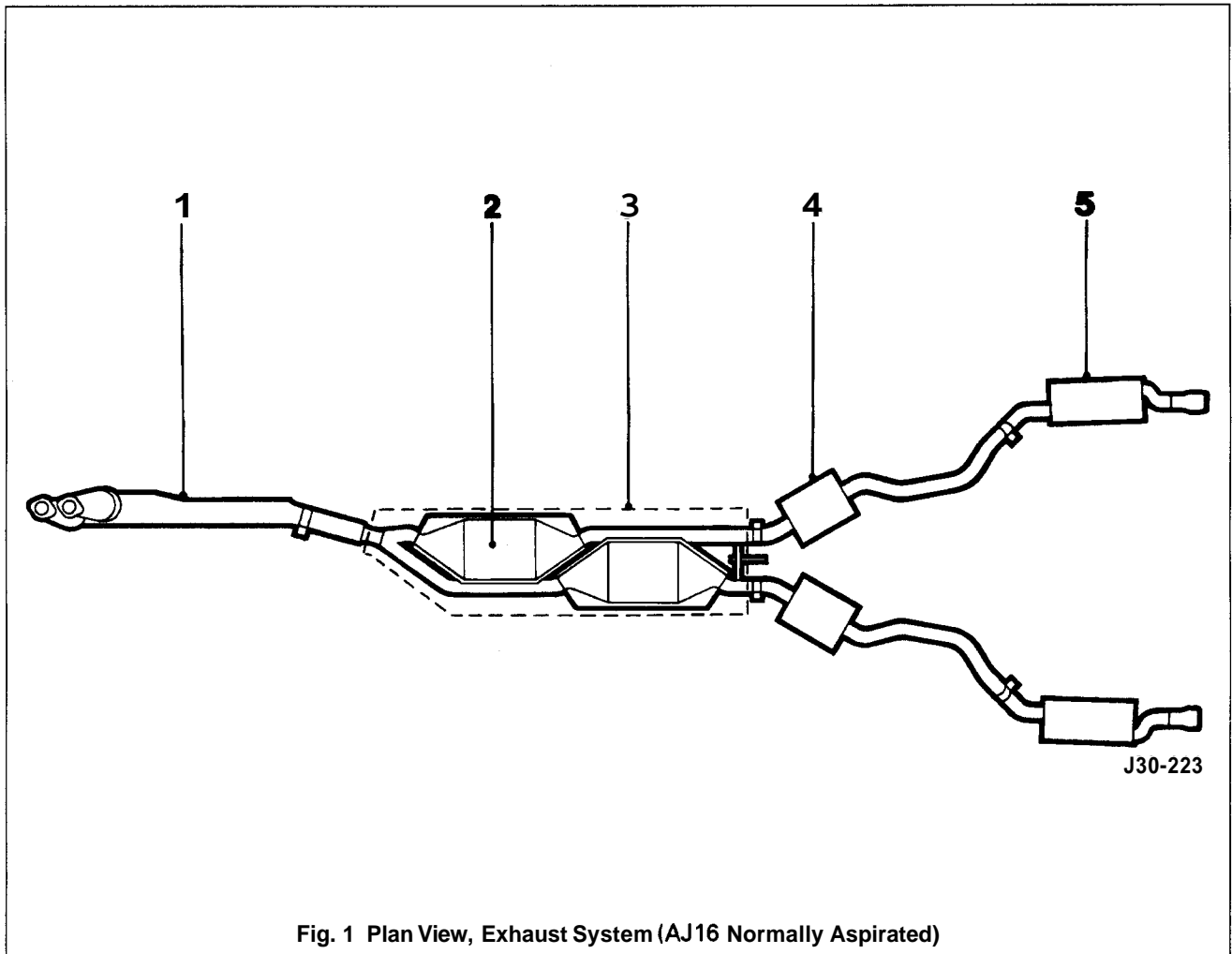




6.1.1 EXHAUST SYSTEM, GENERAL DESCRIPTION



6.1

This section covers the various exhaust systems fitted to AJ16 engined vehicles.

Always refer to the Parts Catalog for parts usage and interchangeability before replacing a component part of the exhaust system.

The low-loss catalytic converter exhaust system for the AJ16 normally aspirated engine comprises of a catalyst/downpipe assembly (1 Fig.1), a underfloor catalytic converter assembly

(2 Fig.1) complete with heat shield (3 Fig.1), an intermediate muffler section (4 Fig.1) and a rear muffler section (5 Fig.1).

On non-catalytic converter systems the downpipe/catalyst assembly is fitted with conventional twin branch downpipes, hence there are no oxygen sensors or gas temperature sensors.

Conventional mufflers are fitted in place of the underfloor converters.



6.1

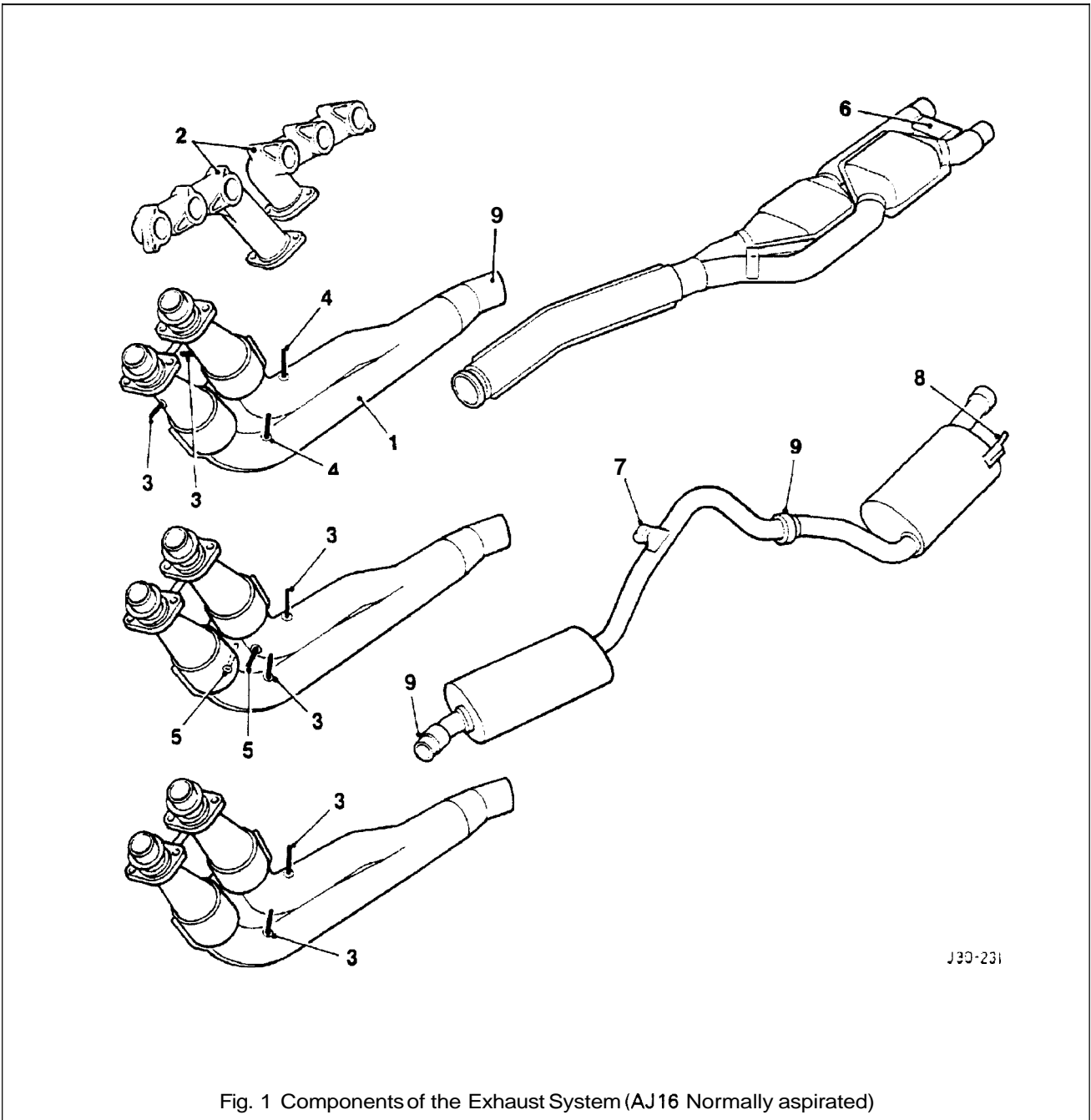


Fig. 1 Components of the Exhaust System (AJ16 Normally aspirated)

Heated oxygen sensors are refitted to the downpipe assembly (1 Fig. 1) which is connected to the manifold (2 Fig. 1). There are two sensors for the ROW and Japan (3 Fig. 1) and two additional sensors (4 Fig. 1) for NAS markets.

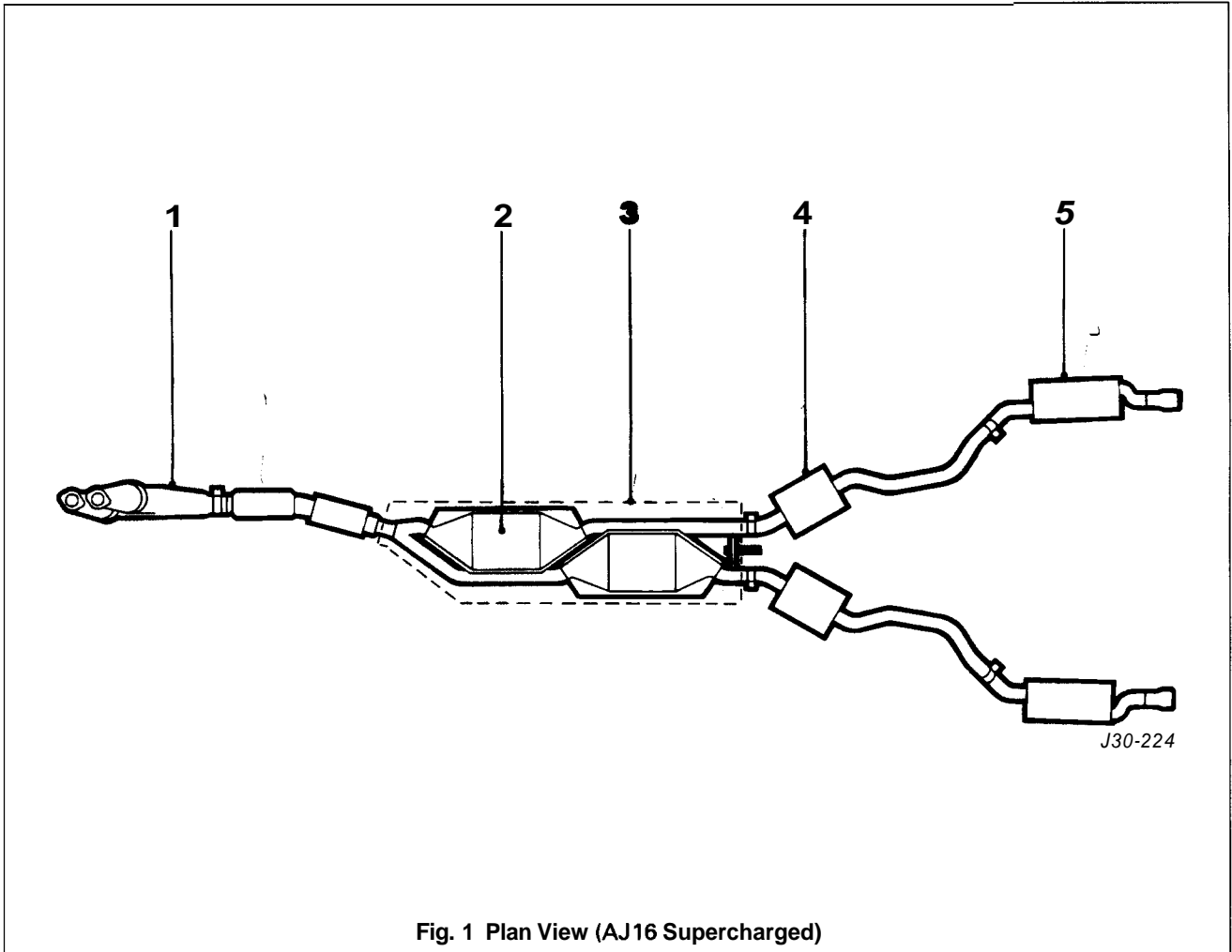
The sensors are located upstream and downstream of catalytic converters.

Apart from two heated oxygen sensors, the exhaust system for vehicles destined for the Japanese market are also fitted with two exhaust gas temperature sensors (5 Fig. 1).

The exhaust system is held in a predetermined position by a fixing arrangement to the manifold by exhaust centre mountings (6 Fig. 1), by rear axis mountings (7 Fig. 1), and tail pipe mountings (8 Fig. 1).

Clamps (9 Fig. 1) used on each slip joint are welded to the pipes and tightened to a higher torque setting than non-welded clamps.

The exhaust system must be free of leaks, binding, grounding and excessive vibrations. These conditions are usually caused by loose, broken, or misaligned clamps, shields, brackets, or pipes. Should any of these conditions exist, check the exhaust system components and alignment. Adjust and renew if necessary. Do not attempt to service brackets, clamps and insulators.



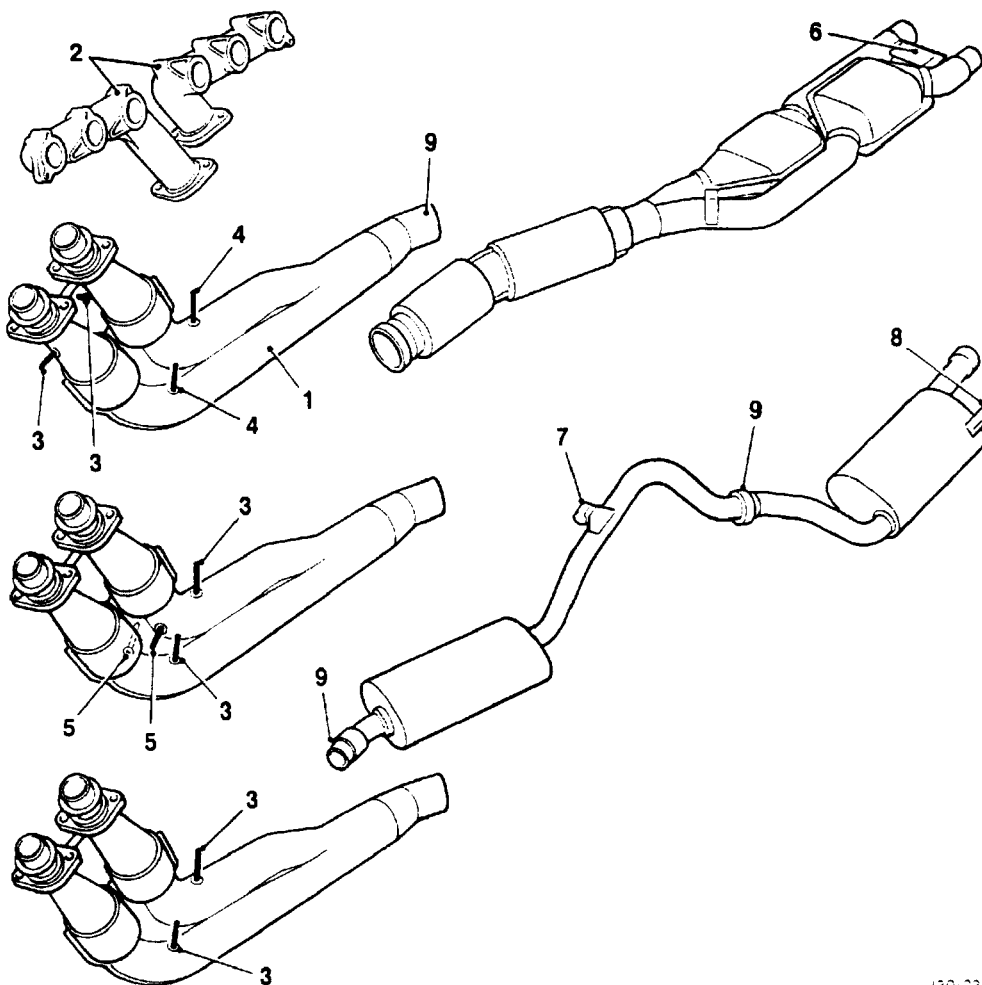
6.1

The only visible difference between the normally aspirated engine's exhaust system and the supercharged version (Fig.1) is that the downpipe for the supercharged engine (Fig.1 and next page) is slightly shorter.

The remove & refit procedures are the same as for the AJ16 normally aspirated.



6.1



J30-232

Fig. 1 Section Layout (AJ16 Supercharged)



6.1.2 DIAGNOSIS AND TESTING

WARNING: THE NORMAL OPERATING TEMPERATURE OF THE EXHAUST SYSTEM IS VERY HIGH. NEVER ATTEMPT TO SERVICE ANY PART OF THE SYSTEM UNTIL IT HAS COOLED. EXHAUST GASES CONTAIN CARBON MONOXIDE WHICH CAN BE HARMFUL TO HEALTH AND ARE POTENTIALLY LETHAL. LEAKS MUST BE REPAIRED IMMEDIATELY.
NEVER OPERATE THE ENGINE IN ENCLOSED AREAS.

External leaks in the exhaust system are often accompanied by noises and exhaust fumes, therefore a visual inspection usually detects the location of the leak. When checking for exhaust leakage or noise, inspect the entire system for burned-out holes, loose or corroded clamps, muffler or exhaust inlet pipe.

Examine the under body for greyish-white or black exhaust soot which indicates the exhaust leakage at that point.

The effect of a small leak can be magnified by holding a rag over the tailpipe outlet while listening to the leak.

If this is carried out, ensure that gases are not inhaled – see **WARNING**.

When testing for a rattle or vibration condition it is helpful to use a rubber mallet. Tap on the exhaust components to simulate the bouncing action of the exhaust while watching for exhaust-to-body / chassis contact.

Also look for loose and rusted flange connections, loose or damaged exhaust shields or clamp and loose or broken exhaust outlet pipe brackets.

6.1.2.1 Symptom Chart

Condition	Possible Cause	Action
Noises and exhaust fumes	Exhaust leak. Misaligned exhaust. Loose clamps or fasteners. Restricted exhaust system.	Refer to Test Step 1A. Go to Test Step 1B, Restricted exhaust system test.
Engine lacking power	Ignition system. Electronic engine controls. Fuel System. Restricted exhaust system.	Go to Test Step 1B

6.1

6.1.2.2 Test A, Exhaust Leakage or Noise

Test Step	Result	Action
Step 1A Clamps and Brackets		
Check for broken or loose clamps and/or exhaust outlet pipe frame brackets. <i>Are clamps and exhaust outlet pipe frame brackets OK?</i>	yes	Go to Step 2A
	no	Service and renew as necessary. Restart engine. If noise still exists go to Step 2
Step 2A System Components		
Check catalytic converters, muffler. <i>Are system components OK?</i>	yes	Go to step 3A
	no	Renew exhaust outlet pipe frame brackets, exhaust inlet pipe and/ or muffler as necessary. If noise still persists, go to Step 3
Step 3A Exhaust Manifold		
Inspect exhaust manifold for loose fasteners and cracks. <i>Is exhaust manifold OK?</i>	yes	Go to Test Step 1B Restricted exhaust system test.
	no	Tighten fasteners or renew exhaust manifold.



6.1.2.3 Test B, Restriction in Exhaust Systems

Test Step	Result	Action
Step 1B Visual Inspection		
Is the exhaust system visually OK?	Yes No	Go to Step 2 B Renew any collapsed exhaust components. Go to Step 2
Step 2B Vacuum Test		
Attach a Vacuum Gauge or equivalent to the intake manifold vacuum source. Connect a Tachometer or equivalent. Start engine and gradually increase speed to 2000rpm with transmission in neutral. <i>Is neutral vacuum above 53.8kPa (16 in. Hg)?</i>	Yes No	Refer to EDM Go to Step 3
Step 3B Vacuum Test Exhaust Disconnected		
Turn engine OFF. Disconnect exhaust system at the exhaust manifold. Repeat vacuum test. <i>Is the manifold vacuum above 53.8kPa (16 in. Hg)?</i>	Yes No	Go to Test Step 4B
Step 4B Vacuum Test Catalytic Converter(s) on, Mufflers off.		
Turn engine OFF. Reconnect exhaust system at the exhaust manifold. Disconnect muffler Repeat vacuum test. <i>Is the manifold vacuum above 53.8kPa (16 in. Hg)?</i>	Yes No	Renew muffler and re-test. Renew catalytic converter.

6.1



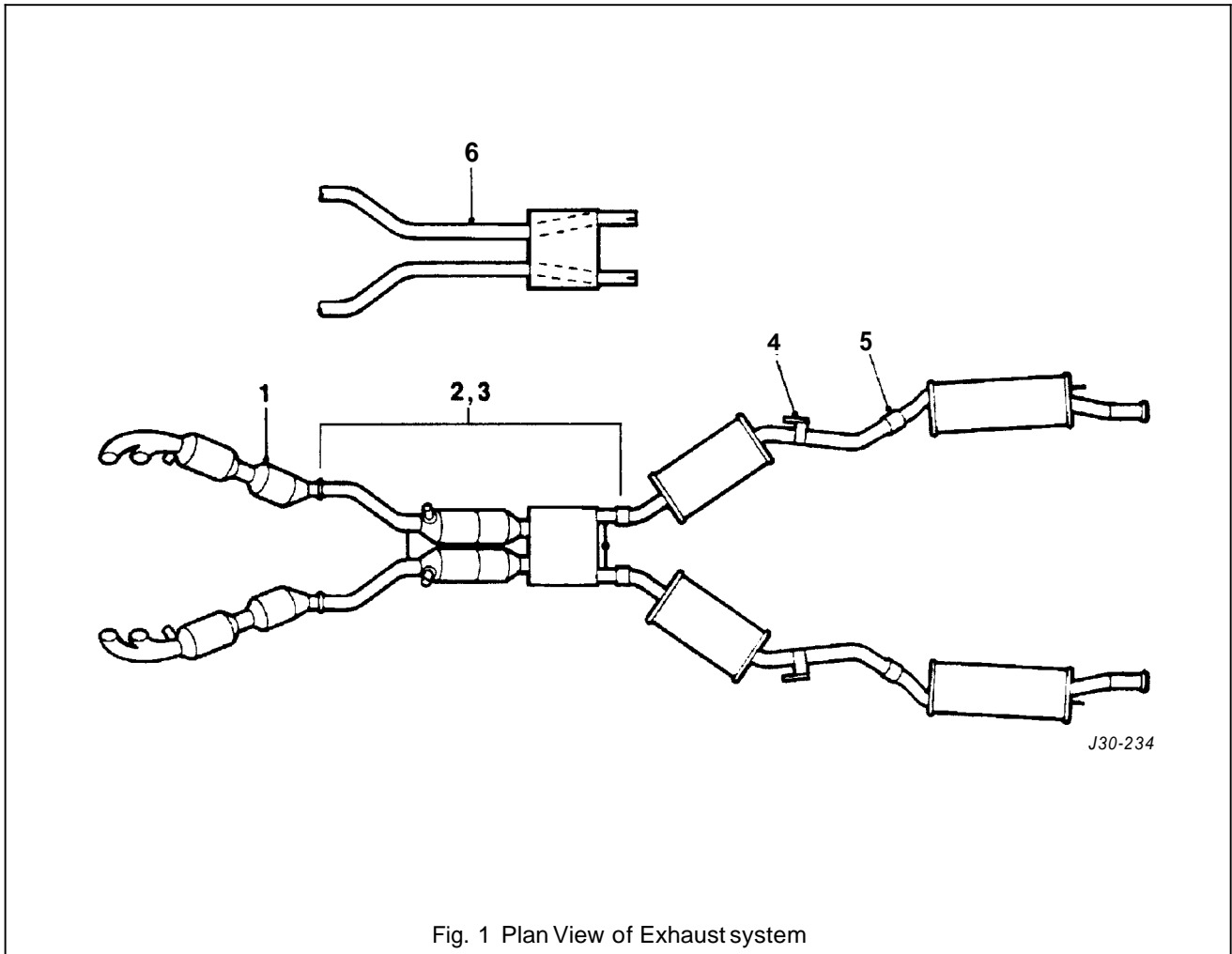
SECTION CONTENTS

Sub-Section	Title	SRO	Page
<i>i</i>	<i>Preliminary Page</i>		<i>i</i>
6.2.7	<i>General Description</i>		7
6.2.2	<i>Diagnosis & Testing</i>		3

6.2



6.2.1 GENERAL DESCRIPTION



The low-loss catalytic converter exhaust system for the V12 engine comprises catalyst/downpipe assembly with additional secondary catalytic converters (1 Fig.1), a underfloor catalytic converter assembly (2 Fig.1) complete with heat shield (3 Fig.1), an intermediate muffler section (4 Fig.1) and a rear muffler section (5 Fig. 1).

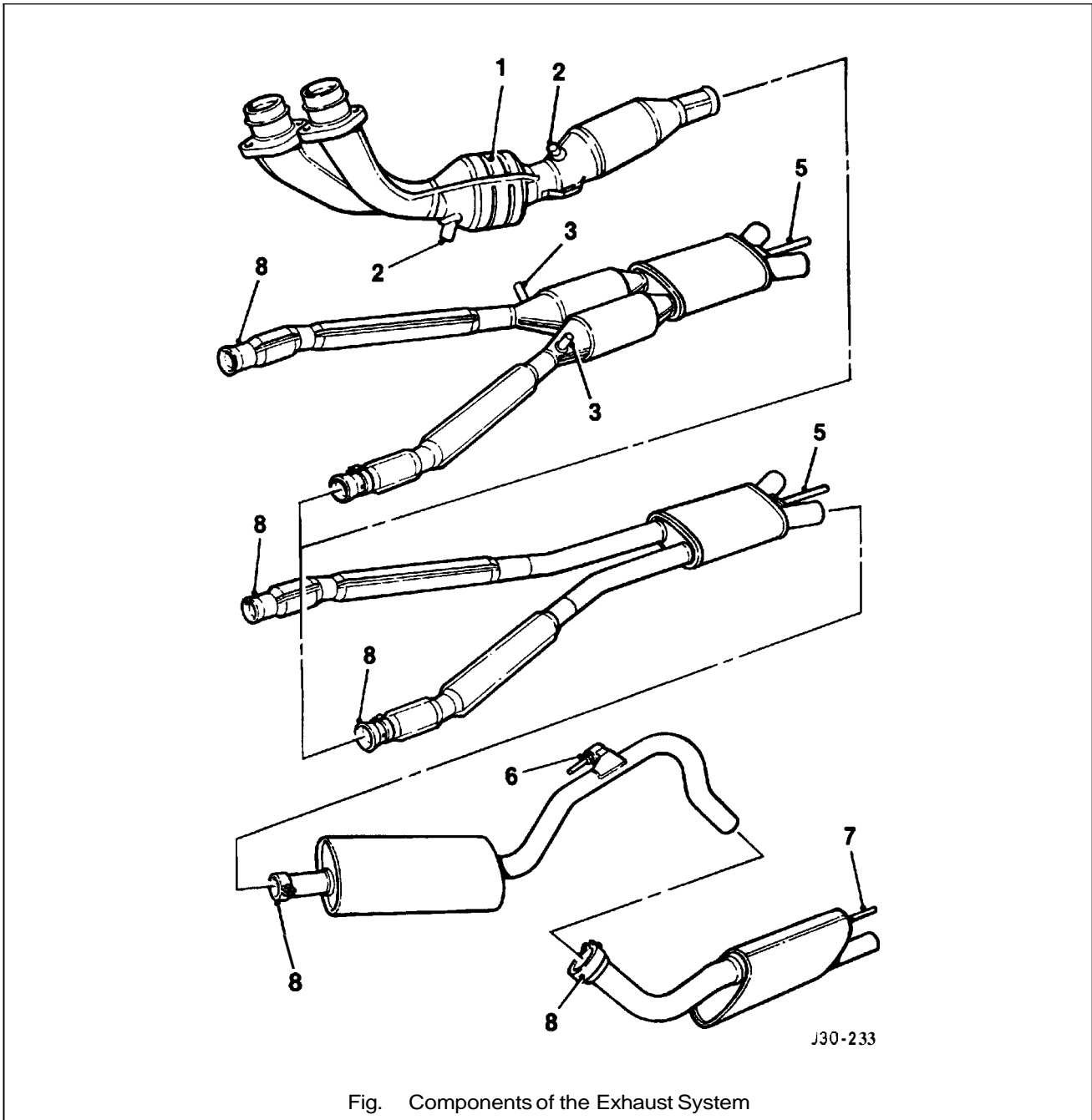
On non-catalytic converter systems, the downpipe/catalyst assembly is fitted with conventional twin branch downpipes (6 Fig.1), hence there are no oxygen sensors or exhaust gas temperature sensors.

Conventional mufflers are fitted in place of the underfloor converters.

6.2



6.2



Two heated oxygen sensors are fitted to the downpipe assembly (1 Fig.1) which is connected to the manifold and two on the underfloor catalytic converter assembly in front of the catalysts. There are two sensors for the ROW and Japan markets (2 Fig.1) and two additional sensors (3 Fig.1) for the NAS markets.

The sensors are located on A-bank and B-bank, upstream and downstream of catalytic converters.

Apart from two heated oxygen sensors, the exhaust system for vehicles destined for the Japanese market are also fitted with two gas temperature sensors (4 Fig.1).

The exhaust system is held in a predetermined position by a fixing arrangement to the manifold by exhaust centre mountings (5 Fig.1), by rear axis mountings (6 Fig.1), and tail pipe mountings (7 Fig.1).

Clamps (8 Fig.1) used on each slip joint are welded to the pipes and tightened to a higher torque setting than non-welded clamps.



The exhaust system must be free of leaks, binding, grounding and excessive vibrations. These conditions are usually caused by loose, broken, or misaligned clamps, shields, brackets, or pipes.

Should any of the above mentioned conditions exist, check the exhaust system components and alignment.

Adjust and renew if necessary. Do not attempt to service brackets clamps and insulators.

6.2.2 *DIAGNOSIS AND TESTING*

The standard exhaust system Diagnosis and Testing procedures are given in Section 6.1 (Exhaust System (AJ16)).



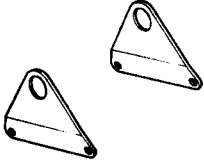
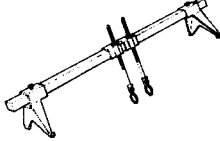
SECTION CONTENTS

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7.1



I. SERVICE TOOLS & EQUIPMENT

Illustration	Jaguar Number	Description	Notes
	18G 1465	Engine lifting brackets	
	MS 53C	Engine support beam Support beam	

II. TORQUE TIGHTENING SPECIFICATIONS

Fixing	Tightening Torque (Nm)
Bell housing to adaptor plate	49 - 54
Bleed nipple to slave cylinder	8 - 10
Center bearing to body	22 - 28
Center bearing to mounting plate	22 - 24
Clutch cover to flywheel	23 - 27
Clutch damper to mounting bracket	7 - 10
Flywheel to crankshaft	95 - 105
Front cover to transmission	23 - 27
Front pipe to intermediate pipe	15 - 18
Gearshift lever housing to transmission	23 - 27
Hydraulic pipes to clutch damper	16 - 22
Hydraulic pipe to master cylinder	16 - 22
Hydraulic pipe to slave cylinder	16 - 22
Master cylinder to housing	15 - 21
Pedal housing to body	24 - 30
Pedal steady bracket to housing	18 - 20
Drive (propeller) shaft center mounting to body	22 - 28
Drive (propeller) shaft to transmission	95 - 105
Slave cylinder to bell housing	15 - 21

7.1



III.

Molykote FB 180 grease	Withdrawal arm pivots / Gearshift lever ball	
Brake (clutch) fluid - minimum DOT 4	Clutch hydraulic system	
Dexron IID	Transmission oil	also used in ZF automatic transmissions
Loctite 573	Front cover securing bolts	
Tivoli Kay Adhesives No. 5696	Exhaust sealer	

IV. SERVICE DATA

Application	Specification
Material removal to clean up clutch face	Up to 1 mm maximum



7.1.1 MANUAL TRANSMISSION, DESCRIPTION

The Getrag 290 5-speed manual transmission (Fig. 1), fitted to this vehicle incorporates synchromesh on all forward gears.

Gear selection is by a centrally mounted lever, connected to the transmission selector shaft via a pivoting joint.

All gears are engaged by a single selector shaft operating three rods which move the selector forks.

The drive pinion is supported at the rear by a duplex ball bearing situated in the front casing and at the front, a spigot engages in a needle roller bearing in the flywheel.

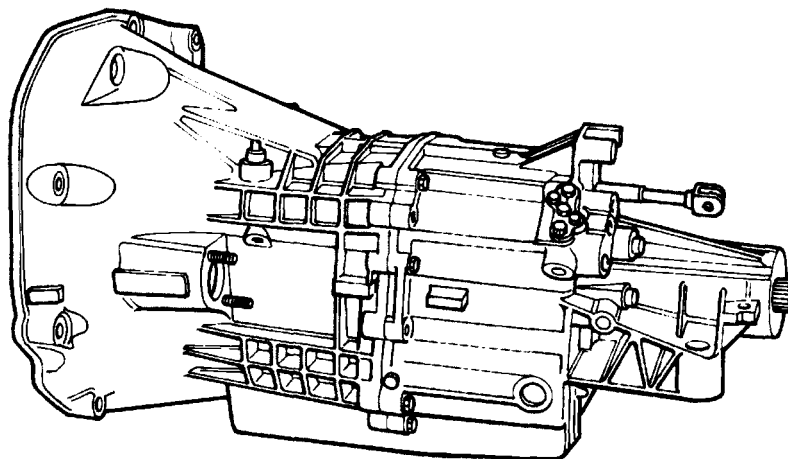
The mainshaft is supported at the front by a caged roller bearing situated in the drive pinion counterbore; in the centre by a roller bearing supported by the intermediate casing and at the rear by a duplex bearing in the transmission rear casing.

Each of the forward speed mainshaft gears incorporates an integral synchromesh mechanism, with the clutch hubs splined to the mainshaft and situated between each pair of gears.

The countershaft is supported at the front by a roller bearing situated in the front casing; in the centre by a roller bearing in the intermediate casing and at the rear by a roller bearing situated in the tail housing.

The reverse idler gear is supported by two caged roller bearings, is in constant mesh and is situated on a stationary shaft.

Longitudinal location of the idler gear is controlled by a spacer abutting the shaft.



J37-099

Fig. 1 The Getrag 290 Transmission



7.1.2 MANUAL TRANSMISSION ASSEMBLY, RENEW

SRO 37.20.01

- Disconnect the battery.
- Remove inlet manifold rear securing nuts.
- Remove injector harness mounting bracket.
- Fit lifting bracket 18G 1465 and secure with the nuts.
- Fit Service Tool MS 53B (Fig. 1) across the wing channels and align to rear lifting bracket.
- Fit and engage retaining hook.
- Tighten hook nut to take weight of engine.
- Disconnect lambda sensor block connectors.
- Remove the exhaust front pipe to the intermediate pipe securing nut/ bolt.
- Remove the front pipe to manifold securing nuts and remove the front pipe assembly.
- Carefully ease exhaust system down for access.
- Remove the drive (propeller) shaft assembly, see Section 9, SRO 47.15.01.
- Fit blanking plug to rear of transmission.
- Remove clutch slave cylinder complete with push rod from bell housing and secure clear.
- Disconnect transmission switch multi-way connector and secure clear.
- Place jack in position beneath the transmission.
- Take weight on the jack, and remove rear mounting to body securing bolts.
- Lower jack and remove rear mounting assembly.
- Remove jack and jacking channel.
- Remove mounting spring and spring mounting rubber.
- From above: undo retaining hook nut to lower rear of transmission (do not allow engine to foul steering rack).
- From below: remove selector shaft yoke securing nut/ bolt (3 Fig. 2).
- Disconnect selector shaft yoke from lower gear shift lever and remove wavy washer.
- Remove gear selector remote control securing bolts (1 Fig. 2).
- Remove mounting rubbers and washers (2 Fig. 2).
- Reposition remote control assembly for access.
- Remove transmission-to-engine adaptor plate securing bolts (1 Fig. 3).

Note: Leave two opposing bolts in for safety.

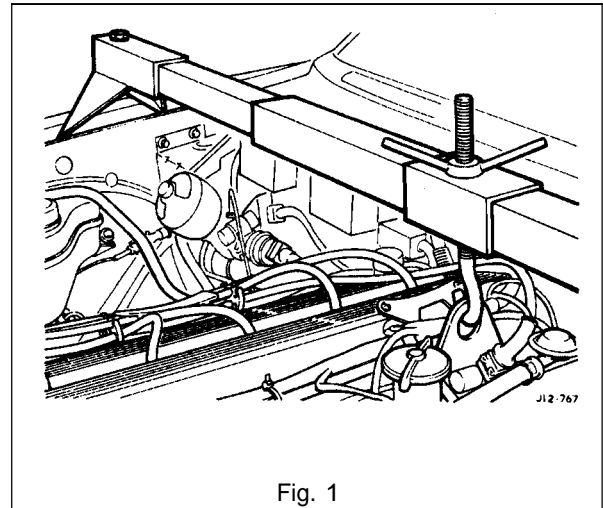


Fig. 1

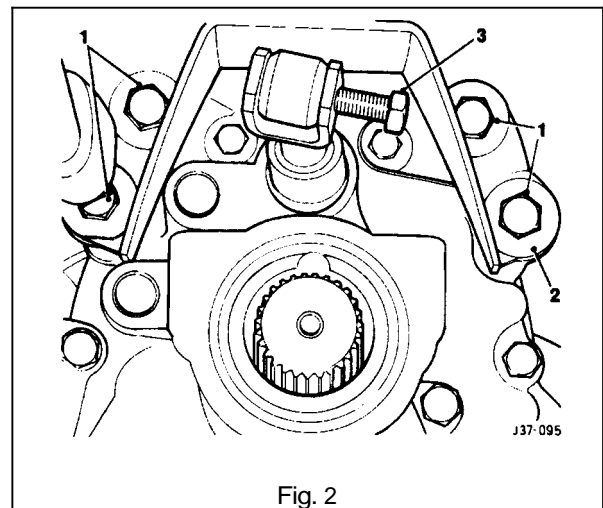


Fig. 2

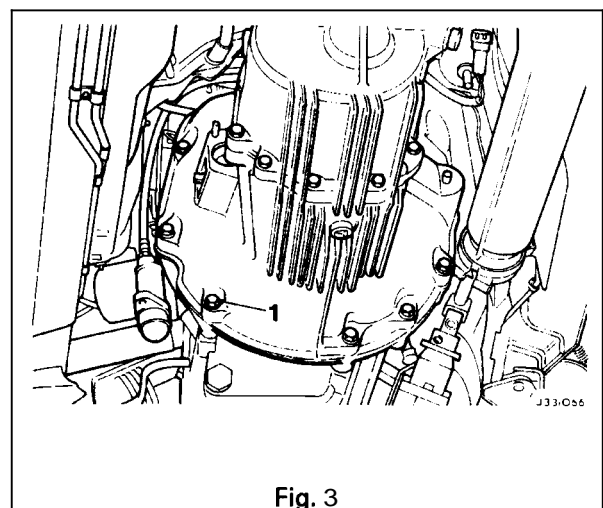
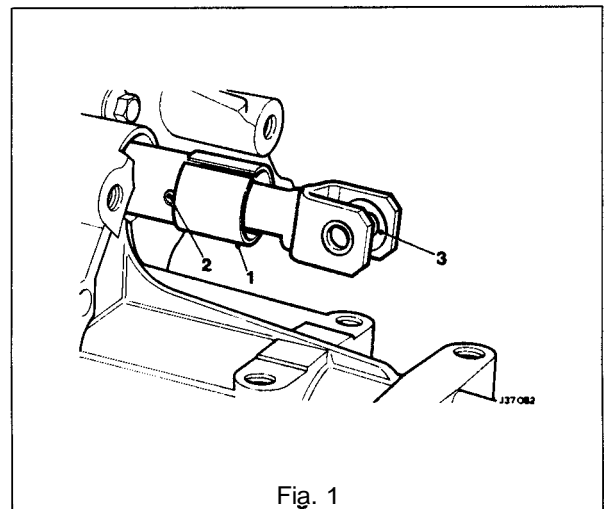


Fig. 3

7.1



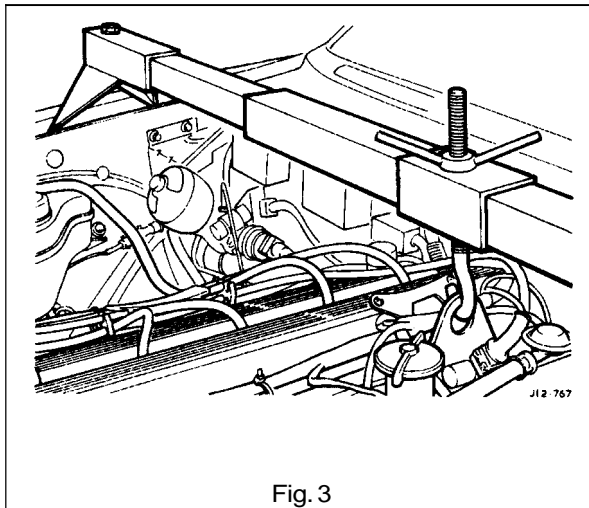
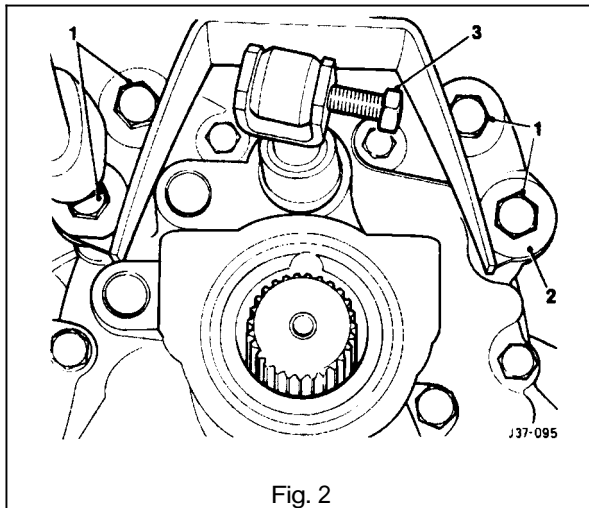
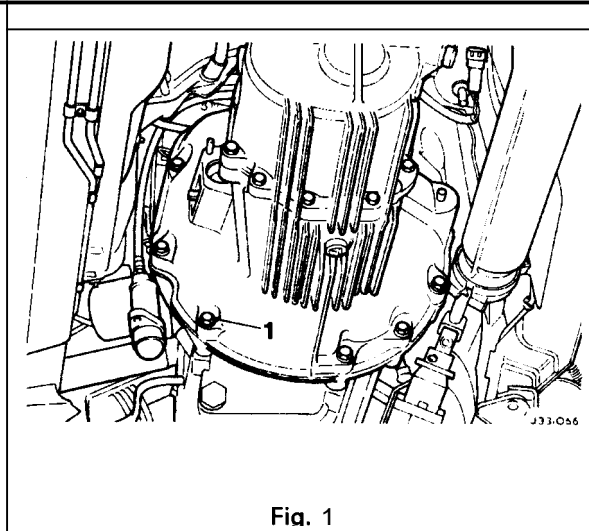
- Remove front clamp from unit lift.
- Raise/ lower unit with jack, no stands.
- Traverse lift under ramp and take weight of transmission.
- Adjust jacking platform angles to suit transmission.
- Adjust side and rear clamps to suit transmission and tighten clamp wing nuts.
- Fit the safety chain assembly to left hand arm of lift, and secure with peg.
- Pass safety chain over transmission and engage in front arm of lift. Tighten the safety chain adjuster.
- Remove remaining transmission to adaptor plate securing bolts and carefully lower transmission from engine.
- Remove transmission from ramp area.
- Remove clutch release bearing assembly from release lever.
- Remove clutch release lever retaining clip and remove lever.
- Remove release lever pivot pin.
- Remove transmission switch.
- Remove rear mounting spring retainer securing nut.
- Remove rear mounting spring retainer and remove rear mounting assembly.
- Reposition selector shaft pin cover.
- Remove selector shaft yoke to selector shaft retaining pin and remove the yoke.
- Remove slave cylinder securing studs.
- Remove the transmission from the unit lift.
- Remove transmission drain plug and allow to drain, refit the drain plug.
- Fit new transmission to unit lift.
- Fill transmission with oil and refit the level plug.
- Clean components and mating faces.
- Fit the slave cylinder mounting studs.
- Lubricate the selector output shaft.
- Fit selector shaft yoke (3 Fig. 1) to selector shaft and secure with retaining pin (2 Fig. 1).
- Reposition the retaining cover (1 Fig. 1) over the selector shaft yoke retaining pin.
- Fit the transmission rear mounting assembly and secure with bolt.
- Fit reverse lamp switch.
- Lubricate the clutch release lever.
- Fit and align lever to transmission and engage onto pivot pin.
- Fit and fully seat lever to pivot retaining clip.
- Lubricate release bearing housing.
- Fit and fully seat bearing assembly to lever.
- Select third gear.
- Move transmission to vehicle and raise into position.
- **Insert** transmission input shaft into clutch and fully seat transmission against adaptor plate, ensuring that transmission is in line as it is fitted and seated to the plate.



7.1



- Fit and tighten transmission to adaptor plate securing bolts (1 Fig. 1).
 - Slacken chain adjuster.
 - Release securing peg from adjuster.
 - Displace securing chain from the unit lift.
 - Slacken clamp from wing nuts.
 - Release clamps from transmission.
 - Lower lift and traverse aside.
 - Refit front clamp to unit lift.
 - Connect transmission switch and fit multi-way connector into securing clip.
 - Clean and lubricate clutch slave cylinder push rod and fit to slave cylinder.
 - Fit slave cylinder to mounting studs and secure with nuts.
 - Fit and seat remote control mounting rubbers and spacers.
 - Align remote control assembly to transmission.
 - Fit mounting rubber backing washers.
- Refit remote control mounting and secure with bolts (1 Fig. 2).
 - Fit wavy washer to gearshift lever.
 - Position selector shaft yoke to gearshift lever.
 - Apply lubricant to selector shaft yoke / gearshift lever assembly.
 - Fit and tighten selector shaft yoke to gearshift lever securing nut / bolt (3 Fig. 2).
- From above: Tighten MS 53B hook nut to raise transmission into position (Fig. 3).
 - Position the jack beneath the transmission.
 - Fit spring to rear mounting assembly.
 - Fit upper rubber to mounting spring.
- Using a jack, fit and seat the mounting assembly to the body / transmission.
 - Fit but do not fully tighten mounting securing bolts.
 - Lower and remove jack.
 - Remove jack channel.
 - From above: Fully undo MS 53B hook nut.
 - From below: Final align mounting to transmission / body.
 - Final tighten the mounting assembly securing bolts.
 - Clamp the front exhaust pipe in a vice.
 - Remove and discard the front pipe to manifold sealing rings.
 - Clean the faces.
 - Fit and fully seat new rings to pipe.
 - Remove the front pipe from the vice and align to the manifold.
 - Align retaining rings to the studs and secure with the nuts.



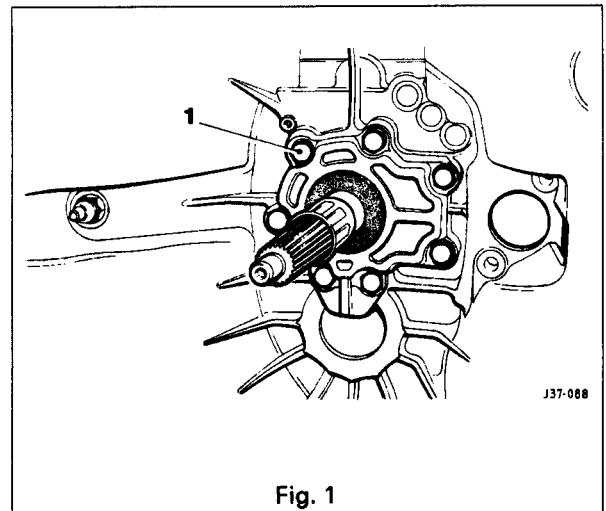


- Fit drive (propeller) shaft to transmission, see Section 9, SRO 47.15.01.
- Clean exhaust joint area, smear with sealant and fit to intermediate pipe.
- Connect exhaust system to front pipe.
- Fit and tighten clamp securing nut / bolt.
- Reposition lambda sensor harness to allow connection from above.
- Reconnect lambda sensor block connectors.
- Remove MS 53B hook and retaining tool.
- Undo and remove lifting bracket securing nuts.
- Remove lifting bracket.
- Fit injector harness mounting bracket.
- Fit and tighten manifold securing nuts.
- Secure injector harness to mounting bracket.

7.1.3 FRONT OIL SEAL, RENEW

SRO 37.23.06

- Remove the transmission assembly (see Sub-Section 7.1.2), and place it on a bench.
- Place drain tray beneath the transmission assembly.
- Remove the front securing bolts (1 Fig. 1) and remove the front cover.
- Note and remove the shims.
- Remove the oil seal from the assembly.
- Clean the front cover and gasket faces.
- Clean the shims.
- Lubricate the face of the new seal.
- Fit and seat the seal to the assembly.
- Fit the shims to the cover.
- Apply sealant to the front cover.
- Lubricate the seal lip.
- Fit and seat the front cover to the transmission and secure with the bolts.
- Remove the transmission filler plug.
- Fill the transmission to the correct level and refit the filler plug.
- Remove the drain tray.
- Refit the transmission assembly (see Sub-Section 7.1.2).

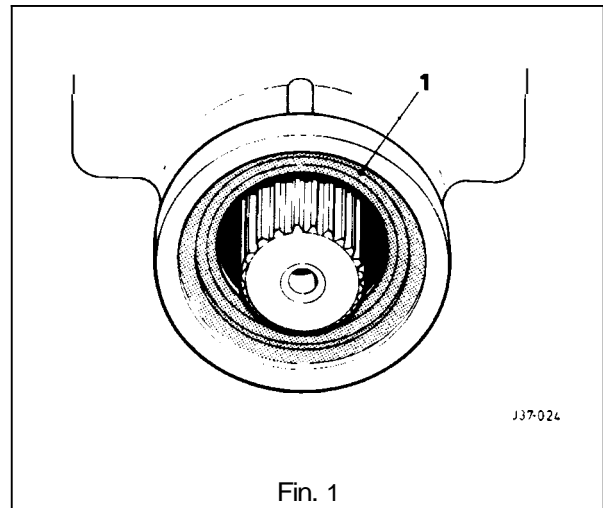




7.1.4 REAR OIL SEAL, RENEW

SRO 37.23.01

- Remove the drive (propeller) shaft, see Section 9, SRO 47.15.01.
- Using a suitable oil seal remover, displace and remove the rear oil seal (1 Fig. 1).
- Clean the seal mounting face.
- Lubricate the seal lip.
- Fit and seat the seal to the transmission.
- Refit the drive shaft, see 47.15.01.



7.1.5 GEARSHIFT LEVER, RENEW

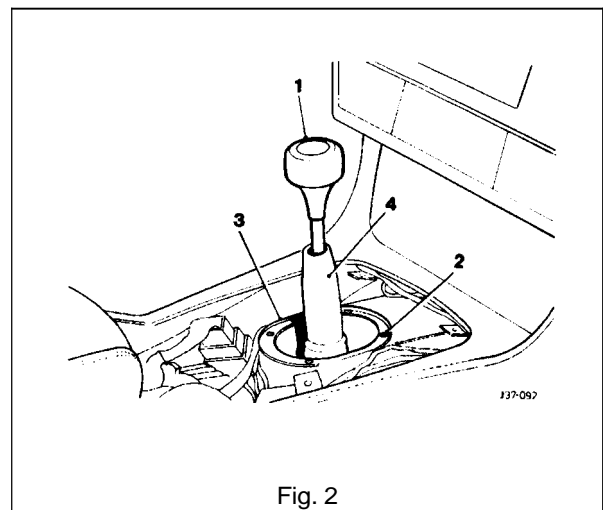
SRO 37.16.04

- Remove and strip down the gear selector remote control assembly as detailed in Sub-section 7.1.8.
- Rebuild and refit the gear selector remote control assembly (Sub-Section 7.1.8), but fit a new replacement gearshift lever and discard the original lever.

7.1.6 GEARSHIFT LEVER DRAUGHT EXCLUDER, RENEW

SRO 37.16.05

- Remove the gearshift lever knob (1 Fig. 2), see Sub-Section 7.1.7.
- Open the centre console storage compartment.
- Remove the centre console securing screws, disconnect the block connectors and remove the console.
- Remove the foam sealing ring.
- Remove the draught excluder securing screws (2 Fig. 2) and ring (3 Fig. 2) and remove the draught excluder (4 Fig. 2).
- Fit the new draught excluder over the gearshift lever and secure with the ring (3 Fig. 2) and screws (2-Fig. 2).
- Refit the foam sealing ring.
- Refit the centre console and reconnect the block connectors and secure with the screws.
- Close the centre console storage compartment.
- Fit the gearshift lever knob/ lock nut and align the knob to its final position.
- Tighten the lock nut and reposition the gearshift lever gaiter.

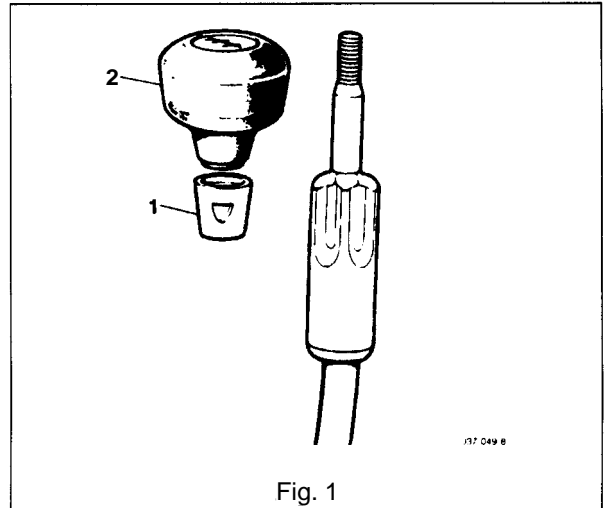




7.1.7 GEARSHIFT LEVER KNOB, RENEW

SRO 37.16.11

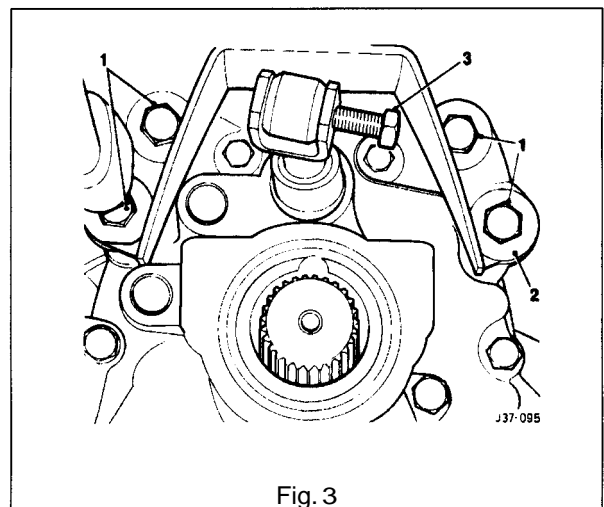
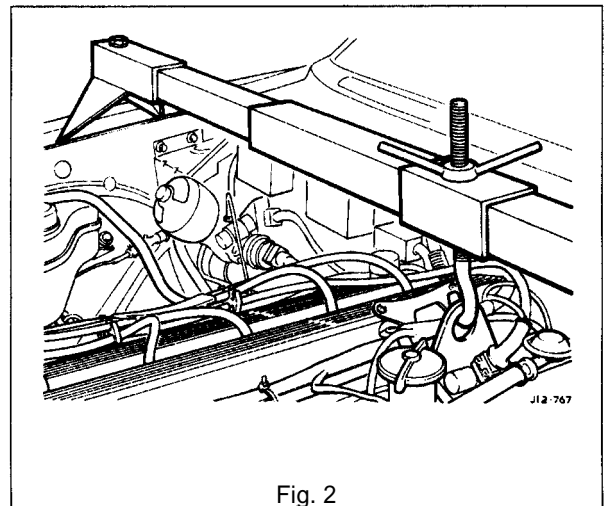
- Displace the gearshift lever gaiter for access and slacken the gearshift lever knob lock nut (1 Fig. 1) and remove the gearshift lever knob (2 Fig. 1).
- Fit the new gearshift lever knob and align to its final position.
- Tighten the lock nut and reposition the gearshift lever gaiter.



7.1.8 GEARSHIFT LEVER/ REMOTE CONTROL ASSEMBLY, RENEW

SRO 37.16.20

- Disconnect the battery.
- Remove inlet manifold rear securing nuts.
- Fit lifting bracket 18G 1465 and secure with the nuts.
- Fit Service Tool MS 538 (Fig. 2) across the wing channels and align to rear lifting bracket.
- Fit and engage retaining hook.
- Tighten hook nut to take weight of engine.
- Select third gear and remove the gearshift lever knob.
- Disconnect lambda sensor block connectors.
- Remove the exhaust front pipe to the intermediate pipe securing nut/ bolt.
- Remove the sealing olive.
- Take the weight of the rear engine mounting using a jack, jack channel and a suitable block.
- Remove the rear mounting securing bolts.
- Lower and remove the rear mounting assembly.
- Carefully ease exhaust system down for access.
- Remove the drive (propeller) shaft assembly, see Section 9, SRO 47.15.01.
- From above: undo retaining hook nut to lower rear of transmission (do not allow engine to foul steering rack).
- From below: slacken but do not remove the selector shaft bolt (3 Fig. 3).
- Remove the gear selector remote control securing bolts (1 Fig. 1) and reposition for access.
- Finally remove the selector shaft bolt (3 Fig. 3).
- Remove the gear selector remote control assembly from the selector shaft.

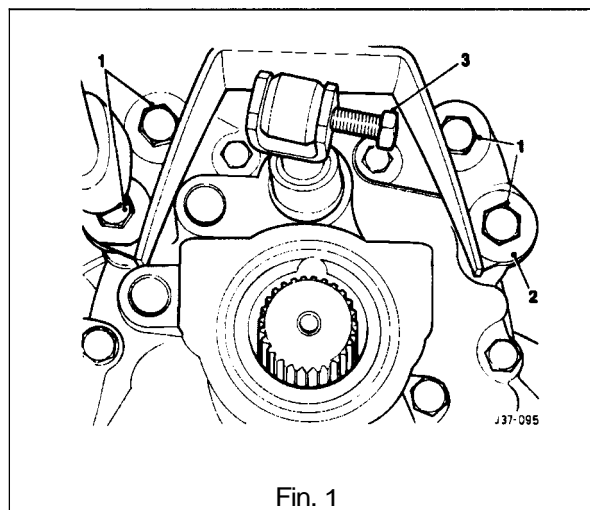


Note: To aid removal, invert the gear selector remote control assembly, i.e. gearshift lever pointing downwards.

7.1



- Ensure that the draught excluder is not displaced from its position.
- Remove the mounting rubbers and washers (2 Fig. 1).
- Mount the gear selector remote control assembly (1 Fig. 2) in a vice.
- Remove the spring ring (2 Fig. 2).
- Remove the gearshift lever (5 Fig. 2).
- Remove the spring retainer (3 Fig. 2) and spring (4 Fig. 2) from the gearshift lever.
- Remove the gearshift lever lower nylon cup (6 Fig. 2) and upper nylon cup (7 Fig. 2).
- Remove the lever housing assembly from the vice.
- Clean all components thoroughly and examine for wear and damage.
- Replace worn or damaged components as necessary.
- Ensure mating faces are clean and grease-free.
- Mount the gear selector remote control assembly (1 Fig. 2) in a vice.
- Fit and seat the lower nylon cup (6 Fig. 2).
- Grease the gearshift lever ball.
- Fit and seat the upper nylon cup (7 Fig. 2).
- Fit the spring (4 Fig. 2) and spring retainer (3 Fig. 2) to the lever.
- Fit **and** seat the gearshift lever
- Compress the spring (4 Fig. 2).
- Fit and seat the gearshift lever
- Fit the spring ring (2 Fig. 2).
- Remove the gear selector remote control assembly (1 Fig. 2) from the vice.
- Lubricate the gearshift lever to ease fitment through the draught excluder.
- Lubricate the lower spacer.
- Position the assembly in its mounting location; enter the gearshift lever into the gaiter.
- Position the gearshift lever into the selector shaft yoke.
- Fit but do not tighten the selector shaft bolt (3 Fig. 1).
- Fit the lower LH mounting rubber and washer.
- Fit the remaining mounting rubbers / washers (2 Fig. 1) and secure with the bolts (1 Fig. 1).
- Secure the selector shaft bolt (3 Fig. 1).
- Tighten MS 538 hook nut to raise the transmission into position.
- Using a jack, fit and seat the rear mounting to the transmission/ body, ensuring that the spring is seated correctly in the spring pan.
- Fit but do not fully tighten the mounting securing bolts.
- Remove the jack and jack channel.
- Secure the rear mounting bolts.
- Slacken off MS 538 hook nut.
- Refit the drive (propeller) shaft assembly, see Section 9, SRO 47.15.01.
- Remove Service Tool MS 538.
- Refit the gearshift lever knob.



Fin. 1

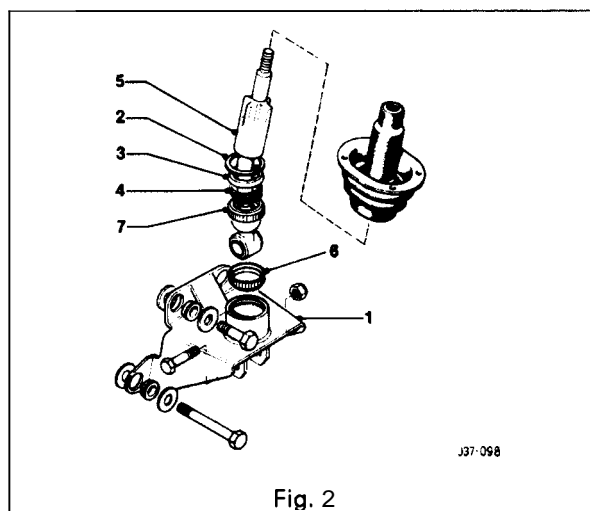


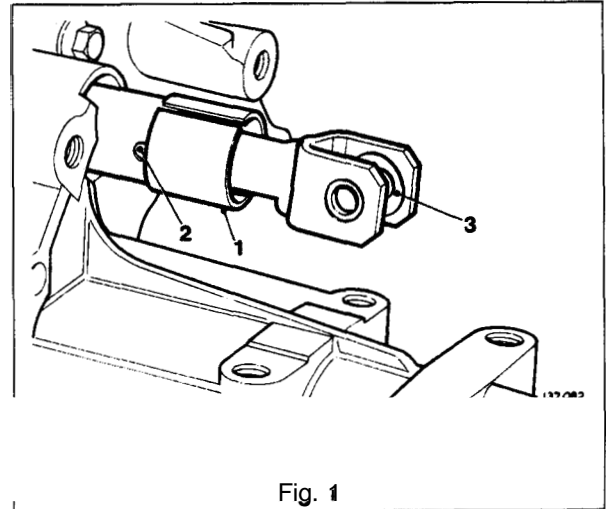
Fig. 2



7.1.9 GEAR SELECTOR SHAFT-REAR, OVERHAUL

SRO 37.16.41

- Remove the gear selector remote control assembly, see 37.16.20.
- Displace the selector shaft cover (1 Fig. 1).
- Remove the selector shaft to selector shaft yoke retaining pin (2 Fig. 1), and remove the yoke (3 Fig. 1).
- Clean all components thoroughly and check for wear and damage.
- Replace worn or damaged components as necessary.
- Lubricate and fit the selector shaft yoke to the selector shaft and secure with the retaining pin.
- Reposition the selector shaft cover.
- Refit the gear selector remote control assembly, see 37.16.20.



7.1.10 REVERSE LAMP SWITCH, RENEW

SRO 37.27.01

- Raise the vehicle on a ramp.
- Note and disconnect reverse lamp switch multi-way connector.
- Slacken off and remove the switch.
- Clean the mating face.
- Fit a new switch.
- Connect the multi-way connector.
- Lower the ramp.

7.1.11 LAYSHAFT FRONT SEAL, RENEW

SRO 37.23.07

- Remove the transmission assembly, see Sub-Section 7.1.2
- Remove the front oil seal assembly, see Sub-Section 7.1.3.
- Using suitable oil seal remover tool, remove and discard layshaft plug seal.
- Clean the transmission face and the front oil seal assembly.
- Fit and fully seat the new seal to the casing.
- Refit the transmission front seal assembly.
- Refit the transmission.



7.1.12 CLUTCH, DESCRIPTION

The single-plate, diaphragm-type clutch, is operated by the pushrod of the slave cylinder acting on the clutch lever. The slave cylinder, mounted on the transmission bell housing, is operated hydraulically from the clutch master cylinder through a series of hydraulic pipes.

The piston in the master cylinder is operated by a push rod from the clutch pedal, which is fitted to the bulkhead mounted pedal box.

The clutch pedal is positioned to the left of the brake pedal.

The engines use a twin-mass flywheel configuration with built-in springs to provide a smooth take-up of drive.

The flywheel is extremely heavy and great care must be taken when lifting it from the vehicle.

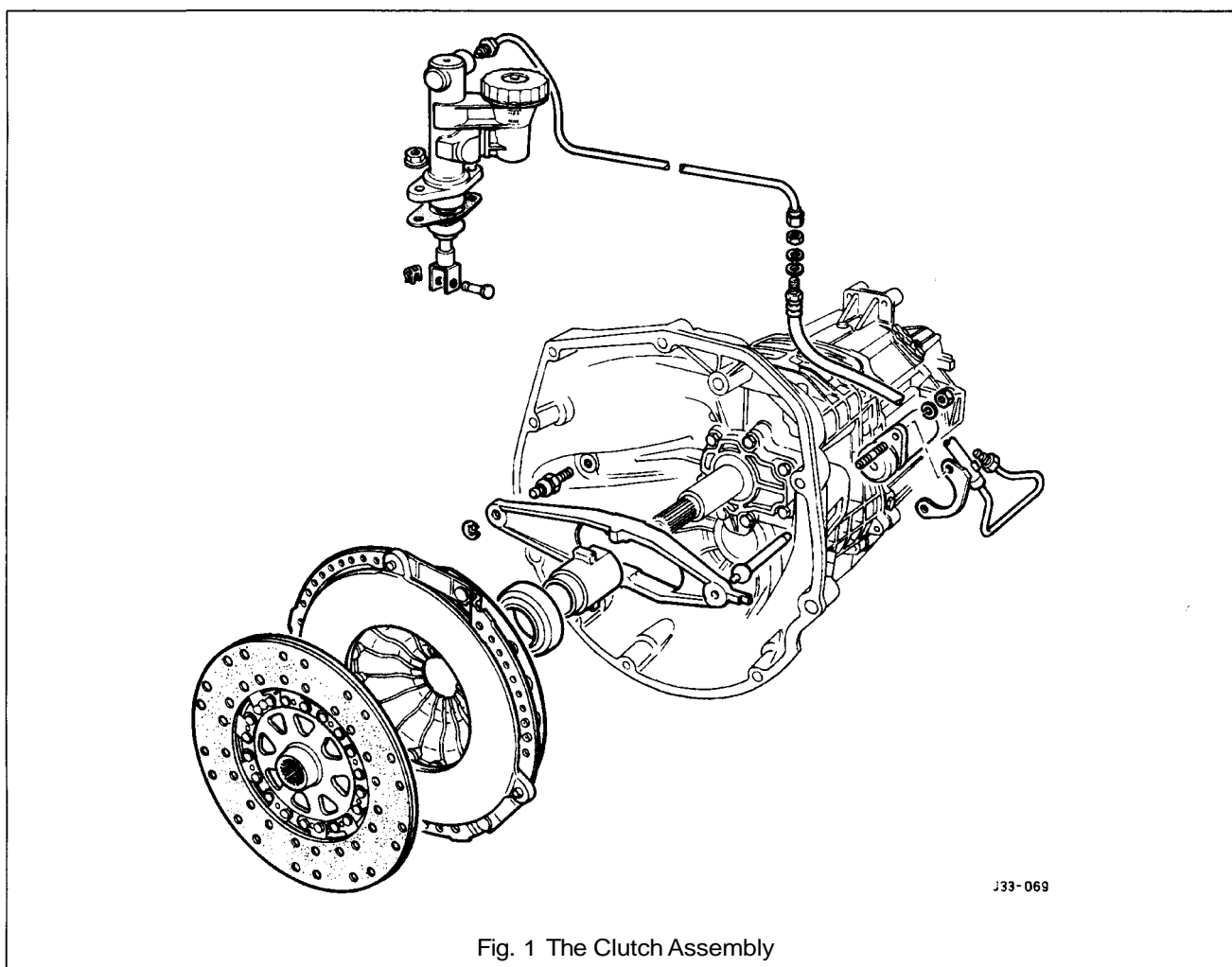


Fig. 1 The Clutch Assembly

CAUTION: The hydraulic fluid used in the clutch hydraulic system is injurious to car paintwork. Utmost precautions **MUST** at all times be taken to prevent spillage of fluid. Should fluid be accidentally spilled onto the paintwork, wipe fluid off immediately with a cloth moistened with denatured alcohol (methylated spirits).



7.1.13 CLUTCH FAULT DIAGNOSIS

Symptom	Possible Cause	Check	Remedy
Difficult gear engagement	Hydraulic system defects	Check fluid level in reservoir	Replenish as necessary and bleed system if necessary
		Check for air in the system	Bleed the system
Rattling clutch	Operating mechanism faults	Check for defective pedal	Renew return spring if necessary
		Clutch unit faults	Check for damaged pressure plate
	Check splines on clutch driven plate and primary pinion shaft for wear	Renew as necessary clutch plate or primary pinion	
	Check clutch driven plate for loose or broken springs and for warping	Renew driven plate	
	Check for wear in the clutch withdrawal mechanism	Renew as necessary	
	Check for worn primary pinion bearing	Renew as necessary	
squeaking clutch	Primary pinion bearing fault	Check for seizing on primary shaft or in flywheel	Lubricate or renew as necessary
Vibrating clutch or clutch judder (often preceded by clutch grab)	Clutch unit faults	Check the clutch driven plate for distortion and damage and for loose or broken torque damper springs	Renew driven plate
		Check for oil and other foreign matter on the clutch friction linings	Renew driven plate and clean related parts
		Check for incorrectly fitted clutch pressure plate	Dismantle from clutch and refit where applicable
		Check that contact witness on friction linings is evenly distributed	Renew driven plate as necessary
	Defects other than in clutch unit	Check for loose flywheel fixings and flywheel run-out	Tighten to correct torque loading
		Check for loose engine mountings	Tighten mounting nuts and bolts
		Check for worn drive (propeller) shaft universal joints	Renew if necessary
		Check for bent primary pinion shaft	Renew as necessary
stiff clutch operation	Operating linkage fault	Check for damaged moving parts in operating linkage	Renew as necessary
		Check for seized linkage, recheck operation after remedy	Lubricate linkage as necessary

7.1



Clutch Fault Diagnosis

Symptom	Possible Cause	Check	Remedy
Clutch knocks	Clutch Fault	Check for worn clutch driven plate hub splines	Renew driven plate
	Primary pinion bearing	Check for wear in bearing	Renew as necessary
Fractured clutch plate	Incorrect fitting method	Damage may be caused by accidental loading during fitting	Always support transmission weight during fitting
		Check mating components for damage	Renew driven plate
Excessive lining wear	Overloading vehicle	Refer to owners handbook for permissible load details	Fit replacement clutch assembly
	Driving with left foot resting on clutch pedal	Check as described under 'slipping clutch'	Fit replacement clutch assembly
Grabbing clutch harsh engagement (from standing start, often followed by clutch udder)	Operating mechanism faulty	Check operating mechanism for wear and binding which usually indicates a binding withdrawal race thrust bearing	Free off bearing. Renew as necessary
		Check pedal for sticking parts including return spring	Free off pedal and check for damaged and distorted parts. Renew if necessary
	Clutch unit faults	Check for oil on friction driven plate	Clean off cover. Renew faces. Rectify oil leak
		Check clutch plate and flywheel for wear. Check flywheel runout. Check also for glazing on driven plate linings	Reclaim or renew as applicable
		Check for driven plate hub splines sticking on pinion shaft. Check pinion shaft for wear.	Free driven plate, and check for wear and distortion
		Check for broken or weak pressure springs. Check torque damper springs in clutch driven plate	Renew if necessary
Engine mounting	Check for damaged or deteriorated engine mountings. Check fixings for tightness	Renew if necessary	

7.1



Clutch Fault Diagnosis

Symptom	Possible Cause	Check	Remedy
Slipping clutch [indicated by vehicle speed not responding to engine speed increase)	Poor driving technique	Ensure that none of the remedy conditions prevail	Do not increase engine speed with clutch partially engaged. Do not drive with left foot resting on clutch pedal.
	Operating mechanism faulty	Check for binding withdrawal lever	Free lever and check for wear and distortion
		Check for binding of clutch pedal movement components	Free off seized or binding components
	Clutch unit faults	Check for oil on friction faces	Clean off metal faces. Renew driven plate. Rectify oil leak.
	Operating mechanism faulty	Check for binding withdrawal lever	Free lever and check for wear and distortion
		Check for binding of clutch pedal movement components	Free off seized or binding components
	Clutch unit faults	Check for oil on friction faces	Clean off metal faces. Renew driven plate. Rectify oil leaks.
		Check for broken rivets and ensure springs	Renew over as necessary
		Check clutch plates and for wear and distortion	Reclaim or renew clutch plate as applicable
		Check clutch driven plate for fractures and distortion. Damage may be caused by accidental loading during assembly of transmission to engine. Always support transmission weight during refitting	Renew driven plate and check mating components for damage
Dragging or spinning clutch	Clutch unit faults	Check for primary pinion bearing seized	Rectify or renew as necessary
		Check clutch driven hub for binding on primary pinion splines. Check for too thick friction linings. Ensure linings are good	Renew as necessary
		Check for foreign matter in clutch unit	Clean and renew components as necessary

7.1



7.1.14 CLUTCH ASSEMBLY, RENEW

SRO 33.10.01

- Remove the rear inlet manifold securing nuts and the injector harness mounting bracket.
- Fit lifting eye 18G 1465 to rear inlet manifold studs and tighten securing nuts.
- Fit Service Tool MS 53B (Fig. 1) and take the weight of the engine with the hook.
- Disconnect the exhaust system from the front pipe.
- Ease the exhaust system down for access and remove heatshield.
- Remove the drive (propeller) shaft assembly and fit a blanking plug to the rear of the transmission.
- Remove the exhaust front pipe assembly.
- Remove the clutch slave cylinder, see Sub-Section 7.1.16, and secure the slave cylinder to one side.
- Disconnect the transmission switch connectors.
- Remove the rear mounting assembly, see Section 3.1, SRO 12.45.04.
- Undo the hook nut of Service Tool MS 53B to lower the rear of the transmission / engine assembly.
- Disconnect the gearshift / selector shaft universal joint securing nut / bolt, remove the wavy washer from the selector and remove the bolts securing the remote control.
- Remove the mounting rubbers and washers.
- Remove the transmission switch for access to the upper right hand transmission / bell housing securing bolt.
- Remove the transmission to engine adaptor plate securing bolts (1 Fig. 2).

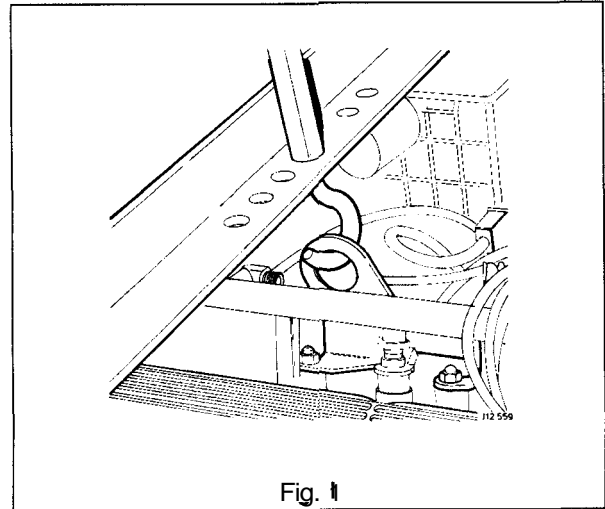


Fig. 1

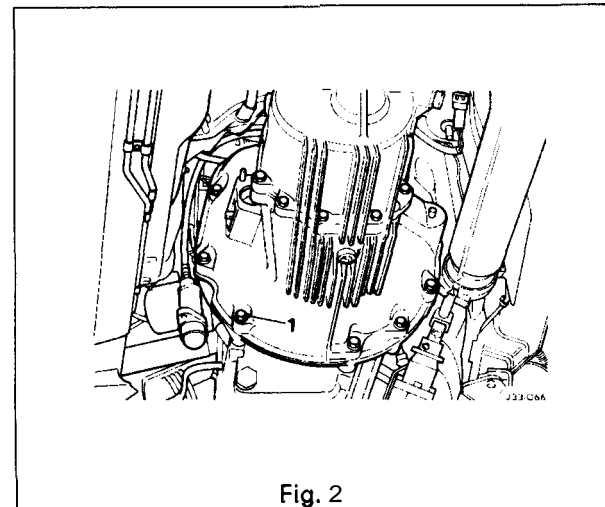


Fig. 2

Note: Leave two opposing bolts in place for safety.

- Fit a suitable hoist, securely to the transmission.
- Take the weight of the transmission and remove the remaining two securing bolts.
- Remove the transmission from the rear of the engine.
- Lower the transmission and remove from the rear of the engine.
- Hold the flywheel in one position and remove the bolts securing the clutch cover to the flywheel.

CAUTION: Make a note of the position of any balance weights relative to the clutch cover.

- Remove the balance weights.
- Remove the clutch cover / drive plate assembly.
- Remove the eight securing bolts (1 Fig. 3) and remove the flywheel (2 Fig. 3).

WARNING: THE TWIN-MASS FLYWHEEL IS EXTREMELY HEAVY. ASSISTANCE MAY BE REQUIRED DURING REMOVAL.

- Clean the face of the flywheel and dowels.

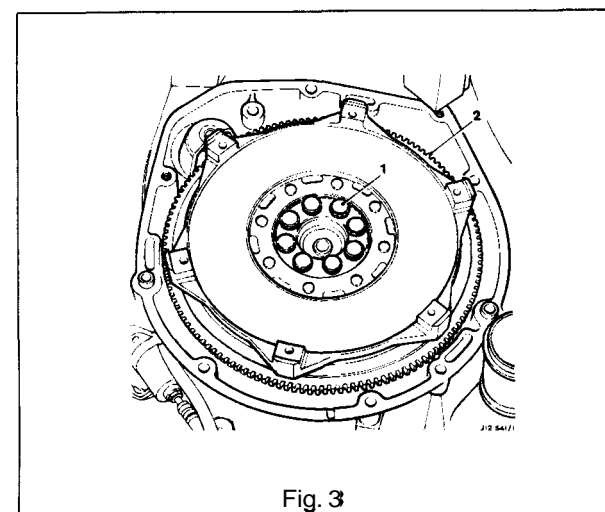


Fig. 3



- Check the flywheel face for scoring; should this be excessive, skim within tolerance.
- Fit a new spigot bearing to the flywheel (2 Fig. 1).
- Refit the flywheel to the crankshaft and tighten the securing bolts (1 Fig. 1).
- Fit the clutch assembly to the flywheel ensuring that the larger, rounded boss faces the flywheel.
- Align the clutch with an input shaft.
- Fit the balance weights to the clutch cover and tighten the securing bolts.
- Remove the input shaft.
Remove the circlip (1 Fig. 2) securing the clutch release arm to the pivot and remove the assembly (2 Fig. 2).
- Slacken and remove the release arm pivot pin.
- Remove the bearing (3 Fig. 2) from the release arm assembly (2 Fig. 2), grease the bearing seat, fit the new bearing to the release arm assembly.
- Re-assemble the release arm ensuring that the pivots are greased.
- Select third forward gear.
- Move the transmission under the ramp and raise it into position against the adaptor plate and secure with the bolts.
- Remove the securing chain from the unit lift and fit front clamp.
- Refit the transmission switch and fit the multi-plug into the securing clip.
- Refit the clutch slave cylinder, see 33.35 01.
- Fit the mounting rubbers and spacers, reconnect the remote control.
- Refit the selector to the gearshift lever.
- Refit the exhaust front pipes to the manifold.
- Remove the blanking plug from the rear of the transmission.
- Refit the drive (propeller) shaft.
- Refit the heat shield and reconnect the exhaust system.
- Lower the ramp.
- Remove the Service Tool MS 53B.
- Remove the engine lifting eye 18G 1465.
- Refit the injector harness mounting bracket and tighten the rear inlet manifold securing nuts.

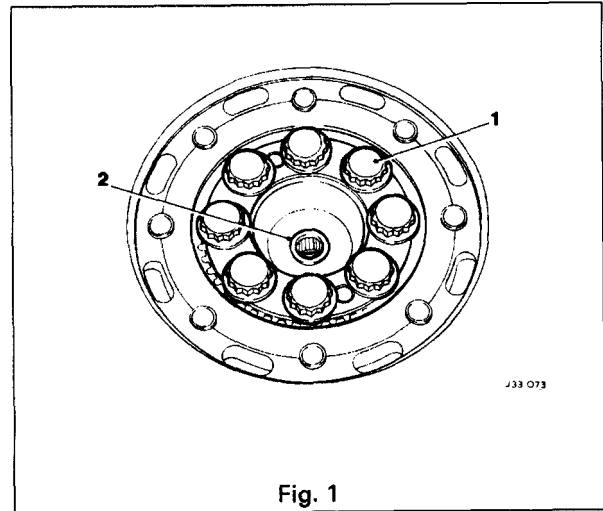


Fig. 1

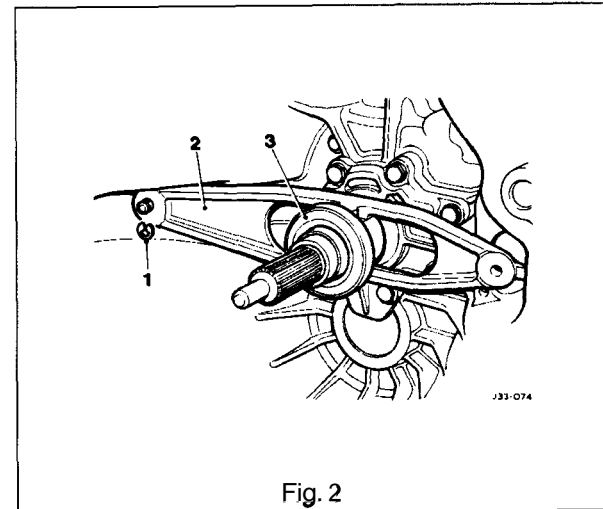


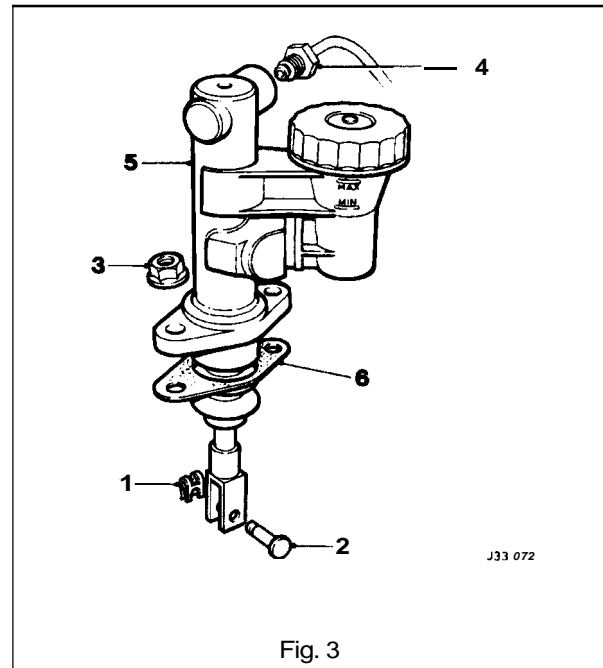
Fig. 2



7.1.15 CLUTCH MASTER CYLINDER, RENEW

SRO 33.20.01

- Remove the clutch master cylinder to clutch pedal clevis pin securing clip (1 Fig. 1), and remove the clevis pin (2 Fig. 1).
- Remove the master cylinder securing nuts (3 Fig. 1).
- Disconnect the hydraulic pipe (4 Fig. 1) from the master cylinder, and fit blanking plugs to the pipe and master cylinder.
- Remove the master cylinder assembly (5 Fig. 1) and the gasket (6 Fig. 1).
- Fit the new master cylinder to the bench vice and fill the reservoir.
- Refit the reservoir cap.
- Remove the blanking plug from the master cylinder.
- Prime the master cylinder by 'working' the push rod until fluid appears at the hydraulic pipe outlet.
- Remove the master cylinder from the vice.
- Place a new gasket (6 Fig. 1) over the mounting studs.
- Fit and align the master cylinder assembly to the studs, and secure with the nuts (3 Fig. 1).
- Remove the blanking plug from the hydraulic pipe (4 Fig. 1).
- Ensure that the union is clean and no foreign matter enters the system.



WARNING: USE ONLY CLEAN BRAKE FLUID OR DENATURED ALCOHOL (METHYLATED SPIRITS) FOR CLEANING. ALL TRACES OF CLEANING FLUID MUST BE REMOVED BEFORE RE-ASSEMBLY. ALL COMPONENTS MUST BE LUBRICATED WITH CLEAN BRAKE FLUID AND ASSEMBLED USING THE FINGERS ONLY.

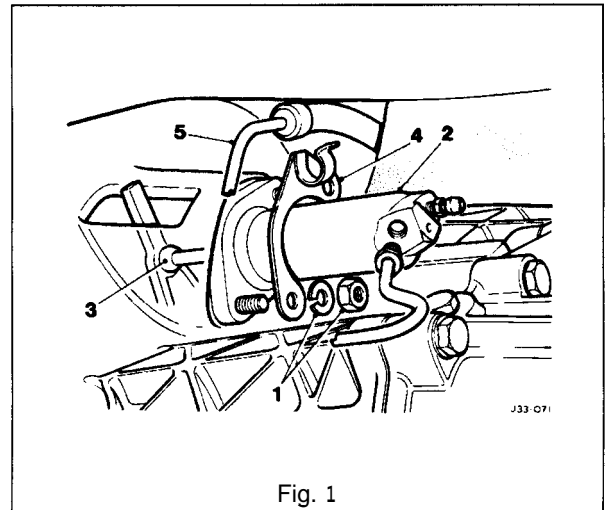
- Reconnect the pipe (4 Fig. 1) to the master cylinder (5 Fig. 1), and tighten the union nut.
- Align the push rod to the pedal.
- Clean and grease the clevis pin (2 Fig. 1).
- Align and fit the clevis pin to the pedal and push rod.
- Fit the securing clip (1 Fig. 1).
- Bleed the clutch hydraulic system, see Sub-Section 7.1.18.



7.1.16 CLUTCH SLAVE CYLINDER, RENEW

SRO 33.35.01

- Disconnect the pipe from the clutch slave cylinder, plug or tape the pipe to prevent the ingress of any dirt.
- Remove the nuts (1 Fig. 1) and spring washers securing the slave cylinder to the transmission.
- Remove the hose clip bracket (4 Fig. 1) complete with the hydraulic hose/pipe (5 Fig. 1), and slide the slave cylinder (2 Fig. 1) off the mounting studs.
- Slide the rubber boot along the push rod (3 Fig. 1) and withdraw the push rod from the cylinder.
- To refit the new clutch slave cylinder, reverse the removal operations.
- Bleed the clutch hydraulic system, see Sub-Section 7.1.18.



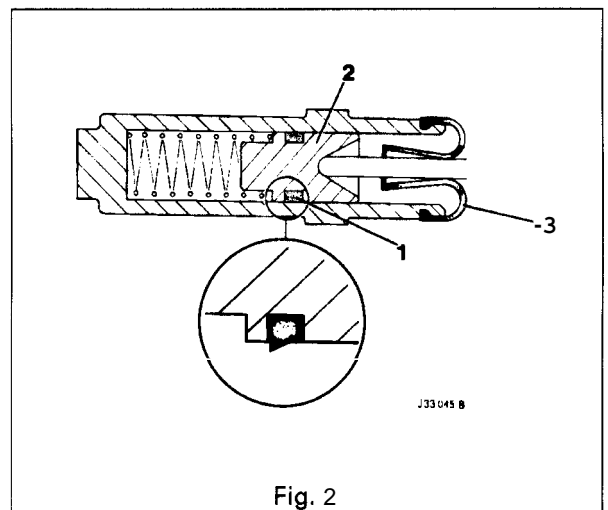
7.1.17 CLUTCH SLAVE CYLINDER, OVERHAUL

SRO 33.35.07

- Remove the clutch slave cylinder, see Sub-Section 7.1.16.
- Dismantle the cylinder. The new parts in the kit will indicate which used parts should be discarded.
- Clean the remaining parts and the cylinder thoroughly with unused brake fluid of the recommended type and place the cleaned parts on to a clean sheet of paper.

WARNING: USE ONLY CLEAN BRAKE FLUID OR DENATURED ALCOHOL (METHYLATED SPIRITS) FOR CLEANING. ALL TRACES OF CLEANING FLUID MUST BE REMOVED BEFORE RE-ASSEMBLY. ALL COMPONENTS MUST BE LUBRICATED WITH CLEAN BRAKE FLUID AND ASSEMBLED USING THE FINGERS ONLY.

- Examine the cylinder bore and the pistons for signs of corrosion, ridges or score marks. Provided the working surfaces are in perfect condition, new seals from the kit can be fitted, but if there is any doubt as to the condition of the parts then a new cylinder must be fitted.
- Fit the new seal (1 Fig. 2) to the piston (2 Fig. 2) with the flat back of the seal against the shoulder.
- Lubricate the seal and the cylinder bore with unused brake fluid of the recommended type and assemble the cylinder.
- Before fitting the dust cover (3 Fig. 2), smear the sealing areas with rubber grease.
- Squeeze the remainder of the grease from the sachet into the cover to help protect the internal parts.
- Refit the clutch slave cylinder, see Sub-Section 33.15.01.
- Bleed the clutch hydraulic system, see Sub-Section 7.1.18.



7.1



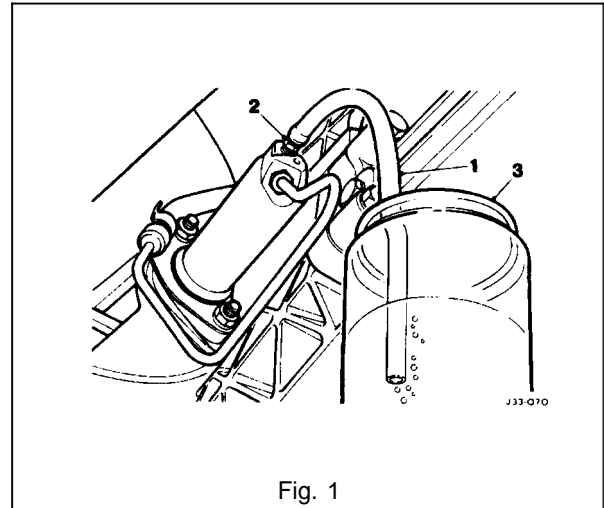
7.1.18 CLUTCH HYDRAULIC SYSTEM, BLEED

SRO 33.15.01

CAUTION: Only use minimum DOT 4 brake fluid in the hydraulic system.

- Remove the reservoir filler cap, and top up to the correct level with hydraulic fluid.
- Attach one end of a bleed tube (1 Fig. 1) to the slave cylinder bleed nipple (2 Fig. 1).
- Partially fill a clean container (3 Fig. 1) with hydraulic fluid.
- Immerse the other end of the bleed tube in the fluid.
- Slacken the slave cylinder bleed nipple.
- Pump the clutch pedal slowly up and down, pausing between each stroke.
- Top up the reservoir with fresh hydraulic fluid after every three pedal strokes.

CAUTION: Do not use fluid bled from the system for topping up purposes as this will contain air. If the fluid has been in use for some time it should be discarded. Fresh fluid bled from the system may be used after it has stood for a few hours allowing all the air bubbles to disperse.



- Pump the clutch pedal until the pedal becomes firm, tighten the bleed nipple.
- Top up the reservoir, refit the filler cap.
- Apply working pressure to the clutch pedal for two to three minutes and examine the system for leaks.

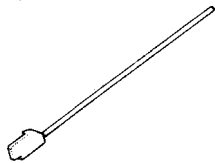
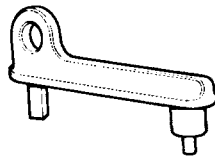


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8.1

1. SERVICE TOOLS & EQUIPMENT

Illustration	Jaguar Number	Description	Notes
	JD 103	Throttle valve alignment tool	
	JD 161	Rotary switch setting tool	

II. TORQUE TIGHTENING SPECIFICATIONS

Fixing	Tightening Torque (Nm)
Dipstick tube union nut	90
Drain plug	15
Fluid filter screws	8
Fluid pan securing bolts	8
Rotary switch to mounting bracket nuts	10- 12
Switch guard to sump pan bolts	15- 18
Transmission oil cooler pipes	20

111. SERVICE MATERIALS

Description	Uses	Notes
To be issued		

8.1

IV. SERVICE DATA

Description	Data
To be issued	



8.1.1 GENERAL DESCRIPTION

This section provides information relating to the automatic transmissions fitted to the 3.2 liter engine (ZF 4 HP 22 transmission) and the 4.0 liter normally aspirated engine (ZF 4 HP 24 E transmission). The general arrangement of the two units is shown in Fig. 1 and Fig. 2. The two automatic transmission units differ in the type of control unit employed: the purely hydraulic control used in the ZF 4 HP 22 unit shifts gears automatically at predetermined points, while the electronic-hydraulic control of the ZF 4 HP 24 E unit provides for optimized shift points and shift quality based on engine and transmission data received by the Transmission Control Module (TCM).

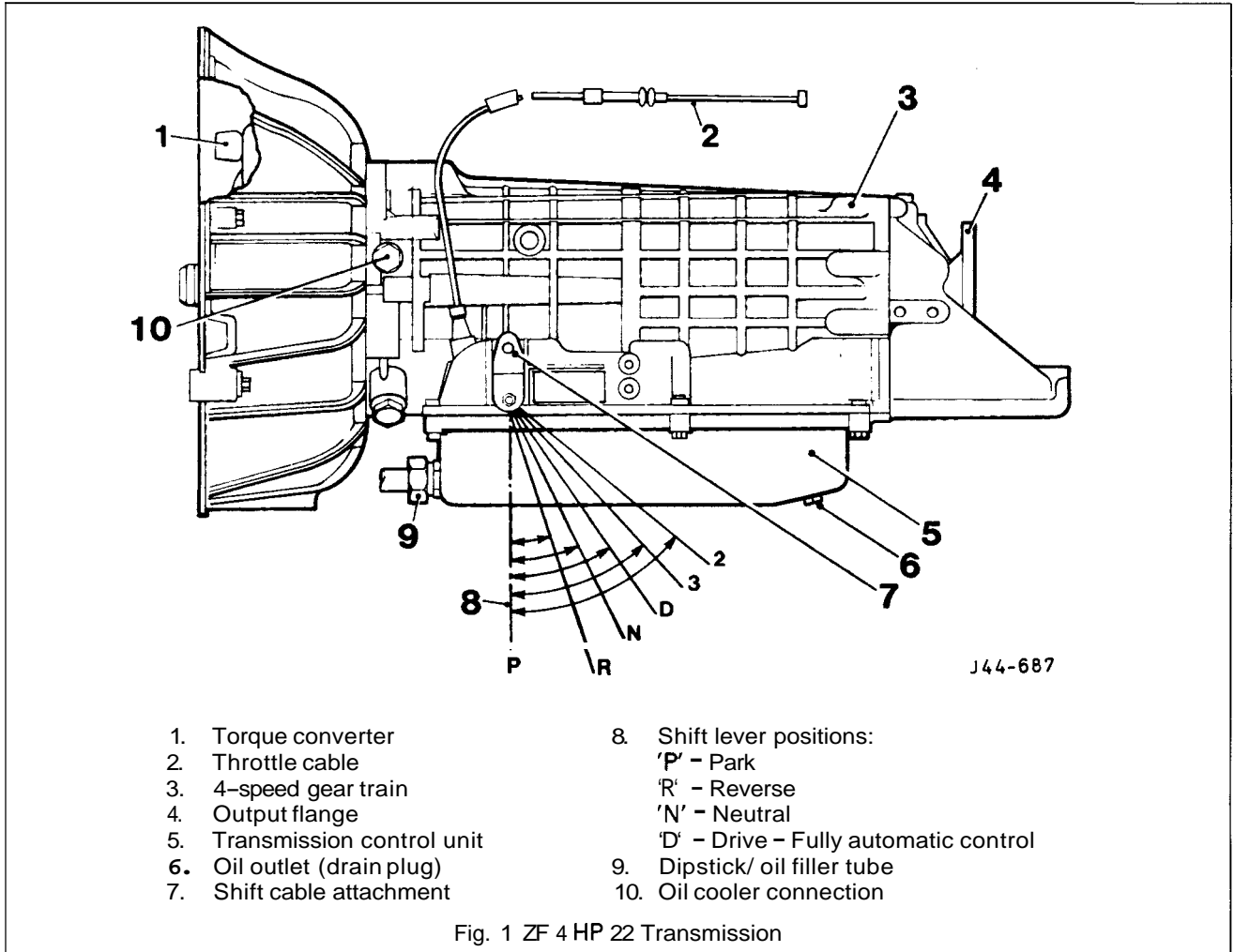
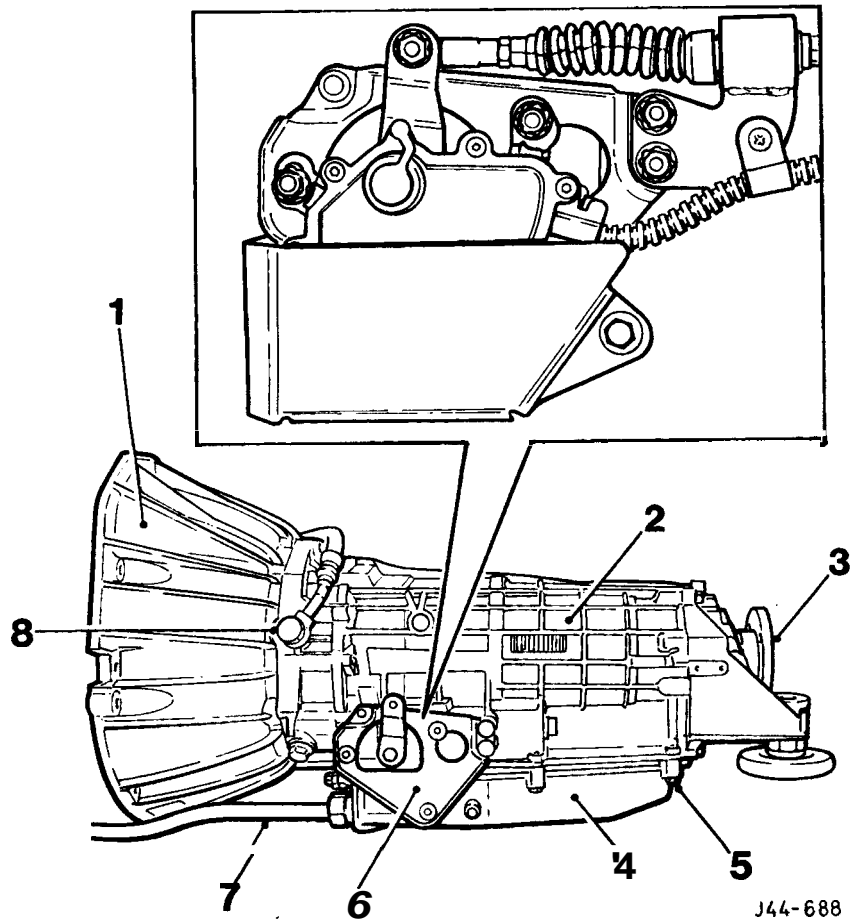


Fig. 1 ZF 4 HP 22 Transmission



J44-688

8.1

- | | |
|------------------------------|---------------------------------------|
| 1. Torque converter | 6. Rotary switch positions: |
| 2. 4-speed gear train | 'P' - Park |
| 3. Output flange | 'R' - Reverse |
| 4. Transmission control unit | 'N' - Neutral |
| 5. Oil outlet (drain plug) | 'D' - Drive (Fully automatic control) |
| | 7. Dipstick/ oil filler tube |
| | 8. Oil cooler connection |

Fig. 2 ZF 4 HP 24 E Transmission



Both types of automatic transmission comprise a hydrodynamic torque converter driving an epicyclic gear train which provides four forward ratios and reverse. Gearshift selection is made by a hydraulic (or electronic-hydraulic) transmission control unit. Six gearshift positions are provided:

Position 'P' (Park) – the driven wheels are mechanically locked at the transmission.

Position 'R' (Reverse) – reverse gear selected.

Position 'N' (Neutral) – engine disconnected from drive-line and wheels.

Position 'D' (Drive) – all four speed ranges are selected automatically with lock-up available in top gear only.

Position '3' – automatic selection of the lowest three speed ranges only.

Position '2' – automatic selection of the lowest two speed ranges only; the transmission is prevented from shifting up to the third and top speed ranges.

Immediate selection of a lower ratio is also available, within mapped limits, by 'kick-down' (pressing the accelerator pedal down beyond the normal full throttle position) for example when overtaking.

A brake pedal / gearshift interlock is incorporated in the shift lever mechanism. The shift lever may only be moved from the 'P' (Park) position if the ignition key switch is in position 'II', and the foot brake is applied. The ignition key cannot be removed from the ignition switch unless the shift lever is in the 'P' (Park) position. Once the ignition key has been removed, the shift lever is locked in the Park position. The gearshift interlock may be overridden manually in the event of an electrical failure or when it is required to move the vehicle manually for access, ie for removal of the propeller shaft.

8.1.1.1 Gear Selection (ZF 4HP 22)

Gearshift selection causes the appropriate gear to be selected through a cable operated shift lever on the side of the transmission unit. When a gear is selected, the shift points are determined by accelerator pedal position through a throttle cable connection and by pressures equivalent to road speed derived from a centrifugal governor on the output shaft.

Gearshift speed and quality are controlled by the hydraulic control unit located in the lower part of the transmission housing. The control unit contains selector valve, control pistons and pressure valves.

The hydraulic control unit can be overridden by 'kickdown'. This is actuated by the final travel of the accelerator pedal and causes the next lower gear to be selected.

8.1.1.2 Gear Selection (ZF 4HP 24 E)

Gearshift selection causes the appropriate gear to be selected through a cable operated shift lever on the side of the transmission unit; the shift lever also operates a rotary switch attached to the side of the transmission unit. When a gear is selected, the rotary switch provides an output or combination of outputs to the TCM, which continuously monitors the gear selected in addition to output shaft speed and transmission oil temperature. Information from the Engine Control Module (ECM) representing engine speed, load and throttle position is also fed to the TCM to enable the most suitable gear to be selected.

Gear selection and gearshift speeds are controlled by the manually operated selector valve, a solenoid operated pressure regulator and three solenoid valves. On receipt of signals from the TCM, the three solenoid valves MV1, MV2 and MV3, in various combinations with the safety valve, determine the appropriate gear range. The TCM, on receipt of information of engine state and road speed, determines the shift speed.

The Performance Mode switch, located on the shift lever surround, provides two alternative shift speed patterns:

1. 'Normal (Economy) Mode' – designed for everyday use.
2. 'Sport Mode' – gear shift takes place at higher road speeds to enhance performance.

The 'kick-down' switch, located beneath the accelerator pedal, is actuated by the final travel of the pedal and signals to the TCM that the next lower gear is to be selected.



8.1.1.3 Shift Speeds

3,2 Liter					
Upshifts					
Light throttle		D1 – D2	D2 – D3	D3 – D4	D4 – TCC on
	mile / h	10 – 11	16 – 23	24 – 29	49 – 53
	km / h	16 – 18	26 – 37	38 – 47	79 – 85
Up to 'kick-down point'		D1 – D2	D2 – D3	D3 – D4	–
	mile / h	32 – 38	58 – 64	79 – 91	–
	km / h	51 – 61	94 – 104	127 – 147	–
Through 'kick-down point'		D1 – D2	D2 – D3	D3 – D4	–
	mile / h	37 – 43	65 – 71	90 – 103	–
	km / h	60 – 69	104 – 114	145 – 166	–
Downshifts					
Zero throttle		TCC off in D4	D4 – D3	D3 – D2	D2 – D1
	mile / h	47 – 51	16 – 22	13 – 14	–
	km / h	76 – 82	24 – 35	22 – 23	–
Upto 'kick-down point'		D4 – D3	D3 – D2	D2 – D1	–
	mile / h	64 – 71	42 – 48	22 – 31	–
	km / h	102 – 114	67 – 78	36 – 50	–
'Kick-down' available		D4 – D3	D3 – D2	D2 – D1	–
	mile / h	86 – 99	61 – 67	30 – 37	–
	km / h	139 – 160	98 – 108	48 – 60	–
Manual inhibit (maximum available speed)		D4 – D3	D3 – D2	–	–
	mile / h	NOT INHIBITED	67 – 76	–	–
	km / h		108 – 123	–	–

TCC – Torque converter clutch



4,0 Liter					
Light throttle		D1 - D2	D2 - D3	D3 - D4	D4 - TCC on
Economy	mile/ h	10 - 12	14 - 21	20 - 29	45 - 55
	km / h	16 - 20	23 - 34	32 - 47	72 - 88
sport	mile/ h	10 - 16	16 - 24	25 - 33	49 - 59
	km / h	16 - 26	26 - 38	40 - 53	79 - 95
Economy					
Economy	mile/ h	34 - 38	57 - 64	88 - 98	88 - 98
	km / h	55 - 61	91 - 103	141 - 157	141 - 157
Sport	mile/ h	43 - 48	73 - 81	110 - 119	110 - 119
	km / h	69 - 77	117 - 130	176 - 191	176 - 191
Through 'kick-down' point					
Economy / sport	mile/ h	43 - 48	73 - 81	110 - 119	110 - 119
	km / h	69 - 77	117 - 130	176 - 191	176 - 191
Zero throttle					
Zero throttle		D2 - D1	D3 - D2	D4 - D3	D4 - TCC on
Economy	mile/ h	NOT AVAILABLE	12 - 10	15 - 13	49 - 39
	km / h	NOT AVAILABLE	20 - 16	24 - 21	79 - 63
sport	mile/ h	10 - 8	12 - 10	15 - 13	52 - 39
	km / h	16 - 13	20 - 16	24 - 21	83 - 63
Up to 'kick-down' point					
Economy	mile/ h	21 - 19	52 - 47	86 - 77	86 - 77
	km / h	34 - 31	83 - 75	138 - 123	138 - 123
sport	mile/ h	30 - 27	72 - 65	109 - 99	109 - 99
	km / h	48 - 43	115 - 104	175 - 159	176 - 159
'Kick-down' available					
Economy / sport	mile/ h	41 - 35	73 - 64	107 - 95	107 - 95
	km / h	66 - 56	117 - 103	171 - 152	171 - 152
Zero throttle					
Zero throttle		D2 - '1'	D3 - '2'	D4 - '3'	
Economy	mile/ h	41 - 35	73 - 64	107 - 94	
	km / h	66 - 56	117 - 103	171 - 152	
sport	mile/ h	50 - 44	85 - 75	130 - 114	
	km / h	80 - 71	136 - 120	208 - 182	



8.1.2 TRANSMISSION FLUID, RENEW (3,2L AND 4,0L)

SRO 44.24.02

- Raise the hood and fit a fender cover.
- Raise the vehicle on a ramp.
- Place a drain tin in position beneath the transmission drain plug.
- Release and remove the transmission drain plug; allow the fluid to drain.
 - Fit the drain plug with a new washer and torque tighten.
 - Reposition the drain tin beneath the dipstick tube union.
- Remove the screw securing the dipstick tube bracket.
- Release the dipstick tube union nut and disconnect the tube from the fluid pan.
- Drain the transmission fluid.
- Clean the tube unions, reconnect the dipstick tube to the fluid pan and torque tighten the union nut.
 - Lower the vehicle on the ramp.
 - Remove the transmission dipstick.
 - Renew the transmission fluid filter, see Sub-section 8.1.6.
- Fill the transmission with the correct fluid, see the ZF Automatic Transmissions Service Manual, General Data.

Note: It will not be possible to get all the initial fill quantity of fluid into the transmission.

- Refit the dipstick.
- Start the engine, apply all brakes and run the transmission through all gear positions and select 'Park'.
- With the engine still running, remove the dipstick.
- Clean the dipstick and refit.
- Remove the dipstick and check the transmission fluid level.
 - Add fluid until the correct level is achieved.
- Stop the engine and refit the dipstick.
- Remove the fender cover and lower the hood.
- Check fluid level to the 'HOT' marks after a 20 mile road run to ensure accurate results.

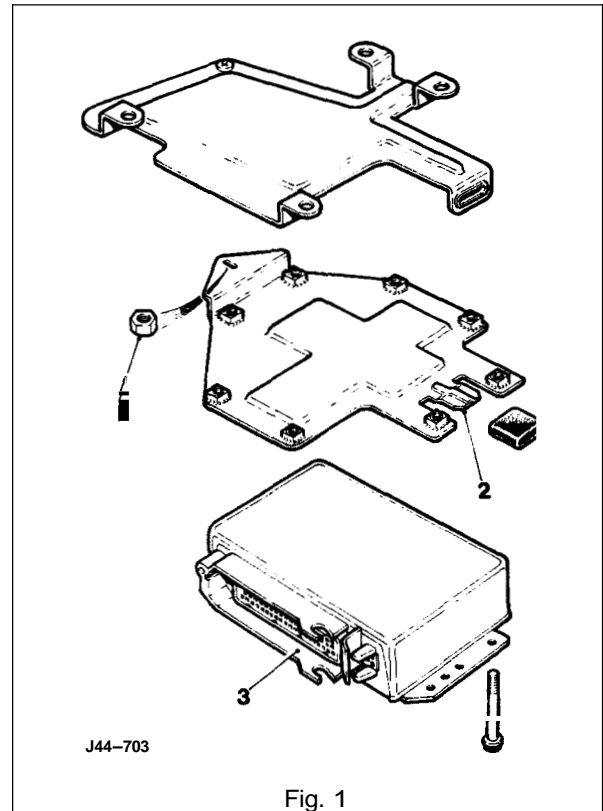
8.1



8.1.3 TRANSMISSION CONTROL MODULE, RENEW (4,0L)

SRO 44.15.32

- Raise the trunk lid and disconnect the battery.
- Remove the passenger side dash liner for access.
- Displace and remove the air conditioning footwell outlet duct.
- Release and remove the footwell carpet securing fastener: displace and reposition the carpet for access.
- Release the Transmission Control Module (TCM) bracket to body bracket securing nut (1 Fig. 1).
- Displace the TCM mounting bracket tang (2 Fig. 1) from the body bracket and mounting stud.
- Reposition the TCM, release the TCM multi-pin plug lever lock and disconnect the multi-pin plug (3 Fig. 1).
- Release and remove the TCM mounting bracket securing bolts and remove the TCM.
- Fit and align the new TCM to the mounting bracket.
- Fit and tighten the TCM securing bolts.
- Connect the TCM harness multi-pin plug and secure the multi-pin plug lever lock.
- Position the TCM to body mounting bracket, ensuring that the tang locates in the bracket slot and stud.
- Fit and tighten the TCM securing nut.
- Position the footwell carpet and fit the carpet fastener.
- Fit and align the footwell outlet duct to air conditioning unit.
- Position and fit the duct fastener to the blower motor slot.
- Refit the dash liner.
- Reconnect the battery.





8.1.4 TRANSMISSION ROTARY SWITCH, ADJUST (4,0L)

SRO 44.15.37

- Raise the vehicle on a ramp.
- Position the shift lever to 'N' ensuring that the stalk enters the gate 'N' notch centrally.
- Release and remove the transmission unit rotary switch protection cover (1 Fig.1) to fluid pan bolts.
- Remove the rotary switch protection cover from the fluid pan bosses.
- Slacken the rotary switch to mounting bracket securing nuts.
- Displace the rubber blanking plug from the rotary switch center boss (2 Fig.1).
- Fit Service Tool JD161 (Fig.2) to the rotary switch to align the switch rotor with the switch body.

CAUTION: Service Tool JD161 is a precision tool and should be treated as such.

- Evenly torque tighten the rotary switch to mounting bracket securing nuts.
- Disengage and remove Service Tool JD161 from the rotary switch.
- Fully seat the rubber blanking plug into the rotary switch center boss.
- Fit the rotary switch protection cover and align with the fluid pan bosses.
- Fit and torque tighten the rotary switch protection cover to fluid pan securing bolts.
- Lower the vehicle on the ramp.
- Check for correct operation of start inhibit and gear selection.

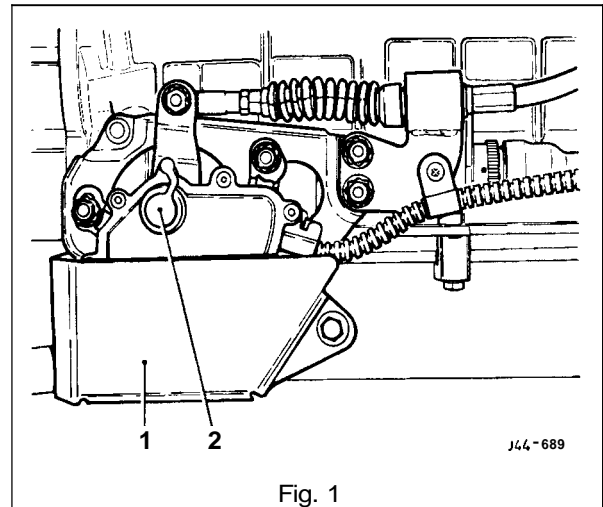
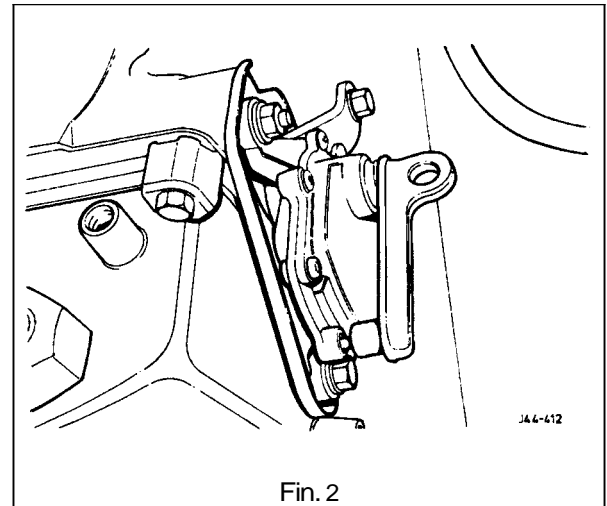


Fig. 1



Fin. 2



8.1.5 TRANSMISSION ROTARY SWITCH, RENEW (4,0L)

SRO 44.15.36

- Check the shift cable adjustment.
- Switch the ignition ON, apply the footbrake and move the shift lever to 'N'.
- Switch the ignition OFF and disconnect the battery.
- Open the armrest lid.
- Release and remove the ashtray securing screws.
- Displace the ashtray assembly for access.
- Disconnect the cigar lighter / illumination harness connectors.
- Place the ashtray assembly aside.
- Displace and remove the console veneer panel rear finisher.
- Carefully displace the Performance Mode switch from the gear surround finisher.
- Disconnect the Performance Mode switch from the harness multi-pin plug.
- Displace and remove the Performance Mode switch surround finisher.
- Displace and remove the shift lever surround finisher.
- Release and remove the veneer panel wing nuts.
- Displace and remove the console finisher veneer panel.
- Cut and remove the rotary switch harness securing straps.
- Disconnect the rotary switch harness multi-pin plugs.
- Reposition the tunnel carpet for access to the harness grommet.
- Displace and reposition the grommet down through the tunnel.
- Feed the harness through the tunnel to the underside of the vehicle.
- Raise the vehicle on a ramp.
- From beneath the vehicle, release and remove the rotary switch harness to transmission 'P' clip securing nut; displace and reposition the 'P' clip from the stud.
- Release and remove the rotary switch harness to transmission 'P' clip securing screw.
- Release and remove the rotary switch protection cover (1 Fig.1) securing bolts; displace and remove the switch cover.
- Disconnect the transmission multi-pin socket (2 Fig.1).
- Reposition the harness clear of the transmission unit.
- Release and remove the rotary switch securing nuts.
- Displace and remove the switch assembly.
- Displace and remove the 'P' clips from the harness.
- Fit and align the 'P' clips to the new harness / switch assembly.
- Displace the rubber sealing plug (3 Fig.1) from the rotary switch.

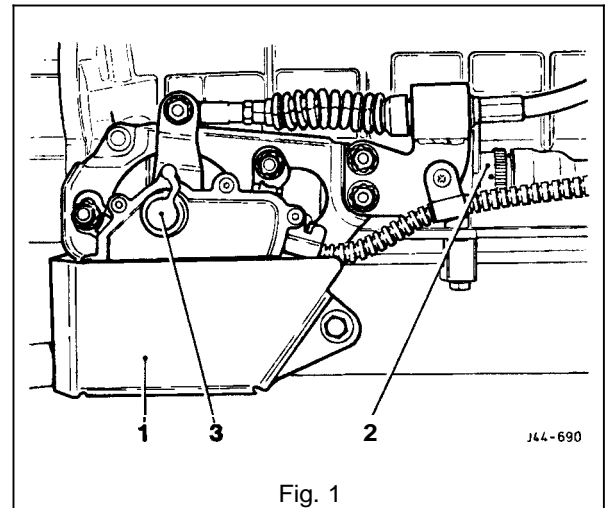


Fig. 1



- Ensure the shift lever is in 'N'.
- Fit and fully seat a new rotary switch to the transmission unit.
- Fit but do not fully tighten the rotary switch securing nuts.
- Fit and align Service Tool JD161 (Fig. 1) to the rotary switch to align the switch rotor to the switch body.
- Finally torque tighten the rotary switch securing nuts.
- Displace and remove Service Tool JD161.
- Reposition and fit the rubber sealing plug to the switch.
- Reconnect the transmission unit multi-pin plug.
- Reposition the harness and feed the multi-pin plugs and grommet through the tunnel aperture.
- From below the vehicle, reposition the harness 'P' clip to its mounting stud.
- Fit and tighten the 'P' clip securing nut.
- Align the harness 'P' clip to transmission shift abutment bracket.
- Fit and tighten the 'P' clip securing screw.
- Fit and align the rotary switch protection cover; fit and torque tighten the securing bolts.
- From inside the vehicle, fit the grommet in the correct orientation and reposition the harness in the correct position.
- Reconnect the rotary switch harness multi-pin plugs.
- From below the vehicle, ensure that there is no excess slack in the switch harness that could foul the propshaft.
- Lower the vehicle on the ramp.
- Reposition and fit the tunnel carpet.
- Using suitable tie straps, secure the harness to the console harness.
- Fit and fully seat the veneer panel to the console; fit and tighten the wing nuts.
- Fit and fully seat the shift lever surround.
- Connect the Performance Mode switch to the harness multi-pin plug and fully seat the switch.
- Fit and align the console veneer panel rear finisher.
- Place the ashtray assembly in position.
- Reconnect the cigar lighter / illumination harness connectors.
- Reposition and fit the ashtray assembly; fit and tighten the securing screws.
- Close the armrest lid.
- Reconnect the battery.

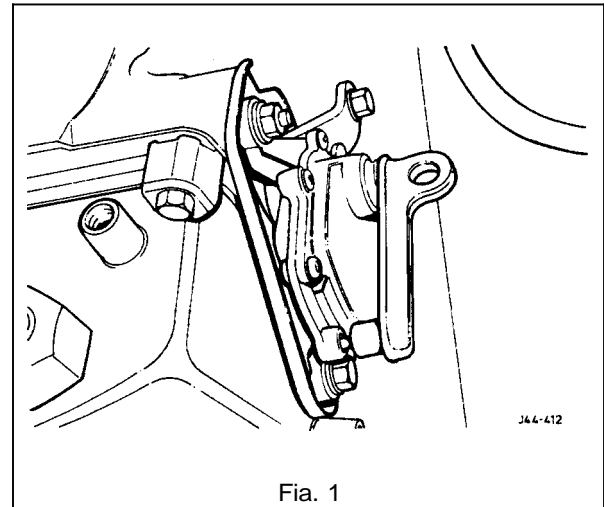


Fig. 1



8.1.6 TRANSMISSION FLUID FILTER, RENEW (3,2L AND 4,0L)

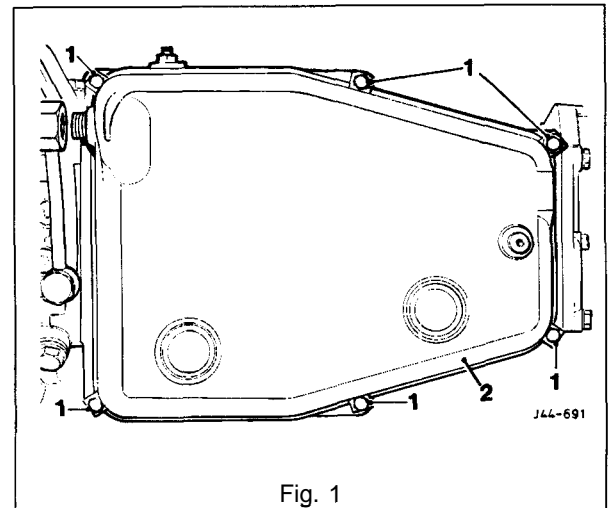
SRO 44.24.07

- Raise the hood and fit a fender cover.
- Raise the vehicle on a ramp.
- Drain the transmission lubrication system, see Sub-section 8.1.2.
- Remove the fluid pan, see Sub-section 8.1.7 (4,0L) or Sub-section 8.1.8 (3,2L).
- Release and remove the fluid filter securing screws; displace and remove the fluid filter.
- Remove and discard the filter 'O' ring.
- Clean the new filter and mating faces.
- Fit the 'O' ring to the new filter; fit and seat the filter assembly to the valve body.
- Fit and torque tighten the filter securing screws.
- Refit the fluid pan, see Sub-section 8.1.7 (4,0L) or Sub-section 8.1.8 (3,2L).
- Lower the vehicle on the ramp.
- Refill the transmission unit with fluid, see Subsection 8.1.2.
- Remove the fender cover and lower the hood.

8.1.7 FLUID PAN, RENEW (4,0L)

SRO 44.24.04

- Raise the hood and fit a fender cover.
- Raise the vehicle on a ramp.
- Drain the transmission lubrication system, see Sub-section 8.1.2.
- Release and remove the rotary switch protection cover to fluid pan securing screws; remove the rotary switch protection cover.
- Release and remove the fluid pan securing bolts and clamps (1 Fig. 1). Displace and remove the fluid pan (2 Fig. 1).
- Drain the fluid pan. Remove and discard the fluid pan gasket if the gasket is damaged.
- Remove the magnets from the fluid pan and place the fluid pan aside.
- Clean the gasket faces and magnets.
- Fit a serviceable gasket to the new fluid pan.
- Fit the magnets in position in the fluid pan.
- Fit and align the fluid pan to the transmission unit; fit and torque tighten the fluid pan clamps and securing bolts.
- Fit the rotary switch protection cover to the fluid pan bosses and fit and torque tighten the rotary switch protection cover securing bolts.
- Lower the vehicle on the ramp.
- Refill the transmission unit with fluid, see Subsection 8.1.2.
- Remove the fender cover and lower the hood.



8.1



8.1.8 FLUID PAN, RENEW (3,2L)

SRO 44.24.04

- Raise the vehicle on a ramp.
- Drain the transmission lubrication system, see Sub-section 8.1.2.
- Release and remove the fluid pan securing bolts and clamps (1 Fig. 1).
- Displace and remove the fluid pan (2 Fig. 1).
- Drain the fluid pan. Remove and discard the fluid pan gasket if the gasket is damaged.
- Remove the magnets from the fluid pan and place the fluid pan aside.
- Clean the gasket faces and magnets.
- Fit a serviceable gasket to the new fluid pan.
- Fit the magnets in position in the fluid pan.
- Fit and align the fluid pan to the transmission unit.
- Fit the fluid pan clamps; fit and torque tighten the fluid pan securing bolts.
- Lower the vehicle on the ramp,
- Raise the hood and fit a fender cover.
- Refill the transmission unit with fluid, see Sub-section 8.1.2.
- Remove the fender cover and lower the hood.

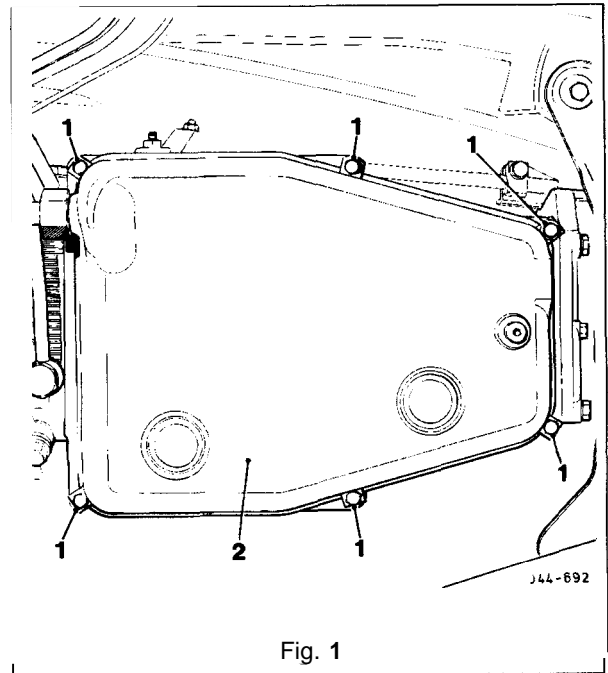


Fig. 1

8.1.9 FLUID PAN GASKET, RENEW (3,2L)

SRO 44.24.05

- Raise the hood and fit a fender cover.
- Raise the vehicle on a ramp.
- Drain the transmission lubrication system, see Sub-section 8.1.2.
- Release and remove the fluid pan securing bolts clamps (1 Fig. 1).
- Displace and remove the fluid pan (2 Fig. 1).
- Remove and discard the fluid pan gasket.
- Remove the magnets from the fluid pan and place the fluid pan aside.
- Clean the fluid pan, gasket faces and the magnets.
- Fit a new fluid pan gasket.
- Fit the magnets in position in the fluid pan.
- Fit and align the fluid pan to the transmission unit, fit the fluid pan clamps, fit and torque tighten the fluid pan securing bolts.
- Lower the vehicle on the ramp.
- Refill the transmission unit with fluid, see Sub-section 8.1.2.
- Remove the fender cover and lower the hood.

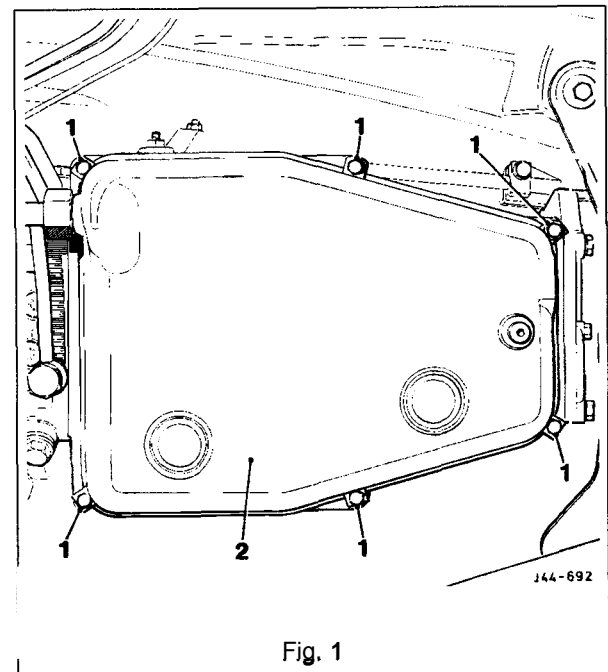


Fig. 1

8.1



8.1.10 TRANSMISSIONSPEED SENSOR, RENEW (4,0L)

SRO 44.15.34

- Raise the hood and fit a fender cover.
- Raise the vehicle on a ramp.
- Drain the transmission lubrication system, see Sub-section 8.1.2.
- Remove the fluid pan, see Sub-section 8.1.7.
- Displace the transmission speed sensor harness from the valve body rear securing clip.
- Release and remove the speed sensor and connector retaining clip from the valve body.
- Displace the speed sensor and connector from the transmission main casing.
- Disconnect and remove the speed sensor from the harness connector.
- Clean the speed sensor, retaining clip and mating surface.
- Connect the new speed sensor to the harness connector.
- Fully seat the speed sensor into the transmission unit main casing.
- Fit the speed sensor and connector retaining clip to the valve body, engaging the tangs onto the connector.
- Fit and tighten the speed sensor and connector retaining clip securing screws.
- Reposition and fully seat the speed sensor harness into the valve body rear; secure the clip.
- Refit the fluid pan, see Sub-section 8.1.7.
- Lower the vehicle on the ramp.
- Refill the transmission unit with fluid, see Sub-section 8.1.2.
- Remove the fender cover and lower the hood.



8.1.11 TRANSMISSION INTERNAL HARNESS MULTI-PIN SOCKET 'O'RING, RENEW (4,0L)

SRO 44.24.20

Raise the hood and fit a fender cover.

- Disconnect the battery.
- Raise the vehicle on a ramp.
- Drain the transmission lubrication system, see Sub-section 8.1.2.
- Remove the fluid pan, see Sub-section 8.1.7.
- Remove the fluid filter, see Sub-section 8.1.6.
- Remove the transmission speed sensor, see Sub-section 8.1.10.
- Disconnect the rotary switch harness multi-pin plug (1 Fig. 1) from the transmission multi-pin socket.
- Release and remove the multi-pin socket to main transmission casing securing nut.
- Release and remove the valve body assembly, ensuring that the multi-pin socket is freed from the main case aperture.
- Remove the valve body harness multi-pin socket 'O' ring and discard.
- Clean the valve body and mating faces.
- Fit a new 'O' ring to the multi-pin socket
- Fit the valve body assembly to the transmission unit. During valve body fitment, engage the shift lever quadrant peg into the manual valve and seat the multi-pin socket through the main case orifice.

Note: The flat on the side of the multi-pin socket should be located on the vertical (left-hand) side of the case.

- Fit but do not tighten the valve body assembly securing screws.
- Gently push the valve body assembly forward to assume this position during the final tightening operation.
- Carry out final tightening of the valve body assembly to main casing securing screws.

Fit and tighten the harness multi-pin socket to main casing securing nut.

- Connect the rotary switch harness multi-pin plug to the transmission multi-pin socket.
- Refit the speed sensor, see Sub-section 8.1.10.
- Renew the fluid filter, see Sub-section 8.1.6.
- Refit the fluid pan, see Sub-section 8.1.7.
- Lower the vehicle on the ramp.
- Reconnect the battery.
- Refill the transmission unit with fluid, see Sub-section 8.1.2.
- Remove the fender cover and lower the hood.

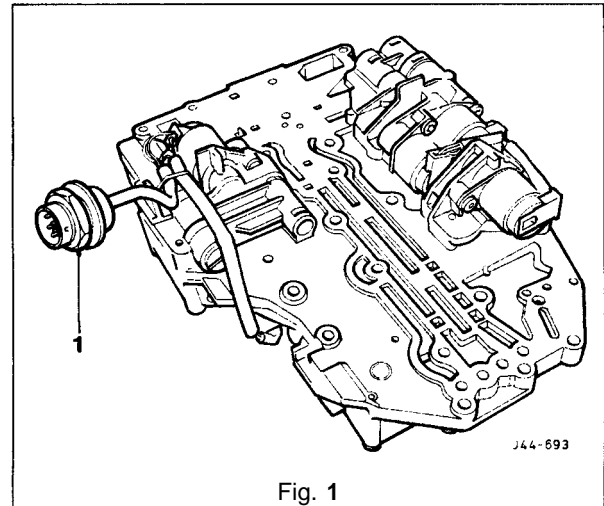


Fig. 1



8.1.12 VALVE BODY ASSEMBLY, RENEW (4,0L)

SRO 44.40.01

- Raise the hood and fit a fender cover.
- Disconnect the battery.
- Raise the vehicle on a ramp.
- Drain the transmission lubrication system, see Sub-section 8.1.2.
- Remove the fluid pan, see Subsection 8.1.7.
- Remove the fluid filter, see Sub-section 8.1.6.
- Remove the transmission speed sensor, see Subsection 8.1.10.
- Disconnect the rotary switch harness multi-pin plug from the transmission multi-pin socket.
- Release and remove the multi-pin socket to main transmission casing securing nut.
- Release and remove the valve body assembly to main casing securing screws.
- Displace and remove the valve body assembly, ensuring that the multi-pin socket is freed from the main case aperture.
- Remove the valve body harness multi-pin socket 'O' ring and discard.
- Clean the valve body and main case mating faces. Check for any signs of damage.
- Fit a new 'O' ring to the multi-pin socket.
- Fit the valve body assembly to the transmission unit. During valve body fitment, engage the shift lever quadrant peg into the manual valve and seat the multi-pin socket through the main case orifice.

Note: The flat on the side of the multi-pin socket should be located on the vertical (left-hand) side of the case.

- Fit but do not tighten the valve body assembly securing screws.
- Gently push the valve body assembly forward to assume this position during the final tightening operation.
- Carry out final tightening of the valve body assembly to main casing securing screws.
- Fit and tighten the harness multi-pin socket to main casing securing nut.
- Connect the rotary switch harness multi-pin plug to the transmission multi-pin socket.
- Refit the speed sensor, see Subsection 8.1.10.
- Renew the fluid filter, see Subsection 8.1.6.
- Refit the fluid pan, see Sub-section 8.1.7.
- Lower the vehicle on the ramp.
- Reconnect the battery.
- Refill the transmission unit with fluid, see Sub-section 8.1.2.
- Remove the fender cover and lower the hood.



8.1.13 VALVE BODY ASSEMBLY, RENEW (3,2L)

SRO 44.40.01

- Raise the hood and fit a fender cover.
- Disconnect the battery.
- Raise the vehicle on a ramp.
- Drain the transmission lubrication system, see Sub-section 8.1.2.
- Remove the fluid pan, see Sub-section 8.1.8.
- Remove the fluid filter, see Subsection 8.1.6.
- Release and remove the valve body securing screws (1 Fig. 1).
- Displace and remove the valve body assembly.
- Clean the valve body and mating faces.
- Fit the new valve body to the transmission unit, locating the throttle valve behind the throttle valve cam and engage the selector.
- Fit but do not tighten the valve body securing screws.
- Fit and engage Service Tool JD 103 between the valve body and the throttle valve pin.
- Align the valve body assembly.
- Fully tighten the valve body securing screws.
- Remove Service Tool JD 103.
- Fit a new fluid filter, see Sub-section 8.1.6.
- Refit the fluid pan, see Subsection 8.1.8.
- Lower the vehicle on the ramp.
- Refill the transmission unit with fluid, see Subsection 8.1.2.
- Remove the fender cover and lower the hood.

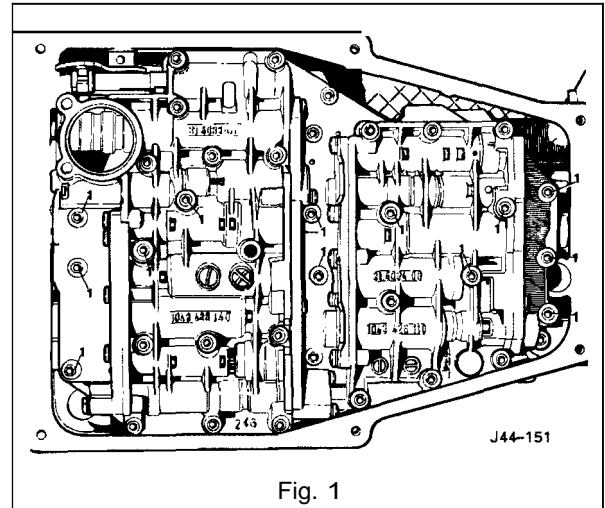


Fig. 1



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1. SERVICE TOOLS & EQUIPMENT

No Jaguar service tools are required for the operations covered by this Sub-section.

Fixing	lightening Torque (Nm)
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Fluid pan to case	24
Pressure control solenoid bracket to valve body	8
Solenoid to valve body	8
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Valve body to case / lubrication pipe	11
Valve body to case / PSM	11

Description	Uses	Notes
Tivoli Kay Adhesives No. 5696 sealant	Exhaust system joints	

Description	Data
To be issued	



8.2.1 GENERAL DESCRIPTION

This section provides information relating to the Powertrain4L80-E transmissions fitted to the 4,0 liter supercharged engine (4,0L SC) and to the 6,0 liter engine (6,0L).

The Powertrain4L80-E is a four-speed, high torque capacity, electronically controlled automatic transmission, which comprises a torque converter with lock-up direct drive clutch and three planetary gear sets. Five multiple disk clutches, one intermediate sprag clutch assembly, two roller clutch assemblies and two band assemblies provide the drive elements necessary for correct sequential gear engagement and operation.

The torque converter containing a pump, a turbine (rotor), a stator assembly, and a clutch pressure disks splined to the turbine, acts as a fluid coupling for smooth torque transmission from the engine. The converter also supplies additional torque multiplication when necessary, and the torque converter clutch (TCC) pressure disk provides a mechanical direct drive or 'lock-up' above a certain speed in top gear for greater fuel economy.

Gearshift operations are controlled from the Transmission Control Module (TCM), which governs the electronically controlled valve body situated within the transmission.

Three planetary gear sets provide reverse and the four forward ratios, the changing of which is fully automatic in relation to load, vehicle speed and throttle opening. The Transmission Control Module receives and integrates various vehicle sensor input signals, and transmits operating signals to the solenoids located in the control valve assembly. These solenoids govern the transmission operating pressures, up-shift and down-shift gear selection patterns and also the torque converter clutch operation by pulse width modulated control.

8.2.1.1 Gear Ranges

Selectable gear positions are: P - Park, R - Reverse, N - Neutral, D - Drive, 3, 2.

P - Park position of the shift lever provides a mechanical locking of the output shaft of the transmission, and as such, must only be engaged when the vehicle is stationary. In addition, and for extra safety, the handbrake should also be applied. It is necessary to have the ignition ON and the footbrake applied to move the shift lever from the Park position. For ignition key removal the shift lever must be in the Park position. The engine can be started in the Park position.

R - Reverse enables the vehicle to be operated in a rearwards direction. The engine cannot be started in the Reverse position.

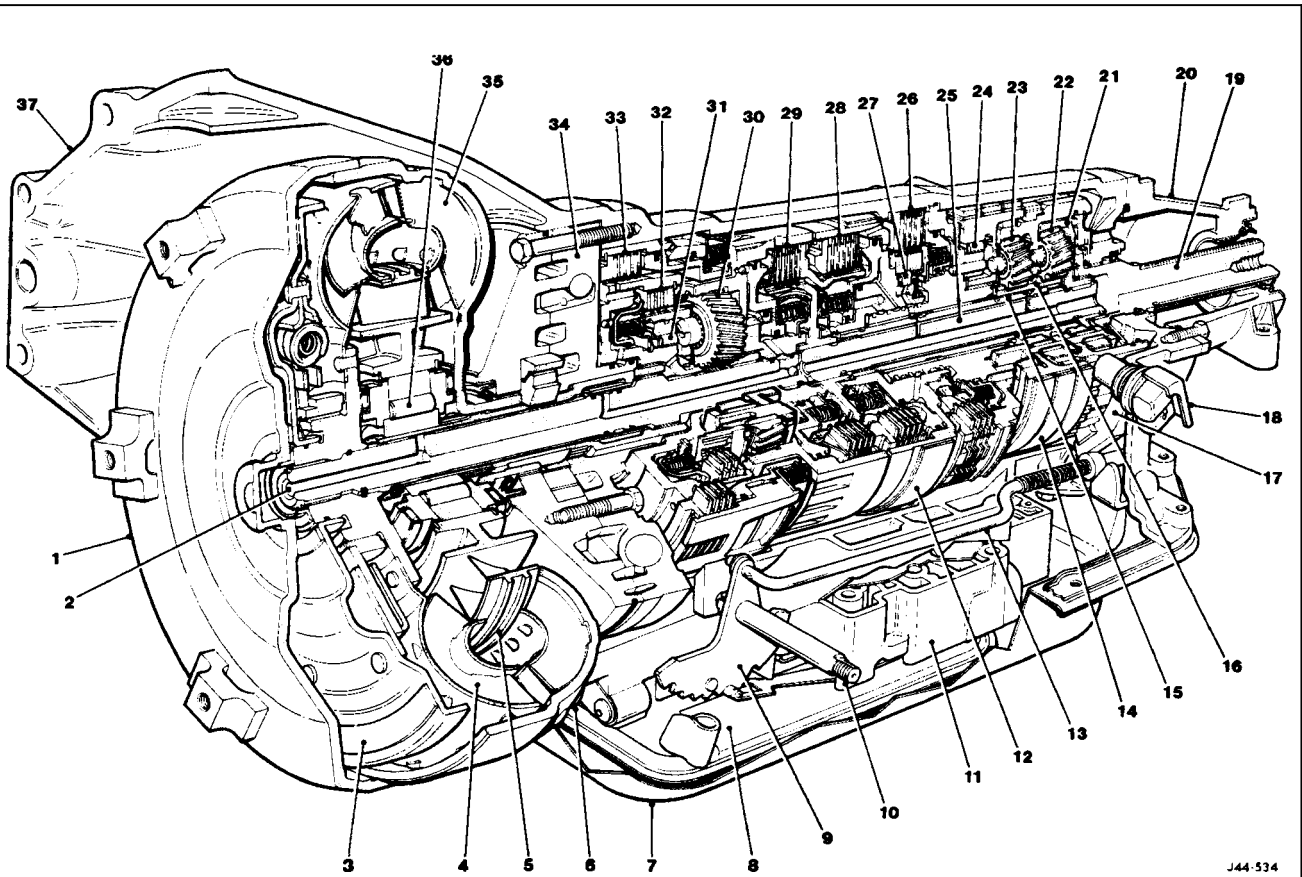
N - Neutral position enables the engine to be started and operated without driving the vehicle. It also allows the vehicle to be moved manually for access, ie for removal of the propeller shaft.

D - Drive position allows the automatic selection of all four forward gear ratios during normal driving conditions for maximum efficiency and fuel economy. On acceleration, down-shifts are obtained by depressing the accelerator pedal or by manual selection. The engine cannot be started in this position.

3 - Manual third position allows automatic operation of the three lower gear ratios but inhibits selection of the fourth ratio. This position is used for towing a trailer or negotiating hilly terrain when greater engine braking control is required. The engine cannot be started in this position.

2 - Manual second position allows automatic operation of the two lower gear ratios but inhibits selection of the third and fourth ratios. This position is used for heavy traffic congestion or negotiating hilly terrain when even greater engine braking control is required than is provided by manual third. This ratio may be selected at any vehicle speed - even if the transmission is in third or fourth ratio, the transmission will immediately down-shift to second gear provided the vehicle speed is below 137 km / h (85 mile / h). The engine cannot be started in this position.

Note: With the Performance Mode switch in the NORMAL position, the vehicle will pull away in second gear. However, if more than 75 per cent of throttle is applied when the vehicle speed is between zero and 13 km / h (8 mile / h), then first gear will be selected. From 13 to 61 km / h (8 to 38 mile / h) first gear is obtainable by 'kick-down'. In 'sport' mode the vehicle pulls away in first gear and the transmission operates fully in all four forward gears.



J44-534

8.2

- | | | |
|----------------------------------|---|--|
| 1. Torque converter | 14. Rear band | 26. Intermediate clutch |
| 2. Turbine shaft | 15. Sun gear shaft | 27. Intermediate sprag clutch |
| 3. Pressure disk | 16. Sun gear | 28. Direct clutch |
| 4. Converter turbine | 17. Parking lock pawl | 29. Forward clutch |
| 5. Converter stator | 18. Transmission case | 30. Overdrive planetary carrier assembly |
| 6. Variable force motor solenoid | 19. Output shaft | 31. Overdrive roller clutch |
| 7. Fluid pan | 20. Rear extension housing | 32. Overrun clutch |
| 8. Filter | 21. Rear internal gear | 33. Fourth clutch |
| 9. Interior detent lever | 22. Output planetary carrier assembly | 34. Pump assembly |
| 10. Manual shaft | 23. Reaction planetary carrier assembly | 35. Converter pump |
| 11. Control valve | 24. 'LO' roller clutch | 36. Stator roller clutch |
| 12. Front band | 25. Main shaft | 37. Output speed sensor |
| 13. Parking lock actuator | | |

Fig.1 Powertrain 4L80-E automatic transmission



8.2.1.2 Shift Speeds

4,0 Liter Supercharged					
Light throttle		D1 - D2	D2 - D3	D3 - D4	D4 - TCC on
Normal	mile/ h	8 - 10	18 - 20	25 - 39	45 - 51
	km / h	13 - 15	28 - 33	40 - 46	72 - 83
sport	mile/ h	10 - 12	20 - 23	30 - 34	47 - 55
	km / h	16 - 19	32 - 37	48 - 55	76 - 88
Up to Detent			D1 - D2	D2 - D3	D3 - D4
Normal	mile/ h		34 - 37	60 - 66	86 - 94
	km / h		54 - 59	97 - 107	138 - 151
sport	mile/ h		43 - 47	74 - 81	103 - 113
	km / h		69 - 76	118 - 130	166 - 182
Maximum shift speeds (through detent)			D1 - D2	D2 - D3	D3 - TCC on
Normal/ Sport	mile/ h		47 - 50	81 - 84	116 - 128
	km / h		75 - 80	130 - 134	187 - 205
Zero throttle		TCC off in D4	D4 - D3	D3 - D2	D2 - D1
Normal	mile/ h	36 - 40	15 - 17	10 - 12	-
	km / h	58 - 64	24 - 27	16 - 19	-
sport	mile/ h	36 - 40	18 - 20	12 - 14	9 - 9
	km / h	58 - 64	29 - 32	20 - 22	14 - 15
Up to detent			D4 - D3	D3 - D2	D2 - D1
Normal	mile/ h		67 - 74	39 - 44	9 - 9
	km / h		107 - 118	63 - 70	14 - 15
sport	mile/ h		81 - 89	57 - 63	27 - 29
	km / h		130 - 144	92 - 101	43 - 47
Kick-down available (through detent)			TCC4 - D3	D3 - D2	D2 - D1
Normal/ Sport	mile/ h		103 - 113	67 - 74	36 - 40
	km / h		165 - 183	107 - 118	58 - 64

TCC - Torque converter clutch

Note: Road speeds shown above are for a vehicle with an axle ratio of 3,58:1, and standard tyres (225 / 65ZR15). For a vehicle with optional sports tyres (225/ 55ZR16) (lattice wheels), these speeds must be reduced by 2,4%.



6,0 Liier					
Light throttle		D1 - D2	D2 - D3	D3 - D4	D4 - TCC on
Normal	mile/ h km / h	- -	20 - 23 32 - 37	29 - 33 46 - 52	48 - 55 77 - 88
sport	mile/ h k m l h	10 - 12 16 - 18	23 - 26 36 - 41	32 - 37 51 - 59	51 - 59 82 - 94
Up to detent			D1 - D2	D2 - D3	D3 - D4
Normal	mile/ h k m l h		35 - 40 56 - 64	61 - 70 98 - 112	83 - 91 133 - 164
sport	mile/ h k m / h		43 - 49 68 - 78	73 - 79 117 - 127	99 - 107 158 - 172
Maximum shift speeds (through detent)			D1 - D2	D2 - D3	D3 - TCC on
Normal / Sport	mile/ h k m l h		48 - 53 77 - 85	81 - 89 130 - 149	116 - 124 186 - 198
Zero throttle		TCC off in D4	D4 - D3	D3 - D2	D2 - D1
Normal	mile/ h k m l h	36 - 40 58 - 64	15 - 17 24 - 27	10 - 12 16 - 19	- -
sport	mile/ h k m / h	36 - 40 58 - 64	18 - 20 29 - 32	12 - 14 19 - 22	6 - 7 10 - 12
Up to detent			D4 - D3	D3 - D2	D2 - D1
Normal	mile/ h k m l h		67 - 75 108 - 119	37 - 41 59 - 66	7 - 9 11 - 14
sport	mile/ h k m / h		84 - 92 134 - 148	60 - 66 96 - 106	27 - 29 43 - 47
'Kick-down' available (through detent)			TCC4 - D3	D3 - D2	D2 - D1
Normal / Sport	mile/ h k m / h		103 - 113 164 - 181	67 - 75 108 - 119	36 - 40 58 - 64

TCC - Torque converter clutch

Note: Roadspeeds shown above are for a vehicle with an axle ratio of 3,58:1, and standard tyres (225 / 65ZR15). For a vehicle with optional sports tyres (225/ 55ZR16) (lattice wheels), these speeds must be reduced by 2,4%.



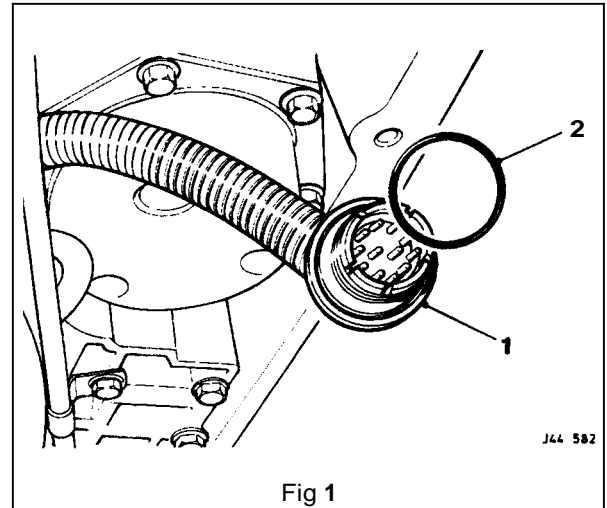
8.2.2 TRANSMISSION INTERNAL HARNESS, RENEW (4,0L SC AND 6,0L)

SRO 44.15.35

- Open the hood and fit a suitable fender cover.
- Raise the vehicle on a ramp,
- Drain the transmission lubrication system, see Sub-section 8.2.13.
- Remove the fluid pan, see Sub-section 8.2.14 (4,0L SC) or Sub-section 8.2.15 (6,0L).

Note: Note the internal harness cable runs for assembly purposes and remove the transmission internal harness multi-pin socket (1 Fig. 1), discarding the 'O' ring seal (2 Fig. 1); see Sub-section 8.2.19.

- Disconnect the internal harness plug from the 'A' Shift solenoid.
- Disconnect the internal harness plug from the 'B' Shift solenoid.
- Disconnect the internal harness plug from the pressure switch manifold.
- Disconnect the internal harness plug from the pulse width modulator (TCC solenoid).
- Disconnect the internal harness plug from the variable force motor.
- Displace the internal harness from the retaining clips.
- Remove the internal harness from the transmission unit.
- Place the harness aside.
- Clean all relevant parts.
- Fit the new internal harness to the transmission unit.
- Secure the internal harness to its retaining clips.
- Connect the internal harness plug to the variable force motor.
- Connect the internal harness plug to the pulse width modulator.
- Connect the internal harness plug to the pressure switch manifold.
- Connect the internal harness plug to the 'B' Shift solenoid.
- Connect the internal harness plug to the 'A' Shift solenoid.
- Fit a new internal harness multi-pin socket 'O' ring, refit the multi-pin socket to the main case and connect the external harness, see Subsection 8.2.19.
- Refit the fluid pan, see Subsection 8.2.14 (4,0L SC) or Sub-section 8.2.15 (6,0L).
- Lower the vehicle on the ramp.
- Refill the transmission unit with fluid, see Subsection 8.2.13.
- Remove the fender cover and close the hood.



8.2.3 PRESSURE SWITCH MANIFOLD, RENEW (4,0L SC AND 6,0L)

SRO 44.15.39

- Open the hood and fit a suitable fender cover.
- Raise the vehicle on a ramp.
- Drain the transmission lubrication system, see Sub-section 8.2.13.
- Remove the fluid pan, see Sub-section 8.2.14 (4,0L SC) or Sub-section 8.2.15 (6,0L).
- Remove the fluid filter, see Sub-section 8.2.18.
- Disconnect the internal harness plug from the pressure switch manifold.
- Release and remove the pressure switch manifold to valve body securing bolts.
- Remove the manifold from the valve body.
- Retrieve the manifold to valve body 'O' ring seals (Fig. 1) and discard.
- Clean the valve body manifold seating area.
- Fit new 'O' ring seals to the grooves in a new pressure switch manifold.
- Fit the manifold to the valve body.
- Fit and tighten the manifold to valve body securing bolts.
- Connect the internal harness plug to the pressure switch manifold.
- Refit the fluid filter, see Sub-section 8.2.18.
- Refit the fluid pan, see Sub-section 8.2.14 (4,0L SC) or Sub-section 8.2.15 (6,0L).
- Lower the vehicle on the ramp.
- Refill the transmission unit with fluid, see Sub-section 8.2.13.
- Remove the fender cover and close the hood.

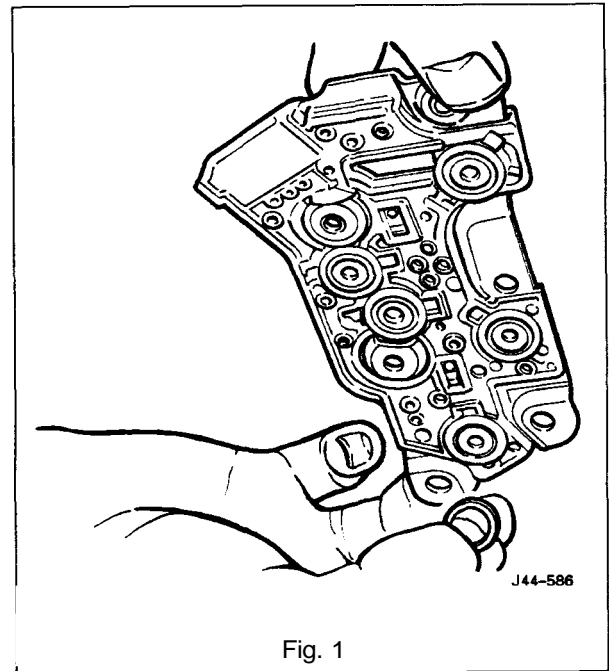


Fig. 1



8.2.4 INPUT SPEED SENSOR, RENEW (4,0L SC)

SRO 44.15.40

- Raise the vehicle on a ramp.
- Reposition the edge of the transmission tunnel sound insulation foam for access.
- Disconnect the harness plug from the input speed sensor.
- Release and remove the speed sensor securing bolt.
- Reposition the speed sensor protection cover for access; the cover remains captive on the harness.
- Remove the speed sensor from the transmission unit and place aside.
- Clean the main case speed sensor area.
- Fit a new 'O' ring seal to a new input speed sensor.
- Lubricate the 'O' ring seal.
- Fit and seat the speed sensor to the main case.
- Reposition and align the speed sensor protection cover.
- Fit and tighten the speed sensor securing bolt.
- Connect the harness plug to the speed sensor.
- Reposition the edge of the transmission tunnel sound insulation foam to the original position.
- Lower the vehicle on the ramp.

8.2.5 OUTPUT SPEED SENSOR, RENEW (4,0L SC)

SRO 44.15.41

- Raise the vehicle on a ramp.
- Reposition the edge of the transmission tunnel sound insulation foam for access.
- Disconnect the harness plug from the output speed sensor.
- Release and remove the speed sensor securing bolt.
- Reposition the speed sensor protection cover for access, noting that the cover remains captive on the harness.
- Remove the speed sensor from the transmission unit and place aside.
- Clean the main case speed sensor area.
- Fit a new 'O' ring seal to a new output speed sensor.
- Lubricate the 'O' ring seal.
- Fit and seat the speed sensor to the main case.
- Reposition and align the speed sensor protection cover.
- Fit and tighten the speed sensor securing bolt.
- Connect the harness plug to the speed sensor.
- Reposition the edge of the transmission tunnel sound insulation foam to the original position.
- Lower the vehicle on the ramp.



8.2.6 INPUT SPEED SENSOR, RENEW (6,0L)

SRO 44.15.40

- Open the hood and fit a suitable fender cover.
- Raise the vehicle on a ramp.
- Slacken the underfloor catalyst to downpipe clamps securing bolts.
- Displace and reposition the olive clamps on the pipes.
Slacken the underfloor catalyst to intermediate silencer clamps securing bolts.
- Displace the underfloor catalyst assembly rearwards to disconnect from the downpipes.
- Displace and remove the olives from the downpipes.
- Using a wire brush, clean the olives and downpipe joints.
- Place a suitable piece of wood between the underfloor catalyst and the body for access.
- Reposition the edge of the transmission tunnel insulation foam for access.
- Release and remove the input speed sensor securing bolt.
- Reposition the speed sensor protection cover for access, noting that the cover remains captive on the harness.
Disconnect the speed sensor harness multi-pin plug.
- Displace and remove the speed sensor from the transmission case.
- Clean the transmission case area.
- Fit a new 'O' ring seal to a new input speed sensor.
- Lubricate the 'O' ring seal.
- Fit and fully seat the speed sensor to the transmission case.
- Reconnect the harness multi-pin plug.
- Reposition and align the protection cover.
- Fit and tighten the speed sensor securing bolt.
- Reposition the insulation foam to its original position.
- Remove the block of wood from between the underfloor catalyst and the floor.
- Apply sealant to the downpipe joints and olives. See Service Materials in the preliminary pages, this Section.
- Fit and seat the olives to the downpipes.
Reconnect the underfloor catalyst to the downpipes.
- Reposition the olive clamps.
- Tighten the underfloor catalyst to downpipe clamps securing bolts.
- Align the intermediate silencers to the underfloor catalyst assembly.
- Tighten the clamp securing bolts.
- Lower the vehicle on the ramp.
- Remove the fender cover and close the hood.



8.2.7 OUTPUT SPEED SENSOR, RENEW (6,0L)

SRO 44.15.41

- Open the hood and fit a suitable fender cover.
- Raise the vehicle on a ramp.
- Slacken the underfloor catalyst to downpipe clamps securing bolts.
- Displace and reposition the olive clamps on the pipes.
- Slacken the underfloor catalyst to intermediate silencer clamps securing bolts.
- Displace the underfloor catalyst assembly rearwards to disconnect from the downpipes.
- Displace and remove the olives from the downpipes.
- Using a wire brush, clean the olives and downpipe joints.
- Place a suitable piece of wood between the underfloor catalyst and the body for access.
- Reposition the edge of the transmission tunnel insulation foam for access.
- Release and remove the output speed sensor securing bolt.
- Reposition the speed sensor protection cover for access, noting that the cover remains captive on the harness.
- Disconnect the speed sensor harness multi-pin plug.
- Displace and remove the speed sensor from the transmission case.
- Clean the transmission case sensor area.
- Fit a new 'O' ring seal to a new output speed sensor.
- Lubricate the 'O' ring seal.
- Fit and fully seat the speed sensor to the transmission case.
- Reconnect the harness multi-pin plug.
- Reposition and align the protection cover.
- Fit and tighten the speed sensor securing bolt.
- Reposition the insulation foam to its original position.
- Remove the block of wood from between the underfloor catalyst and the floor.
- Apply sealant to the downpipe joints and olives. See Service Materials in the preliminary pages, this Section.
- Fit and seat the olives to the downpipes.
- Reconnect the underfloor catalyst to the downpipes.
- Reposition the olive clamps.
- Tighten the underfloor catalyst to downpipe clamps securing bolts.
- Align the intermediate silencers to the underfloor catalyst assembly.
- Tighten the clamp securing bolts.
- Lower the vehicle on the ramp.
- Remove the fender cover and close the hood.

8.2.8 TEMPERATURE SENSOR, RENEW (4,0L SC AND 6,0L)

The temperature sensor forms part of the internal wiring harness. Should the sensor require replacement, a new wiring harness must be fitted. See Subsection 8.2.2.

8.2.9 VARIABLE FORCE MOTOR, RENEW (4,0L SC AND 6,0L)

SRO 44.15.43

- Open the hood and fit a suitable fender cover.
- Raise the vehicle on a ramp.
- Drain the transmission lubrication system, see Sub-section 8.2.13.
- Remove the fluid pan, see Sub-section 8.2.14 (4,0L SC) or Sub-section 8.2.15 (6,0L).
- Remove the fluid filter, see Subsection 8.2.18.
- Disconnect the internal harness plug from the variable force motor.
- Release and remove the motor retaining clamp to valve body securing screw (1 Fig. 1).
- Remove the retaining clamp (2 Fig. 1) and remove the motor (3 Fig. 1) from the valve body and place aside.
- Fit a new variable force motor to the valve body.

CAUTION: Do not adjust the motor screw and ensure that the motor filter is not damaged.

- Align the motor.
- Fit the motor to the valve body retaining clamp.
- Fit and tighten the motor retaining clamp securing screw.
- Connect the internal harness plug to the motor.
- Refit the fluid filter, see Sub-section 8.2.18.
- Refit the fluid pan, see Subsection 8.2.14 (4,0L SC) or Sub-section 8.2.15 (6,0L).
- Lower the vehicle on the ramp.
- Refill the transmission unit with fluid, see Subsection 8.2.13.
- Remove the fender cover and close the hood.

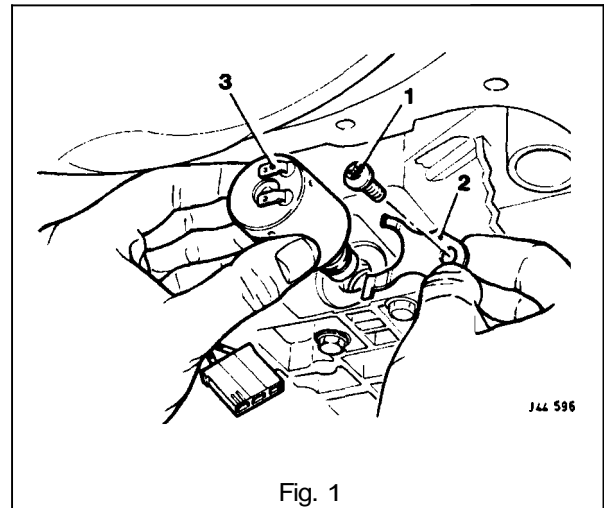


Fig. 1



8.2.10 PULSE WIDTH MODULATOR (TCC SOLENOID), RENEW (4,0L SC AND 6,0L)

SRO 44.15.44

- Open the hood and fit a suitable fender cover.
- Raise the vehicle on a ramp.
- Drain the transmission lubrication system, see Sub-section 8.2.13.
- Remove the fluid pan, see Subsection 8.2.14 (4,0L SC) or Subsection 8.2.15 (6,0L).
- Remove the fluid filter, see Subsection 8.2.18.
- Disconnect the internal harness plug from the pulse width modulator.
- Remove the modulator to valve body retaining clip.
- Displace and remove the modulator from the valve body, noting the orientation.
- Remove and discard the 'O' ring seals from the modulator.
- Place the modulator aside.
- Fit new 'O' ring seals to a new pulse width modulator.
- Lubricate the 'O' ring seals.
- Fit and seat the modulator, in the correct orientation, to the valve body using a twisting motion.
- Fit the pulse width modulator to valve body retaining clip.
- Connect the internal harness plug to the modulator.
- Refit the fluid filter, see Subsection 8.2.18.
- Refit the fluid pan, see Subsection 8.2.14 (4,0L SC) or Sub-section 8.2.15 (6,0L).
- Lower the vehicle on the ramp.
- Refill the transmission unit with fluid, see Subsection 8.2.13.
- Remove the fender cover and close the hood.



**8.2.11 'A' SHIFT SOLENOID, RENEW
(4,0L SC AND 6,0L)**

SRO 44.15.45

- Open the hood and fit a suitable fender cover.
- Raise the vehicle on a ramp.
- Drain the transmission lubrication system, see Sub-section 8.2.13.
- Remove the fluid pan, see Sub-section 8.2.14 (4,0L SC) or Sub-section 8.2.15 (6,0L).
- Disconnect the internal harness plug from the 'A' Shift solenoid.
- Release and remove the 'A' Shift solenoid to valve body securing screw.
- Remove the solenoid from the valve body (Fig. 1).
- Remove and discard the 'O' ring seal from the valve body.
- Place the solenoid aside.
- Fit a new 'O' ring seal to a new 'A' Shift solenoid.
- Lubricate the 'O' ring seal.
- Fit the solenoid to the valve body using a twisting motion.
 - Fit and tighten the solenoid to the valve body using a new securing screw.
 - Connect the internal harness plug to the solenoid.
 - Refit the fluid pan, see Sub-section 8.2.14 (4,0L SC) or Sub-section 8.2.15 (6,0L).
 - Lower the vehicle on the ramp.
 - Refill the transmission unit with fluid, see Sub-section 8.2.13.
- Remove the fender cover and close the hood.

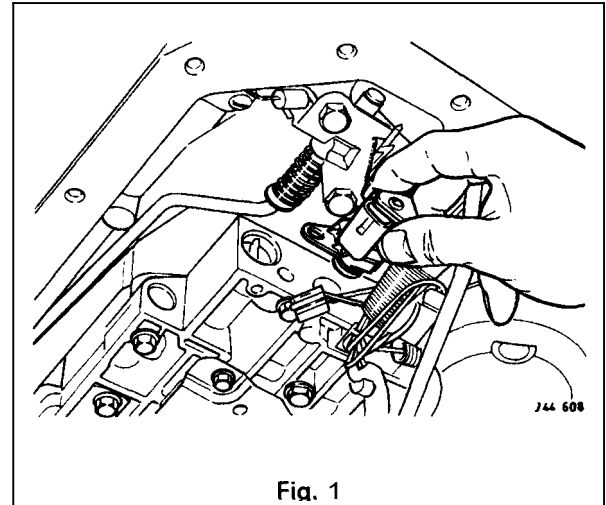


Fig. 1

8.2



8.2.12 'B' SHIFT SOLENOID, RENEW (4,0L SC AND 6,0L)

SRO 44.15.46

- Open the hood and fit a suitable fender cover.
- Raise the vehicle on a ramp.
- Drain the transmission lubrication system, see Sub-section 8.2.13.
- Remove the fluid pan, see Subsection 8.2.14 (4,0L SC) or Subsection 8.2.15 (6,0L).
- Disconnect the internal harness plug from the 'B' Shift solenoid.
- Release and remove the 'B' Shift solenoid to valve body securing screw.
- Remove the solenoid from the valve body (Fig. 1).
- Remove and discard the 'O' ring seal from the solenoid.
- Place the solenoid aside.
- Fit a new 'O' ring seal to a new 'B' Shift solenoid.
- Lubricate the 'O' ring seal.
- Fit the solenoid to the valve body using a twisting motion.
- Fit and tighten the solenoid to the valve body using a new securing screw.
- Connect the internal harness plug to the solenoid.
- Refit the fluid pan, see Subsection 8.2.14 (4,0L SC) or Sub-section 8.2.15 (6,0L).
- Lower the vehicle on the ramp.
- Refill the transmission unit with fluid, see Subsection 8.2.13.
- Remove the fender cover and close the hood.

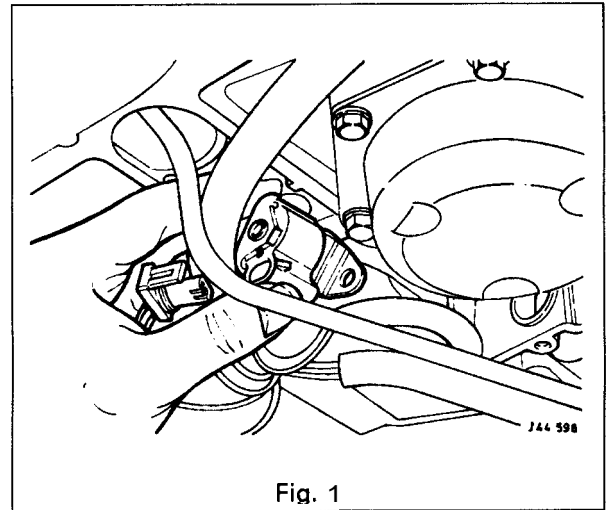


Fig. 1



8.2.13 LUBRICATION SYSTEM, DRAIN AND REFILL (4,0L SC AND 6,0L)

SRO 44.24.02

- Raise the vehicle on a ramp.
- Position a drain tin below the transmission unit.
- Release and remove the fluid pan drain plug.
- Allow the fluid to drain.
- Clean the drain plug, including the magnet and the fluid pan drain plug face.
- Fit and tighten the fluid pan drain plug.
- Remove the drain tin from below the transmission unit.
- Lower the vehicle on the ramp.
 - Open the hood and fit a suitable fender cover.
 - Remove and wipe the dipstick.
- Fit a funnel to the dipstick tube.
- Initially fill the transmission with 4,5 liters of fluid.
- Remove the funnel.
- Open the front door.
- Check that the parking brake is applied.
- Start the engine.
- Apply the footbrake.
 - Run the shift lever through all positions, finally returning to the Park position.
- Release the footbrake.
- Insert the dipstick, then remove and inspect the level.
- Fit the funnel to the dipstick tube.
- Fill the transmission to the 'COLD' level mark on the dipstick with the correct fluid, see the Powertrain Automatic Transmissions Service Manual, General Data.

CAUTION: On no account should the vehicle be driven unless the fluid level is at the 'COLD' level and the system primed.

- Remove the funnel.
 - Replace the dipstick.
 - Switch the ignition OFF.
 - Remove the fender cover and close the hood.
 - Close the door.

8.2

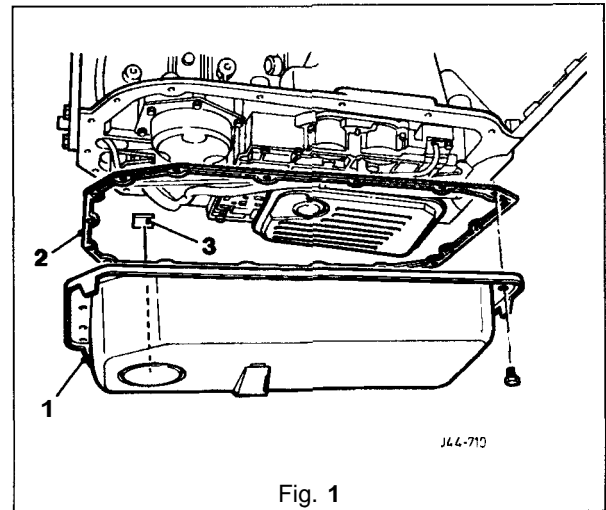
Note: After road testing the vehicle, the fluid level on the dipstick should be between the 'HOT' Min / Max marks. Check the level with the transmission at normal operating temperature (90 to 100°C), with the engine left running and the transmission in the Park position.



8.2.14 FLUID PAN, RENEW (4,0L SC)

SRO 44.24.04

- Open the hood and fit a suitable fender cover.
- Raise the vehicle on a ramp.
- Drain the transmission lubrication system, see Sub-section 8.2.13.
- Slacken the downpipe catalyst to intermediate catalyst clamp securing bolts.
- Slacken the intermediate catalyst to intermediate silencers clamp securing bolts.
- Disconnect the intermediate catalyst pipe from the downpipe.
- Clean the downpipe and intermediate pipe joint.
- Release and remove the fluid pan securing bolts.
- Remove the fluid pan (1 Fig. 1) and gasket (2 Fig. 1).
- Drain the residual fluid from the fluid pan.
- Remove the fluid pan gasket.
- Clean the fluid pan gasket, which can be re-used if in good condition.
- Place the fluid pan gasket aside.
- Remove the magnet (3 Fig. 1) from the fluid pan.
- Clean the magnet and place on a clean surface.
- Clean the transmission fluid pan joint face.
- Clean the fluid pan.
- Place the fluid pan aside.
- Attach the magnet to the recess in a new fluid pan.
- Fit and align a serviceable gasket to the fluid pan.
- Fit the fluid pan and gasket to the transmission unit.
- Fit and tighten the fluid pan securing bolts.
- Apply sealant to the intermediate pipe joint. See Service Materials in the preliminary pages, this Section.
- Reconnect the intermediate pipe to the downpipe.
- Align the intermediate catalyst assembly.
- Tighten the intermediate pipe to the downpipe securing clamp.
- Align the intermediate silencers to the intermediate catalyst assembly.
- Tighten the intermediate silencer securing clamps.
- Lower the vehicle on the ramp.
- Refill the transmission unit with fluid, see Subsection 8.2.13.
- Remove the fender cover and close the hood.





8.2.15 FLUID PAN, RENEW (6,0L)

SRO 44.24.04

- Open the hood and fit a suitable fender cover.
 - Raise the vehicle on a ramp.
 - Slacken the underfloor catalyst to downpipe clamps securing bolts.
 - Displace and reposition the olive clamps on the pipes.
 - Slacken the underfloor catalyst to intermediate silencer clamps securing bolts.
- Displace the underfloor catalyst assembly rearwards to disconnect from the downpipes.
 - Displace and remove the olives from the downpipes.
 - Using a wire brush, clean the olives and downpipe joints.
 - Place a suitable piece of wood between the underfloor catalyst and the body for access.
- Drain the transmission lubrication system, see Sub-section 8.2.13.
- Release and remove the fluid pan securing bolts.
- Drain the residual fluid from the fluid pan.
 - Remove the fluid pan (1 Fig. 1) and gasket (2 Fig. 1).
 - Clean the fluid pan gasket, which can be re-used if in good condition.
 - Place the fluid pan gasket aside.
 - Remove the magnet (3 Fig. 1) from the fluid pan.
 - Clean the magnet and place on a clean surface.
 - Clean the transmission fluid pan joint face.
 - Clean the fluid pan.
 - Place the fluid pan aside.
 - Attach the magnet to the recess in a new fluid pan.
 - Fit and align a serviceable gasket to the fluid pan.
 - Fit the fluid pan and gasket to the transmission unit.
 - Fit and tighten the fluid pan securing bolts.
- Remove the block of wood from between the underfloor catalyst and the floor.
- Apply sealant to the downpipe joints and olives. See Service Materials in the preliminary pages, this Section.
- Fit and seat the olives to the downpipes.
- Reconnect the underfloor catalyst to the downpipes.
 - Reposition the olive clamps.
 - Tighten the underfloor catalyst to downpipe clamps securing bolts.
 - Align the intermediate silencers to the underfloor catalyst assembly.
 - Tighten the clamp securing bolts.
- Lower the vehicle on the ramp.
- Refill the transmission unit with fluid, see Sub-section 8.2.13.

Remove the fender cover and close the hood.

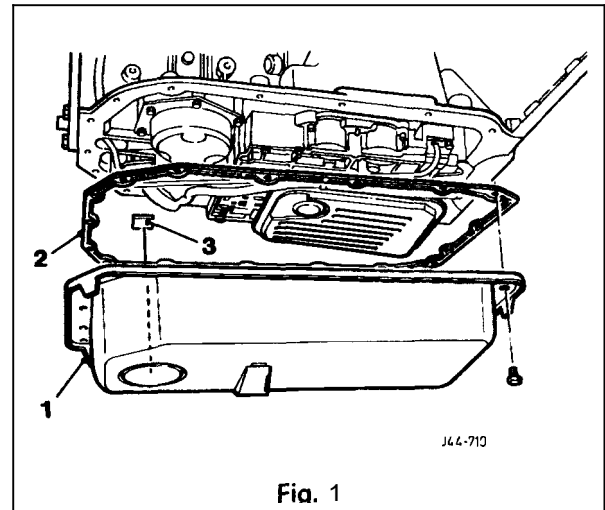


Fig. 1

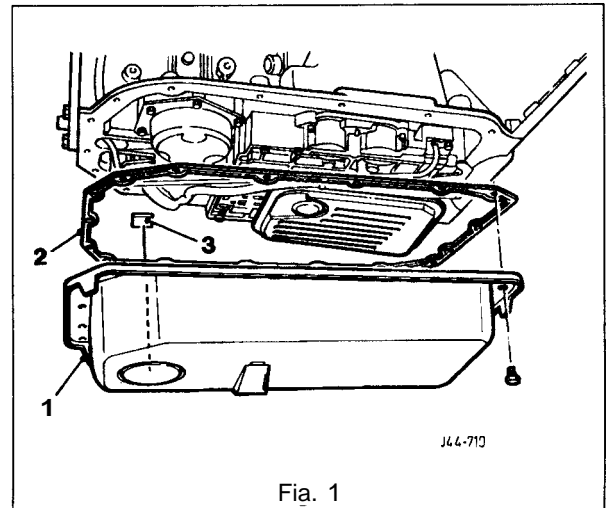
8.2



8.2.16 FLUID PAN GASKET, RENEW (4,0L SC)

SRO 44.24.05

- Open the hood and fit a suitable fender cover.
- Raise the vehicle on a ramp.
- Drain the transmission lubrication system, see Sub-section 8.2.13.
- Slacken the downpipe catalyst to intermediate catalyst clamp securing bolts.
- Slacken the intermediate catalyst to intermediate silencers clamp securing bolts.
- Disconnect the intermediate catalyst pipe from the downpipe.
- Clean the downpipe and intermediate pipe joint.
- Release and remove the fluid pan securing bolts.
- Remove the fluid pan (1 Fig. 1) and gasket (2 Fig. 1).
- Drain the residual fluid from the fluid pan.
- Remove and discard the fluid pan gasket.
- Remove the magnet (3 Fig. 1) from the fluid pan; clean the magnet.
 - Place the magnet on a clean surface.
 - Clean the transmission fluid pan joint face.
 - Clean the fluid pan.
 - Place the fluid pan aside.
 - Attach the magnet to the recess in a new fluid pan.
 - Fit and align a new gasket to the fluid pan.
 - Fit the fluid pan and gasket to the transmission unit.
 - Fit and tighten the fluid pan securing bolts.
 - Apply sealant to the intermediate pipe joint. See Service Materials in the preliminary pages, this Section.
 - Reconnect the intermediate pipe to the downpipe.
 - Align the intermediate catalyst assembly.
 - Tighten the intermediate pipe to downpipe securing clamp.
 - Align the intermediate silencers to the intermediate catalyst assembly.
 - Tighten the intermediate silencer securing clamps.
- Lower the vehicle on the ramp.
- Refill the transmission unit with fluid, see Sub-section 8.2.13.
- Remove the fender cover and close the hood.





8.2.17 FLUID PAN GASKET RENEW (6,0L)

SRO 44.24.05

- Open the hood and fit a suitable fender cover.
- Raise the vehicle on a ramp.
- Slacken the underfloor catalyst to downpipe clamp securing bolts.
- Displace and reposition the olive clamps on the pipes.
- Slacken the underfloor catalyst to intermediate silencer clamps securing bolts.
- Displace the underfloor catalyst assembly rearwards to disconnect from the downpipes.
Displace and remove the olives from the downpipes.
- Using a wire brush, clean the olives and downpipe joints.
- Place a suitable piece of wood between the underfloor catalyst and the body for access.
- Drain the transmission lubrication system, see Sub-section 8.2.13.
- Release and remove the fluid pan securing bolts.
- Remove the fluid pan (1 Fig. 1) and gasket (2 Fig. 1).
- Drain the residual fluid from the fluid pan.
Remove and discard the fluid pan gasket.
- Remove the magnet (3 Fig. 1) from the fluid pan; clean the magnet.
- Place the magnet on a clean surface.
- Clean the fluid pan joint face.
- Clean the fluid pan.
- Place the fluid pan aside.
- Attach the magnet to the recess in the fluid pan.
- Fit and align a new gasket to the fluid pan.
- Fit the fluid pan and gasket to the transmission unit.
- Fit and tighten the fluid pan securing bolts.
- Remove the block of wood from between the under floor catalyst and the floor.
- Apply sealant to the downpipe joints and olives. See Service Materials in the preliminary pages, this Section.
- Fit and seat the olives to the downpipes.
- Reconnect the underfloor catalyst to the downpipes.
- Reposition the olive clamps.
- **Tighten** the underfloor catalyst to downpipe clamps securing bolts.
- Align the intermediate silencers to the underfloor catalyst assembly.
- Tighten the clamp securing bolts.
- Lower the vehicle on the ramp.
- Refill the transmission unit with fluid, see Sub-section 8.2.13.
- Remove the fender cover and close the hood.

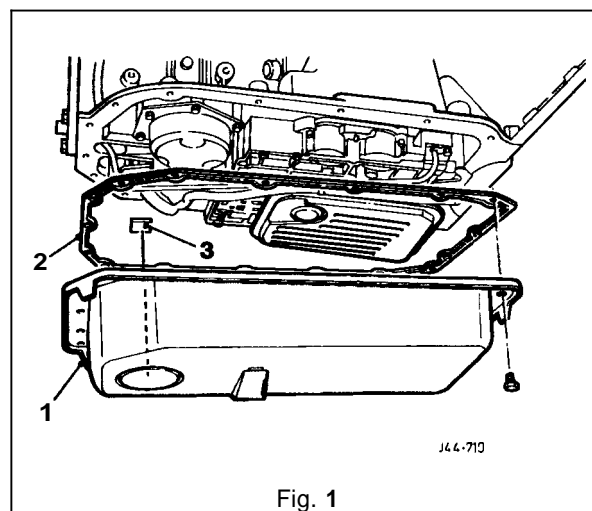


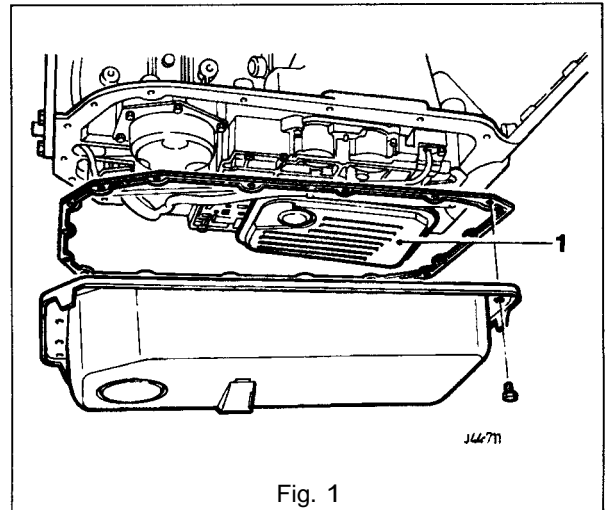
Fig. 1



8.2.18 FLUID FILTER, RENEW (4,0L SC AND 6,0L)

SRO 44.24.07

- Open the hood and fit a suitable fender cover.
- Raise the vehicle on a ramp.
- Drain the transmission lubrication system, see Sub-section 8.2.13.
- Remove the fluid pan, see Sub-section 8.2.14 (4,0L SC) or Sub-section 8.2.15 (6,0L).
- Displace and remove the filter (1 Fig. 1) from the transmission unit and place aside.
- Fit and align a new filter to the transmission unit.
- Refit the fluid pan, see Sub-section 8.2.14 (4,0L SC) or Sub-section 8.2.15 (6,0L).
- Lower the vehicle on the ramp.
- Refill the transmission unit with fluid, see Subsection 8.2.13.
- Remove the fender cover and close the hood.





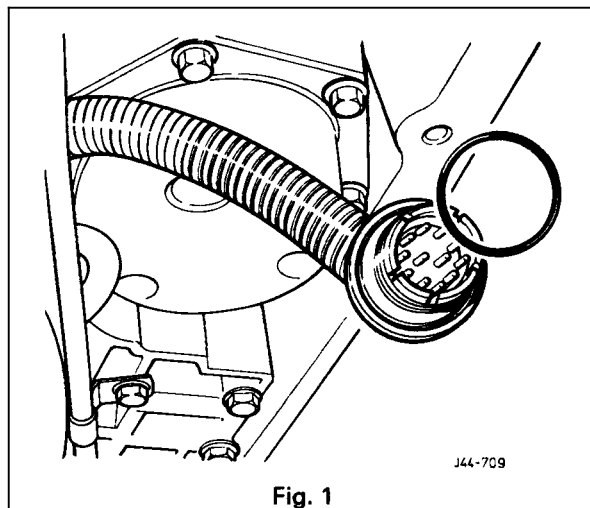
8.2.19 TRANSMISSION INTERNAL HARNESS MULTI-PIN SOCKET 'O' RING, RENEW (4,0L SC AND 6,0L)

SRO 44.24.20

- Open the hood and fit a suitable fender cover.
- Raise the vehicle on a ramp.
- Drain the transmission lubrication system, see Sub-section 8.2.13.
- Remove the fluid pan, see Sub-section 8.2.14 (4,0L SC) or Sub-section 8.2.15 (6,0L).
- Disconnect the external harness multi-pin plug from the internal harness multi-pin socket.

Note: The plug is secured to the socket by its captive locking ring.

- Release and remove the internal harness multi-pin socket to transmission casing securing nut.
- Displace the internal harness multi-pin socket from the transmission casing.
- Remove and discard the 'O' ring seal (Fig.1) from the multi-pin socket.
 - Fit and seat a new 'O' ring seal to the multi-pin socket.
 - Reposition and seat the internal harness multi-pin socket to the transmission casing.
 - Fit and tighten the internal harness multi-pin socket to the transmission casing securing nut.
- Connect the external harness multi-pin plug to the internal harness multi-pin socket; the plug is secured by its captive locking ring.
- Refit the fluid pan, see Sub-section 8.2.14 (4,0L SC) or Sub-section 8.2.15 (6,0L).
- Lower the vehicle on the ramp.
- Refill the transmission unit with fluid, see Sub-section 8.2.13.
- Remove the fender cover and close the hood.





8.2.20 INTERNAL LUBRICATION PIPE, RENEW (4,0L SC AND 6,0L)

SRO 44.24.21

- Open the hood and fit a suitable fender cover.
- Raise the vehicle on a ramp.
- Drain the transmission lubrication system, see Sub-section 8.2.13.
- Remove the fluid pan, see Subsection 8.2.14 (4,0L SC) or Sub-section 8.2.15 (6,0L).
- Release and remove the internal lubrication pipe retainer to valve body securing bolt.
- Remove the lubrication pipe retainer.
- Release and remove the lubrication pipe clamp to valve body securing nut.
- Remove the lubrication pipe clamp.
- Displace and remove the lubrication pipe from the transmission unit.
- Drain any residual fluid from the lubrication pipe and place the pipe aside.
- Clean the relevant parts.
- Fit and fully seat a new lubrication pipe to the transmission unit.
 - Fit the lubrication pipe clamp.
 - Fit and tighten the lubrication pipe clamp to valve body securing bolt.
 - Fit the lubrication pipe retainer.
- Refit the fluid pan, see Sub-section 8.2.14 (4,0L SC) or Subsection 8.2.15 (6,0L).
- Lower the vehicle on the ramp.
- Refill the transmission unit with fluid, see Sub-section 8.2.13.
- Remove the fender cover and close the hood.



8.2.21 INTERNAL DIPSTICK STOP, RENEW (4,0L SC AND 6,0L)

SRO 44.24.22

- Open the hood and fit a suitable fender cover.
- Raise the vehicle on a ramp.
- Drain the transmission lubrication system, see Sub-section 8.2.13.
- Remove the fluid pan, see Sub-section 8.2.14 (4,0L SC) or Sub-section 8.2.15 (6,0L).
- Release and remove the dipstick stop to valve body securing bolts.
- Reposition the internal harness securing clip.
- Remove the dipstick stop.
- Clean all relevant parts.
- Place the dipstick stop aside.
- Fit a new dipstick stop to the valve body.
- Reposition and align the internal harness securing clip.
- Fit and tighten the dipstick stop to valve body securing bolts.
- Refit the fluid pan, see Sub-section 8.2.14 (4,0L SC) or Sub-section 8.2.15 (6,0L).
- Refit the downpipe to underfloor catalyst olives.
- Lower the vehicle on the ramp.
- Refill the transmission unit with fluid, see Sub-section 8.2.13.
- Remove the fender cover and close the hood.

8.2



8.2.22 *MANUAL DETENT SPRING, RENEW* (4,0L SC AND 6,0L)

SRO 44.26.10

- Open the hood and fit a suitable fender cover.
- Raise the vehicle on a ramp.
- Drain the transmission lubrication system, see Sub-section 8.2.13.
- Remove the fluid pan, see Subsection 8.2.14 (4,0L SC) or Sub-section 8.2.15 (6,0L).
- Remove the fluid filter, see Subsection 8.2.18.
- Select 'P' (Park) and ensure that the pawl is engaged.
- Release and remove the manual valve detent spring and roller assembly to valve body securing bolts.
- Remove the detent spring assembly and place aside.
- Clean the relevant parts.
- Fit a new detent spring assembly to the valve body.
- Fit but do not fully tighten the detent spring assembly to the valve body securing bolts.
- Align the detent spring to centralize the roller with the detent lever in the 'P' (Park) position.
- Check that in 'N' (Neutral), the shift lever is properly in position. It is essential that the detent spring within the transmission unit dictates to the shift lever and not the other way around.
Finally tighten the detent spring assembly to valve body securing bolts.
- Refit the fluid filter, see Subsection 8.2.18.
- Refit the fluid pan, see Subsection 8.2.14 (4,0L SC) or Sub-section 8.2.15 (6,0L).
- Lower the vehicle on the ramp.
- Refill the transmission unit with fluid, see Subsection 8.2.13.
- Remove the fender cover and close the hood.

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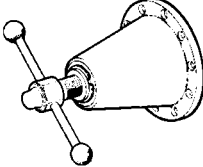
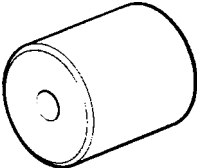
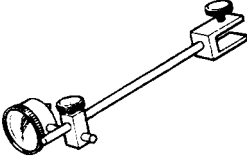
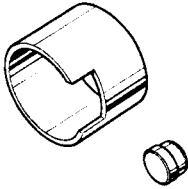
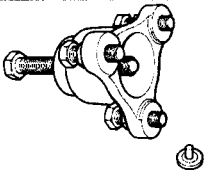
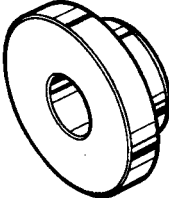
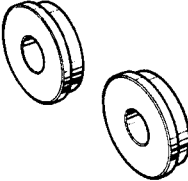
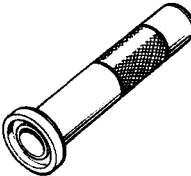


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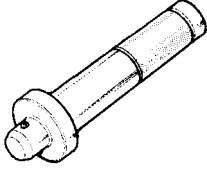
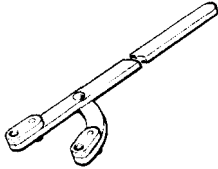


1. SERVICE TOOLS & EQUIPMENT

Illustration	Jaguar Number	Description	Notes
	JD 1 D	Hub remover	
	JD 1D / 7	Thread protector	
	JD 13B	Dial test indicator (DTI) and locator	
	JD 132 - 1	Hub press tool and button	
	JD 156	Pinion puller	
not illustrated	JD 198	Pinion Oil seal installer	
	JD 550 - 1	Output shaft oilseal remove/ replace	
	JD 550 - 4 / 1 & 4 / 2	Adaptor / replacer bearing and	
	SL 7	Bearing replacer	



SERVICE TOOLS & EQUIPMENT (CONTINUED)

illustration	Jaguar Number	Description	Notes
	18G 134	Driver Handle	
		Pinion flange wrench	
	18G 1205	Pinion flange wrench	

**II. TORQUE TIGHTENING SPECIFICATIONS**

Fixing	Tightening Torque (Nm)
'A' frame to differential	85 - 115
'A' frame to wide mounting bracket	72 - 98
ABS sensor to hub carrier	8 - 10
Axle shaft hub nut * See repair operations 47.10.01 and 64.15.14 & 15 this section	304 - 336 *
Axle shaft to output flange	81 - 99
Bush, 'A' frame lower mounting to body	80 - 100
Centre drive shaft bearing to crossmember	19 - 27
Crossmember to body	19 - 27
Differential nose to wide mounting bracket	34 - 46
Differential strut to body	85 - 95
Drive shaft to auto-gearbox flange	33 - 45
Drive shaft flexible coupling to pinion flange	71 - 83
Exhaust joint 'Olive'	14 - 18
Exhaust joint 'Torca clamp'	60 - 80
Exhaust mounting to wide mounting bracket	22 - 88
Final drive unit to wide mounting bracket at differential 'nose'	34 - 46
Hub carrier fulcrum	80 - 100
Lower shock absorber bolt	80 - 100
Mounting bracket ('A' frame) to body (inner)	40 - 50
Mounting bracket ('A' frame) to body (outer)	80 - 100
Oil drain plug	26 - 34
Oil filler plug	20 - 26
Output shaft housing to differential case	52 - 58
Pendulum assembly to differential	160 - 200
Pinion drive flange nut * See repair operation 5120.01 this section	Minimum 135 *
Rear mounting bracket to differential	85 - 105
Road wheel - Alloy	88 - 102
Road wheel - Steel	68 - 82
Upper link to differential	72 - 98
Upper link to wide mounting bracket & 'A' frame	85 - 115
Wide mounting bracket to 'A' frame	85 - 115
Wishbone pivot nut	80 - 100
Wishbone tie to differential stud	85 - 105



Description	Uses	Notes
Loctite 270 Adhesive	Axle shaft spline	30/ 50% radial coverage
Hylosil 102 – Sealant	Output shaft bearing housing to differential case	
Retinax A grease	Rear hub bearings and seal pre-lubrication	See Sub Section IV Service Data

IV. SERVICE DATA

	Specification
$= \underline{0.32}$ <p>minus 0.08 = 3.07 mm (required adjustable spacer) Minimum specified pre-load \square 0.025, therefore 3.15 minus 0.025 = 3.125 mm (required adjustable spacer). Adjustable spacers are available in 0,05 mm increments from 2,22 to 3,47 mm.</p>	0,025 to 0,08 mm
Rear hub bearing grease – Quantity	Inner bearing race 1,5 ml. Outer bearing race 9,0 ml
Final drive unit pinion spigot radial run-out	Must not exceed 0,08 mm TIR (total indicator reading). Should the run-out exceed the stated limit, renew the final drive unit.

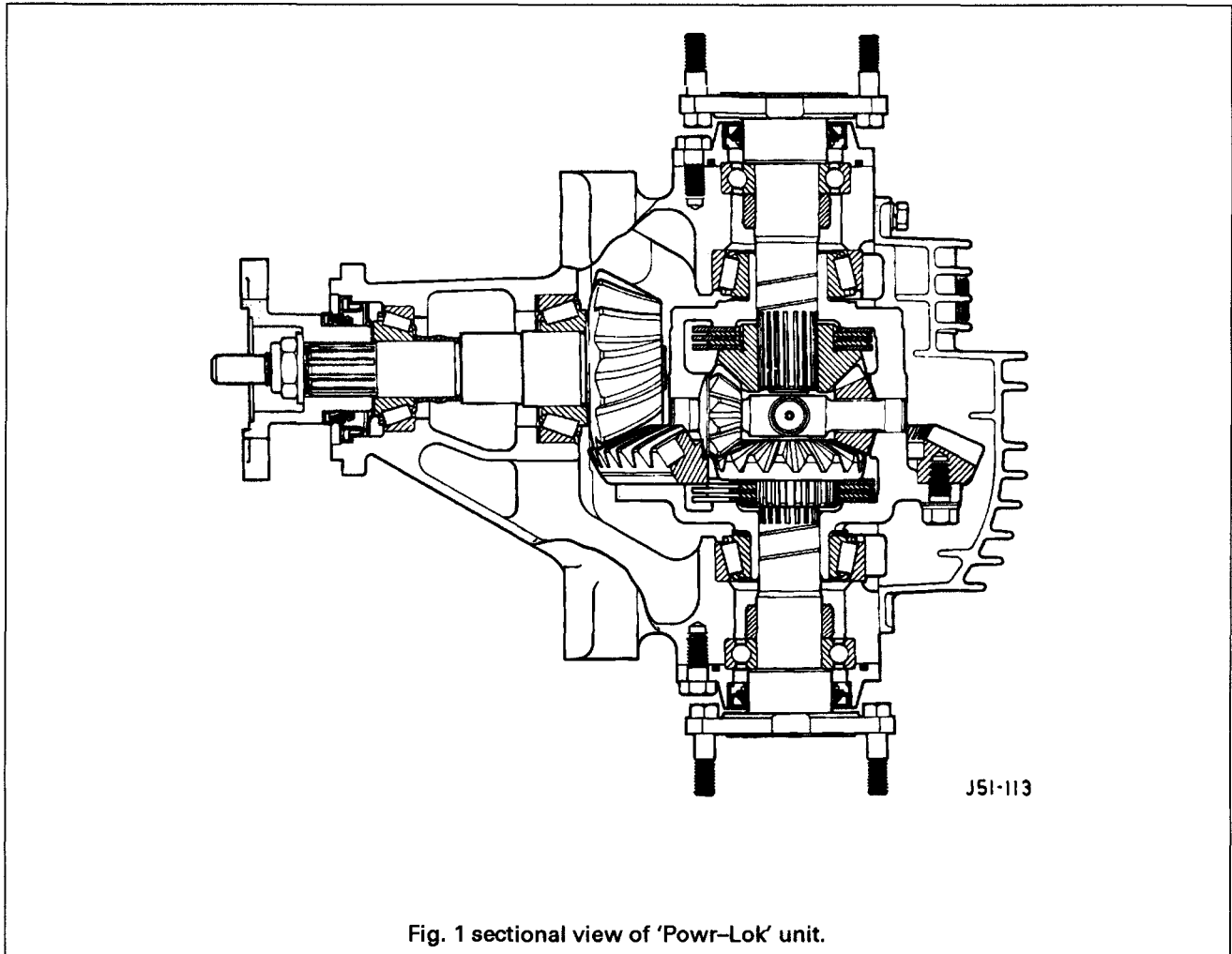


9.1 MAJOR COMPONENT DESCRIPTION

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, 'Powr-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.



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 DRIVESHAFT, 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 center stud is positioned centrally in relation to the crossmember inspection hole.

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

The differential spigot radial run-out is within specification, see preliminary pages.

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

12 Cylinder

- Remove exhaust center section.

All

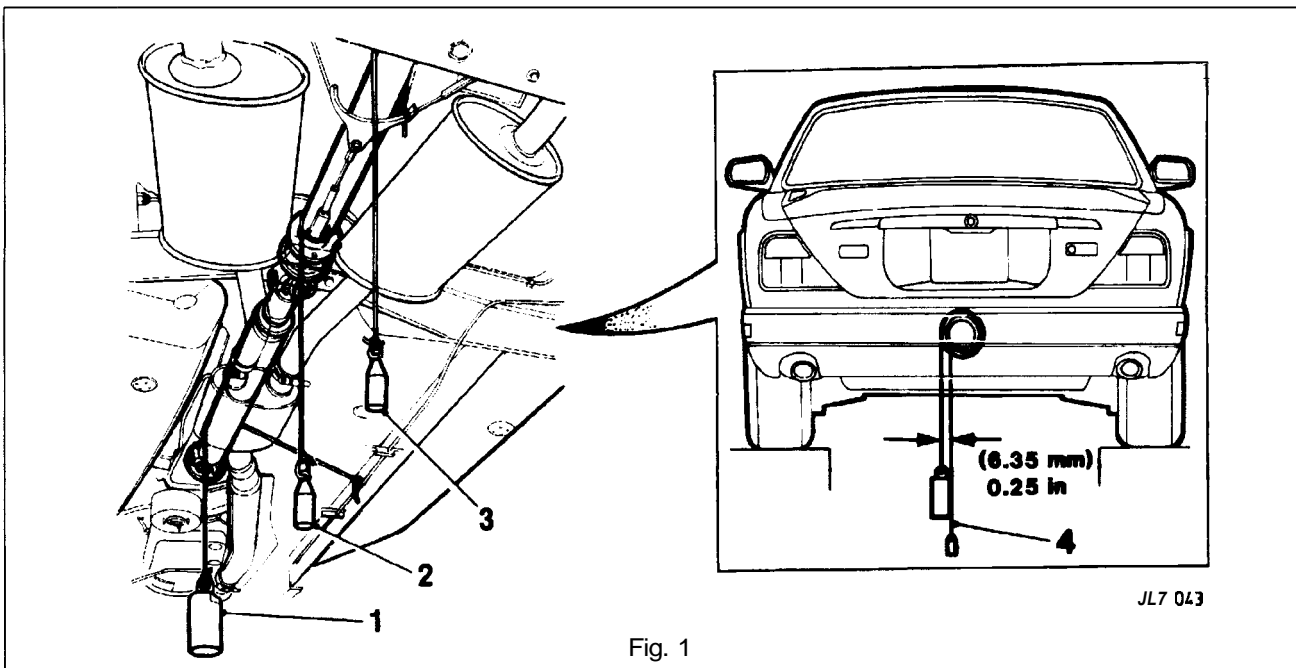
- Locate suitable 'plumb lines' over drive shaft outside diameter, but NOT over any balance weight or weld:

- Front section - behind gearbox output coupling, 12,7 mm (0.5 in) diameter weight (1 Fig. 1).
- Rear section - immediately behind center bearing (2 Fig. 1).
- 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.

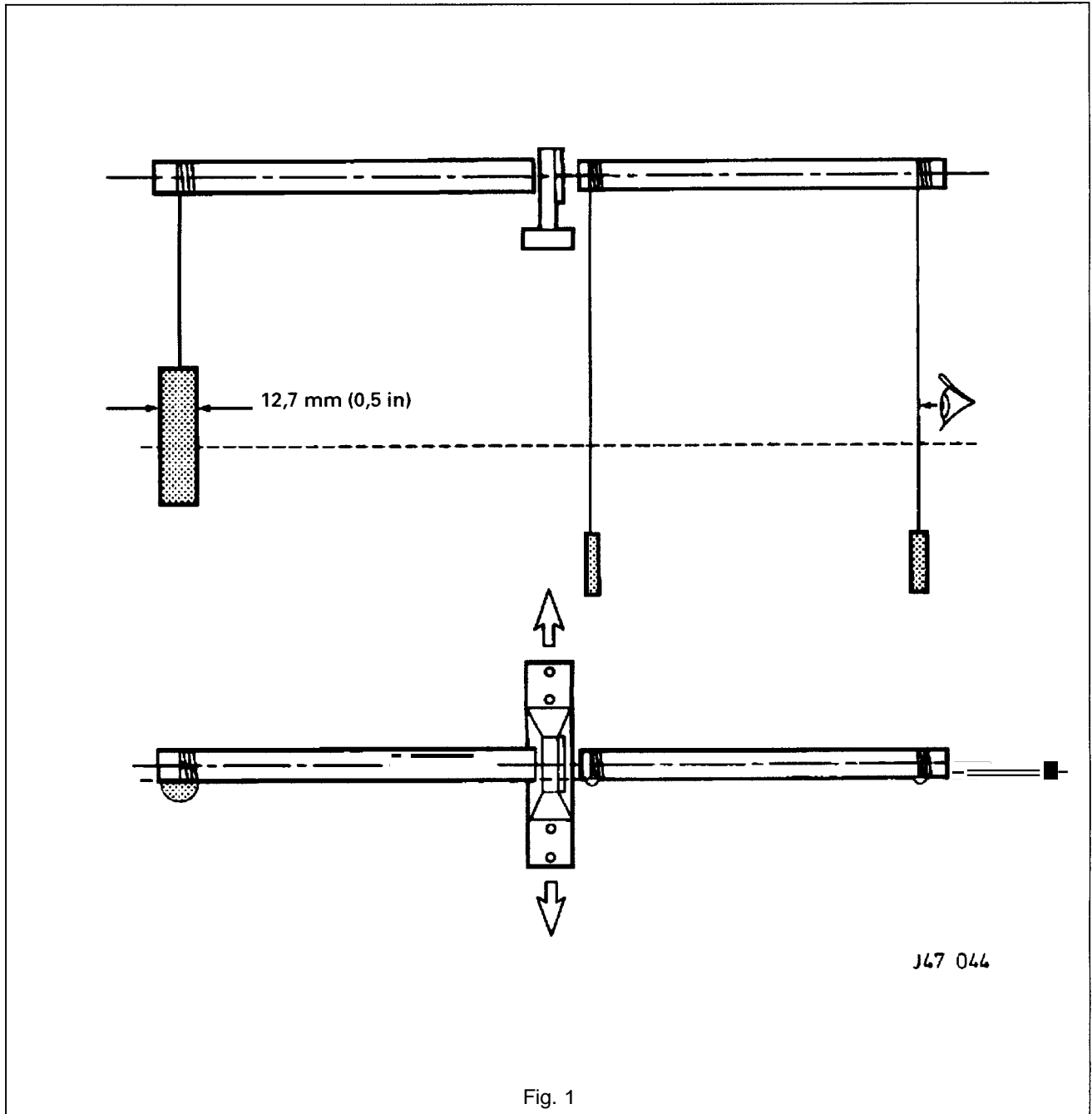




Method 2

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 realign 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 127 mm (0,5 in) 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.

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 198 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.

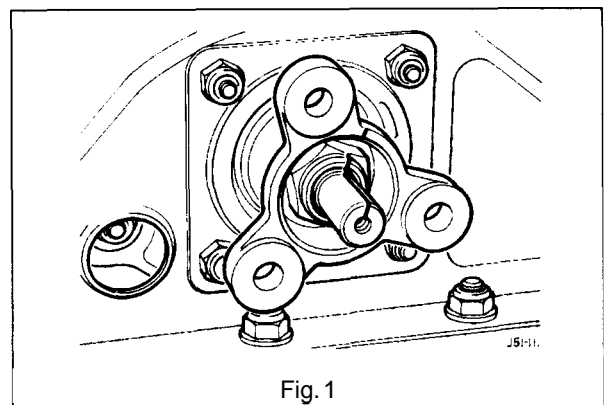
Tighten the drive flange nut to the original noted torque PLUS 10%.

- 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.

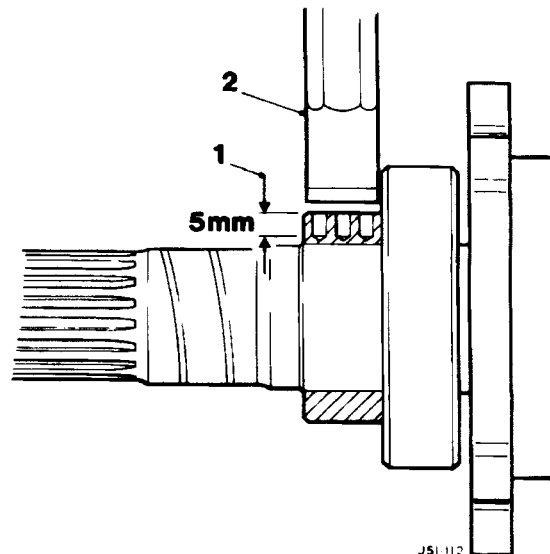


Fig. 1

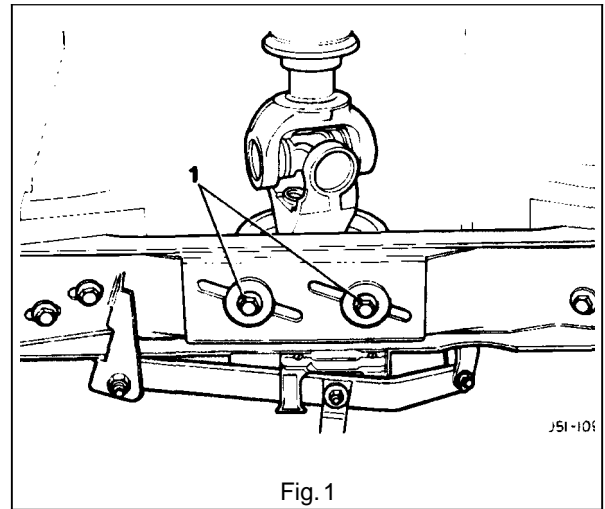
9.8 FINAL DRIVE UNIT, RENEW

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.

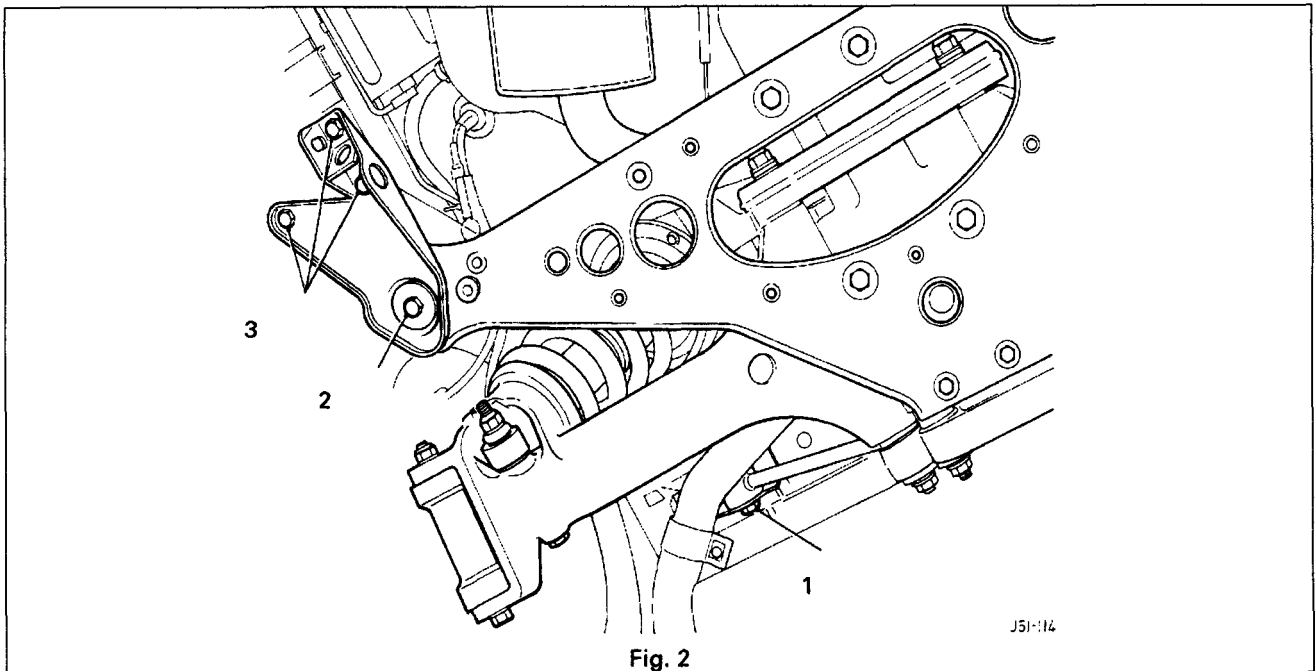
CAUTION: Under no circumstances must the flexible coupling (or its fixings) be loosened or removed from the drive shaft flange.

- 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 1 D (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.

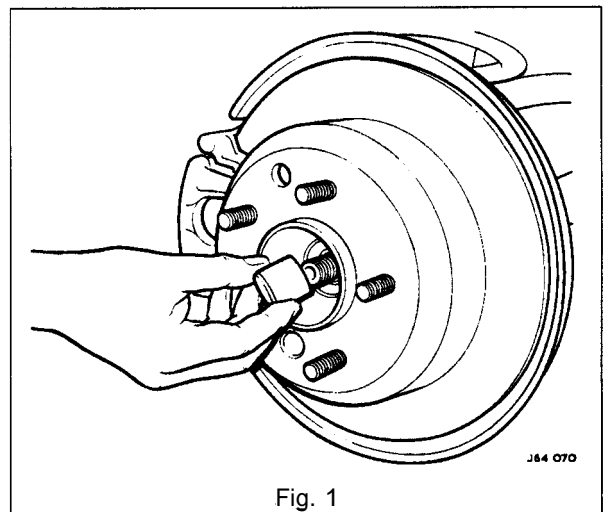


Fig. 1

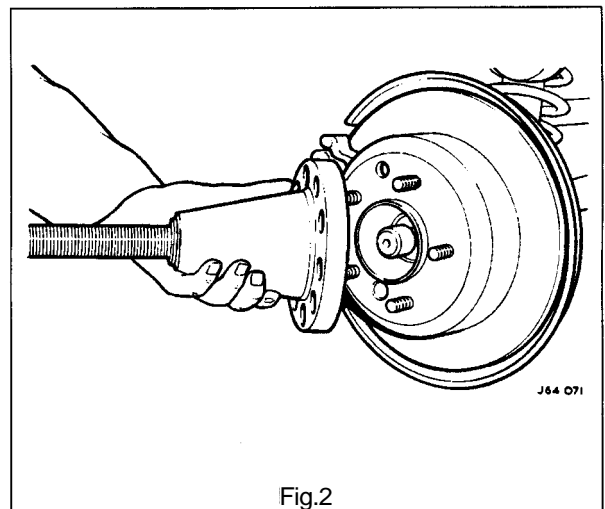


Fig.2

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 1 D (Fig. 1), push shaft through hub and pull the hub carrier assembly clear.
- Using Hub tool JD 132 - 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.

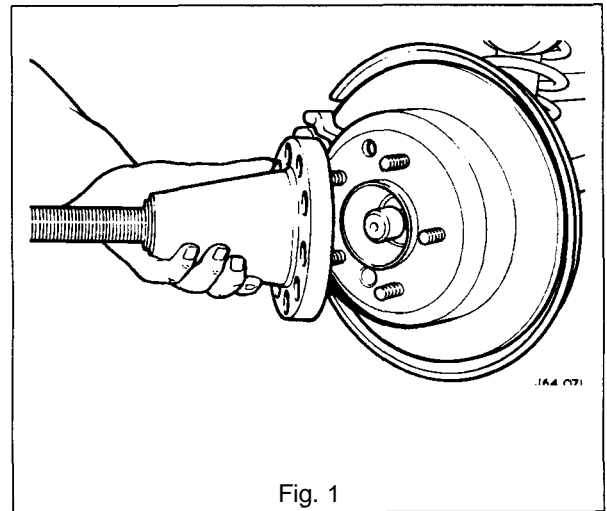


Fig. 1

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.

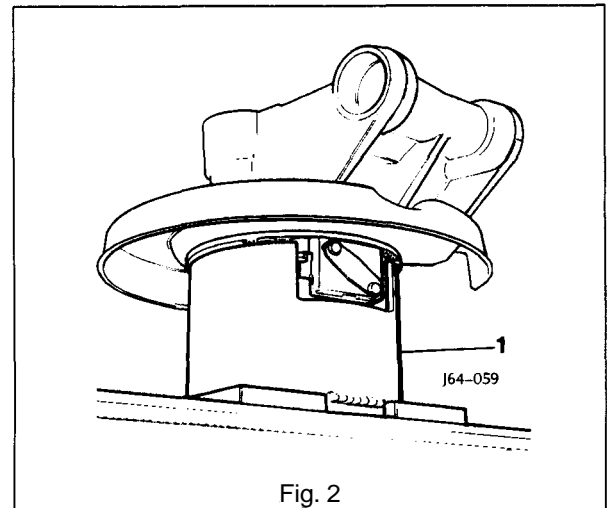


Fig. 2



- 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.

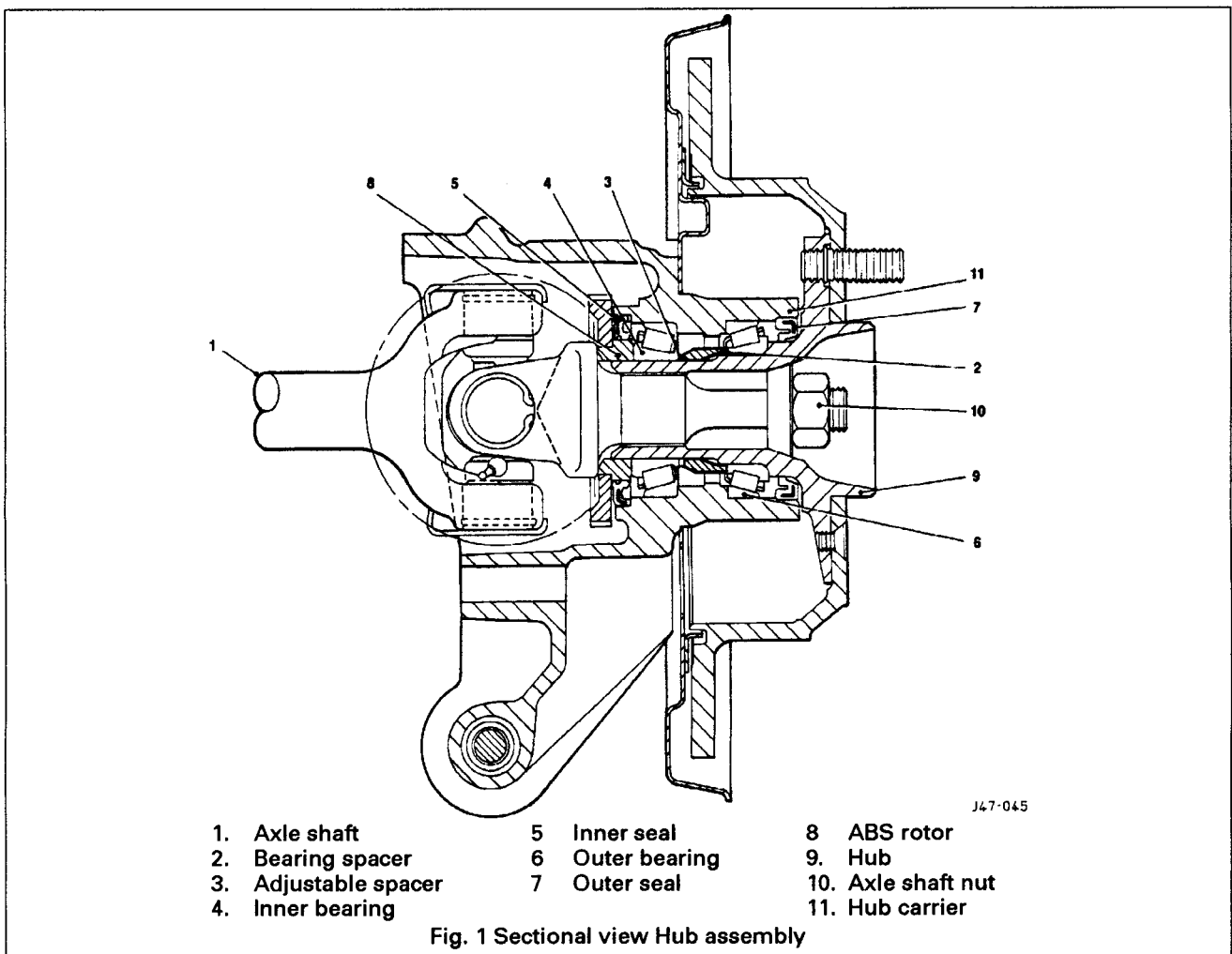
Replace all locking wire and split pins (cotter pins).

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.



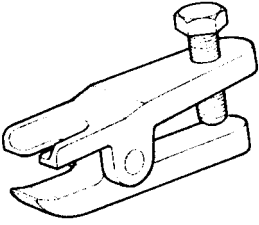
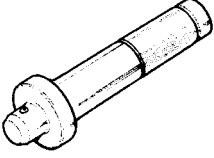
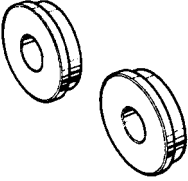
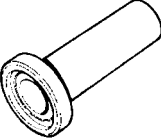


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I. SERVICE TOOLS & EQUIPMENT

Illustration	Jaguar Number	Description	Notes
	JD 100	Ball joint separator	
	18G-134	Handle	
	JD550-5 / 1 & 2	Adaptor	
	JD-179	Seal replacer	

**II. TORQUE TIGHTENING SPECIFICATIONS**

Fixing	Tightening Torque (Nm)
Air bag to steering wheel	4 - 5
Blanking plug for rack centralizing pin	7 - 10
Fluid pipe to pump banjo bolt	34 - 46
Fluid pipe to cooler sleeve nut X 2	17 - 23
Fluid pressure pipe pump to rack mid connector	17 - 23
Heatshield to rack (12 cylinder)	22 - 28
Horn bar (at steering wheel)	5 - 7
Hose from fluid reservoir (worm drive)	25 - 35 Retighten to nominal after 30 minutes
Hose to pump (worm drive)	25 - 35 Retighten to nominal after 30 minutes
Hose to fluid reservoir from cooler (worm drive)	25 - 35 Retighten to nominal after 30 minutes
Lower column to steering rack pinion	22 - 28
Pressure switch to feed pipe 12 cylinder only	85 - 11,5
Road wheel - Alloy	88 - 102
Road wheel - Steel	68 - 82
Steering column outer tube to body	17 - 23
Steering column universal joint to lower column	17 - 23
Steering column upper bracket to column outer tube	16 - 20
Steering column upper bracket to plenum stiffener	17 - 23
Steering column upper cowls	2.5 - 3.5
Steering rack to crossmember 12 cylinder	39 - 51
Steering rack to crossmember 6 cylinder	43 - 57
Steering wheel to column	34 - 46
Tie strap plenum	16 - 20
Track rod end taper ball pin to steering arm	59 - 71
Track rod end lock nut	51 - 69
Tube nut - fluid pipe at steering rack 2 off	17 - 23

**II. SERVICE MATERIALS**

Description	Uses	Notes
Retinax A grease	Front hub bearings and seals	See Sub Section IV Service Data
Power steering hydraulic fluid	Dexron 2E ATF minimum (or equivalent)	See Sub Section IV Service Data

Application	Specification
Front hub end-float	0,025 to 0,08 mm
Front hub bearing grease - Quantity	4 ml in each race
Toe-in 12 cylinder	0° 5' + or - 10' underside of front crossbeam 143mm from ground level
Toe-in 6 cylinder	0° 5' + or - 10' underside of front crossbeam 153mm from ground level
Steering system capacity	Approx 1 liter from dry
Steering system operating pressure	100> 110 bar
Steering system level checking frequency	16,000 km
Steering rack turns lock to lock	2,83
Drive belt tension (12 cylinder only)	Burroughs method - New belt 790 N; If tension falls below 270 N reset at 630 N Clavis method - New belt 114 to 120 Hz; If tension falls below 70 Hz reset at 87 to 93 Hz For new belt, rotate engine 3 revolutions minimum and retension
Drive belt tension measuring point	Mid-way between crankshaft and compressor pulley



10.1 STEERING SYSTEM DESCRIPTION

10.1.1 Steering Column Major Components

- Integrated column assembly incorporating power, or manual, reach/ tilt mechanism and lock.
- Ignition switch.
- Ignition interlock solenoid.
- Key transponder coil.
- Body attachment points.

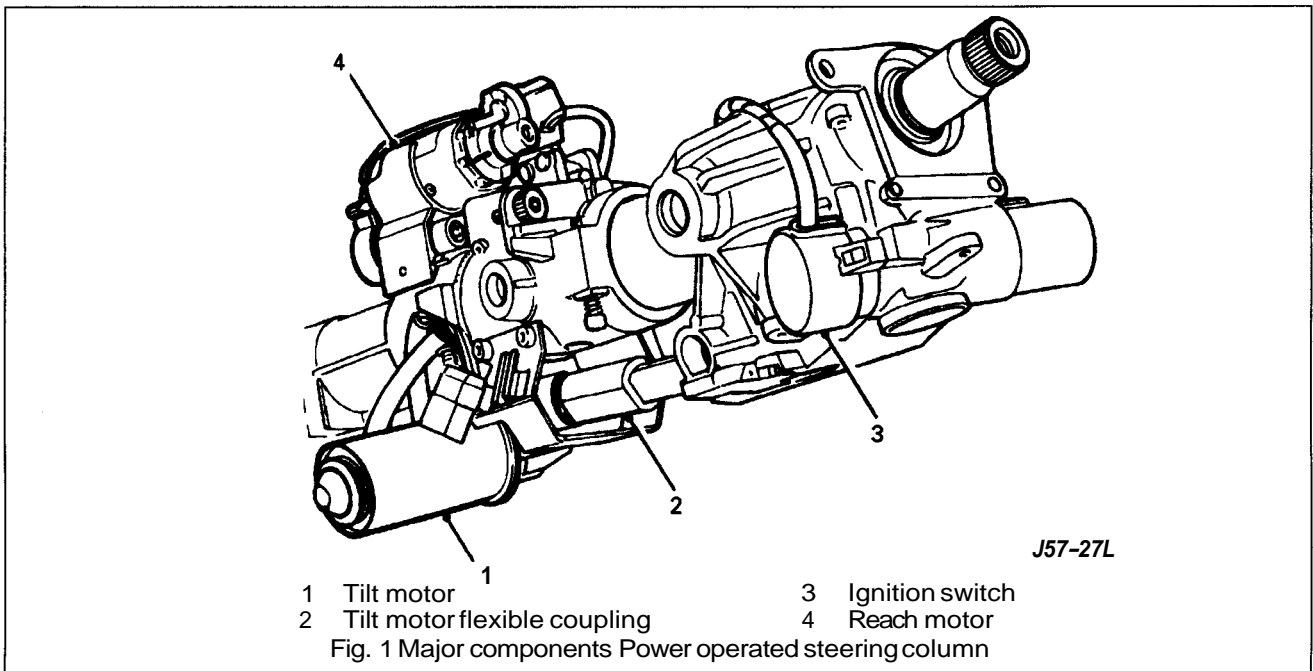
Depending upon model, the steering column may be adjusted for tilt and reach, either by electrical or manual means. Power variants may be either automatically or manually adjusted and all types have the entry / exit feature.

10.1.2 Steering Column Operating Principle

Power Adjust: Two independent motor / gearbox assemblies provide infinite adjustment for reach and height within approximate ranges of 35mm and 13° respectively. Adjustments may be automatically made in conjunction with the seat memory facility or manually when the adjustment switch is used. It should be noted that selection of 'Off' will disable the automatic entry / exit mode.

Manual Adjust: The cable operated reach adjustment is infinite within a range of 35mm, with the desired position being fixed by a rack and wedge. Tilt variations are stepped at approximately 3° intervals with 6 positions being available, the uppermost being unlatched.

From the uppermost position the column may be pulled down to engage the first detent without using the tilt lever.



WARNING: MANUAL ADJUST ONLY: TO AVOID PERSONAL INJURY, COLUMN UPWARD TRAVEL SHOULD BE MANUALLY RESTRAINED TO CHECK UPWARD SPRING ASSISTANCE. THIS IS ESPECIALLY IMPORTANT IF THE STEERING WHEEL HAS BEEN REMOVED FOR MAINTENANCE REASONS.

WARNING: ALL TYPES; DO NOT REMOVE THE STEERING COLUMN FROM THE VEHICLE WITH THE STEERING WHEEL ATTACHED UNLESS THE STEERING IS CENTERED AND THE COLUMN LOCK IS ENGAGED. IF THE LOCK IS TO BE RENEWED, 'LOCK-WIRE' THE ASSEMBLY TO PREVENT ROTATION. FAILURE TO OBSERVE THIS MAY RESULT IN AN INOPERATIVE AIRBAG SYSTEM. SEE LABEL ON STEERING WHEEL HUB.