

# 155

## REPAIR MANUAL

### ● MECHANICAL UNITS



GROUP 12 - CLUTCH



GROUP 13 - GEARBOX - DIFFERENTIAL



GROUP 17 - AXLE SHAFTS



GROUP 21 - FRONT SUSPENSION



GROUP 22 - FRONT AND REAR BRAKES



GROUP 23 - STEERING



GROUP 25 - REAR SUSPENSION



GROUP 28 - WHEELS AND TYRES



CLUTCH

12-1

### GROUP 12

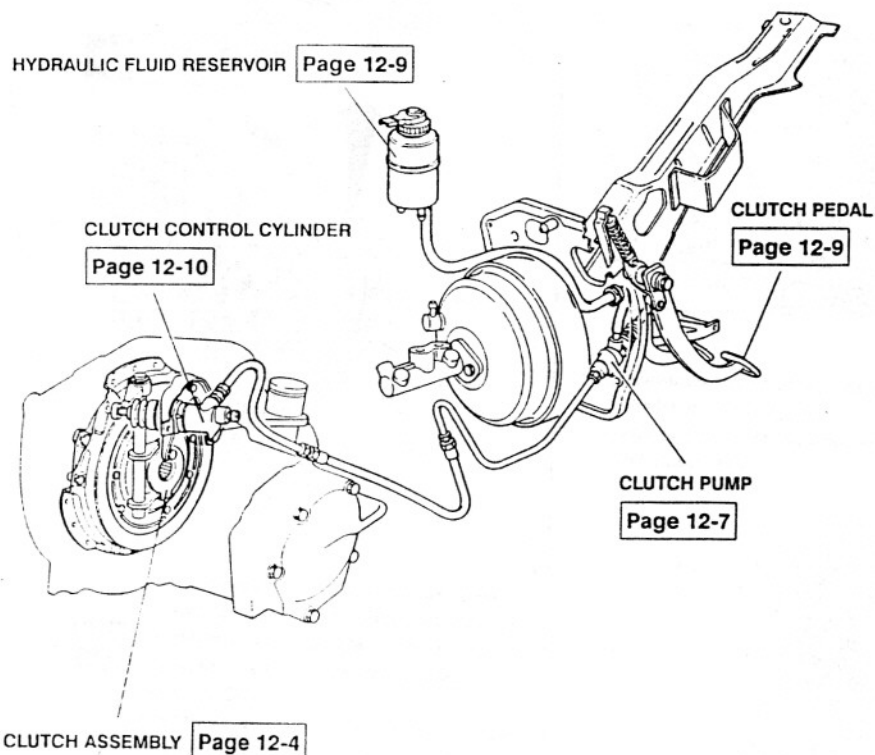
## CLUTCH

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## ILLUSTRATED INDEX

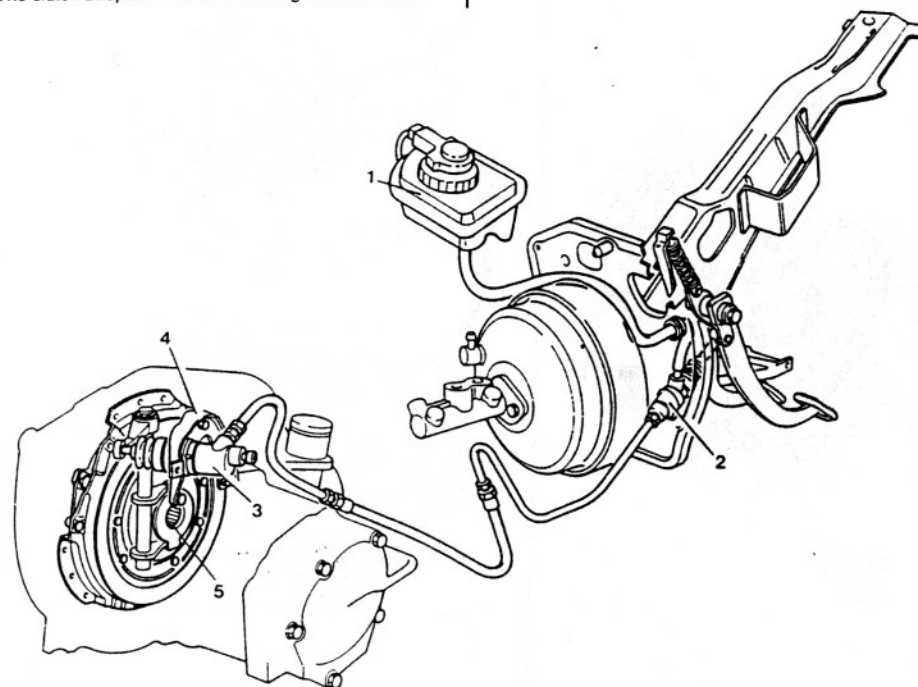


## CLUTCH

## DESCRIPTION

The clutch adopted for the entire range of Alfa Romeo

167 vehicles is of the dry monodisc type with a diaphragm pressure plate with springs.



This traditional solution is integrated with a series of devices aimed at:

1. respecting the current laws regarding the problem of environmental pollution;
  2. reducing the pressure necessary to depress the clutch pedal;
  3. containing the size of the assembly within acceptable values.
- The problem of pollution has been faced with the addition of friction gaskets and clutch plate employing ecological material (without asbestos) in the same way as for the brake pads.
  - To reduce the effort required to depress the clutch pedal and to facilitate disengagement, a hydraulic disengagement device has been adopted on all the models in the "167" range.

This device is composed of a tank (1) shared with the braking system, a pump (2) secured to the pedal and a cylinder (3) fitted to the gear lever bell by way of a bracket (4) and thrust bearing (5).

The use of a hydraulic device makes it possible to:

- increase reliability in relation to the traditional, mechanical type solution;
- improve progression due to the damping of the hydraulic system during disengagement which avoids jerking particularly when the transmitted torque is high;
- greater operating precision as this device permits a constant adjustment to be made in the height of the clutch pedal;
- increase driving comfort, a result of the reduction in the level of vibrations transmitted to the engine due to the the damping effect of the oil.



## CLUTCH ASSEMBLY

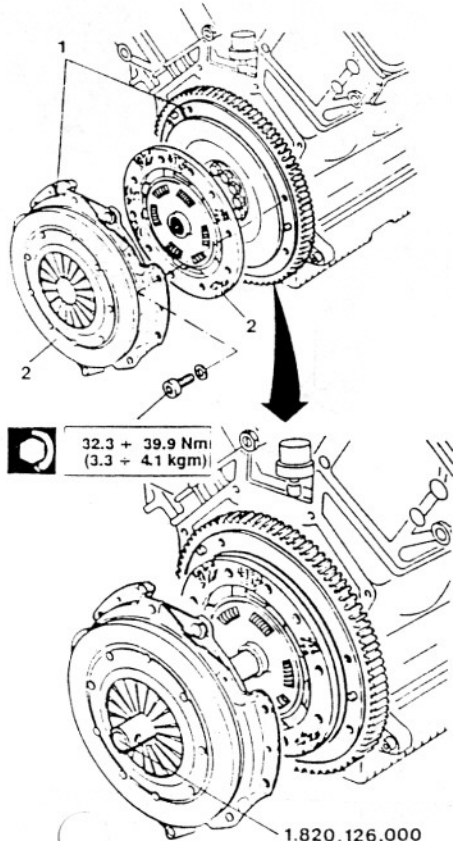
## REMOVAL AND REFITTING

Remove the gearbox (see: GR. 13 - GEARBOX-DIFFERENTIAL - Removal and refitting).

- When replacing the driven gear, mark the relative position between the disk pressure plate and flywheel in order to facilitate refitting.
- Loosen the six screws securing the pressure plate to the flywheel and remove the pressure plate together with the driven gear.



Refit by reversing the procedure followed for removal and using tool No. 1.820.126.000 to centre the clutch plate, tighten the pressure plate retaining screws to the specified torque.

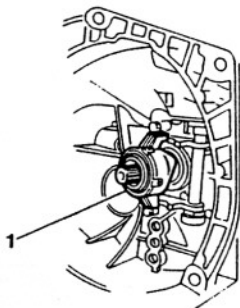


PA4655C J0000

- Withdraw the thrust bearing from its sleeve located in the gearlever bell.

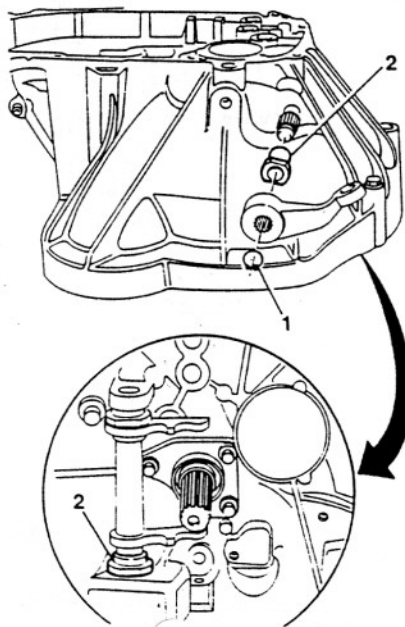


When refitting the bearing it must not show signs of crawling or noise when rotating. If it does then it must be replaced.



Only if necessary:

- Remove the seeger ring and withdraw the clutch engagement control lever.
- Remove the anti-slip bushing from the gearlever bell.



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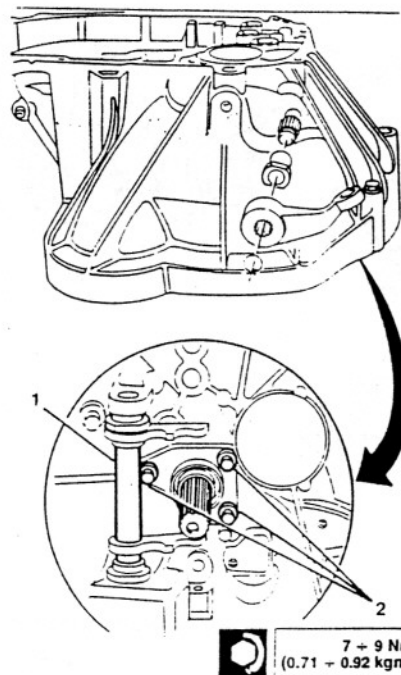


When refitting install a new bushing whenever there is excessive play on the pin.

- Operating from inside the gearlever bell, withdraw the clutch engagement sleeve control pin and fork.
- Loosen the screws and remove the thrust bearing sleeve.



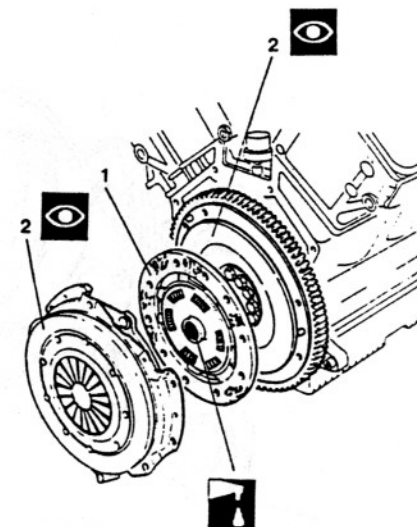
When refitting, grease the bushings and sleeve with the specified product. The sleeve and oil seal should be replaced whenever oil leaks are discovered.



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## CHECKS AND INSPECTIONS

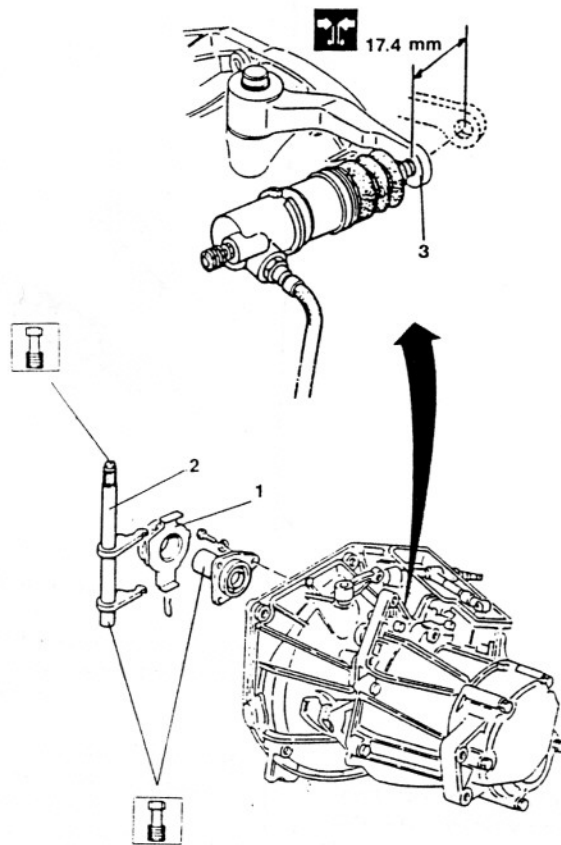
- Check the clutch plate for even wear of the gaskets and their minimum thickness. Check for signs of burning or vitrification and the correct installation and integrity of the springs of the flexible coupling. Check the clutch plate hub for damage, freedom of movement and limited play on the power take-off shaft coupling.
- Check the working surfaces of the flywheel and disc pressure plate for signs of overheating, irregular wear, nicks or parts missing. If necessary replace the disc pressure plate and/or grind the engine flywheel (see: REPAIR MANUAL - ENGINES - GR. 01).



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1. Check the thrust bearing for noise, excessive play and freedom of movement in the sheath.
2. Check the fork for cracks, deformation, freedom of movement and excessive wear of the working surfaces.
3. Check that the disengagement stroke of the clutch control lever is 17.4 mm; if the stroke is below this figure, check the efficiency of the hydraulic circuit.

**CLUTCH PUMP****REMOVAL AND REFITTING**

Using a suitable tool clamp the oil delivery hose to prevent excessive oil spillage during removal.

1. Disconnect the oil delivery hose from the pump.
  2. Remove the safety clip and withdraw the pin connecting the pump to the clutch pedal.
  3. Loosen the nut securing the pump to the body.
- Working in the engine compartment, proceed as follows:

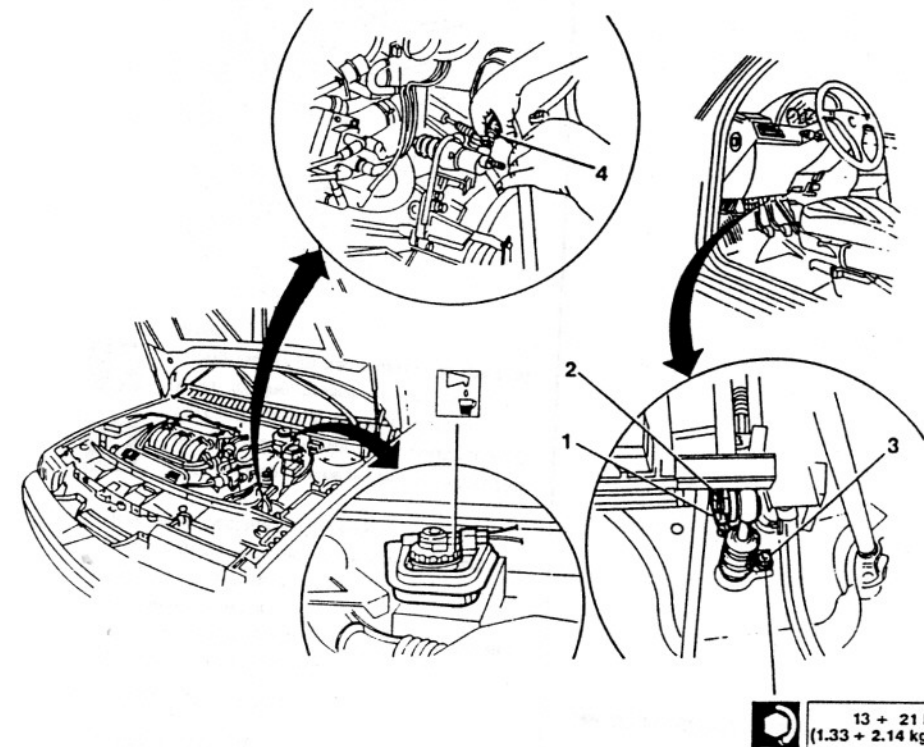
4. Disconnect the flexible hose from the clutch control cylinder.
- Working from inside the vehicle, withdraw the pump together with the flexible hose carrying the oil to the cylinder.




Refit by reversing the procedure followed for removal and tightening the screw securing the clutch pump to the body to the correct torque.



When refitting the pump bleed air from the system (see: BLEEDING THE HYDRAULIC SYSTEM).



 13 + 21 Nm  
(1.33 + 2.14 kgm)



## DISASSEMBLY AND REASSEMBLY

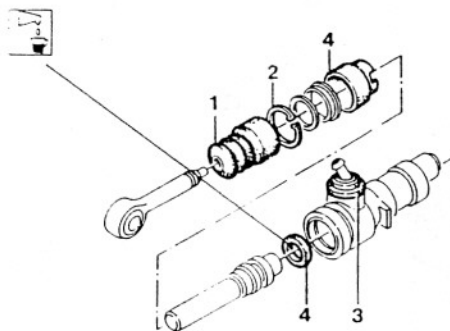
1. Pull off the protective boot from the clutch pump control rod.
2. Remove the spring ring from the clutch pump piston and withdraw the piston from the pump body.
3. Disassemble the gasket and connection located on the inlet of the hose arriving from the hydraulic fluid reservoir.
4. Remove the rubber seal rings.



When refitting install new rings after lubricating with the specified oil and replace the anti-friction gasket.



Refit by reversing the procedure followed for removal.



## CHECKS AND INSPECTIONS

- Check that the piston and inner surface of the cylinder shows no sign of marking, scoring abrasion or rust.

If traces of abrasion or seizing are found in the cylinder body, replace the pump assembly.



## CLUTCH PEDAL

## REMOVAL AND REFITTING

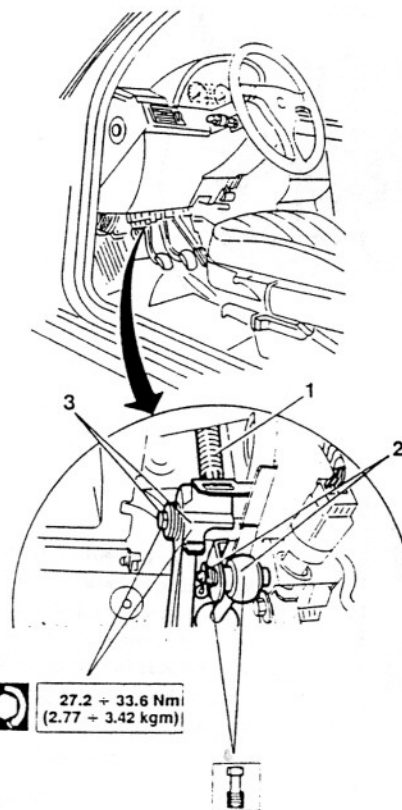
1. Disconnect the clutch pedal return spring.
2. Remove the cotter pin and withdraw the pin connecting the pump to the clutch pedal.
3. Loosen and remove the through screw on the clutch pedal together with the washers and spacers and then disconnect the clutch pedal.



Refit, by reversing the procedure followed for removal and tightening the through screw on the clutch pedal to the correct torque.



When refitting, grease the components securing the clutch pedal using the specified grease.



27.2 + 33.6 Nm  
(2.77 + 3.42 kgm)

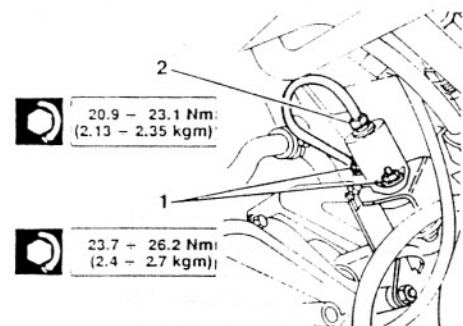


## CLUTCH CONTROL CYLINDER

## REMOVAL AND REFITTING

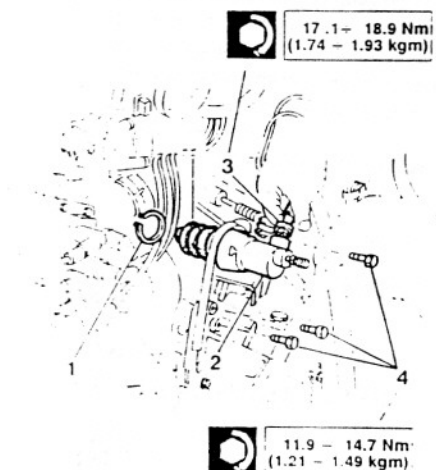
– Only for 1.8 - 2.0 T.S. models

1. Loosen the screws securing the cylinder to the support.
2. Loosen the connection securing the oil delivery hose to the cylinder and remove the cylinder.



– Only for 2.4 V6 models.

1. Remove snap ring.
2. Withdraw the clutch control cylinder from its bracket.
3. Disconnect the connection on the hose carrying hydraulic fluid to the cylinder and plug the hose.
4. If necessary unscrew and remove the screws securing the clutch control cylinder support bracket.



When refitting the cylinder bleed air from the system (see: BLEEDING THE HYDRAULIC SYSTEM).



Refit by reversing the procedure followed for removal and tighten the clutch control cylinder support bracket retaining screws to the correct torque.



## DISASSEMBLY AND REASSEMBLY

1. Pull off the rubber protection and remove it together with the control rod.
2. Using a jet of compressed air, remove the piston from the cylinder body.
3. If necessary remove the relief valve screw from the control cylinder body.

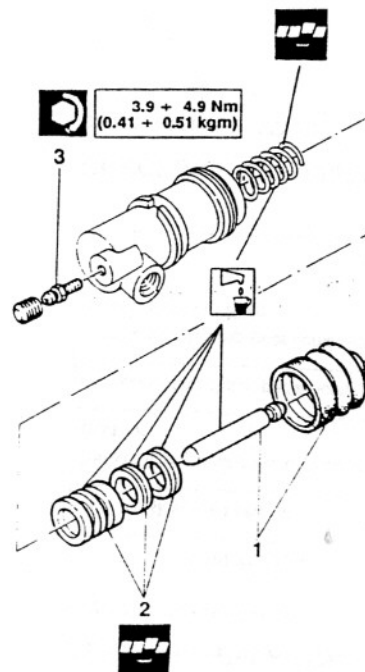


Lubricate the components in the cylinder with the correct oil before refitting.



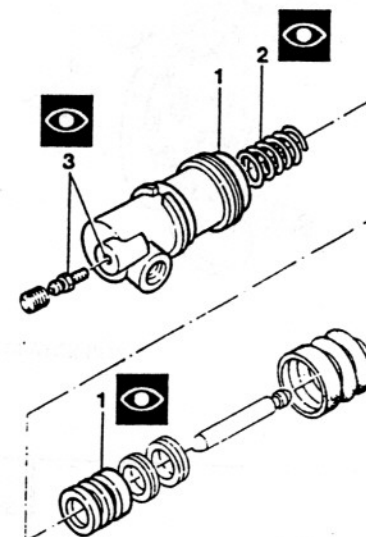
Refit by reversing the procedure followed for removal tightening the relief valve screw to the specified torque if previously removed.

– Substitute all seal rings when refitting.



## CHECKS AND INSPECTIONS

1. Check that there are no signs of marking, scoring abrasion or rust inside the cylinder and on the piston. If signs of abrasion or seizing are detected on the cylinder body, replace the assembly.
2. Check the spring for damage.
3. Check that the relief hole is not blocked.



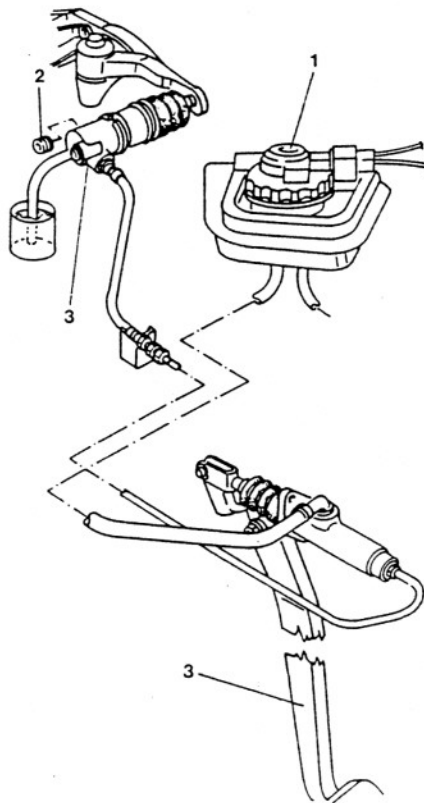


## BLEEDING THE HYDRAULIC SYSTEM

**WARNING:**

Do not re-use the hydraulic fluid resulting from the bleeding operation.

1. Remove the cap on the clutch and brake fluid supply reservoir and if necessary top up to the correct level with the specified fluid.
  2. Remove the protective cap from the relief screw on the cylinder and push a hose onto the screw. Put one end into a transparent container full of hydraulic fluid.
  3. Simultaneously loosen the relief screw and fully depress the clutch pedal and allowing it to return slowly. Repeat the operation until all air trapped in the circuit has been eliminated. Then with the clutch pedal fully depressed, close the relief screw, remove the hose and install the protective cap.
- Top up the level of fluid in the reservoir and replace the cap.
- During bleeding the fluid in the reservoir must not fall below the "MIN" mark.
  - Operate with care in order to prevent the hydraulic fluid from touching paintwork.
  - After bleeding check that both the clutch and gears disengage and engage correctly.
- If necessary check the disengagement stroke on the clutch control lever.



## TECHNICAL CHARACTERISTICS AND SPECIFICATIONS

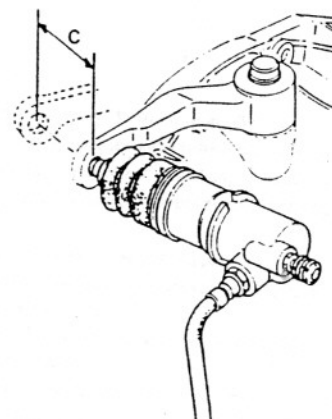
### GENERAL INDICATIONS

#### FLUIDS AND LUBRICANTS

APPLICATION	TYPE	NAME
Clutch disk splined section	OIL	(MILLOIL OBTS250)
Thrust bearing seat and clutch control lever shaft rod	GREASE	TUTELA MR3
Pin connecting clutch pedal/pump	GREASE	SHELL RETINAX G
Lubrication of pump inner components and hydraulic system filling	FLUID Class: DOT 4 SAE J170 3F	ALFA ROMEO BRAKE FLUID SUPER DOT 4

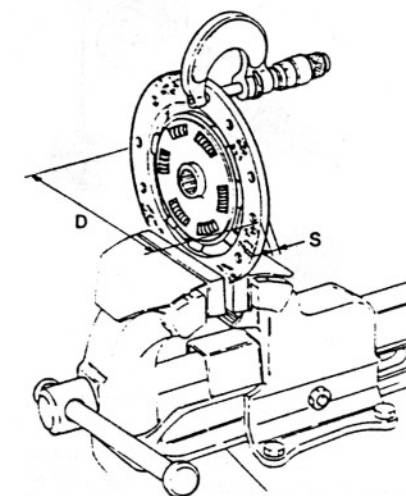
### CHECKS AND ADJUSTMENTS

#### CLUTCH CONTROL LEVER



Clutch control lever disengagement travel ..... C = 17.4 mm

#### CLUTCH DISK



Clutch disk thickness ..... S = 7.1 + 7.7 mm  
Clutch disk diameter ..... D = (2.4 V6) = 228.6 mm  
..... (1.8 - 2.0 T.S.) = 215 mm



## TIGHTENING TORQUES: 1.8 - 2.0 T.S.

Description	N·m	kg·m
Screw with unlosable washer securing clutch mechanism	32.3 + 39.9	3.29 + 4.07
Hexagon nut securing clutch cylinder to bracket	23.75 + 26.25	2.42 + 2.67
Hexagon nut securing bracket to compound screw	20.9 + 23.1	2.13 + 2.35
Union securing pipe to cylinder	17.1 + 18.9	1.74 + 1.92
Nut securing hoses to bracket	17.85 + 22.05	1.82 + 2.25
Union for clutch control/clutch pump hoses	17.1 + 18.9	1.74 + 1.92

## TIGHTENING TORQUES: 2.4 V6

Description	N·m	kg·m
Allen screw securing clutch mechanism	17.85 + 22.05	1.82 + 2.25
Clutch control/clutch pump hose connection	17.1 + 18.9	1.74 + 1.92
Hexagonal head screw securing clutch cylinder bracket to gearbox	11.9 + 14.7	1.21 + 1.49

## SPECIAL TOOLS

TOOL NUMBER	DESCRIPTION
1.820.126.000	Clutch disk centering spindle
1.821.215.000	Thrust bearing puller (only for clutch version with tie-rods)



## FAULT DIAGNOSIS AND CORRECTIVE ACTION

SYMPTOMS AND ANOMALIES	FAULT ISOLATION	TEST
<b>CLUTCH SLIPS</b> During acceleration, engine revs increase without corresponding increase in vehicle speed	<ul style="list-style-type: none"> <li>- Start engine</li> <li>- apply handbrake</li> <li>- depress clutch pedal and engage 4th gear</li> <li>- accelerate and release clutch pedal gradually; the vehicle does not move and the engine does not stop</li> </ul>	<b>A</b>
<b>CLUTCH DOES NOT DISENGAGE PROPERLY</b> Sticking or noises are noted when changing down or when engaging reverse gear	<ul style="list-style-type: none"> <li>- Start engine</li> <li>- depress clutch pedal and engage reverse gear after 4 or 5 seconds; noise is noted when changing gear</li> </ul>	<b>B</b>
<b>CLUTCH VIBRATES OR JERKS</b> Clutch pedal vibrates when it is being released	<ul style="list-style-type: none"> <li>- Start engine</li> <li>- depress and release clutch pedal; vehicle does not pull off smoothly but jerks or vibrates</li> </ul>	<b>C</b>
<b>NOISY CLUTCH</b>	<ul style="list-style-type: none"> <li>- Start engine</li> <li>- Depress and release clutch pedal; noise is noted during pedal actuation</li> </ul>	<b>D</b>
<b>EXCESSIVE PRESSURE REQUIRED TO ACTUATE CLUTCH PEDAL</b> Clutch requires excessive pressure on the pedal	<ul style="list-style-type: none"> <li>- Press clutch pedal using the applicable tool; pedal pressure is correct if applied pressure does not exceed the prescribed value</li> </ul>	<b>E</b>





## CLUTCH SLIPS

TEST A

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
A1	CHECK PEDAL		
	- Check that clutch pedal returns to proper rest position when released	<input checked="" type="radio"/> OK ▶ <input type="radio"/> OK ▶	Carry out step A3 Carry out step A2
A2	CHECK CLUTCH CYLINDER		
	- Check that clutch cylinder pin returns to proper rest position. Visually check that the exterior of cylinder body is not leaking oil through the piston inner seal	<input checked="" type="radio"/> OK ▶ <input type="radio"/> OK ▶	Carry out step A3 Replace clutch cylinder; if fault persists replace clutch pump
A3	CHECK CONTROL LEVER		
	- Check that the clutch control lever disengagement travel is within prescribed limits	<input checked="" type="radio"/> OK ▶ <input type="radio"/> OK ▶	Carry out step A4 Overhaul clutch unit
A4	CHECK CLUTCH DISK		
	- Check wear of clutch disk lining	<input checked="" type="radio"/> OK ▶ <input type="radio"/> OK ▶	Carry out step A5 Replace clutch disk



## CLUTCH SLIPS (continued)

TEST A

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
A5	CHECK FOR CONTAMINATION BY OIL OR GREASE		
	- Check for presence of oil or grease on the surfaces of the disk	<input checked="" type="radio"/> OK ▶ <input type="radio"/> OK ▶	Carry out step A6 Replace clutch disk and gearbox main shaft oil seal
A6	CHECK FLYWHEEL AND DISK PRESSURE PLATE		
	- Check working surfaces of the flywheel and disk pressure plate for traces of overheating, uneven wear, nicks and removed material	<input type="radio"/> OK ▶	Replace disk pressure plate and/or reface the flywheel (see: REPAIR MANUAL - ENGINES - GR. 01)



## CLUTCH DOES NOT DISENGAGE PROPERLY

## TEST B

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
B1	CHECK FOR FLUID LEAKAGE	OK ▶	Carry out step B2
	- Visually check for fluid leakage from clutch actuating cylinder, pump or lines	<del>OK</del> ▶	Replace defective parts
B2	CHECK PUMP INTERNAL LEAKAGE	OK ▶	Carry out step B3
	- Slowly depress clutch pedal and at the same time check that fluid does not flow back into the reservoir - Start the engine, depress clutch pedal, engage first gear and hold the clutch pedal down; wait for about 30 seconds and check that the vehicle does not move	<del>OK</del> ▶	Replace clutch pump
B3	CHECK FOR TRAPPED AIR	OK ▶	Carry out step B4
	- Check for presence of trapped air in the hydraulic circuit by verifying that the clutch control lever disengagement travel is with the prescribed limits	<del>OK</del> ▶	Purge trapped air from the circuit
B4	CHECK SPLINED COUPLING	OK ▶	Carry out step B5
	- Check for dirt, rust or dents on splines of clutch disk hub and of gearbox main shaft	<del>OK</del> ▶	Remove any damage and clean the hub and main-shaft splines; replace clutch disk if necessary
B5	CHECK CLUTCH DISK	OK ▶	Carry out step B6
	- Check that the clutch disk is not distorted	<del>OK</del> ▶	Replace clutch disk
B6	CHECK DIAPHRAGM SPRING	<del>OK</del> ▶	Replace disk pressure plate
	- Check that the disk pressure plate diaphragm spring is not damaged		



## CLUTCH VIBRATES AND/OR JERKS

## TEST C

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
C1	CHECK ENGINE MOUNTS	OK ▶	Carry out step C2
	- Check that the engine mounts are not loose or deteriorated (see group 00)	<del>OK</del> ▶	Tighten or replace affected mounts
C2	CHECK CLUTCH DISK	OK ▶	Carry out step C3
	- Check clutch disk lining for "vitrification" due to overheating, traces of oil or grease, distortion, wear or loose rivets. Check flexible couplings springs for damage	<del>OK</del> ▶	Replace clutch disk and, if necessary, gearbox main shaft oil seal
C3	CHECK FLYWHEEL AND DISK PRESSURE PLATE	<del>OK</del> ▶	Replace disk pressure plate and if necessary re-face or replace flywheel (see: REPAIR MANUAL - ENGINES - GR. 01)
	- Check working surfaces of flywheel and disk pressure plate for wear or distortion		



NOISY CLUTCH	TEST D
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
D1	CHECK THRUST BEARING		
- Check thrust bearing for wear or binding; check condition of mating surfaces of thrust bearing and disk pressure plate spring		<input checked="" type="radio"/> OK ▶ <input checked="" type="radio"/> OK ▶	Carry out step D2  Replace thrust bearing; replace disk pressure plate if necessary
D2	CHECK FORK		
- Check that the thrust bearing fork does not creak when moved		<input checked="" type="radio"/> OK ▶	Check fork shaft bushings and replace if necessary



EXCESSIVE PRESSURE REQUIRED TO ACTUATE CLUTCH PEDAL	TEST E
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
E1	CHECK PEDAL SPRING		
- Check clutch booster mechanism spring for damage		<input checked="" type="radio"/> OK ▶ <input checked="" type="radio"/> OK ▶	Carry out step E2  Replace spring
E2	CHECK ACTUATING CYLINDER		
- Carry out step A2 of TEST A (see step A2)		<input checked="" type="radio"/> OK ▶ <input checked="" type="radio"/> OK ▶	Carry out step E3  (See step A2)
E3	CHECK CLUTCH UNIT		
- Check clutch unit for internal breakage and damage		<input checked="" type="radio"/> OK ▶	Replace affected parts inside clutch unit