



9.1 MAJOR COMPONENT DESCRIPTION

Power is transmitted from the gearbox to the final drive unit via a two piece drive shaft (formerly known as 'propeller shaft') which is supported by a center bearing. Isolation from vibration and transmitted harshness is suppressed by rubber mounting of both the center bearing and the connection of the drive shaft to differential drive flange.

The hypoid final drive assembly is available with either a conventional, or a limited slip differential.

The limited slip, 'Power-Lok' unit may be identified by either a tag carrying the legend 'PL' or a label with an 'X', both to be found on the rear cover.

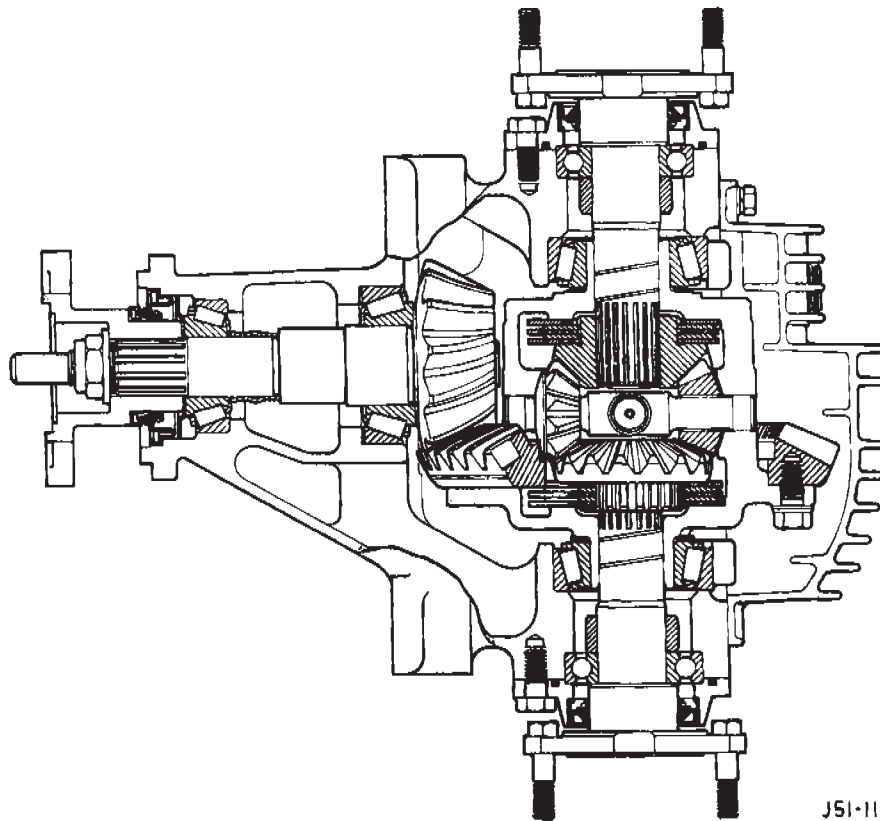


Fig. 1 sectional view of 'Powr-Lok' unit.

Forged axle shafts (formerly known as 'drive shaft') transmit drive from the differential to the rear wheels, each shaft having two universal joints. The axle shaft acts as an upper suspension link and controls static wheel camber by insertion of appropriate shims between the final drive unit and axle shaft inner flanges. Each axle shaft is supported at the outer end by preloaded taper roller bearings housed in a cast aluminium hub carrier.



9.2 DRIVE SHAFT, ALIGN

SRO 47.15.51

CAUTION: To preserve 'drive line' refinement, individual parts, other than fixings, **MUST NOT** be renewed. In the event of any balance or drive shaft component related problem, the complete assembly must be renewed. Under no circumstances must the flexible coupling (or its fixings) be loosened or removed from the drive shaft flange.

Preliminary Checks

Before this procedure is actioned it is advisable to ensure that:

The gearbox mounting should be fitted squarely with equal spaces between the bump stops both axially and laterally.

The crossmember is central on the body fixings and not 'hard over' to one side.

The differential spigot radial run-out is 0.075mm.

If the vehicle has been standing for a period the tires may be 'flat-spotted'. If so, this will clear in approximately 400 km (250 miles). After this distance the source of vibration should be re-assessed.

12 Cylinder

- Remove exhaust center section.

All

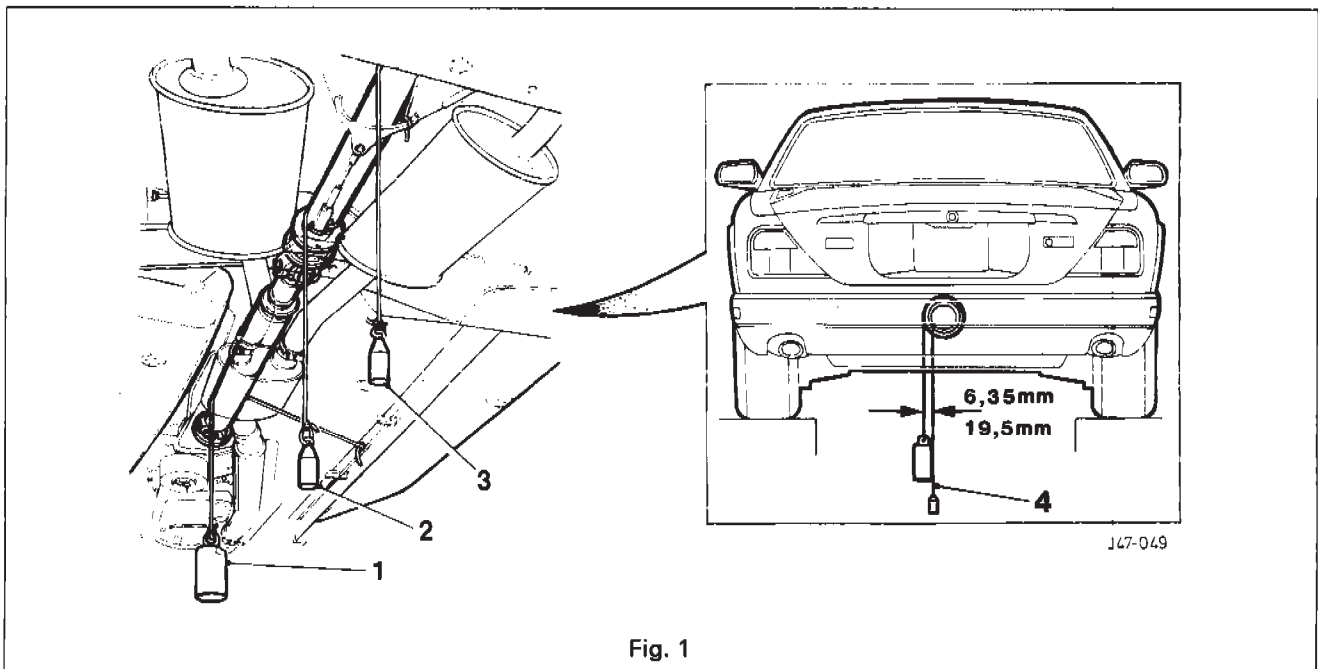
- Locate suitable 'plumb lines' over drive shaft outside diameter, but NOT over any balance weight or weld:

1. Front section – behind gearbox output coupling (shaft without rubber damping), 12,7 mm diameter weight (1 Fig. 1).
2. Rear section – immediately behind center bearing (shaft with rubber damping), 38.1mm diameter weight (2 Fig. 1).
3. Rear section – in front of differential flange (3 Fig. 1)

Note: It is essential that the front weight should be as specified so that the different diameters of the two shafts may be taken into account.

Method 1

- Viewed from the rear with the rear 'plumb line' coincidental with the outside diameter of the front weight, the center 'plumb line' should align with the rear 'plumb line' (4 Fig. 1).
- To re-align the center bearing, slacken bearing fixings and position to suit.
- Tighten all fixings to specification ensuring that the 'anti-twist' plate is allowed to freely align before the center bearing fixings are secured.

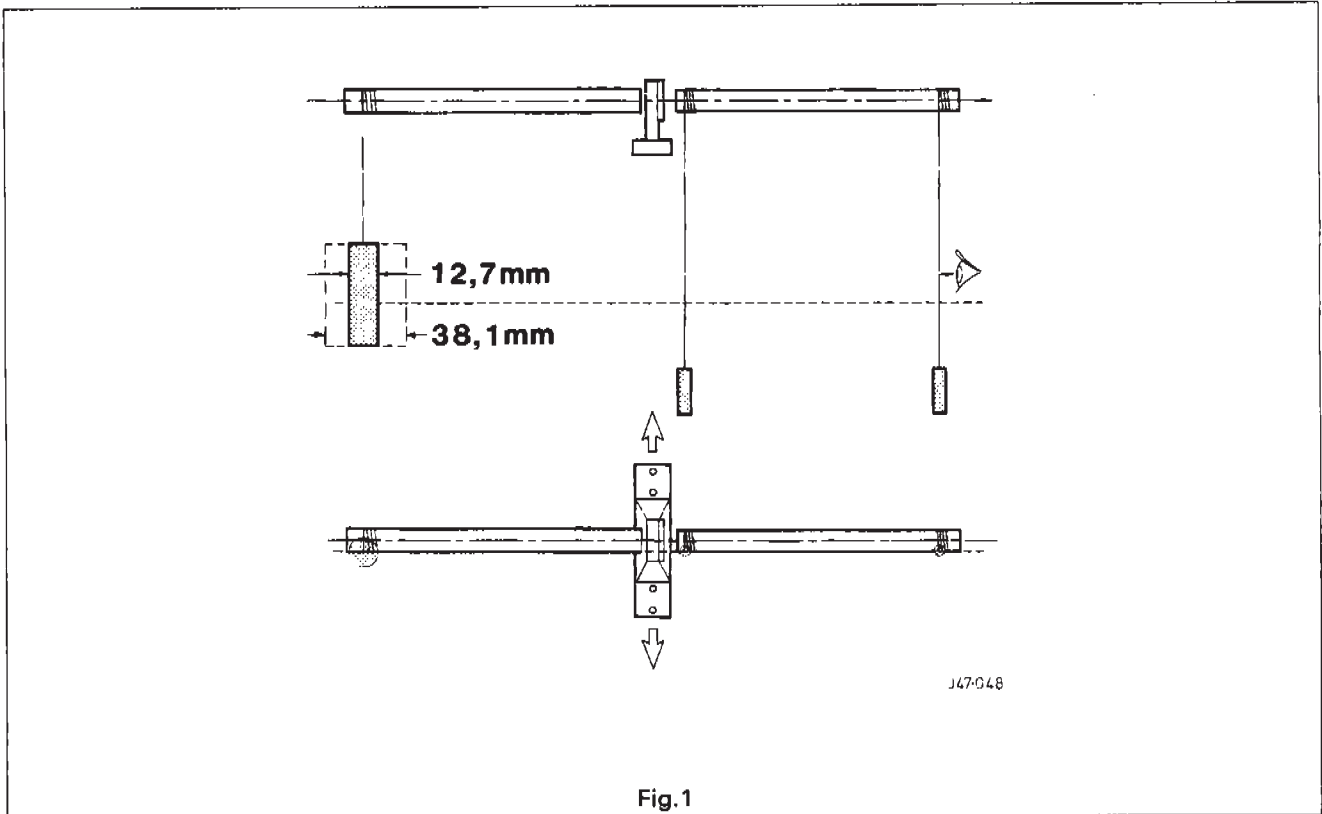




Method 2

A refinement to Method 1 may be made by stretching a line horizontally along the center line of the vehicle to touch the outside diameter of the front weight and the rear 'plumb line'. Take care not to bias the vertical lines with the horizontal line.

- Set the center 'plumb line' to touch the horizontal line by movement of the center bearing (Fig. 1).
- To re-align the center bearing, slacken bearing fixings and position to suit.
- Tighten all fixings to specification ensuring that the 'anti-twist' plate is allowed to freely align before the center bearing fixings are secured.



Recommended locally made tools

Plumb line **Locally made**

Weight **Locally made 12,7mm diameter mild steel**



9.3 OUTPUT SHAFT END FLOAT, CHECK

SRO 51.10.24

- Disconnect vehicle battery ground lead.
- Support the vehicle at the rear.
- Mount a dial test indicator (DTI) to the differential housing with the probe resting on the output shaft flange (DTI probe must be parallel to the output shaft center line and NOT at an angle).
- Push the wheel / shaft assembly inwards and zero the DTI; pull outwards and note the reading.
- If the end float exceeds 0,15 mm; firstly verify the shim preload and if this is found to be correct, renew the output shaft bearing. See 51.10.22. this section, for shim check and renew operations.

9.4 OUTPUT SHAFT HOUSING 'O' RING, RENEW

SRO 51.20.19

- Disconnect vehicle battery ground lead.
- Prior to removal of shaft assembly check output shaft end float in accordance with operation 51.10.24.
- See operation 51.10.22. this section, for process detail, less bearing / oil seal renew.

9.5 OIL SEAL – PINION FLANGE, RENEW

SRO 51.20.01

- Disconnect vehicle battery ground lead.
- Support the vehicle at the rear.
- Disconnect main handbrake cable at compensator.
- 'Match mark' the FLEXIBLE COUPLING to the differential DRIVE FLANGE and remove fixings.
- Remove fixings center bearing to crossmember and push drive shaft rear section forward to disengage from pinion spigot.

CAUTION: Under no circumstances must the flexible coupling (or its fixings) be loosened or removed from the drive shaft flange.

- Support the drive shaft, do not allow it to hang.
- 'Match mark' the drive flange retaining nut to both the pinion and the drive flange (Fig. 1).
- Slacken the flange retaining nut approximately half a turn and retighten to the 'match mark' noting the required force. If the force does NOT exceed 135 Nm, the final drive unit MUST be replaced.
- Remove the retaining nut, washer and drive flange.

CAUTION: Use only special tools; 18G 1205 to restrict rotation and JD 156 to remove drive flange.

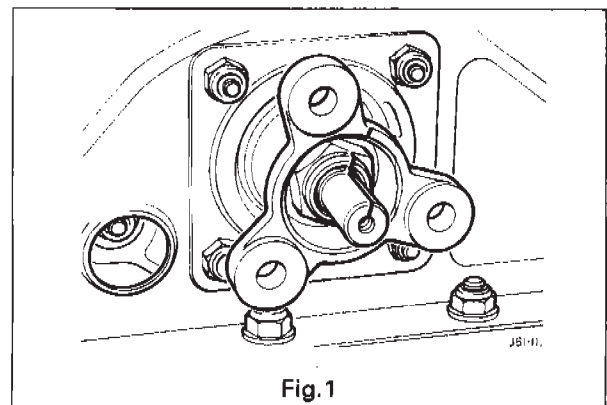
- Inspect the drive flange oil seal surface for damage corrosion or grooving and replace as necessary.

Note: Do not use abrasive cloth, or paper, to remove imperfections from the seal surface.

- Remove oil seal from differential case taking care not to damage the machined counterbore.
- Clean seal counterbore.
- Using special tool JD 18G 1428A fit replacement oil seal to differential case ensuring that, seal is square, fully seated and the lip spring is not dislodged.
- Apply grease to drive flange seal diameter and refit the flange to the pinion in the original position.

Note: Do not hammer the drive flange onto the pinion; pull down with the drive flange nut.

- Tighten the drive flange nut to the original noted torque PLUS 10%.
- Check that the pinion spigot radial run-out is to specification.
- Fitting and reassembly is the reversal of this procedure ensuring that drive shaft fixings are renewed and that the shaft is aligned in accordance with Sub-Section 9.2.
- Correct the final drive oil level if required.
- Tighten all fixings to specification.





9.6 OUTPUT SHAFT BEARING, RENEW

SRO 51.10.22

9.7 OUTPUT SHAFT OIL SEAL, RENEW

SRO 51.20.04

- Disconnect vehicle battery ground lead.
- Support the vehicle at the rear and remove the rear road wheel (or wheels).
- 'Match mark' the axle shaft flange to the output shaft flange and remove fixings, note camber shim.
- Thoroughly clean the area around the output shaft housing and differential case.
- Release fixings and remove output shaft assembly, discard 'O' ring.
- Mark bearing retaining collar axially and drill 3 off holes 4,0 mm diameter equally spaced, to a MAXIMUM depth of 5,0 mm (1 Fig. 1).
- With a suitable chisel (2 Fig. 1) strike the collar across the three drilled holes to relieve tension within the steel.

CAUTION: Do not drill into the output shaft, it is not necessary to break the inside diameter of the collar. There is no need to split the collar when chiselling.

- Using a suitable press, remove bearing and collar, remove the oil seal and discard it along with bearing.

CAUTION: The original bearing must NOT be cleaned and reused; always renew it.

Inspect the output shaft oil seal surface for damage corrosion or grooving and replace as necessary.

Note: Do not use abrasive cloth or paper to remove imperfections from the seal surface

- Using special tools JD 550-1 and 18G 134, assemble new oil seal to housing, ensuring that the seal top face is 1,8 mm below the housing top face and NOT down on the counterbore face.
- Lubricate the output shaft seal diameter and oil seal lip and position the housing assembly to the shaft.
- Using special tool SL 7 and a suitable press, assemble bearing to output shaft.
- Using special tool SL 7 and a suitable press, assemble retaining collar to output shaft.
- Fit the original shims and using hand pressure only to seat the assembly, check that the clearance between the output shaft housing and differential case is in the range 0,05 to 0,13 mm. Shim to suit if not in this range.
- Using a new 'O' ring and sealant on the mating faces, assemble the output shaft assembly to the differential case. See Sub-Section 9.3 Output Shaft End Float Check.
- Fitting and reassembly is the reversal of this procedure ensuring that all fixings are tightened to specification and new locking nuts are used.
Correct the final drive oil level if required.

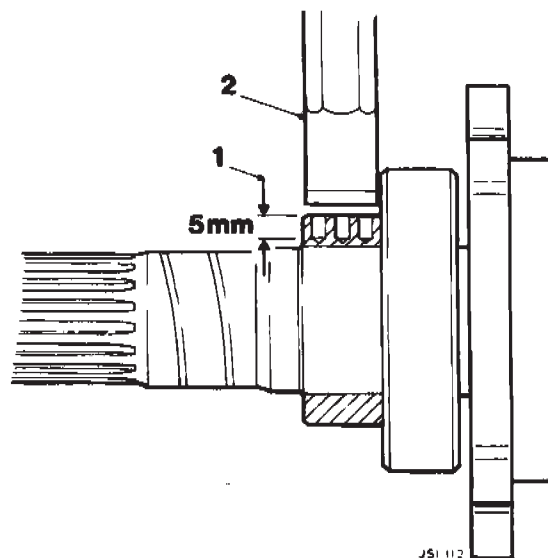


Fig. 1



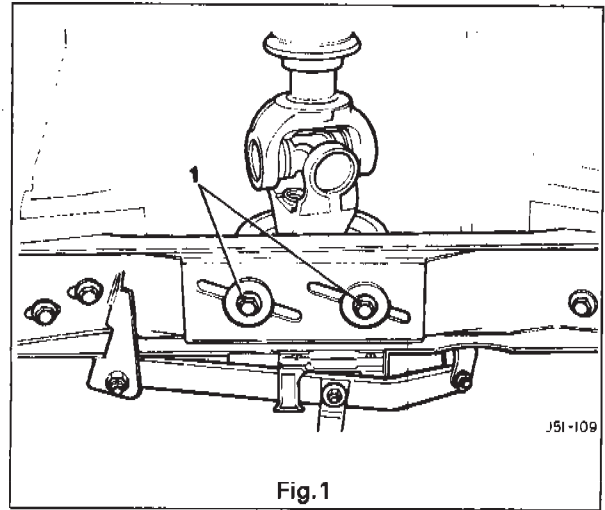
9.8 FINAL DRIVE UNIT, RENEW

SRO 51.25.13

- Disconnect vehicle battery ground lead.
- Support the vehicle at the rear and remove the rear road wheels.
- Disconnect brake pad wear sensor multi-plug at RH hub carrier and remove tie straps from wishbone. Release ABS speed sensors at RH and LH hub carriers and remove tie straps from wishbones.
- Remove rear brake calipers, see Section 12, and support at bump stop. Disconnect main handbrake cable at compensator, short cables at joining piece and remove compensator.
- Remove fixings, FLEXIBLE coupling to differential DRIVE FLANGE.

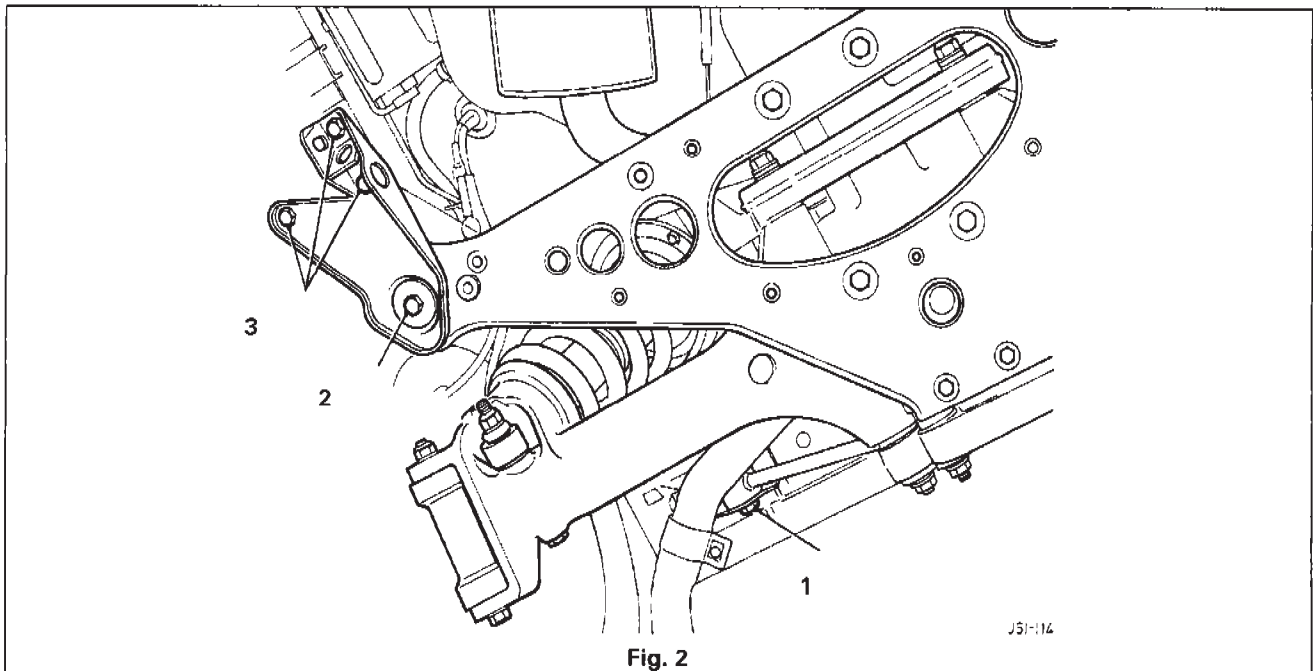
CAUTION: Under no circumstances must the flexible coupling (or its fixings) be loosened or removed from the drive shaft flange.

- Remove fixings center bearing to crossmember (1 Fig. 1) and push drive shaft rear section forward to disengage from pinion spigot.



Note: Take account of any shims located between the center bearing and the crossmember.

- Release fixings and remove, over axle exhaust pipe mounting from wide mounting bracket.
- Support the rear suspension assembly from below and remove fixings from RH and LH sides in the following order:
 1. Shock absorber to body upper fixings.
 2. Differential strut to body (1 Fig. 2).
 3. 'A' frame bush (2 Fig. 2).
 4. Lower mounting bracket assembly to body (3 Fig. 2).
- Carefully lower the unit clear of the vehicle and place in a safe working location.
- Release handbrake cable to wide mounting bracket clips.
- Disconnect RH and LH axle shafts from differential couplings, note camber shim and discard fixings.
- Remove wishbone pivot bolt, washers and remove wishbone / hub / axle shaft assembly RH and LH.





- Remove upper link assembly from differential and wide mounting bracket / 'A' frame.
- Release fixings, 'A' frame to differential, 'A' frame to wishbone tie and wide mounting bracket to 'A' frame.
- Remove wishbone tie assembly, rear mounting bracket and pendulum assembly.
- Release fixings differential nose to wide mounting bracket.
- Assembly and fitting is the reversal of this procedure, taking note of the following:
 - Drive shaft must be aligned in accordance with Sub-Section 9.2.
 - Renew all self locking nuts.
 - Renew all bolts that were originally fitted with thread locking adhesive.
 - Replace all locking wire and split pins (cotter pins).
 - Tighten all fixings to the specified torque.
 - Correct the final drive oil level if required.
 - Check and adjust rear wheel camber setting as required.

9.9 AXLE SHAFT ASSEMBLY, RENEW

SRO 47.10.01

- Disconnect vehicle battery ground lead.
- Slacken appropriate axle shaft hub nut.
- Support the vehicle at the rear and remove rear road wheel.
- Remove brake caliper in accordance with 70.55.03. Section 12, but do not disconnect hydraulics.
- Slacken hub carrier fulcrum and remove ABS sensor from hub carrier.
- Remove axle shaft hub nut and collar.
- Remove fixings axle shaft to differential output shaft flange, note camber shim.
- With service tools JD 1D/7 (Fig. 1) and JD 1D (Fig. 2), push shaft through hub.
- Remove axle shaft assembly.

CAUTION: Take care not to introduce debris into the hub bearings, or damage seal.

- Prior to assembly, remove all traces of adhesive from hub splines.
- Assembly and fitting is the reversal of this procedure taking note of the following:

Adhesive should be applied to axle shaft splines over a radial area of 30 to 50%.

Renew all bolts that were originally fitted with thread locking adhesive.

Replace all locking wire and split pins (cotter pins).

Tighten all fixings to the specified torque.

Check and adjust rear wheel camber setting.

Verify operation of brakes.

Renew all self locking nuts.

Note: The axle shaft nut is a self-locking item with a thread insert and must NOT be re-used.

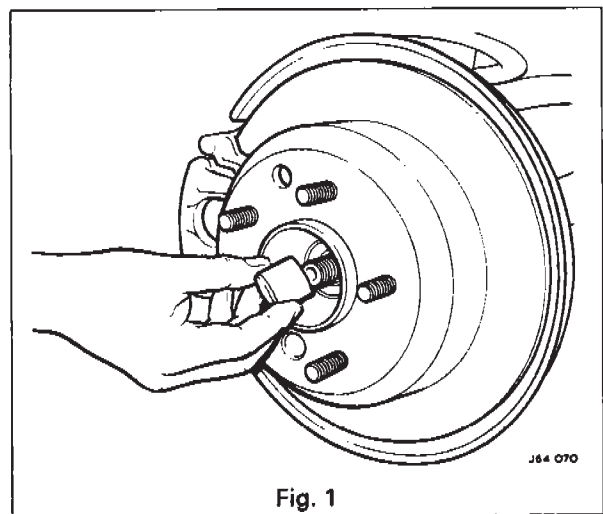


Fig. 1

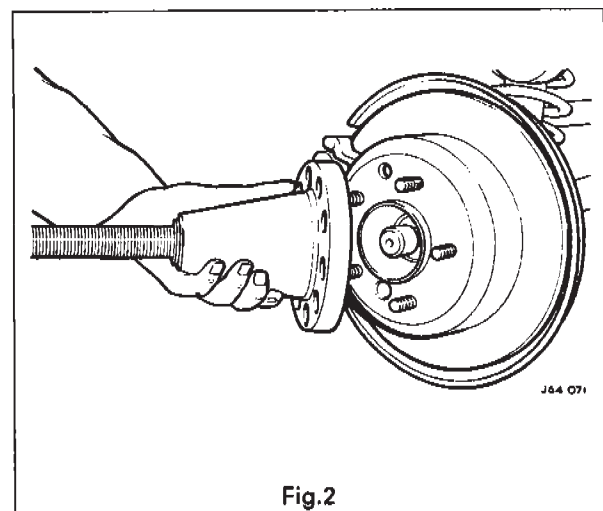


Fig.2



9.10 REAR HUB BEARING, RENEW

SRO 64.15.14

9.11 REAR HUB OIL SEAL, RENEW

SRO 64.15.15

Removal

- Disconnect vehicle battery ground lead.
- Slacken appropriate axle shaft hub nut.
- Support the vehicle at the rear and remove rear road wheel.

Note: To aid assembly, mark the position of the head of the hub carrier fulcrum, relative to the wishbone slot.

- Disconnect handbrake cable inner and outer.
- Remove brake caliper in accordance with Section 12, but do not disconnect hydraulics.
- Slacken hub carrier fulcrum and remove ABS sensor from hub carrier.
- Remove axle shaft hub nut (and discard), collar and hub carrier fulcrum.
- Using service tools JD 1D / 7 and JD 1D (Fig. 1), push shaft through hub and pull the hub carrier assembly clear.
- Using Hub tool JD 132 - 1 (1 Fig. 2) and a suitable press, align the hub assembly to the tool ensuring the hand brake expander locates into the tool cut out.
- Locate button JD 132 - 2 and press the hub from the carrier.
- Remove the outer bearing race and seal from either the hub or the carrier and place the ABS rotor to one side.
- Remove from the carrier; bearing spacer, adjustable spacer, inner race and seal.

Renew Bearings / Seal(s)

- Using a suitable drift remove the inner and outer bearing cups.
- Clean all components paying particular attention to the removal of all traces of locking compound from the hub AND axle shaft splines.
- Using service tools JD 550 - 4 / 2, 4 / 1 and 18G 134, fit new cups to the hub carrier ensuring that they are 'square' and fully seated.
- Fit the new outer bearing race to the hub.

Note: Do not fit seals or 'pack' bearing at this point.

- Assemble the hub and race to the carrier along with bearing spacer (noting orientation) and the largest available adjustable spacer, i.e. 3.47 mm.
- Fit the new inner bearing and ABS rotor to the hub.
- Apply a compressive load to the hub / bearing assembly, using a press, vice or long bolt. Ensure that the force that the axle shaft fixing would normally provide is not exceeded.
- Measure the hub end-float, using service tool JD 13B dial test indicator (DTI).
- Using the indicated endfloat dimension, select a suitable adjustable spacer to give the specified pre-load.

Note: See Service Data, (preliminary pages) for pre-load specification and typical example.

- Remove the outer bearing from the hub.
- Lubricate the bearings as specified.
- Locate the outer bearing to the hub carrier assembly.

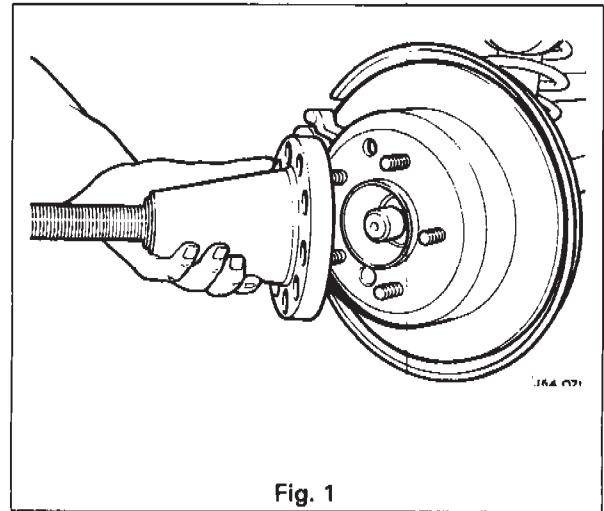


Fig. 1

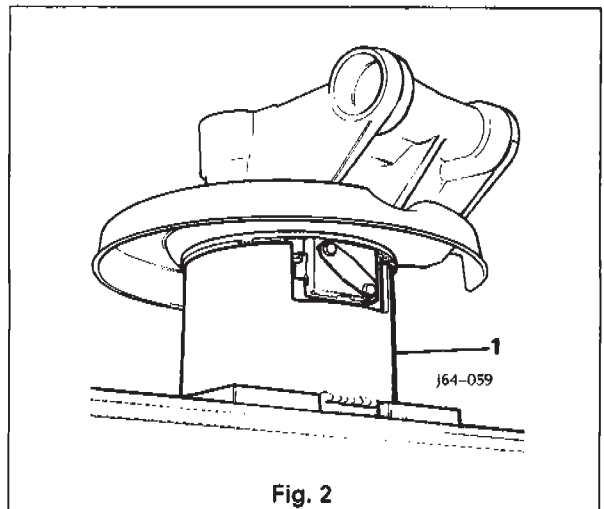


Fig. 2



- Using service tools JD 550 – 4/2, 4/1 and 18G 134, fit new seal to the hub carrier ensuring that it is 'square' and fully seated.
- Invert the assembly and locate the bearing spacer (noting orientation) and selected adjustable spacer over the hub.
- Assemble the inner bearing race and locate the inner seal using service tools JD 550 – 4/2, 4/1 and 18G 134, ensuring that the seal is 'square' and fully seated.
- Press the ABS rotor into position.
- Assembly and fitting is the reversal of this procedure taking note of the following:

Adhesive should be applied to axle shaft splines over a radial area of 30 to 50%.

For the initial setting, position the head of the hub carrier fulcrum to the mark previously made on the wishbone prior to checking and adjusting (if required) rear wheel toe-in.

Renew all bolts that were originally fitted with thread locking adhesive.

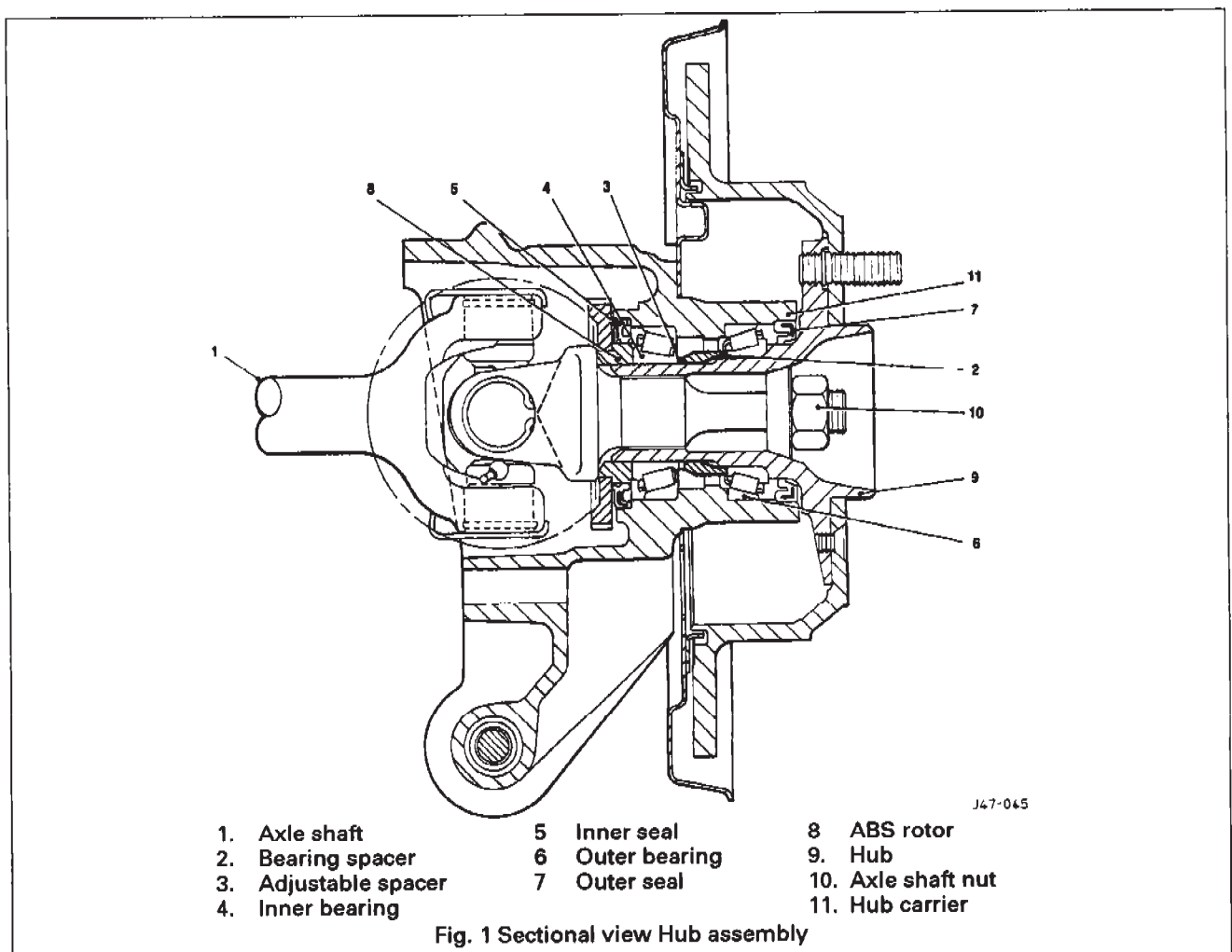
Replace all locking wire and split pins (cotter pins).

Tighten all fixings to the specified torque.

Verify operation of brakes.

Renew all self locking nuts.

Note: The axle shaft nut is a self-locking item with a thread insert and must NOT be re-used.





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