## TRANSMISSION

### GROUP 15

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Drive line consists of shafting connecting engine to clutch - transmission - axle drive assembly. This unique layout allows propeller shaft to be positively connected to engine at all times. Propeller shaft consists of two halves connected to one another and to anchor points by means of flexible joints. Propeller shaft is anchored to body through a center bearing assembly provided with a ball bearing.
PROPELLER SHAFT

REMOVAL

1. Raise car on a platform lift.
2. Remove exhaust pipe front and center section as specified in Group 04: Exhaust system - Removal.
3. Back off capscrews ② and remove center crossmember ①.

6. Disconnect bell housing from body.
   a. For vehicles with high-torque propeller shaft (see: Group 00: Complete Car - Use of Units in Car):
      - Back off capscrews ① and disconnect rear engine mount from body.
   b. All other models:
      - Back off nuts ①, disconnect rear engine mount from body, retrieving spacers ②.

8. Back off six screws retaining axle front crossmember to body.

WARNING:
On Alfa Romeo Giulietta and GTV 2000 there is no need to disturb the crossmember.

9. Position a column lift provided with cradle A.2.0075 under De Dion axle.
10. Acting on De Dion axle, lower crossmember and transmission unit.

5. Back off plate-bell housing securing bolts and remove plate.

1 Rear engine mounting capscrews
2 Transmission remote control rod/lever bolt
3 Transmission remote control rod

1 Bellow
2 Transmission remote control rod/lever bolt
3 Transmission remote control rod

1 Rear engine mounting retaining nuts
2 Spacers

7. Clamp propeller shaft and back off bolts connecting shaft joints to flywheel and clutch fork; rotate shaft and back off the remaining bolts.

1 Center bearing to body retaining nut
2 Center bearing
3 Washer

December 1986
12. Take off shaft disconnecting from clutch shaft fork first and then from flywheel.

**INSTALLATION**

Install by reversing removal sequence and adhering to the instructions given below.

- Where not already carried out during overhaul, lubricate front bush and rear centering bush using the recommended grease (ISECO Molykote BR2) (quantity: see Inspection Specifications - Fluids and Lubricants).
- If necessary, wet flywheel bush using the same type of grease.
- Tighten nuts retaining flexible joints to flywheel and clutch fork to the specified torque (see Inspection Specifications - Tightening Torques).

**WARNING:**

On assembly, use new self-locking nuts.

- Tighten transmission unit crossmember to body capscrews to the specified torque.

** Tightening torque**

Transmission unit crossmember to body capscrews

39 to 44 N·m
(4 to 4.5 kg·m)
(28.8 to 32.5 ft·lb)

- For 4 cylinder petrol and turbo diesel cars.
  - Check that distance A between the propeller shaft and the rear engine support is as specified.

**Distance A between the propeller shaft and rear engine support.**

4 cylinder petrol run car:

\[ A = 7 \text{ mm (0.28 in)} \]

Turbo diesel car:

\[ A = 24 \text{ mm (0.94 in)} \]

If this distance differs from the specified one, vary the length of the spacers placed between the rear engine support and the body accordingly.

**FRONT JOINT**

1 Retaining ring
2 Washer
3 Spring
4 Ball cap
5 Bush
6 Rubber cap
7 Nut
8 Washer
9 Flexible member
10 Front shaft
11 Capscrew

May 1985

15-4

PA360900000001
DISASSEMBLY
1. Clamp front shaft in a vice and remove retaining ring ① from bush ④, take off washer ② and spring ③.

CAUTION:
If flexible joint has been replaced, tool A.2.0315 is not required for assembly.

2. Tighten three flexible joint nuts with associated washers to the specified torques (see Inspection Specifications - Tightening Torques).

INSPECTION
Clean all parts
1. Check that bush and ball working surface is not worn; replace damaged parts as necessary.
2. Check flexible joint (replace if cracked or dented).

ASSEMBLY
1. Using tool A.2.0315, install flexible joint ① and position rubber ring ②.

3. Lubricate bush using the recommended grease (ISECO Molykote BR2) (quantity: see Inspection Specifications - Fluids and Lubricants) and coat ball joint and bush working surfaces using recommended grease (ISECO Molykote G Rapid).  
4. Insert ball cap in bush and position on front shaft spigot using tool A.3.0246.

3. Install tool A.2.0315 on flexible joint. Back off three nuts retaining joint ① to front shaft ②, retrieve associated washers, remove joint and rubber ring ③.

5. Insert spring and washer in bush and position retaining ring. Remove tool A.2.0315.

1 Retaining ring
2 Washer
3 Spring
4 Bush

1 Flexible joint
2 Front shaft
3 Rubber ring

A.3.0361

A.2.0315

A.3.0246

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15-5

September 1984
CENTER BEARING

DISASSEMBLY
1. Clamp front shaft (1) in a vice, mark front and rear (2) shaft position, install tool A.2.0315 on center flexible joint.

2. Back off three nuts retaining front shaft to center bearing, remove associated washers and take off both shafts.

3. Mark front shaft fork and spigot to facilitate assembly.

4. Using a puller, take off spherical seat (1) from front shaft spigot.

5. Back off and remove locknut (1) and nut (3) retaining fork (2).

1 Front shaft
2 Rear shaft
3 Center bearing support
4 Bearing
5 Capscrew
6 Fork
7 Nut
8 Locknut
9 Ball
10 Spherical seat
11 Nut
12 Washer
13 Flexible joint
14 Washer
15 Nut
16 Retaining ring
17 Rubber cap
18 Front bush
19 Rear shaft
20 Capscrew

T 39 : 49
(4 : 5)
(28.8 : 36.1)

T 93 : 103
(9.5 : 10.5)
(68.6 : 76)

N · m
(T · kg·m
(lb·ft)

PA360900000000
6. Using a press with adapter plates of tool A.2.0248 take off fork 1 from front shaft 2.

8. Using tool A.3.0265/0002, take off center support bearing at the press.

9. Take off ball 1 from front shaft spigot 2.

10. Clamp rear shaft in a vice, mark center support position with respect to shaft, install tool A.2.0315 on joint, back off three retaining nuts, remove associated washers and take off joint.
11. Remove rear shaft front bush rubber ring 1 after removing retaining ring.

CAUTION:
On disassembly do not damage fork as its replacement will affect shaft balancing.

7. Using a press with adapter plates of tool A.2.0247, take off center support 1 after marking front and rear sides, and retrieve associated cup.

INSPECTION
Clean all parts.
1. Check support bearing: replace if necessary.
2. Check that ball or spherical seat working surface is not worn or scored; replace damaged parts as necessary.
3. Check flexible joint; if cracked or dented; replace without hesitation.

ASSEMBLY
1. Lubricate bush and rubber ring using 5 cc of recommended grease (ISCEO Molykote BR2).
2. Install rubber ring 2 in bush 1 and lock through associated retaining ring.
TRANSMISSION

5. Install cup on front shaft and install center support according to reference marks previously applied.
6. Assemble fork aligning reference marks previously applied.


3. Using tool A.2.0315, install flexible joint on rear shaft, tighten three retaining nuts with associated washers to the specified torque.

A.2.0315

7. Tighten fork and center support nut and locknut to specified torque.

Tightening torque
Center flexible joint/rear shaft nuts
39 to 48 N·m
(4 to 5 kg·m)
(28.8 to 36.1 ft·lb)

A.3.0244

1. Ball
2. Front shaft spigot


10. Using a plastic mallet, install spherical seat.

CAUTION:

a. Do not remove tool A.2.0315 as it will be needed to assemble propeller shaft.
b. If flexible joint has been replaced, tool A.2.0315 is not required for assembly.
REAR JOINT

DISASSEMBLY
1. Clamp rear shaft in a vice and take off rear seal.
2. Install tool A.2.0315 on flexible joint, back off three retaining nuts, retrieve associated washers, take off flexible joint and rubber cap, after removing retaining ring.
3. Take off spherical seat and remove ball 1 from spigot 2 of rear shaft 3.

INSPECTION
1. Check that ball or spherical seat working surface is not worn or scored; replace damaged parts as necessary.
2. Check flexible joint; if cracked or dented, replace without hesitation.

ASSEMBLY
1. Using tool A.3.0244, install ball 1 on rear shaft 3 spigot 2.
2. Lubricate rear centralizing bush in position on flexible joint using the recommendend grease (ISECO Molykote BR2) (quantity: see Inspection Specifications - Fluids and Lubricants).
3. Install seal on bush and secure through retaining ring.
4. Using tool A.2.0315, install flexible joint, tighten 3 retaining nuts with associated washers to the specified torque (see Inspection Specifications - Tightening Torques).

WARNING:
If flexible joint has been replaced, on assembly tool A.2.0315 is not required.

5. Install seal, positioning lip on rear bush.

PA360900000000 15-9 September 1984
TRANSMISSION

INSPECTION SPECIFICATIONS

GENERAL REQUIREMENTS

FLUIDS AND LUBRICANTS

| Description | Type | Recommended product | Quantity
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Flywheel bush</td>
<td>GREASE</td>
<td>ISECO: Molykote BR2</td>
<td>Coat with 5 cc (0.3 cu.in) or Fill up</td>
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<tr>
<td>Propeller shaft front bush</td>
<td>GREASE</td>
<td>ISECO: Molykote BR2 Part. No. 3671-68841</td>
<td>Coat or Fill up</td>
</tr>
<tr>
<td>Center bush and rubber ring</td>
<td>GREASE</td>
<td>ISECO: Molykote G Rapid Part. No. 3671-68842</td>
<td>Coat or Fill up</td>
</tr>
<tr>
<td>Rear centralizing bush on flexible joint</td>
<td>GREASE</td>
<td>ISECO: Molykote G Rapid Part. No. 3671-68842</td>
<td>Coat or Fill up</td>
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<tr>
<td>Front clearance take up ball and spherical bush working surface</td>
<td>GREASE</td>
<td>ISECO: Molykote G Rapid Part. No. 3671-68842</td>
<td>Coat or Fill up</td>
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<td>Center ball and spherical seat working surface</td>
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<td>ISECO: Molykote G Rapid Part. No. 3671-68842</td>
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<tr>
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<td>GREASE</td>
<td>ISECO: Molykote G Rapid Part. No. 3671-68842</td>
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CHECKS AND ADJUSTMENTS

For 4 cylinder petrol and turbodiesel cars

Distance A between the propeller shaft and rear engine support

4 cylinder petrol run car
A = 7 mm (0.28 in)

4 cylinder turbodiesel car
A = 24 mm (0.94 in)

May 1985

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PA360900000001
## TRANSMISSION

### TIGHTENING TORQUES

<table>
<thead>
<tr>
<th>Description</th>
<th>Cars with transmission for high torques</th>
<th>All other cars</th>
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<tbody>
<tr>
<td>Nuts, front/rear flexible joint</td>
<td>56 to 57 (5.6 to 5.8) (40.6 to 42)</td>
<td>39 to 49 (4 to 5) (28.8 to 36.1)</td>
</tr>
<tr>
<td>Nuts, center flexible joint to propeller shaft yokes</td>
<td>39 to 49 (4 to 5) (28.8 to 36.1)</td>
<td>39 to 49 (4 to 5) (28.8 to 36.1)</td>
</tr>
<tr>
<td>Nuts, fork and center bearing</td>
<td>93 to 103 (9.5 to 10.5) (68.6 to 76)</td>
<td>93 to 103 (9.5 to 10.5) (68.6 to 76)</td>
</tr>
<tr>
<td>Cap screws, transmission crossmember to body</td>
<td>39 to 44 (4 to 4.5) (28.8 to 36.1)</td>
<td>39 to 44 (4 to 4.5) (28.8 to 36.1)</td>
</tr>
</tbody>
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### TROUBLESHOOTING

<table>
<thead>
<tr>
<th>Fault</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
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<tbody>
<tr>
<td>Noise and chatter under any running condition</td>
<td>• Worn flexible joints</td>
<td>Replace worn joints</td>
</tr>
<tr>
<td></td>
<td>• Loose flexible joint nuts</td>
<td>Tighten nuts</td>
</tr>
<tr>
<td></td>
<td>• Worn center bearing</td>
<td>Replace bearing</td>
</tr>
<tr>
<td></td>
<td>• Loose center bearing support capscrews</td>
<td>Tighten screws</td>
</tr>
<tr>
<td>Chatter during sharp torque changes</td>
<td>• Worn flexible joints</td>
<td>Replace worn joints</td>
</tr>
<tr>
<td></td>
<td>• Loose flexible joint nuts</td>
<td>Tighten joint nuts</td>
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### TOOLS

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<td>Support, car lift</td>
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<td>A.2.0247</td>
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<td>Part No.</td>
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<td>Adapter plates, center joint yoke</td>
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<td>A.2.0315</td>
<td>Remover/replacer, flexible joint</td>
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<td>15-9</td>
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<tr>
<td>A.3.0244</td>
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<tr>
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<td>Installer, ball with bush, front shaft</td>
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<td>Remover, front/rear ball, propeller shaft</td>
<td>15-5</td>
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