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DESCRIPTION

- The clutches used (single-plate or double-plate type according to motorization) are of the hydraulic control type with automatic taking-up.

- Clutch disengagement is realized by means of the special master cylinder which, operated by clutch pedal, transmits the pressure increase of system (supplied by the clutch and brake fluid tank) to piston of operating cylinder 8. This last, through push rod 9 operates on clutch disengagement fork 1 which moves thrust bearing 13 and wins diaphragm spring 15 action with consequent backing of driven plate (plates) 14 and clutch disengagement.

- The peculiarity of the hydraulic control is that of keeping thrust bearing 13 in contact with diaphragm spring 15 of pressure plate body 16, independently of driven plate (plates) wear degree, thus realizing taking-up in an automatic and progressive way. As a consequence, no adjustment is required for the clutch.

Single-plate clutch with "pushed" diaphragm spring
Single-plate clutch with "drawn" diaphragm spring

1. Propeller shaft connection fork
2. Dust cover
3. Clutch shaft support front bearing
4. Clutch cover
5. Spacer
6. Clutch shaft support rear bearing
7. Clutch flywheel
8. Clutch operating cylinder
9. Push rod
10. Guard
11. Clutch disengagement fork
12. Sleeve
13. Thrust bearing
14. Driven plate
15. Diaphragm spring
16. Pressure plate body
17. Speed gear main shaft centering needle bearing
CLUTCH

HYDRAULIC CONTROL

PEDAL

For clutch pedal removal procedure, refer to Group 22 - Front and Rear Brakes - Pedals - Removal.

CLUTCH MASTER CYLINDER

REMOVAL

1. Operating from engine compartment, remove plug from brake and clutch system supply tank, then drain fluid until level is below master cylinder supply hose.
2. Unscrew the screws securing windshield washer liquid tank to body and move tank sideways.
3. Detach hose 1 from clutch master cylinder 2.
4. Unscrew union of pipe 3 and disconnect it from master cylinder.
5. Operating from vehicle inside, remove split pin 1 and withdraw pin 2 then detach pedal 3 from fork 4.
6. Remove cup 5 and recover spring 6.

7. Tighten to the prescribed torques

- Tightening torques
  - Clutch hydraulic system pipe unions
    - 8 to 10 Nm
    - (0.8 to 1 kgf.m)
    - 5.8 to 7.2 ft-lb
  - Clutch hydraulic system hose unions
    - 10 to 15 Nm
    - (1 to 1.5 kgf.m)
    - 7.2 to 10.8 ft-lb

- Restore tank level making use of the fluid prescribed.

Clutch hydraulic system fluid
- ATE "Blau S"
- or
- AGIP Brake Fluid Super HD
- or
- IP Auto Fluid FR

- Carry out air bleeding from clutch hydraulic system (refer to: "Hydraulic System Bleeding").

CLUTCH OPERATING CYLINDER

REMOVAL (INTERVENTION ON VEHICLE)

1. Disconnect hose 1 from bracket on body and plug it suitably.
2. Unscrew the two screws securing operating cylinder 3 to clutch box 2, then remove it together with guard.

INSTALLATION

To install clutch master cylinder, reverse the order of removal and comply with the following.

1. Master cylinder supply hose
2. Clutch master cylinder
3. Clutch control pipe
4. Clutch master cylinder control fork
5. Cup
6. Spring
DISASSEMBLY

1. Remove the following items from operating cylinder 4: push rod 5 with guard 6, piston 7 with seal rings 8, and spring 9.
2. Withdraw push rod from guard and remove bleeder screw 2.

Single-plate clutch with “pushed” diaphragm spring

Single-plate clutch with “drawn” diaphragm spring and double-plate clutch

1. Disconnect hose 1 from bracket on body and plug it suitably.
2. Remove ring 3 on operating cylinder body.
3. Remove guard 4 and withdraw clutch control fork.
4. Remove operating cylinder from bracket 5.

1 Clutch hose
2 Bracket
3 Retaining ring
4 Guard
5 Support bracket
CHECKS AND INSPECTIONS

Visually check the disassembled components and replace the worn or damaged ones, supplied in the spare part kit.

CAUTION:
Wash all components of operating cylinder using suitable fluid. Do not use gasoline, kerosene or mineral oils in order not to damage the rubber parts of hydraulic system.

1. Check for scratches and rust on piston and inside clutch operating cylinder.
2. Check spring efficiency and integrity of seal rings.
3. Verify that bleeder hole is free from impurities.

REASSEMBLY

Reassemble the clutch operating cylinder by reversing the order of disassembly.

INSTALLATION

For installation, reverse the order of removal and comply with the following.

- Tighten the hydraulic system hose union to support bracket pipe to the prescribed torque.

  \[ T \]: **Tightening torques**
  
  Unions of clutch hydraulic system hoses
  
  10 to 15 N·m
  
  (1 to 1.5 kg·m
  
  7.2 to 10.8 ft·lb)
  
  Unions of clutch hydraulic system pipes
  
  8 to 10 N·m
  
  (0.8 to 1 kg·m
  
  5.8 to 7.2 ft·lb)

- Carry out system bleeding (refer to: "Hydraulic System Bleeding").

HYDRAULIC SYSTEM PIPING

CHECKS AND INSPECTIONS

Visually check system piping integrity. Replace damaged parts. In the event of fluid leaks from unions, if due to loosening, tighten them and, if necessary, replace the damaged components.

DISASSEMBLY

1. Remove the top-up plug on supply tank and drain the fluid by means of a syringe.
2. Loosen securing nuts of pipe connecting master cylinder to clutch operating cylinder; then remove pipe.

REASSEMBLY

1. Reassemble piping on vehicle by reverse the order of disassembly.
2. Tighten unions to the prescribed torque.

  \[ T \]: **Tightening torques**
  
  Unions of clutch hydraulic system hoses
  
  10 to 15 N·m
  
  (1 to 1.5 kg·m
  
  7.2 to 10.8 ft·lb)
  
  Unions of clutch hydraulic system pipes
  
  8 to 10 N·m
  
  (0.8 to 1 kg·m
  
  5.8 to 7.2 ft·lb)

3. Restore correct fluid level into tank, then bleed air from hydraulic system (refer to: "Hydraulic System Bleeding").
HYDRAULIC SYSTEM BLEEDING

CAUTION:
The clutch hydraulic system must be bled whenever hydraulic system has been disconnected or air has entered it.

Carefully comply with the following procedure:
1. Remove plug of brake and clutch hydraulic system supply tank and, if necessary, restore level with the prescribed fluid.

Fluid for clutch hydraulic system
ATE "Blau S"
or
AGIP Brake Fluid Super HD
or
IP Auto Fluid FR

2. Remove bleeder screw cap on operating cylinder and fit a hose on it dipping hose ends into a transparent tank fitted with system fluid.

3. At the same time, loosen bleeder screw and press clutch pedal up to end of travel, then release it slowly; repeat this operation until all possible air bubbles have been ejected.

4. With clutch pedal pressed to end of travel, close the bleeder screw, remove hose and install cap.
5. Restore fluid level into tank and install the related plug.

CAUTION:
a. Do not re-use the hydraulic fluid drained during bleeding operations.
b. Operate carefully in order to prevent hydraulic fluid from getting in contact with paint, with consequent damage of paint itself.
c. During bleeding operation, fluid level in the tank, must be kept above the min. mark.

6. Verify that clutch disengagement and speeds engagement takes place properly.

If necessary, verify travel of operating cylinder push rod.

This travel can not be adjusted and depends on the volume of fluid moved by the clutch master cylinder piston.

Single-plate with "pushed" diaphragm spring:
\[ C = 11 \text{ to } 12.7 \text{ mm} \]
\[ (0.43 \text{ to } 0.50 \text{ in}) \]

Single-plate with "drawn" diaphragm spring:
\[ C = 12.5 \text{ mm} \]
\[ (0.49 \text{ in}) \]

7. If "c" stroke value is not as specified, check efficiency of control hydraulic system.

REMOVAL AND INSTALLATION OF CLUTCH-SPEED GEAR-DIFFERENTIAL UNIT

Refer to: Group 17 - "Removal and Installation of Clutch Speed Gear-Differential Unit."

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SEPARATION AND RECONNECTION AT BENCH OF CLUTCH UNIT FROM/TO SPEED GEAR AND DIFFERENTIAL UNITS

SEPARATION

Set the clutch-speed gear-differential unit on a suitable turning stand (refer to: Group 17 - "Removal and Installation of Clutch-Speed Gear-Differential Unit") then proceed to clutch unit removal operation.

SINGLE-PLATE CLUTCH WITH "PUSHED" DIAPHRAGM SPRING

1. Clutch unit disassembly.
   a. Remove pin ③ from rod ② and withdraw lever ④.

2. Fork and thrust bearing
   a. Withdraw thrust bearing ④ from sleeve ③.
   b. Remove fork ① by releasing it from pin ②.

DOUBLE-PLATE CLUTCH

1. Clutch unit disassembly.
   a. Remove clutch operating cylinder from clutch-speed gear casing.
   b. Remove fork ① operating as per figure.

SINGLE-PLATE CLUTCH WITH "DRAWN" DIAPHRAGM SPRING AND DOUBLE-PLATE CLUTCH

1. Clutch disengagement fork
c. Remove pin 2 securing lever 1 to speeds engagement and selection rod.
d. Loosen and remove the four screws 3.

e. Withdraw clutch unit from shaft.

RECONNECTION

To reassemble clutch unit to speed gear-differential unit, reverse the order of disassembly and comply with the following:

a. Lubricate spherical pin on clutch operating cylinder with the prescribed grease.

Clutch disengagement fork spherical pin
Grease:
AGIP Grease 33 FD
IP Autogrease FD

b. Lubricate the thrust bearing guide sleeve and fork working surfaces with the prescribed grease.

Thrust bearing and clutch disengagement fork working seat
Grease:
AGIP Grease 33 FD
IP Autogrease FD
c. Tighten crosswise the securing screws to the prescribed torque.

\[\text{Tightening torque}
\]

Screws securing clutch unit to speed gear-differential unit
29 to 32 N·m  
(2.9 to 3.3 kg·m  
21 to 23.9 ft·lb)

\[\text{Tightening torque}
\]

Union of clutch hydraulic system hose
10 to 15 N·m  
(1 to 1.5 kg·m  
7.2 to 10.8 ft·lb)

e. Reinstall lever on speeds engagement and selection rod, and secure it with a new securing pin.
CLUTCH UNIT REMOVAL AND INSTALLATION
(Intervention on vehicle)

REMOVAL

Single-plate clutch with "pushed" diaphragm spring
1. Remove front and central part of exhaust system, disconnect propeller shaft from clutch shaft fork, remove speeds engagement and selection rod and disconnect isostatic control from gear lever, operating as per Group 13 - "Outer Linkage - Speed Gear Control Assembly - Removal".
2. Unscrew union 4 disconnecting hose 1 and pipe 5 of clutch system. Plug pipe so as to prevent leaks.
3. Unscrew nut 3 and disconnect hose 1 from bracket 2.

4. Unscrew and remove bolts 1 securing clutch-speed gear-differential unit to flexible supports on cross member 2.
   Unscrew nut 3 and remove cross member.

5. Withdraw pin 1 from lever 2, then remove lever.

6. Remove boot from clutch operating cylinder
7. Unscrew screws 1 and remove unit from main shaft splined section.

8. Withdraw bearing 1, protection sleeve and fork 2 from sleeve on shaft.

1 Bolts securing clutch-speed gear-differential unit to supports
2 Cross member
3 Nut securing cross member

1 Hose
2 Support bracket
3 Nut securing hose to bracket
4 Pipe - hose union
5 Pipe

1 Screw securing clutch unit to speed gear-differential unit

1 Spring pin
2 Speeds control rear lever
INSTALLATION

For installation, reverse the order of removal and comply with following:

- **Lubricate** the following items with the prescribed grease: clutch fork spherical pin; thrust bearing seat and spherical seat of operating cylinder push rod.

**Grease:**

- AGIP Grease 33 FD
- or
- IP Autogrease FD

- **Lubricate** the spherical seat of propeller shaft rear joint with the prescribed grease.

**Grease:**

- ISECO Molykote BR2

- Comply with the following tightening torques

   1: **Tightening torques**

   - Screws securing clutch unit to speed gear-differential unit
     
     29 to 32 N·m  
     (2.9 to 3.2 kg·m  
     21 to 23.9 ft·lb)

   - Screws securing propeller shaft joint to clutch shaft fork

   | Single-plate clutch with "pushed" diaphragm spring |
   | 40 to 50 N·m  
   | (4 to 5 kg·m  
   | 28.9 to 36.1 ft·lb) |

   | Single-plate clutch with "drawn" diaphragm spring and double-plate clutch |
   | 55 to 57 N·m  
   | (5.6 to 5.8 kg·m  
   | 40.5 to 41.9 ft·lb) |

   - Unions of clutch hydraulic system pipes
     
     8 to 10 N·m  
     (0.8 to 1 kg·m  
     5.8 to 7.2 ft·lb)

   - Unions of clutch hydraulic system hoses
     
     10 to 15 N·m  
     (1 to 1.5 kg·m  
     7.2 to 10.8 ft·lb)

- If necessary, carry out air bleeding from clutch hydraulic system (refer to: "Hydraulic System Bleeding").

* Install the lever on the speeds control rod making use of a new pin.

---

1 Thrust bearing
2 Clutch disengagement fork

---

Single-plate clutch with "drawn" diaphragm spring and double-plate clutch

Proceed per the single-plate clutch with "pushed" diaphragm spring, taking care to withdraw fork 1 before removing the clutch unit.

---

1 Clutch disengagement fork
CLUTCH UNIT OVERHAUL AT BENCH

Single-plate clutch with "pushed" diaphragm spring

1 Propeller shaft connection fork
2 Dust cover
3 Clutch cover front bearing
4 O-ring
5 Spacer
6 Clutch cover
7 Speeds engagement and selection rod boot
8 Speeds engagement and selection rod bush
9 Shoulder washer
10 Clutch cover rear bearing
11 Rear bearing retaining ring
12 Clutch flywheel
13 Clutch shaft
14 Needle bearing
15 Clutch plate
16 Pressure plate body
17 Thrust bearing
18 Fork
19 Rubber cap on spherical pin
20 Spherical pin
21 Clutch-speed gear casing

N-m
(kg-m
ft-lb)
Single-plate clutch with "drawn" diaphragm spring

1. Propeller shaft connection fork
2. Dust cover
3. Clutch cover front bearing
4. O-Ring
5. Spacer
6. Clutch cover
7. Speeds engagement and selection rod boot
8. Speeds engagement and selection rod bush
9. Clutch cover rear bearing
10. Threads ring nuts for rear bearing securing
11. Clutch flywheel
12. Clutch shaft
13. Needle bearing
14. Clutch plate
15. Retaining ring
16. Ring
17. Pressure plate body
18. Belleville springs
19. Thrust bearing
20. Rubber cap on spherical pin
21. Fork
22. Spherical pin
23. Clutch-speed gear casing

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Double-plate clutch

1. Propeller shaft connection fork
2. Dust cover
3. Clutch cover front bearing
4. O-Ring
5. Spacer
6. Clutch cover
7. Speeds engagement and selection rod boot
8. Speeds engagement and selection rod bush
9. Clutch cover rear bearing
10. Threaded ring nuts for rear bearing securing
11. Clutch flywheel
12. Clutch shaft
13. Needle bearing
14. Front clutch plate
15. Intermediate pressure plate body
16. Rear clutch plate
17. Retaining ring
18. Ring
19. Rear pressure plate body
20. Belleville springs
21. Thrust bearing
22. Rubber cap on spherical pin
23. Fork
24. Spherical pin
25. Clutch-speed gear casing
SINGLE-PLATE CLUTCH WITH "PUSHED" DIAPHRAGM SPRING

DISASSEMBLY

1. Clutch cover removal
   a. Unscrew and remove bolt ①, then remove operating cylinder ②.

2. Clutch unit disassembly
   a. If not present, carry out the countermarking between flywheel and pressure plate body so that correct order can be maintained when reassembling. Loosen and release the screws with related washers securing pressure plate body ① to flywheel ②.

---

1 Bolt securing operating cylinder to clutch cover
2 Clutch operating cylinder

b. If necessary, remove boot ② and bush ① from clutch cover.

d. By means of extractor A.3.0477, withdraw fork ①, then remove dust cover ②.

---

1 Speeds engagement and selection rod bush
2 Speed engagement and selection rods boot

c. Secure clutch cover on vice fitted with jaws, as per figure. Release and remove the nut securing propeller shaft fork.

d. By means of extractor A.3.0477, withdraw fork ①, then remove dust cover ②.

---

1 Pressure plate body
2 Clutch flywheel

b. Separate pressure plate body ② and clutch plate ① from flywheel.

e. Withdraw cover of clutch flywheel shaft.

---

1 Clutch plate
2 Pressure plate body

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c. If necessary, withdraw centering bearing (3) of speed gear main shaft from shaft (2), by means of suitable extractor.

d. If necessary, unscrew and remove the screws with related washers securing flywheel (1) to shaft (2).

1 Clutch flywheel
2 Clutch shaft

3. Removal of clutch cover bearings
   a. Remove retaining ring (1) of rear bearing (2).

1 Rear bearing retaining ring
2 Clutch cover rear bearing

b. Set clutch cover on a suitable base and, disaligning spacer, tap uniformly, by means of a punch, on outer race of front bearing (2) in order to remove it from the related cover; recover spacer (1).

1 Bearings spacer
2 Clutch cover front bearing

3. Withdraw ring (1) from cover.
CHECKS AND INSPECTIONS

Before carrying out the checks and inspections, wash with suitable solvent all the disassembled items (exception made for the driven plate), to eliminate the residual dust and grease. Use denatured ethyl alcohol to eliminate sealant residuals.

1. Clutch plate

Verify wear degree of clutch plate and check that:
- Plate gaskets are free from burns, greasy residuals and vitrification.
- Wear is uniform.
- Gaskets securing rivets are perfectly riveted.
- Clutch plate springs are in good conditions.
- In the event of clutch malfunctions, due to oil leaks from seal ring on the direct drive shaft, both clutch plate and seal ring are replaced.
- Hub of plate 3 is in good conditions and slides without sticking or excessive backlash on direct drive shaft coupling 2. If necessary, replace the whole plate.

2. Pressure plate

Verify that pressure plate working surface 2 is free from overheating, uneven wear, scores and removal of material.
If necessary, replace the pressure plate.

3. Clutch disengagement fork and thrust bearing

a. Verify that thrust bearing is not noisy, free from excessive backlash and that it slides freely on guide sleeve.
b. Verify that clutch disengagement fork is free from cracks, deformations and excessive wear of working surfaces. Replace it, if necessary.
4. Clutch cover

Check for good conditions of clutch cover; examine accurately the ball bearings supporting clutch flywheel shaft; replace them if too worn or in the event of seizing or noise.

5. Flywheel

Check for overheating, uneven wear, scoring or removal of material on flywheel working surface. If necessary, disassemble flywheel and grind both working surface and pressure plate support plane.

The following must be taken into account when grinding flywheel:

a. Removal of material on driven plate support plane must be such that the dimension between driven plate support plane and pressure plate is within the below values.

- For clutch plates 200 mm dia. (7.87 in)
  \[ A = 25 + 0.2 \text{ mm (0.9842 + 0.0078 in)} \]
- For clutch plates 215 mm dia. (8.46 in)
  \[ A = 22.5 + 0.2 \text{ mm (0.8858 + 0.0078 in)} \]

b. Should dimension A be out of tolerance, remove material also from support plane of pressure plate.

c. As regards the tolerances, refer to:
  "Service Data and Specifications".

CAUTION:

a. Should replacement operations or interventions be required on flywheel, pressure plate and flywheel-clutch shaft, the whole unit should be replaced so as not to alter balancing.

b. Or, after grinding or replacement of a few components, carry out balancing of the whole unit.

6. Needle bearing

Verify that centering needle bearing of main shaft, previously removed from clutch shaft, is free from seizures, excessive wear; replace it if necessary.

7. Clutch flywheel shaft

Examine thoroughly the clutch flywheel shaft. Replace it if working surfaces are worn.

REASSEMBLY

1. Clutch cover bearing insertion

Operate as follows to reassemble clutch cover.

a. Insert shoulder washer on cover and, by means of tool A.3.0282, fit bearing completely. Install retaining ring making sure it is housed in the related seat.
2. Clutch unit reassembly

a. If previously disassembled, reassemble flywheel unit ① and shaft ②. To carry out this operation, tighten the new securing screws treated with LOC- TITE sealing compound Stud Lok (red) to the prescribed torque, operating as per figure, with flywheel arranged on vice fitted with protective jaws.

⑦: Tightening torque
Screws securing clutch shaft to flywheel
27 to 31 N·m
(2.7 to 3.2 kg·m
19.5 to 23.1 ft·lb)

b. If previously disassembled, insert bearing ①, housed in the clutch flywheel shaft, by means of tool A.3.0405.

c. Insert driven plate ① into flywheel ② with the hub jutting part towards outside, as shown in the figure.
1 Driven plate
2 Clutch flywheel

d. Install pressure plate body on flywheel. By means of spindle A.4.0205, center the clutch plate and tighten, crosswise, the screws securing pressure plate body ① to flywheel.

T : Tightening torque
Screws securing pressure plate body to flywheel
13 to 16 N·m
(1.3 to 1.6 kg·m
9.4 to 11.6 ft·lb)

b. Insert dust cover ②
c. Apply a layer of Sealing compound LOCTITE 242 (Blue) on shaft tang, taking care to remove previous sealant residuals by swabbing and blowing the surfaces concerned. However, remove grease from surfaces by means of denatured ethyl alcohol.
d. Insert fork ① on clutch shaft and secure it with the related nut lock fork on a vice fitted with protective jaws, as per figure, and tighten nut to the prescribed torque.

T : Tightening torque
Nut securing propeller shaft connecting fork to clutch shaft
93 to 103 N·m
(9.5 to 10.5 kg·m
68.7 to 75.9 ft·lb)

e. Reinstall bush ① and boot ②.

3. Clutch cover reassembly
a. Remove spindle A.4.0205 and reinstall cover on clutch unit.

1 Bush for speeds engagement and selection rod
2 Boot

f. Reconnect operating cylinder ② to clutch cover and tighten bolt ①.
SINGLE-PLATE CLUTCH WITH “DRAWN” DiAPHRAGM SPRING

DISASSEMBLY

1. Clutch cover removal
   a. If necessary, remove boot 2 and bush 1 from clutch cover.
   b. Secure clutch cover on vice fitted with jaws, as per figure. Release and remove the nut securing propeller shaft fork.

2. Clutch unit disassembly
   a. If not present, carry out the counter-marking between flywheel and pressure plate body so that correct order can be maintained when reassembling. Loosen and release the screws with related washers securing pressure plate body 1 to flywheel 2.
   b. Separate pressure plate body 2 and clutch plate 1 from flywheel.
   c. If necessary, withdraw centering bearing 3 of speed gear main shaft from shaft 2, by means of suitable extractor.

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3. Thrust bearing removal
   a. Set rear pressure plate body as per figure, then slightly press on it to overcome the reaction of bearing Belleville spring and remove retaining ring 1.
   b. Remove ring 2 securing thrust bearing to diaphragm spring 3.

4. Removal of clutch cover bearings
   a. Unscrew the two ring nuts 1 securing bearing 2.

   d. If necessary, unscrew and remove the screws with related washers which secure flywheel 1 to shaft 2, separate shaft from flywheel.
b. Set clutch cover on a suitable base and, disaligning spacer, tap uniformly, by means of a punch, on outer race of front bearing 2 in order to remove it from the related cover; recover spacer 1.

d. By means of a suitable extractor, withdraw rear bearing 1.

c. Withdraw ring 1 from cover.

CHECKS AND INSPECTIONS

Before carrying out the checks and inspections, wash with suitable solvent all the disassembled items (exception made for the driven plate), to eliminate the residual dust and grease.

Use denatured ethyl alcohol to eliminate sealant residuals.

1. Clutch plate

Verify wear degree of clutch plate and check that:
- Plate gaskets are free from burns, greasy residuals and vitrification.
- Wear is uniform.
- Gaskets securing rivets are perfectly riveted.
- Clutch plate springs are in good conditions.
- In the event of clutch malfunctions, due to oil leaks from seal ring on the direct drive shaft, both clutch plate and seal ring are replaced.
- Hub of plate 3 is in good conditions and slides without sticking or excessive backlash on direct drive shaft coupling 2. If necessary, replace the whole plate.
2. **Pressure plate**

Verify that pressure plate working surface ② is free from overheating, uneven wear, scores and removal of material. If necessary, replace the pressure plate.

![Diagram of pressure plate with labels 1, 2, and 3]

1. Pressure plate support plane
2. Working surface

3. **Clutch disengagement fork and thrust bearing**

   a. Verify that thrust bearing is not noisy, free from excessive backlash and that it slides freely on guide sleeve.
   b. Verify that clutch disengagement fork is free from cracks, deformations and excessive wear of working surfaces. Replace it, if necessary.

4. **Clutch cover**

Check for good conditions of clutch cover; examine accurately the ball bearings supporting clutch flywheel shaft; replace them if too worn or in the event of seizing or noise.

5. **Flywheel**

Check for overheating, uneven wear, scoring or removal of material on flywheel working surface ②. If necessary, disassemble flywheel and grind both working surface and pressure plate support plane ①.

6. **Needle bearing**

Verify that centering needle bearing of main shaft, previously removed from clutch shaft, is free from seizures, excessive wear; replace it if necessary.

7. **Clutch flywheel shaft**

Examine thoroughly the clutch flywheel shaft. Replace it if working surfaces are worn.

**REASSEMBLY**

1. **Clutch cover bearing insertion**

Operate as follows to reassemble clutch cover.

   a. By means of tool A.3.0282 fit bearing ① fully home and fix it by the two-threaded ring nuts.

   ![Diagram of clutch cover bearing insertion]

   1. Cover rear bearing

   For grinding tolerances, refer to "Service Data and Specifications".

   **CAUTION:**

   a. Should replacement operations or interventions be required on flywheel, pressure plate and flywheel-clutch shaft, the whole unit should be replaced so as not to alter balancing.
   b. Or, after grinding or replacement of a few components, carry out balancing of the whole unit.
b. Overtur cover and install spacer ② taking care to position it with the chamfered side towards front part of cover, then install O-ring ①.

3. Clutch unit reassembly
   a. If previously disassembled, reassemble flywheel unit ① and shaft ②. To carry out this operation, tighten the new securing screws treated with LOCTITE sealing compound Stud Lok (red) to the prescribed torque, operating as per figure, with flywheel arranged on vice fitted with protective jaws.

   ①: Tightening torque
   Screws securing clutch shaft to flywheel
   27 to 31 N·m
   (2.7 to 3.2 kg·m)
   (19.5 to 23.1 ft·lb)

   b. If previously disassembled, insert bearing ①, housed in the clutch flywheel shaft, by means of tool A.3.0405.

2. Thrust bearing reassembly
   To reassemble thrust bearing, reverse the order of disassembly.
c. Insert driven plate ① into flywheel ② with the hub jutting part towards outside, as shown in the figure.

1. Screws securing pressure plate body to flywheel

4. Clutch cover reassembly
   a. Remove splindle A.4.0205 and reinstall cover on clutch unit.

1. Fork
2. Dust cover
3. Splined tang

b. Insert dust cover ②.

c. Apply a layer of Sealing compound LOCTITE 242 (Blue) on shaft tang, taking care to remove previous sealant residuals by swabbing and blowing the surfaces concerned. However, remove grease from surfaces by means of denatured ethyl alcohol.

d. Insert fork ① on clutch shaft and secure it with the related nut lock fork on a vice fitted with protective jaws, as per figure, and tighten nut to the prescribed torque.

1. Tightening torque
   Nut securing propeller shaft connecting fork to clutch shaft
   93 to 103 N·m
   (9.5 to 10.5 kg·m)
   (68.7 to 75.9 ft·lb)

e. Reinstall bush ① and boot ②.
**CLUTCH**

Release and remove the screws with washers securing rear pressure plate body 3 to flywheel 1.

c. Separate intermediate pressure plate body 3 and clutch plate 2 from flywheel 1.

**DOUBLE-PLATE CLUTCH**

**REMOVAL**

1. Clutch cover removal

Operate as per "Single-Plate Clutch with "Drawn" Diaphragm Spring - Disassembly - Clutch Cover Removal.

To remove propeller shaft connecting fork, make use of puller A.3.0600.

2. Clutch unit disassembly

a. If not present, carry out markings between flywheel 1 and pressure plates bodies 2 and 3.

b. Withdraw rear pressure plate body 1 with the related thrust bearing 2 and clutch plate 3.

c. Separate intermediate pressure plate body 3 and clutch plate 2 from flywheel 1.

d. If necessary, withdraw speed gear main shaft centering bearing 3 from shaft 2, by means of suitable puller.

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3. Thrust bearing removal

a. Set rear pressure plate body as per figure, then slightly press on it to overcome the reaction of bearing Belleville spring and remove retaining ring ①.
b. Remove ring ② securing thrust bearing to diaphragm spring ③.

e. If necessary, unscrew and remove the screws with related washers which secure flywheel ① to shaft ②; separate shaft from flywheel.

4. Removal of clutch cover bearings

Operate as per "Single-Plate Clutch with "Drawn" Diaphragm Spring - Disassembly - Removal of Clutch Cover Bearings."
CHECKS AND INSPECTIONS

For the base checks, refer to: "Single-Plate Clutch with "Drawn" Diaphragm Spring - Checks and Inspections".
As regards the specific components of Double-Plate Clutch, comply with the following:

1. Clutch plate

Check wear degree of both driven plates.

CAUTION:
In the event of malfunctions identified on one plate only, the replacement of both plates is however required.

2. Pressure plate body

For this type of clutch, no grindings nor repair operations are to be executed for both pressure plates bodies.
As a consequence, in the event of excessive wear of deep scratches on both bodies, the whole unit must be replaced.

3. Clutch flywheel

For grinding tolerances, refer to "Service Data and Specifications".

REASSEMBLY

1. Insertion of clutch cover bearing

To reinstall bearings, operate as per: "Single-Plate Clutch with "Drawn" Diaphragm Spring - Reassembly - Insertion of Clutch Cover Bearing".

2. Thrust bearing reassembly

To reassemble thrust bearing, reverse the order of disassembly.

d. By means of tool A.4.0205, align hubs grooves of the two clutch plates.

e. Position pressure plate body 2, complete with thrust bearing 1, complying with the countermarks executed when disassembling.

1 Front clutch plate
2 Clutch flywheel

1 Intermediate pressure plate body
2 Rear clutch plate
3 Clutch flywheel

1 Thrust bearing
2 Rear pressure plate body
3 Rear clutch plate
4 Intermediate pressure plate body
5 Clutch flywheel
6 Front clutch plate
f. Insert screws ① securing pressure plate bodies to clutch flywheel, secure them according to the specified sequence, then, by means of tool A.4.0205, tighten the screws to the prescribed torque.

①: Tightening torque
Screws securing pressure plate to clutch flywheel
18 to 22 N·m
(1.8 to 2.2 kg·m
13.0 to 15.9 ft·lb)

1 Screws

h. Withdraw tool A.4.0205.

4. Clutch cover reassembly

Ressemble clutch cover by proceeding as per: "Single-Plate Clutch with "Drawn" Diaphragm Spring - Reassembly - Clutch Cover Reassembly".

To carry out verification, visually check that clearance “A” (shown in figure), due to diaphragm spring action, occurs in the vicinity of the taking up devices. This condition is necessary to guarantee the clutch unit disengagement travel.
**SERVICE DATA AND SPECIFICATIONS**

**GENERAL SPECIFICATIONS**

**FLUIDS AND LUBRICANTS**

<table>
<thead>
<tr>
<th>Application</th>
<th>Type</th>
<th>Name</th>
<th>Q.ty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spherical seat and clutch operating cylinder push rod (1 and 2)</td>
<td>GREASE</td>
<td>AGIP Grease 33FD</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>IP Autogrease FD</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Std. No. 3671-69833/34</td>
<td></td>
</tr>
<tr>
<td>Rubber washer on spherical pin for clutch disengagement fork 1</td>
<td></td>
<td>ISECO Molykote BR2</td>
<td>5 cm³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Std. No. 3671-69841</td>
<td>0.3 cuin</td>
</tr>
<tr>
<td>Spherical pin and clutch disengagement fork (2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thrust bearing seat and clutch disengagement fork (1 and 2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Propeller shaft rear joint spherical seat</td>
<td>GREASE</td>
<td>ISECO Molykote BR2</td>
<td>5 cm³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Std. No. 3671-69841</td>
<td>0.3 cuin</td>
</tr>
<tr>
<td>Clutch hydraulic system filling (1 and 2)</td>
<td>FLUID</td>
<td>AGIP Brake Fluid Super HD</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>ATE &quot;Blau S&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>IP Auto Fluid F.R.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Std. No. 3681-69905</td>
<td></td>
</tr>
</tbody>
</table>

**CAUTION:**
Product harmful to paint. Keep it away from paint on view

(1) For single-plate clutch with “pushed” diaphragm spring
(2) For single-plate clutch with “drawn” diaphragm spring and for double-plate clutch
# CLUTCH

## SEALANTS

**Single-plate clutch with "pushed" diaphragm spring**

**Single-plate clutch with "drawn" diaphragm spring and double-plate clutch**

<table>
<thead>
<tr>
<th>Application</th>
<th>Type</th>
<th>Name</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Threading of screws securing clutch shaft to flywheel - See note 1</td>
<td>SEALING COMPOUND</td>
<td>LOCTITE Stud Lok (Red) Std. No. 3524-00002</td>
<td></td>
</tr>
<tr>
<td>2 Clutch shaft splined tang for propeller shaft connecting fork See note 1</td>
<td>SEALING COMPOUND</td>
<td>LOCTITE 242 (Blue) Std.No. 3524-00010</td>
<td></td>
</tr>
</tbody>
</table>

(1) Before applying sealing compound, remove any trace of old compound by swabbing and blowing the surfaces concerned. Remove grease from surfaces with trichlorethylene and chlorothene.
### CHECKS AND ADJUSTMENTS

**SINGLE-PLATE CLUTCH FLYWHEEL WITH “PUSHED” DIAPHRAGM SPRING**

![Clutch Diagram]

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>216 mm (8.46 in)</th>
<th>200 mm (7.87 in)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clutch diameter</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Rectification</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Removal of material on driven plate support plane must be such that the dimension between driven plate support plane and clutch cover is within the A value.</td>
<td>22.5 ± 0.2 (0.89 ± 0.01)</td>
<td>25 ± 0.2 (0.98 ± 0.01)</td>
</tr>
<tr>
<td>Should dimension A be out of tolerance, remove material also from support plane of clutch cover.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tolerances</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Parallelism error between driven plate support plane and clutch shaft connection plane (measured on a radius with &quot;r&quot; length)</td>
<td>0.08 (0.003)</td>
<td>0.08 (0.003)</td>
</tr>
<tr>
<td>- Parallelism error between clutch cover support plane and clutch shaft connection plane</td>
<td>0.08 (0.003)</td>
<td>0.08 (0.003)</td>
</tr>
<tr>
<td>- Roughness of driven plate support plane</td>
<td>0.4 to 0.5</td>
<td>0.4 to 0.5</td>
</tr>
</tbody>
</table>
**SINGLE-PLATE CLUTCH FLYWHEEL WITH “DRAWN” DIAPHRAGM SPRING**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>215 mm (8.46 in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectification</td>
<td>Removal of material on driven plate support plane must be such that the dimension between driven plate support plane and clutch cover is within the A value. A mm (in) 12.5 ± 0.2 (0.49 ± 0.01)</td>
</tr>
<tr>
<td>Should dimension A be out of tolerance, remove material also from support plane of clutch cover.</td>
<td></td>
</tr>
<tr>
<td>Tolerances</td>
<td></td>
</tr>
<tr>
<td>- Parallelism error between driven plate support plane and clutch shaft connection plane $\delta$ mm (in) 0.08 (0.003)</td>
<td></td>
</tr>
<tr>
<td>- Parallelism error between clutch cover support plane and clutch shaft connection plane $\delta$ mm (in) 0.08 (0.003)</td>
<td></td>
</tr>
<tr>
<td>- Roughness of driven plate support plane $\sqrt{\mu}m$ 0.4 to 0.5</td>
<td></td>
</tr>
</tbody>
</table>
DOUBLE-PLATE CLUTCH FLYWHEEL

Dimensions

<table>
<thead>
<tr>
<th>Description</th>
<th>S mm (in)</th>
<th>0.2 max (0.01)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Removal of material from driven plate support plane and clutch cover, shown by the &quot;S&quot;, dimension must be</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tolerances

<table>
<thead>
<tr>
<th>Description</th>
<th>/ / mm (in)</th>
<th>0.06 (0.0024)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum parallelism error between driven plate support plane and clutch shaft connection plane</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Roughness of driven plate support plane

<table>
<thead>
<tr>
<th>Roughness</th>
<th>μm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roughness of driven plate support plane</td>
<td>0.4 to 0.5</td>
</tr>
</tbody>
</table>

CLUTCH

DIMENSIONS (1)

<table>
<thead>
<tr>
<th>Description</th>
<th>g·cm (in·lb)</th>
<th>10 (0.0096)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure plate-flywheel static balancing (max out-of balance allowed)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Operating cylinder pushrod travel

Single-plate clutch with "pushed" diaphragm spring:
C = 11 to 12.7 mm
(0.443 to 0.5 in)

Single-plate clutch with "drawn" diaphragm spring:
C = 12.5 mm
(0.49 in)

(1) Dimensions applicable to all versions with single-plate clutch

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## Tightening Torques

<table>
<thead>
<tr>
<th>Application</th>
<th>Clutch Type</th>
<th>Single-plate with &quot;pushed&quot; diaphragm spring</th>
<th>Single-plate with &quot;drawn&quot; diaphragm spring</th>
<th>Double-plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screws securing propeller shaft coupling to clutch shaft fork</td>
<td>Clutch type</td>
<td>39 to 49</td>
<td>55 to 57</td>
<td>55 to 57</td>
</tr>
<tr>
<td></td>
<td>(4 to 5)</td>
<td>(5.6 to 5.8)</td>
<td>(5.6 to 5.8)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(28.9 to 36)</td>
<td>(40.5 to 41.9)</td>
<td>(40.5 to 41.9)</td>
<td></td>
</tr>
<tr>
<td>Screws securing pressure plate to clutch flywheel</td>
<td>Clutch type</td>
<td>13 to 16</td>
<td>13 to 16</td>
<td>18 to 22</td>
</tr>
<tr>
<td></td>
<td>(1.3 to 1.6)</td>
<td>(1.3 to 1.6)</td>
<td>(1.8 to 2.2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(9.4 to 11.6)</td>
<td>(9.4 to 11.6)</td>
<td>(13 to 15.9)</td>
<td></td>
</tr>
<tr>
<td>Screws securing clutch shaft to flywheel</td>
<td>Clutch type</td>
<td>27 to 31</td>
<td>27 to 31</td>
<td>27 to 31</td>
</tr>
<tr>
<td>(for sealant compounds refer to: &quot;Sealants&quot;)</td>
<td>(2.7 to 3.2)</td>
<td>(2.7 to 3.2)</td>
<td>(2.7 to 3.2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(19.5 to 23.1)</td>
<td>(19.5 to 23.1)</td>
<td>(19.5 to 23.1)</td>
<td></td>
</tr>
<tr>
<td>Nut securing propeller shaft connecting fork to clutch shaft</td>
<td>Clutch type</td>
<td>93 to 103</td>
<td>93 to 103</td>
<td>93 to 103</td>
</tr>
<tr>
<td></td>
<td>(9.5 to 10.5)</td>
<td>(9.5 to 10.5)</td>
<td>(9.5 to 10.5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(68.7 to 75.9)</td>
<td>(68.7 to 75.9)</td>
<td>(68.7 to 75.9)</td>
<td></td>
</tr>
<tr>
<td>Screws securing clutch unit to differential-speed gear unit</td>
<td>Clutch type</td>
<td>29 to 32</td>
<td>29 to 32</td>
<td>29 to 32</td>
</tr>
<tr>
<td></td>
<td>(2.9 to 3.3)</td>
<td>(2.9 to 3.3)</td>
<td>(2.9 to 3.3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(21 to 23.9)</td>
<td>(21 to 23.9)</td>
<td>(21 to 23.9)</td>
<td></td>
</tr>
<tr>
<td>Hydraulic system pipe unions:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hoses</td>
<td>(10 to 15)</td>
<td>(10 to 15)</td>
<td>(10 to 15)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1 to 1.5)</td>
<td>(1 to 1.5)</td>
<td>(1 to 1.5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(7.2 to 10.8)</td>
<td>(7.2 to 10.8)</td>
<td>(7.2 to 10.8)</td>
<td></td>
</tr>
<tr>
<td>Pipes</td>
<td>8 to 10</td>
<td></td>
<td>8 to 10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.8 to 1)</td>
<td></td>
<td>(0.8 to 1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(5.8 to 7.2)</td>
<td></td>
<td>(5.8 to 7.2)</td>
<td></td>
</tr>
<tr>
<td>Screws securing speed gear-differential unit to lateral support small block</td>
<td>Clutch type</td>
<td>18.6 to 23.5</td>
<td>18.6 to 23.5</td>
<td>18.6 to 23.5</td>
</tr>
<tr>
<td></td>
<td>(1.9 to 2.4)</td>
<td>(1.9 to 2.4)</td>
<td>(1.9 to 2.4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(13.7 to 17.3)</td>
<td>(13.7 to 17.3)</td>
<td>(13.7 to 17.3)</td>
<td></td>
</tr>
</tbody>
</table>
# TROUBLE DIAGNOSIS AND CORRECTIVE ACTION

<table>
<thead>
<tr>
<th>Condition</th>
<th>Probable cause</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clutch slips</td>
<td>Some trouble symptoms can be also due to engine malfunctions. First of all, determine whether trouble is caused by engine or clutch.</td>
<td>Proceed as follows to test clutch slipping:</td>
</tr>
<tr>
<td>Symptoms:</td>
<td></td>
<td>- engage parking brake</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- disengage clutch and change to 4th speed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- accelerate, then gradually release clutch pedal: if car does not move and engine does not stop, clutch is slipping</td>
</tr>
<tr>
<td>- Wheel power insufficient when uphill driving</td>
<td></td>
<td>- Clutch plate gaskets too worn</td>
</tr>
<tr>
<td>- Abnormal increase of fuel consumption</td>
<td></td>
<td>- Oil or grease present on gaskets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Diaphragm spring damaged or worn condition in correspondence with thrust bearing support area</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Flywheel or pressure plate deformed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Pushrod of clutch operating cylinder does not return to initial position:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Operating cylinder piston or master cylinder piston seized</td>
</tr>
<tr>
<td>Clutch can not be easily disengaged</td>
<td>Proceed as follows to check clutch disengagement:</td>
<td>- disengage clutch and change to Reverse speed</td>
</tr>
<tr>
<td>Symptoms:</td>
<td></td>
<td>- change to Neutral and accelerate progressively, keeping clutch pedal depressed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- after a short interval, change to Reverse speed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If noise is heard when changing speed, clutch is dragging.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Wear or rust on splined section of clutch plate hub.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Oil leaks from master cylinder, operating cylinder and hydraulic system</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Air in the hydraulic system</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Pedal travel insufficient</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Operating cylinder inefficient</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Master cylinder inefficient</td>
</tr>
</tbody>
</table>
## CLUTCH

<table>
<thead>
<tr>
<th>Condition</th>
<th>Probable cause</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clutch can not be easily disengaged (continue)</td>
<td>• Clutch plate deformed or eccentric</td>
<td>Replace clutch plate</td>
</tr>
<tr>
<td></td>
<td>• Diaphragm spring fatigued</td>
<td>Replace diaphragm spring</td>
</tr>
<tr>
<td></td>
<td>• Oil in clutch plate gaskets</td>
<td>Replace clutch plate (if faulty, replace oil seal ring of main shaft)</td>
</tr>
<tr>
<td>Clutch chatters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symptoms:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clutch pedal chatters when vehicle is started and clutch still partially engaged</td>
<td>• Clutch plate gaskets vitrified due to overheating</td>
<td>Replace clutch plate</td>
</tr>
<tr>
<td></td>
<td>• Oil or grease on clutch plate gaskets</td>
<td>Replace clutch plate</td>
</tr>
<tr>
<td></td>
<td>• Clutch plate gaskets deformed</td>
<td>Replace clutch plate</td>
</tr>
<tr>
<td></td>
<td>• Flywheel working surface worn or deformed</td>
<td>Repair or replace flywheel</td>
</tr>
<tr>
<td></td>
<td>• Pressure plate working surface worn or deformed</td>
<td>Replace pressure plate</td>
</tr>
<tr>
<td></td>
<td>• Gaskets rivets loose</td>
<td>Replace clutch plate</td>
</tr>
<tr>
<td></td>
<td>• Rubber supports of clutch-speed gear-differential unit loose or deteriorated</td>
<td>Secure or replace supports</td>
</tr>
<tr>
<td></td>
<td>• Diaphragm spring fatigued</td>
<td>Replace pressure plate</td>
</tr>
<tr>
<td></td>
<td>• Clutch shaft bearings damaged</td>
<td>Replace bearings</td>
</tr>
<tr>
<td>Noisy clutch</td>
<td>• Thrust bearing inusable</td>
<td>Replace thrust bearing</td>
</tr>
<tr>
<td>Noisy disengagement:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Thrust bearing a/o support damaged or not suitably lubricated</td>
<td>Replace or lubricate thrust bearing a/o support</td>
</tr>
<tr>
<td>Noise when clutch is engaged:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Gaskets rivets loose</td>
<td>Replace clutch plate</td>
</tr>
<tr>
<td></td>
<td>• Clutch plate gaskets cracked</td>
<td>Replace clutch plate</td>
</tr>
<tr>
<td></td>
<td>• Clutch plate springs fatigued</td>
<td>Replace clutch plate</td>
</tr>
<tr>
<td></td>
<td>• Clutch shaft bearings damaged</td>
<td>Replace bearings</td>
</tr>
<tr>
<td>Clutch jerks</td>
<td>• Oil or grease on clutch plate gaskets</td>
<td>Replace clutch plate (if faulty, replace main shaft oil seal ring).</td>
</tr>
</tbody>
</table>
## CLUTCH

<table>
<thead>
<tr>
<th>Condition</th>
<th>Probable cause</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clutch jerks (continue)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symptoms:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Vehicle does not start smoothly</td>
<td>• Gaskets worn or rivets loose</td>
<td>Replace clutch plate</td>
</tr>
<tr>
<td></td>
<td>• Wear or rust on direct drive shaft a/o clutch plate splined sections</td>
<td>Clean or replace (according to requirements) the direct drive shaft a/o clutch plate.</td>
</tr>
<tr>
<td></td>
<td>• Flywheel a/o pressure plate friction surfaces worn or deformed</td>
<td>Repair or replace flywheel a/o clutch cover.</td>
</tr>
<tr>
<td></td>
<td>• Supports of clutch-speed gear-differential unit loose or deteriorated</td>
<td>Secure or replace supports</td>
</tr>
</tbody>
</table>

## SPECIAL SERVICE TOOLS

<table>
<thead>
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