Clutch

Page
Return
Page 1
Page 2
Page 3
Page 4
Page 5
Page 6
Page 7
Page 8
Page 9
Page 10
Page 11
Page 12
Page 13
Page 14

GROUP 12

CLUTCH

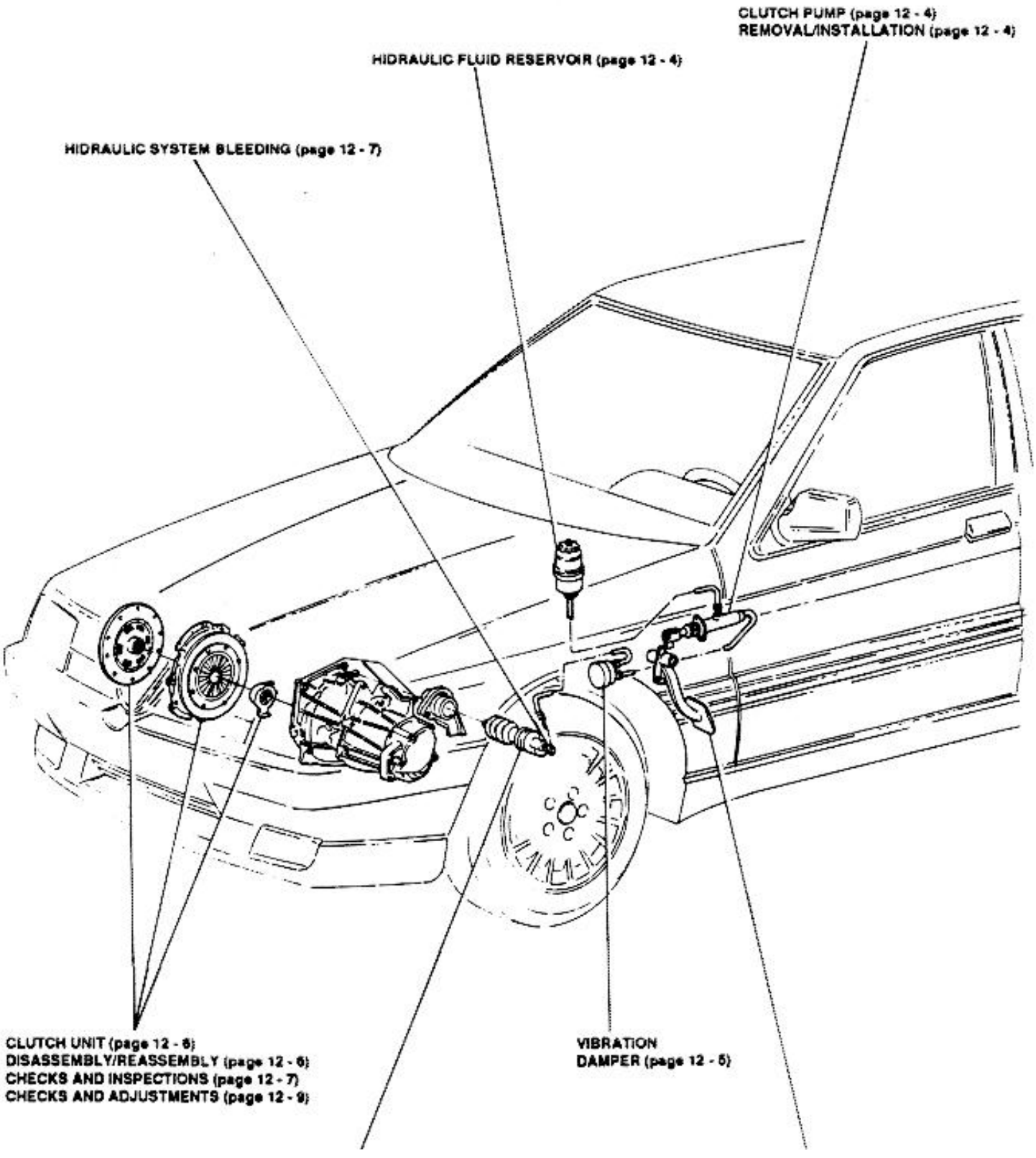
TABLE OF CONTENTS

GROUP 12

CLUTCH

TABLE OF CONTENTS

ILLUSTRATED INDEX



CLUTCH MASTER CYLINDER (page 12 - 5)
REMOVAL/INSTALLATION (page 12 - 5)

CLUTCH PEDAL (page 12 - 3)
REMOVAL/INSTALLATION (page 12 - 3)

CLUTCH

DESCRIPTION

The clutch includes all those elements that transmit the mechanical power of engine crankshaft to the gearbox-differential and to the drive wheels. This mechanical connection is realized using the friction force developed between surfaces faced and pressed against each other by a spring.

The Alfa 164 model is equipped with a hydraulically actuated dry single-disc clutch, with throw-out bearing; the throw-out bearing acts on a diaphragm spring and enables engagement and disengagement of the driven disc.

The main components of the clutch are: the clutch pedal, the pump, the master cylinder and the clutch unit.

The clutch pedal actuates the pump through a mechanical linkage.

Pressurized fluid is delivered to the master cylinder through a suitable hydraulic circuit.

The actuating cylinder, seated into its support, actuates the clutch disengagement fork through a plunger; the throw-out bearing overcomes the reaction of the diaphragm spring and backs the clutch pressure plate body, thus disengaging the clutch.

Engagement of the clutch is performed in a similar manner.

When the clutch pedal is released, the clutch diaphragm spring determines a pressure of the clutch disc on engine flywheel.

The friction force that creates is sufficient to drive into motion all the mechanical devices involved in the drive system and vehicle movement.

The hydraulic fluid flows back to clutch pump through the same hydraulic circuit, and depressurizes the clutch master cylinder.

The hydraulic fluid reservoir supplies both the brakes and clutch systems, to maintain both systems efficient.

Specific characteristics of the clutch are as follows:

- Hydraulic actuation that maintains the throw-out bearing in contact with the diaphragm spring regardless of driven disc wear, and provides automatic and progressive take-
- Clutch unit provided with a disc free of asbestos fibers conforming to actual anti-pollution regulations

The "S" version vehicles are equipped with an oversize clutch unit to match the increased power of the engine; nevertheless, the disassembly and reassembly procedures remain unchanged.

Clutch unit controls (control lever and fork) act on the throw-out bearing pulling, and not pushing, the Belleville washer of disc pressure plate, and therefore press the clutch disc against the flywheel.

CLUTCH PEDAL

The clutch pedal is the point of application of pressure applied by the driver.

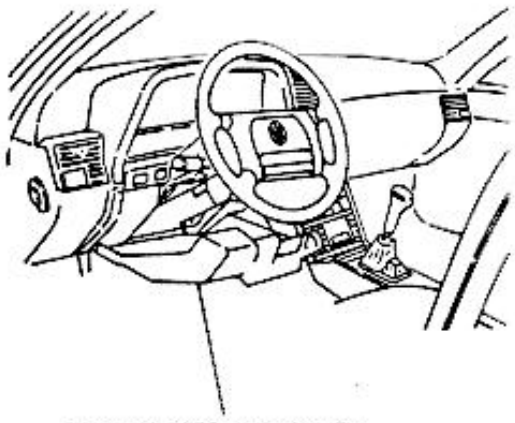
The pedal is hinged to the pedals group and is mechanically connected to the clutch pump piston through a lever and fork linkage.

A spiral spring allows the driver to apply a lower pressure on the pedal during clutch actuation.

In the event of failure of the system, with consequent loss or decrease of pressure in the clutch hydraulic circuit, the clutch pedal is moved to bottom of travel by the action of the spring, thus evidencing the presence of a malfunction.

REMOVAL/INSTALLATION

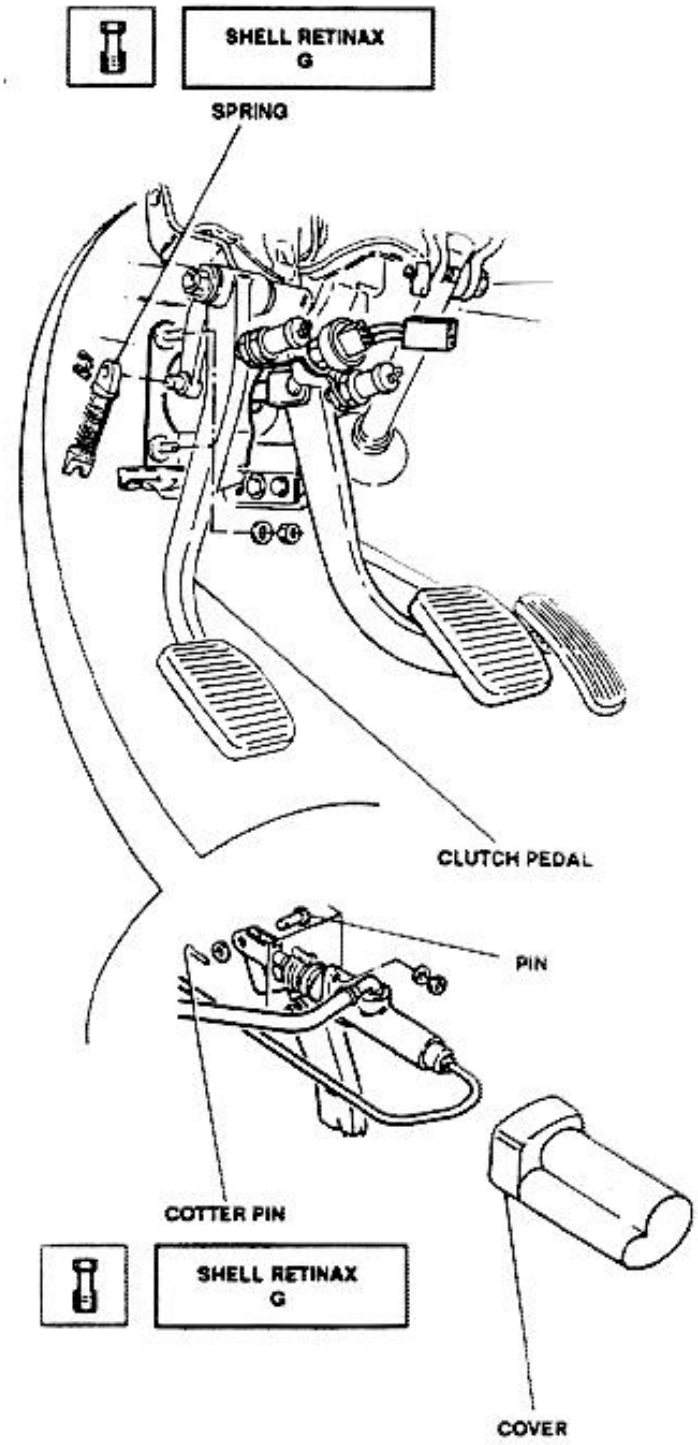
1. Remove knees protection panel from driver's side.



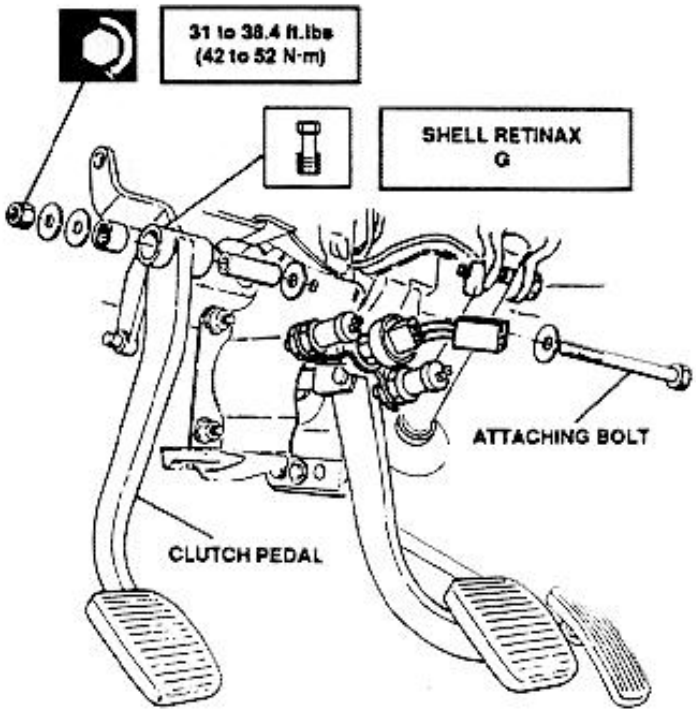
KNEES PROTECTION PANEL

up of slack.
Therefore, no adjustment of the clutch is required.

2. Remove clutch pump cover.
3. Remove clutch servo unit mechanism spring.
4. Remove cotter pin and withdraw pin securing pump-clutch pedal.



5. Remove nut and withdraw bolt securing pedals group to support.



HYDRAULIC FLUID RESERVOIR

Refer to **Group 22.**

CLUTCH PUMP

The clutch pump consists of a piston seated inside of a cylinder and connected to the clutch pedal by means of a lever and fork linkage. The pressure applied on clutch pedal produces an increase of pressure of the hydraulic fluid; the fluid is delivered to the clutch master cylinder through a hydraulic circuit. Overhaul of the clutch pump can not be performed: therefore, replace pump if defective.

REMOVAL/INSTALLATION

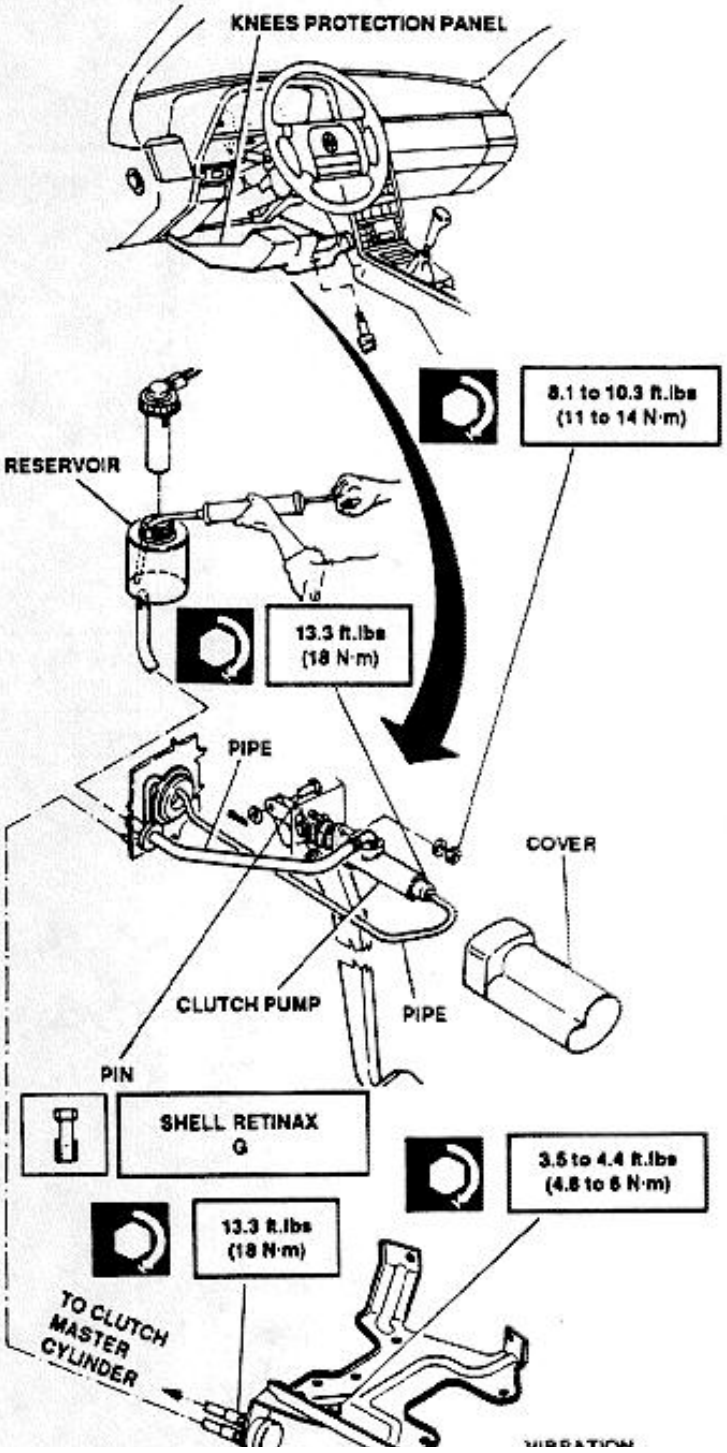
1. Empty reservoir by sucking hydraulic fluid with a syringe.
2. Remove knees protection panel, driver's side.
3. Remove clutch pump plastic cover.
4. Remove cotter pin and withdraw pin securing clutch pump-pedal.
5. Disconnect piping from pump, paying attention to

6. Remove clutch pedal.

prevent draining of hydraulic fluid.

6. Remove nuts and remove clutch pump.
7. Disconnect the vibration damper hoses.
8. Unscrew the fixing screws and remove the vibration damper from the air filter support.

? Following installation of the pump and the vibration damper, bleed air trapped in system (Refer to: **"HYDRAULIC SYSTEM BLEEDING"**).

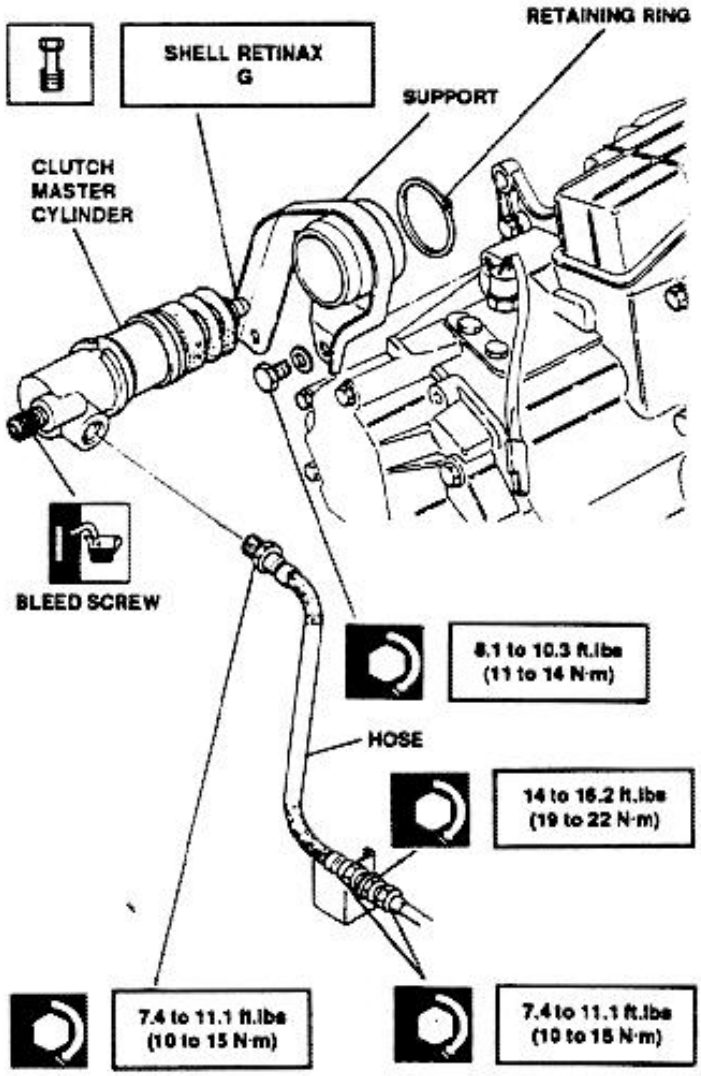


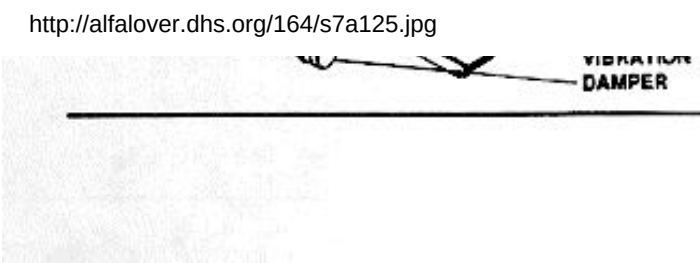
CLUTCH MASTER CYLINDER

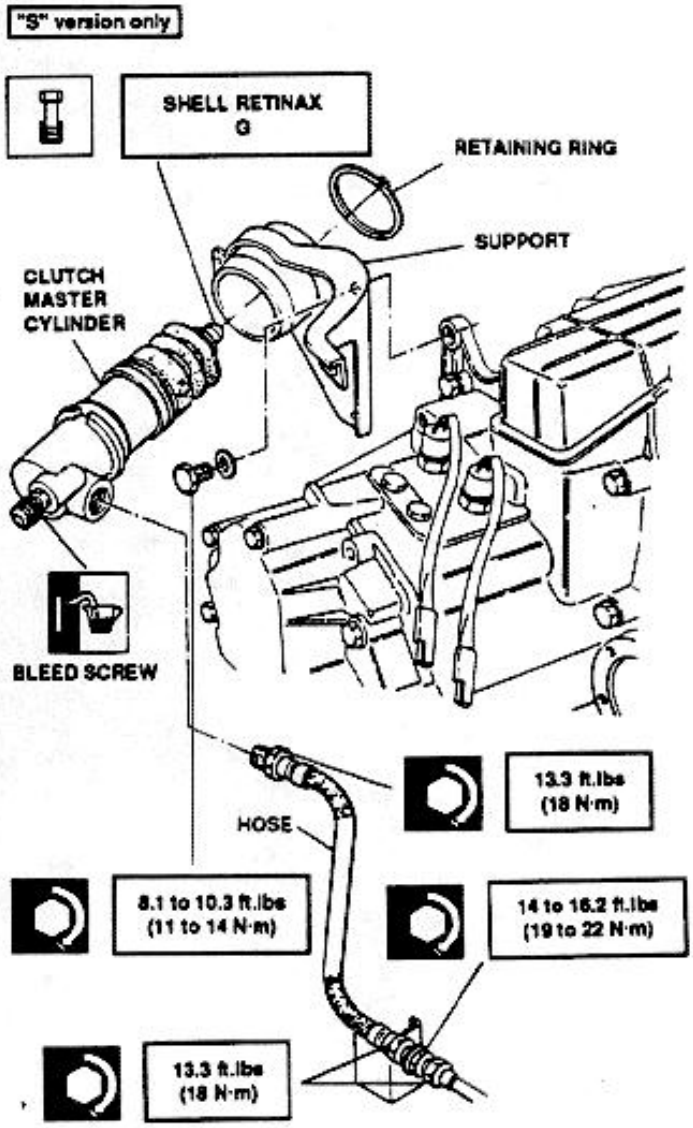
The clutch master cylinder engages and disengages the clutch by the pressure of fluid delivered by the clutch pump. The cylinder acts directly on clutch control lever. Overhaul of the clutch master cylinder can not be performed: therefore, replace cylinder if defective.

REMOVAL/INSTALLATION

1. Remove retaining ring.
2. Extract clutch master cylinder from its support.
3. Disconnect hose and plug openings.
4. If required, remove three attaching nuts and remove support.
5. Following installation, bleed air trapped in system (Refer to: **"HYDRAULIC SYSTEM BLEEDING"**).




DAMPER

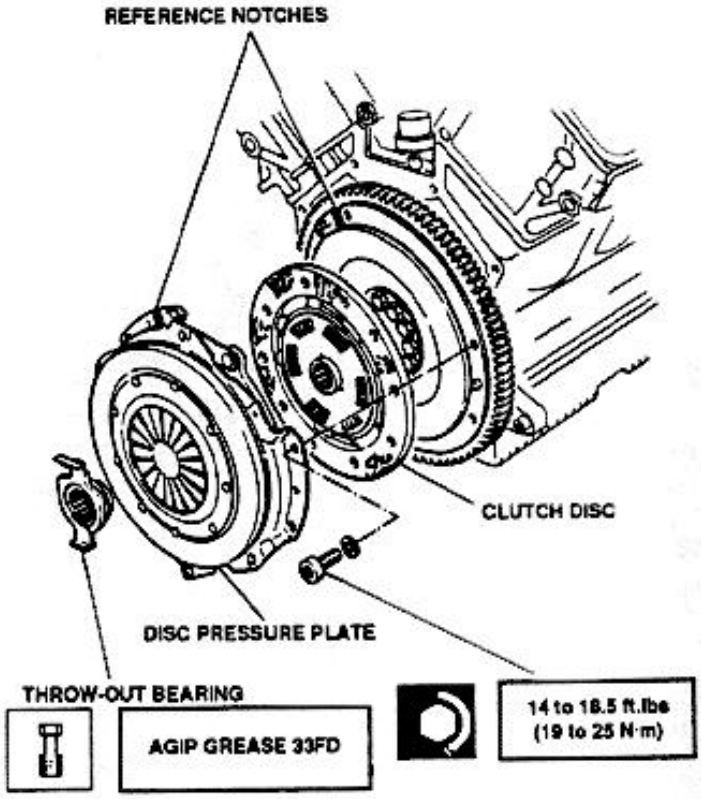


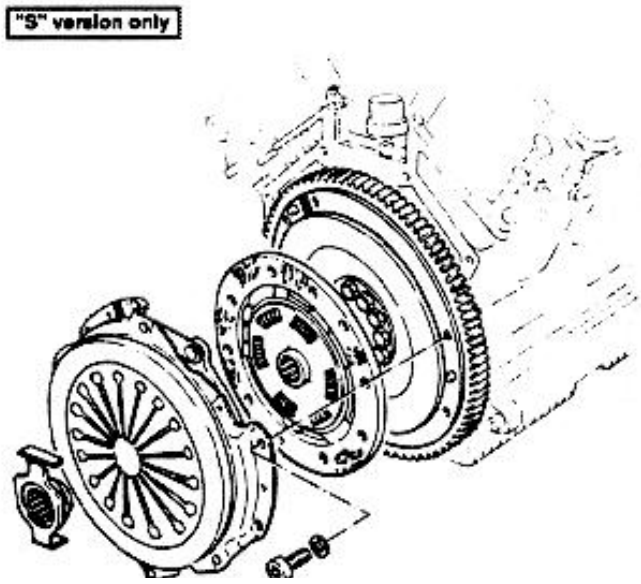
CLUTCH UNIT

The clutch unit mechanically connects the engine crankshaft (flywheel) to the driven shaft (gearbox main shaft) by means of the friction forces developed by the flywheel and clutch disc surfaces which are faced and pressed one against the other by the diaphragm spring.
The main components of clutch unit are: the clutch disc, disc pressure plate, throw-out bearing and thrust bearing control rod.

DISASSEMBLY/REASSEMBLY

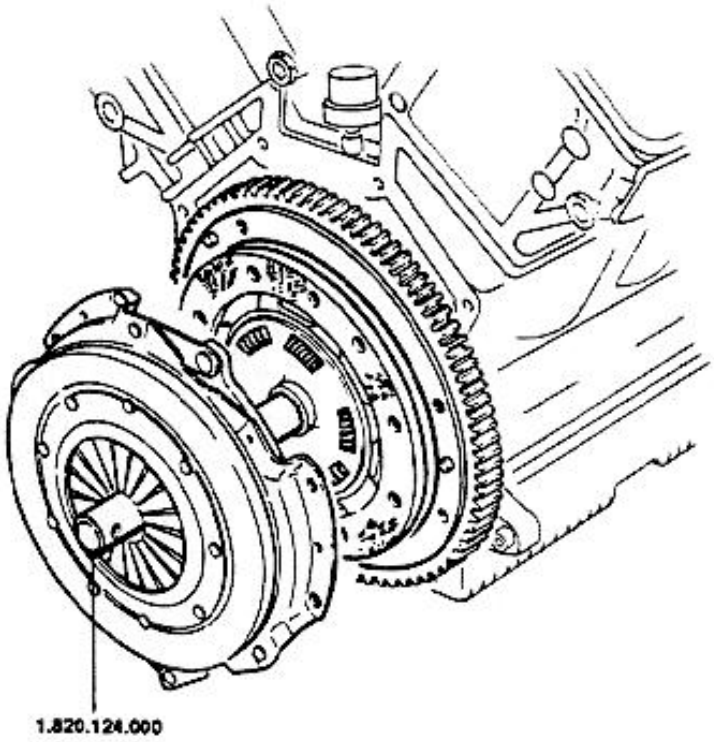
1. Remove gearbox (refer to **Group 23**).
3. Remove attaching screws, then remove disc pressure plate and clutch disc.
4. Release springs and remove throw-out bearing - (**on "S" version only**). Remove throw-out bearing using tool No. 1.821.215.000.

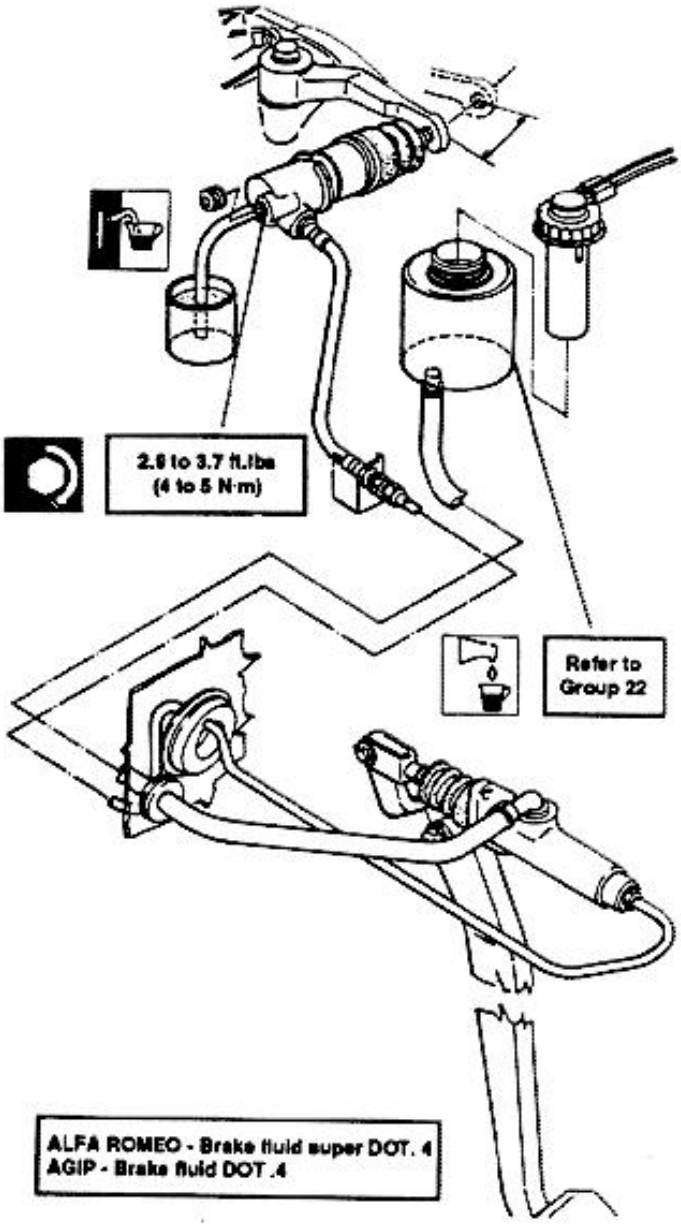




2. Countermark flywheel and disc pressure plate.

5. At reassembly, center clutch disc using tool No. 1.820.124.000.





HYDRAULIC SYSTEM BLEEDING

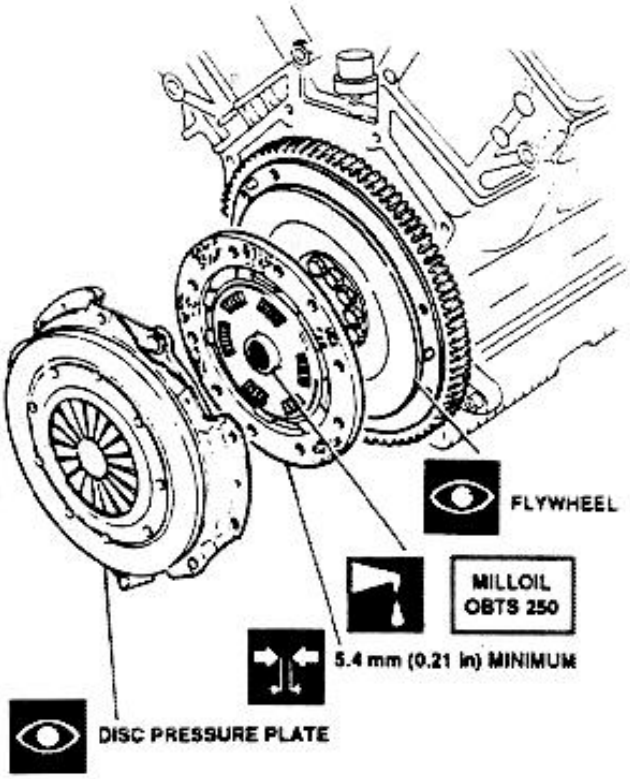
PRECAUTIONS:

- Never re-use hydraulic fluid drained during bleeding.
- During bleeding, maintain level of fluid in reservoir above "MIN" mark.
- Take any precaution to prevent hydraulic fluid from contacting the paintwork.
- After bleeding has been accomplished, check for proper disengagement of clutch and engagement of speeds.
  If required, check disengagement travel of clutch control lever.

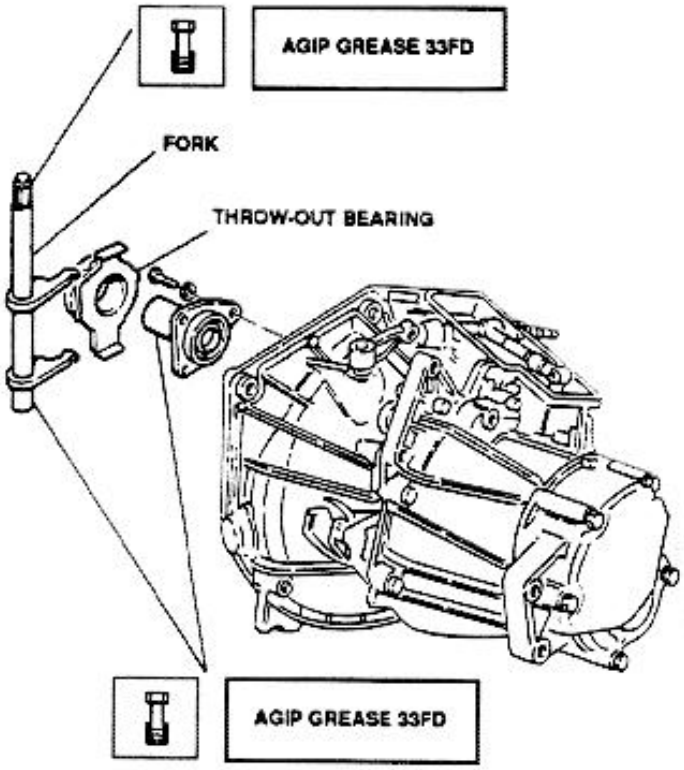
CHECKS AND INSPECTIONS

1. Check clutch disc for even wear of friction gaskets and minimum thickness, absence of burns or traces of vetrification; check fastening devices for proper riveting and cushioning springs for integrity.
   Check clutch disc hub for integrity, freedom of movement and absence of excessive play of coupling onto drive quill shaft.

2. Check work surfaces of flywheel and disc pressure plate for traces of overheating, abnormal wear, nicks or removed material. If necessary, replace disc pressure plate and/or grind the flywheel (refer to **Group 01**).



3. Check throw-out bearing for noisy operation, excessive play and freedom of movement onto guide sleeve.
4. Check fork for cracks, distortion, freedom of movement and excessive wear of work surfaces.



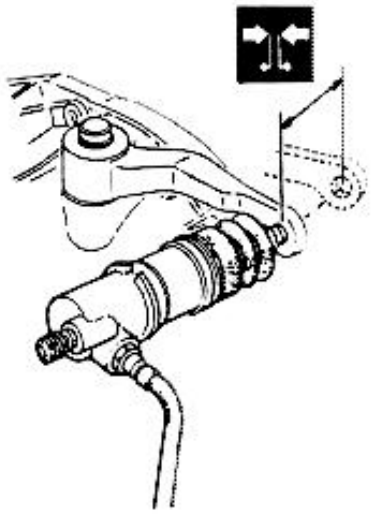
TECHNICAL CHARACTERISTICS AND SPECIFICATIONS

FLUIDS AND LUBRICANTS

Application	Type	Name
Pin connecting clutch pedal to clutch master cylinder	GREASE	SHELL RETINAX G
Spherical seating in clutch control lever plunger of clutch master cylinder	GREASE	SHELL RETINAX G
Throw-out bearing seating and clutch control lever shaft	GREASE	AGIP GREASE 33 FD
Clutch hydraulic system servicing	FLUID	ALFA ROMEO Brake fluid super DOT. 4 AGIP Brake fluid DOT 4
Clutch disc spline	OIL	MILLOIL OBTS 250

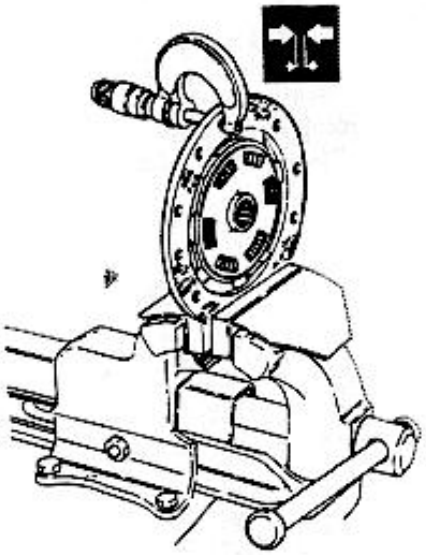
CHECKS AND ADJUSTMENTS

CLUTCH CONTROL



Clutch control lever disengagement stroke	15.5 to 18.0 mm (0.61 to 0.71 in)
Clutch control lever disengagement stroke ("S "version)	12.6 to 14.1 mm (0.50 to 0.55 in)
Control lever maximum stroke with clutch disc to wear limit ("S" version)	19.27 to 20.77 mm (0.76 to 0.82 in)

CLUTCH DISC



Disc thickness (new)	7.4 to 8.0 mm (0.29 to 0.31 in)
Disc thickness to wear limit	5.4 mm (0.21 in)
Disc thickness (new) ("S" version)	7.1 to 7.7 mm (0.28 to 0.30 in)
Disc thickness to wear limit ("S"version)	5.4 mm (0.21 in)

TIGHTENING TORQUES

Disc pressure plate to flywheel attaching screws	14 to 18.4 ft.lbs	19 to 25 Nm
Clutch master cylinder support to gearbox attaching screw	8.1 to 10.3 ft.lbs	11 to 14 Nm
Clutch pump attaching nuts	8.1 to 10.3 ft.lbs	11 to 14 Nm
Clutch master cylinder bleed screw	2.9 to 3.6 ft.lbs	3.9 to 4.9 Nm
Hydraulic system fitting nuts	7.4 to 11 ft.lbs	10 to 15 Nm
Clutch master cylinder fitting	14 to 16.2 ft.lbs	19 to 22 Nm
Vibration damper fitting	13.3 lbs	18 Nm
Vibration damper to air filter support	3.5 to 4.4 lbs	4.8 to 6 Nm

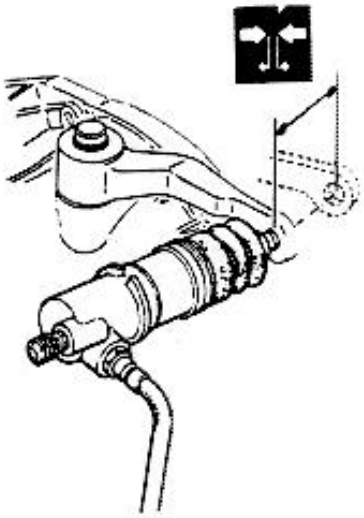
SPECIAL TOOLS

Tool number	Description
1.820.124.000	Disc clutch centering mandrel
1.821.215.000	Throw-out bearing puller

TROUBLESHOOTING PROCEDURE

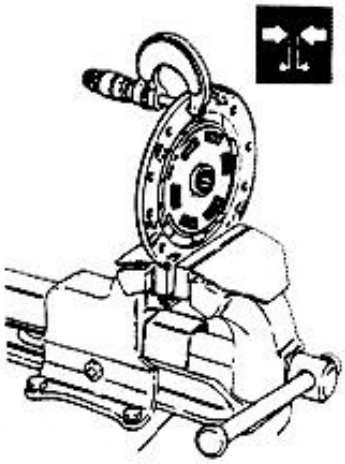
TROUBLES AND SYMPTOMS	FAULT ISOLATION	TEST REFERENCE
CLUTCH SLIPS During acceleration, engine revs increase, without corresponding increase of vehicle speed.	- Start engine. - Apply parking brake. - Press clutch pedal and shift into 4th gear. - Accelerate and release clutch pedal gradually; the vehicle does not move or moves slightly and engine does not stop.	**A**
CLUTCH DOES NOT DISENGAGE PROPERLY Sticking or noises are noted during shifting to a lower gear or to reverse gear.	- Start engine. - Press clutch pedal and engage 1st gear after 1 to 2 seconds; noise is noted during gear shift.	**B**
CLUTCH VIBRATES OR JERKS Clutch pedal vibrates during pedal release.	- Start engine. - Press release clutch pedal; vehicle does not begin moving smoothly, by it jerks and vibrates.	**C**
CLUTCH IS NOISY	- Start engine. - Press and release clutch pedal: noise is noted during pedal actuation.	**D**
EXCESSIVE PRESSURE REQUIRED TO ACTUATE CLUTCH PEDAL Clutch requires excessive pedal pressure.		**E**

CLUTCH SLIPS	TEST A

TEST STEPS	RESULTS	REMEDY
A1 PEDAL CHECK - Check that clutch pedal returns to proper rest position when released	OK ▶ ~~OK~~ ▶	Carry-out **step A3** Carry-out **step A2**
A2 CLUTCH MASTER CYLINDER CHECK - Check that clutch master cylinder pin returns to proper rest position; furthermore, visually check the exterior of master cylinder body for absence of oil leakage through the piston inner seal	OK ▶ ~~OK~~ ▶	Carry-out **step A3** Replace **clutch master cylinder**; if fault persists replace **clutch pump**
A3 CONTROL LEVER CHECK - Check that clutch control lever disengagement travel is within limits  **15.5 to 18 mm (0.6 to 0.7 In)** **for "S" version only: 12.6 to 14.1 mm (0.5 to 0.55 In)**	OK ▶ ~~OK~~ ▶	Carry-out **step A4** Overhaul **clutch unit**

(Cont.d)

CLUTCH SLIPS	TEST A

TEST STEPS	RESULTS	REMEDY
A4 CLUTCH DISK CHECK		
- Check wear of clutch disk lining  **for all versions: min. 5.4 mm (0.21 in)**	OK ▶ ~~OK~~ ▶	Carry-out **step A5** Replace **clutch disk**
A5 OIL OR GREASE CONTAMINATION CHECK		
- Check for presence of oil or grease on the disk surfaces	OK ▶ ~~OK~~ ▶	Carry-out **step A6** Replace **clutch disk** and **gearbox main shaft oil seal**
A6 FLYWHEEL AND DISK PRESSURE PLATE CHECK		
- Check working surfaces of flywheel and disk pressure plate for traces of overheating, uneven wear, nicks and removed material	~~OK~~ ▶	Replace **disk pressure plate** and/or grind **the flywheel material** (refer to **Group 01**)

End of test A

CLUTCH DOES NOT DISENGAGE PROPERLY — TEST B

TEST STEPS	RESULTS	REMEDY
B1 FLUID LEAKAGE CHECK - Visually check for fluid leakage from clutch actuating cylinder, pump or lines	OK ▶ ~~OK~~ ▶	Carry-out **step B2** Replace **defective items**
B2 PUMP INTERNAL LEAKAGE CHECK - Press clutch pedal slowly, and simultaneously check that fluid does not flow back to the reservoir - Start engine, press clutch pedal, engage first gear and hold the clutch pedal pressed; wait for about 30 seconds and verify the vehicle does not tend to move	OK ▶ ~~OK~~ ▶	Carry-out **step B3** Replace **clutch pump**
B3 TRAPPED AIR CHECK - Check for presence of air trapped into the hydraulic circuit by verifying that clutch control lever disengagement travel is within limits	OK ▶ ~~OK~~ ▶	Carry-out **step B4** **Purge trapped air** from the circuit
B4 SPLINED COUPLING CHECK - Check for presence of dirt, rust or dents on splines of clutch disk hub and of gearbox main shaft	OK ▶ ~~OK~~ ▶	Carry-out **step B5** Polish out any damage and clean the **hub** and **main shaft splines**; replace **clutch disk**, if necessary

(Cont.d)