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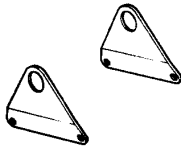
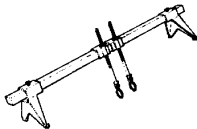
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## Manual Transmission & Clutch (AJ16)



### 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

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**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

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### 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.

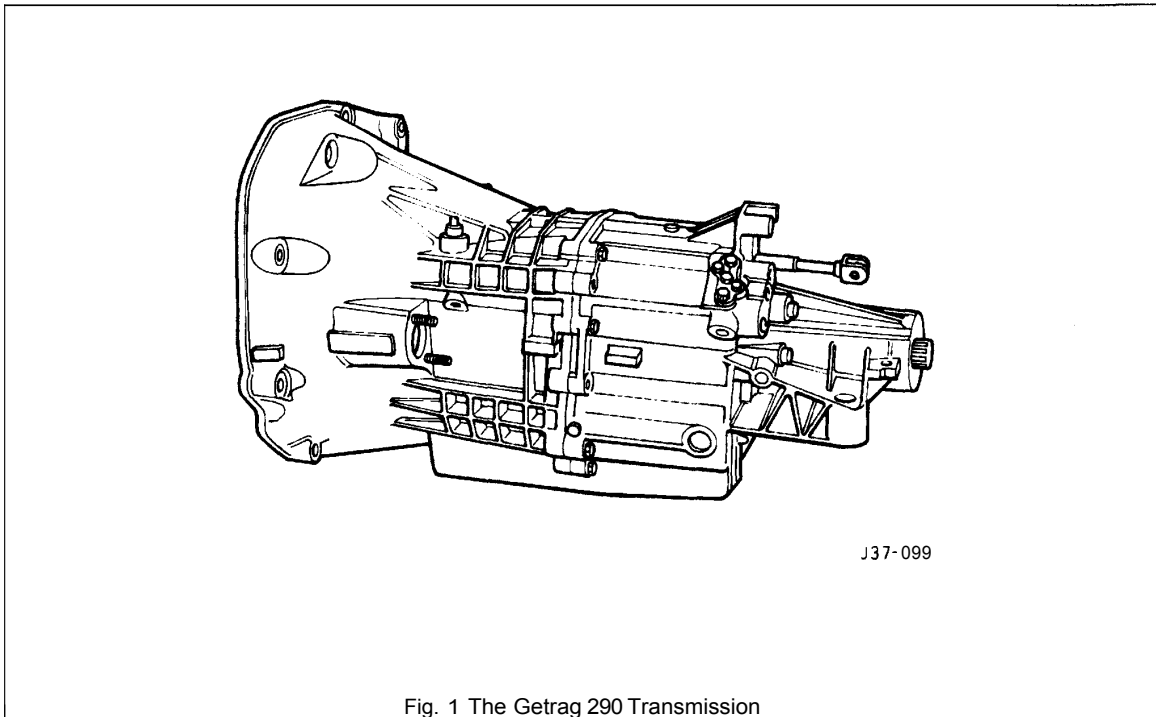
The mainshaft is supported at the front by a caged roller bearing situated in the drive pinion counterbore; in the centre by a roller bearing supported by the intermediate casing and at the rear by a duplex bearing in the transmission rear casing.

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.



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### 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 gearshift 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.

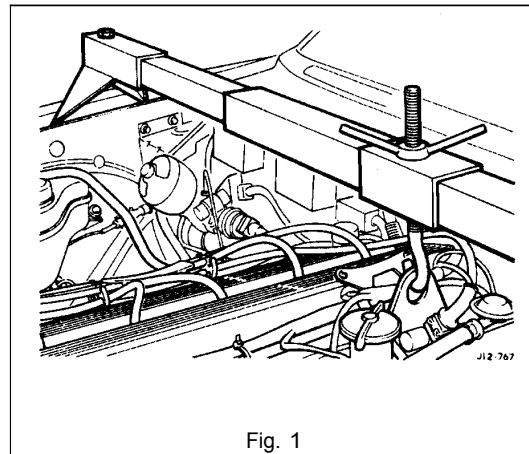


Fig. 1

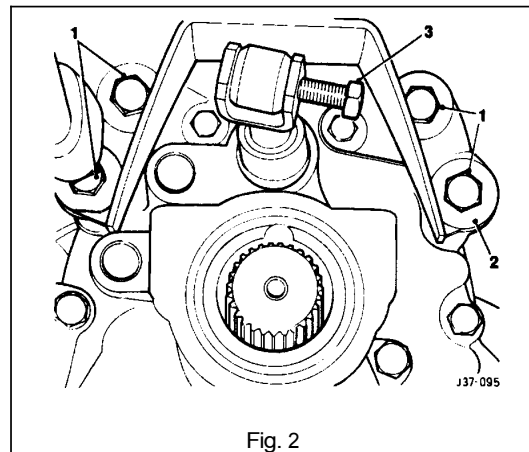


Fig. 2

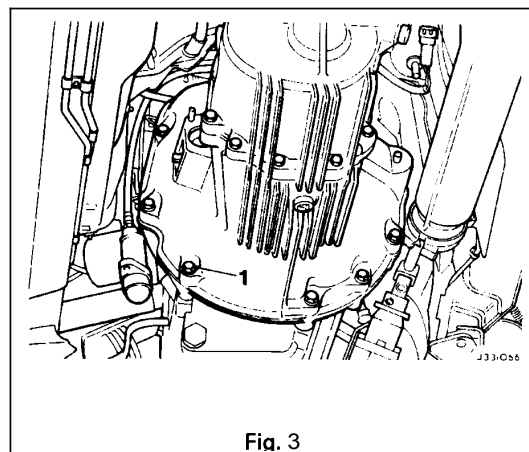
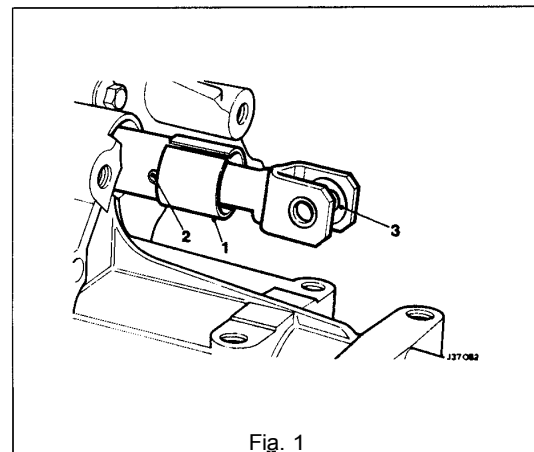


Fig. 3

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- 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.



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## Manual Transmission & clutch (AJ16)



- 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.

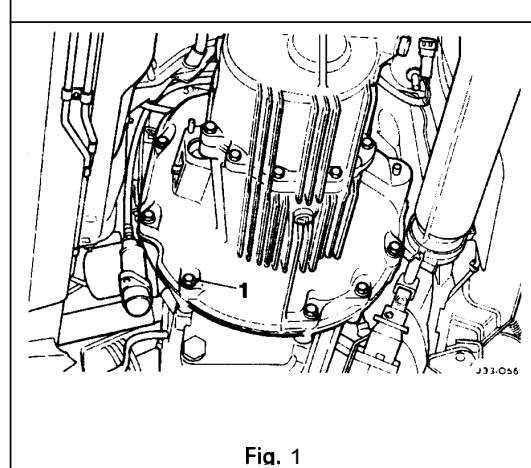


Fig. 1

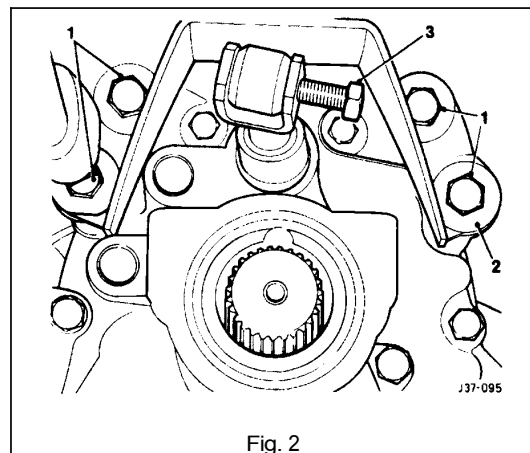


Fig. 2

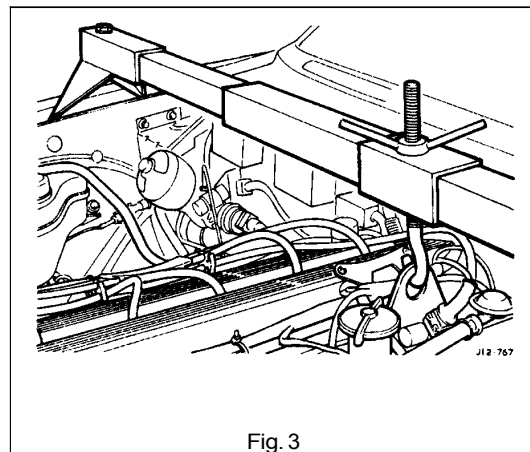


Fig. 3





- 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).

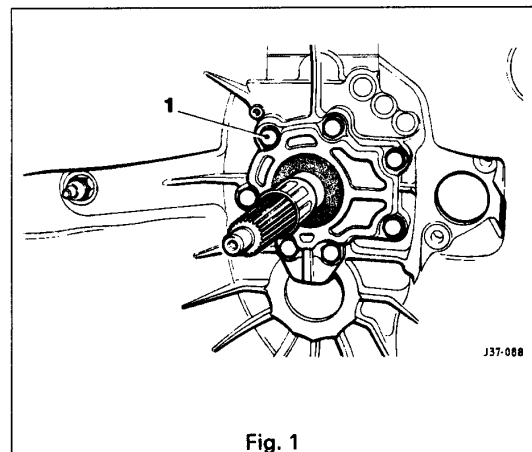


Fig. 1

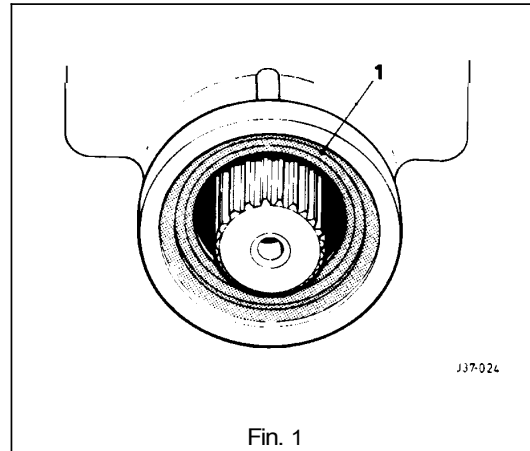
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### 7.1.4 REAR OIL SEAL, RENEW

#### 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

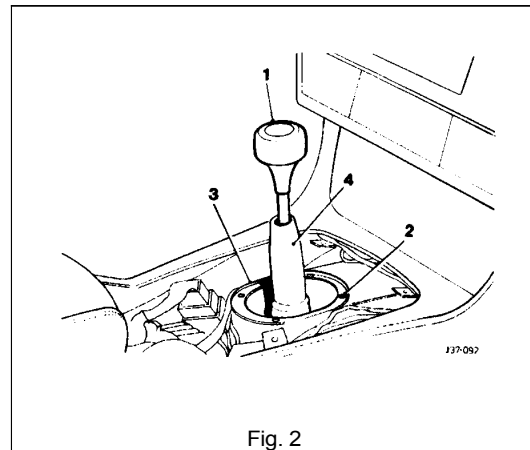
#### SRO 37.16.04

- 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.



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## 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.

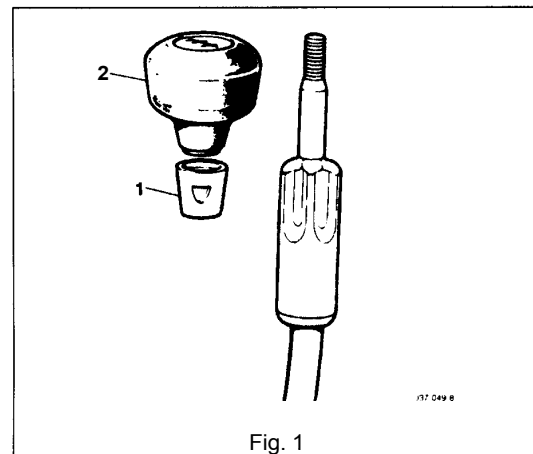


Fig. 1

## 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.

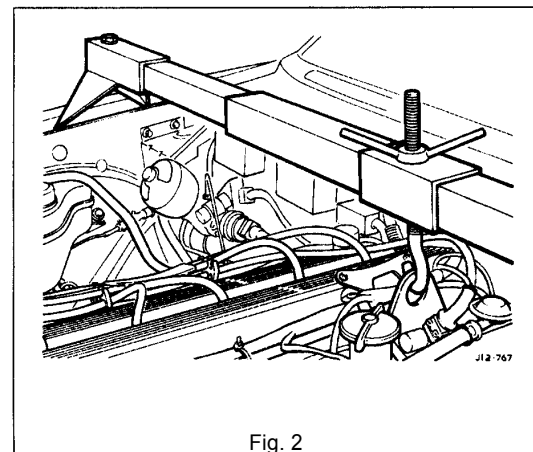


Fig. 2

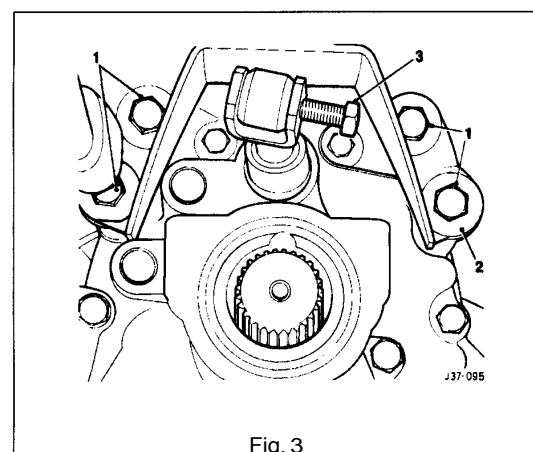


Fig. 3

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

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- 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 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.

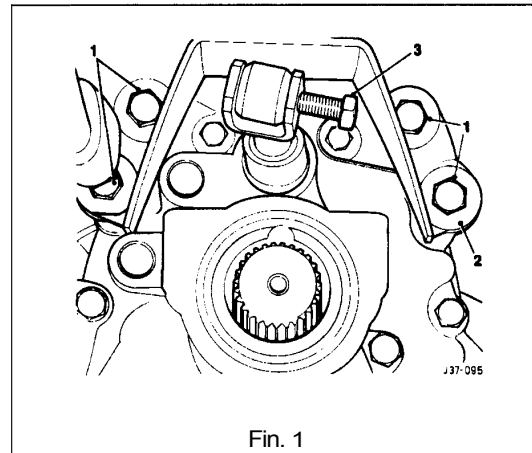


Fig. 1

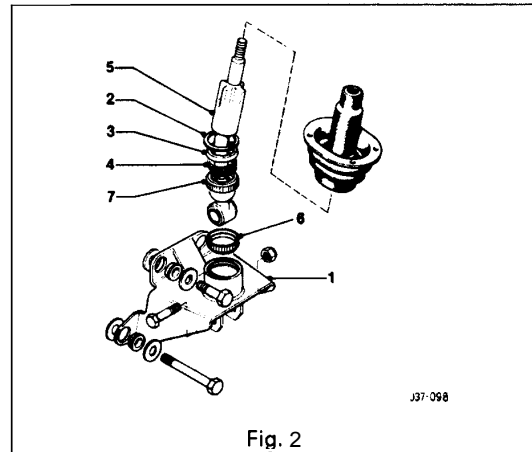


Fig. 2

### 7.1



### 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.

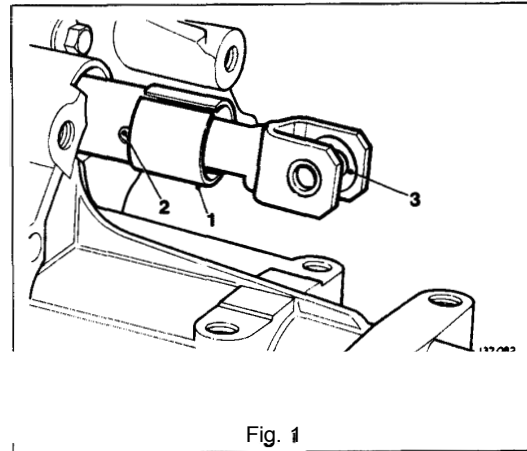


Fig. 1

### 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.

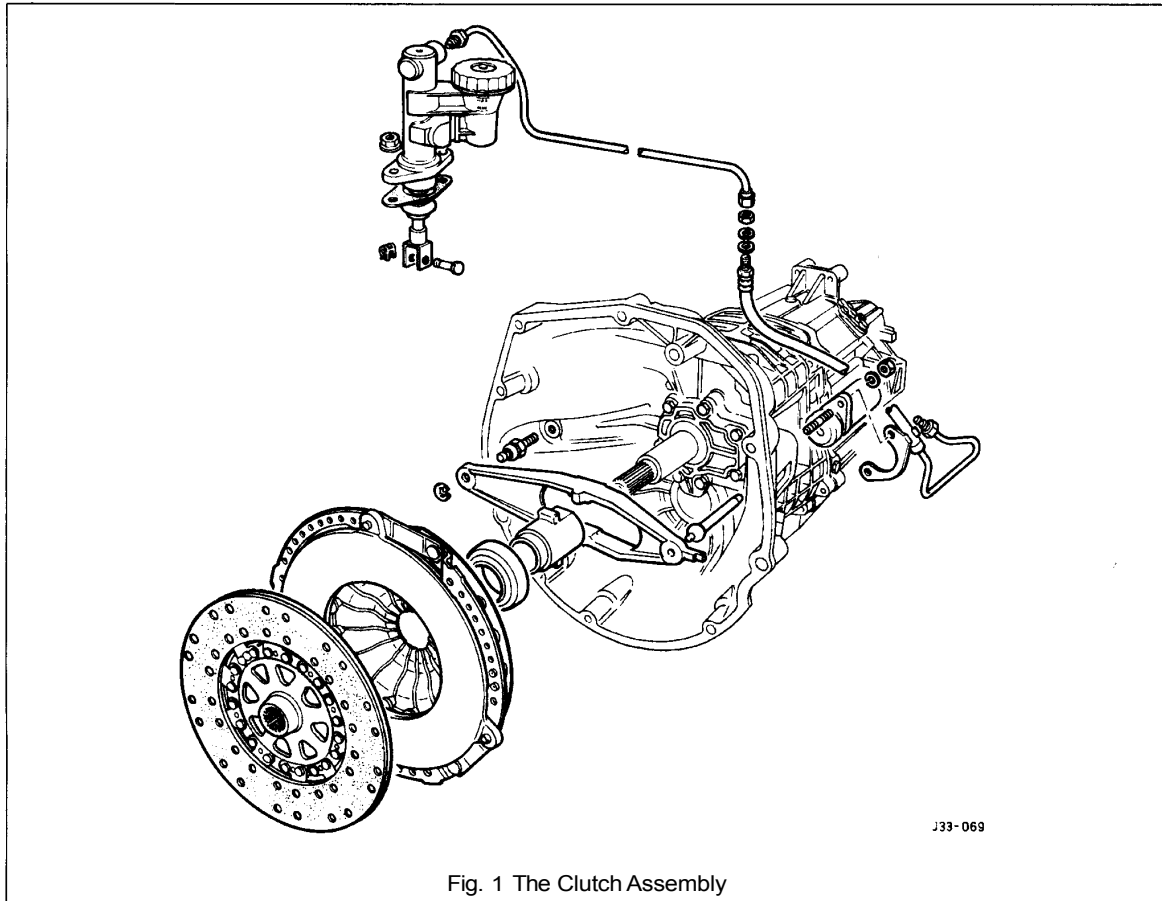


Fig. 1 The Clutch Assembly

**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	Renew 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	<b>Tighten mounting nuts and bolts</b>
		Check for worn drive (propeller) shaft universal joints	<b>Renew if necessary</b>
		Check for bent primary pinion shaft	<b>Renew as necessary</b>
stiff clutch operation	Operating linkage fault	Check for damaged moving parts in operating linkage	<b>Renew as necessary</b>
		Check for seized linkage, <b>recheck</b> 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 clutchudder)	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
	Engine mounting	Check for broken or weak pressure springs. Check torque damper springs in clutch driven plate	Renew if necessary
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 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).

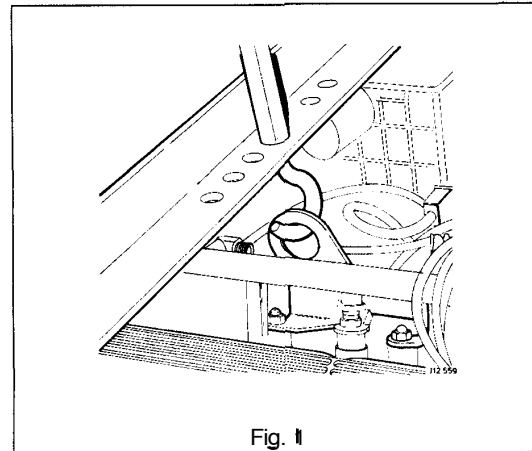


Fig. 1

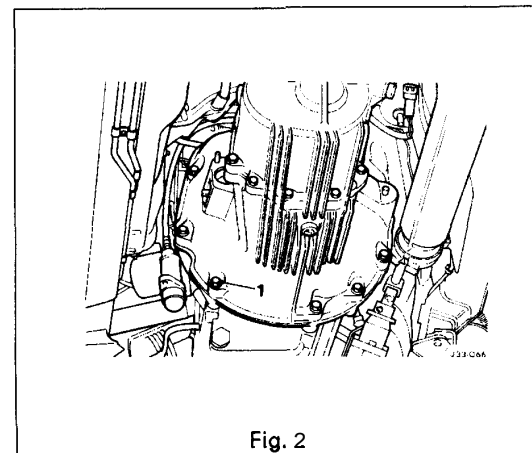


Fig. 2

## 7.1

**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.

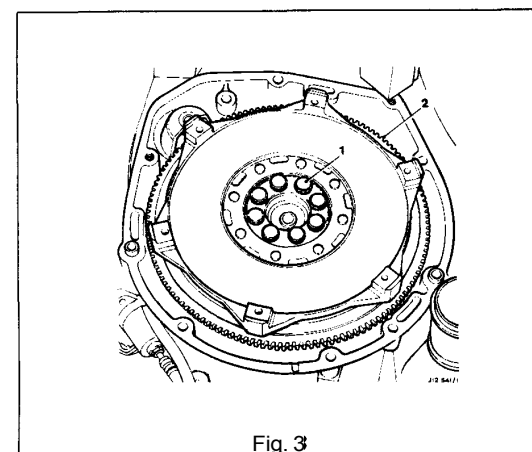


Fig. 3



- 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.

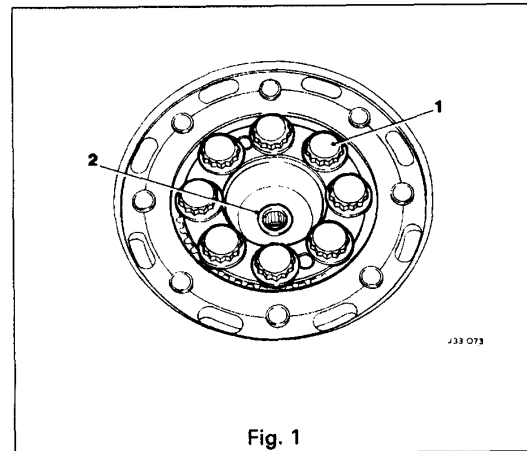


Fig. 1

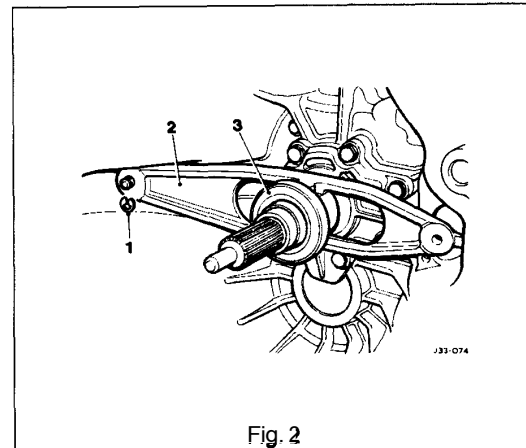


Fig. 2

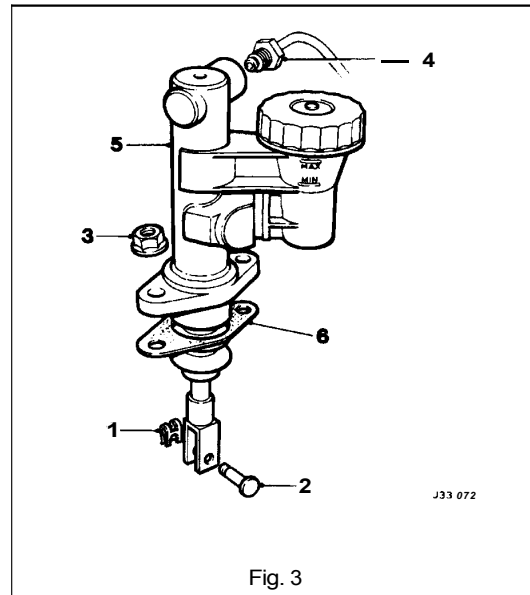
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### 7.1.15 CLUTCH MASTER CYLINDER, RENEW

#### 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.

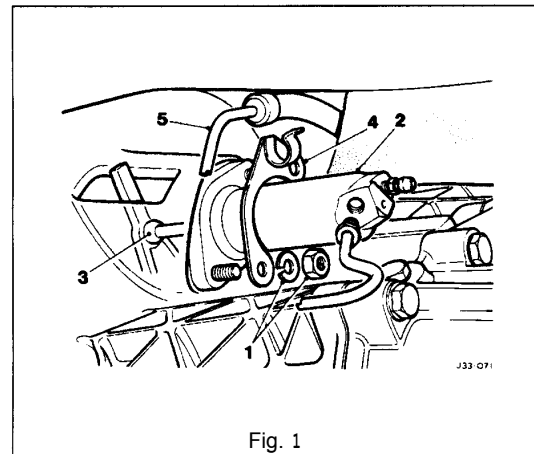


Fig. 1

## 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.

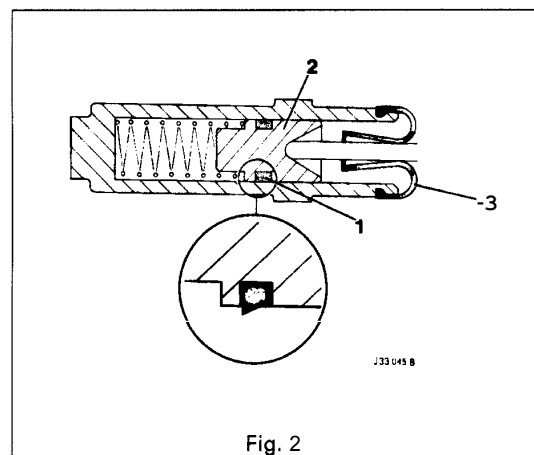


Fig. 2

7.1



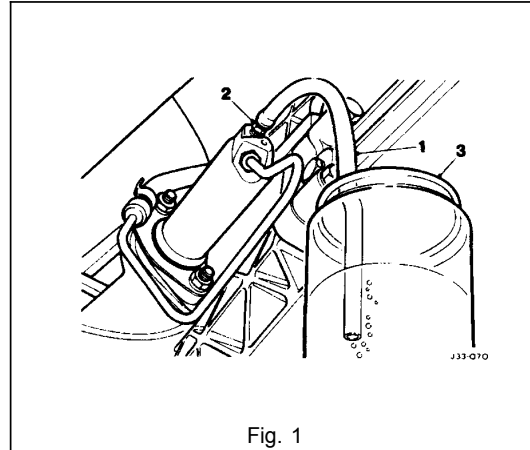
### 7.1.18 CLUTCH HYDRAULIC SYSTEM, BLEED

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.