

# Removal and Installation of Propeller Shaft

Job No.

41—1

## Removal:

1. Unscrew the wing nut for adjusting the hand brake cable.
2. Bend up the locking plates at the joint flange of the rear propeller shaft and disconnect the propeller shaft from the flange of the rear axle.
3. Remove the brake equalizer from the guide grooves along the side of the propeller shaft housing of the chassis base panel and detach the return spring. Pull back the brake equalizer and push it upward outside the housing.
4. Mark the relative position of the slip coupling and the propeller shaft, pull the slip coupling toward the rear and remove (Fig. 41 — 1/1).

**Note:** It is necessary to mark the relative position of the two parts in order to ensure that on reinstallation the slip coupling is installed in exactly the same position. The propeller shaft and the slip coupling have been balanced together; if their relative position is changed, the result may be increased unbalance and consequently drumming of the propeller shaft.

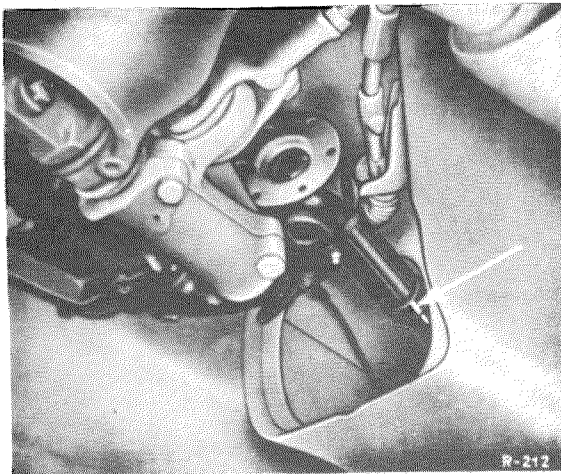


Fig. 41 — 1/1

5. Disconnect the propeller shaft at the transmission flange. The shaft plate remains attached to the transmission.
6. Detach the cover plate for the propeller shaft intermediate bearing.

Mark the position of the bearing bracket on the chassis base panel (5) and unscrew the two fixing screws (4) for the bearing bracket (Fig. 41 — 1/2).

Turn the bearing bracket by 180° so that the attaching face points upward.

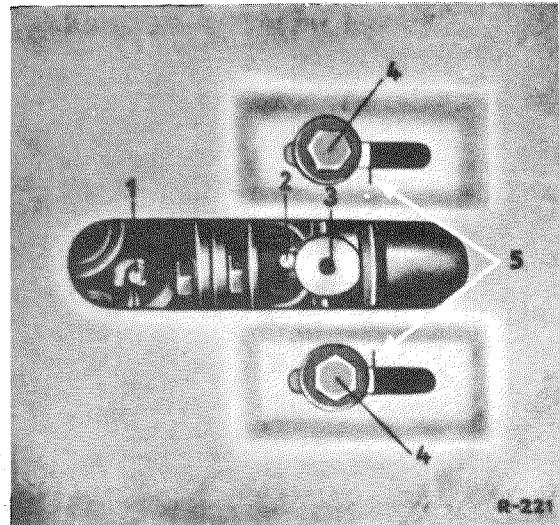


Fig. 41 — 1/2

- 1 Front universal joint pinion rim grease fitting
- 2 Pinion rim grease fitting for annular grooved bearing
- 3 Threaded bore for cover plate fixing screw
- 4 Fixing screw for bearing bracket
- 5 Position marking of bearing bracket on chassis base panel

7. Push the propeller shaft into the lower left corner of the housing and remove toward the rear (Fig. 41 — 1/3).

**Note:** During removal, lift the intermediate bearing and the front propeller shaft by means of Fork 120 589 02 61 in order to prevent the propeller shaft from catching on the ribs in the housing.

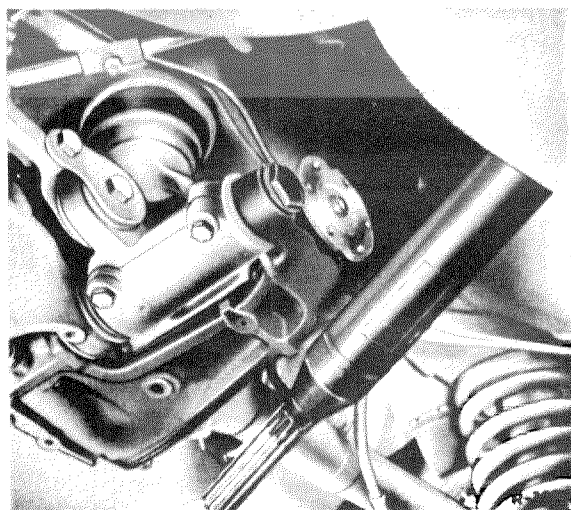


Fig. 41 — 1/3

8. After removal of the propeller shaft check the three-way flange at the transmission for run-out.

To do this, remove the shaft plate at the transmission and check the run-out by means of Tester 136 589 04 21 (Fig. 41 — 1/4).

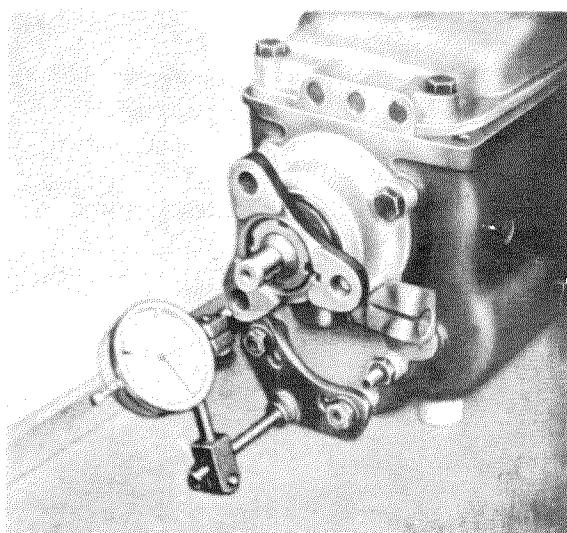


Fig. 41 — 1/4

The run-out is measured at the outside diameter and must not exceed 0.1 mm; if the run-out is greater, change the position of the three-way flange on the splined shaft extension in order to compensate for any additional run-out of the main shaft in relation to the three-way flange. If

after that the run-out of the three-way flange still exceeds 0.1 mm the flange can be turned down to a minimum thickness of 8.5 mm. Otherwise the three-way flange must be replaced.

9. In special cases it is advisable also to check the run-out of the circular flange of the rear axle, using Tester 136 589 04 21.

The run-out is measured at the outside diameter and should not exceed 0.02 mm; if the run-out is greater, change the position of the circular flange on the drive pinion shaft.

If this does not improve the situation, the circular flange can be turned down to a minimum thickness of 5.7 mm.

Otherwise the circular flange must be replaced.

#### Installation:

10. Attach the shaft plate to the transmission three-way flange and cotter the fitted screws. Use the three short fitted screws (see Fig. 41 — 1/5). Install the shaft plate in such a way that the double links are under tensile stress. For this purpose the bores (1) must always be connected to the three-way flange of the transmission (Fig. 41 — 1/4a). On the recent versions of the shaft plate the bores (1) are marked as shown in the picture below (see 'a').

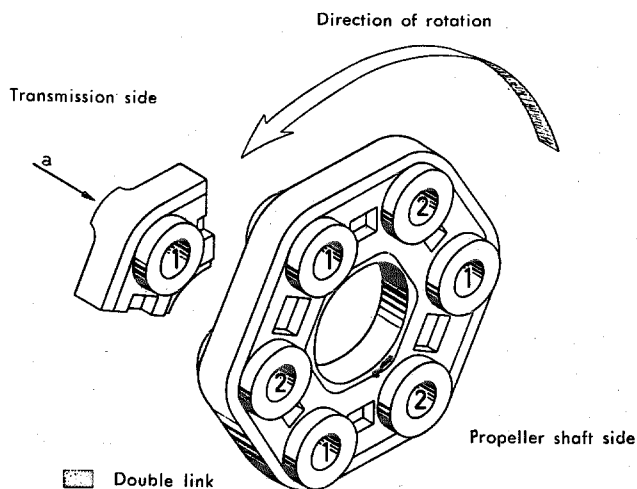


Fig. 41 — 1/4a

- 1 Attach to three-way flange of transmission
- 2 Attach to three-way flange of propeller shaft

On the old type of shaft plate the double links can easily be distinguished by bending the shaft plate at a point between two bores. There is a considerable difference in the degree of stiffness between the double links and the single links. If the shaft plate is not mounted correctly its life will be shortened.

11. Remove the slip coupling from the propeller shaft, if a new shaft is to be installed. Before doing so, mark slip coupling and propeller shaft.
12. Turn the bearing bracket of the propeller shaft intermediate bearing so that the attaching face points upward.
13. Push the brake equalizer upward and slide the propeller shaft into the housing in the chassis base panel past the rear axle on the left.

**Note:** When sliding in the intermediate bearing and the front propeller shaft, lift them by means of Fork 120 589 02 61 in order to prevent the shaft from catching on the ribs of the housing.

During installation make sure that the brake cable does not wind itself round the propeller shaft.

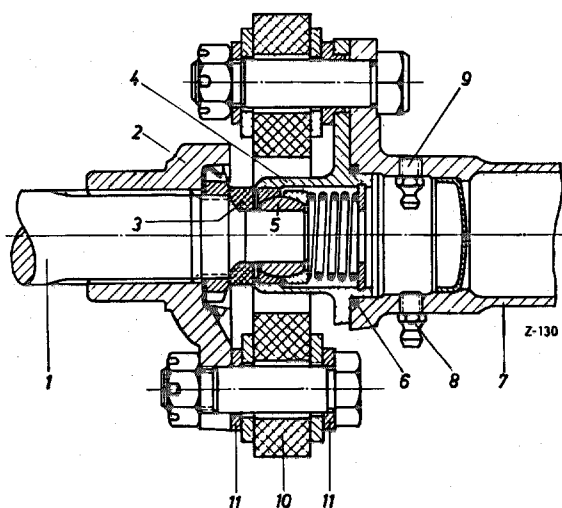


Fig. 41 — 1/5

- |                                  |                             |
|----------------------------------|-----------------------------|
| 1 Transmission main shaft        | 6 Sealing ring              |
| 2 Three-way flange on main shaft | 7 Propeller shaft           |
| 3 Sealing ring                   | 8 Pinion rim grease fitting |
| 4 Center cross                   | 9 Relief grease fitting     |
| 5 Locating ball                  | 10 Shaft plate              |
|                                  | 11 Washer                   |

14. Slide the sealing ring (3) on the journal of the transmission main shaft (1) between the three-way flange (2) and the center cross (4). Do not omit the sealing ring (6) between center cross (4) and propeller shaft flange (Fig. 41 — 1/5).

15. Turn the bearing bracket of the intermediate bearing in such a way that the attaching face points downward again.

16. Install the slip coupling on the splined extension of the propeller shaft, paying attention to the marking (see Fig. 41 — 1/1).

17. Connect the propeller shaft to the flange of the transmission (see Fig. 41 — 1/5).

To do this install the three long fitted screws through the flange of the propeller shaft and through the shaft plate.

Install the castle nuts together with the washers and cotter them.

18. Attach the propeller shaft to the flange of the rear axle. Use new locking plates.

19. Attach the propeller shaft intermediate bearing without forcing (see Fig. 41 — 1/2).

**Note the position marked during the removal operation.**

20. Attach the brake equalizer and the return spring.

21. Install the brake cable in the brake lever and tighten the wing nut until the hand brake is correctly adjusted (see Job No. 42 — 19, Section C).

22. Apply grease to all lubricating points on the propeller shaft:

- a) Pinion rim grease fitting (8) at the front of the propeller shaft, lubricating the center cross and the centering head (see Fig. 41 — 1/5).

**Note:** The pinion rim grease fitting inside the propeller shaft operates as a relief valve so that the air can escape during lubrication. The lubricating operation is completed as soon as grease emerges from the pinion rim grease fitting.

- b) Pinion rim grease fitting (1) at the center universal joint (see Fig. 41 — 1/2).
- c) Pinion rim grease fitting (2) for the intermediate bearing (see Fig. 41 — 1/2).
- d) Pinion rim grease fitting for the rear universal joint (Fig. 41 — 1/6).

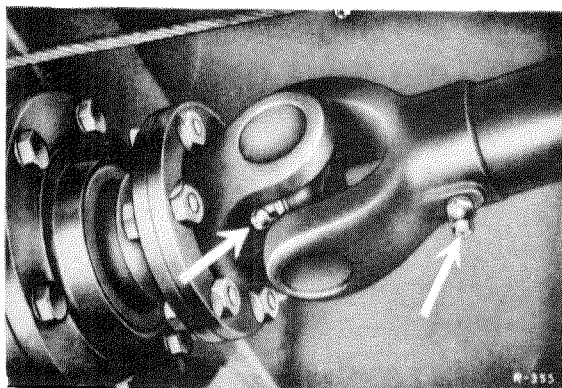


Fig. 41 — 1/6

- e) Pinion rim grease fitting on slip coupling (Fig. 41 — 1/6).

**Note:** The slip coupling must not be overlubricated, since otherwise the propeller shaft would become subject to axial thrust. On recent models the cover (6) on the splined hub (5) has been provided with a bore (a) and the pinion rim grease fitting (4) has been repositioned (Fig. 41 — 1/7).

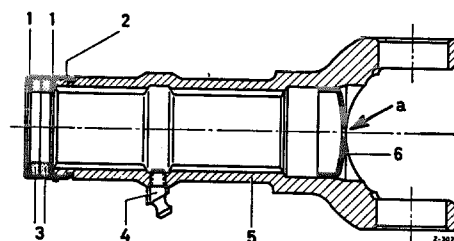


Fig. 41 — 1/7

- |                                    |                                  |
|------------------------------------|----------------------------------|
| 1 Washer                           | 4 Pinion rim grease fitting      |
| 2 Sealing ring retainer            | 5 Splined hub of universal joint |
| 3 Sealing ring; tallowed wool felt | 6 Cover                          |
|                                    | a Outlet bore diameter 2 mm      |

During lubrication the air can escape through bore (a). As soon as grease emerges, the lubricating operation is completed.

This arrangement guarantees easy movement of the slip coupling, since no thrust can build up and no grease buffer can form between the front of the splined hub and the cover.

**It is impossible to make a corresponding change on older models, since apart from making the bore (a), the pinion rim grease fitting would have to be changed and also the splined hub would have to be altered.**

- 23. After lubrication install the cover plate for the propeller shaft intermediate bearing.