

# Meritor Inc. Trailer Axle Service Manual LM & LC Series

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# General Information

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# 1 General Information

## Service Notes

This manual describes the correct lubrication, service and installation procedures for Meritor Inc.'s LM & LC series axles. Information contained in this publication was in effect at the time the publication was approved for printing and is subject to change without notice or liability.

The designated trademarks are registered marks of their respective owners and Meritor Inc. and its affiliates are not commercially connected, affiliated, or associated with any of the owners of such marks. The Meritor Inc. products presented herein are not endorsed or authorised by any of the trademark owners.

You must follow company procedures and understand all procedures and instructions before you begin to service or repair a unit. Some procedures require the use of special tools and lubricants for safe and correct service. Failure to use special tools when required can cause serious personal injury to service personnel, as well as damage to equipment and components.

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



### WARNING

A Warning indicates you must follow a procedure exactly. Otherwise serious Personal injury can occur.

### NOTE:

A NOTE indicates an operation, procedure or instruction that is important for correct service. A NOTE can also supply information that can help to make service quicker and easier.



### CAUTION

A caution indicates that you must follow a procedure exactly. Otherwise, damage to equipment or components can occur. Serious personal injury can also result, in addition to damaged or malfunctioning equipment or components.



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

## Safety Instructions

- Observe the manufacturer's safety instructions for jacking up and securing the vehicle
- Only use original Meritor Inc. parts
- Use only the tools recommended.
- Observe the following service instructions and notes
- When working on the brake assembly you must ensure that it cannot be activated inadvertently.
- Always ensure appropriate safety glasses and gloves are worn when carrying out the procedures detailed in this publication.
- 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 Meritor Inc. brake cleaner for cleaning the brake assembly.
- When removing or fitting a complete brake assembly, you should remember it has a dead weight of up to 120lbs (55kg). Use a lifting system, taking care not to damage the brake assembly.



**CAUTION:** Ensure any grease removed from the assembly/components, or contaminated cloth, is disposed of in accordance with local environmental regulations.



**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:** Ensure any discarded friction product, or cloth contaminated with brake dust, is disposed of in accordance with local environmental regulations.



**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 Meritor Inc.'s Web Site

Additional maintenance and service information for Meritor Inc.'s commercial vehicle systems component lineup is also available at [www.meritor.com](http://www.meritor.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.

## Meritor Inc. Axle Warranty

For full warranty terms and conditions see 'Meritor Inc. Warranty Terms and Conditions

Unless otherwise stated, Aftermarket components are warranted for 1 year, parts only, mechanical failure only.

## Warranty Procedure

Should any Meritor Inc. equipment fitted to your trailer become unserviceable within the warranty period, contact the trailer manufacturer or Meritor Inc. Service Department who will advise on the appropriate action.

A comprehensive network of original parts distributors and service stations operate throughout Europe; this is supported internationally with agents strategically placed around the world.

MERITOR Inc. reserves the right to make changes in specifications shown herein or add improvements at any time without notice or obligation.

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*The high quality assurance management systems applied by Meritor Inc. are endorsed with the awarding of ISO 9001, Lloyd's Register Quality Assurance.*

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# Introduction

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## 2 Introduction

### Introduction to the LM Axle Range

The Meritor LM range of axles are manufactured to the same high standards expected of all Meritor products.

The LM Series has been specifically designed, as its name implies, for Low Maintenance and hence reduced cost of ownership whilst furthering Meritor's reputation for low weight.

### Introduction to the LC Axle Range

The LC cartridge bearing hub is an innovative addition to the standard LM axle range. Meritor Inc. were the first axle manufacturer to offer this fully sealed bearing unit in European trailer axles.

The LC offers the optimum combination of bearing performance and reduced service times.

The cartridge bearing is manufactured to extreme levels of accuracy allowing it to be operated in a precisely controlled pre-loaded condition for optimum life performance. Whilst the hub can be left for up to 7 years without removal from the beam, the sealed bearing allows for quick and clean routine brake servicing should the hub need to be removed more frequently.

### Axle Installation

The following notes and recommendations are offered as a guide to the trailer manufacturer and service engineer. They are based on experience gained from both the manufacture and servicing of single and multiple axle installations.

### Limitations of Use

The following limitations apply to the LM series axles.

For normal road and RO-RO use at 9 tonne axle weight the LM9000 (13mm wall) beam is authorised for Meritor air and mechanical suspensions only when assembled by Meritor. In all other instances of normal road, RO-RO, and unrestricted tipper use at 9 tonne axle weight using non-Meritor suspensions, air or mechanical, the LM9300 (16mm wall) beam must be used.

For extreme conditions, i.e. narrow frame centres (<1100mm), high centre of gravity (>2000mm) please consult Meritor Technical Sales Department.

In cases where suspensions of non-Meritor manufacture are used, the trailer builder or suspension manufacturer must satisfy themselves as to the suitability and compatibility of the axle and suspension, particularly from a durability standpoint. Meritor will be pleased to assist in assessing such compatibility, but cannot warrant the fitment of its axles to suspensions of unknown characteristics.

## 2 Introduction

### Exploded View - LM Hub Assembly

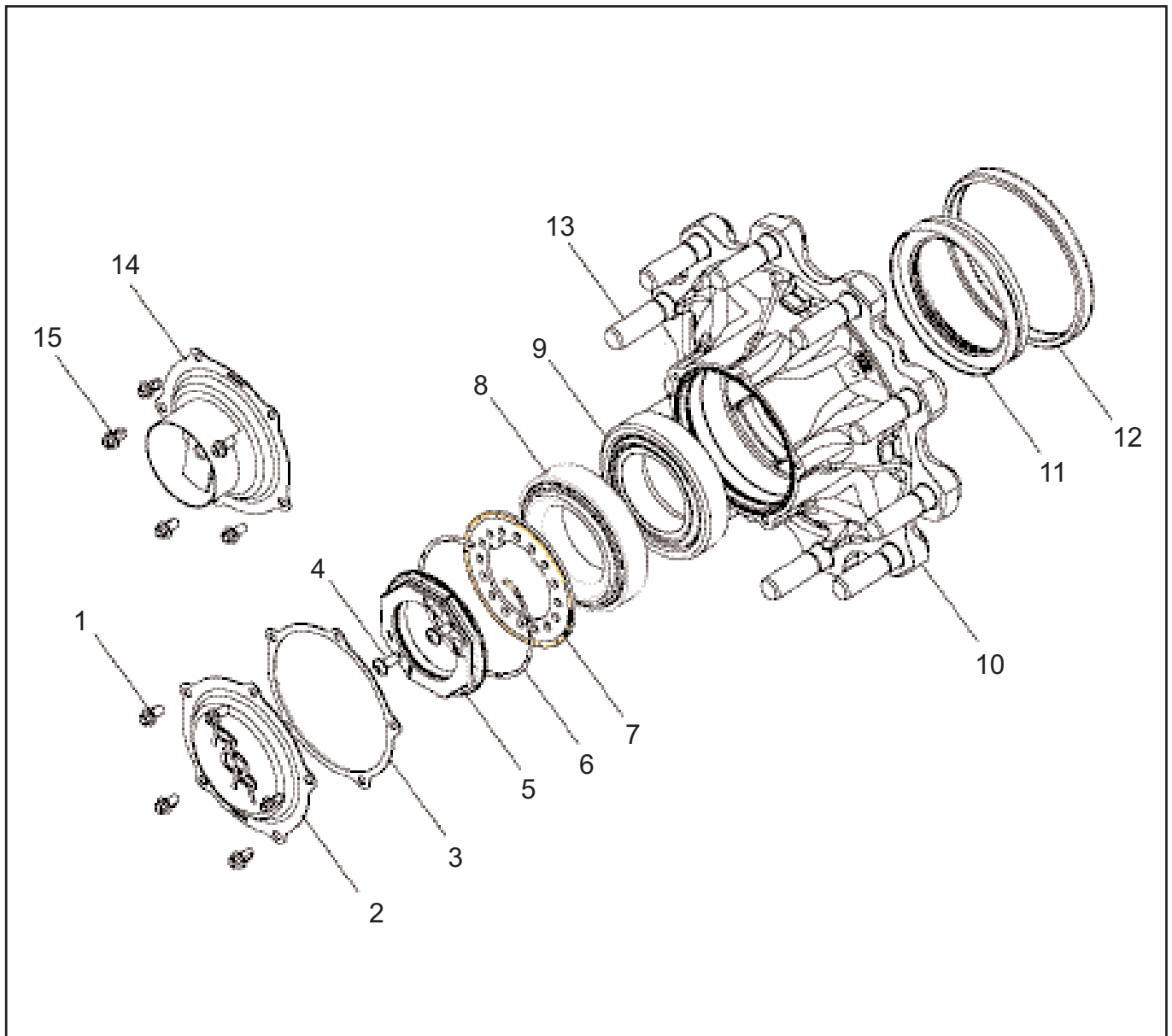


Fig 2.1

Item	Description	QTY (per axle)	Item	Description	QTY (per axle)
1	Retaining Screw	10	12	ABS Pole Wheel (Drumbrakes only)	2
2	Hub Cap	2	13	Wheel Stud	20
3	Gasket	2	14	Odmeter Hub Cap	2
4	Button Head Screw	4	15	Retaining Screw	10
5	Hub Locknut	2			
6	Retaining Clip	2			
7	Retaining Washer	2			
8	Outer Bearing	2			
9	Inner Bearing	2			
10	Hub	2			
11	Seal	2			

## 2 Introduction

### Exploded View - LC Hub Assembly

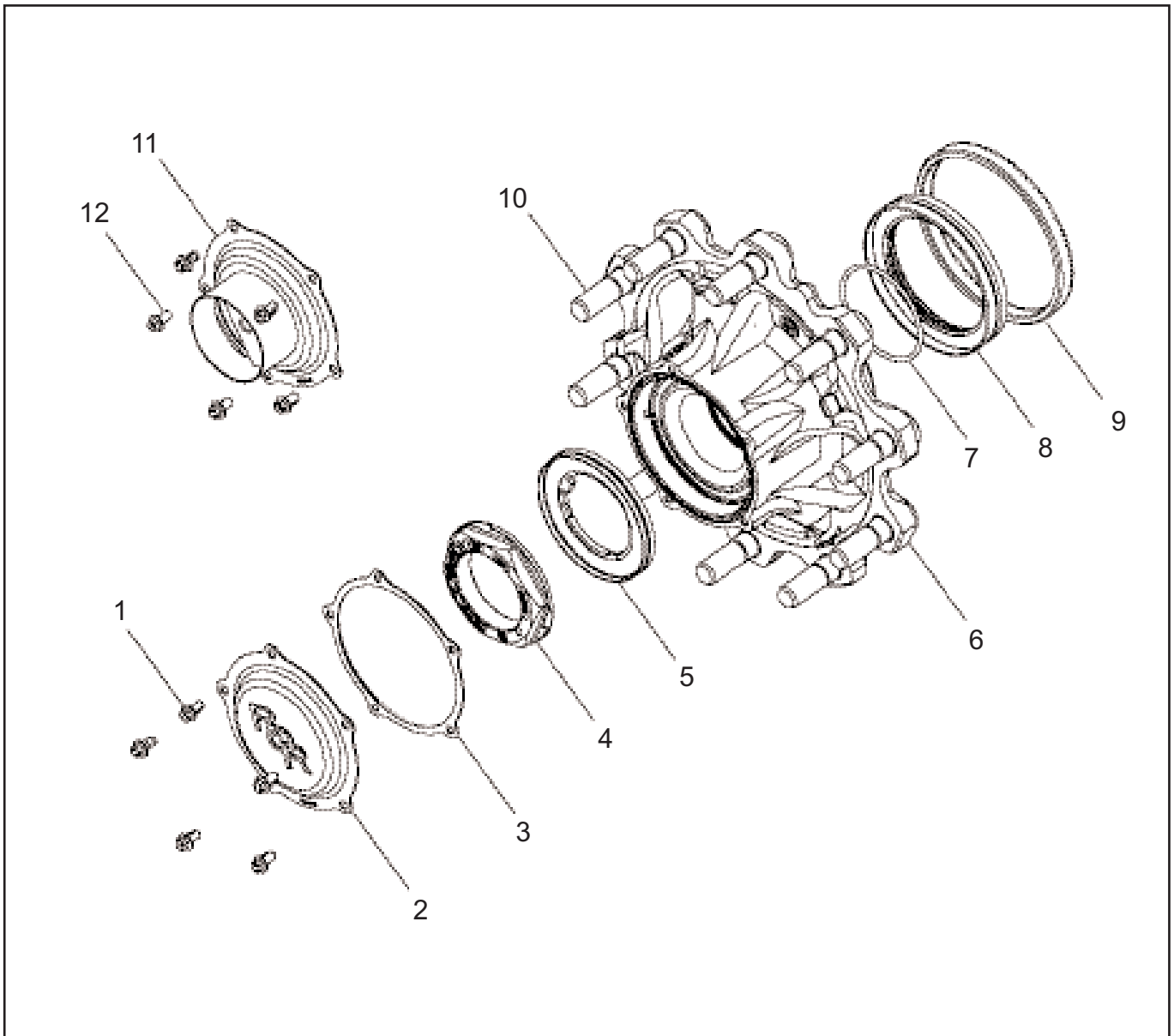


Fig 2.2

Item	Description	QTY (per axle)
1	Retaining Screw	10
2	Hub Cap	2
3	Gasket	2
4	Hub Nut	2
5	Stake Washer	2
6	Hub	2
7	O-Ring Seal (Autumn 2009 onwards only)	2
8	Seal	2
9	ABS Pole Wheel (Drumbrakes only)	2
10	Wheel Stud	20
11	Odometer Hub Cap	2
12	Retaining Screw	10

# 2 Introduction

Exploded View - LM & LC Axle

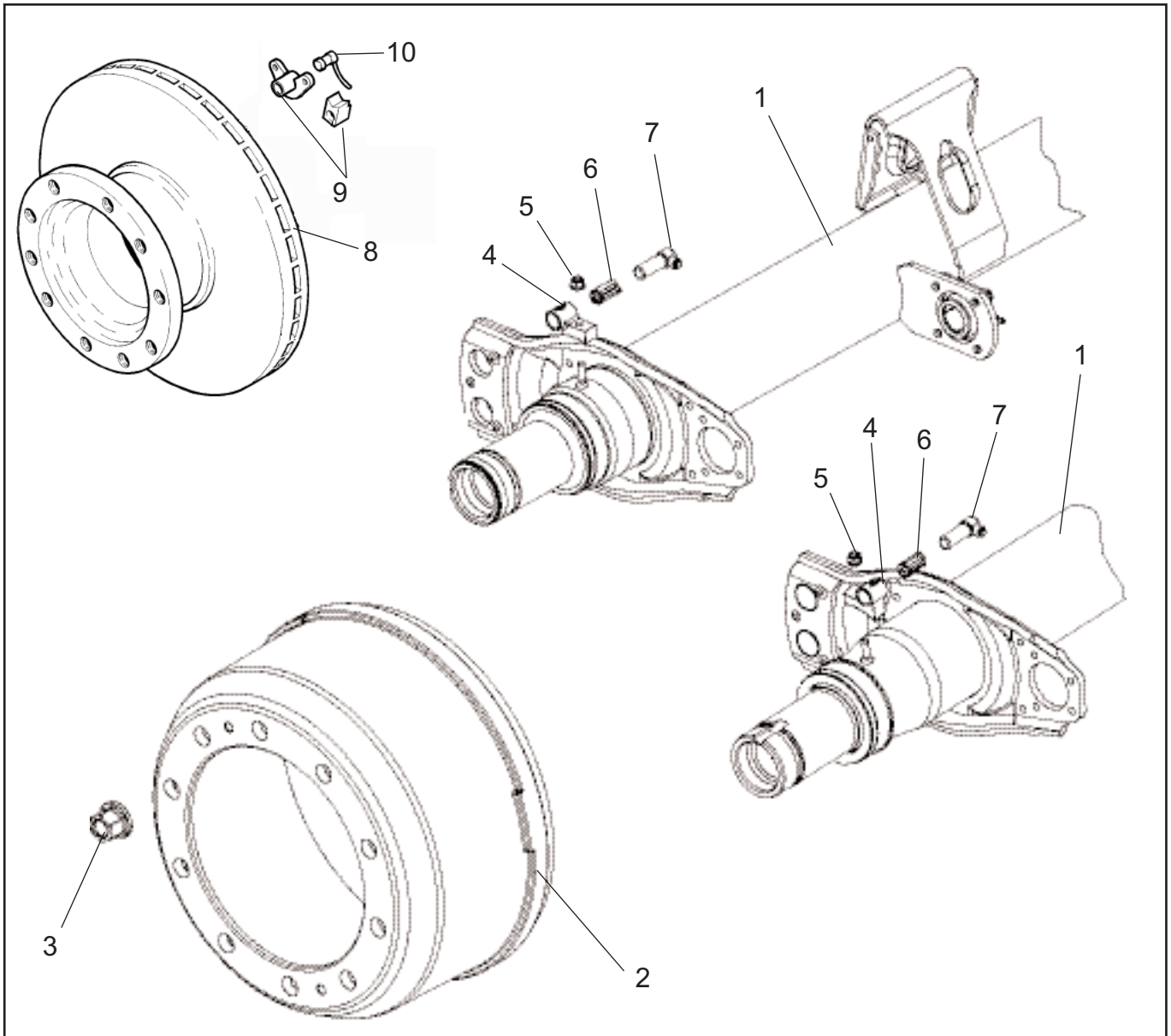


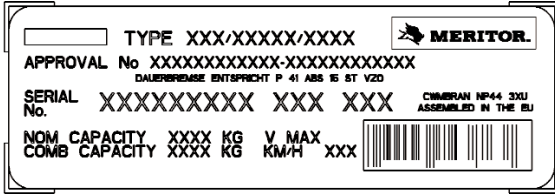
Fig 2.3

Item	Description	QTY (per axle)
1	Axle Beam	1
2	Brake Drum	2
3	Wheel Nut	20
4	ABS Sensor Block	2
5	Retaining Nut (Sensor Block)	2
Not illustrated	Retaining Bolt (Sensor Block) - Pre May 2002 Axles only	2
6	Spring Clip	2
7	ABS Sensor	2
<b>Alternative Components - Disc Brake Applications</b>		
8	Rotor - ABS Pole Wheel is an integral part	2
9	ABS Sensor Block	2
10	ABS Sensor	2

# 2 Introduction

## The Axle Identification Plate

Every axle leaving the Meritor factory is fitted with an identification plate which contains all the information needed to ensure correct replacement parts are obtained.



## Identifying the Axle Type

All LM/LC axles are fitted with 10 stud, ISO 4107 spigot mount wheel fixings and asbestos free brake pads or linings as standard. Other options are detailed below.

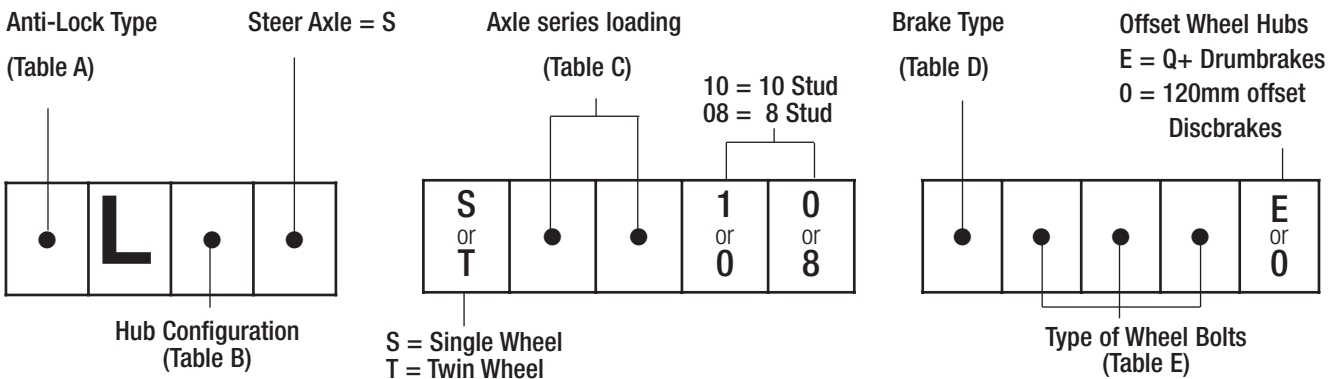


Table "A"

Axle Letter code	Exciter Ring Type	Suitable For
W	100t / 80t Solid Ring	Wabco Bosch Grau DGX & MGX 100

Table "B"

Axle Letter Code	Hub Configuration
M	Standard Bearing Hub
C	Cartridge Bearing Hub

Table "C"

Axle Series	Nominal Highway Rating, Kg	Wall Thickness	Max Offset *
90	9000	13mm	460mm
93**	9300	16mm	490mm

Table "D"

Axle Letter Code	Brake Type
B	B Drumbrake - 350mm Dia
Q	Q+ Drumbrake - 420mm Dia
H	DX 195 Discbrake
E	ELSA 2 Discbrake
D	D DUCO Discbrake
J	Elsa 225L Discbrake
K	ELSA 195 Discbrake

\* Offset =  $\frac{\text{Track Spring Centres}}{2}$

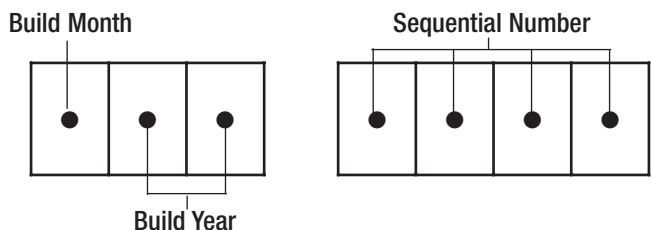
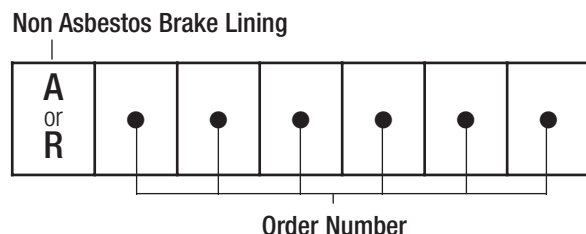
\*\* For use with Non Meritor air suspensions.

The axle ratings shown are for normal highway use only. Any special application must be approved by Meritor Technical Sales

Table "E"

Axle Letter Code	Wheel Mounting Type
MX	M22x1.5p wheel studs for single steel wheels
MXA	M22x1.5p wheel studs for single alloy wheels

## Identifying The Serial Number



# Inspection & Maintenance

# 3

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# 3 Inspection & Maintenance

## Drumbrake Axles

### Inspect Camshaft and Camshaft Bearings for Wear

Place a lever between the camshaft and axle beam close to the cam head bearing assembly and lever up and down to detect free movement (Fig. 3.1). This should not exceed 3mm total movement at the bearing (the amount at the lever will depend on the lever length so discretion and judgement is required).

Similarly place the lever between the axle and camshaft close to the cam spline bearing assembly (spherical) at the spline end of the camshaft and lever up and down checking for similar play as at the cam head bearing assembly.

If the play at either bearing exceeds the 3mm value stated above, this suggests wear has occurred. The camshaft and bearings should be replaced as necessary.

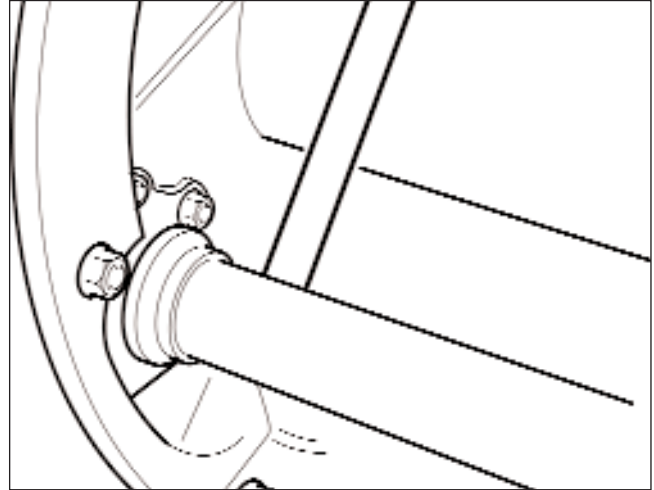


Fig. 3.1

### Inspect Brake Drum

With the brake drum removed from the vehicle.

Clean excess brake dust from the brake drum and inspect the drum braking surface for corrosion, excessive wear or other damage.



**CAUTION:** Never use an air line to blow dust from the brake/drum 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 light corrosion by using coarse emery cloth at an angle of 45 degrees in one direction and then 45 degrees in the other direction to produce a cross hatch effect. **DO NOT USE ANY FORM OF POWER TOOL.**

If the drum braking surface shows signs of light heat crazing it usually can be reused (Fig. 3.2) but if the heat crazing is severe the drum should be replaced. (Fig. 3.3)

Should the drum life be extended by turn-out machining the recommended machining limit should be;

**Q+** Drumbrakes 423 mm diameter.

**B** Drumbrakes 352.5 mm diameter.

During the projected wear-out life of the shoes the final drum diameter must not exceed;

**Q+** Drumbrakes 424.0 mm diameter.

**B** Drumbrakes 353.5 mm diameter.

Excessively worn drums must not be re-assembled with new brake shoes if the diameter exceeds the dimensions below.

**Q+** Drumbrakes 423 mm diameter.

**B** Drumbrakes 352.5 mm diameter.

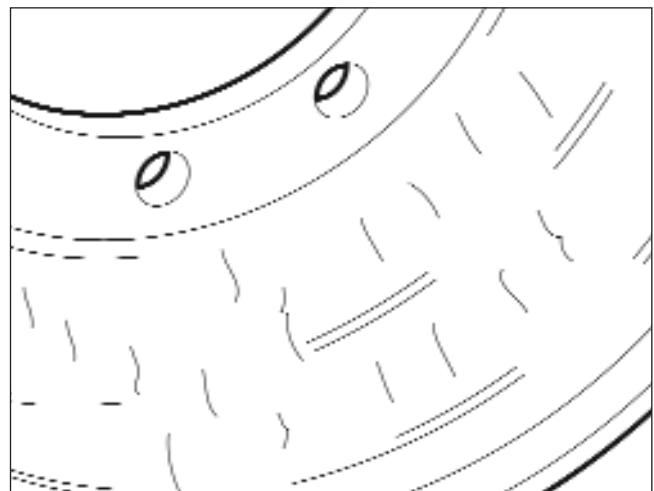


Fig. 3.2

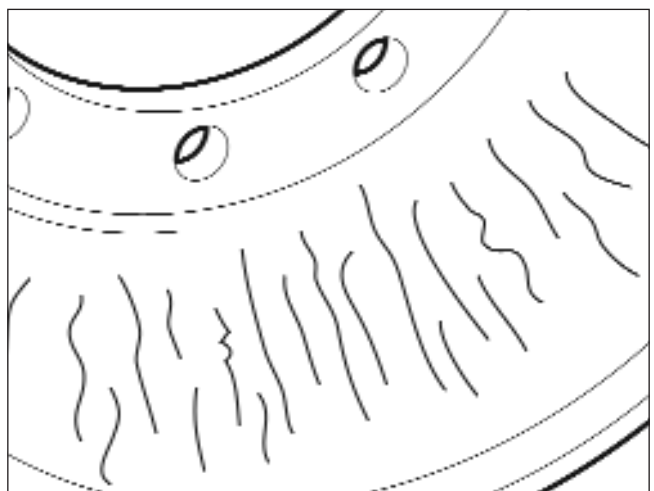


Fig. 3.3

# 3 Inspection & Maintenance

## Inspect Brake Linings

Do not disturb the brake lining surfaces if these show normal working appearance. Do not contaminate the surface of the linings with grease etc. Clean any compressed lining debris from the rivet holes. The brake lining surface may be carefully cleaned by hand using suitable abrasive paper if contaminated by dirt etc.

**DO NOT USE ANY FORM OF POWER TOOL.**



**CAUTION:** Ensure any discarded friction product, or cloth contaminated with brake dust, is disposed of in accordance with local environmental regulations

## Lubricate Brake Chamber Clevis Pin Assembly

Lubricate the clevis pin assembly from both sides with oil, and make sure the brake can be operated easily by pulling the slack adjuster by hand

## Push Rod Setting Lengths for Manual and Auto Slack Adjusters (Haldex & Meritor Inc.)

To ensure the correct installed slack adjuster positions, it is necessary to identify the type of air chamber bracket installed.

Follow the published procedure for auto slack installation and setting provided in the **S Cam Trailer Drumbrake Service Manual MM 1000**.

## Disc Brake Axles

Refer to the appropriate Meritor Inc. disc brake service manual for detailed disc brake inspection procedures.



**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

Rotors should be examined in situ, whenever the brakes are serviced or new pads are fitted - or immediately if erratic braking performance is noted. The rotor condition should be visually checked for the following surface conditions, and replaced with a new rotor as described in **Section 6 Rotor Replacement** if suspect or defective.



**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.

## Cracks (Fig 3.4)

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.

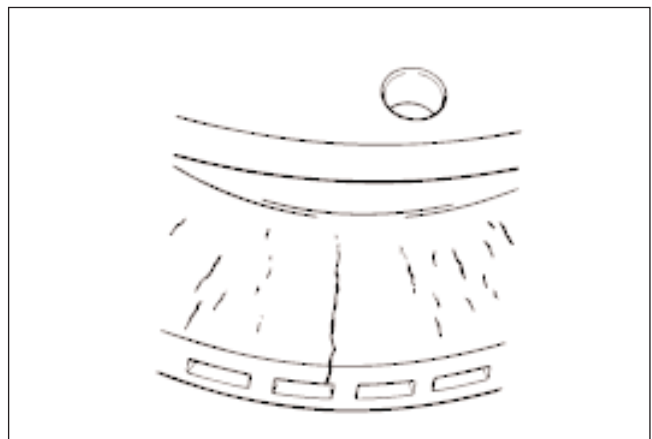


Fig. 3.4



# 3 Inspection & Maintenance

## Heat Crazing (Fig 3.5 & Fig 3.6)

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 3.5)

Light heat crazing is fine, tight cracks in the rotor's surface. Continue to use a rotor with light heat crazing.

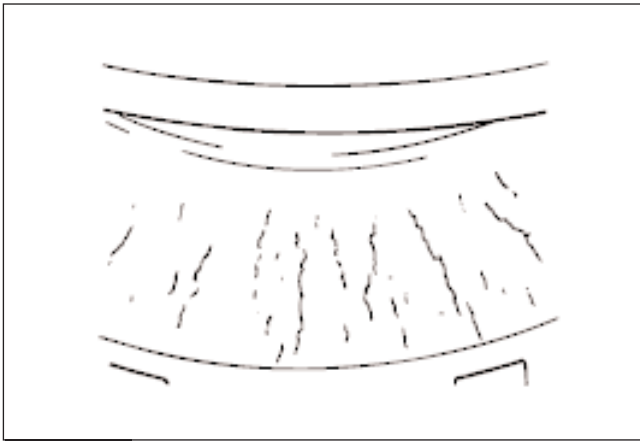


Fig. 3.5

### Heavy Heat Crazing (Fig 3.6)

Heavy heat crazing 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 crazing.

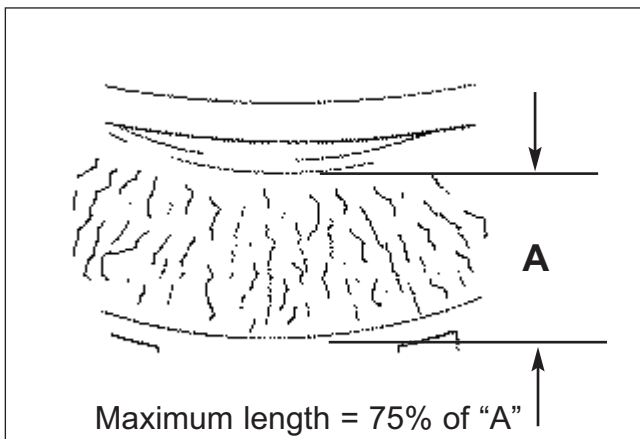


Fig. 3.6

**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.

### Scoring (Fig 3.7)

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.

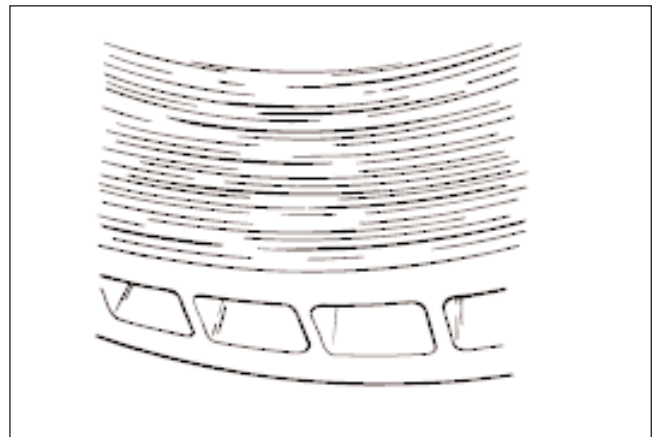


Fig. 3.7

# 3 Inspection & Maintenance

## "Blue" Rotor (Fig 3.8)

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.

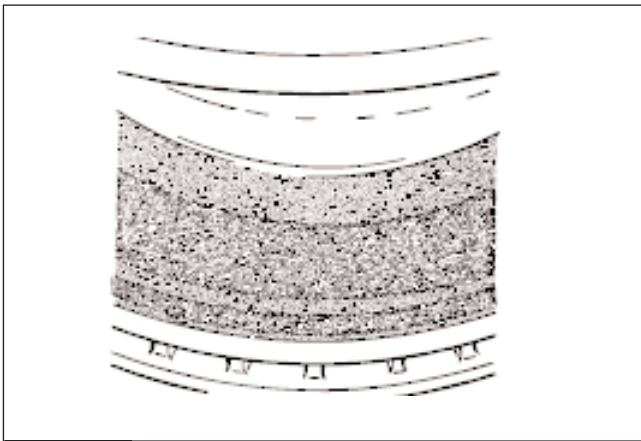


Fig. 3.8

## ABS Ring

The toothed ABS ring, which may be a press fit component or an integral part of the rotor, should be inspected for damage and corrosion. If there is any doubt in the suitability for further service the ABS ring or rotor should be replaced as described in **Section 6 Rotor Replacement** or **Section 7 ABS Component Replacement**

## Rotor Run Out

Use a Dial test Indicator (DTI) to check the run-out both axially and radially as in (Fig. 3.9).

### Axial

Run-out should not exceed 0.3mm over the rotor braking surface when the rotor is turned on properly adjusted wheel bearings. Excessive run-out may be due to incorrect mounting of the hub, fastener torque's or mal-adjusted bearings.

### Radial

Run out should not exceed 0.8mm total indicator reading.

### Thickness

Rotor thickness must not vary by more than 0.13mm across any two points of the rotor faces.

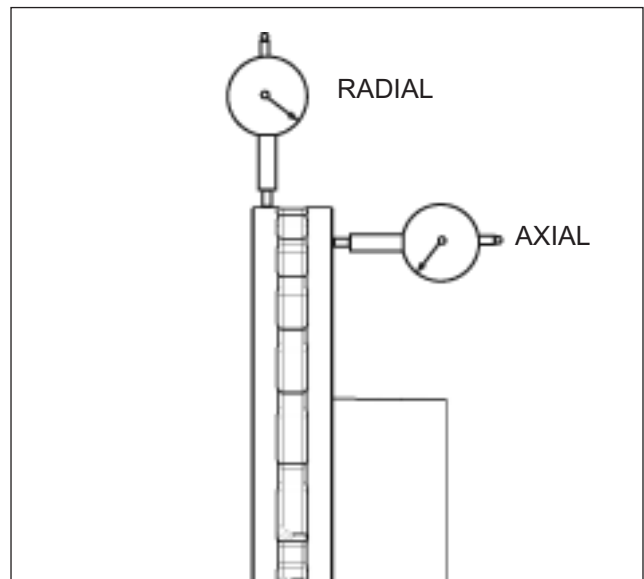


Fig. 3.9

## Skimming

Resurfacing the rotor is permissible until the minimum thickness is reached 41mm. Refer to the appropriate Meritor service manual detailed below for full rotor wear parameters.

DX	MM 1147	DUCO	MM 1127
Elsa 2	MM 1130	Elsa 195/225	MM 0350

Surface finish after machining should be 5 microns maximum.



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



# Hub Service & Replacement

# 4

pg. 21 LM Hub removal  
pg. 25 LM Hub refitment  
pg. 28 LC Hub removal  
pg. 31 LC Hub refitment

# 4 Hub Service & Replacement

## LM Hub Removal

Removal of the LM hub is required for all rotor replacements on disc brake applications and for servicing the 'B' drumbrake variant (see below).

In addition, hub removal will also be required if a problem is identified during routine inspection, or at the major hub service interval, as prescribed in **Section 11**.

For hub removal and replacement follow the appropriate procedures detailed in this section.

## Drum Brake Axles

The LM axle fitted with the Q+ drum brake features an outboard mounted brake drum, thus enabling complete brake service to be performed without the removal of the hub assembly. This practice is strongly recommended by Meritor.

Should it however prove necessary to remove the hub, e.g. if you have a 'B' drum brake, the following procedure can be performed either with the road wheel and brake drum assembled to the hub or with the road wheel and brake drum removed. In the latter instance follow the procedure below.



**CAUTION:** Meritor Inc. recommends the use of a wheel dolly to remove the wheel, hub, and drum as an assembly. The wheel dolly can be used easily by one man and will prevent seal and bearing damage.

Raise the vehicle enough to get clearance to remove the wheel and tyre. Support the axle with safety stands. Remove the wheel and tyre.



**WARNING:** Do not work under a vehicle supported only by jacks. Jacks can slip or fall over can cause serious personal injury. Support the vehicle with safety stands, block the wheels to prevent the vehicle from moving.

**NOTE:** Comprehensive Drum Brake instructions can be found in the Meritor Inc. service manual ;  
**S Cam Trailer Drumbrake - MM 1000**

Remove the brake drum as described in **Section 5 Brake Drum Replacement**.

Follow **Removal of Hub Locknut procedure** that follows.

## Disc Brake Axles

Raise the vehicle enough to get clearance to remove the wheel and tyre. Support the axle with safety stands. Remove the wheel and tyre.



**WARNING:** Do not work under a vehicle supported only by jacks. Jacks can slip or fall over can cause serious personal injury. Support the vehicle with safety stands, block the wheels to prevent the vehicle from moving.

**NOTE:** Comprehensive Disc Brake instructions can be found in the appropriate MeritorHVS Service Manual detailed below:

<b>DX</b>	<b>MM 1147</b>
<b>DUCO</b>	<b>MM 1127</b>
<b>ELSA 2</b>	<b>MM 1130</b>
<b>Elsa 195/225</b>	<b>MM 0350</b>

De-adjust the brake.



**WARNING:** Always de-adjust/adjust the brake carefully by hand with a suitable wrench. Never exceed the maximum torque specified for the type of disc brake in either direction and NEVER use power tools.

Remove the brake pads and air chamber.

Remove the caliper bolts. Take care not to allow the brake assembly to fall (Fig 4.1). Remember that the brake assembly has a weight of up to 55kgs.

Lift the brake assembly away from the axle.

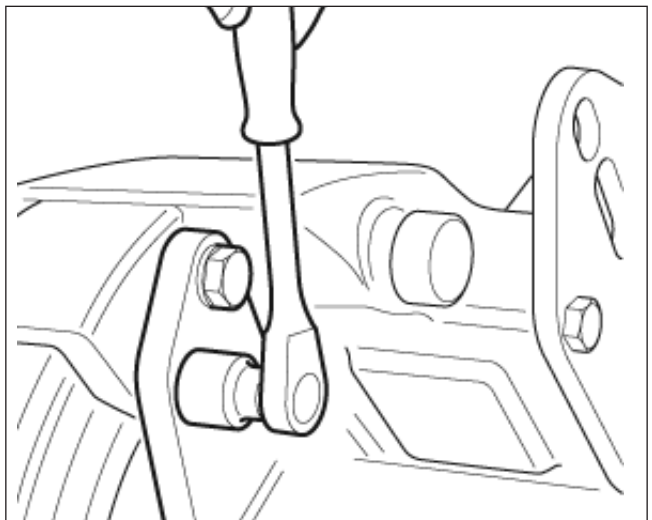


Fig. 4.1

# 4 Hub Service & Replacement

## REMOVAL OF HUB LOCKNUT

Remove the five M8 hub cap retaining screws.

Remove hub cap and gasket (Fig. 4.2).

Remove the two socket button head screws using 5mm A/F Allen key (Fig. 4.3).

The hub locknut should be removed using hub nut spanner (Meritor CVA part number MST 3104).



**WARNING:** Do not attempt to loosen/remove the hub locknut by striking the nut using a chisel or drift. Damage to the components will occur causing possible loss of wheel end retention and personal injury.

It is recommended that the retaining clip and retaining washer are left in the hub until the hub assembly has been removed from the spindle.

## REMOVAL OF HUB

Remove the hub assembly from the axle using a hub puller (Meritor CVA part number MST 3110). The five M8 hub cap screws may be used to secure the hub puller to the hub face (Fig. 4.4).

If the hub is to be removed whilst still assembled to the road wheel and brake drum, use a wheel dolly to support the weight of the assembly.

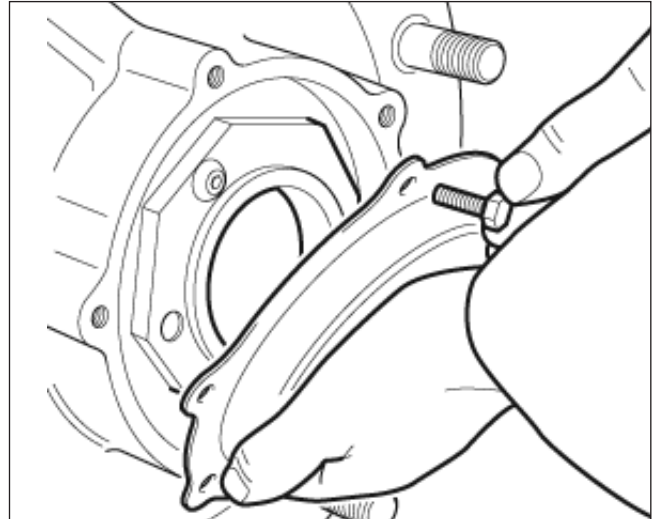


Fig. 4.2

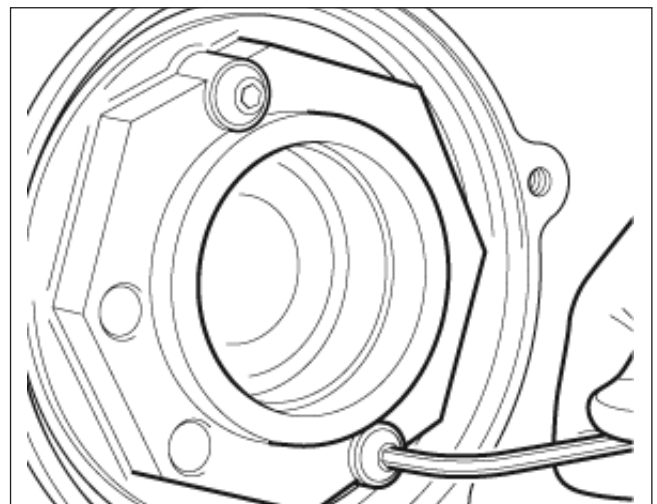


Fig. 4.3

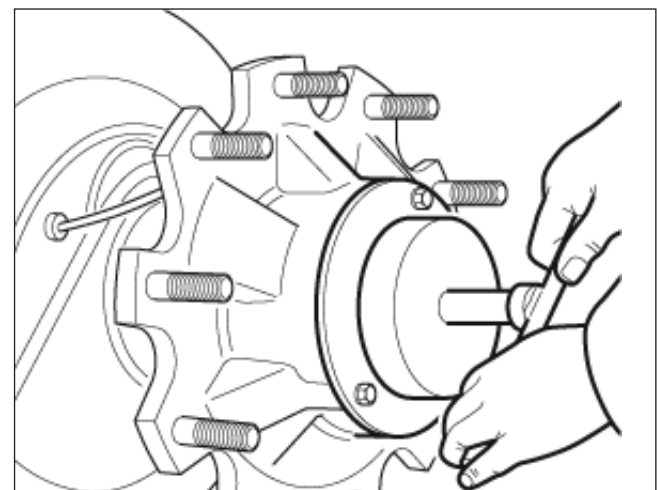


Fig. 4.4

# 4 Hub Service & Replacement

## REMOVAL OF OIL SEAL AND INNER BEARING CONE

The oil seal should be removed from the hub using an oil seal removal tool (Meritor CVA part number MST 3107) and suitable lever (Fig. 4.5).

THE SEAL MUST BE DISCARDED. NEVER RE-USE AN OIL SEAL AFTER THE HUB HAS BEEN DISMOUNTED FROM THE AXLE SPINDLE.

Remove the inner bearing cone and place it in a clean area. Identify the bearing cone clearly to ensure that it is refitted to its original position in the hub.

## REMOVAL OF RETAINING WASHER AND OUTER BEARING CONE

The retaining clip can now be removed from the outer side of the hub with a pair of pliers or suitable screw driver.

Remove the retaining washer (Fig. 4.6).

Remove the outer bearing cone and place it in a clean area. Identify the bearing cone clearly to ensure that it is refitted to its original position in the hub.

## CHECK GREASE CONDITION

If the grease within the bearing is clean and does not appear burnt there should be no necessity to totally clean down the assembly.

Check the hub cavity for any grease contamination caused during hub removal from the spindle. Any contamination must be removed or if this is excessive a complete hub clean down must be carried out.

## CLEANING OF HUB

Wipe clean the hub cavity removing all the old grease and any contamination.



**CAUTION:** Ensure any grease removed from the assembly/components, or contaminated cloth, is disposed of in accordance with local environmental regulations.

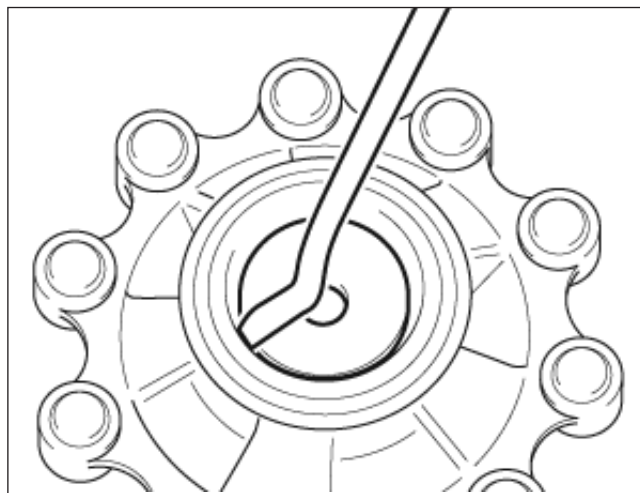


Fig. 4.5

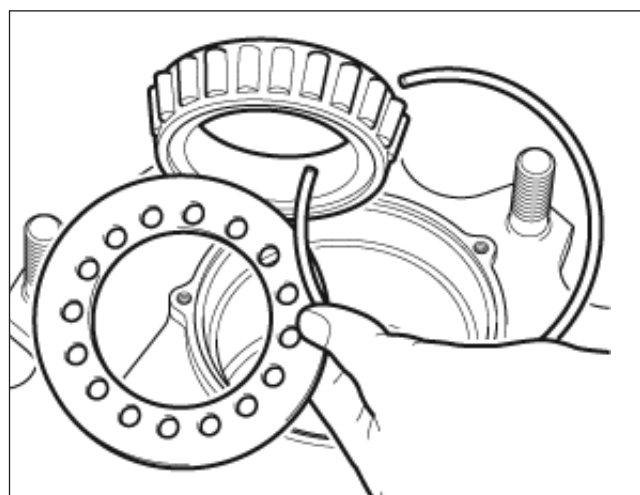


Fig. 4.6

## INSPECT BEARINGS

Check both bearings, cones and raceways for:

- Cage damage
- Corrosion
- Roller and raceway damage or pitting
- Metallic debris or flaking Bearing cup security - Ensure both bearing cups are well secured in the hub, by checking they are fully seated within the hub bore, and with a good grip of the cups try to rotate them. If any movement of the cups is detected then the hub will have to be replaced. Do not attempt to fit new bearings into a hub with worn bores.

If any of the above defects are evident the complete bearing (cup and cone) MUST be replaced.

# 4 Hub Service & Replacement

**NOTE:** It is advisable to replace with a complete new hub and bearing assembly which is available from Meritor CVA Distributors.

## INDIVIDUAL BEARING REPLACEMENT PROCEDURE

Drift out the bearing cup from the hub ensuring that the bearing bore within the hub is not damaged.

## BEARING CUP REFITMENT

Ensure the hub cavity is clean and free from visual damage, debris, burrs or any oxidation.



**CAUTION:** The bearing 'Cups' and 'Cones' are clearly marked by manufacturer type for identification. Never assemble a bearing using a 'Cup' from one manufacturer with a 'Cone' from a different manufacturer. Always check the bearing components are from the same manufacturer before assembly continues.



**CAUTION:** Always use genuine MERITOR Bearings - STANDARD ISO BEARINGS CANNOT BE USED.

Insert the bearing cup into the hub and using a bearing cup driver (Meritor CVA part number MST 3103) drive the cup fully home ensuring the cup sits squarely against the hub shoulder.

Check the bearing cup is retained correctly. Grip the bearing cup and ensure there is no axial or rotational movement present.

## REGREASE BEARINGS

Thoroughly pack both bearing cones with Meritor Hub Grease, Blue Lithium EP2. The grease should be concentrated in the space between the roller cage and cone raceway. Refer to **Section 11** for correct grease quantities. Refill the bearing cavity. Refer to **Section 11** for correct grease quantity.

**NOTE:** Greased bearings should always be placed in a clean area.



**CAUTION:** Only use the grease supplied with replacement components/kits, or that specified.

Under no circumstance should any other type of grease be used.

## REFIT INNER BEARING

Refit inner bearing cone into the inner bearing cup pressing fully home to assist location of oil seal driver.

## FIT NEW OIL SEAL

Apply 15 - 20gm of Meritor Hub Grease, Blue Lithium EP2 to the cavity of the new seal, working the grease in evenly around the circumference of the seal.

Apply a light smear of Meritor Hub Grease, Blue Lithium EP2 to the bore of the oil seal.

Press the new oil seal onto the oil seal driver (Meritor CVA part number MST 3106) ensuring the 'OIL SIDE' marking on the seal is visible (i.e. faces away from the plate of the driver) such that the seal will be installed the correct way round in the hub.

Locate the nose of the driver into the bore of the inner bearing cone and drive the seal fully home ensuring the seal remains square to the hub at all times (Fig. 4.7). The outer face of the seal should be flush with the back face of the hub when fully installed

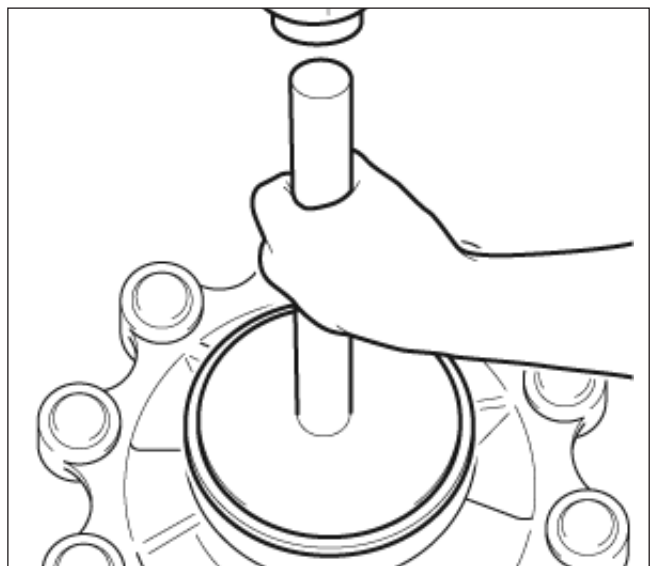


Fig. 4.7

Check the hub cavity grease and top up as necessary with Meritor Hub Grease, Blue Lithium EP2. Refer to **Section 11** for correct grease quantity.

**NOTE:** The grease must be distributed evenly within the cavity between the inner and outer bearings. Ensure the bearing bore/s are clean and free from any excess grease.



**CAUTION:** Only use the grease supplied with replacement components/kits, or that specified.

Under no circumstance should any other type of grease be used.



# 4 Hub Service & Replacement

## REFIT OUTER BEARING AND RETAINING WASHER

Refit the outer bearing cone. Fit the retaining washer into the hub, ensuring the adjustment indicator markings are facing outwards and fit the retaining clip to hold the bearing cone in place ready for reassembling hub to axle spindle (Fig. 4.8).

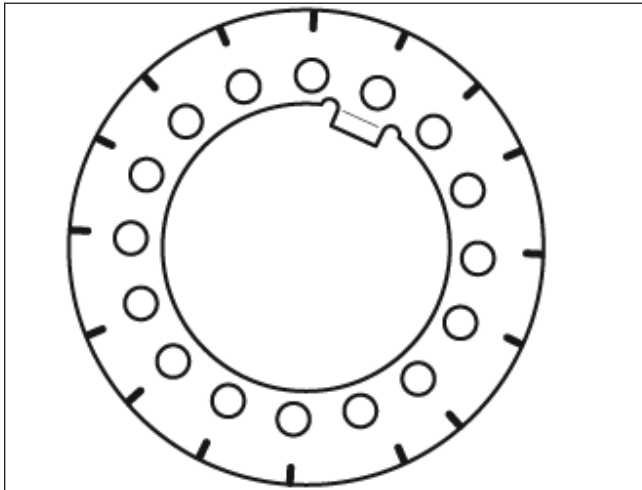


Fig. 4.8

## LM Hub Re-Fitment Procedure

### CLEAN SPINDLE BEARING JOURNAL

Prior to re-assembling the hub onto the spindle, check the spindle for damage and remove any fretting or rust on bearing journals using medium grade emery cloth strip. Also ensure the inner bearing abutment shoulder is clean and free from damage. Clean the oil seal journal, removing brake dust or corrosion from adjacent areas.

### CHECK SPINDLE END THREAD

Any minor damage can be repaired using a die nut and holder (Meritor CVA part numbers MST 3108 and MST 3109).

Apply 1 to 2 grams (volume 1 to 1.5 cm<sup>3</sup>) of Optimol 'Optimoly White Paste T' to the axle spindle in the area 'A' (Fig 4.9). Refer to **Section 11 Lubricants** for the Meritor CVA Optimol part numbers.

Spread the grease evenly around the spindle's circumference using a suitable soft brush. Using the excess grease on the brush, apply an even film around the circumference of the bearing journal shoulder, area 'B' (Fig 4.9). This will reduce spindle wear and assist future removal of the hub assembly.

Apply 0.5 to 1 grams of Optimol 'Optimoly White Paste T' to the outboard bearing bore and spread evenly around the circumference. Refer to **Section 11 Lubricants** for the Meritor CVA Optimol part numbers.



**CAUTION:** Only use the grease supplied with replacement components/kits, or that specified.

Under no circumstance should any other type of grease be used.

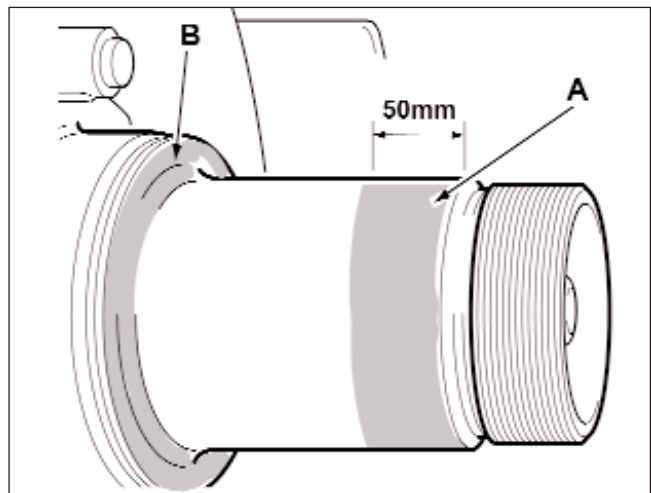


Fig. 4.9

## RE-MOUNT HUB ASSEMBLY



**CAUTION:** Ensure the hub is squarely aligned to the axle spindle during refitting.

If the axle is fitted with ABS:

In the case of the Drum brake; check the condition of the sensor and pull it fully forward on its mounting block.

In case of the Meritor Disc Brake, refer to **Section 7 ABS Component Replacement** for ABS installation instructions.

### Drum Brake Axles

If the hub is still assembled to the road wheel and brake drum, use a wheel dolly to align the hub assembly with the axle spindle, adjusting the height until the brake drum fits over the brake linings.

Push the hub or hub, drum and wheel assembly onto the axle spindle and align the key on the retaining washer with the keyway in the spindle end. Push the assembly onto the spindle taking care not to damage the oil seal or spindle threads.

# 4 Hub Service & Replacement

## Disc Brake Axles

Push the hub and rotor assembly onto the axle spindle and align the key on the retaining washer with the keyway in the spindle end. Push the assembly fully onto the spindle taking care not to damage the oil seal or spindle threads.

## Disc & Drumbrake Axles

### REFIT HUB LOCKNUT

Fit the hub locknut (Fig. 4.10) and tighten using hub nut spanner (Meritor CVA part number MST 3104) until the nut is fully engaged on the spindle thread.

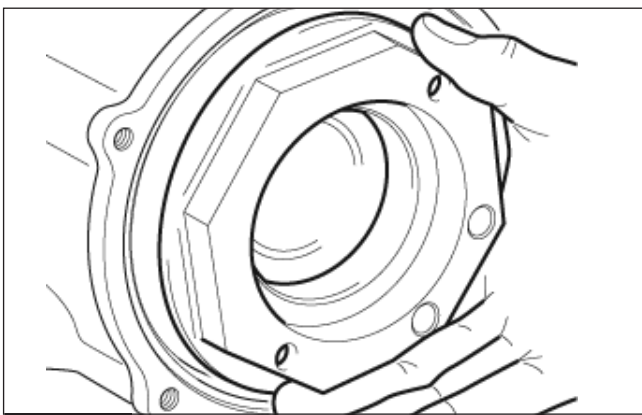


Fig. 4.10

### HUB LOCKNUT SETTING PROCEDURE

**T** Torque the nut to 100Nm **WHILST ROTATING THE HUB**. The hub **MUST** be rotated 5-10 revolutions whilst the end nut torque is continuously applied. Back off the nut one flat of the socket (i.e. 1/8 turn) anticlockwise.

Remove the hub nut spanner. Rotate the but in a **CLOCKWISE** direction (i.e. in the 'tightening' sense) until the corners of the nut align with the **NEXT** nearest mark on the face of the retaining washer (Fig 4.11)

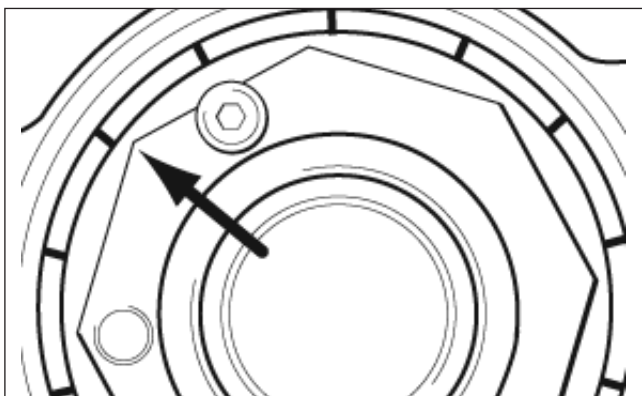


Fig. 4.11

Should the corners of the nut already line up **EXACTLY** with an index mark, do not further rotate the nut.

Fix the two button head screws to the locknut and tighten evenly until both the heads are flush with the face of the locknut.

Ensure the screws correctly engage onto the holes in the lock washer.

**NOTE:** The button-head screws include a nylon thread locking patch. The locking properties of this patch are effective for two further applications of the screw after initial factory assembly. The screws should then be replaced.

Tighten the two button-head screws to the torque value specified in **Section 11 Torque Values** using a 5mm A/F Allen socket and torque wrench (Fig 4.12)

**NOTE:** This torque value should be used for all screw types - i.e. with or without the nylon locking patch.

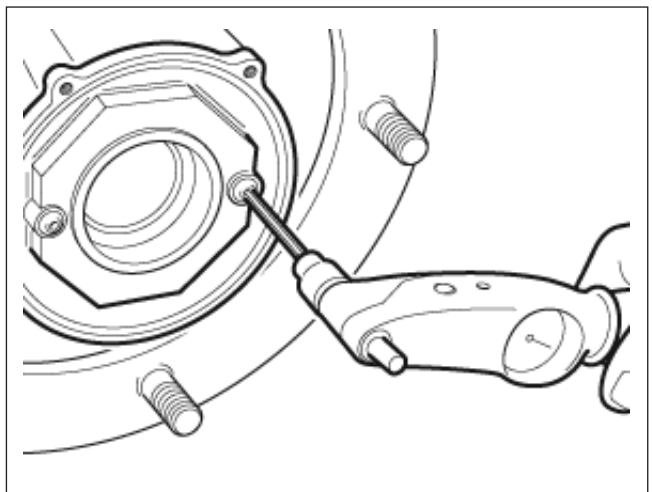


Fig. 4.12

### CHECK BEARING ADJUSTMENT

Check for free rotation of the hub assembly and ensure the bearing clearance is not excessive.

If in doubt repeat the Hub Locknut Setting Procedure.

# 4 Hub Service & Replacement

## REFIT HUB CAP

Check the seal location groove in the hub face is clean and fit the hub cap gasket (Fig. 4.13), engaging the raised rib of the gasket into the groove in the hub face and align the hub cap retaining screw holes.

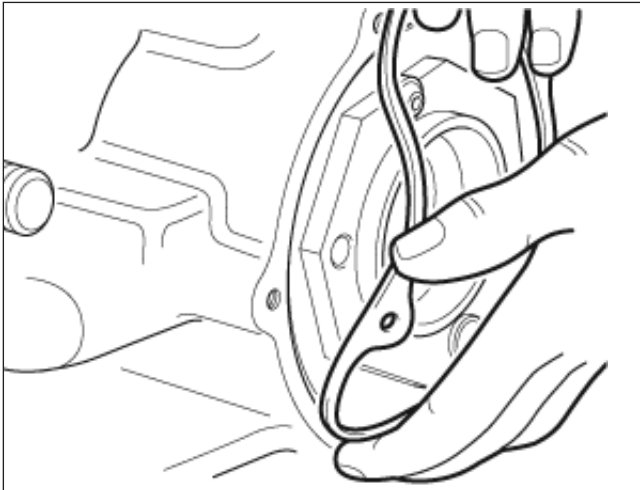


Fig. 4.13

Fit the hub cap and tighten the retaining screws evenly. Finally tighten the hub cap retaining screws to the torque value specified in **Section 11**. Ensure the gasket is compressed evenly and not damaged (Fig 4.14).

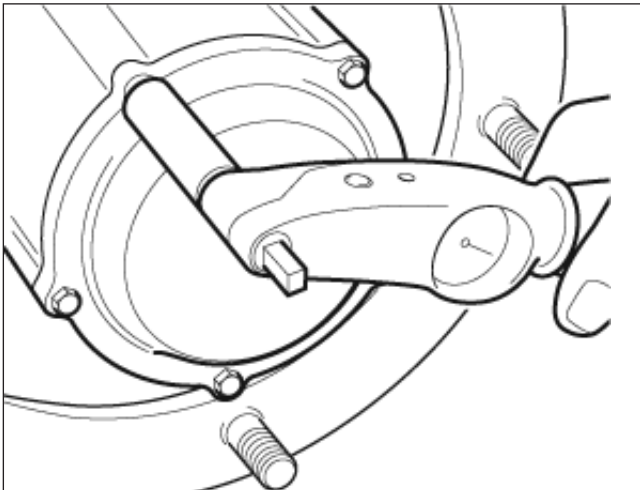


Fig. 4.14

## Drum Brake Axles

Where applicable, refit the brake drum as described in **Section 5 Brake Drum Replacement**.

## Disc Brake Axles

Lift the brake assembly over the rotor.



**CAUTION:** Do not use the pad retaining plate or stabiliser bar, where applicable, for handling purposes. Damage to the disc brake components could result.

While supporting the brake assembly, align the brake assembly mounting holes with the fixing points on the axle torque plate. Fit the caliper bolts.

**NOTE:** D-Duco disc brake applications fitted to pre 2002 built axles use hardened washers with M20 caliper bolts. Where applicable the hardened washers must be used.

Take care not to allow the brake assembly to fall. Remember that the brake assembly has a weight of upto 55kgs.

Tighten the fixings, starting on the top half of the torque plate.

Tighten the fixings to the torque value specified in **Section 11** using a suitable size socket ( $\frac{3}{4}$ " drive recommended) (Fig. 4.15).

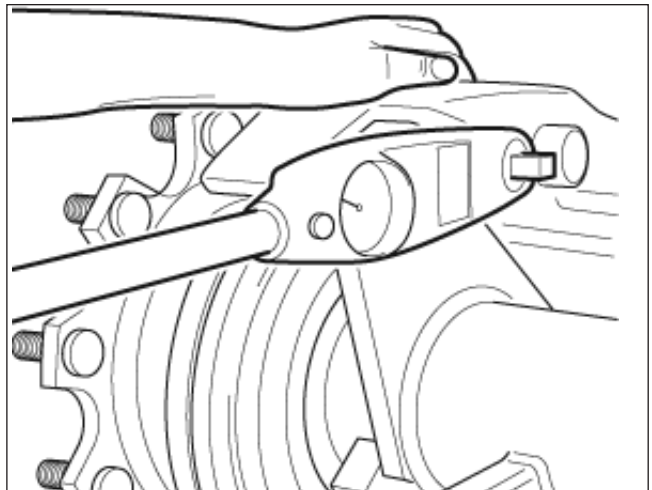


Fig. 4.15

Refit the air chamber and brake pads as described in the appropriate Meritor Inc. Disc Brake service manual listed below:

<b>DX</b>	<b>MM 1147</b>
<b>DUCO</b>	<b>MM 1127</b>
<b>ELSA 2</b>	<b>MM 1130</b>
<b>Elsa 195/225</b>	<b>MM 0350</b>

Where applicable, refit the road wheel. Remove the axle safety stands and lower the vehicle to the ground.

# 4 Hub Service & Replacement

## LC Hub Removal

The LC hub and bearing assembly is fully sealed and can normally be left undisturbed for a 7 year or 1 Million Km (whichever is the soonest) maintenance free period.

## Drum Brake Axles

The LC axle fitted with the Q + drum brake features an outboard mounted brake drum, thus enabling complete brake service to be performed without the removal of the hub assembly. This practice is strongly recommended by Meritor.

Should it however prove necessary to remove the hub, the following procedures can be performed either with the road wheel and brake drum assembled to the hub or with the road wheel and brake drum removed. In the latter instance follow the procedure below.



**CAUTION:** Meritor Inc. recommends the use of a wheel dolly to remove the wheel, hub, and drum as an assembly. The wheel dolly can be used easily by one man and will prevent seal and bearing damage.

Raise the vehicle enough to get clearance to remove the wheel and tyre. Support the axle with safety stands. Remove the wheel and tyre.



**WARNING:** Do not work under a vehicle supported only by jacks. Jacks can slip or fall over and cause serious personal injury. Support the vehicle with safety stands, block the wheels to prevent the vehicle from moving.

Remove the brake drum as described in **Section 5 Brake Drum Replacement**

Proceed to the **Hub Cap Removal procedure** below.

## Disc Brake Axles

The LC axle fitted with a disc brake would normally only require hub removal when it is necessary to replace the rotor.

Should it however prove necessary to remove the hub, the following procedures can be performed

Raise the vehicle enough to get clearance to remove the wheel and tyre. Support the axle with safety stands. Remove the wheel and tyre.



**WARNING:** Do not work under a vehicle supported only by jacks. Jacks can slip or fall over and cause serious personal injury. Support the vehicle with safety stands, block the wheels to prevent the vehicle from moving.

**NOTE:** Comprehensive Disc Brake instructions can be found in the appropriate Meritor Inc. Service Manual detailed below;

DX	MM 1147
DUCO	MM 1127
Elsa 2	MM 1130
Elsa 195/225	MM 0350

Deadjust the brake.



**WARNING:** Always de-adjust/adjust the brake carefully by hand with a suitable wrench. Never exceed the maximum torque specified for the type of disc brake in either direction and NEVER use power tools.

Remove the brake pads and air chamber

Remove the caliper bolts (Fig. 4.16).

Take care not to allow the brake assembly to fall. Remember that the brake assembly has a weight of upto 55kgs.

Lift the brake assembly away from the axle.

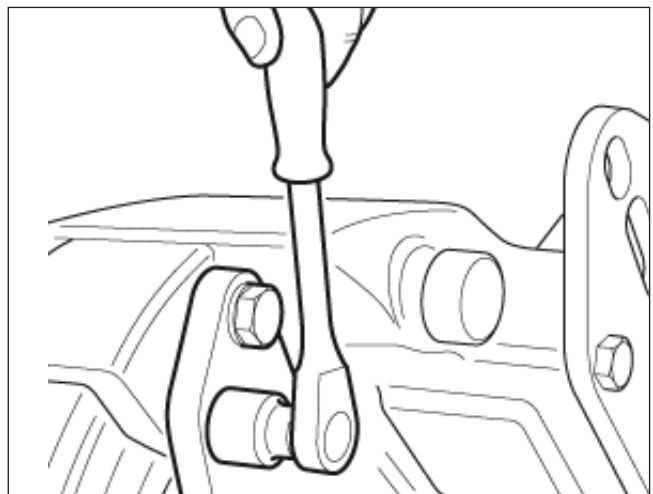


Fig. 4.16

# 4 Hub Service & Replacement

## REMOVAL OF AXLE HUB NUT

Remove the five M8 hub cap retaining screws. Remove the hub cap and gasket (Fig. 4.17).

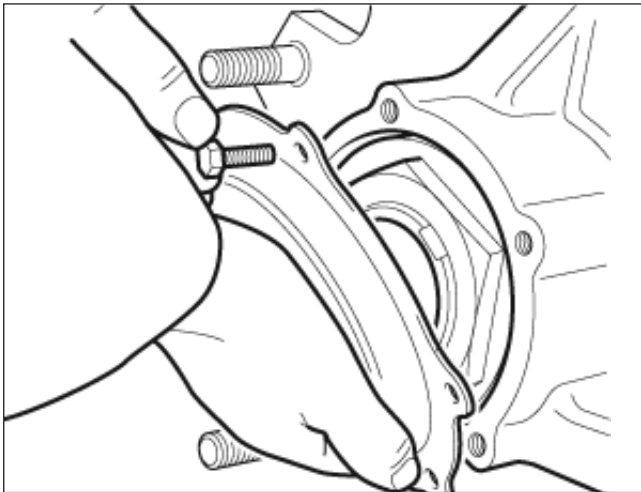


Fig. 4.17

Using a suitable small chisel or screwdriver, lever back the flange of the stake washer where it has been staked to one of the slots in the axle hub nut. Ensure the washer flange is clear of the nut flange (Fig.4.18).

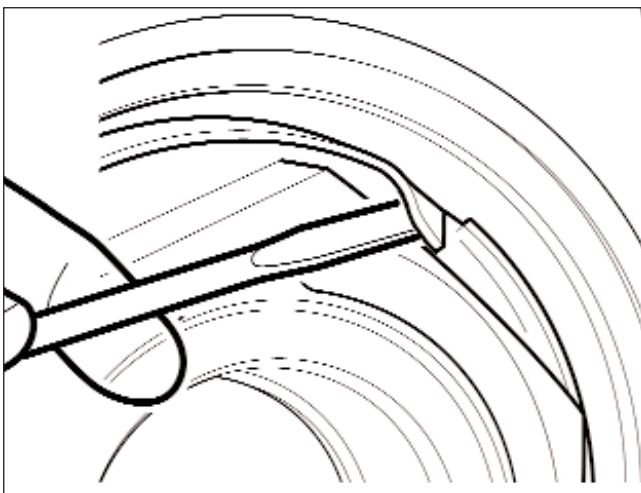


Fig. 4.18

**WARNING:** Do not attempt to loosen/remove the hub locknut by striking the nut using a chisel or drift. Damage to the components will occur causing possible loss of wheel end retention and personal injury.

The axle hub nut can now be removed using the hub nut socket from the Meritor LC service kit (Meritor CVA part No. MST 3105) and a suitable 3/4" drive wrench.

**NOTE:** The torque required to remove the nut will be at least 700Nm.

Fully remove the hub nut and lift away the retaining washer assembly (Fig. 4.19)

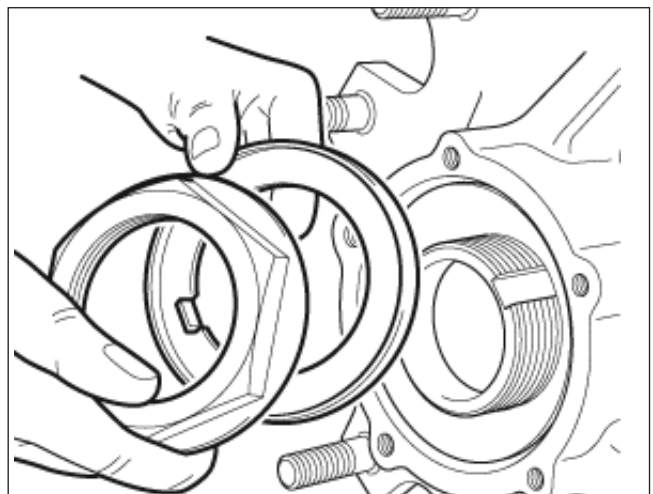


Fig. 4.19

## REMOVAL OF THE HUB ASSEMBLY

Remove the hub assembly from the axle using a hub puller (Meritor CVA part No. MST 3110).

The five M8 hub cap retaining screws may be used to secure the hub puller to the hub face (Fig. 4.20)

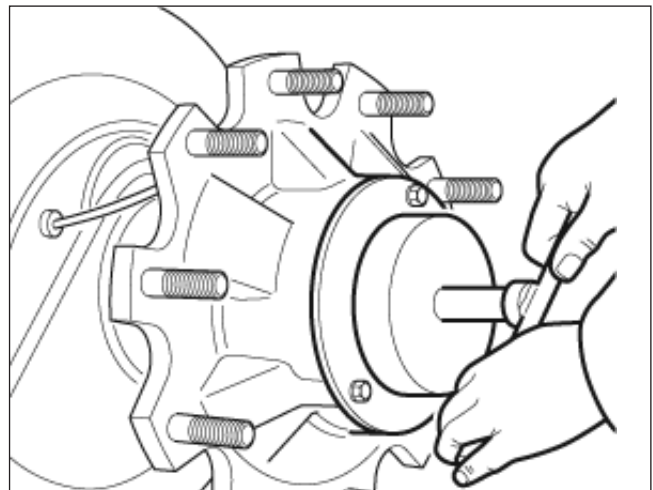


Fig. 4.20

# 4 Hub Service & Replacement

## Drum Brake Axles

If the hub is to be removed whilst still assembled to the road wheel and brake drum, use a wheel dolly to support the weight of the assembly.

## Disc Brake Axles

Remove the hub and rotor as an assembly

## HUB AND BEARING INSPECTION

The LC bearing unit is fully sealed and cannot be serviced.

It is however, recommended that for maximum bearing life, the auxiliary seal at the back of the hub is replaced whenever the hub is removed from the axle, as damage may have occurred during the hub removal process.



**CAUTION:** Later hub assemblies, from Autumn 2009, also incorporate an O ring positioned in a recess on the inner bearing (Fig 4.21).

Where applicable remove the O ring and discard.

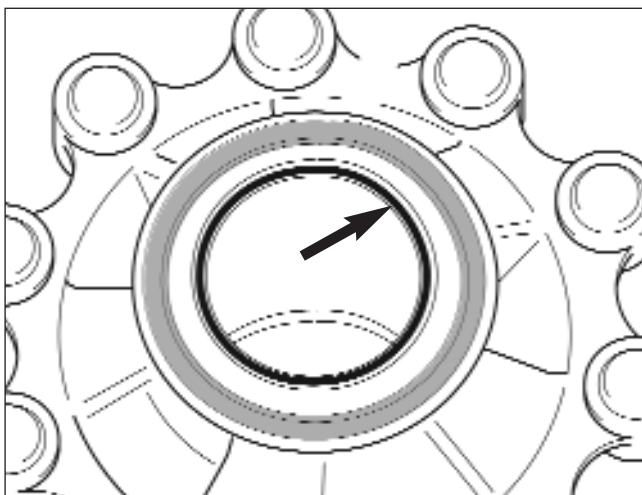


Fig. 4.21

The oil seal should be removed from the hub using an oil seal removal tool (Meritor CVA part No. MST 3107) and suitable lever (Fig. 4.22).

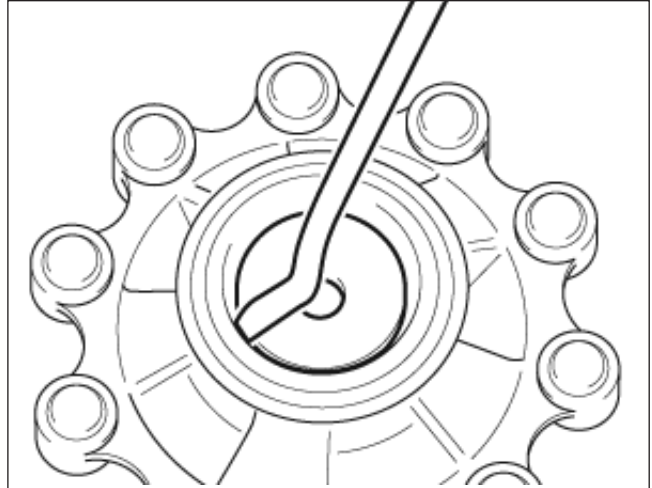


Fig. 4.22

This seal must not be confused with the inner and outer main bearing seals which are integral to the bearing unit and cannot be serviced.

Inspect the hub assembly for general signs of damage. Check the two bearing oil seals for leakage.

**NOTE:** A small witness of grease may be in evidence around the seals. This is normal and should simply be wiped clean.

Wipe the inner bore of the bearing unit with clean dry paper to remove any residue of assembly paste.

Inspect the spring clip between the two halves of the bearing cone for damage.

**NOTE:** Never attempt to remove:-

The circular spring bearing retaining clip from the hub

The bearing assembly from the hub

Either of the two oil seals integral to the bearing unit from the bearing

The spring clip between the two halves of the inner bearing cone.



**WARNING:** This will cause irreparable damage to the Hub Assembly and automatically invalidate ALL Hub warranty.

# 4 Hub Service & Replacement

## FIT NEW AUXILIARY OIL SEAL

Apply 15 - 20gm of Meritor Hub Grease, Blue Lithium EP2 to the cavity of the new seal, working the grease in evenly around the circumference of the seal.

Apply a light smear of Meritor Hub Grease, Blue Lithium EP2 to the bore of the oil seal.

Press the new oil seal onto the oil seal driver (Meritor CVA part No.MST 3106) ensuring the 'oil side' marking on the seal is visible (i.e. faces away from the plate of the driver) such that the seal will be installed the correct way round in the hub.

Locate the nose of the driver into the bore of the inner bearing cone and drive the seal fully home ensuring the seal remains square to the hub at all times (Fig. 4.23). The seal will bottom out on the inner hub shoulder and the outer face will remain proud of the hub when fully installed.

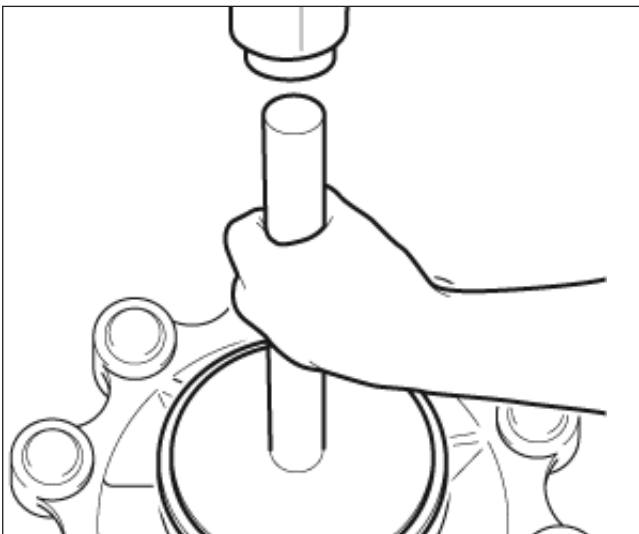


Fig. 4.23

## LC Hub Re-fitment Procedure

### CLEAN SPINDLE BEARING JOURNAL

Prior to re-assembling the hub onto the spindle, check the spindle for damage and remove any fretting or rust on bearing journals using medium grade emery cloth strip. Also ensure the inner bearing abutment shoulder is clean and free from damage.

Clean the oil seal journal, removing brake dust or corrosion from adjacent areas.

## CHECK SPINDLE END THREAD

Any minor damage can be repaired using a die nut and holder (Meritor CVA part numbers MST 3108 and MST 3109).

Apply 1 to 2 grams (volume 1 to 1.5 cm<sup>3</sup>) of Optimol 'Optimoly White Paste T' to the axle spindle in the area 'A' (Fig 4.24). Refer to **Section 11 Lubricants** for the Meritor CVA Optimol part numbers.

Spread the grease evenly around the spindle's circumference using a suitable soft brush. Using the excess grease on the brush, apply an even film around the circumference of the bearing journal shoulder, area 'B' (Fig 4.24). This will reduce spindle wear and assist future removal of the hub assembly.



**CAUTION:** If the quantity of Optimol White Paste exceeds 2 grams in area 'A', there is a risk that the end clamp load will relax, resulting in a loose end nut.

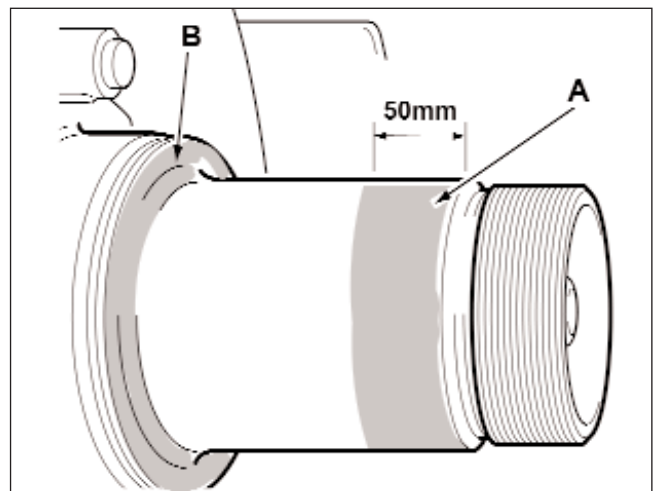


Fig. 4.24

Ensure the hub bearing bores are clean and free from any excess grease.

Apply 0.5 to 1 grams of Optimol 'Optimoly White Paste T' to the outboard bearing bore only and spread evenly around the circumference. Refer to **Section 11 Lubricants** for the Meritor CVA Optimol part numbers.



**CAUTION:** Only use the grease supplied with replacement components/kits, or that specified. Under no circumstance should any other type of grease be used.

# 4 Hub Service & Replacement

## RE-MOUNT HUB ASSEMBLY



**CAUTION:** Later hub assemblies, from Autumn 2009, incorporate an O ring positioned in a recess on the inner bearing (Fig 4.25).

Where applicable, fit the new O ring into position (Fig 4.25).

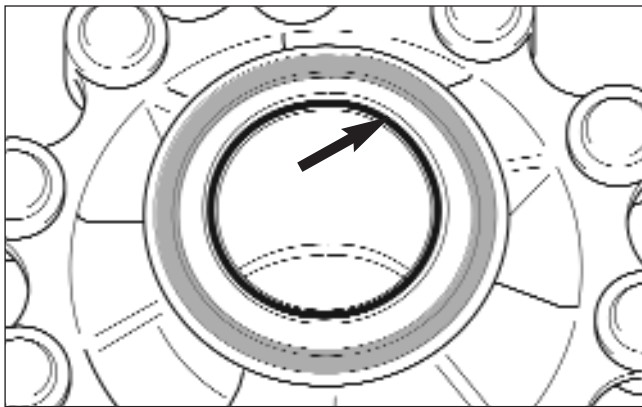


Fig. 4.25



**CAUTION:** Ensure the hub is squarely aligned to the axle spindle during refitting.

If the axle is fitted with ABS:

In the case of the Drum Brake; check the condition of the sensor and pull it fully forward in its mounting block.

In the case of the Meritor Disc Brake, refer to **Section 7 ABS Component Replacement** for ABS installation instructions.

### Drum Brake Axles

**NOTE:** Before re-fitting the hub, ensure the clip between the two halves of the bearing cone (in the bore of the bearing) is correctly seated.

If the hub is still assembled to the road wheel and brake drum, use a wheel dolly to align the hub assembly with the axle spindle, adjusting the height until the brake drum fits over the brake linings.

Push the hub, or hub, drum and wheel assembly onto the axle spindle using a single smooth pushing action. Ensure the assembly is pushed fully onto the spindle with a single push, taking care not to damage the oil seal, O ring, or spindle threads.



**CAUTION:** The hub assembly **MUST** be pushed onto the axle spindle using a single smooth pushing action. **DO NOT** attempt to “rock” or “ease” the hub onto the axle spindle, this could damage the bearings and lead to premature failure.

### Disc Brake Axles

Push the hub and rotor assembly onto the axle spindle using a single smooth pushing action. Ensure the assembly is pushed fully onto the spindle with a single push, taking care not to damage the oil seal, O ring, or spindle threads.



**CAUTION:** The hub assembly **MUST** be pushed onto the axle spindle using a single smooth pushing action. **DO NOT** attempt to “rock” or “ease” the hub onto the axle spindle, this could damage the bearings and lead to premature failure.

### Disc & Drumbrake Axles

#### REFIT THE STAKE WASHER ASSEMBLY

The stake washer assembly may be re-used twice after original factory fitment. After the flange of the stake washer has been bent over in three positions the stake washer assembly **MUST** be replaced.

Lightly lubricate the full dished face of the stake washer with Optimol 'Optimoly white paste T' or a conventional hub bearing grease.



**CAUTION:** Only use the grease supplied with replacement components/kits, or that specified.

**Under no circumstance should any other type of grease be used.**

Fit the stake washer assembly (Fig. 4.26) by aligning the washer key with the spindle keyway.

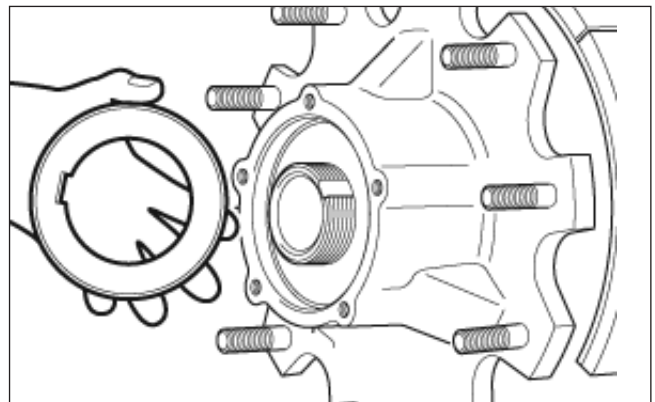


Fig. 4.26



## 4 Hub Service & Replacement

Ensure the stake washer assembly is fitted the correct way round with the dish of the stake washer facing outwards (Fig. 4.27)

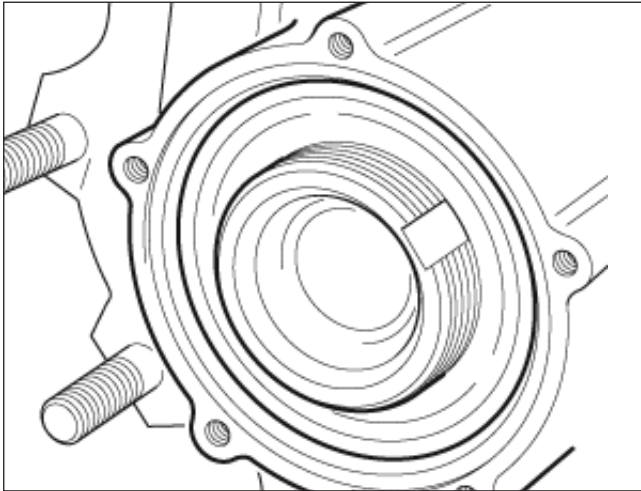


Fig. 4.27

### REFIT AXLE HUB NUT

Fit the axle hub nut to the spindle thread.

Wind the nut down the spindle thread using the hub nut socket from the Meritor LC Service Kit (Meritor CVA part No. MST 3105).

Continue until the hub is fully located and at the same time continuously rotate the hub (5 - 10 complete revolutions) to ensure the bearing rollers are seated.

Using a suitable 3/4" drive torque wrench, apply a final tightening torque to the value specified in **Section 11**.

Continue to rotate the hub whilst the final torque is applied (Fig. 4.28).

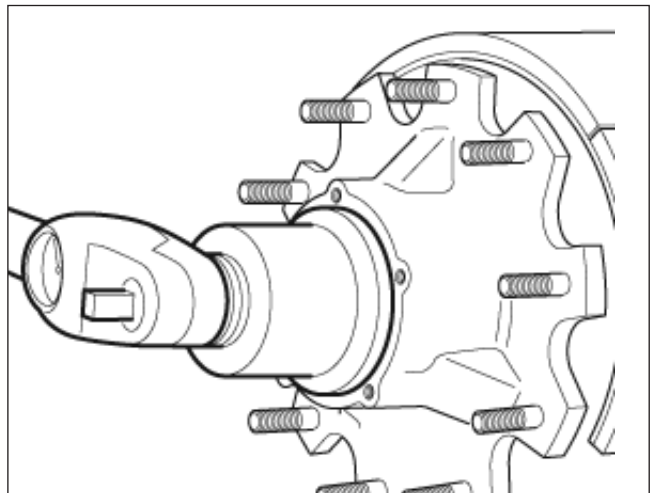


Fig. 4.28

# 4 Hub Service & Replacement

## STAKING THE WASHER TO AXLE HUB NUT

Using the staking tool from the Meritor LC Service Kit (Meritor CVA part No. MST 3105) stake a previously unused section of the outer flange of the stake washer into ONE of the slots on the face of the nut flange (Fig. 4.29).

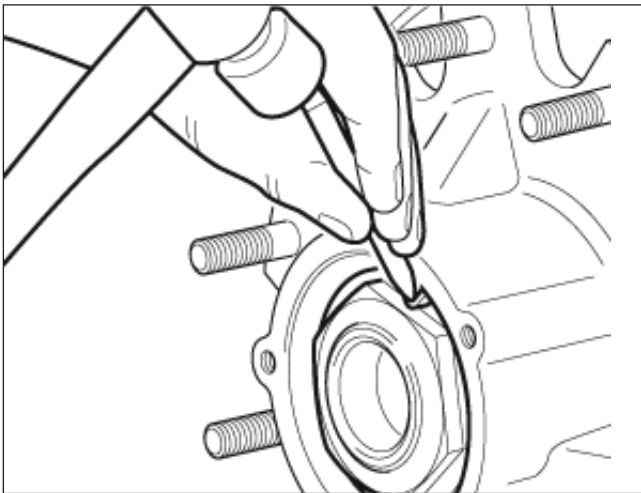


Fig. 4.29

The washer material should be split along the edge of the flat end of the slot in the nut and formed over progressively into the remaining length of the slot so as to resist the unwinding of the nut in the event that torque is lost (Fig. 4.30).

Fig. 4.31 and Fig. 4.32 show incorrect locking procedure.

It is possible to complete the staking operation by using a piece of 10mm x 10mm square bar by placing the end of the bar on the staking washer flange at a shallow angle. Carefully align it so that the one side of the bar is in line with the flat end of the slot in the nut flange.

Do not use a sharp bladed tool such as a chisel or screw driver.

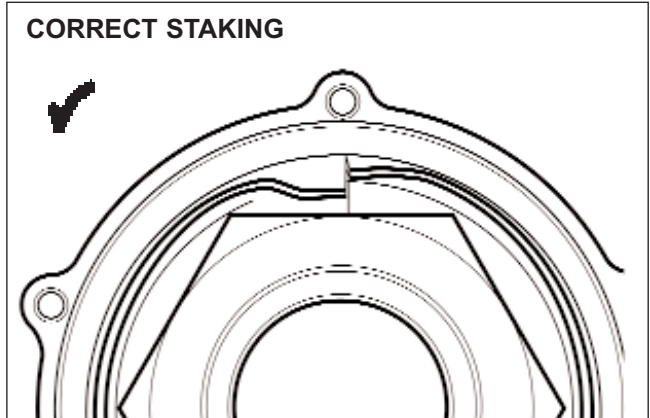


Fig. 4.30

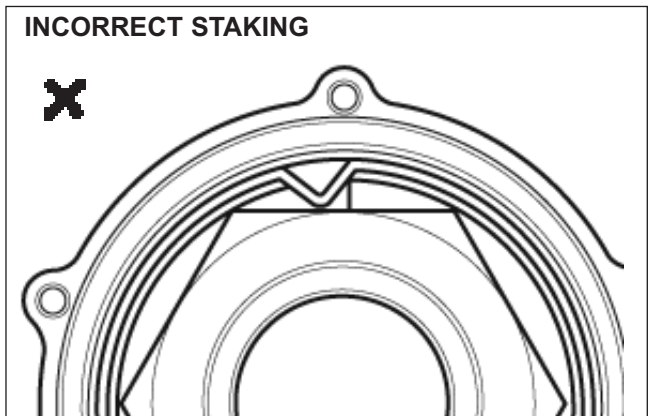


Fig. 4.31

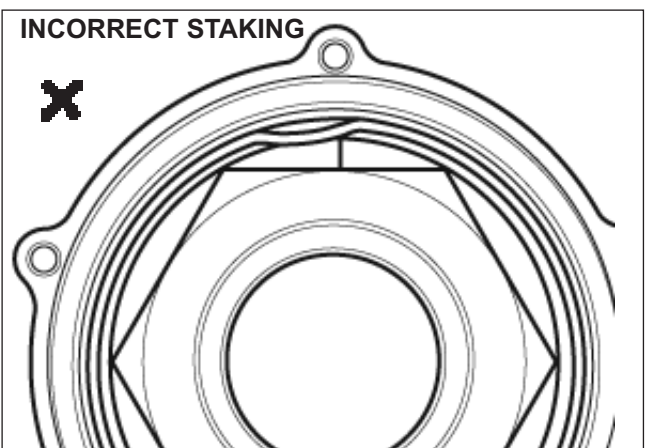


Fig. 4.32

## CHECKING THE BEARING SETTING

Check for free rotation of the hub assembly. It should not be possible to detect any axial bearing clearance.

# 4 Hub Service & Replacement

## REFIT HUB CAP

Check the seal location groove in the hub face is clean and fit the hub cap gasket (Fig. 4.33), engaging the raised rib of the gasket into the groove in the hub face and align the hub cap retaining screw holes.

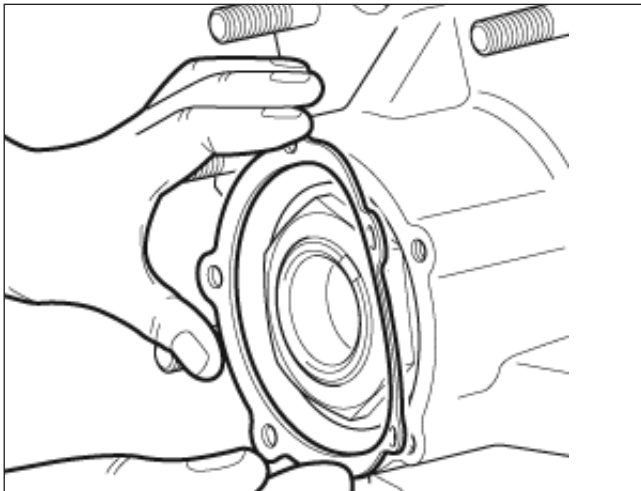


Fig. 4.33

Fit the hub cap and tighten the retaining screws evenly. Finally tighten the hub cap retaining screws to the torque value specified in **Section 11**. Ensure the gasket is compressed evenly and is not damaged (Fig. 4.34).

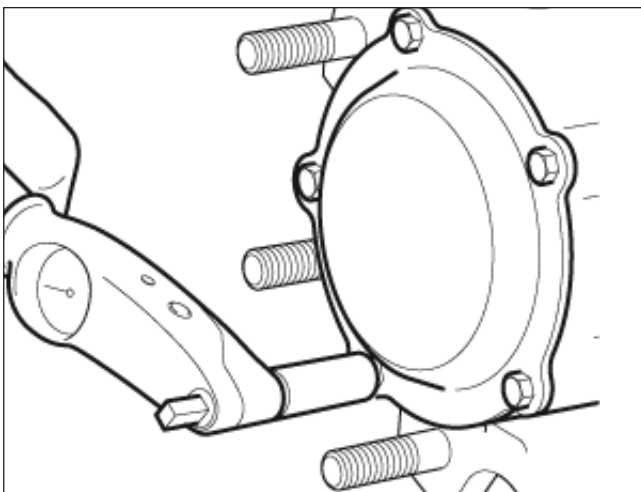


Fig. 4.34

## Drum Brake Axles

Where applicable, refit the brake drum as described in **Section 5 Brake Drum Replacement**

## Disc Brake Axles

Lift the brake assembly over the rotor.



**CAUTION:** Do not use the pad retaining plate or stabiliser bar, where applicable, for handling purposes. Damage to the disc brake components could result.

While supporting the brake assembly, align the brake assembly mounting holes with the fixing points on the axle torque plate. Fit the caliper bolts.

**NOTE:** D-Duco disc brake applications fitted to pre 2002 built axles use hardened washers with M20 caliper bolts. Where applicable the hardened washers must be used.

Take care not to allow the brake assembly to fall. Remember that the brake assembly has a weight of upto 55kgs.

Tighten the fixings, starting on the top half of the torque plate.

Tighten the fixings to the torque value specified in **Section 11** using a suitable size socket ( $\frac{3}{4}$ " drive recommended) (Fig. 4.35).

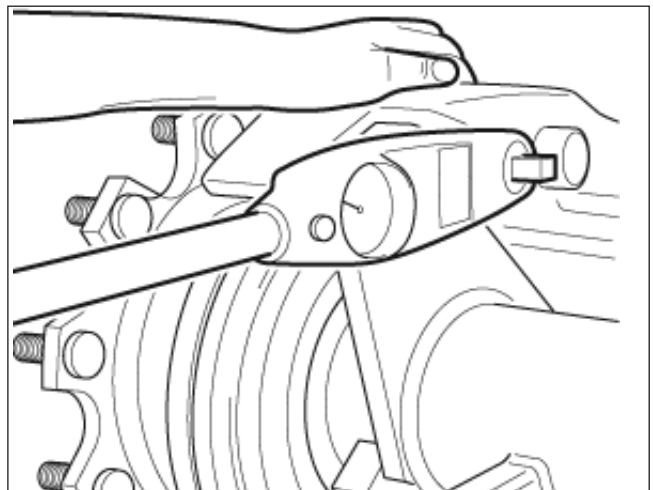


Fig. 4.35

Refit the air chamber and brake pads as described in the appropriate Meritor Inc. Disc Brake service manual listed below;

<b>DX</b>	<b>MM 1147</b>
<b>DUCO</b>	<b>MM 1127</b>
<b>Elsa 2</b>	<b>MM 1130</b>
<b>Elsa 195/225</b>	<b>MM 0350</b>

Where applicable, refit the road wheel. Remove the axle safety stands and lower the vehicle to the ground.

# Drum Replacement

# 5

PG. 37 Drum removal

PG. 37 Drum fitment

# 5 Drum Replacement

## DRUM REMOVAL

The following procedures can be performed either with the road wheel and brake drum assembled to the hub or with the road wheel and brake drum removed. In the latter instance follow the procedure below.

Raise the vehicle enough to get clearance to remove the wheel and tyre. Support the axle with safety stands. Remove the wheel and tyre.



**WARNING:** Do not work under a vehicle supported only by jacks. Jacks can slip or fall over and cause serious personal injury. Support the vehicle with safety stands, block the wheels to prevent the vehicle from moving.

## DE-ADJUST BRAKES

Using the manual adjustment nut on the slack adjuster fully de-adjust the brake. Follow the appropriate procedure for the type of automatic slack adjuster fitted. Instructions are available through the Meritor Inc. Technical Sales Department.

Use two suitable M12 x 1.75 screws to jack the brake drum face from the hub. The screws should be tightened evenly to prevent the drum from jamming on the hub spigot (Fig. 5.1).

**NOTE:** It is advisable to grind a lead onto the threaded end of the M12 screws to prevent any possible binding in the brake drum.

The brake drum can then be lifted clear of the hub.

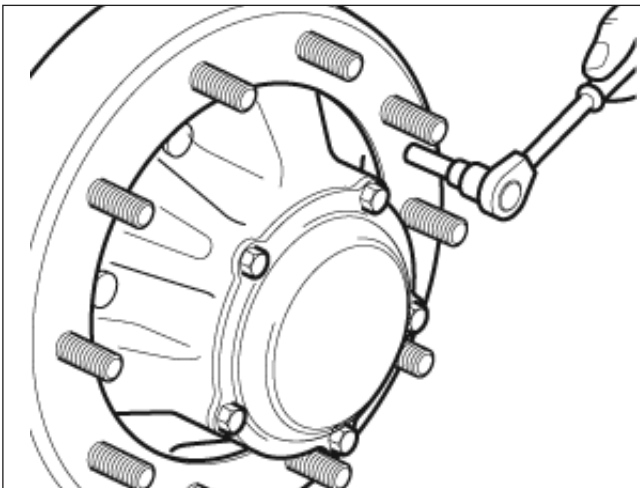


Fig. 5.1

## DRUM FITMENT

Replace the brake drum by fitting over the ten wheel studs. To assist with future drum removal, ensure the two threaded jack-off holes in the drum flange are aligned with the two bosses on the hub flange (Fig. 5.2).

Ensure the drum is fully seated on its location spigots.

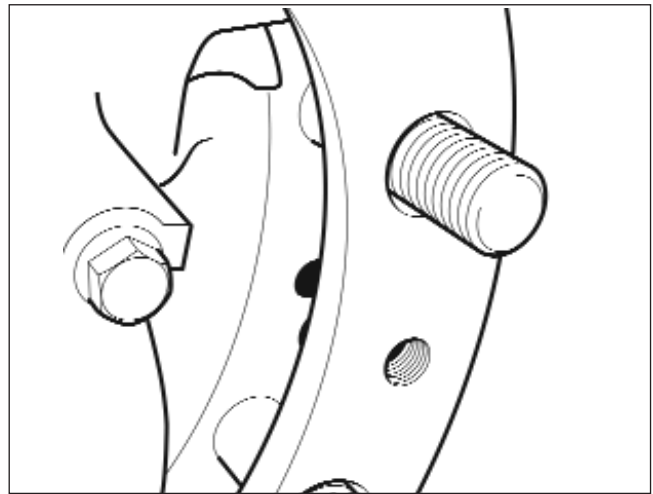


Fig. 5.2



**WARNING:** The brake drum is not positively secured to the hub and is loose on the axle until the road wheel is replaced and wheel nuts secured.

If the trailer is to be moved or left unattended prior to replacement of the road wheel, ensure the brake drum is temporarily secured by fitting a minimum of two wheel nuts diametrically opposite to each other.

Refit the road wheel.

Remove the axle safety stands and lower the vehicle to the ground.

# Rotor Replacement

# 6

PG. 39 Rotor removal

PG. 39 Rotor fitment

# 6 Rotor Replacement

## ROTOR REMOVAL



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

Raise the vehicle enough to get clearance to remove the wheel and tyre. Support the axle with safety stands. Remove the wheel and tyre.



**WARNING:** Do not work under a vehicle supported only by jacks. Jacks can slip or fall over and cause serious personal injury. Support the vehicle with safety stands, block the wheels to prevent the vehicle from moving.

Loosen the bolts securing the rotor to the hub assembly, **DO NOT REMOVE AT THIS STAGE**

Remove the Hub as described in **Section 4 Hub Removal & Replacement**

Place the hub on a suitable flat clean surface with the rotor facing up and remove the rotor securing bolts. Lift the rotor from the hub and discard.

**NOTE:** For 8 wheel stud ELSA 195 disc brake applications, the rotor is secured by the wheel bolts. The wheel bolts must be removed before the rotor can be lifted clear of the hub. Refer to the disc brake application in **Section 9 Wheel Bolt Replacement**.

**NOTE:** Most new rotors are supplied with the ABS ring as an integral component. However, if the new rotor utilises a press fit ABS ring follow the procedure detailed in **Section 7 ABS Component Replacement**

## ROTOR FITMENT

Place the new rotor loose on its hub mounting spigot and align the fixing holes.

By hand fit at least two opposite rotor mounting bolts before turning the assembly over (Fig 6.1).

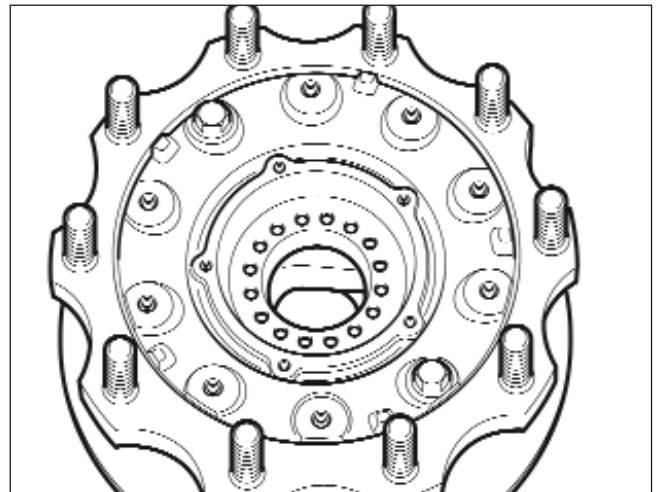


Fig. 6.1



Fit the remaining fasteners. Apply a nominal torque of no more than 30 Nm to all fasteners to seat the rotor. Check the correct length of bolt has been used in all 10 positions.

**NOTE:** For 8 wheel stud ELSA 195 disc brake applications, the rotor is secured by the wheel bolts. New wheel bolts must be fitted to secure the rotor to the hub. Refer to the disc brake application in **Section 9 Wheel Bolt Replacement**.

Refit the Hub and rotor assembly as described in **Section 4 Hub Removal & Replacement**

Tighten the rotor securing bolts to the correct torque specified in **Section 11 Torque Values**.

Refit the road wheel.

Remove the axle safety stands and lower the vehicle to the ground.

# ABS Component Replacement

# 7


PG. 41 Drumbrake axles

PG. 43 Disc brake axles



# 7 ABS Component Replacement

Raise the vehicle enough to get clearance to remove the wheel and tyre. Support the axle with safety stands. Remove the wheel and tyre.

 **WARNING:** Do not work under a vehicle supported only by jacks. Jacks can slip or fall over and cause serious personal injury. Support the vehicle with safety stands, block the wheels to prevent the vehicle from moving.

## Drum Brake Axles

Remove the Hub as described in **Section 4 Hub Removal & Replacement**

### FITTING AN ABS POLE WHEEL

With the hub removed from the axle, place it, oil seal end upwards, on a clean, flat surface and cover the bore with a clean cloth to protect the bearings and grease from contamination.

Check that the pole wheel mounting spigot on the hub is clean and free from rust using medium emery paper to clean it up if necessary. Ensure no emery dust or other debris contaminates the bearings or grease.

The pole wheel can be fitted hot or cold using the oil seal driver (Meritor CVA Part No. MST 3106). If fitting hot, heat the pole wheel evenly to a maximum of 150°C using a hot plate or induction heater and place onto the hub spigot ensuring it fully seats. If fitting cold, use the oil seal driving tool to drive the pole wheel onto the hub spigot ensuring it bottoms out against the mounting shoulder (Fig. 7.1).

### FITTING AN ABS SENSOR

**NOTE:** Axles produced before May 2002 used an M10 bolt to secure the sensor block to the axle. Axles manufactured after May 2002 incorporate a welded stud to mount the sensor block, which is then secured with a 'Nyloc' nut. Follow the appropriate procedure detailed below.

#### Sensor Block Assembly - Before May 2002

Axle beams are provided with a sensor block bolt fixing hole and location groove. The hole is located on the spindle end behind the oil seal journal.

Apply Meritor Brake Lubricant grease to bush.

Assembly the spring bush into the sensor mounting block (Fig. 7.2). Push the sensor fully into the mounting block assembly.

When the hub is refitted the pole wheel will push the sensor back thus attaining the correct clearance.

Fix the sensor block assembly to the axle beam;

**NOTE:** The sensor must be assembled into the sensor mounting block as described in this procedure, prior to fixing the block assembly to the axle beam. The sensor cannot be fitted once the block is in position.

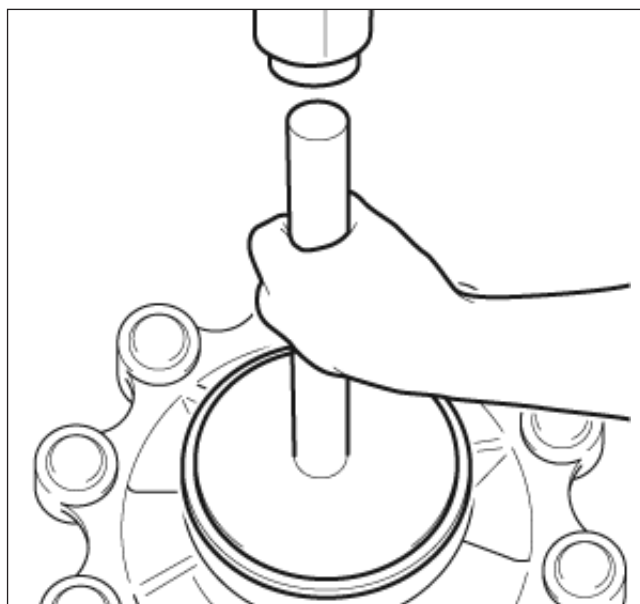


Fig. 7.1

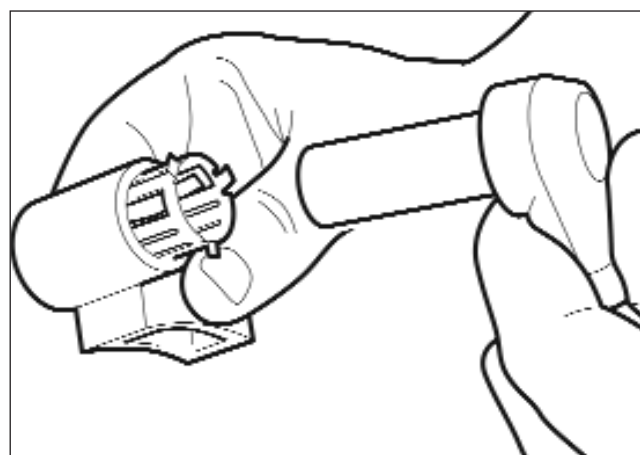


Fig. 7.2

# 7 ABS Component Replacement

Position the mounting block assembly so that the two small feet on the front edge of the block locate into the radial groove in the spindle just forward of the bolt hole.

Line up the bolt hole in the block with the hole in the beam and engage the M10 thread forming fixing bolt. **ALWAYS USE THE CORRECT BOLT.** Refer to Meritor Parts List.

Tighten the fixing bolt to the torque specified in **Section 11**. Ensure the block is correctly seated and fully clamped.

The sensor may be rotated in the mounting block to allow the cable to pass either side of the anchor bracket.

Pass the sensor cable through the dust cover using the uppermost hole and fit the strain relief grommet.

Ensure the lower cable exit hole in the dust cover is fitted with a blanking plug.

## Sensor Block Assembly - From May 2002

Apply Meritor Brake Lubricant grease to bush.

Assemble the spring bush into the sensor mounting block (Fig. 7.2). Push the sensor fully into the mounting block assembly.

When the hub is refitted the pole wheel will push the sensor back thus attaining the correct clearance.

Fix the sensor block assembly to the axle beam;

All axle beams are provided with a sensor block mounting stud (A) welded to the axle beam (Fig. 7.3).

**NOTE:** The sensor must be assembled into the sensor mounting block as described in this procedure, prior to fixing the block assembly to the axle beam. The sensor cannot be fitted once the block is in position.

Locate the mounting block assembly (B) onto the welded stud, as shown in Fig. 7.3.

Secure the sensor block in position with a new M8 'Nyloc' lock nut. **ALWAYS USE THE CORRECT NUT.** Refer to Meritor Parts List.

Tighten the 'Nyloc' lock nut to the torque specified in **Section 11**. Ensure the block is correctly seated and fully clamped.

The sensor may be rotated in the mounting block to allow the cable to pass either side of the anchor bracket.

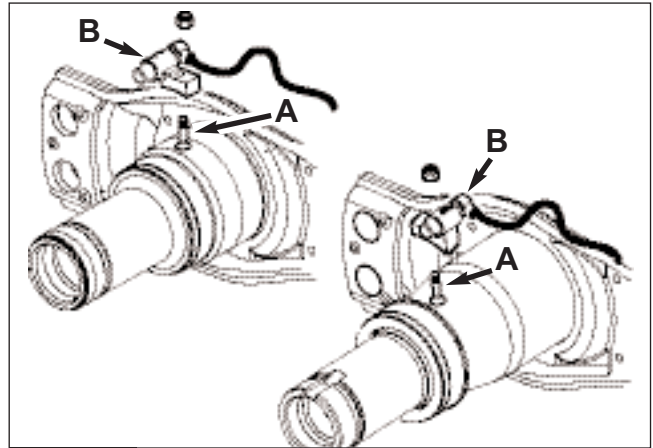


Fig. 7.3

Pass the sensor cable through the dust cover using the uppermost hole and fit the strain relief grommet.

Ensure the lower cable exit hole in the dust cover is fitted with a blanking plug.

Refit the hub as described in **Section 4 Hub Removal & Replacement**

## CHECKING SENSOR OUTPUT

Connect the output cable to a suitable multimeter.

Rotate the hub by hand at a constant rate of approximately 30 rpm and note the maximum and minimum readings. The minimum permissible voltage reading is 400 millivolts and the ratio of maximum/minimum should not exceed 2.

If either values are not obtained check the installed air gap between the sensor and pole wheel does not exceed 0.7 millimeters and the pole wheel run out does not exceed 0.2 millimeters.

If the installation is still not correct, contact the supplier of the ABS equipment for further advice.

# 7 ABS Component Replacement

## Disc Brake Axles

Remove the Hub as described in **Section 4 Hub Removal & Replacement**

### FITTING A NEW ABS RING

Most new rotors are supplied with the ABS ring as an integral component and if there is damage to the ABS ring a new rotor must be fitted. However, For DX disc brake applications the new rotor may utilise a press fit ABS ring, if necessary follow the procedure detailed below.

Place the hub on a suitable flat clean surface with the rotor placed loose on its mounting spigot. Push the ABS tube into the rotor (Fig. 7.4).

Using an LM oil seal driver (Meritor CVA part No. MST 3106), gently tap the ABS tube over its spigot on the hub (Fig. 7.5).

Keep the pole wheel square at all times and do not use excessive force to avoid damage to the thin tube.

When the pole wheel is approximately 4mm below the face of the rotor, gently lift the rotor up off the hub spigot and lower it back, to ensure the barbs on the tube engage properly onto the step in the rotor bore. (Fig. 7.6).

By hand fit at least two opposite rotor mounting bolts before turning the assembly over.

**T** Fit the remaining fasteners. Apply a nominal torque of no more than 30 Nm to all fasteners to seat the rotor. Check the correct length of bolt has been used in all 10 positions.

**NOTE:** All rotor fixings must be tightened to the torque value specified in **Section 11**

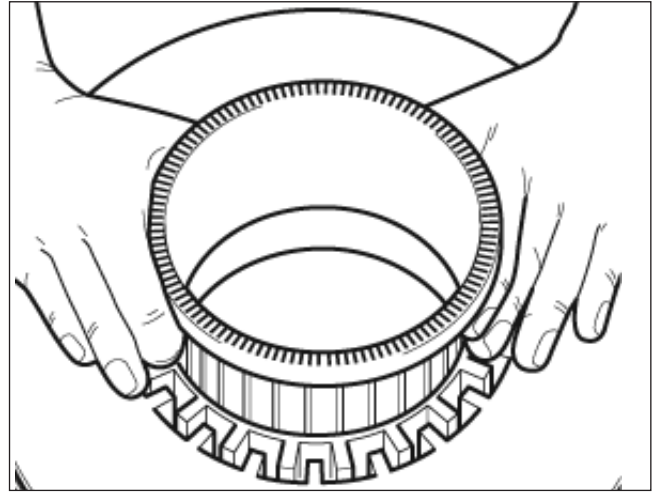


Fig. 7.4

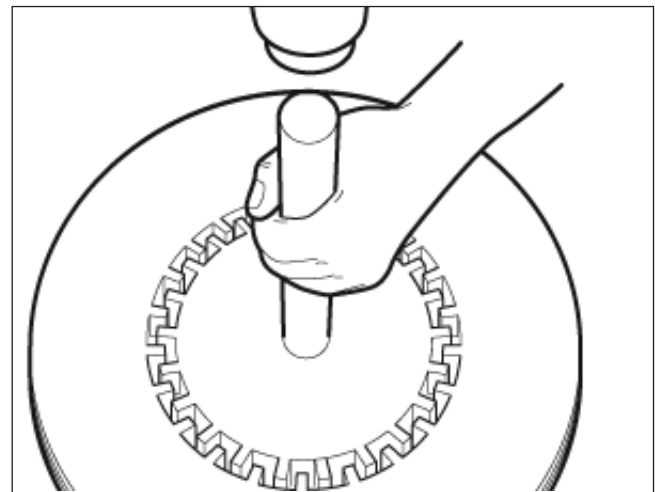


Fig. 7.5

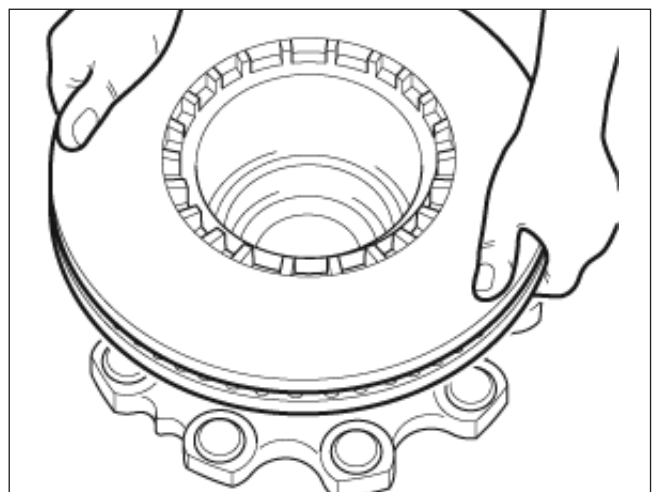


Fig. 7.6

# 7 ABS Component Replacement

## FITTING AN ABS SENSOR

### Sensor Block Assembly:

Apply Meritor Brake Lubricant grease to the bush.

Assemble the spring bush into the sensor mounting block.

Push the sensor fully into the mounting block. Check when the hub and rotor has been fitted and that the sensor has been pushed up to the pole wheel (Fig 7.7).

Refit the hub as described in **Section 4 Hub Removal & Replacement**

**NOTE:** When the hub is refitted the pole wheel will push the sensor back thus attaining the correct clearance.

## CHECKING SENSOR OUTPUT

Connect the output cable to a suitable multimeter.

Rotate the hub by hand at a constant rate of approximately 30 rpm and note the maximum and minimum readings.

The minimum permissible voltage reading is 400 millivolts and the ratio of maximum/minimum should not exceed 2.

If either values are not obtained check the installed air gap between the sensor and pole wheel does not exceed 0.7 millimeters and the pole wheel run out does not exceed 0.2 millimeters.

If the installation is still not correct, contact the supplier of the ABS equipment for further advice.

## Disc & Drumbrake Axles

Refit the road wheel.

Remove the axle safety stands and lower the vehicle to the ground.

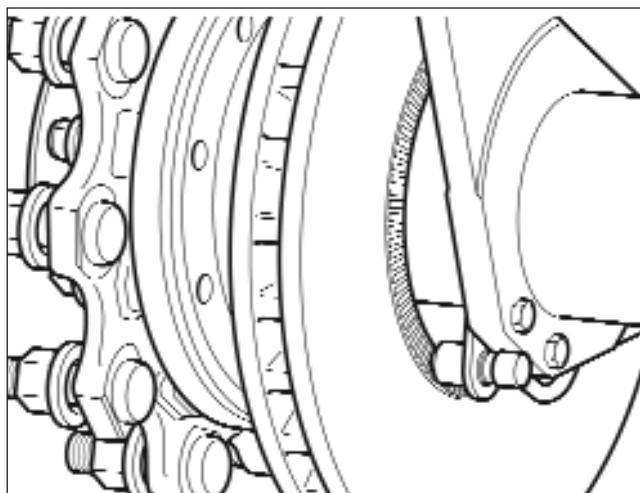


Fig. 7.7



# Hub Odometer Replacement

# 8

PG. 47 Hub odometer fitment

# 8 Hub Odometer Replacement

## Hub odometer Fitment

The LM/LC axle may be fitted with an hubodometer by using a special hub cap (Fig 8.1).

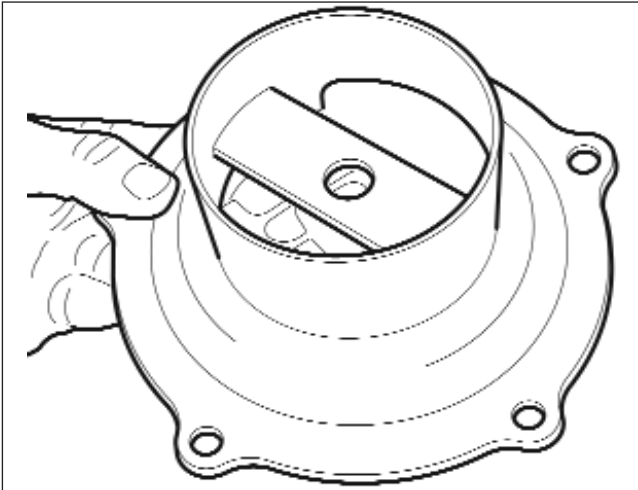


Fig. 8.1

It is not possible to fit an hubodometer to a standard hub cap (Fig 8.2) and attempting to do so will affect the hub sealing and may damage the spindle.

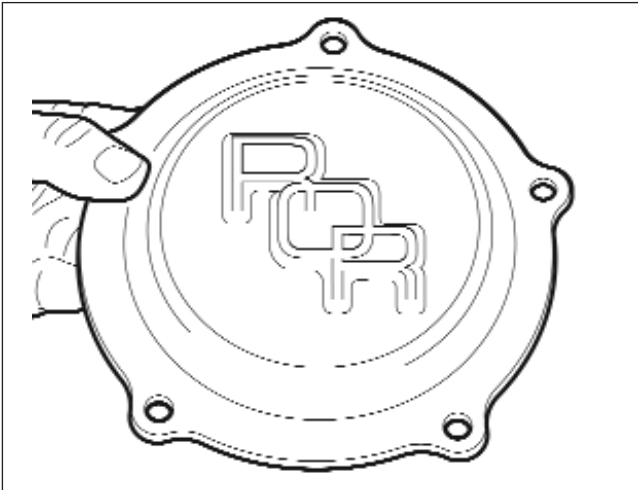


Fig. 8.2

For hubodometer types up to 85mm outside diameter use hub cap Meritor Part No. 21224904.

It is advisable to assemble the hubodometer to the hub cap prior to fitting the hub cap to the axle. Where applicable remove the hub cap from the hub as described in **Section 4 Hub Service & Replacement**

Place the hub cap on a clean, flat surface. Fit the nut to a suitable open ended spanner and using a small amount of grease place the washer onto the nut.

Using the spanner, position the nut and washer under the mounting hole in the cross bar of the hub cap.

**T** Lower the hubodometer through the hole to engage the thread. Rotate the hubodometer to screw the nut along the mounting stud until hand tight. Finally tighten the nut with the spanner in the normal way (Fig. 8.3) to a maximum of 27 Nm.

The hub cap and gasket can now be fitted to the axle as described in **Section 4 Hub Service & Replacement**.

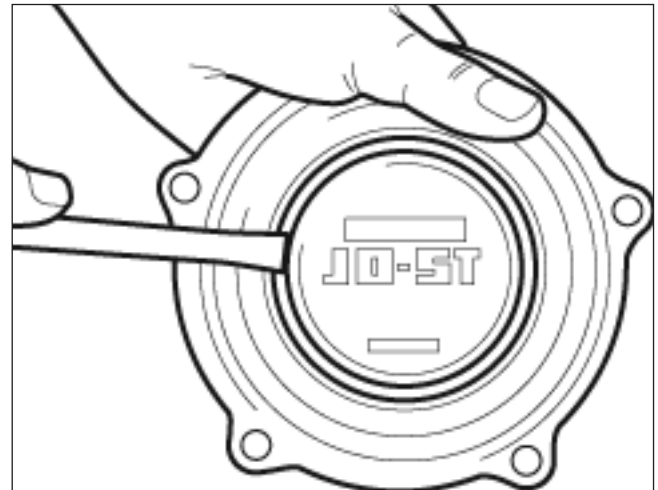


Fig. 8.3

# Wheel Bolt Replacement

# 9

PG. 49 Drumbrake axles

PG. 49 Disc brake axles



# 9 Wheel Bolt Replacement

## Drum Brake Applications

### REMOVAL AND REFITTING OF WHEEL BOLTS

With the hub removed from the axle, support it by placing blocks under the flange. Using the wheel bolt removal tool (Meritor CVA Part No. MST 3211) drive out the wheel bolts (Fig. 9.1).

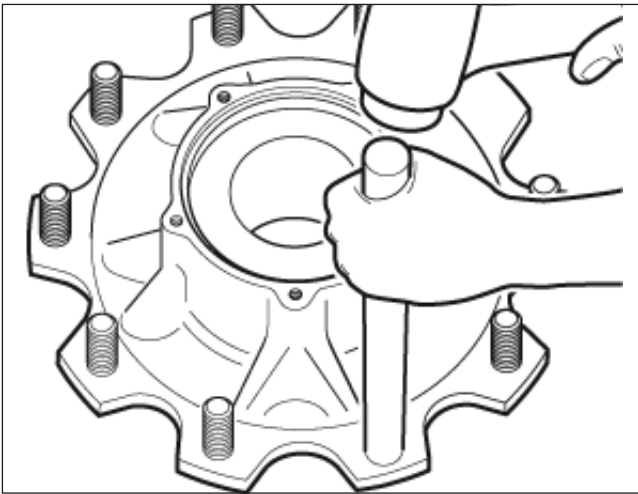


Fig. 9.1

To replace the wheel bolts, turn the hub over, oil seal end upwards, and support the hub on the brake drum aligning the holes in both hub and drum. Using the wheel bolt driving tool (Meritor CVA Part No. MST 3210) drive the bolts until the heads are fully seated against the hub flange (Fig. 9.2).

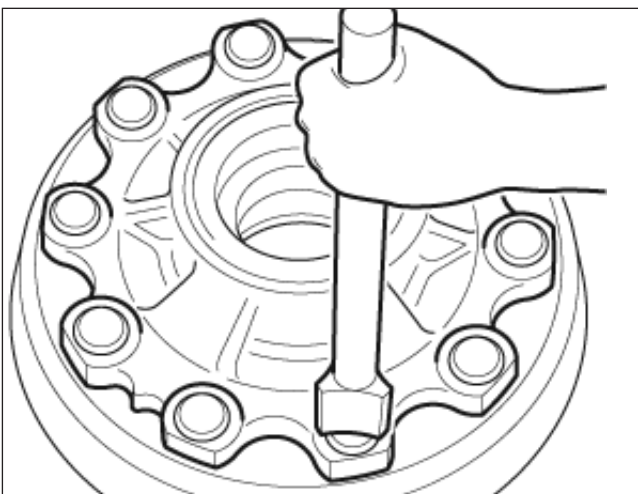


Fig. 9.2

## Disc Brake Applications

### REMOVAL AND REFITTING OF WHEEL BOLTS

With the hub removed from the axle, support it by placing blocks under the flange, or if the rotor is still attached to the hub, stand the inboard face of the rotor on a clean, flat, firm surface.

Using the wheel bolt removal tool (Meritor CVA Part No. MST 3211) drive out the wheel bolts (Fig. 9.3)

Wind the new stud into the hub using spacer washers and a wheel nut. Ensure the gap under the bolt head does not exceed 0.1mm. (Fig. 9.4)

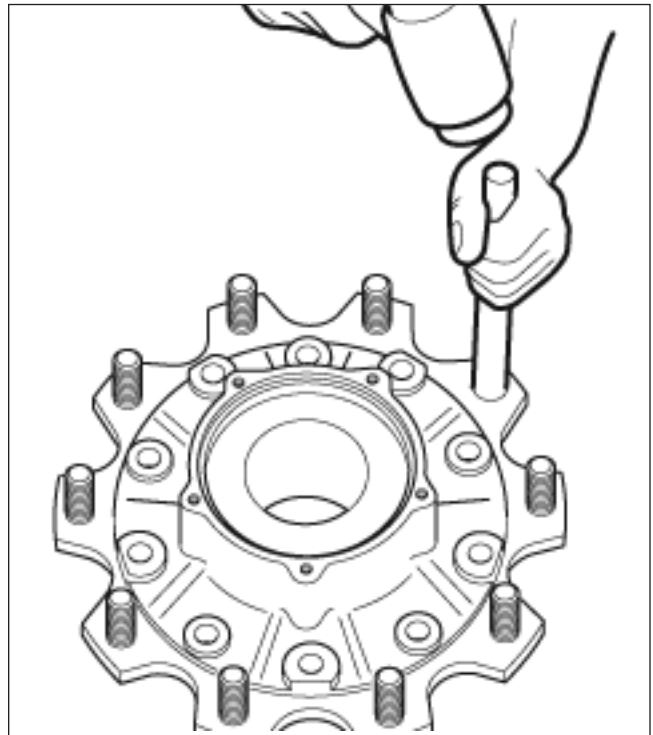


Fig. 9.3

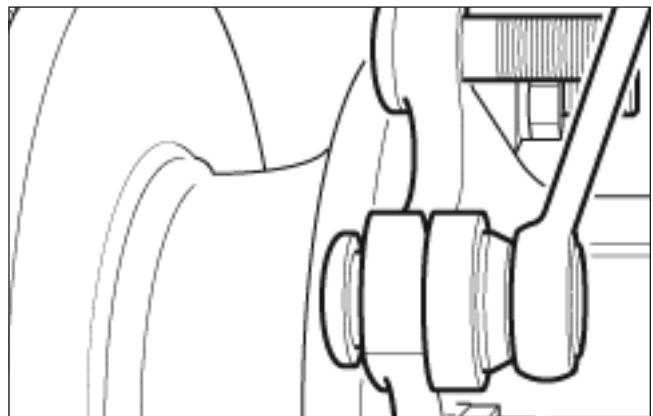


Fig. 9.4

# Axle Welding Recommendations

# 10

PG. 51 Welding procedures  
PG. 51 Stresses and Welding

# 10 Axle Welding Recommendations

## Welding Procedures

Incorrect weld placement will void Meritor Inc.'s warranty and can reduce the fatigue life of the trailer axle beam and suspension components. Serious personal injury can result.

The suspension and axle must be protected from heat and weld spatter to avoid damage and any plastic or rubber components must be properly covered. All parts must be dry and free from oil and dirt prior to welding. Ensure that the suspension is properly earthed to avoid arcing.

All tack welds are at least 25mm long.

The number of tack welds is kept to a minimum. If possible clamp the bracket tightly to the beam and eliminate the tack welds.

The welding procedure recommended in the Meritor suspension manual is followed.

More than one weld run is required make the following run with a different start/finish point and before the previous run has cooled down. Descale between runs.

Oil, rust and thick deposits of paint are removed from the surfaces to be joined.

The welding consumables meet the relevant British Standards and are used as recommended by the manufacturer.

At the end of fillet welds, the weld is 'backed up' to fill the crater.



**WARNING: Incorrect weld placement, or weld spatter, can result in reduced fatigue life of the suspension system, serious personal injury and damage to components.**

The following precautions will prevent damage to the axle and suspension during welding and improve service life:

1. Prevent weld spatter from falling on the axle and road springs.
2. Ensure the earth connection is made to the axle beam, preventing the passage of current through the wheel bearings.
3. Do not test the arc on the axle beam or springs.
4. Remove scale and slag from fillet welds before painting to prevent corrosion.

## Stresses & Welding (Fig 10.1)

During use the axle beam is subjected to a wide variety of forces. These are caused by the payload, bumps in the road surface, cornering and braking.

Because these forces are constantly varying, the stresses in the axle beam also vary, causing fatigue. The top and bottom of the beam generally experience the greatest stresses and hence the most fatigue, whilst the section of beam around the horizontal centre line sees the least stress and fatigue.

Welds in the high stress areas will adversely affect the fatigue strength, for this reason do not weld in the area 95mm wide top and bottom of the beam, or 50° either side of the vertical centre line, as shown in the diagram below. Weld tacks or weld spatter are not allowed in this area.

The beam material is controlled to ensure that pre-heating is normally not necessary when welding as per BS5135.

The direction of welding should be as near the horizontal as possible and welding around the corners of brackets or spring seats should be avoided.

Separate drawings exist on request from the Meritor Technical Sales Department detailing seat welding procedures for both air and mechanical Meritor suspensions.

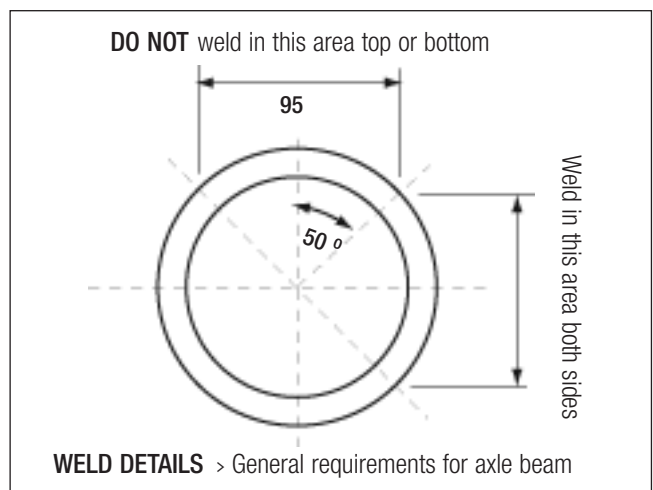


Fig. 10.1

# Maintenance schedules, Torque values Lubricants & Grease volumes

# 11

pg. 53 Maintenance schedules  
pg. 54 Torque Values  
pg. 54 Recommended Lubricants  
pg. 54 Grease Fill Volumes

# 11 Maintenance schedules, Torque values, Lubricants & Grease volumes

## Maintenance schedules

### LM & LC – Disc & Drum

#### Check Brake Adjustment & Wheel Nut Torques;

- Before entering service.
- After 150 km.
- After 1500 km.
- Every 3 months.
- After any wheel fixing removal.
- After any brake service.

### LM Only – Disc & Drum

#### Hub and Bearing Inspection, Including Oil Seal Replacement;

- Whenever hubs are removed from axle.
- Annually after 1st major hub overhaul.

#### Major Hub Service;

- If a problem is found during inspection.
- Prior to 2nd annual test or after 300,000 km, whichever occurs first.

### LC Only – Disc & Drum

#### Hub and Bearing Inspection, Including Oil Seal Replacement;

- The LC hub assembly is maintenance free. However a visual inspection should be carried out and the auxiliary oil seal replaced whenever the hub is removed from the axle.

**NOTE:** The LC hub is not a serviceable item.  
Any problems should be reported to Meritor Service Department.

### LM & LC – Drumbrakes only

#### Lubricate Camshaft Bearings;

- Recommended maximum at 3 monthly intervals.

**NOTE:** If other than Meritor Brake Lubricant Total Fina is used or where vehicles are in contact with severe abrasives a max of 6 week interval necessary.

# 11 Maintenance schedules, Torque values, Lubricants & Grease volumes



## Torque Values - Drum & Disc Brake Axles

Hub cap bolts . . . . .	11 - 15 Nm
Dust cover bolts . . . . .	50 - 60 Nm
Dust cover nuts . . . . .	11 - 15 Nm
Cam spline bearing assembly bolts (spherical) . . . . .	50 - 60 Nm
Cam head bearing assembly bolts.....	50 - 60 Nm
ABS sensor fixing bolts (disc brakes) . . . . .	20 - 25 Nm
ABS Sensor fixing bolts (pre May 2002 drumbrakes) . . . . .	30 - 50 Nm
ABS sensor fixing nut (drumbrakes) .....	17 - 22 Nm
LM Axle Hub Locknut .....	Refer to setting procedure, <b>Section 4</b>
Button head screws (axle lock nut) . . . . .	15 - 20 Nm
LC Axle Hub Nut . . . . .	700 - 750 Nm
Wheel nuts . . . . .	680 - 750 Nm
Air chamber nuts:	
Tighten evenly to initial torque of .....	80 - 100 Nm
<b>Retighten</b> to a final torque of .....	180 - 210 Nm

### Additional Torque values - DISC BRAKE AXLES ONLY

Rotor flange bolts . . . . .	230 - 270 Nm
Caliper bolt M16 (DX 195 only).....	280 - 320 Nm
Caliper bolt M18.....	380 - 420 Nm

## Recommended Lubricants

### Hub Bearings:

Meritor Hub Grease, Blue Lithium EP2 Elf Lithium EP2 Total Multis EP2 Shell Calithia EP2T Texaco Multifak EP2 BP LS EP2 Silkolene G62 Eurol Universalfett EP2 Axel Christiernsson Lithac 162 EP Castrol Spheerol EPL2 Shell Alvania Grease EP(LF)2 Mobil Mobilux EP2 Fina Marson EPL2 SKF LGEP2 GB Lithium EP2 Esso Beacon EP2

### Brake Components and Camshaft Bearings:

Meritor Brake Lubricant - (Total Fina CERAN WRC2)

Spindle Bearing Journal:

Optimol Optimoly White Paste 'T' (*available as detailed below*)

1 Kg Tub - Meritor CVA Part Number .....99538008

100 gm Tube - Meritor CVA Part umber.....99538009

## Hub & Bearing Grease Fill Volumes

### LM Hub

Hub Cavity . . . . . 150-200 gm

Inner Bearing . . . . . 35-40 gm

Outer Bearing . . . . . 35-40 gm

Hub Cap . . . . . Nil

### LC Hub

Hub is pre-packed no maintenance unit



**CAUTION:** Only use the grease supplied with replacement components/kits, or that specified. Under no circumstance should any other type of grease be used.



# Service Tools

# 12

- pg. 57 MST 3103 Bearing Driver (LM applications)
- pg. 57 MST 3104 Hub Nut Spanner (LM applications)
- pg. 57 MST 3105 Hub Nut Spanner (LC applications)
- pg. 57 MST 3106 Oil Seal Driver
- pg. 58 MST 3107 Oil Seal Removal Tool
- pg. 58 MST 3108 Die Nut
- pg. 58 MST 3109 Die Nut Holder
- pg. 58 MST 3110 Hub Puller
- pg. 59 MST 3210 Wheel Bolt Driver
- pg. 59 MST 3211 Wheel Bolt Removal Tool



# 12 Service Tools

**MST 3103** - Bearing Driver (LM applications)

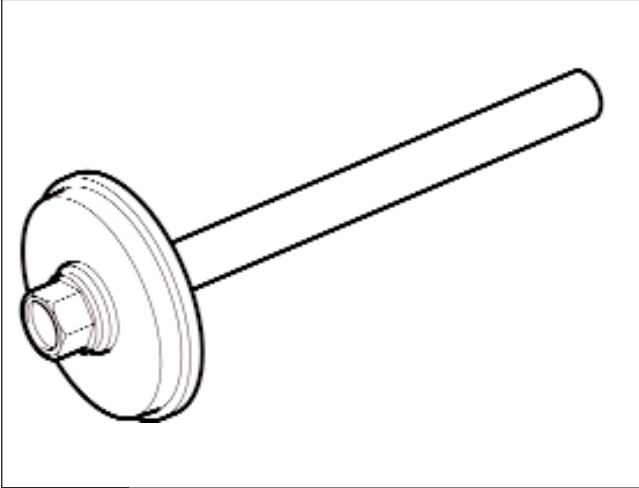


Fig. 12.1

**MST 3105** - Hub Nut Spanner (LC applications)

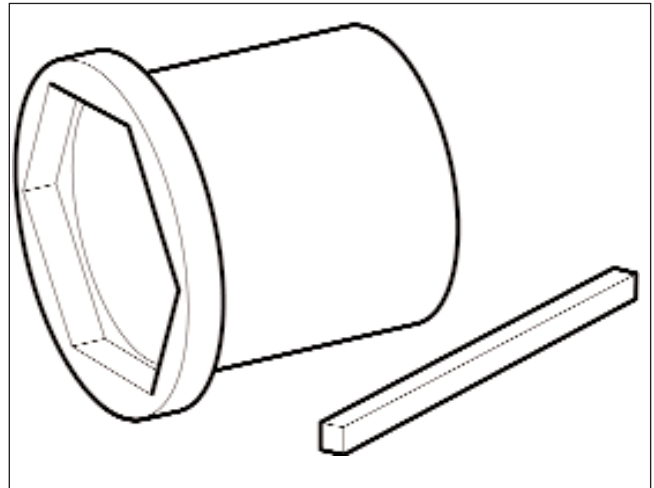


Fig. 12.3

**MST 3104** - Hub Nut Spanner (LM applications)

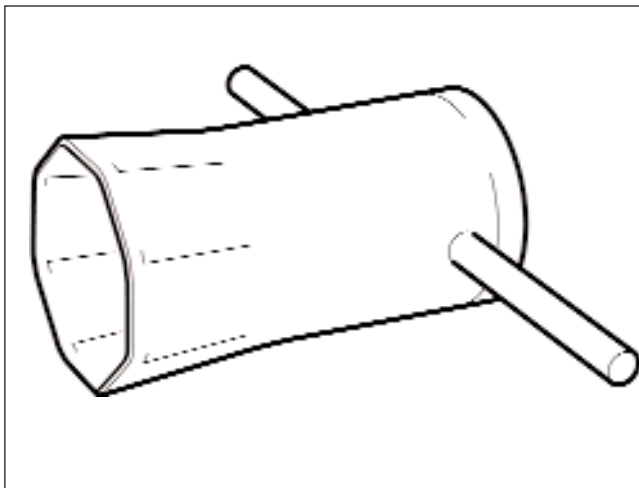


Fig. 12.2

**MST 3106** - Oil Seal Driver

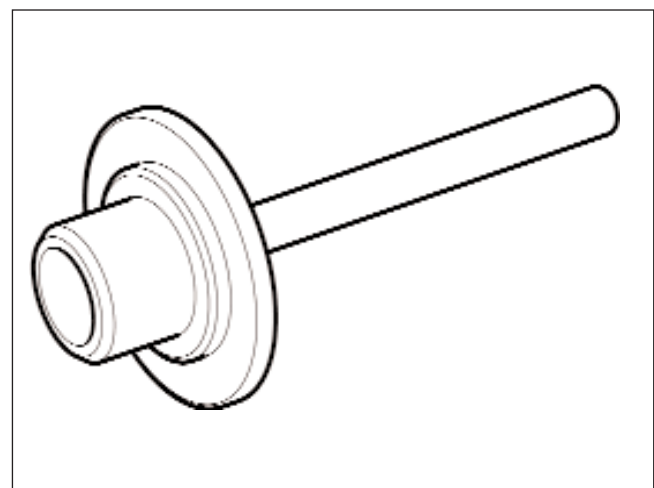


Fig. 12.4

# 12 Service Tools

**MST 3107 - Oil Seal Removal Tool**

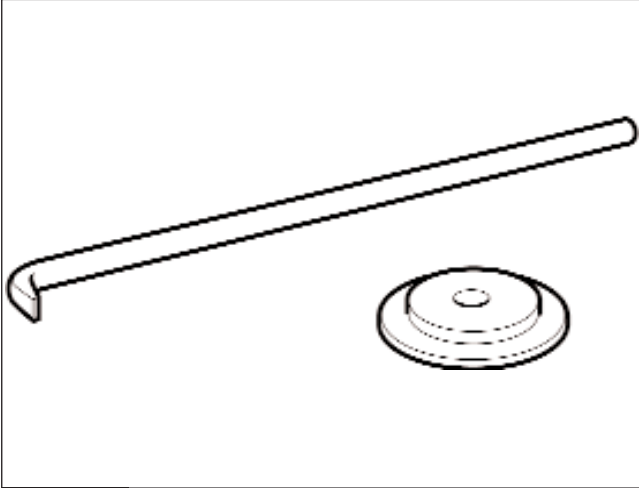


Fig. 12.5

**MST 3109 - Die Nut Holder**

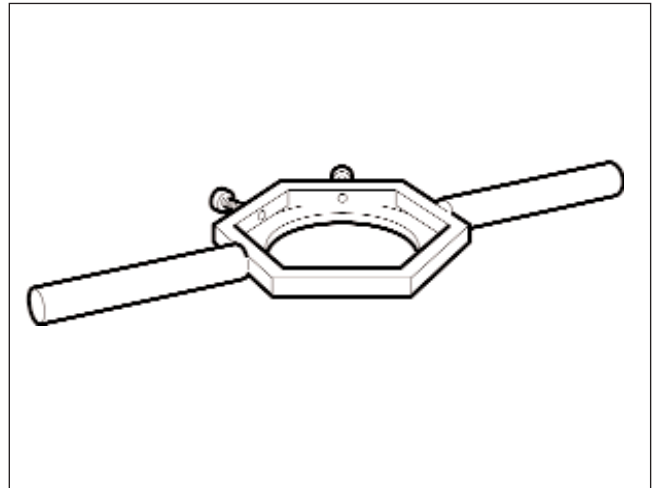


Fig. 12.7

**MST 3108 - Die Nut**

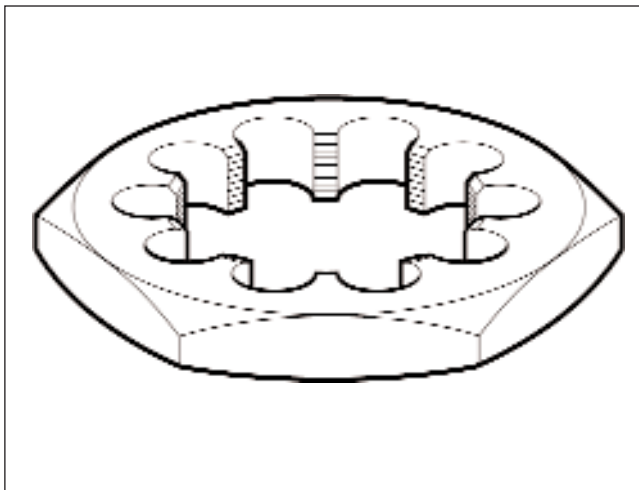


Fig. 12.6

**MST 3110 - Hub Puller**

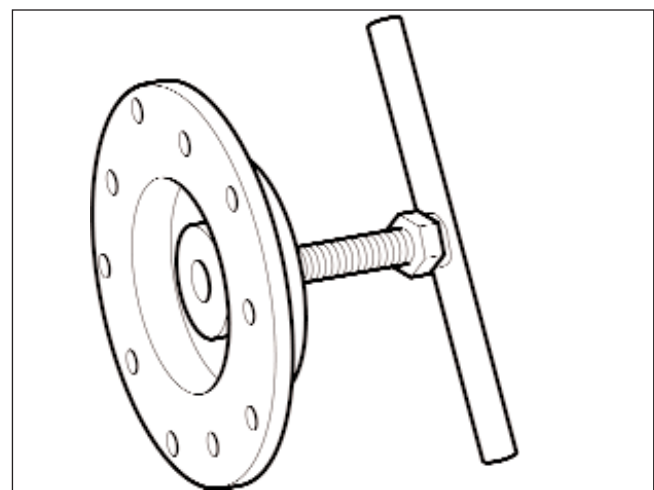


Fig. 12.8

## 12 Service Tools

**MST 3210** - Wheel Bolt Driver

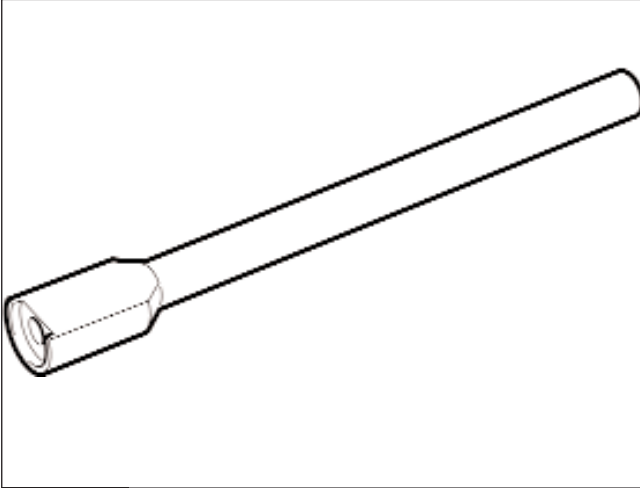


Fig. 12.9

**MST 3211** - Wheel Bolt Removal Tool

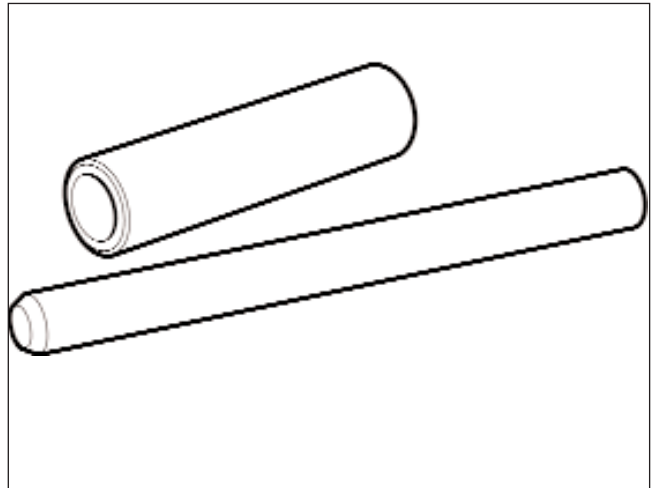


Fig. 12.10

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