use the sealant supplied with replacement components/kits, that is specified above or by the vehicle manufacturer. Under no circumstance should any other type of sealant be used.

Ensure that the caps are fully located.

Clean and inspect the rotor as described in **Section 2 Operational Checks - Rotor Inspection and Maintenance.**

Refit the brake assembly to the vehicle as described in **Section 4 Brake Replacement.**

Re-Fit or fit new axle set of brake pads, set the initial running clearance and test as described in **Section 3 Pad Replacement.**

Charge the air system and wind in the spring brake retraction screw (where applicable). Apply the brakes 10 times to settle the pads and allow the auto adjuster to set the correct running clearance.

Check that the rotor is free to rotate.

Refit the road wheels, remove the axle stands and lower the vehicle to the ground.

Road test.

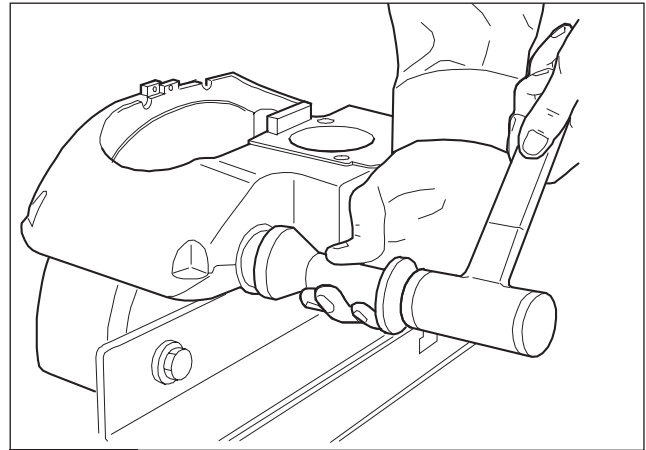
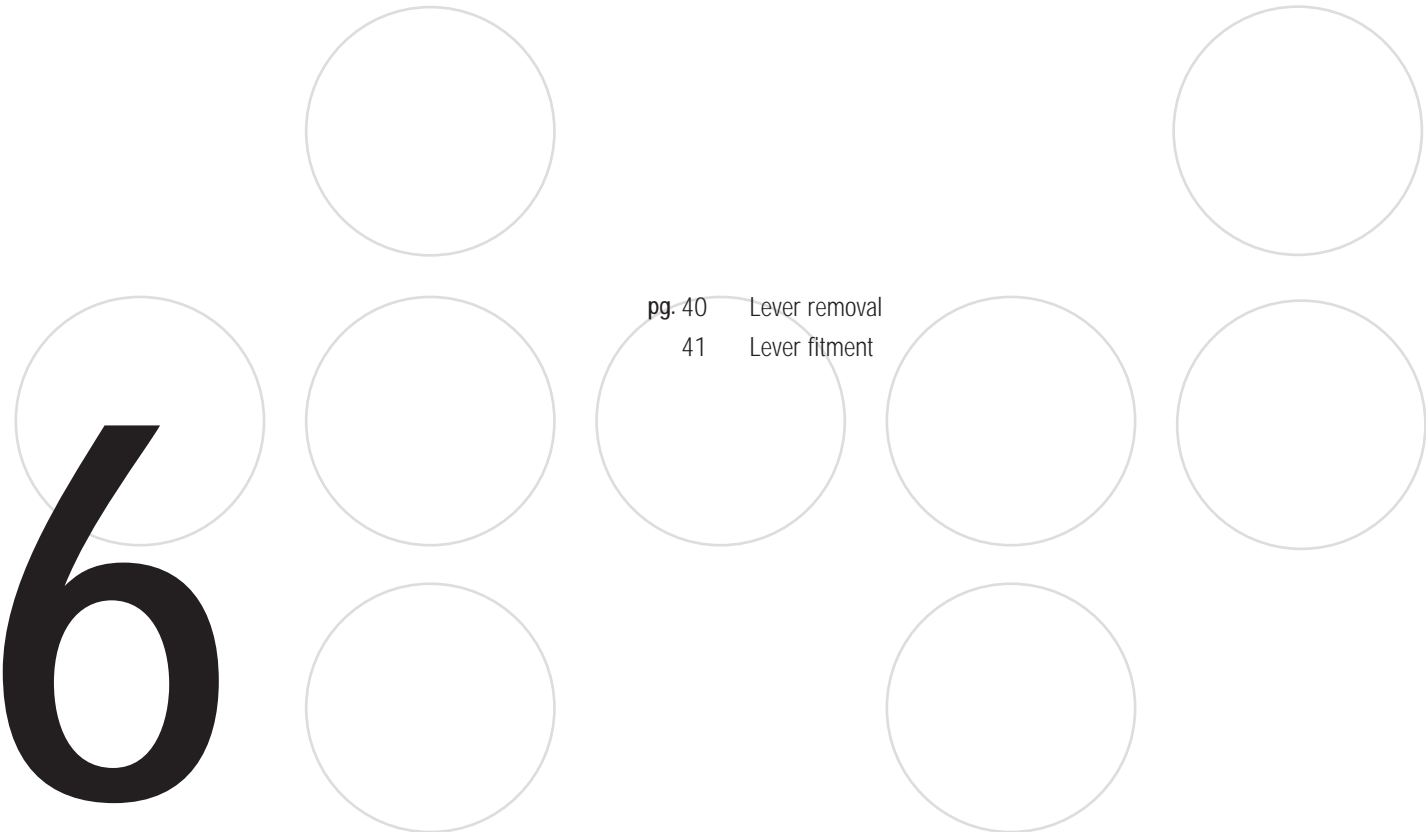


Fig 5.6


Lever Replacement



6 Lever Replacement

Park the vehicle on hard ground and chock the road wheels. Apply air pressure to release the park brake and wind off the spring brake retraction screw (where appropriate). Jack up the axle and fit suitable axle stands securely. Remove the road wheels and exhaust all air from the system.

Remove any dirt from the brake assembly. Ensure the rubber dust excluders fitted to the tappet heads, guide sleeves, and where applicable eccentric shaft, are not damaged.

 **CAUTION:** Never use an air line to blow dust from the brake/rotor area. If inhaled any form of dust can at best be an irritant, at worst dangerous. Whenever possible remove dry brake dust with a vacuum brush. Alternatively wipe the areas with a damp cloth, never try to accelerate drying time by using an air line.

Lever Removal

Remove split pin and clevis pin connecting the air actuator pushrod to the brake actuating lever (Fig 6.1). Clean the cover plate, pay particular attention to the area around the lever.

NOTE: If the working area of the brake is not easily accessible, Remove the air chamber from the brake. Support under the vehicle wheel arch in a position which does not cause undue strain on the connected air pipe.

Remove the lever clamp screw (Fig 6.2). Should the lever prove difficult to remove from the eccentric shaft, carefully insert an appropriate wedge (screwdriver blade) in the groove in order to assist removal (Fig. 6.3)

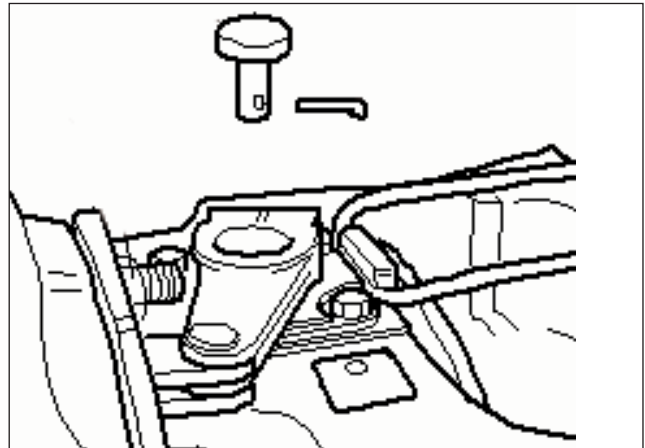


Fig 6.1

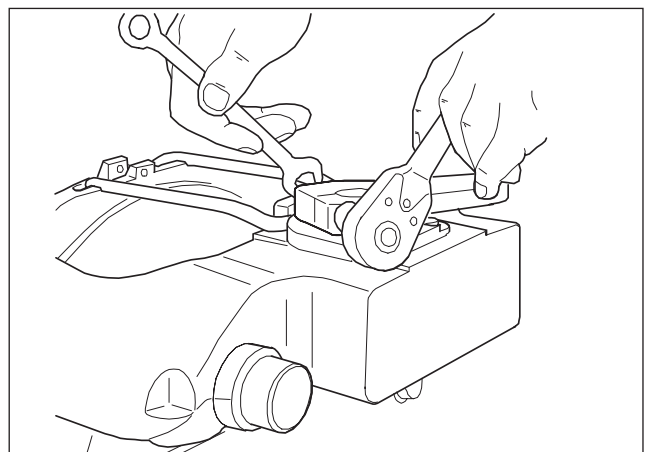


Fig 6.2

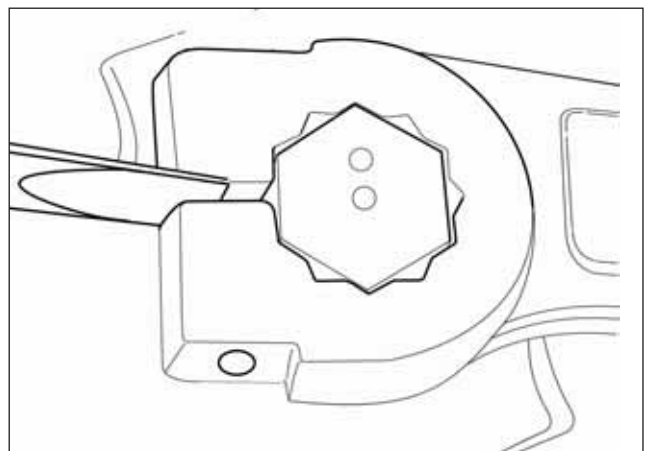


Fig 6.3

6 Lever Replacement

Lever Fitment

Ensure the mark on the lever and eccentric shaft are aligned, thus ensure correct positioning of the lever on the eccentric shaft. (Fig. 6.4).

Fit a new clamp screw and tighten to a torque of 30 Nm.

Where applicable offer the air actuator to the housing assembly ensuring the mounting faces are clean .

Initially tighten the 2 nuts to a pre-torque of 80 -100 Nm, (this ensures the actuator does not distort).

Apply a final torque of 180 - 210 Nm

Align the air chamber clevis on the new lever and fit a new clevis pin and split pin to retain.

Charge the air system and wind in the spring brake retraction screw (where applicable). Apply the brakes 10 times to settle the pads and allow the auto adjuster to set the correct running clearance. Check that the rotor is free to rotate.

Refit the road wheels, remove the axle stands and lower the vehicle to the ground.

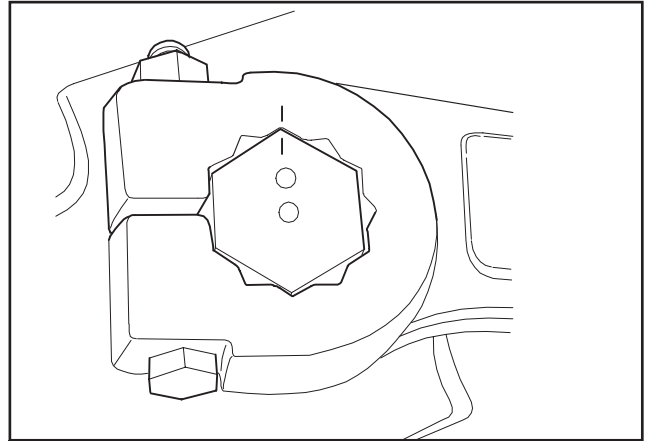
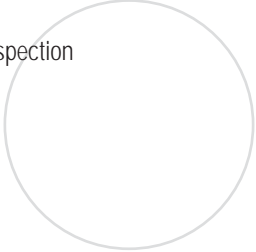
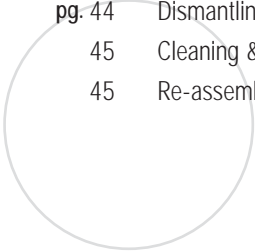


Fig 6.4

Stabiliser Bar Replacement

7



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7 Stabiliser Bar Replacement

Park the vehicle on hard ground and chock the road wheels. Apply air pressure to release the park brake and wind off the spring brake retraction screw (where appropriate). Jack up the axle and fit suitable axle stands securely. Remove the road wheels and exhaust all air from the system.

Remove any dirt from the brake assembly. Ensure the rubber dust excluders fitted to the tappet heads, guide sleeves and where applicable, eccentric shaft are not damaged.

CAUTION: Never use an air line to blow dust from the brake/rotor area. If inhaled any form of dust can at best be an irritant, at worst dangerous. Whenever possible remove dry brake dust with a vacuum brush. Alternatively wipe the areas with a damp cloth, never try to accelerate drying time by using an air line.

Dismantling

The stabiliser bar can be replaced on the vehicle although removal of the brake will facilitate easier working conditions.

Remove the pin clip A and the pin B allowing the stabiliser bar C to rotate and be hinged to the brake on the lever's side. (Fig.7.1) Remove Clevis Pin connecting the air actuator pushrod to the brake actuating lever Fig.7.2).

NOTE: If the working area of the brake is not easily accessible, remove the air chamber from the brake as described in **Section 4 Brake Replacement**. Support under the vehicle wheel arch in a position which does not cause undue strain on the connected air pipe.

Remove the lever clamp screw and discard. Remove the lever as described in **Section 6 Lever Replacement**, and retain.

Thoroughly clean the area around the cover plate and eccentric shaft.

It is advisable at this stage to remove the brake pads and carry out cleaning and examination of the brake and rotor as described in **section 2 Operational checks**.

Remove the brake pads as described in **Section 3 Pad Replacement**.

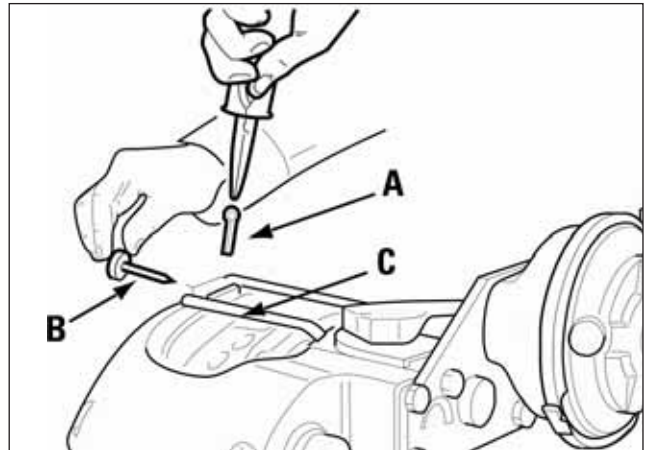


Fig 7.1

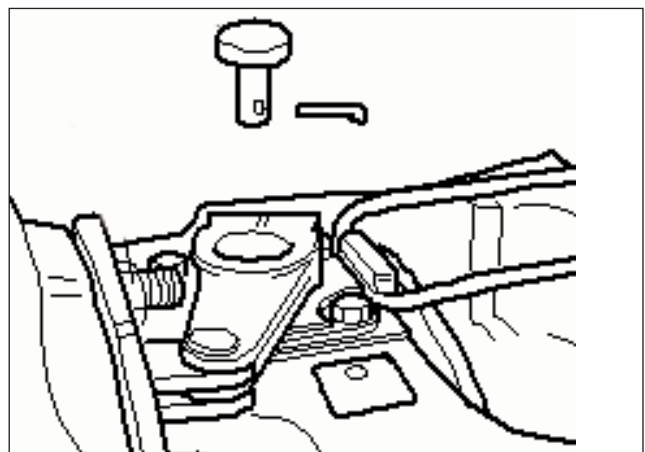


Fig 7.2

Remove the Eccentric Shaft Seal Excluder if fitted.

Remove the 2 Cover Plate Screws and discard. Remove the Cover Plate assembly in which the Eccentric Shaft upper bearing unit is positioned. Whilst removing the cover plate, hold the eccentric shaft in place to ensure the shaft is not pulled out simultaneously with the cover plate.

NOTE: Care should be taken when removing the cover plate assembly, that none of the rollers are allowed to become dislodged from the cover plate bearing. The bearing assembly is an uncaged needle roller bearing.

7 Stabiliser Bar Replacement

Remove the cover plate gasket and discard. Remove the stabiliser bar from housing.

Cleaning and inspection

Thoroughly clean the cover plate mounting surface on the brake housing.

Ensure no debris is allowed to enter the eccentric bore. Clean the old thread locking compound from cover plate screw holes (Fig. 7.3)

Reassembly

Fit the new stabiliser bar ensuring correct location in the brake.

Apply grease (MBG 1003) to all bearing surfaces of the cover plate assembly, and thoroughly lubricate the rollers.

NOTE: Only use the grease supplied with replacement components/kits, that is specified above or by the vehicle manufacturer. Under no circumstance should any other type of grease be used.

Apply a small bead of sealant (MBG 1002) on both sides of the new gasket. Position gasket on the cover plate and install the cover plate into the housing, ensure that the lugs on the gasket are positioned parallel with the rotor as shown in Fig 7.4. Fit the sensor bracket, if required and secure with 2 new screws (with thread locking compound previously applied) and tighten to a torque of 35 Nm

NOTE: Only use the sealant supplied with replacement components/kits, that is specified above or by the vehicle manufacturer. Under no circumstance should any other type of sealant be used.

Refit the lever as described in **Section 6 Lever Replacement**.

Where applicable refit the air chamber as described in **Section 4 Brake Replacement**.

Refit the brake pads as described in **Section 3 Pad Replacement**.

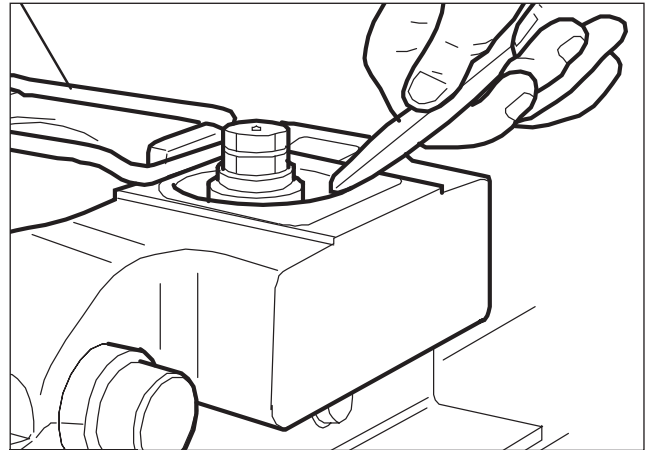


Fig 7.3

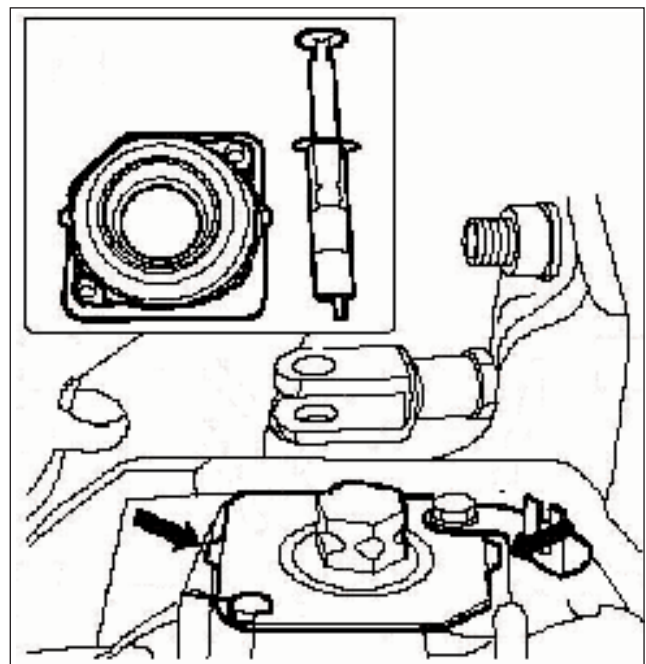


Fig 7.4

Charge the air system and wind in the spring brake retraction screw (where applicable). Apply the brakes 10 times to settle the pads and allow the auto adjuster to set the correct running clearance. Check that the rotor is free to rotate.

Refit the road wheels, remove the axle stands and lower the vehicle to the ground.

Road test.

Piston Dust Excluder Replacement


8

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8 Piston Dust Excluder Replacement

Park the vehicle on hard ground and chock the road wheels. Apply air pressure to release the park brake and wind off the spring brake retraction screw (where appropriate). Jack up the axle and fit suitable axle stands securely. Remove the road wheels and exhaust all air from the system.

Remove any dirt from the brake assembly. Ensure the rubber dust excluders fitted to the guide sleeves and where applicable, eccentric shaft are not damaged.

 **CAUTION:** Never use an air line to blow dust from the brake/rotor area. If inhaled any form of dust can at best be an irritant, at worst dangerous. Whenever possible remove dry brake dust with a vacuum brush. Alternatively wipe the areas with a damp cloth, never try to accelerate drying time by using an air line.

Dismantling

Remove Clevis Pin connecting the air actuator pushrod to the brake actuating lever. Remove the air chamber from the brake. Support under the vehicle wheel arch in a position which does not cause undue strain on the connected air pipe.

Remove the pin clip A and the pin B allowing the stabiliser bar C to rotate and be hinged to the brake on the lever's side. (Fig.8.1)

Remove the brake pads and pad springs as described in **Section 3 Pad Replacement**.

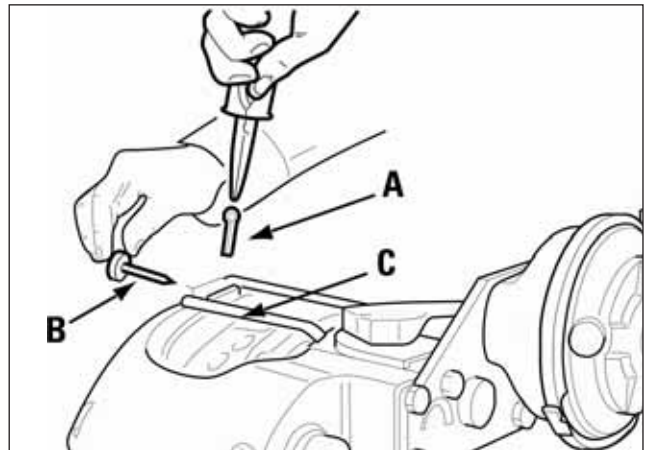


Fig 8.1

Cleaning and inspection

Worn brake pads must be replaced if the friction material level has worn to 3mm.

It is advisable at this stage to carry out cleaning and examination of the brake and rotor as described in **Section 2 Operational checks**.

Remove all traces of scale, dirt etc, from pad apertures and abutment faces that may restrict the movement of the pads and, therefore, prevent sufficient adjustment of the brake. Clean the 8 pad support plates in the saddle with a wire brush (Fig.8.2) removing any build-up of debris or rust. This allows the new pads to be correctly seated in position

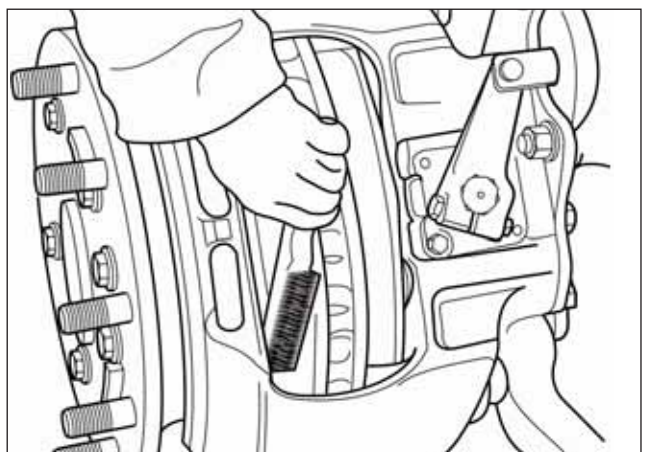


Fig 8.2

8 Piston Dust Excluder Replacement

Remove the saddle to axle flange retaining screws. Remove the brake from vehicle as described in **Section 4 Brake Replacement** and secure it to a bench mounted bracket using the same fixings as on the vehicle. (DXT 17) (Fig. 8.3)

Using the manual adjuster device, carefully wind out both actuating pistons fully until they disengage from the adjuster sleeves within the brake housing. Both actuation pistons must remain attached to the thrust plate. (Fig. 8.4)

Remove and discard both piston seal excluders from the brake body using a suitably size drift. (Fig.8.5)

Remove all traces of sealant from around seal excluder location in the calliper body and ensure the excluder location is clean.

NOTE: Ensure that no debris is allowed to enter the brake body.

Clean the seal excluder location groove on the actuating pistons and piston threads with suitable cleaning fluid, ensure they are clean and dry before re-assembly.

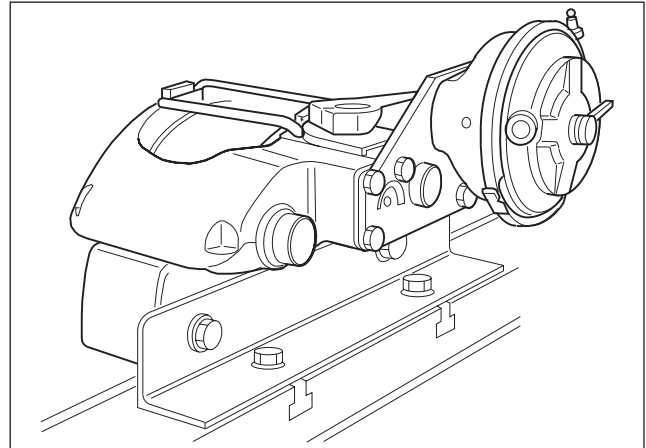


Fig 8.3

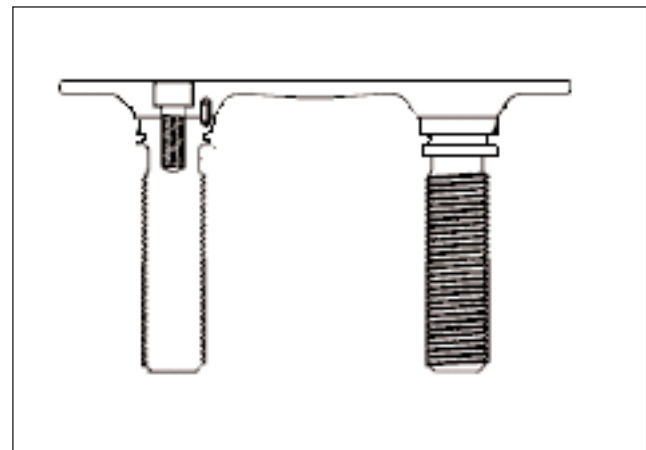


Fig 8.4

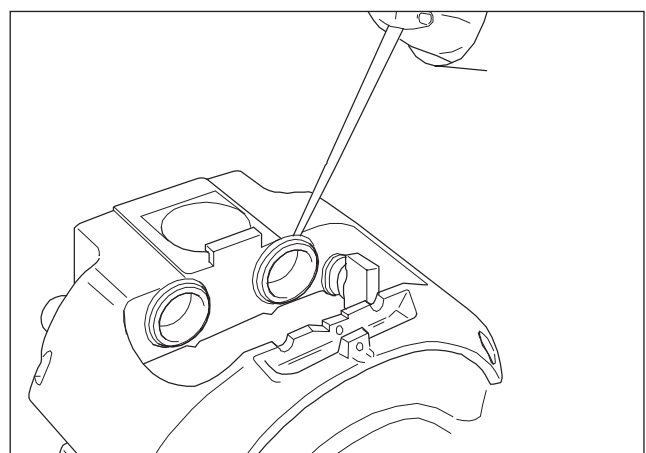


Fig 8.5

8 Piston Dust Excluder Replacement

Re-Assembly

Before reassembly, apply sealant MBG 1002 on the outside of the metal ring of the piston seal excluder.

NOTE: Only use the sealant supplied with replacement components/kits, that is specified above or by the vehicle manufacturer. Under no circumstance should any other type of sealant be used.

Fit the new actuator piston seal excluders into the housing, pushing them into position with the ArvinMeritor Service Tool DXT 08.



CAUTION: Ensure the tool locates on the metal part of the excluder only, contact with the rubber component can seriously damage the excluder and will require replacement.

Apply grease (MBG 1003) to each of the piston threads.

Position the thrust plate together with the actuating pistons within the saddle. Using the manual adjuster device, engage both pistons within the thread of the adjuster sleeves. Turn the manual adjuster device to wind both pistons in to housing, do not use excessive force to carry out this operation.

NOTE: If a torque in excess of 6 Nm is required, disengage threads and start process again.

Wind in both pistons until the thrust plate is protruding from the brake body by approximately 30 mm, this should give sufficient access to fit the new excluders onto the actuating pistons.

Fit the new piston seal excluders onto the actuating pistons. Check carefully for correct location in the groove on the piston head.

NOTE: do not use any grease to aid assembly. The use of grease could cause the excluders to prematurely pull-off the piston location groove.

Gently extend each excluder to ensure they are securely located on the piston. The excluder should not pull-off when applying a reasonable force.

Refit the brake assembly as described in **Section 4 Brake Replacement**.

Where applicable refit the air chamber as described in **Section 4 Brake Replacement**.

Refit the pads as detailed in **Section 3 Pad Replacement**

Eccentric Shaft Replacement

9

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9 Eccentric Shaft Replacement

This procedure covers the replacement of the early level eccentric shaft with a latest type of eccentric shaft assembly incorporating a grease nipple.

Park the vehicle on hard ground and chock the road wheels. Apply air pressure to release the park brake and wind off the spring brake retraction screw (where appropriate). Jack up the axle and fit suitable axle stands securely. Remove the road wheels and exhaust all air from the system.

Remove any dirt from the brake assembly. Ensure the rubber dust excluders fitted to the tappet heads and guide sleeves are not damaged.



CAUTION: Never use an air line to blow dust from the brake/rotor area. If inhaled any form of dust can at best be an irritant, at worst dangerous. Whenever possible remove dry brake dust with a vacuum brush. Alternatively wipe the areas with a damp cloth, never try to accelerate drying time by using an air line.

Dismantling

The operation can be performed on the vehicle although removal will facilitate easier working conditions.

Depending on brake model, either remove the pin clip A and the pin B, allowing the stabiliser bar C to rotate and be hinged to the brake on the lever's side. (Fig.9.1)

Remove Clevis Pin connecting the air actuator (rotation chamber) pushrod to the brake actuating lever (Fig. 9.2).

Thoroughly clean the area around the cover plate and eccentric shaft.

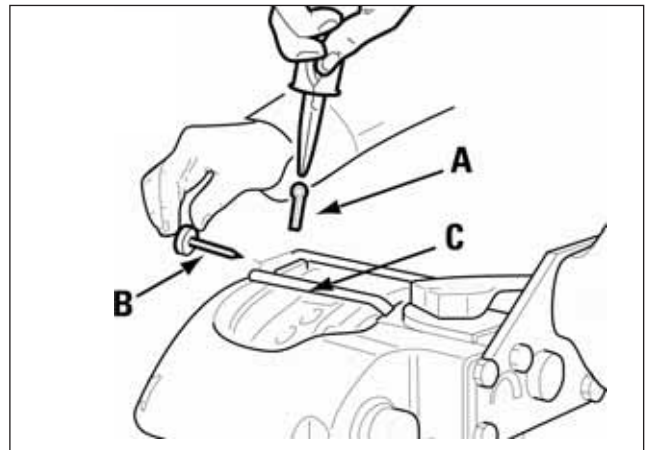


Fig 9.1

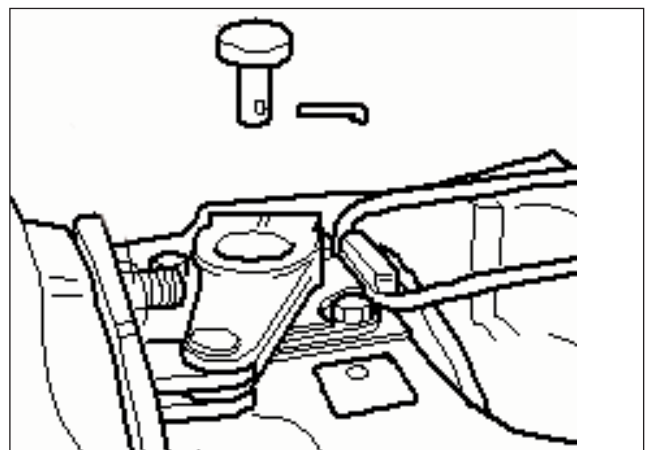


Fig 9.2

9 Eccentric Shaft Replacement

NOTE: If the working area of the brake is not easily accessible, Remove the air chamber from the brake as described in **Section 4 Brake Replacement**. Support under the vehicle wheel arch in a position which does not cause undue strain on the connected air pipe.

Remove the lever clamp screw and discard (Fig 9.3).

Remove the lever as described in **Section 6 Lever Replacement**. and retain.

It is advisable at this stage to remove the brake pads to allow cleaning and examination of the brake.

Fully de-adjust the brake. This will allow for easier removal and replacement of parts and help keep internal components in the correct position.

Remove the adjuster stem port plug and washer (Fig 9.4). Locate a suitable hexagon wrench in the adjuster stem (Fig 9.5) and rotate the wrench as detailed in **Section 1 Manual Adjustment/De-adjustment**.

WARNING Always de-adjust/adjust the brake carefully by hand with a suitable wrench. NEVER use power tools. Do not exceed adjustment torque of 10 Nm or de-adjustment torque of 25Nm. Exceeding these torque levels can result in damage to the adjuster gearbox.

CAUTION: During brake de-adjustment, stop turning the wrench if resistance is felt. This indicates that the adjuster pistons are fully retracted. Further turning of the wrench could lock the adjuster pistons in the sleeves, thus preventing auto-adjustment operation or cause damage to the adjuster mechanism.

Remove the brake pads and pad springs as described in **Section 3 Pad Replacement**.

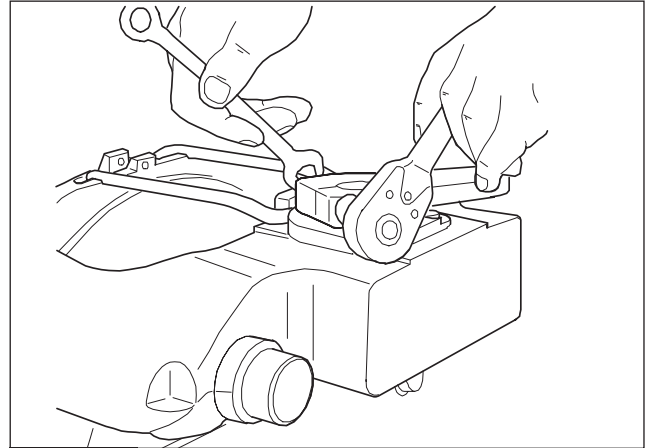


Fig 9.3

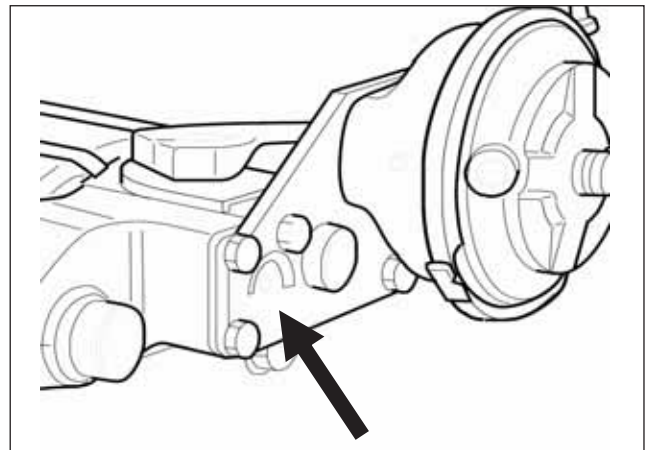


Fig 9.4

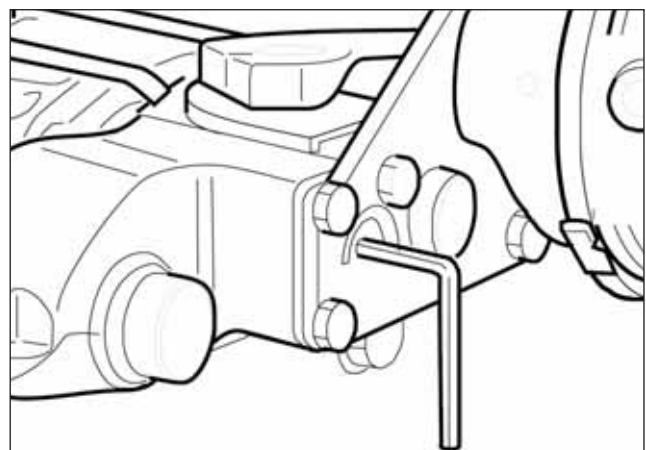


Fig 9.5

9 Eccentric Shaft Replacement

Cleaning and inspection

With the brake pads removed check the integrity of the guide sleeve and tappet excluders. They should be secure and free from any signs of damage. Check that the brake housing assembly slides freely on the guide sleeves.



WARNING Take care not to trap fingers whilst checking the sliding action of the brake.

Examine the brake rotor for corrosion, grooving and signs of deep cracks. If there is any doubt in the serviceability of any component refer to the vehicle manufacturer for corrective action.

It is advisable at this stage to carry out cleaning and examination of the brake and rotor as described in **Section 2 Operational checks**.

Remove all traces of scale, dirt etc, from pad apertures and abutment faces that may restrict the movement of the pads and, therefore, prevent sufficient adjustment of the brake. Clean the 8 pad support plates in the saddle with a wire brush (Fig 9.6) removing any build-up of debris or rust. This allows the pads to be correctly seated in position

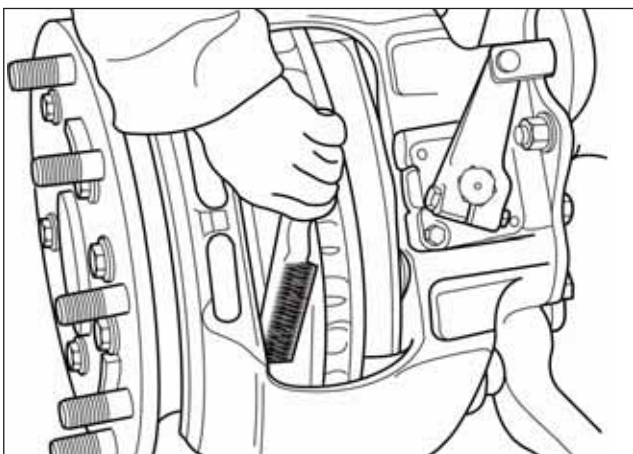


Fig 9.6

Eccentric shaft removal

Ensure the area under the shield is clean. Remove the 2 Cover Plate Screws and discard. Remove the Cover Plate assembly in which the Eccentric Shaft upper bearing unit is positioned. Whilst removing the cover plate, hold the eccentric shaft in place to ensure the shaft is not pulled out simultaneously with the cover plate.

NOTE: Care should be taken when removing the cover plate assembly, that none of the rollers are allowed to become dislodged from the cover plate bearing. The bearing assembly is an uncaged needle roller bearing.

Remove the cover plate gasket and discard. Remove the stabiliser bar from housing. Thoroughly clean the cover plate mounting surface on the brake housing. Ensure no debris is allowed to enter the eccentric bore. Clean the old thread locking compound from cover plate screw holes (Fig. 9.7)

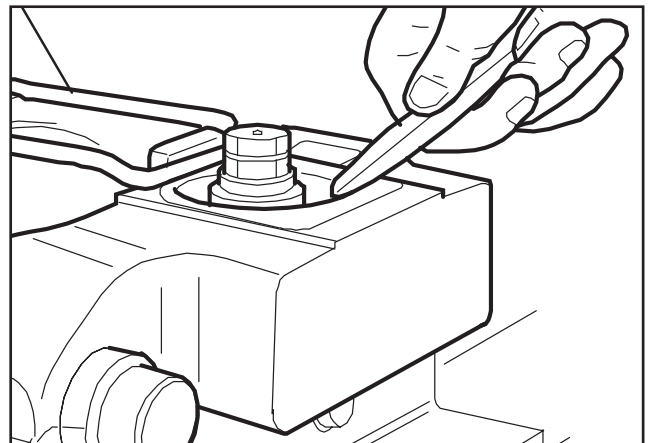


Fig 9.7

9 Eccentric Shaft Replacement

Rotate the Eccentric shaft in the direction of the brake application (this can be done using the lever) until 3 clicks are felt, or sufficient rotation has taken place to align the eccentric high point with the elliptical area D in the upper brake opening to allow removal of Eccentric shaft (Fig 9.8).

NOTE: Rotating the Eccentric Shaft slightly allows the shaft and Eccentric Shaft Support Bearing to pass through the upper brake opening. The opening is machined elliptical to allow this operation to take place.

Pull out Eccentric Shaft together with the Eccentric Shaft Support Bearing and discard. (Fig. 9.9)

NOTE: Care should be taken with the eccentric shaft removed that no rollers are dislodged from the Lower Eccentric Shaft Bearing, as this is an uncaged needle roller bearing assembly which is not replaced during this procedure.

CAUTION: Do not move the manual adjuster stem with the Eccentric shaft removed as this could cause the Adjuster Gear segment to become displaced. The consequence of this would be to make reassembly more difficult.

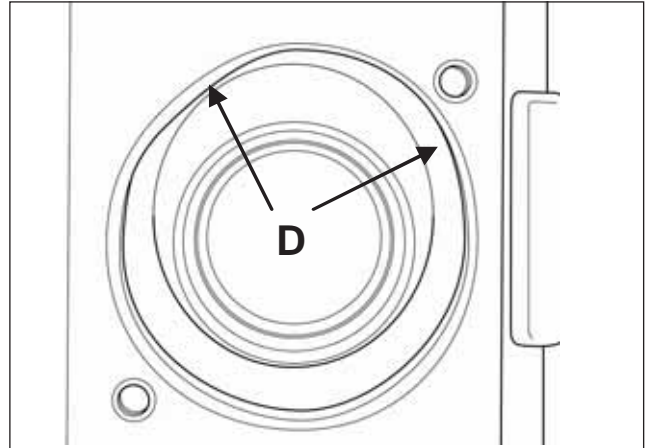


Fig 9.8

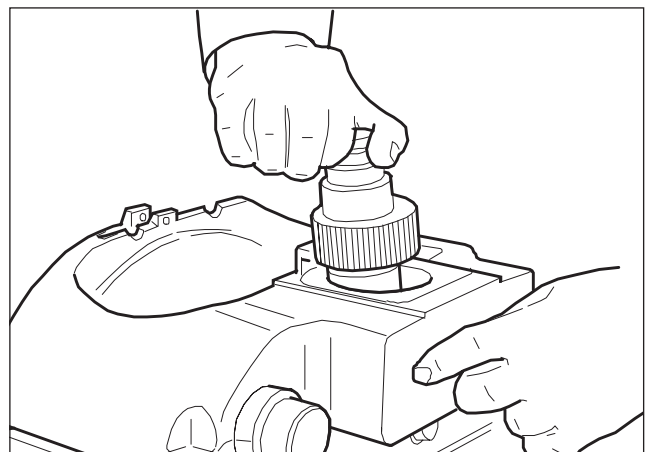


Fig 9.9

9 Eccentric Shaft Replacement

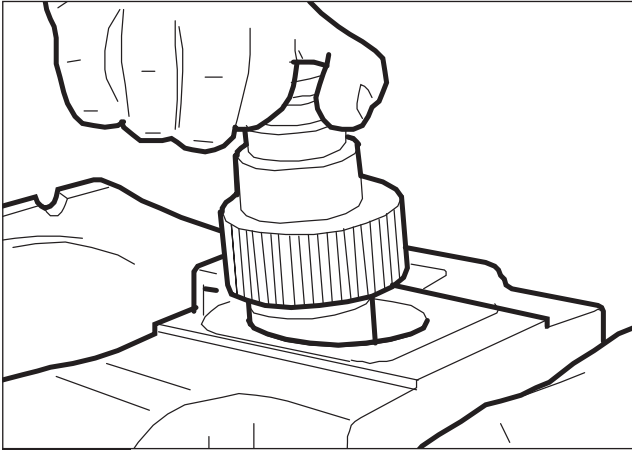


Fig 9.10

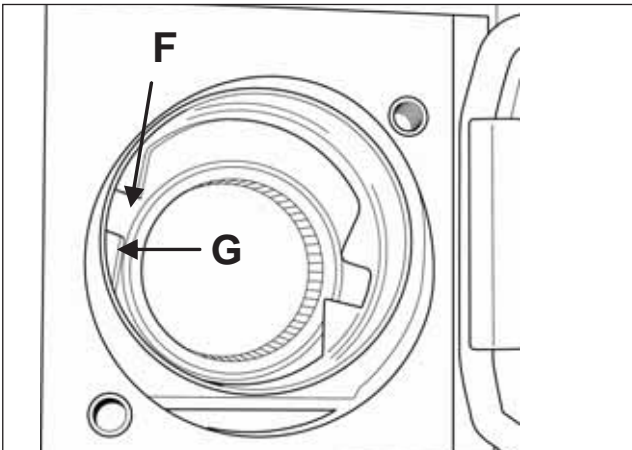


Fig 9.11

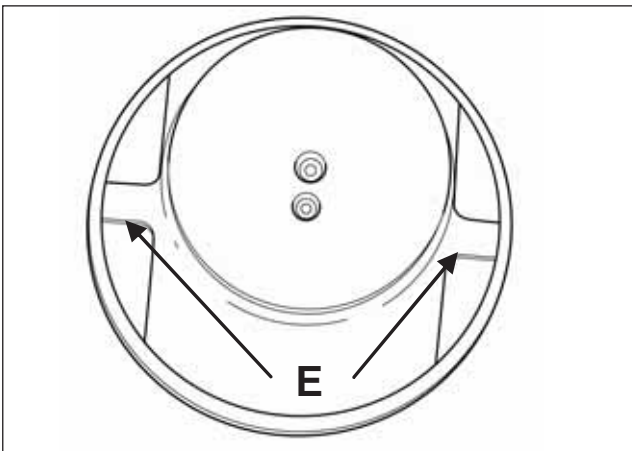


Fig 9.12

Reassembly

Apply lubricating grease (MBG 1003) to the Lower Eccentric Shaft Bearing within the housing, taking care not to allow the loose needle rollers to become displaced.

Apply lubricant grease (MBG 1003) to all bearing surfaces of new Eccentric Shaft. Position the new Eccentric Shaft Support Bearing in the seat on the eccentric shaft, and thoroughly lubricate the rollers.

NOTE: Only use the grease supplied with replacement components/kits, that is specified above or by the vehicle manufacturer. Under no circumstance should any other type of grease be used.

Insert the new Eccentric Shaft by passing it through the upper brake housing, align the eccentric high point with the machined elliptical section of the housing. Pass through the Actuation Block and the Adjuster Gear Segment. (Fig. 9.10)

NOTE: it may be necessary to very slightly rotate the eccentric shaft to ensure correct engagement of the eccentric shaft 'tongues' E into the adjuster gear segment "cut outs" F (Figs 9.11 & 9.12).

NOTE: If the Adjuster Gear Segment has been disturbed and before assembly ensure that the Adjuster Gear Segment G is correctly aligned, only the "cut out" segments F should be visible, the remainder of the segment should be concentric with the large diameter in the Actuation Block.

Assembly is correct when the Eccentric Shaft is fully engaged in the Adjuster Gear Segment "cut outs" F. (Figs. 9.11 & 9.12)

Failure to fully engage may be due to a displaced needle roller in the lower shaft bearing.

9 Eccentric Shaft Replacement

Check that rollers are correctly located, or if the Adjuster gear segment has become displaced, before repeating the assembly procedure.

At this point and before fitting the Cover Plate assembly, manually rotate the eccentric shaft several times, using the lever temporarily fitted, in order to check the function of the automatic adjustment mechanism thus ensuring all components are assembled correctly.

To check the function of the adjuster insert a hexagonal tool into the manual adjuster port.

NOTE: The hexagonal drive should rotate in one direction only in response to the rotation of the eccentric shaft. Failure to do so indicates that the 'eccentric shaft tongues' are not correctly engaged, therefore the assembly process should be repeated. It may be necessary to release the internal mechanism in the ADJUST direction if the components were 'locked' back during initial de-adjustment.

Thoroughly apply lubricant grease (MBG 1003) to the needle roller bearing **A** in the new Cover Plate assembly, taking care not to allow needle rollers to become displaced. At the same time, smear a thin film of grease (MBG 1003) to the inside diameter of the Cover Plate seal **B** (Fig. 9.13)

NOTE: Only use the grease supplied with replacement components/kits, that is specified above or by the vehicle manufacturer. Under no circumstance should any other type of grease be used.

Refit the stabiliser bar ensuring correct location in the brake.

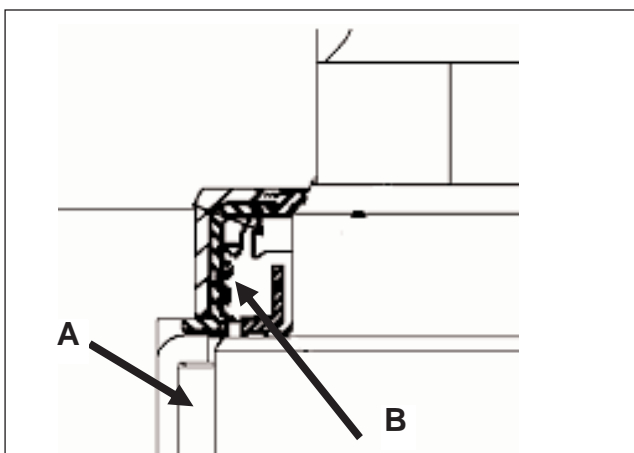


Fig 9.13

9 Eccentric Shaft Replacement

Apply a small bead of sealant (MBG 1002) on both sides of the new gasket. Position gasket on the cover plate and install the cover plate into the housing, ensure that the lugs on the gasket are positioned parallel with the rotor as shown in Fig 9.14. Fit the sensor bracket, if required and secure with 2 new screws (with thread locking compound previously applied) and tighten to a torque of 35 Nm.

NOTE: Only use the sealant supplied with replacement components/kits, that is specified above or by the vehicle manufacturer. Under no circumstance should any other type of sealant be used.

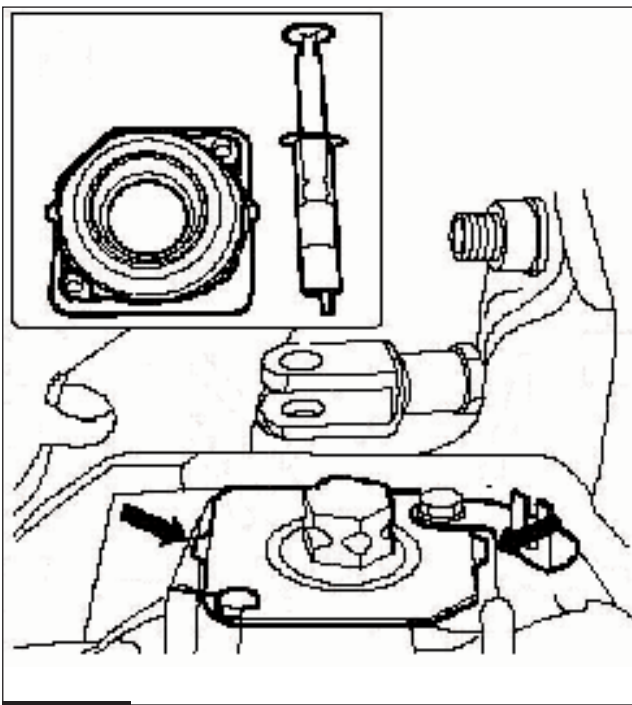


Fig 9.14

Refit the lever as described in **Section 6 Lever Replacement**.

Fit the new lever clamping screw and, where applicable, nut. Tighten to a torque of 30 Nm.

Manually actuate the lever several times in order to check for free movement of the eccentric shaft.

Before refitting brake to axle (if removed) or refitting the actuator, using a suitable hand grease gun containing grease from MBG 1006 (tin), pump grease into the grease nipple (Fig. 9.15) - six applications of the grease gun maximum.

CAUTION: The recommended grease is contained in MBT 1006. Do not use any grease other than that recommended by the vehicle manufacturer or supplied in the service kit. Only six applications of the grease gun maximum - grease extrusion may not be visible.

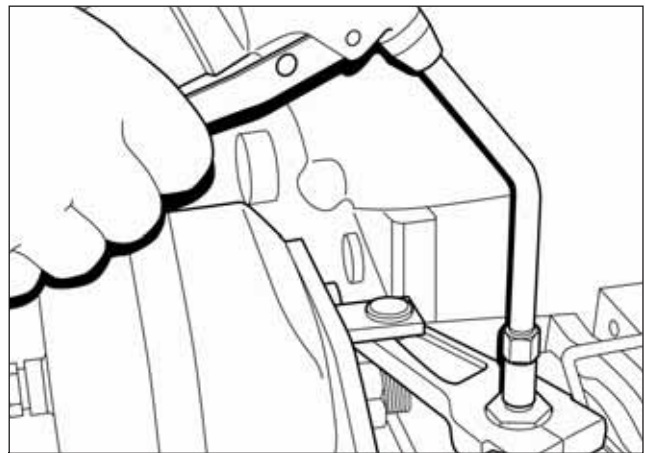


Fig 9.15

9 Eccentric Shaft Replacement

Refit brake to the axle (if removed) as described in **Section 4 Brake Replacement**.

Where applicable refit the air chamber as described in **Section 4 Brake Replacement**.

Fit the brake pads as described in **Section 3 Pad Replacement**.

Align the air chamber clevis on the lever, fit the clevis pin and split pin to retain.

Charge the air system and wind in the spring brake retraction screw (where applicable).

Apply the brakes 10 times to settle the pads and allow the auto adjuster to set the correct running clearance. Check that the rotor is free to rotate.

Refit the road wheels, remove the axle stands and lower the vehicle to the ground and road test.

Preventive Maintenance

NOTE: it is recommended that every 3 months, or at an interval deemed appropriate by the operator, the eccentric shaft is greased with 3 applications of grease (MBG 1006) from a standard hand held grease gun..

It is NOT recommended that an automatic lubrication system is fitted to the grease nipple.

NOTE: Only use the grease supplied with replacement components/kits, that is specified above or by the vehicle manufacturer. Under no circumstance should any other type of grease be used.

Slide Pin, Bush & Seal Replacement

10

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64 Re-assembly

10 Slide Pin, Bush & Seal Replacement

Park the vehicle on hard ground and chock the road wheels. Apply air pressure to release the park brake and wind off the spring brake retraction screw (where appropriate). Jack up the axle and fit suitable axle stands securely. Remove the road wheels and exhaust all air from the system.

Remove any dirt from the brake assembly. Ensure the rubber dust excluders fitted to the tappet heads, and where applicable, eccentric shaft are not damaged.



CAUTION: Never use an air line to blow dust from the brake/rotor area. If inhaled any form of dust can at best be an irritant, at worst dangerous. Whenever possible remove dry brake dust with a vacuum brush. Alternatively wipe the areas with a damp cloth, never try to accelerate drying time by using an air line.

IMPORTANT The brake assembly number should be noted in order to obtain the correct service kit.

Dismantling

Remove Clevis Pin connecting the air actuator (rotation chamber) pushrod to the brake actuating lever.

Remove the air chamber from the brake as described in **Section 4 Brake Replacement**. Support under the vehicle wheel arch in a position which does not cause undue strain on the connected air pipe.

Remove the brake pads as described in **Section 3 Pad Replacement**.

Cleaning and inspection

Worn brake pads must be replaced if the friction material level has worn to 3mm

With the brake pads removed check the integrity of the tappet excluders. They should be secure and free from any signs of damage.

It is advisable at this stage to carry out cleaning and examination of the brake and rotor as described in **Section 2 Operational checks**.

Remove all traces of scale, dirt etc, from pad apertures and abutment faces that may restrict the

movement of the pads and, therefore, prevent sufficient adjustment of the brake. Clean the 8 pad support plates in the saddle with a wire brush removing any build-up of debris or rust. This allows the new pads to be correctly seated in position

Remove the brake assembly as described in **Section 4 Brake Replacement**.

To replace the slide pin arrangement, it will be necessary to remove the slide pin screws. As there are at a very high torques used, the mounting device should be clamped onto a sturdy workbench. (Service Tool DXT 17)

Using a hammer and suitable drift, knock out and discard the 2 Slide Pin Covers A (Fig. 10.1)

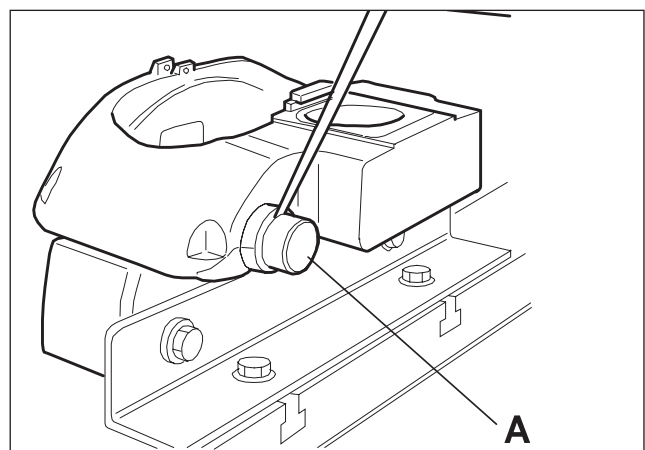


Fig 10.1

10 Slide Pin, Bush & Seal Replacement

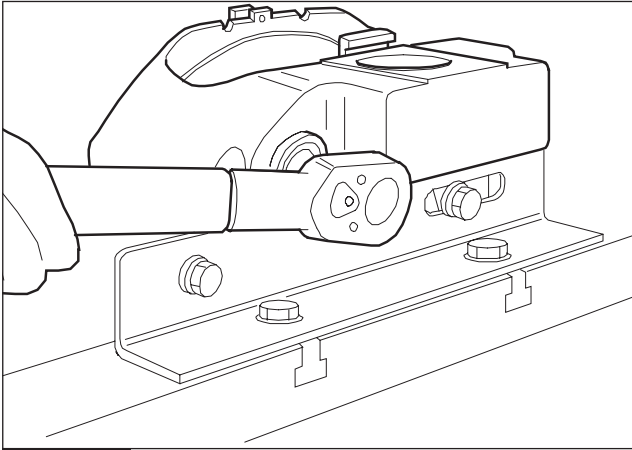


Fig 10.2

Remove and discard the 2 Slide Pin Screws. Due to the high tightening torque, use wrench with a suitable adaptor or extension. (Fig. 10.2)

NOTE: Slide Pin Screws may be different in length. Make a note or mark the brake body in order to identify the correct screw positions. The Slide Pins are also different (slight difference on the outside diameter) and counter bore different depth to accommodate the different length screws. (Fig. 10.3)

Remove the brake body from the saddle.

Remove the 2 Slide Pins from the brake and discard.

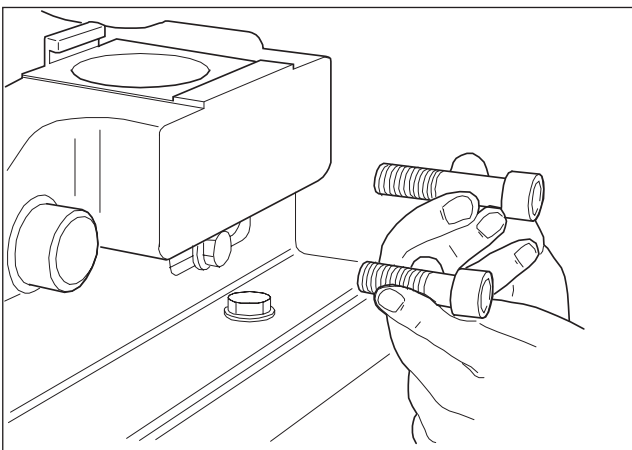


Fig 10.3

NOTE: Ensure to MARK the respective positions of the 2 slide pins and screws i.e. Long and short

Remove and discard the two Slide Pin Excluder seals from the brake. (Fig. 10.4)

Press or tap out the old bushes using the correct ArvinMeritor service tool DXT 03 (Fig. 10.5).

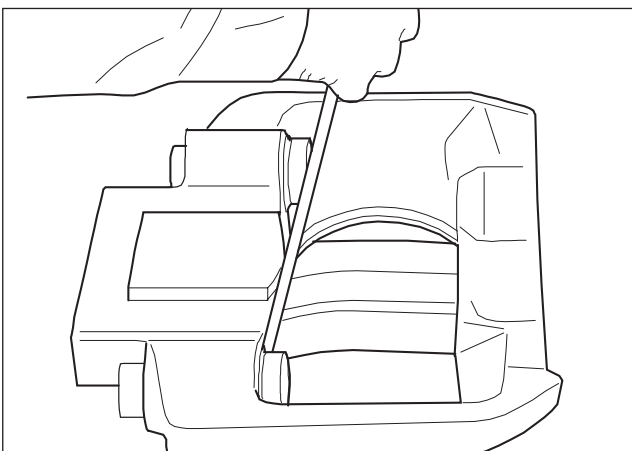


Fig 10.4

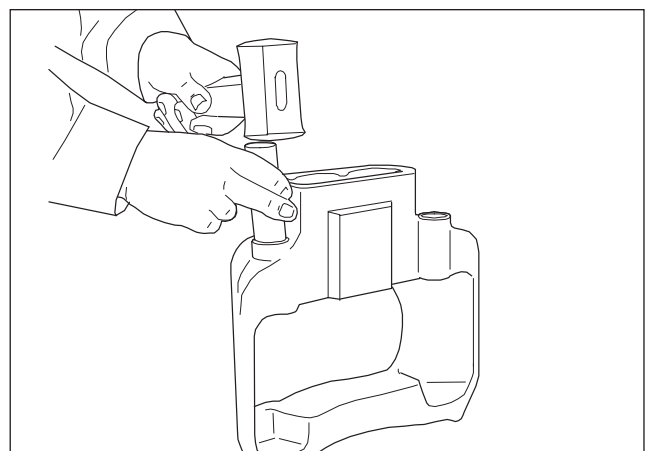


Fig 10.5

10 Slide Pin, Bush & Seal Replacement

Re-assembly

Clean the housing and remove all traces of old sealant from both ends of the slide pin bush bores. Fit the first new Slide Pin Bush onto the correct ArvinMeritor service tool DXT 06 and carefully locate in the mouth of the bore of the housing. Use a press to press the bush in until the shoulder of the tool contacts the housing. Lift the tool out of the housing and fit the second bush and press the bush in until the shoulder of the tool contacts the housing.

Repeat above for the other housing slide pin bore.



CAUTION: Do not try to hammer in bushes as this could damage the edge of the bush and prevent the fitting of the new slide pin (fig 10.6).

Check the dimension (2.50mm) as shown in Fig 10.7. The bush must be below shoulder of bore by the dimension indicated (Fig. 10.7).

Fit new Slide Pin Excluders seals. Before re-assembly, apply a sealant (MBG 1002) on the outside diameter of the metal ring insert. (Fig. 10.8)

NOTE: Only use the sealant supplied with replacement components/kits, that is specified above or by the vehicle manufacturer. Under no circumstance should any other type of sealant be used.

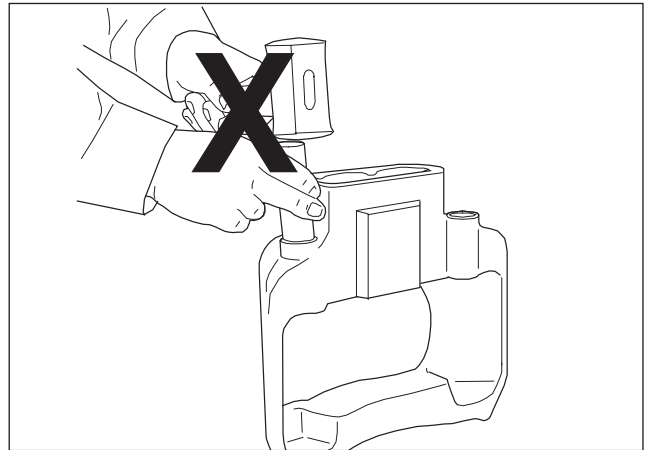


Fig 10.6

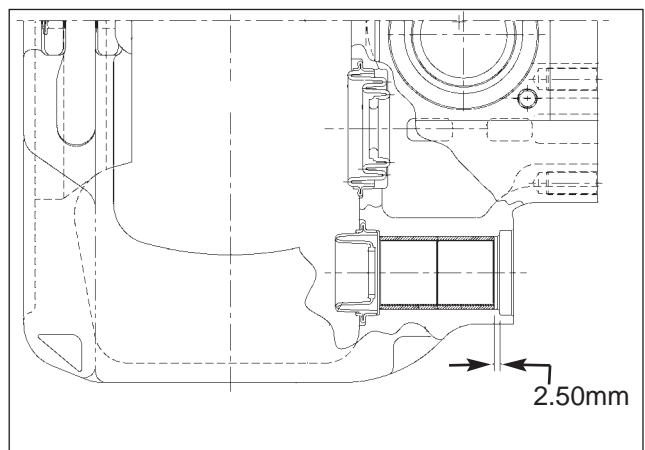


Fig 10.7

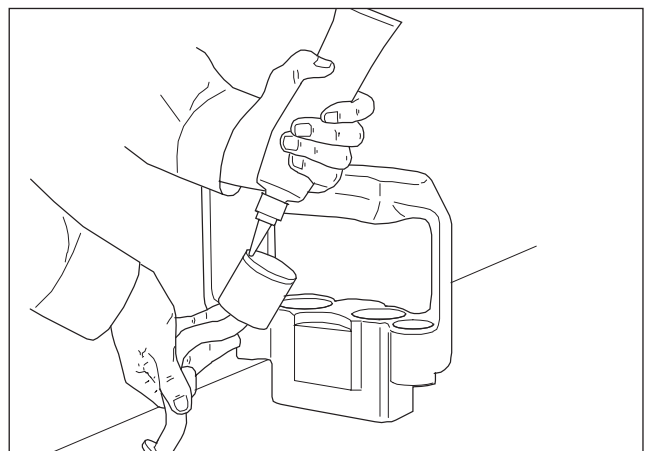



Fig 10.8

10 Slide Pin, Bush & Seal Replacement

Tap into position with the correct ArvinMeritor service tool DXT 11 (Fig. 10.9).

NOTE: it may be necessary to wind out (adjust) brake in order to gain access with the service tool behind the "thrust plate". With the brake adjusted, it is possible to move the thrust plate to gain access with the tool.

 **WARNING:** Do not release thrust plate fixing screws to gain access.

When inserted ensure that the excluder metal ring is fully home and flush with the housing.

Fit new Slide Pins into the bushes, applying lubricant (MBG 1004) on to the outside surface on the pins and within the bush in the brake body.

NOTE: The Slide Pin with the short screw (and outer diameter slightly oversized) should be installed on the right hand side (looking at the brake from the end plate) on brakes with clockwise lever actuation, the opposite applies for brakes with counter clockwise lever actuation.

NOTE: Only use the grease supplied with replacement components/kits, that is specified above or by the vehicle manufacturer. Under no circumstance should any other type of grease be used.

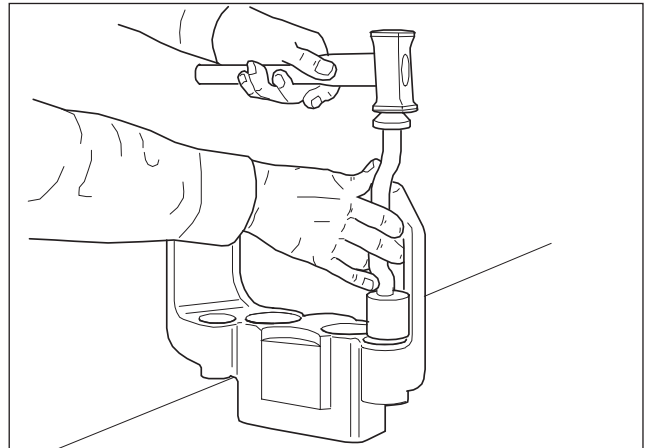



Fig 10.9

Position the collar of the rubber seal in the appropriate slot on the slide pin and ensure the excluder is correctly located. (Fig. 10.10)

 **WARNING** Clean any traces of thread tightening compound from all inner threads of brake components. Use only new screws during maintenance. The use of old screws is very dangerous and can seriously affect brake performance.

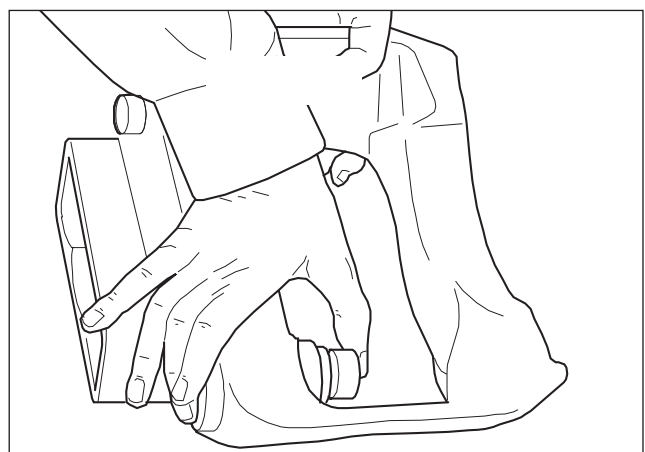


Fig 10.10

10 Slide Pin, Bush & Seal Replacement

For ease of assembly, remove saddle from the bench mounting device, offer the saddle to the brake body and align the slide pins with the corresponding seats in the saddle. Insert the new Slide Pin Screws, with the pre-applied thread locking compound and hand tighten. Refit assembly to the bench mounting device and finally tighten the screws to the specified torque - (Fig. 10.11)

DX 175 - Hexagon head	240 Nm +/- 15 Nm
Torx head	200 Nm +/- 10 Nm

After torque tightening the locking screws, ensure that the brake slides freely on the slide pins. Install new slide pin caps. Before reassemble, apply a small bead of sealant (MBG 1002) to the edge of the new Slide Pin Cap. Press or tap the end caps into position using the ArvinMeritor service tool DXT 18 (Fig. 10.12)

NOTE: Only use the sealant supplied with replacement components/kits, that is specified above or by the vehicle manufacturer. Under no circumstance should any other type of sealant be used.

Ensure that the caps are fully located. Refit brake to the axle as described in **Section 4 Brake Replacement**.

Refit the air chambers described in **Section 4 Brake Replacement**.

Refit the brake pads as described in **Section 3 Pad Replacement**.

Charge the air system and wind in the spring brake retraction screw (where applicable).

Apply the brakes 10 times to settle the pads and allow the auto adjuster to set the correct running clearance. Check that the rotor is free to rotate.

Refit the road wheels, remove the axle stands and lower the vehicle to the ground.

Road test.

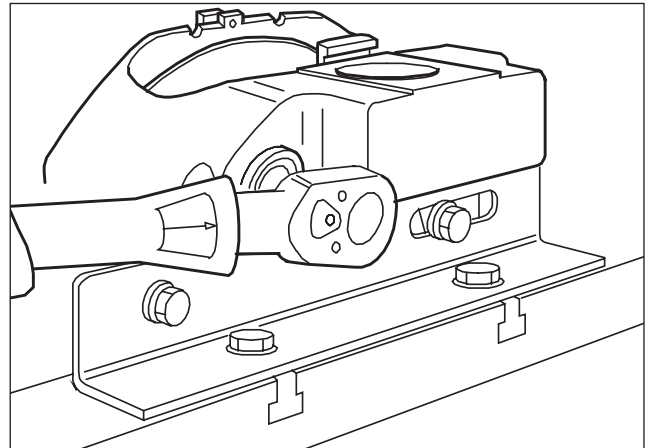


Fig 10.11

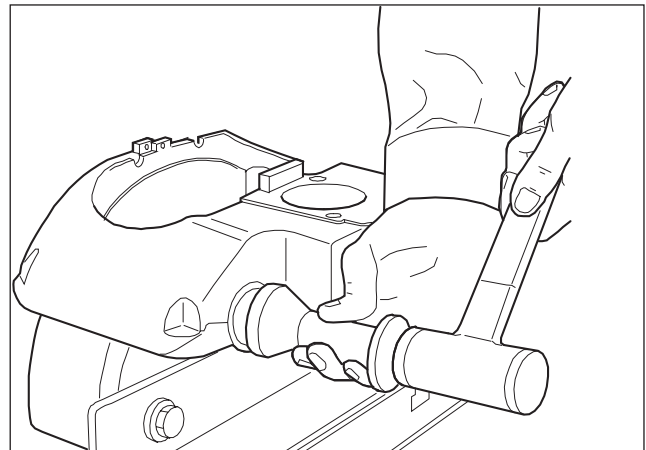
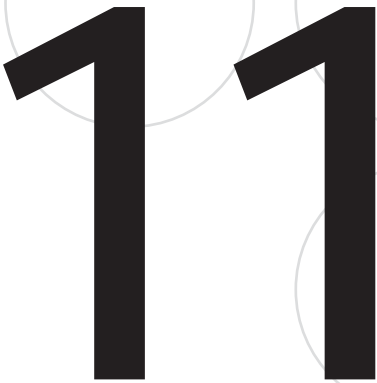


Fig 10.12

Rotor Wear Conditions for Rework or Replacement

A large, bold, black number '11' is centered on the page. The number is composed of two vertical bars with a slight top-left slant. The background features several faint, light gray circles of varying sizes scattered across the page.

- pg. 69 New rotor condition
- 69 Maximum permissible wear
- 69 Uneven rotor wear

11 Rotor Wear Conditions for Rework or Replacement

This document explains safe working practices for the limitations of a rotor life for the Meritor DX 175 Air Disc Brake, with a pad back plate thickness of 8mm or above.

Dimension Detail	mm
New Rotor Thickness	34
Minimum Resurfacing Thickness	30
Minimum Fully Worn Thickness	28
Pad Back Plate Thickness	8
Carrier Rotor Gap	38.7
Minimum Friction Material Thickness	3

New Rotor Condition - Fig 11.1

The rotor nominal maximum thickness (new condition) is 34mm.

The rotor gap between the carrier abutments of the brake assembly is 38.7mm nominally. Therefore, if the rotor is central to the carrier abutments an equal clearance of 2.3mm nominally is achieved either side of the rotor. However, due to tolerances the rotor is not always central to the carrier abutment gap and this may result in the rotor requiring to be replaced before being worn to the minimum thickness.

Maximum permissible Rotor Wear - Fig 11.2

The rotor is permitted to wear to a minimum thickness of 28mm provided that there a maximum wear of no more than 3mm off anyone rotor face. When equal wear is achieved on both sides of the rotor, the rotor maintains a central position in the carrier abutments.

Uneven Rotor Wear - Fig 11.3

In many cases where uneven wear takes place the rotor is required to be replaced before wearing down to the minimum 28mm thickness. In the case of uneven rotor wear it is important that the gap between rotor and carrier abutment must not exceed 5.3mm.



CAUTION: You must always renew the rotor on both wheels of an axle. Only use the rotors that have been approved by the vehicle manufacturer.

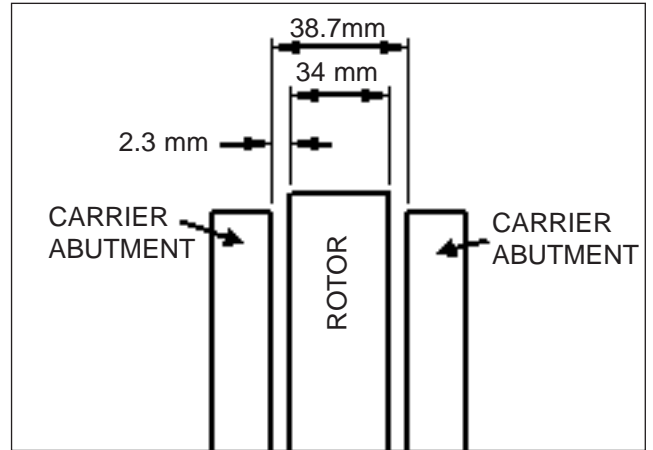


Fig 11.1

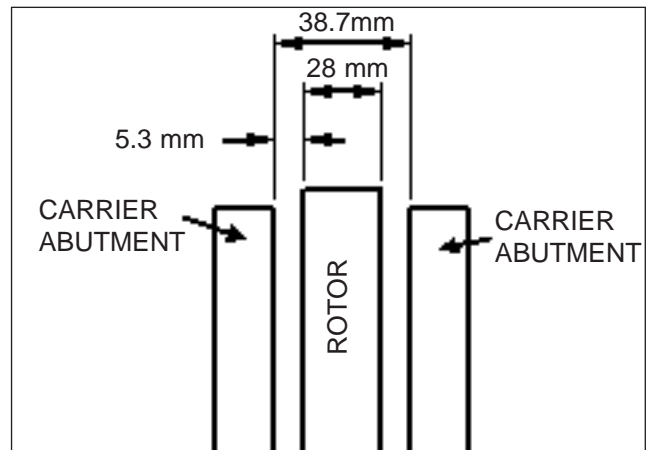


Fig 11.2

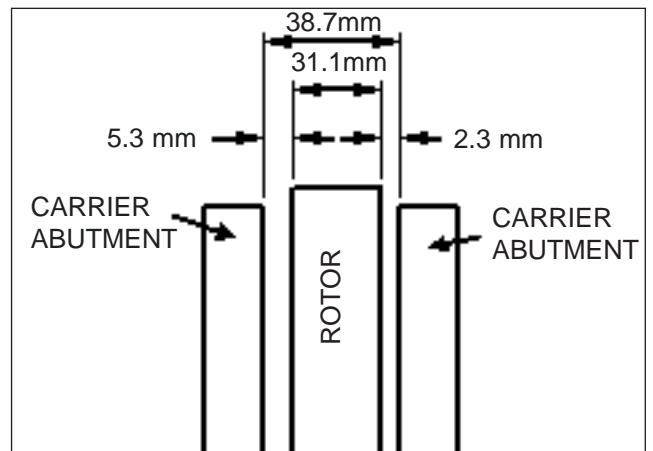


Fig 11.3

11 Rotor Wear Conditions for Rework or Replacement



WARNING: To ignore these recommendations could result in severe damage to the wheel end assembly due to heat damage from metal pad back plate contacting the rotor. To wear the pad back plate down to a thickness where it is possible to be trapped between carrier abutments and rotor could cause the wheel to lock at best and pad back plates to come out of the brake assembly at worst. If these recommendations are not followed this negates any warranty claim and ArvinMeritor cannot be held responsible for operator neglect.

Servicing & Maintenance

12

pg. 73	Maintenance intervals
74	Maintenance operation
74	Recommended lubricants
74	Tightening torques

12 Servicing & Maintenance

Maintenance Intervals

Although there is no routine maintenance of the brake assembly required, it is important the following inspections are carried out at the periods specified, or those detailed in the vehicle or trailer manufacturer's manual.

Service intervals

Every 3 months or 20000 km.

It is recommended at this interval, or at an interval deemed appropriate by the operator, the eccentric shaft is regreased with 3 applications of recommended ArvinMeritor Grease MBG 1006 grease from a standard hand held grease gun.


It not recommended that an automatic lubrication system if fitted to the grease nipple.

A visual inspection of pad life should be made. Brake pads should be replaced when the lining thickness has worn to 3.0 mm. Visually inspect the general condition of the brake assembly for damage or corrosion.

Inspect the slide pin and actuating piston seal excluders and ensure they are undamaged and securely located. If any of the excluders are detached or damaged the relevant part of the brake should be dismantled and the components examined for corrosion and damage. If there is any doubt in the suitability for further service, replace/rectify in accordance with the instructions of this manual or the vehicle/trailer manufacturer's instructions.

Every 12 months or at the vehicle / trailer manufacturer's recommendations.


Remove brake pads as described in **Section 3 Pad Replacement**. Inspect the slide pin and actuating piston seal excluders and ensure they are undamaged and securely located. If any of the excluders are detached or damaged the relevant part of the brake should be dismantled and the components examined for corrosion and damage. Replace/rectify in accordance with the vehicle /trailer manufacturer's instructions.

 **CAUTION** You must always renew the brake pads on both wheels of an axle. Only use the brake pads that have been approved by the vehicle manufacturer. Brake pads must be replaced when the lining thickness has worn to 3mm minimum.


Check the housing assembly slides easily on the slide pins secured to the saddle. If the housing does not slide easily, remove from the saddle as described in **Section 10 Slide Pin & Bushing Replacement**.

If there is any doubt in the suitability for further service, replace with new components.

Check the slide pin bush for wear in line with instructions in **Section 2 Operational checks**.

 **WARNING** Take care not to trap fingers whilst checking the sliding action of the brake.

Check the brake rotor for signs of heavy grooving; cracking or corrosion as described in **Section 2 Operational checks**, and the thickness dimension are in accordance with **Section 11 Rotor Wear Conditions**, or the recommendations of the manual of the vehicle/trailer manufacturer's recommendations.

 **CAUTION:** You must always renew the rotor on both wheels of an axle. Only use the rotors that have been approved by the vehicle manufacturer.

NOTE: These service intervals are meant as a guide, the frequency should be tailored to suit the environmental conditions of the brake assembly and hence to the vehicle/trailer operating conditions, so therefore it is up to the operator to determine the most appropriate service intervals with technical support from ArvinMeritor if necessary.

These service intervals are the maximum recommended times under normal operating conditions. Extreme temperatures or adverse conditions (e.g. dusty or severe environments, frequent uphill driving, very low temperatures) will require more frequent servicing. It is the responsibility of the vehicle operator to schedule these intervals, with technical support from ArvinMeritor if necessary.

In some cases, it is possible to carry out operations with brake unit mounted on vehicle. However, ArvinMeritor recommends that all operations (with the exception of pad replacement and operating tests) be carried out with the brake unit removed from vehicle and installed on bench. This promotes safer working conditions and better results.

12 Servicing & Maintenance

Maintenance operations

In order to ensure reliable and efficient brake operation, recommended maintenance intervals, lubricants and correct procedures should be followed carefully.

Recommended lubricants

ArvinMeritor recommends the use of two lubricating greases (available as spare parts).

Code Use

MBG 1003 (sachet of grease) or MBT 1006 (tin of grease) Use on all actuation and adjustment system components

MBG 1004 (lubricating oil) Use only for slide pin plain bearings (bushings)



WARNING: Only original ArvinMeritor spare parts should be used. Use of non-recommended lubricants shall adversely affect performance and service life. Use of non-original parts could seriously affect brake performance.

Tightening Torques (Nm)

<u>Part Ref (Figs 1.1 & 1.2)</u>	<u>Description</u>	<u>DX 175</u>
<u>32</u>	<u>Adjuster device screw</u>	<u>10</u>
<u>12-14</u>	<u>Lever clamp screw</u>	<u>30</u>
<u>37</u>	<u>Slide pin locking screws:</u>	
	<u>Socket Head</u>	<u>240</u>
	<u>Torx Head</u>	<u>200</u>
<u>9</u>	<u>Cover plate screws</u>	<u>35</u>

Service Diagnosis

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pg. 77 Service diagnosis tables

13 Service Diagnosis

Condition	Possible Cause	Check For	Corrections
Brake Drag	Incorrect initial adjustment	Correct pad-to-rotor clearance	Readjust to set the correct rotor-to- pad clearance
	Incorrect pad-to-rotor clearance	Automatic adjuster function	Replace adjuster, housing or brake assembly
	Spring or service brake not releasing	Correct operation of air system or air chamber	Refer to the vehicle manufacturer's instructions. Repair or replace parts as required
	Vehicle air system		
	Air line too short	Correct air line length	Replace the air line. Refer to the vehicle manufacturer's instructions
	Brake not releasing	Damaged guide pin excluders; Housing should move back and forth by hand with linings removed	Replace guide pins, excluders and bushes
			Replace the brake assembly
		Water entry or seized operation shaft, internal	Replace operating shaft and air chamber
			Replace housing or brake assembly and air chamber
	Tappets not releasing: Damaged tappet excluders	Replace tappets, bushes and excluders	
Replace housing or brake assembly			
Short brake pad lining life	Refer to Brake Drag	Refer to Brake Drag	Refer to Brake Drag
	Damaged rotor surface	Cracks or heavy heat spotting / banding	Refer to the vehicle manufacturers instructions or brake maintenance manual. Repair or replace parts as required
	Vehicle overload	Refer to weight limitations on the vehicle identification plate	Observe the vehicle manufacturers load recommendations
	Companion brakes do not work correctly	Inspect the companion vehicle brakes and air system.	Adjust or repair as required
Smoking brakes	High brake temperature	Refer to Brake Drag and Short brake pad lining life	Refer to Brake Drag and Short brake pad lining life: Can be a temporary situation with new or low mileage pads
	Contamination on the linings or rotor	Grease, oil, undercoating, paint, etc., on the linings or rotor	Inspect the hub seal. Replace as required
			Clean the rotor and brake assembly
		Replace the axle set of pads	

13 Service Diagnosis

Condition	Possible Cause	Check For	Corrections
. Poor stopping power . Long stopping distances . High brake pressures . Poor driver feel . Vehicle pulls to one side	Vehicle air system malfunction	Correct air pressure at the chamber inlet	Have the air system evaluated by a qualified brake system specialist
	Contamination on the linings or rotor	Grease, oil, undercoating, paint, etc., on the linings or rotor	Inspect the hub seal. Replace as required
			Clean the rotor and brake assembly
			Replace the axle set of pads
	Companion brakes not working correctly	Inspect the companion vehicle brakes and air system	Adjust or repair as required
	Brakes out-of-adjustment	Excessive pad-to-rotor clearance	Readjust to set the correct pad-to-rotor clearance
		Automatic adjuster function	Replace adjuster or housing assembly
	Pads not sliding in carrier / saddle	Excessive dirt / corrosion in pad locations	Clean pads and carrier / saddle locations
		Excessive wear in pad locations	Fit new carrier / saddle
	Incorrect pads installed	Refer to the vehicle manufacturer for the correct pads	Replace the axle set of pads
	Spreader / Thrust Plate not sliding smoothly in carrier / saddle	Spreader / Thrust Plate not sliding smoothly in carrier / saddle	Loosen plate fixing screw/s. Reposition plate on pistons / tappets. Re-tighten screw/s to specified torque
	Brake seized or sticking on guide pins	Damaged guide pin excluders; housing should move back and forth by hand with linings removed	Replace guide pins, excluders and bushes
			Replace the brake assembly
Vehicle overload	Refer to the weight limitations on the vehicle identification plate	Observe the vehicle manufacturer's load recommendations	
Brake noise/ Judder	Incorrect pad installation	Friction material facing the brake not the rotor surface	Correct the pad installation. Replace the pads and rotor, if necessary
	Incorrect pads installed	Refer to the vehicle manufacturer for the correct pads	Replace the axle set of pads

13 Service Diagnosis

Condition	Possible Cause	Check For	Corrections
Brake noise/ Judder, continued	Brake pads not free to move in the brake	Corrosion or debris on the pads or carrier / saddle pad locations	Clean or replace the pads, if necessary. Clean the pad locations on the carrier / saddle
		Excessive wear in pad locations	Fit new carrier / saddle
	Worn brake pads	Lining thickness	Replace the axle set of pads, if necessary
	Loose pads	Bent pad retainer or loose pad retainer screw	Replace or tighten the pad retainer
	Pad spring damaged or not installed	Correct pad spring installation	Install the pad springs
	Rotor cracks or excessive run-out / thickness variation	Excessive cracking, heat spotting / banding or run-out / rotor thickness variation	Refer to the vehicle manufacturer's instructions or brake maintenance manual. Repair or replace parts as required
	Brake component attachments are not installed to specification	Check for loose connections and fasteners	Tighten the connections and fasteners to the specified torque

Service Tools

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- pg. 81 DXT 03
- 81 DXT 06
- 81 DXT 08, DXT 11, DXT 18
- 81 DXT 17
- 82 DXT 19
- 82 DXT 20
- 82 MST 1018

14 Service Tools

DXT 03 Bush Removal Tool (DX175)

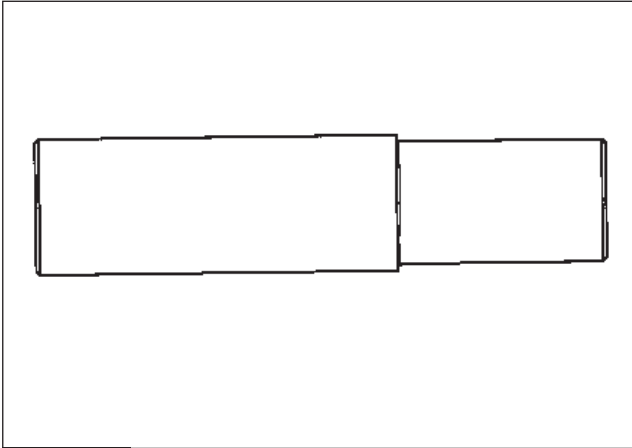


Fig 15.1

DXT 08 Piston Excluder Insertion Tool (DX175)

DXT 11 Slide Pin Excluder Insertion Tool (DX175)

DXT 18 Slide Pin Cover Insertion Tool (DX175)

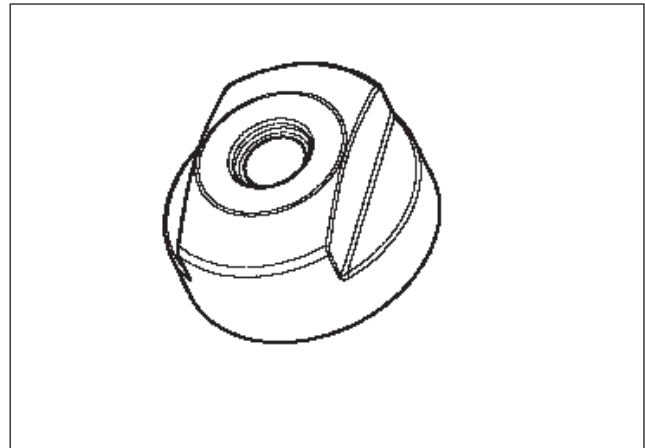


Fig 15.3

DXT 06 Bush Insertion Tool (DX175)

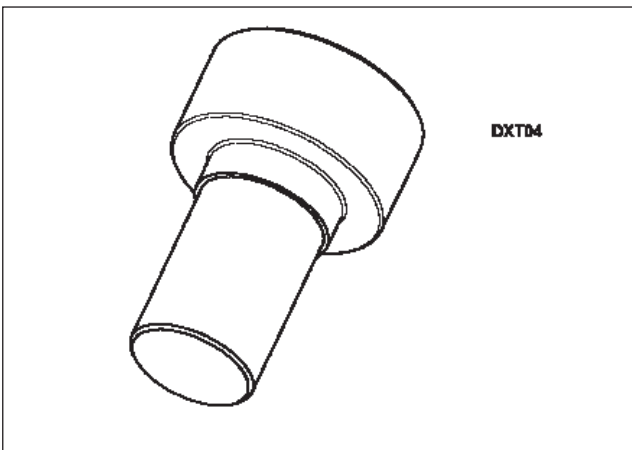


Fig 15.2

DXT 17 Brake Support [universal - All DX]

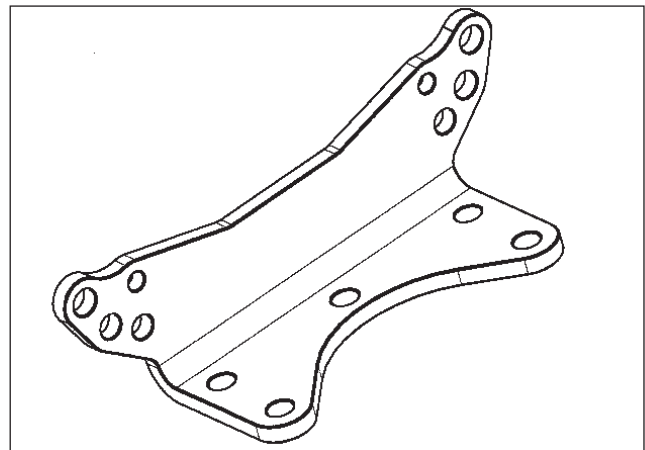


Fig 15.4

14 Service Tools

DXT 19 Universal Handle Tool (All DX)

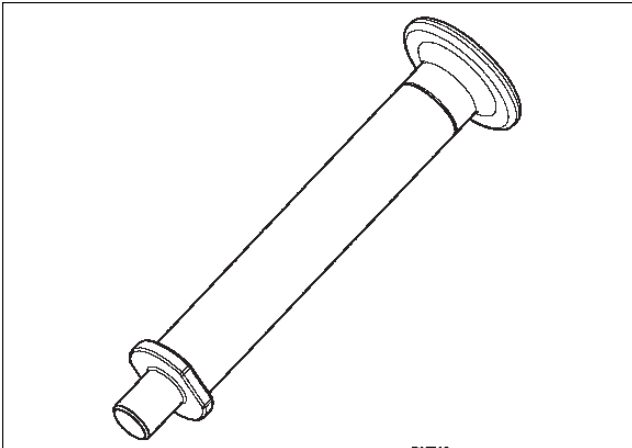


Fig 15.5

MST 1018 Frame Lift Adaptor (All DX)

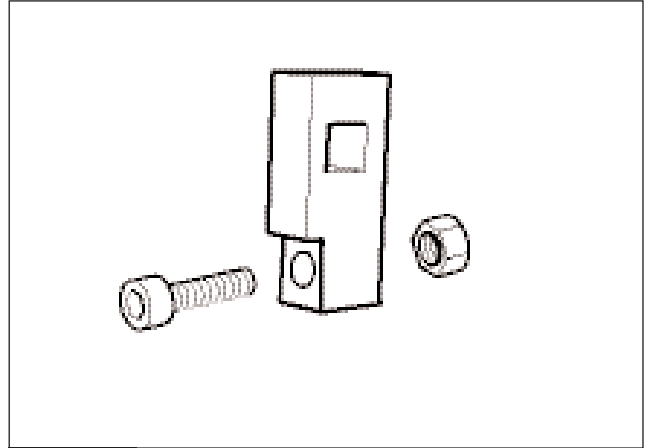


Fig 15.7

DXT 20 Universal Shaped Handle Tool (All DX)

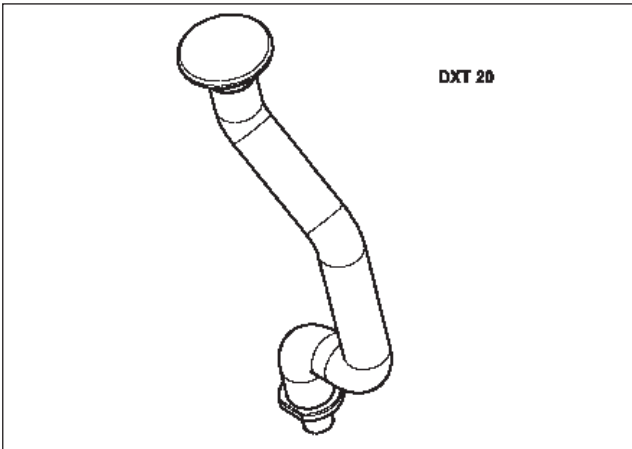


Fig 15.6

ArvinMeritor Heavy Vehicle Braking Systems

Grange Road, Cwmbran
South Wales NP44 3XU - U.K.
Tel.: +44 (0) 1633 834238
Fax: +44 (0) 1633 834191
www.arvinmeritor.com

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