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<td>Description of Repair Works</td>
<td>15-50</td>
</tr>
</tbody>
</table>
The present document gives directions to the trained personnel to repair the

Marmon-Herrington (M-H) Transfer Case MVG 1200

Customary tools and devices, which are workshop standard, are supposed to be available.

Disassembly and assembly of one version only is explained in this document. Differing working sequences of other possible versions can easily be recognised by the skilled professional. For such jobs see enclosed sectional and perspective views.

The repair of the component may require changed working sequences or/and differing adjustment or checking data, according to the technical development of the product over the years.

Therefore, we recommend rendering your M-H Product only to the hands of periodically trained personnel.

Damages caused by improperly or unprofessionally executed repair work through untrained personnel and the resulting consequences are excluded from any contractual liability.

This also applies when NON-ORIGINAL-PARTS are being used.
The company repairing M-H Components is in any case responsible for all aspects of safety.

The valid safety regulations and legal directives have to be obeyed to avoid injury of persons and damage of the product during maintenance and repair.

The proper repair of the M-H Product requires adequately trained personnel. To undergo training is the obligation of the repairer.

Always assure professional and clean working conditions. Components shall always be cleaned before disassembly.

The use of indicated tools is a precondition.

After disassembly, all parts have to be cleaned. This applies in particular to corners, nooks and oil catchers in housings and covers.

Carefully remove old sealing compound.
Clean surfaces thoroughly before sealing.

Lubrications bores, grooves and pipes are to be checked to be free from obstructions. They must be free from deposits, contamination and preservatives. The latter applies particularly for new parts.

Parts that are being damaged during disassembly are to be replaced by new ones.
E.g.: radial oil seals, o-rings, groove-rings, seal cups, protection caps a. s. o.

Parts as bearings, thrust washers, synchromesh parts etc., which are liable to normal wear have to be checked by the skilled professional. He judges if a part can be reused or not.

Parts, which have a shrink fit, must be driven to their end position after cooling down to assure perfect seating. Before pressing-in parts like shafts, bearings etc. both contact surfaces must be oiled.

On the assembly all given adjustment tolerances, check data and tightening torques have to be observed. M-H Components are to be filled with lubricant after the repair. Observe filling instructions and lubrication chart. After filling, the oil drain and oil level plugs must be tightened to correct torque.

Use Original M-H Parts only!
Technical Data

| Max. torque input | 12 000 Nm (8850 lbft) |
| Max. input speed  | 3000 1/min |
| Transmission ratio | road gear 1 : 1 / off road gear 1 : 1.75 (or 1 : 1.22) |
| Weight            | approx. 230 kg |
| Oil quantity      | approx. 4.5 l (3.5 l without differential) |
| Oil grade         | SAE 90 or 85 W 90 according MIL-L-2105 API-GL-4 or MIL-L-2105 B/C API-GL-5 |

Flanges

<table>
<thead>
<tr>
<th>Flanges</th>
<th>(KV = sorrrated)</th>
<th>Flange projection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>L1</td>
</tr>
<tr>
<td>Input</td>
<td>DIN 150</td>
<td>103 mm (4.05 in)</td>
</tr>
<tr>
<td></td>
<td>DIN 165</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DIN 180</td>
<td></td>
</tr>
<tr>
<td></td>
<td>KV 150</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SAE 1600</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SAE 1700</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SAE 1800</td>
<td></td>
</tr>
<tr>
<td>Front output</td>
<td>DIN 150</td>
<td>165 mm (6.5 in)</td>
</tr>
<tr>
<td></td>
<td>DIN 165</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DIN 180</td>
<td></td>
</tr>
<tr>
<td></td>
<td>KV 150</td>
<td>169 mm (6.6 in)</td>
</tr>
<tr>
<td></td>
<td>SAE 1600</td>
<td>183 mm (7.4 in)</td>
</tr>
<tr>
<td>Rear output</td>
<td>DIN 150</td>
<td>125 mm (4.9 in)</td>
</tr>
<tr>
<td></td>
<td>DIN 165</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DIN 180</td>
<td></td>
</tr>
<tr>
<td></td>
<td>KV 150</td>
<td>123 mm (4.8 in)</td>
</tr>
<tr>
<td></td>
<td>SAE 1600</td>
<td>145 mm (5.7 in)</td>
</tr>
<tr>
<td></td>
<td>DIN 225</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SAE 1700</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SAE 1800</td>
<td></td>
</tr>
</tbody>
</table>
### Setting data

<table>
<thead>
<tr>
<th>Item</th>
<th>Designation</th>
<th>Dimensions</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bearing clearance of drive shaft</td>
<td>0.01 - 0.06 Nm</td>
<td>to adjust with shim washers</td>
</tr>
<tr>
<td>2</td>
<td>Bearing clearance of output shaft</td>
<td>0.01 - 0.06 Nm</td>
<td>to adjust with shim washers</td>
</tr>
<tr>
<td>3</td>
<td>Axial clearance of twin wheel</td>
<td>0.3 - 0.5 mm</td>
<td>to adjust with shim washers</td>
</tr>
<tr>
<td>4</td>
<td>Temperature of the flange while mounting</td>
<td>120 °C</td>
<td></td>
</tr>
</tbody>
</table>

### Tightening torques

<table>
<thead>
<tr>
<th>Item</th>
<th>Designation</th>
<th>Nm (kpm)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>Housing bolts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M2</td>
<td>Collar nuts of flange</td>
<td>1100 (110)</td>
<td></td>
</tr>
<tr>
<td>M3</td>
<td>Collar nut of flange</td>
<td>650 (65)</td>
<td></td>
</tr>
<tr>
<td>M4</td>
<td>Fixing bolts for rear planet carrier</td>
<td>80 - 85 Nm + 120° (5°)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>8.0 - 8.5 kpm + 120° (5°)</td>
<td></td>
</tr>
</tbody>
</table>
Transfer case MVG 1200 7124.

sealing compound DIRKO for all surfaces
Transfer case MVG 1200 7124 with interaxle differential.

110 Nm

LOCTITE 243

1080 Nm

OCTITE 243

120° C

23 Nm

0° C

Nm

46 Nm

80 Nm

110 Nm

0,01 - 0,06 mm

0,3 - 0,5 mm

80 - 85 Nm + 120° (±5°)

120° C

1080 Nn

46 Nm

loctite 243

sealing compound DIRKO for all surfaces
Transfer case MVG 1200 7120. with interaxle differential.

sealing compound DIRKO for all surfaces
Consumables

Materials, auxiliaries, and preservatives are considered consumables required for vehicle repair.

Table of consumables for unit repair.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Designation of compound</th>
<th>Product name</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>Standard grease</td>
<td></td>
</tr>
<tr>
<td>F2</td>
<td>Roller bearing grease</td>
<td></td>
</tr>
<tr>
<td>G1</td>
<td>Antiseize compound</td>
<td>Molykote antiseize compound</td>
</tr>
<tr>
<td>G2</td>
<td></td>
<td>Loctite-Anti-Seize</td>
</tr>
<tr>
<td>G3</td>
<td></td>
<td>Molykote M55</td>
</tr>
<tr>
<td>D1</td>
<td>Sealing compound</td>
<td>Dirko</td>
</tr>
<tr>
<td>D2</td>
<td></td>
<td>Loctite Super ... RTV2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Loctite 510 (red)</td>
</tr>
<tr>
<td>K2</td>
<td>Adhesive</td>
<td>Loctite 242 e (light blue)</td>
</tr>
<tr>
<td>R1</td>
<td>Cleaner</td>
<td>Loctite sealant remover</td>
</tr>
</tbody>
</table>

In the following diagram the greases, anti-seize agents, sealing compounds and adhesives are indicated with their symbol and point to the components to be treated.
Definitions

The terms used in the repair manual were chosen with the current standard in mind.

The application and definition of operations and work instructions is explained here.

<table>
<thead>
<tr>
<th>Designation</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remove</td>
<td>Removal of a component from a component group or of a part from an assembly without first removing any other components.</td>
</tr>
<tr>
<td>Mount</td>
<td>To fit a part to an assembly or a component to a component group without any further components being involved.</td>
</tr>
<tr>
<td>Disconnect</td>
<td>To separate a detachable connection of wire, tubing, or hose.</td>
</tr>
<tr>
<td>Connect</td>
<td>To bring together a detachable connection of wire, tubing, or hose.</td>
</tr>
<tr>
<td>Pull off</td>
<td>To remove a component that is press-fitted to another.</td>
</tr>
<tr>
<td>Push on</td>
<td>To join two components by press-fitting.</td>
</tr>
<tr>
<td>Unscrew</td>
<td>To open a rotary connection.</td>
</tr>
<tr>
<td>Screw down</td>
<td>To close a rotary connection.</td>
</tr>
<tr>
<td>Removing</td>
<td>Removal of a component from a component group or of a part from an assembly when other components must first be displaced.</td>
</tr>
<tr>
<td>Install</td>
<td>To attach a component to a component group or a part to an assembly, if, for functional reasons, other component groups will be attached.</td>
</tr>
<tr>
<td>Loosen</td>
<td>Partial detachment of fixing elements in a component or a part.</td>
</tr>
<tr>
<td>Remove</td>
<td>To detach the fixing elements of a component or a part.</td>
</tr>
<tr>
<td>Tighten</td>
<td>To firmly attach the fixing elements of a component or a part.</td>
</tr>
<tr>
<td>Disassembly</td>
<td>Dismantling of component groups into their constituent parts</td>
</tr>
<tr>
<td>Assembly</td>
<td>The joining together of parts of a component group</td>
</tr>
<tr>
<td>Set, Adjust</td>
<td>Correction of deviation with the help of the proper tools or equipment</td>
</tr>
<tr>
<td>Fill</td>
<td>Adding or topping - up of fluids</td>
</tr>
<tr>
<td>Renew</td>
<td>Replacement of an accessory material with a new one</td>
</tr>
<tr>
<td>Replacement</td>
<td>Substitution of a machine, component group or part with a new or reconditioned one of the same type</td>
</tr>
<tr>
<td>Measure</td>
<td>Determination of the current nominal condition by investigating physical size</td>
</tr>
<tr>
<td>Checking</td>
<td>Comparison of the current nominal condition against a set standard</td>
</tr>
<tr>
<td>Cleaning</td>
<td>Removal of foreign and auxiliary materials.</td>
</tr>
<tr>
<td>Service</td>
<td>Measures necessary to maintain proper functioning</td>
</tr>
</tbody>
</table>
Jobs on dismounted transfer case

Dismantling and assembling transfer case
Job number: 0720.00.10

Additional work:
Removing and fitting the transfer case
Connect transfer case to mounting stand
SK 17996

Special tools:
Ram device SK 17828/A
Draw bolts TS86W
Mounting stand TS 220 W
Holding plate SK 17999
Pulling device for ball roller bearings TS83W
Holding device TS 12 W

Standard tools:
Two-arm puller KUKKO 20/3
Pulling-off device KUKKO 18/1
Inside puller KUKKO 21/7
Extractor support KUKKO 22/5
Inside puller KUKKO 21/89
Extractor support KUKKO 22/2
Two-arm puller KUKKO 20/2
Separating tool KUKKO 17/2
Two-arm puller KUKKO 20/1
Two hexagonal bolts M10x70

Checking tools:
Torque wrench 200Nm
Torque multiplier "Gedore 8600-11"

Measuring tools:
Sliding gauge
Inside gauge 15 - 200 mm
Micrometer 100 - 125 mm, 125 - 150 mm

Consumables:
Silicon sealant
Oil
Loctite 242

1.1 Dismantling transfer case

1.1.1 Dismantling transfer case housing parts, selector cylinder and front axle drive

1 Undo collar nuts (2/1, 3/1) from the flanges (2/2, 3/2).
2 Draw the flanges off the shafts with two-arm puller KUKKO 20/3 (4/1).

3 Remove shim washer from the drive shaft.

4 Remove clamping bolt from the drive pinion of the tachograph.

5 Screw on ram device SK 17828/A (5/1) and draw the driving pinion out of the bearing cover with light blows.

6 Remove front axle output (6/1).

7 Remove drive shaft bearing cover (6/2) and the front cover (6/3) and take the shaft seal out of the bearing cover.

8 Remove the cover for the selector cylinder (6/4).

9 Remove the retaining ring from the selector rod, undo the selector cylinder fixing nuts (6/5) and remove the selector cylinder complete with piston and sealing ring.

1.1.2 Dismantling transfer case lubricating system

1 Undo the fixing bolts of the oil pump cover (7/1) and remove the cover.
2 Rotate the drive shaft until the ball is visible in the slot (8/2).

3 Using pulling-off device KUKKO 18/1 (9/1) and draw bolts TS 86 W (9/2), extract the oil pump from the oil pump bearing housing. From this position the oil pump can be withdrawn using two hexagonal bolts (M6).

4 Remove the pressure pipe (9/3) between the oil pump bearing housing and the bearing cover of the rear axle output.

5 Remove the oil pump bearing housing (9/4) and knock out the outer bearing ring.

6 Remove flange (7/2) with pressure switch.

7 Undo fixing bolts for the cover (10/1). Press cover out of the housing with the bolts (10/2) M10x70.

8 Press outer bearing rings (11/1) and cylinder roller bearings (11/2) out of the cover for the transfer case.
1.1.3 Removing drive shaft, twin wheel and planet gears.

1. Take drive shaft (12/4), together with the selector fork (12/2) and selector rod (12/3) out of the transfer case and remove valve ball, driver ball and oil guide ring.

2. Draw out oil pipe (12/5).

3. Remove oil sump (13/1).

4. Remove planet gears (13/2) together with the double wheel (13/3).
   or: Remove output shaft

5. Remove oil pipe.

6. Undo fixing bolts of the rear cover (15/1) and undo the bearing cover (15/2) of the rear axle output.

7. Remove the shim washers with the bearing cover for the rear axle output.

8. Press the shaft sealing ring out of the bearing cover (15/2).
9 Press the cylinder roller bearings (16/1) and the outer bearing rings (16/2) out of the housing.
1.2 Assembling transfer case

1.2.1 Determining required thickness of shims

1. Press shaft sealing ring (17/1) into the bearing cover for the rear axle output.

2. Place oil guide ring (18/1) into the bearing cover for the rear axle output. The cylinder pin (18/2) must lock into the groove.

3. Knock the bearing outer rings (19/1) for the rear axle output into the blind bore holes in the housing.

4. Fit the bearing cover (20/1) for the rear axle output to the transfer case housing.
5 Drive the outer bearing ring (21/1) into the bearing housing for the oil pump.

6 Fit the oil pump bearing housing (22/1) onto the transfer case.

7 Fit planet gears.
   or: fit output shaft

8 Fit drive shaft.
9 Drive outer bearing rings (25/1) into the cover.

10 Place cover (26/1) in position on the transfer case housing and secure.

11 Press the shaft sealing ring (27/1) flush into the bearing cover for the drive shaft.

12 Fit front axle output (28/1) and bearing cover for the drive shaft (28/2).
13 Rotate transfer case. Remove bearing cover for rear axle output (29/1) and bearing housing for oil pump (29/2).

14 Measure protrusion (B1) of the oil guide ring

or: Measure protrusion (B1) of outer bearing race

15 Measure the depth (A1) of the bearing seating in the bearing cover for the rear axle output.

16 Determine the required thickness (X1) of the shim washers.

\[ X1 = A1 - B1 + \text{clearance} \]

Washer thicknesses:
- \( s = 0.1 \text{ mm} \)
- \( s = 0.15 \text{ mm} \)
- \( s = 0.2 \text{ mm} \)
- \( s = 0.4 \text{ mm} \)
- \( s = 1.0 \text{ mm} \)

Axial clearance = 0.01 to 0.06 mm

17 Fit the required shim washers (32/1) and bearing cover to the rear axle output (32/2).
18 Measure the protrusion (B2) of the roller bearing in the oil pump bearing housing.

19 Measure the depth (A2) of the bearing seat in the oil pump bearing housing.

20 Determine the required thickness (X2) of the shim washers.

\[ X2 = A2 - B2 - \text{clearance} \]

Washer thicknesses:
- \( s = 0.1 \text{ mm} \)
- \( s = 0.15 \text{ mm} \)
- \( s = 0.2 \text{ mm} \)
- \( s = 0.4 \text{ mm} \)

Axial clearance = 0.01 to 0.06 mm

21 Fit the oil pump bearing housing (35/1) with the required shim washers (35/2).

22 Drive shafts into place.
Dismount transfer case according to Chapter 1.1.

3  Remove the bearing cover to the drive shaft (39/1) and the front axle output (39/2).

4  Remove the bearing housing for the rear axle output (40/1) and the bearing housing for the oil pump (40/2).

5  Remove the cover (41/1) of the transfer case.

6  Lift out drive shaft (42/1) and planet gears (42/2).
1.2.3  Fitting drive shaft and planet gears

1  Smear the sealing edge of the oil pump suction pipe (43/1) with silicon sealant and make fast from the outside of the housing with fixing bolts (43/2).

2  Drive the cylinder roller bearing (44/1) into the housing.

3  Fit oil guide (45/1)

4  Insert twin wheel (46/1) and planet gears (46/2) together.
    or: output shaft separately
5 Fit selector fork (47/1) on the selector rod (47/2).

6 Insert selector fork (48/1) and selector rod together with the drive shaft (48/2).

7 Fix the valve ball $D = 4.5$ and the driver ball $D = 6.0$ into the drive shaft with grease.

8 Spread silicon sealant on the sealing surface of the transfer case housing.

9 Place cover in position and tighten up fixing bolts to 110 Nm.

10 Fit the cylinder roller bearing (50/1) for the twin wheel into the transfer case housing.
1.2.4 Fitting transfer case housing parts, selector cylinder and front axle output

1. Smear front cover (51/1) and bearing cover for the drive shaft (51/2) with silicon sealant and fit in position.

2. Place cover washer (52/1) on the ball roller bearing for the front axle output.

3. Smear front axle output (51/3) with silicon sealant and fit.

4. Slide sealing ring (53/3) on to the selector shaft.

5. Smear selector cylinder (54/1) with silicon sealant and fit.

6. Slide washer (53/4) and O-ring (53/5) on to the selector shaft.

7. Slide piston (54/2) with sealing sleeve over the selector rod and fix in position with a retaining ring (53/6).
8  Smear cover with silicon sealant and fit.

9  Rotate transfer case
   Insert oil pipe (56/1).

10 Smear oil pump bearing housing (57/1) with silicon sealant and then fit bearing housing along with the required shim washers.

11 Hold oil pump gear teeth in position for installation and rotate the drive shaft until the markings on it coincide with the recesses in the bearing housing.

Fit oil pump (58/1). The driver ball in the drive shaft must lock into the groove (58/2) in the oil pump.
12 Smear the cover (59/1) of the oil pump with silicon sealant and fit in place.

13 Smear flange (60/1) with pressure switch with silicon and fit in position.

14 Slide gear (61/1) on to the output shaft.

15 Smear bearing cover (62/1) for the rear axle output with silicon and fit along with the required shim washers.
16 Slide the drive pinion of the tachograph into the bearing bush. Smear bearing bush (63/1) with silicon grease and fit in position.

17 Tighten clamping bolt (with silicon sealant)
1.2.5 Setting axial clearance of twin wheel

1. Measure depth of the bearing seating in the rear cover of the twin wheel (A3).

2. Measure protrusion of the cylinder bearing (B3).

3. Determine thickness of the shim washer (X3).

   \[ X3 = A3 - B3 - \text{clearance} \]

   Washer thicknesses:
   \[ s = 0.1 \text{ mm} \]
   \[ s = 0.2 \text{ mm} \]
   \[ s = 0.5 \text{ mm} \]

   Using shim washers set the axial clearance at between 0.3 and 0.5 mm.

4. Smear rear cover (66/1) with silicon sealant and fit along with required shim washers (66/2).

5. Fit the pressure pipe on to the housing with hollow-bodied screws.

1.2.6 Fitting flanges

1. Warm up flanges (68/1) and (67/2) to 120°C and slide on to the shafts.

2. Fit collar nut for the flange of the output shaft using holding device TS 12 W and torque spanner and tighten up to a torque of 1100 Nm. (Use torque multiplier).

3. Fit collar nut for the flange of the drive shaft using holding device TS 12 W and torque spanner and tighten up to a torque of 650 Nm.
1.2.7.1 Removal, installation and adjustment of transfer case shifter (pneumatic) two and three position - with spring

1. Adjusting bolt (160/1)
   Pressure switch (160/2)
   Counter nut (160/3).

2. Shift cylinder (161/1)
   Cover (161/2)
   Piston (161/3)
   Setting screw (161/4).

3. Push O-Ring (162/1) into groove on shifting rod (59/2) and grease.

4. Install seal collar (162/3) on piston (162/4) with open side toward the smaller piston diameter and grease it.

5. Apply silicone sealant to sealing surface of the shift cylinder (162/5) and install the shift cylinder in the gear housing.

6. Push piston (162/4) with the open side of the seal collar facing (162/3) outward, over the shifting rod (162/2) and fix with securing ring (162/6).

7. Apply silicone sealant to cover (162/7) and mount.

8. Screw in and tighten reducer (162/8) along with copper sealing ring (162/9).
2.7.3 Setting of transfer case gear shifter  
(pneumatic) two and three position with spring

Remark: It the setting of the gear shifter ist done on the
installed transfer case, it is necessary to select
the required range for the adjustment on the
instrument panel with the corresponding switch.
The working steps for adjustment are equal to
the ones on the dismantled transfer case.

1 Dismantle set screw (166/1) with counter screw
   (166/2) of the operating cylinder and remove rest of
   Loctite.

2 Remove set screw (167/1) together with pressure
   switch (167/2) and counter nut (167/3) from the front
   gear box housing and clean off rest of Loctite.

3 Remove remaining sealant from the threaded holes
   with tap M12 x 1.5.

Adjustment of "low"-gear

4 Low-gear is switch automatically by spring force.
   Ensure that dog clutch is locked by turning the input
   shaft on the flange.

5 Cover thread of set screw (166/1) and of counter nut
   (166/1) with Loctite 242e and screw into cover
   (166/3) of the operating cylinder until set screw
   touches the piston/piston road noticably. Then turn
   set screw another 1/3 until 1/2 turn and lock with
   counter nut.

Adjustment of "High"-gear

6 High-gear is operated by applying compressed air
   (P = / 1 bar) throught the connection socket
   (166/4) in the cover of the operation cylinder. Gear
   change can be eased by turning of the input shaft on
   the flange.

7 Cover thread of set screw (167/1) and of counter nut
   (167/3) with Loctite 242e and screw into the front
   gear box housing until set screw touches the piston
   road noticably. Then turn set screw another 1/3 until
   1/2 turn and lock with counter nut.

8 Push pin (167/4) into the set screw (167/1) and
   mount pressure switch (167/2) with copper sealing
   ring (167/5).
1.3 Jobs on components of the transfer case

1.3.1 Checking and measuring components of the transfer case
Job number: 0720.01.22

CHECKING:

1 Visually check the blind bore holes in the housing for damage and signs of wear.

MEASURING:

2 Measure the blind bore holes with an inside gauge and micrometer.

A...Ø 129.978 ± 130.00
B...Ø 119.978 ± 120.00
C...Ø 109.978 ± 110.00
D...Ø 124.978 ± 125.00

1.3.2 Dismantling and assembling selector cylinder of the transfer case selector mechanism
Job number: 0720.04.25

CHECKING:

1 Visually check bush for reusability.

DISMANTLING:

2 Withdraw bush using inside puller KUKKO 21/89 (78/2) and extractor support 22/2 (78/1).

3 Remove sealing sleeves from the piston and from the selector cylinder.

ASSEMBLY:

4 Smear sleeve (79/1) with Loctite 242 and press into the selector cylinder. During this operation note the position of the inner bevel.
5 Insert the sealing sleeves (80/1) in the piston.

6 Insert sealing sleeve (80/2) in the selector cylinder.

7 The further stages of assembly are given in Section 1.2.4.

1.3.3 Dismantling and assembling oil pump

Job number: 0720.06.15

Dismantling:

1 Remove oil pump cover (81/1).

2 Remove the oil pump ring gear (82/1) and the oil pump gear (82/2) from the oil pump housing.

Checking:

3 Check tooth profiles and thrust surfaces for signs of wear.

Assembly:

4 Insert the oil pump ring gear (82/1) and the oil pump gear (82/2) in the oil pump housing.

5 Fit oil pump housing

1.3.4 Dismantling, assembling front axle output

Job number: 0720.01.40

Dismantling:

1 Remove cover washer (83/1).

2 Remove cover (83/2).
3 Remove retaining ring (84/1) from the selector fork.

**ATTENTION:** The piston (84/2) is pressed against the retaining ring by a spring. When removing the retaining ring, gently ease the spring.

4 Withdraw piston and spring. Remove sealing sleeves from the piston.

5 Withdraw retaining ring with spacer sleeve.

6 Remove selector fork (85/1) along with sealing ring and selector sleeve (85/2).

7 Press out bush with washer.

8 Remove drive shaft to the front axle output (86/1) after releasing retaining ring.

9 Press shaft sealing ring out of the bearing housing.

10 Draw deep groove roller bearing (87/1) off output shaft using two-arm puller KUKKO 20/2 (87/2).

**CHECKING:**

11 Carry out visual check of bearing housing and output shaft for damage and traces of wear.
ASSEMBLY:

12 Press in shaft sealing ring (88/1).

13 Insert cylinder ring (88/2) in the housing with the ring slot of the spring facing upwards.

14 Smear silicon sealant on the non-chamfered face A of the bush (89/1) and press into position.

15 Warm up the deep grooved ball bearing (90/1) to 80°C and slide on to the output shaft of the front wheel output.

16 Place the output shaft (91/1) of the front wheel output in the bearing housing and fix in position with the retaining ring (91/2).
17 Slide the selector sleeve (92/1), with the selector fork (92/2) already fitted, on to the drive shaft.

18 Slide spacer sleeve on to the selector fork and fix selector fork (93/1) in position with retaining ring (93/2).

19 Slide sealing ring (94/1) and spring (94/2) over the selector fork.

20 Insert sealing sleeve (95/1) in the groove in the piston (95/2).
21 Slide piston (96/1) and retaining ring (96/2) on to the selector fork (96/2). Compress the spring with the piston and the retaining ring until the retaining ring locks into the groove in the selector fork.

22 Smear cover (97/1) with silicon sealant and fit to the bearing housing.

23 Mount the pressure switch.

1.3.5 Dismantling, checking and assembling drive shaft
Job number: 0720.02.05

Dismantling:

1. Draw drive gear \( z \) (no. of teeth) = 23 (98/1), washer (98/2) and taper roller bearing (98/3) off the drive shaft using two-arm puller KUKKO 20/3 (98/5). Remove selector sleeve (98/4).

2. Draw drive wheel \( z \) (no. of teeth) = 17 (99/1), thrust washer (99/2) and taper roller bearing (99/3) off the drive shaft using two-arm puller KUKKO 20/3 (99/4).

Checking:

3. Carry out a visual check of the shafts and drive wheels for damage, wear and grooving.
Note: When using a new drive shaft, insert the blind bore lock in the drive shaft.

ASSEMBLY:

4 Slide drive gear \( z \) (no. of teeth) = 17 (101/1) on to the drive shaft together with thrust washer (101/2). The chamfer on the thrust washer should face upwards.

5 Warm up taper roller bearing (102/1) to 80\(^\circ\)C and slide on to the drive shaft.

6 Rotate drive shaft. Slide selector sleeve (103/1), drive gear \( z \) (no. of teeth) = 23 (103/2) and washer (103/3) on to drive shaft.
7 Warm up taper roller bearing (104/1) to 80°C and slide on to the drive shaft.

1.3.6 Dismantling, assembling twin wheel
Job number: 0720.02.10

DISMANTLING:

1 Draw off bearing inner rings (105/1) using pulling-off device KUKKO 18/1 (105/2) and separating tool KUKKO 17/2 (105/3).

CHECKING:

Carry out a visual check of the bearing positions for damage, wear and grooving.

ASSEMBLY:

2 Warm up bearing inner rings (106/1) to 80°C and slide on to the twin wheel.

1.3.7 Dismantling, assembling planet gears
Job number: 0720.02.15

DISMANTLING:

1 Remove retaining ring (107/1).
2. Loosen bearing inner ring (108/1).

3. Draw off bearing inner ring (109/1) using pulling-off device 18/1 (109/2) and separating tool KUKKO 17/2 (109/3).

4. Draw the taper roller bearing (110/1) using the two-arm puller KUKKO 20/1 (110/2) off the front planet carrier and remove the supporting disc.

5. Before removal, mark fixing bolts (111/1) with a centre punch. If previously-marked fixing bolts are already fitted, these must not be reused. Free planet carrier at rear (111/2).
6 Remove sun gear \( z \) (no. of teeth) = 28 (112/1), thrust washer, planet wheels (112/2) and the set of rollers with washers.

7 Extract planet shaft (113/1) with washers (113/2) and remove seating ball.

8 Draw taper roller bearing (114/1) from the front planet carrier using taper roller bearing pulling device TS 83 W (114/2).

9 Draw taper roller bearing (115/1) off the rear planet carrier using two-arm puller KUKKO 20/3 (115/2).
10 Separate output shaft to the rear axle output (116/1) from the hollow wheel z (no. of teeth) = 67 (116/3) by removing retaining ring (116/2).

11 Withdraw needle sleeve and sealing ring using inner puller KUKKO 21/7 (117/1) and extractor support 22/2 (117/2).

12 Withdraw outer bearing ring of the output shaft to the rear axle output using inner puller KUKKO 21/89 (118/1) and extractor support 22/5 (118/2).

CHECKING:

13 Carry out a visual check of the bearing positions and tooth flanks for damage, wear and grooving.

ASSEMBLY:

14 Grease needle sleeve (119/1) and press into the output shaft for the rear axle output.
15 Press sealing ring (120/1) into the output shaft for the rear axle output.

16 Insert output shaft for rear axle output (121/1) in the hollow wheel z (no. of teeth) = 67 (121/2) and secure with retaining ring (121/3).

17 Warm up taper roller bearing (122/1) to 80°C and slide on to the output shaft for the rear axle output.

18 Drive the outer bearing ring (123/1) into the output shaft using a soft metal drift.
Note: If a new front planet carrier is used, then body-fit pins (124/1) are driven in.

19. Insert seating balls (125/2) in the planet shafts (125/1). Fit the planet bolts with washers (125/3) into the front planet carrier.

20. Place the planet gears (126/1) on the body-fit pins and insert the set of rollers (126/2). Oil the set of rollers and fit washers (127/1).
21 Fit thrust washer (128/1) and sun gear (128/2).

22 Place rear planet carrier (129/1) in position, oil fixing bolts and tighten to a torque of 80 - 85 Nm. Mark the position of the bolts and tighten by 120°.

23 Slide supporting disc (130/1) on to the rear planet carrier.

24 Warm up taper roller bearing (130/2) to 80°C and slide on to its seating on the rear planet carrier.

25 Warm up inner ring (131/1) to 80°C and slide on to the stub of the rear planet carrier.
26 Secure the inner ring with the retaining ring (132/1).

27 Rotate planet carrier. Warm up taper roller bearing (133/1) to 80°C and slide on to its seating on the front planet carrier.