MVG 1200 Series Service Manual

Pro Gear's Harmon-Herrington MVG 1200 Series Service Manual to assist in identifying the parts for your Harmon-Herrington transfer case unit.

If you need any assistance identifying the correct transfer case unit for your truck and equipment, contact your Harmon-Herrington replacement part specialists at Pro Gear and Transmission.

Pro Gear Transmission has same day shipping and 1000’s of products in stock and ready to ship internationally for your next project.

For parts or service contact the Harmon-Herrington specialists at Pro Gear & Transmission, Inc.

1 (877) 776-4600
(407) 872-1901
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REPAIR MANUAL
TRANSFER CASE
MVG 1200

MARMON-HERRINGTON ALL-WHEEL DRIVE
13001 Magisterial Drive • Louisville, KY 40223

JW02/99

TABLE OF CONTENTS

PREFACE

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.

GENERAL WORKING DIRECTIONS

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!

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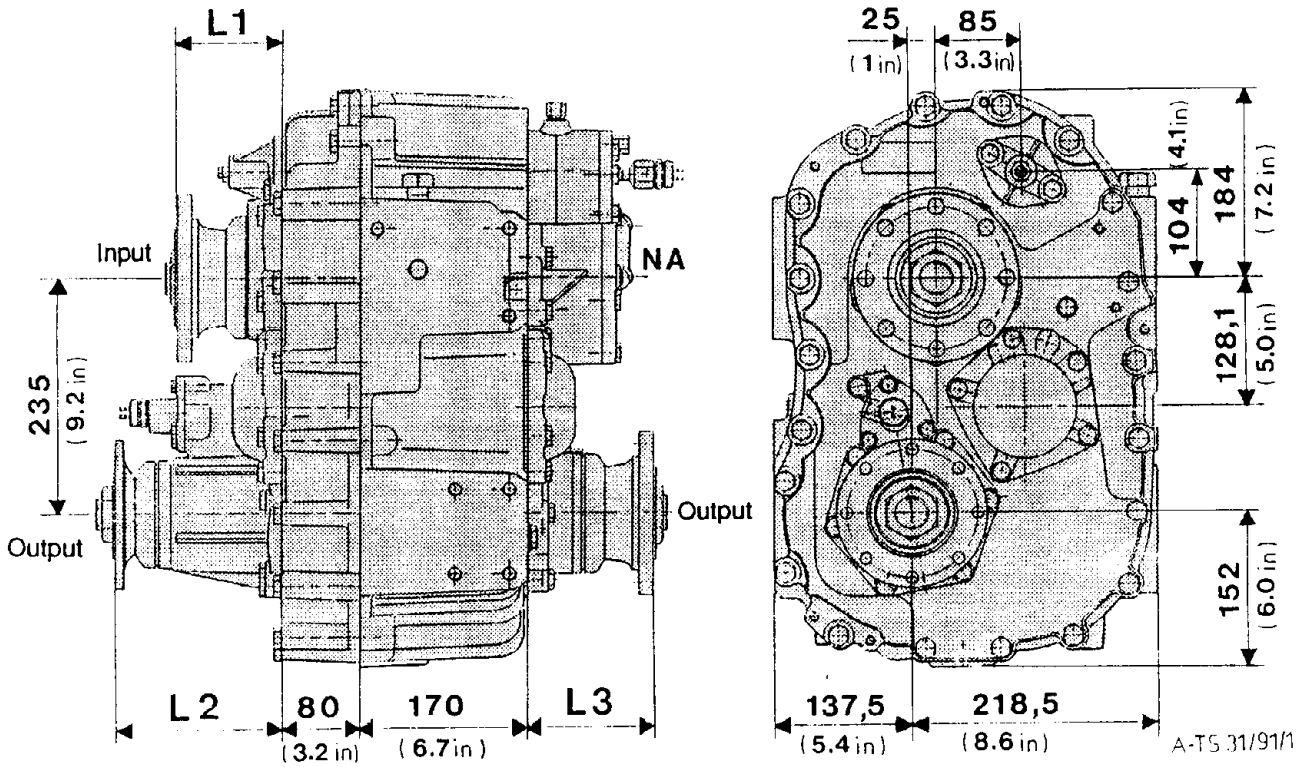
Technical Data

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



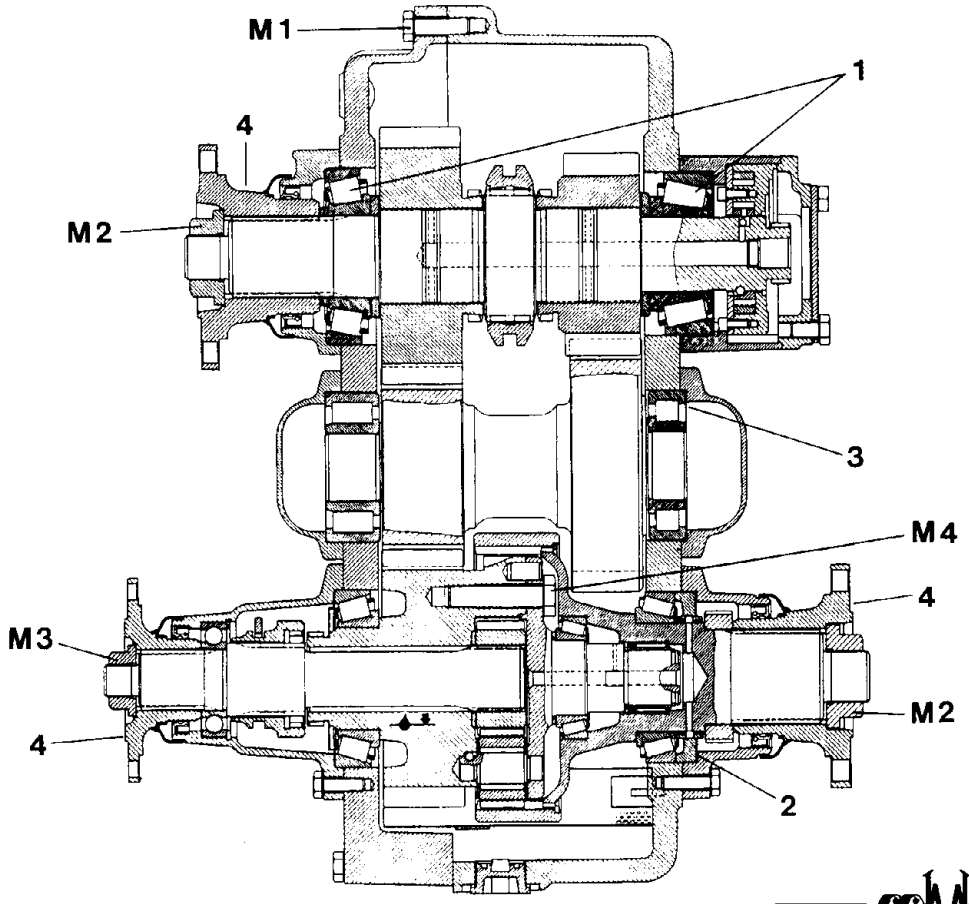
Flanges	(KV = serrated)	Flange projection L1	L2	L3
Input	DIN 150 DIN 165 DIN 180	103 mm (4.05 in)		
	KV 150 SAE 1600	102 mm (4.0 in)		
	SAE 1700 SAE 1800	122 mm (4.8 in)		
Front output	DIN 150 DIN 165		165 mm (6.5 in)	
	DIN 180		190 mm (7.5 in)	
	KV 150		169 mm (6.6 in)	
	SAE 1600		189 mm (7.4 in)	
Rear output	DIN 150 DIN 165 DIN 180			125 mm (4.9 in)
	KV 150 SAE 1600			123 mm (4.8 in)
	DIN 225			145 mm (5.7 in)
	SAE 1700 SAE 1800			143 mm (5.6 in)

Setting data

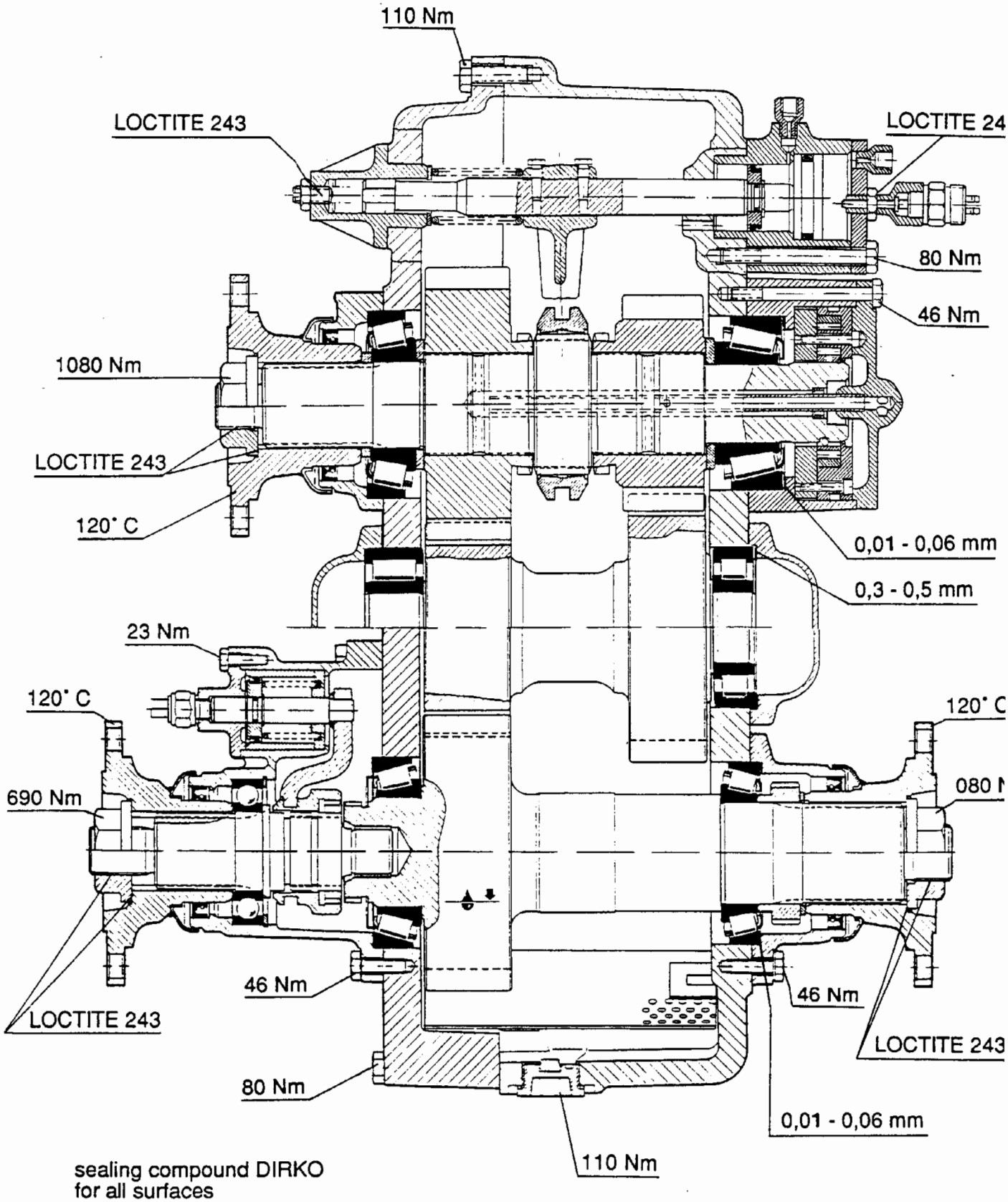
Item	Designation	Dimensions	Remarks
1	Bearing clearance of drive shaft	0.01 - 0.06 Nm	to adjust with shim washers
2	Bearing clearance of output shaft	0.01 - 0.06 Nm	to adjust with shim washers
3	Axial clearance of twin wheel	0.3 - 0.5 mm	to adjust with shim washers
4	Temperature of the flange while mounting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

Tightening torques

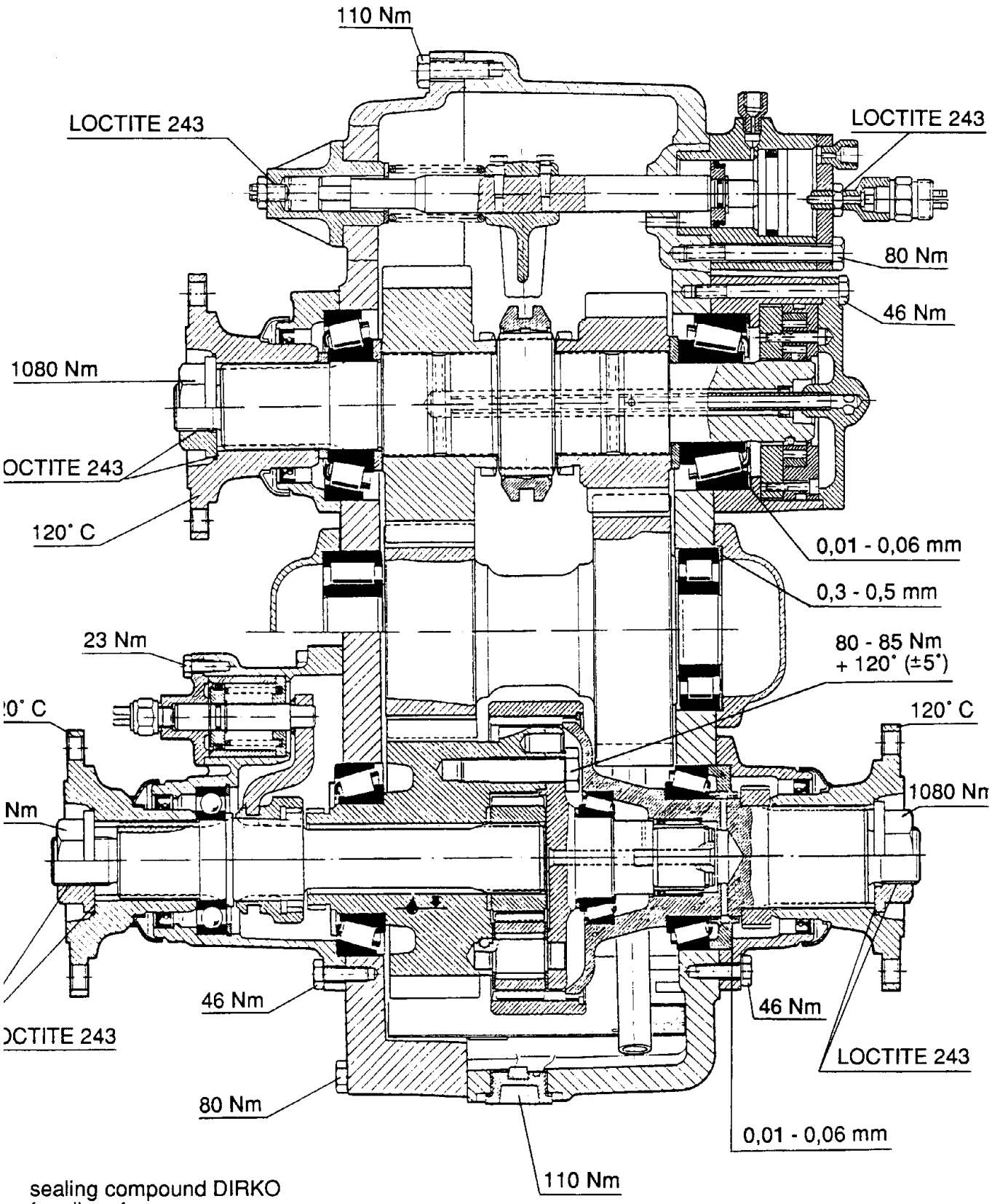
Item	Designation	Nm (kpm)	Remarks
M1	Housing bolts		
M2	Collar nuts of flange	1100 (110)	
M3	Collar nut of flange	650 (65)	
M4	Fixing bolts for rear planet carrier	80 - 85 Nm + 120° (5°) 8,0 - 8,5 kpm + 120° (5°)	



Transfer case MVG 1200 7124.



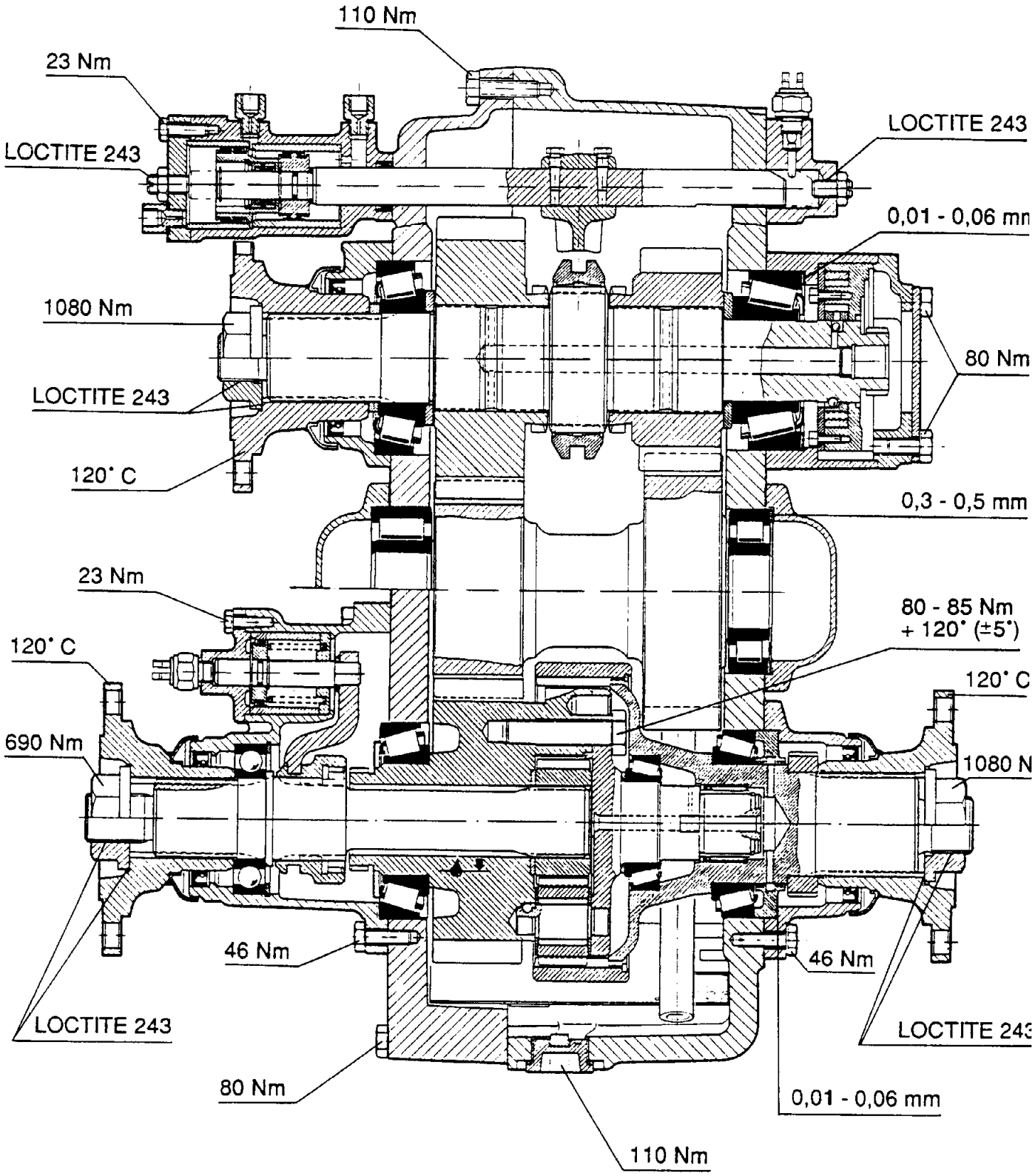
Transfer case MVG 1200 **7124.** with interaxle differential.



sealing compound DIRKO
for all surfaces

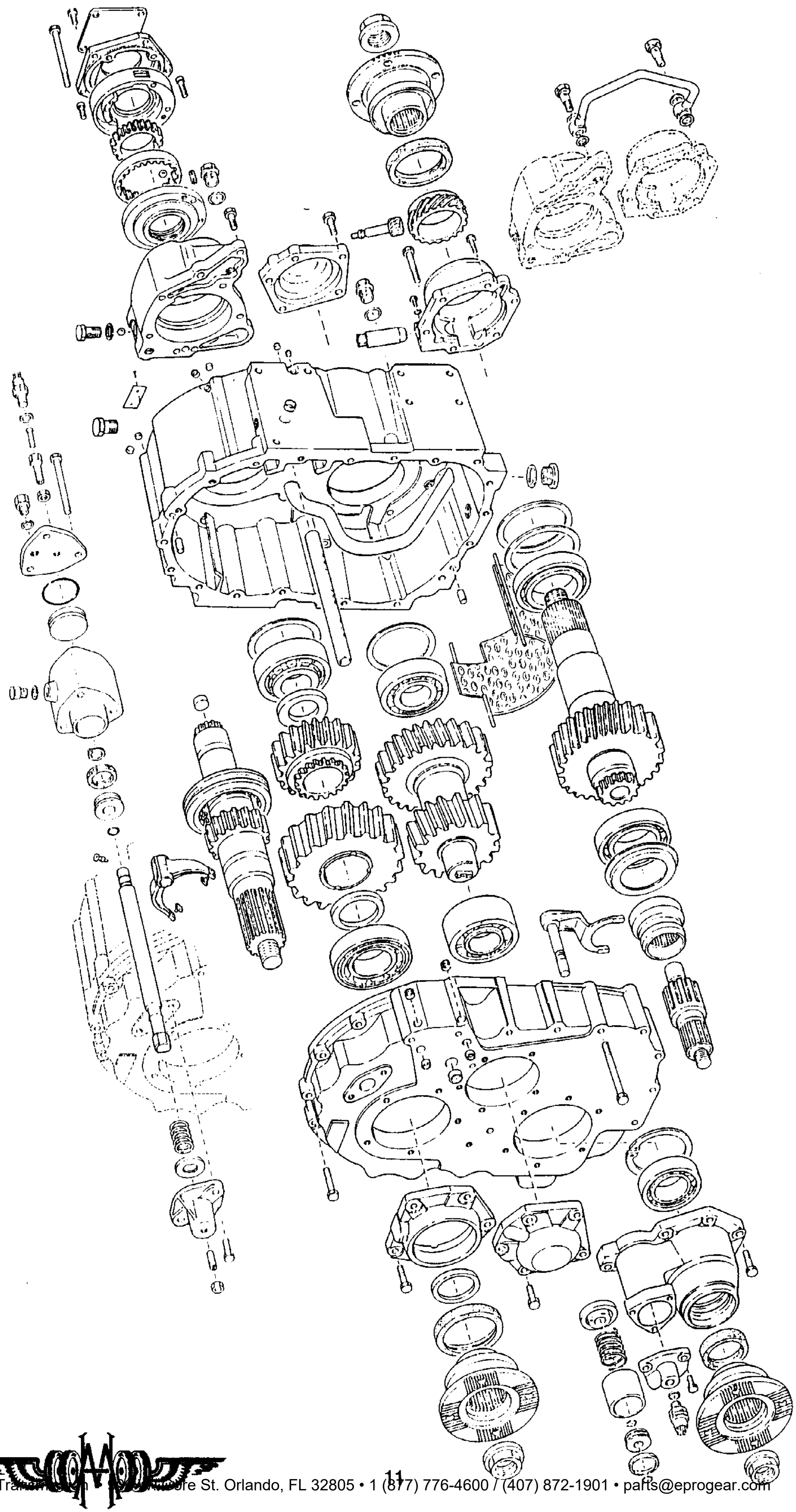
A-TS V/93/92

Transfer case MVG 1200 **7120.** with interaxle differential.



sealing compound DIRKO
for all surfaces

A-TS V/93/93



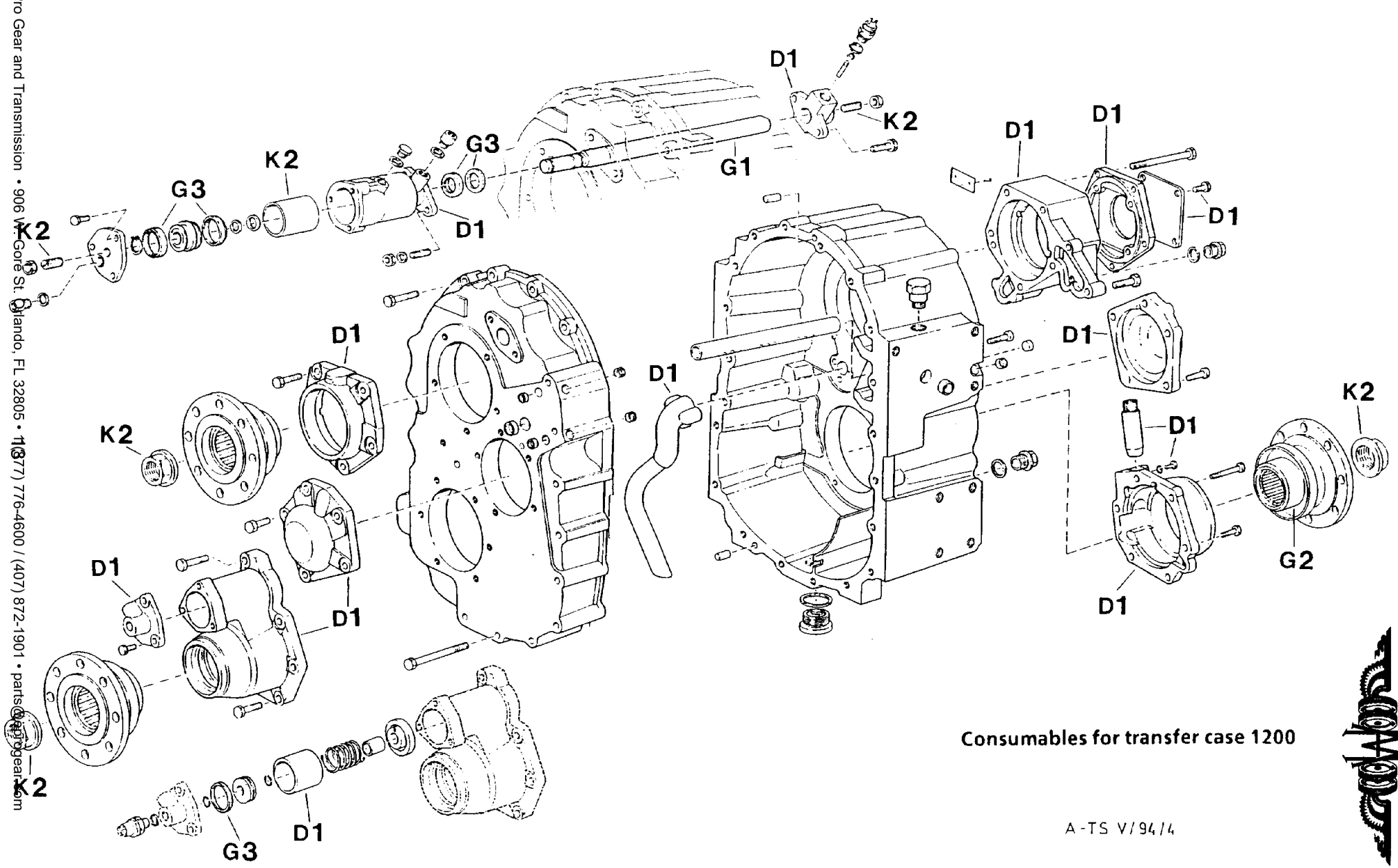
Consumables

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

Table of consumables for unit repair.

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

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.



Consumables for transfer case 1200

A-TS V/94/4

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.

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

1 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:

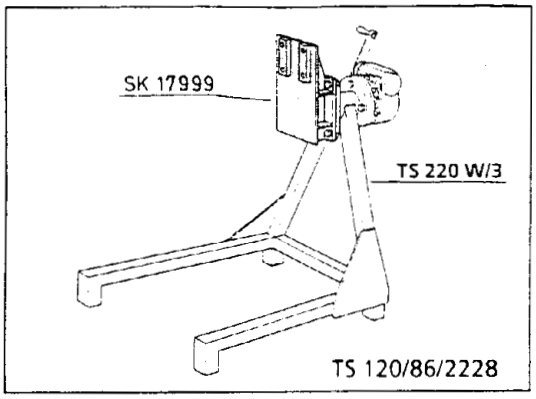
Torque wrench 200Nm
Torque multiplier "Gedore 8600-11"

Measuring tools:

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

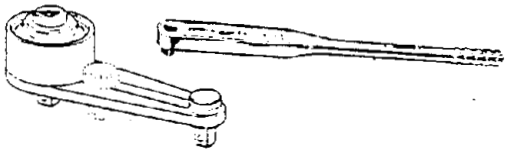
Consumables:

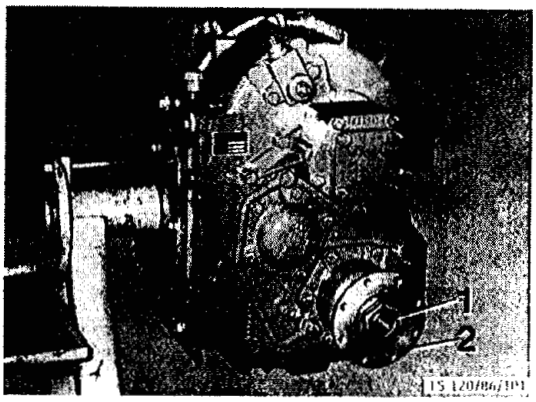
Silicon sealant
Oil
Loctite 242



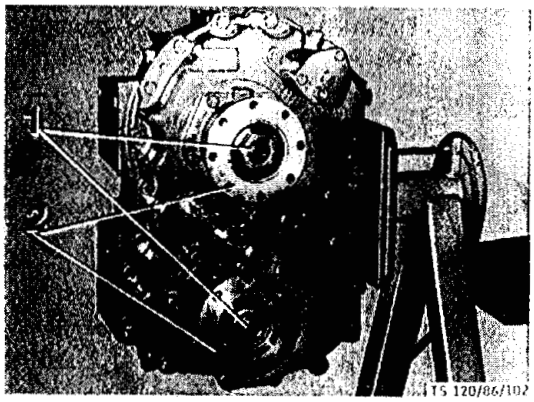
Pict. 1

Loosen flange nuts with a torque multiplier





Pict. 2



Pict. 3

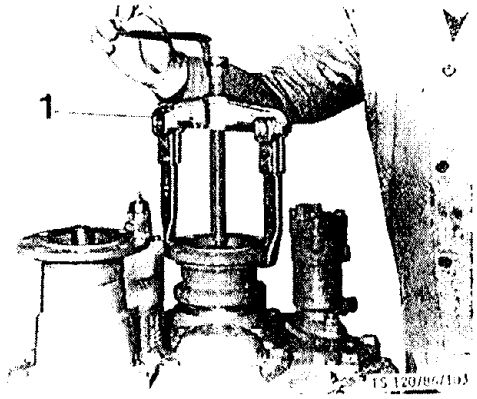
1.1 Dismantling transfer case

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).

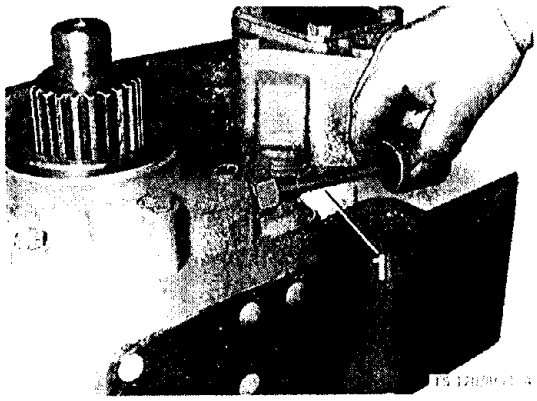
3 Remove shim washer from the drive shaft.



Pict. 4

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.



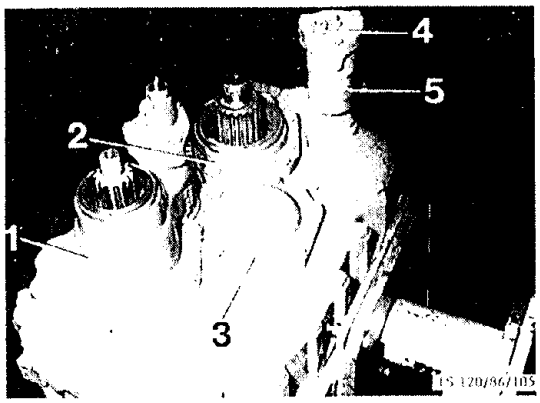
Pict. 5

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).

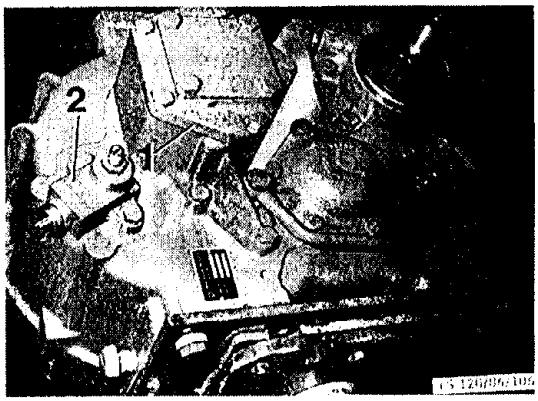
9 Remove the retaining ring from the selector rod, undo the selector cylinder fixing nuts (6/5) and remove the selector cylinder complete with piston and sealing ring.



Pict. 6

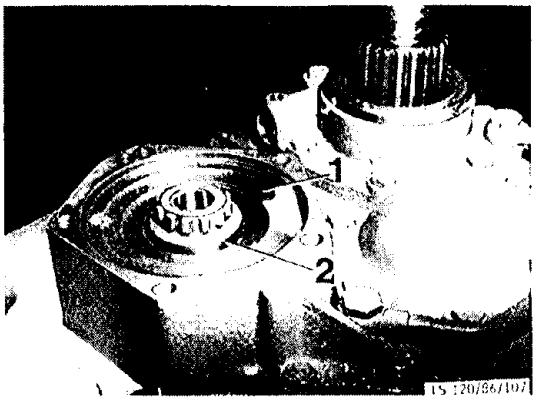
1.1.2 Dismantling transfer case lubricating system

1 Undo the fixing bolts of the oil pump cover (7/1) and remove the cover.



Pict. 7

2 Rotate the drive shaft until the ball is visible in the slot (8/2).



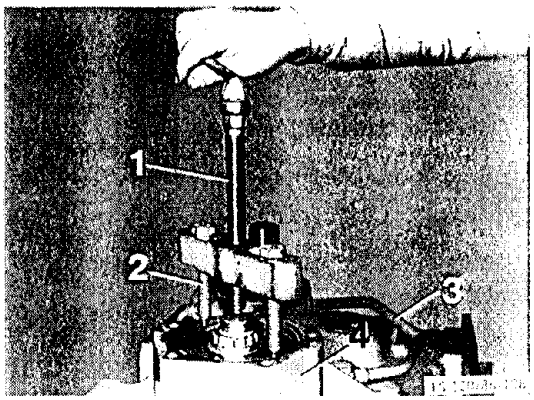
Pict 8

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.

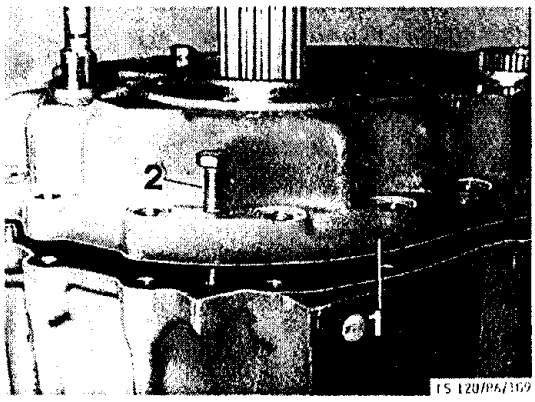
5 Remove the oil pump bearing housing (9/4) and knock out the outer bearing ring.

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



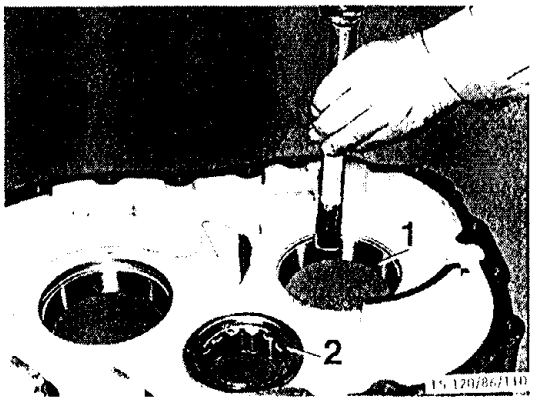
Pict 9

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



Pict 10

8 Press outer bearing rings (11/1) and cylinder roller bearings (11/2) out of the cover for the transfer case.

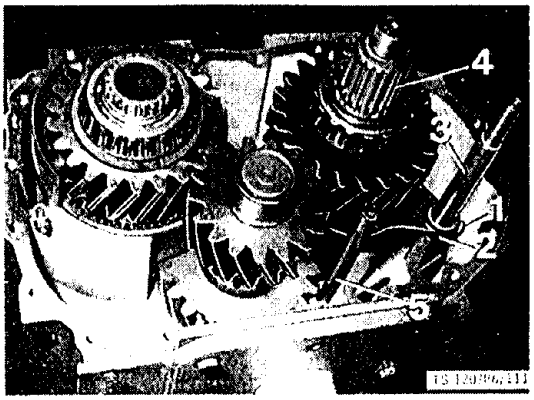


Pict 11

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).

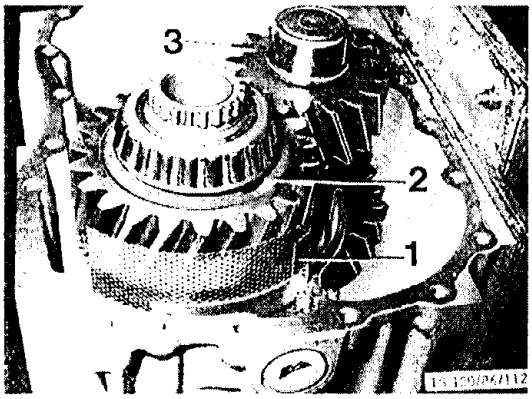


Pict 12

3 Remove oil sump (13/1).

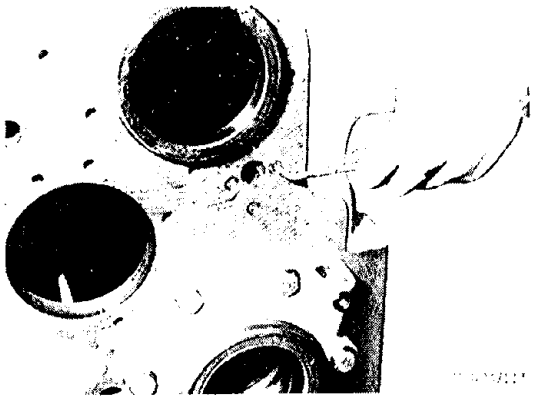
4 Remove planet gears (13/2) together with the double wheel (13/3).

or: Remove output shaft



Pict 13

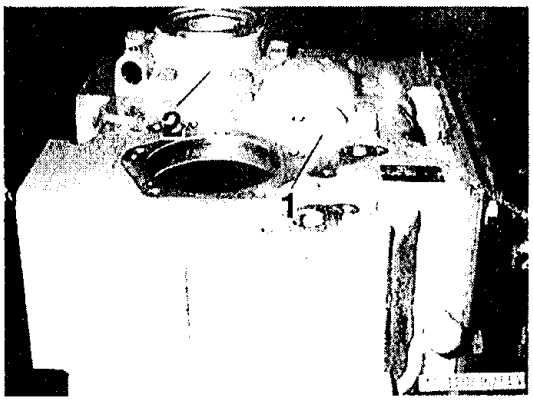
5 Remove oil pipe.


Pict 14

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

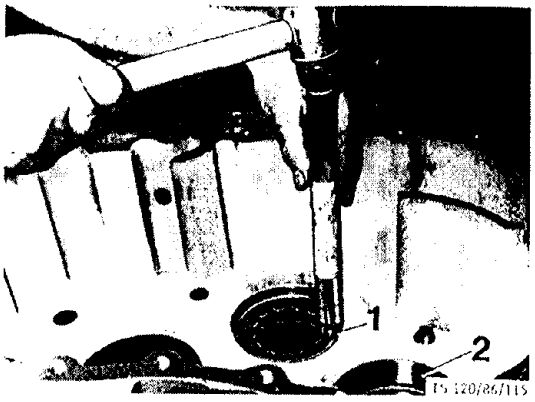
7 Remove the shim washers with the bearing cover for the rear axle output.

8 Press the shaft sealing ring out of the bearing cover (15/2).



Pict. 15

9 Press the cylinder roller bearings (16/1) and the outer bearing rings (16/2) out of the housing.

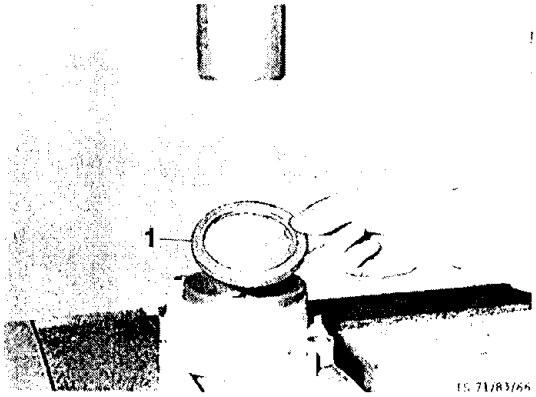


Pict 16

1.2 Assembling transfer case

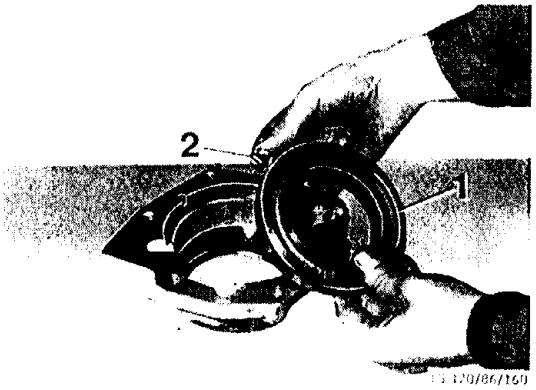
1.2.1 Determining required thickness of shims

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



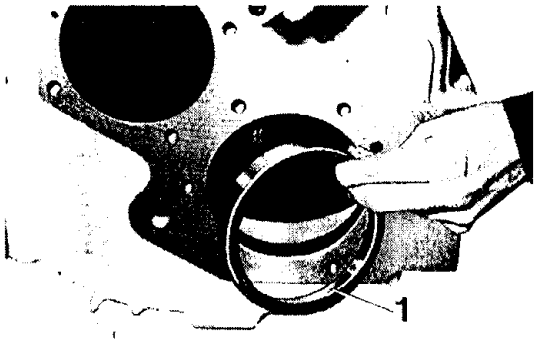
Pict. 17

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



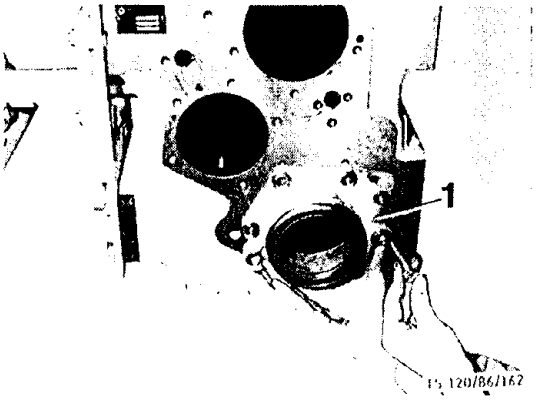
Pict. 18

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



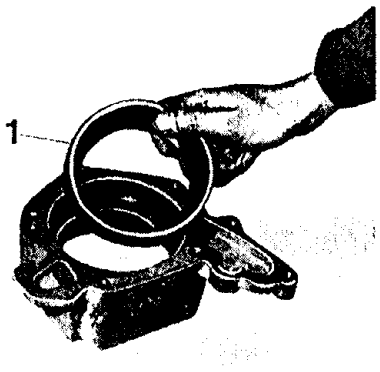
Pict. 19

4 Fit the bearing cover (20/1) for the rear axle output to the transfer case housing.



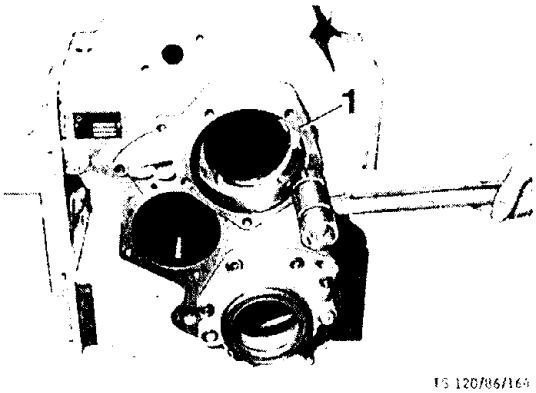
Pict. 20

5 Drive the outer bearing ring (21/1) into the bearing housing for the oil pump.



Pict 21

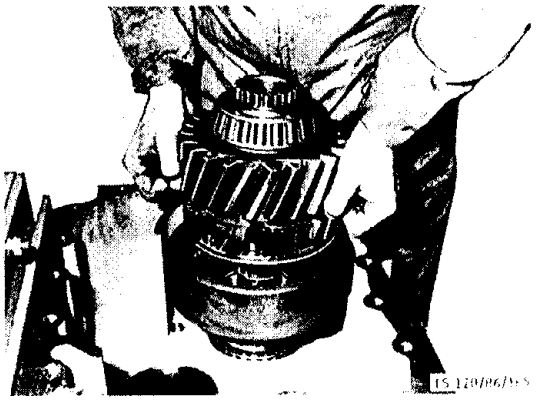
6 Fit the oil pump bearing housing (22/1) on to the transfer case.



Pict 22

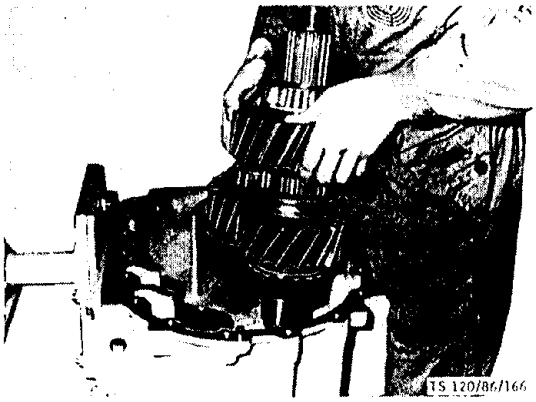
7 Fit planet gears.

or: fit output shaft



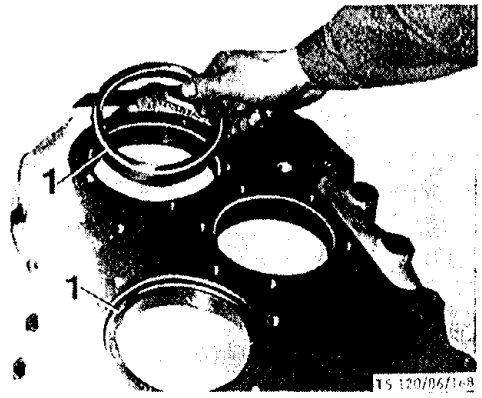
Pict 23

8 Fit drive shaft.



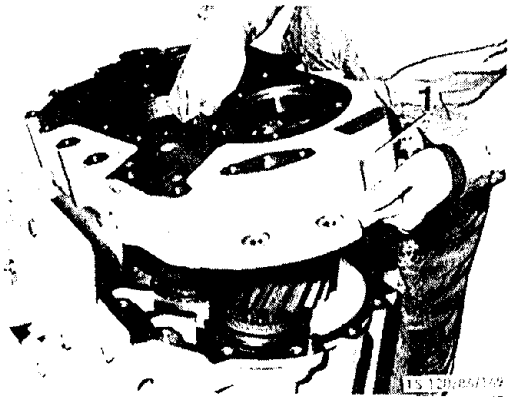
Pict 24

9 Drive outer bearing rings (25/1) into the cover.



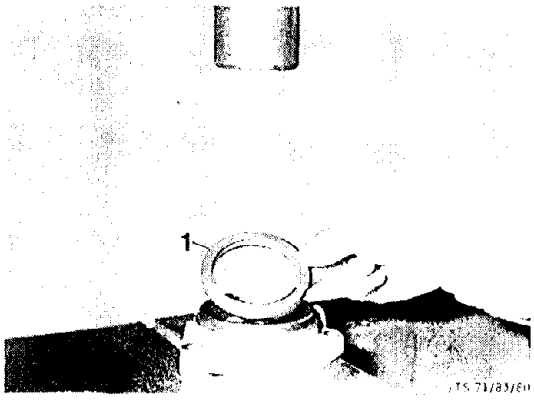
Pict. 25

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



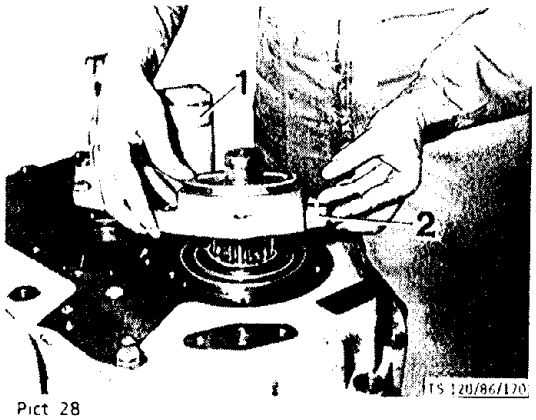
Pict. 26

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



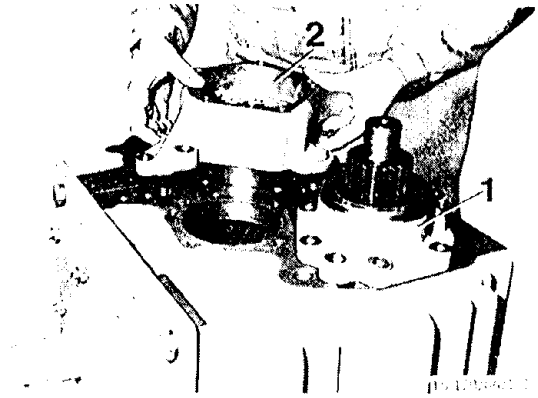
Pict. 27

12 Fit front axle output (28/1) and bearing cover for the drive shaft (28/2).



Pict. 28

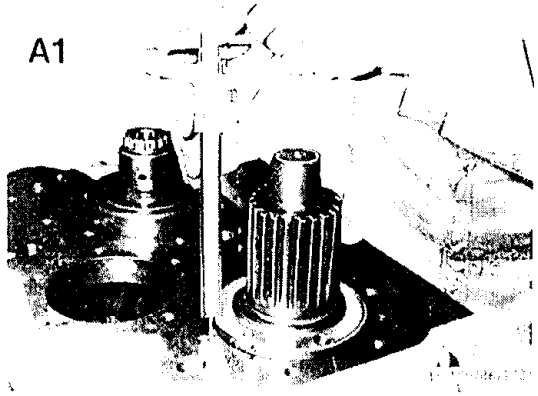
13 Rotate transfer case. Remove bearing cover for rear axle output (29/1) and bearing housing for oil pump (29/2).



Pict. 29

14 Measure protrusion (B1) of the oil guide ring

or: Measure protrusion (B1) of outer bearing race



Pict. 30

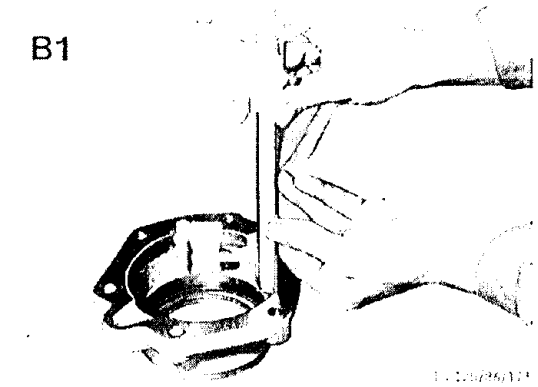
15 Measure the depth (A1) of the bearing seating in the bearing cover for the rear axle output.

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

X1 = A1-B1 - clearance

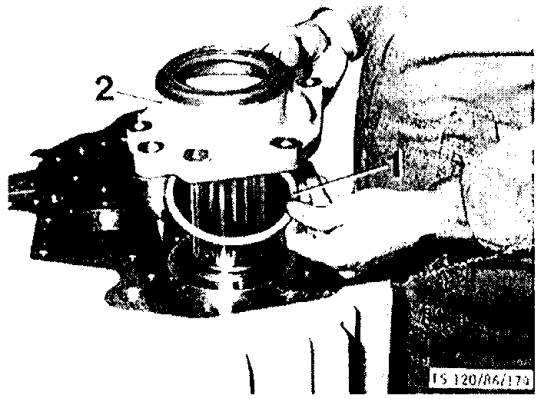
Washer thicknesses: s = 0,1 mm
s = 0,15 mm
s = 0,2 mm
s = 0,4 mm
s = 1,0 mm

Axial clearance = 0,01 to 0,06 mm



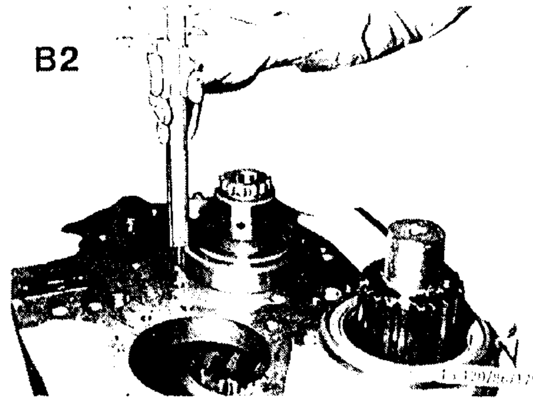
Pict. 31

17 Fit the required shim washers (32/1) and bearing cover to the rear axle output (32/2).



Pict. 32

18 Measure the protrusion (B2) of the roller bearing in the oil pump bearing housing.



Pict 33

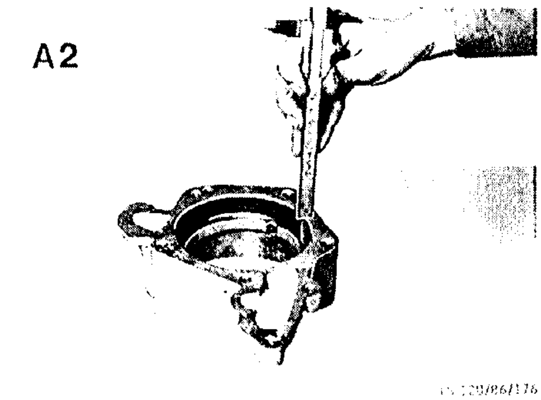
19 Measure the depth (A2) of the bearing seat in the oil pump bearing housing.

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

X2 = A2-B2 - clearance

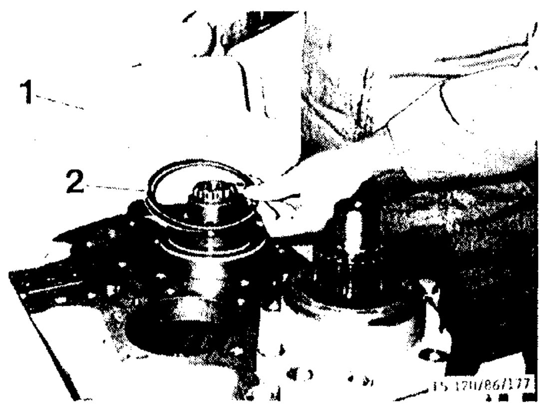
Washer thicknesses: s = 0,1 mm
s = 0,15 mm
s = 0,2 mm
s = 0,4 mm

Axial clearance = 0,01 to 0,06 mm



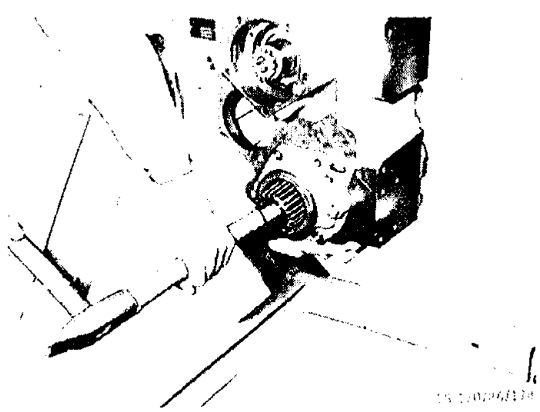
Pict 34

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



Pict 35

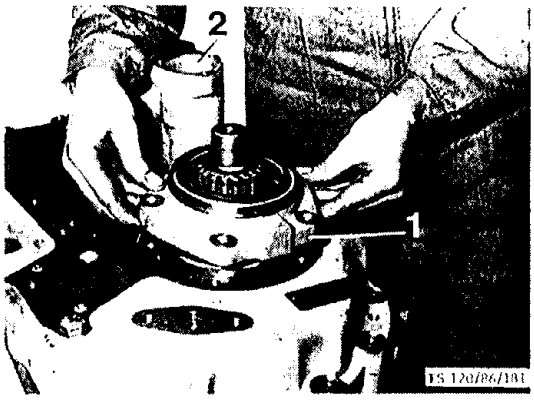
22 Drive shafts into place.



Pict 36

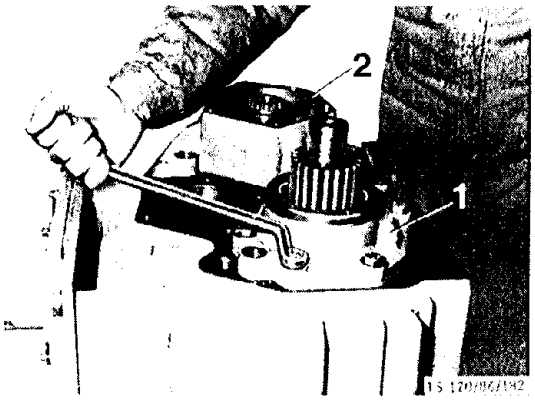
Dismount transfer case according to Chapter 1.1.

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



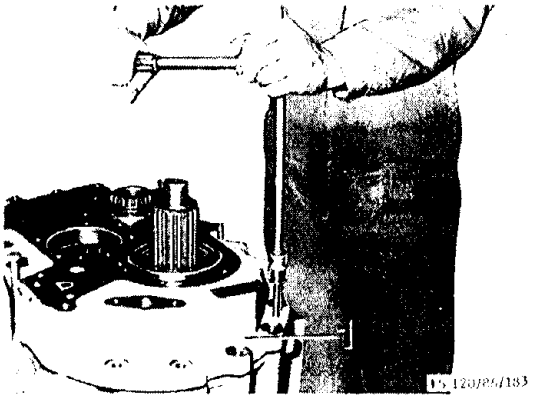
Pict. 39

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



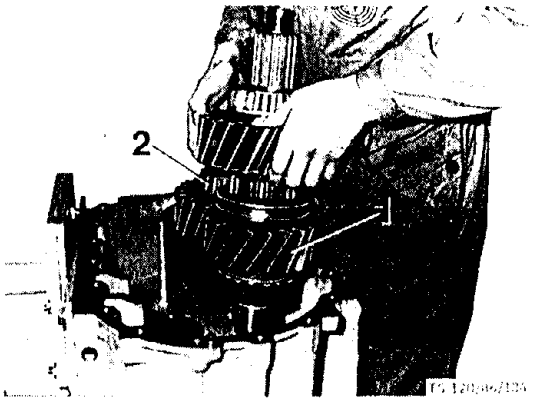
Pict. 40

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



Pict. 41

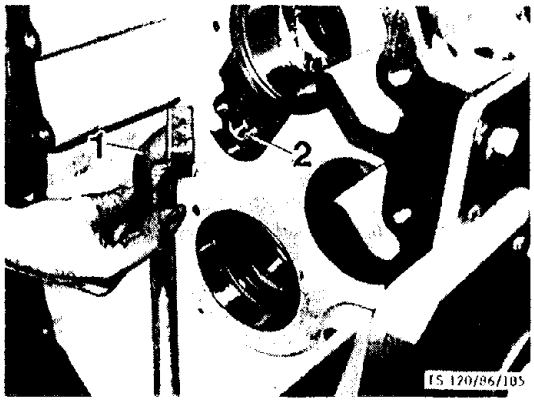
6 Lift out drive shaft (42/1) and planet gears (42/2).



Pict. 42

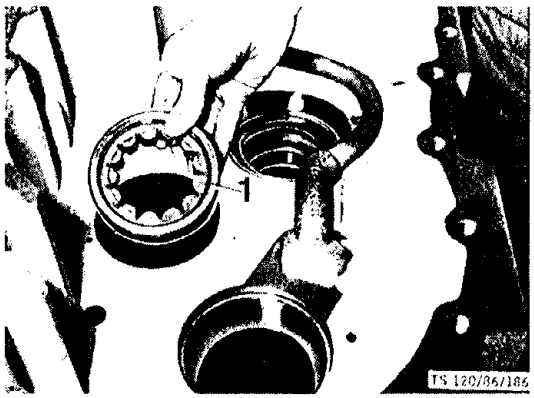
1.2.3 Fitting drive shaft and planet gears

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).



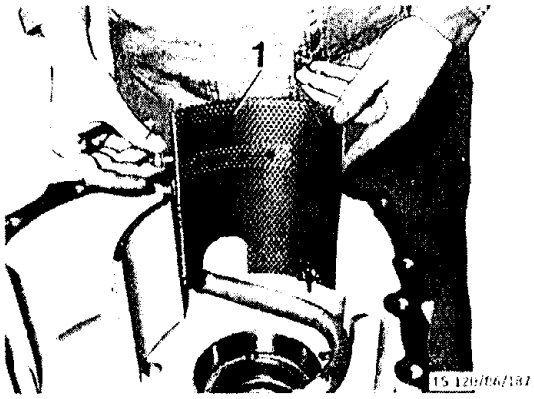
Pict. 43

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



Pict 44

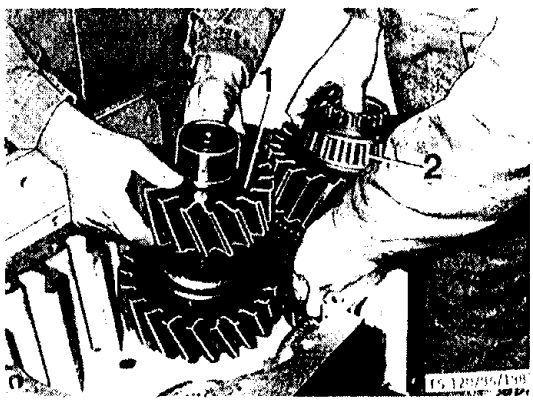
3 Fit oil guide (45/1)



Pict 45

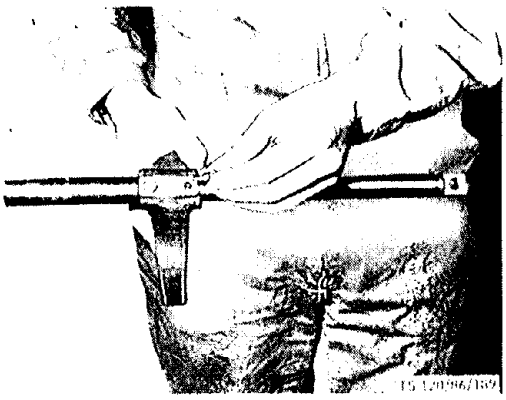
4 Insert twin wheel (46/1) and planet gears (46/2) together.

or: output shaft separately



Pict 46

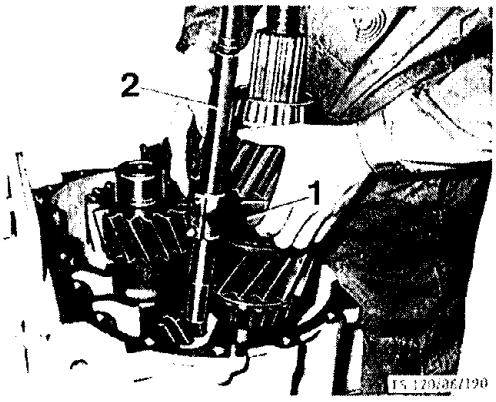
5 Fit selector fork (47/1) on the selector rod (47/2).



Pict. 47

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

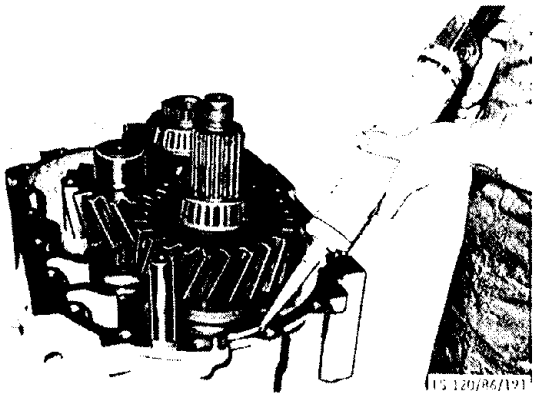
7 Fix the valve ball D = 4.5 and the driver ball D = 6.0 into the drive shaft with grease.



Pict. 48

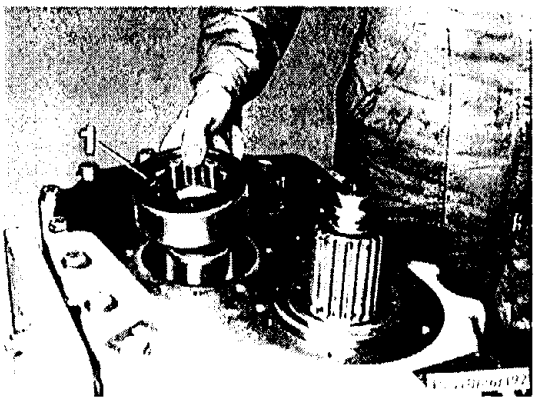
8 Spread silicon sealant on the sealing surface of the transfer case housing.

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



Pict. 49

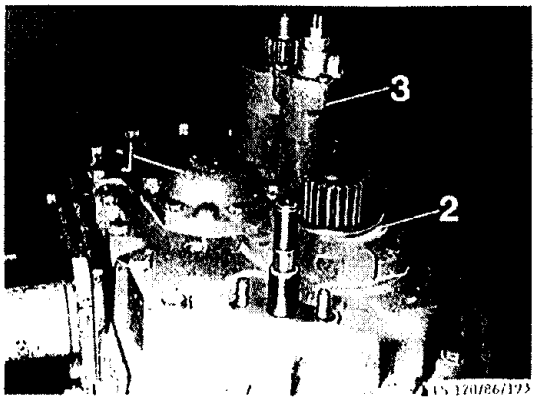
10 Fit the cylinder roller bearing (50/1) for the twin wheel into the transfer case housing.



Pict. 50

1.2.4 Fitting transfer case housing parts, selector cylinder and front axle output

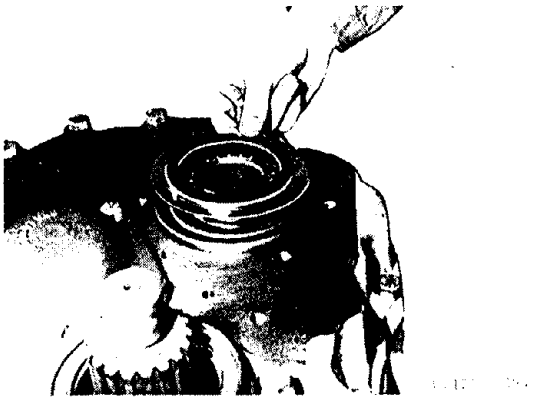
1 Smear front cover (51/1) and bearing cover for the drive shaft (51/2) with silicon sealant and fit in position.



Pict. 51

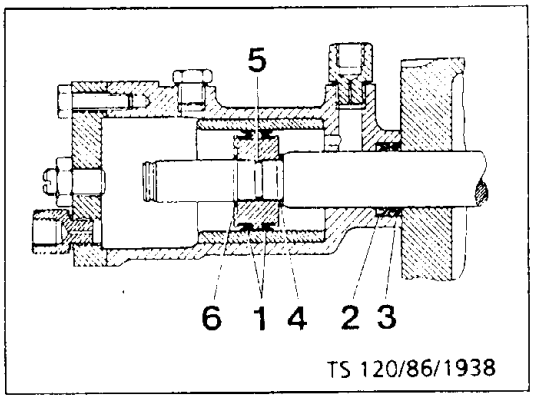
2 Place cover washer (52/1) on the ball roller bearing for the front axle output.

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



Pict. 52

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

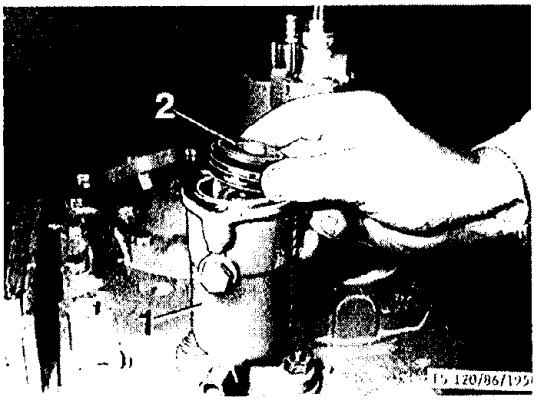


Pict. 53

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

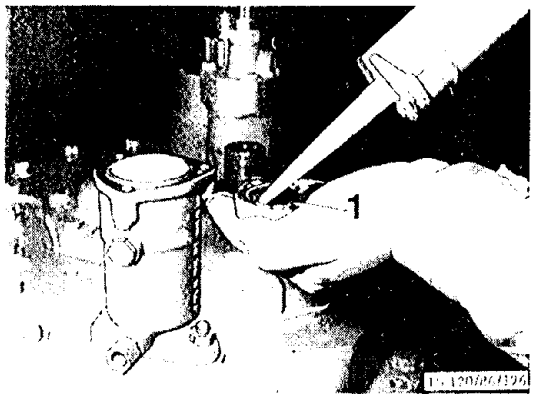
6 Slide washer (53/4) and O-ring (53/5) on to the selector shaft.

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



Pict. 54

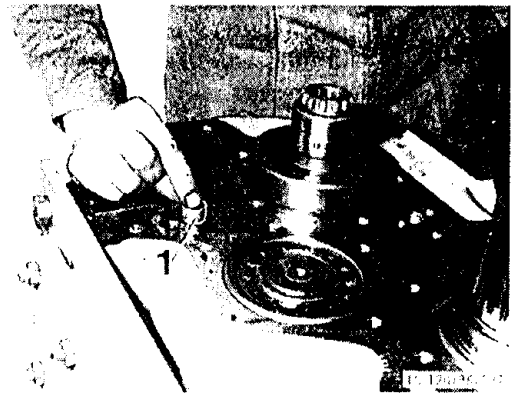
8 Smear cover with silicon sealant and fit.



Pict. 55

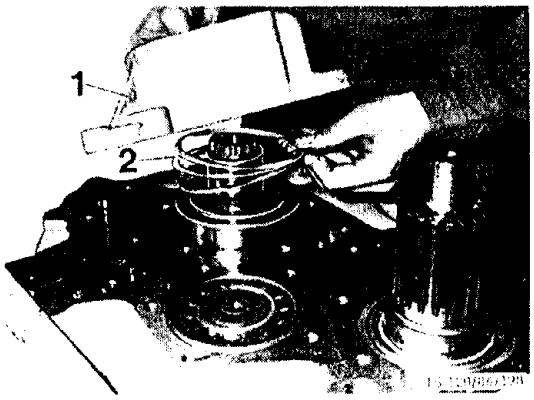
9 Rotate transfer case

Insert oil pipe (56/1).



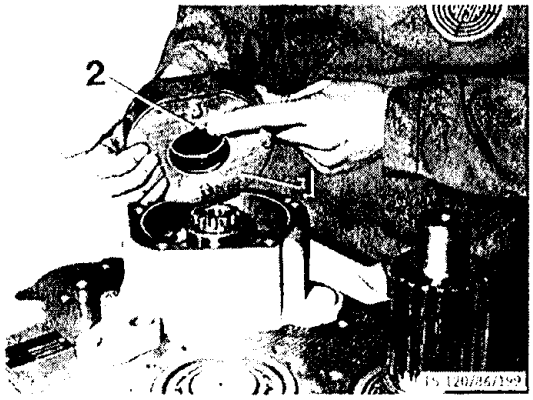
10 Smear oil pump bearing housing (57/1) with silicon sealant and then fit bearing housing along with the required shim washers.

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.



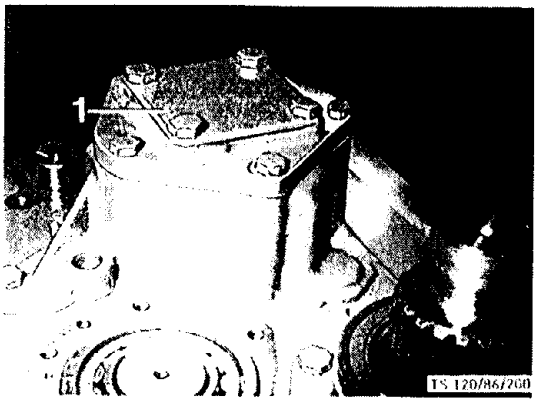
Pict. 57

Fit oil pump (58/1). The driver ball in the drive shaft must lock into the groove (58/2) in the oil pump.



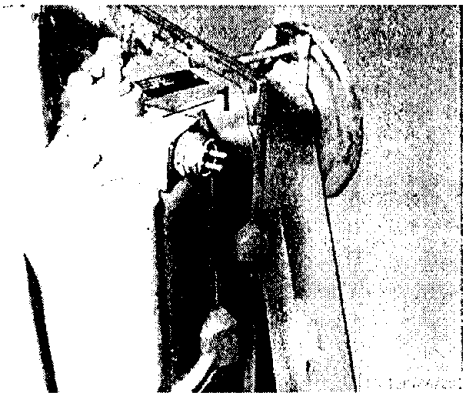
Pict. 58

12 Smear the cover (59/1) of the oil pump with silicon sealant and fit in place.



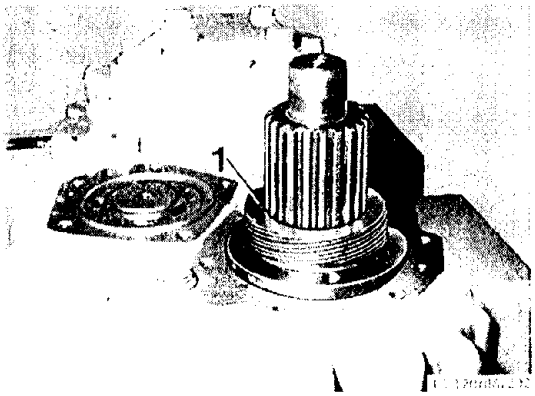
Pict. 59

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



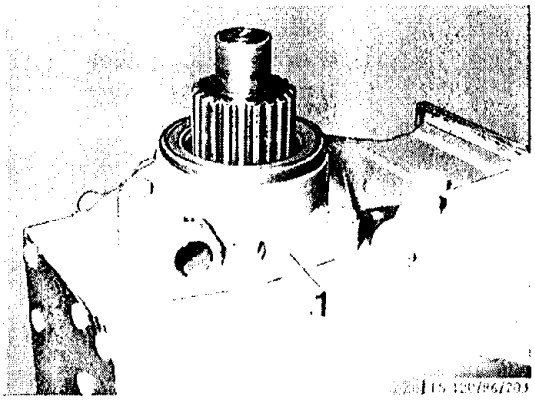
Pict. 60

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



Pict. 61

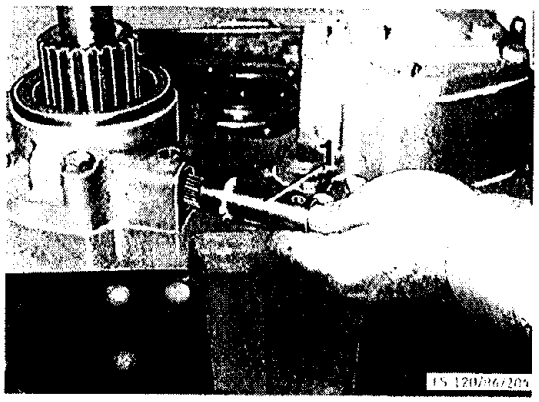
15 Smear bearing cover (62/1) for the rear axle output with silicon and fit along with the required shim washers.



Pict. 62

16 Slide the drive pinion of the tachograph into the bearing bush. Smear bearing bush (63/1) with silicon grease and fit in position.

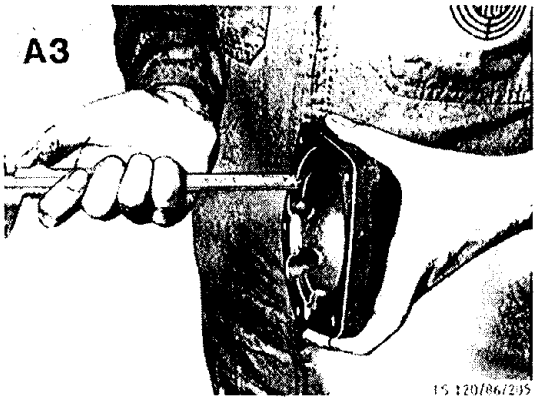
17 Tighten clamping bolt (with silicon sealant)



Pict. 63

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).



Pict. 64

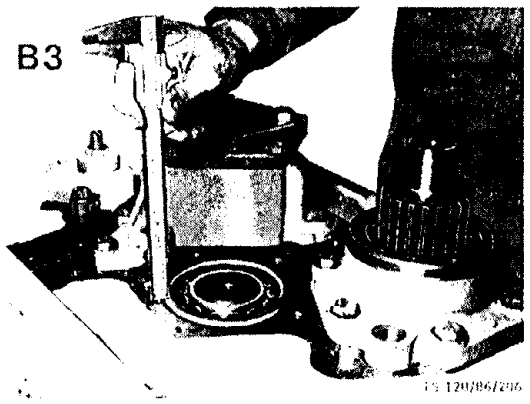
2 Measure protrusion of the cylinder bearing (B3).

3 Determine thickness of the shim washer (X3).

$$X3 = A3 - B3 - \text{clearance}$$

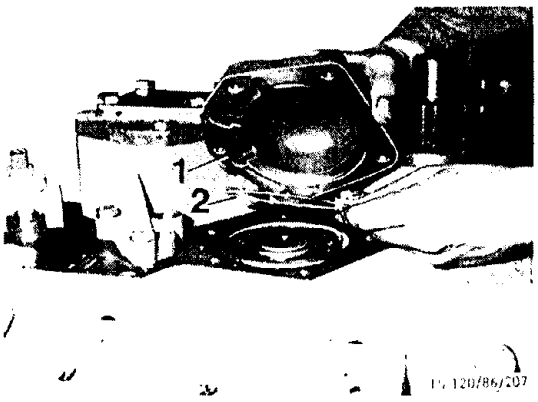
Washer thicknesses: s = 0,1 mm
s = 0,2 mm
s = 0,5 mm

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



Pict. 65

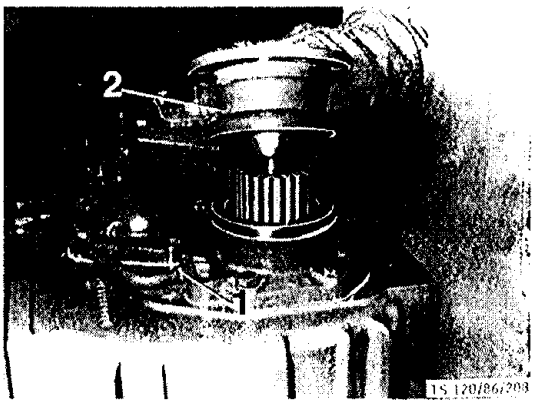
4 Smear rear cover (66/1) with silicon sealant and fit along with required shim washers (66/2).



Pict. 66

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

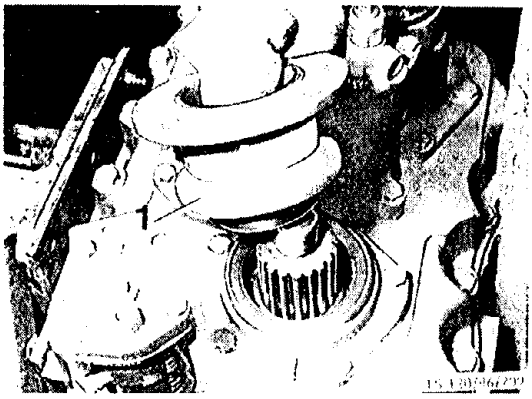
6 Grease shaft sealing ring.



Pict. 67

1.2.6 Fitting flanges

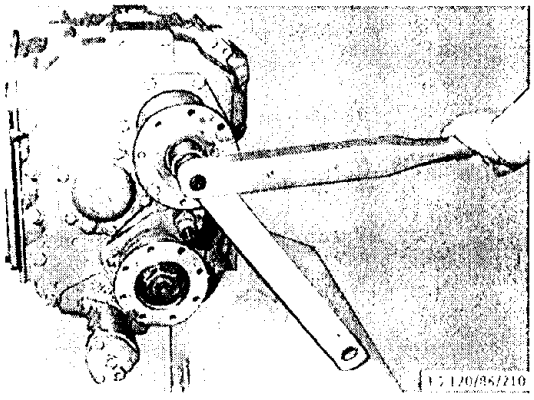
1 Warm up flanges (68/1) and (67/2) to 120°C and slide on to the shafts.



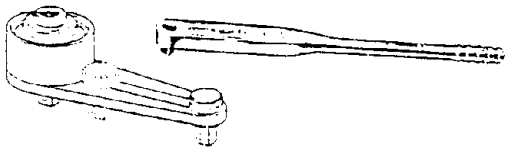
Pict. 68

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).

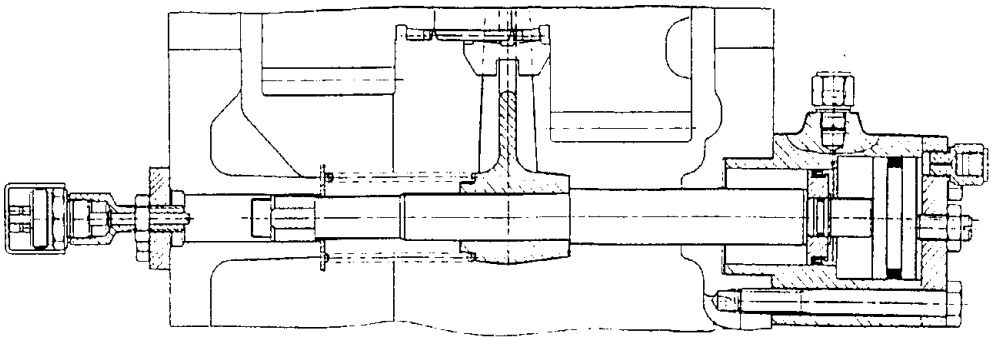
3 Fit collar nut for the flange of the drive shaft using holding device TS 12 W and torque spanner and tighten up to a torque of 650 Nm.



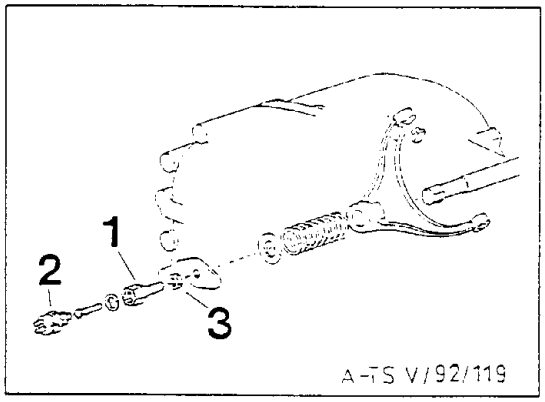
Pict. 69



1.2.7.1 Removal, installation and adjustment of transfer case shifter (pneumatic) two and three postition - with spring

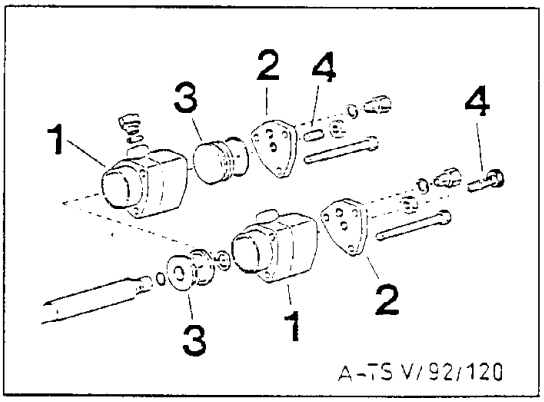


1 Adjusting bolt (**160/1**)
Pressure switch (**160/2**)
Counter nut (**160/3**).



Pict. 160

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



Pict. 161

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

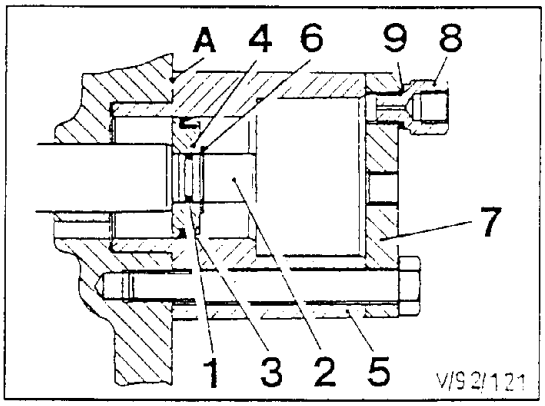
4 Install seal collar (**162/3**) on piston (**162/4**) with open side toward the smaller piston diameter and grease it.

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**).

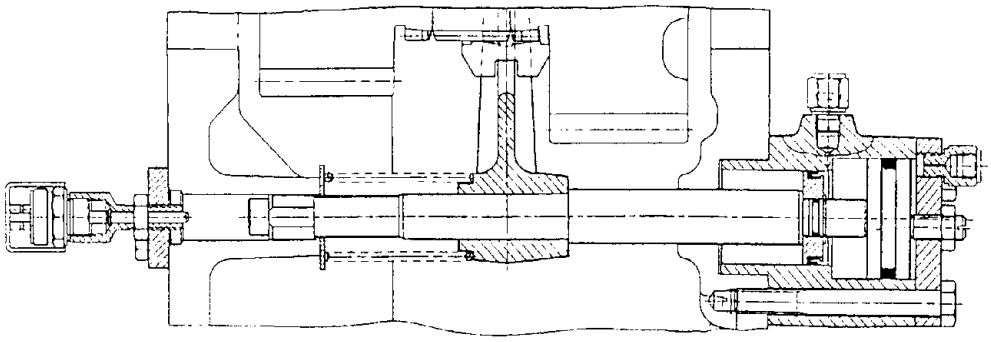
7 Apply silicone sealant to cover (**162/7**) and mount.

8 Screw in and tighten reducer (**162/8**) along with copper sealing ring (**162/9**).



Pict. 162

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 sealent 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.

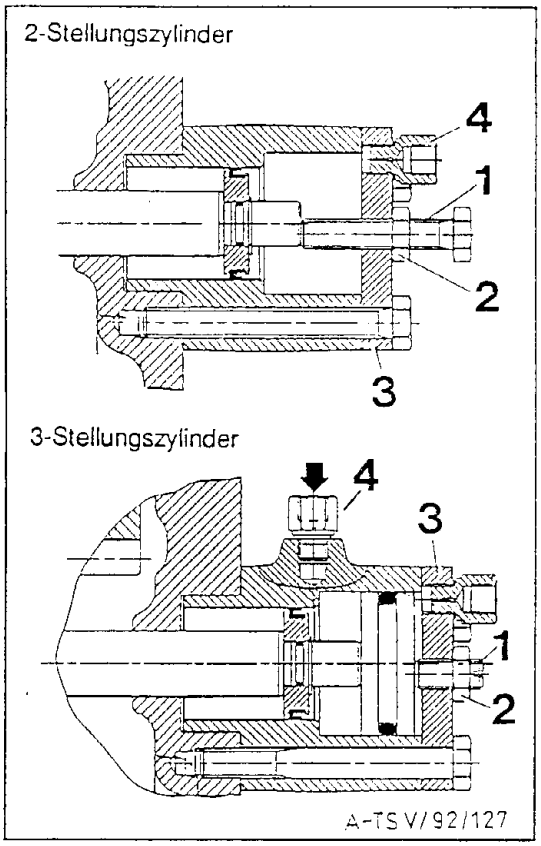
5 Cover thread of set screw (**166/1**) and of counter nut (**166/1**) with Loctite 242e and screw into cover (**166/3**) of the operating cylinder until set screw touches the piston / piston road noticeably. Then turn set screw another 1/3 until 1/2 turn and lock with counter nut.

Adjustment of "High"-gear

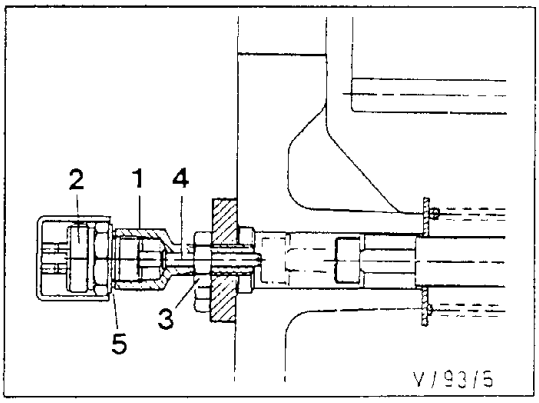
6 High-gear is operated by applying compressed air (P = / ± 1 bar) throught the connection socket (**166/4**) in the cover of the operation cylinder. Gear change can be eased by turning of the input shaft on the flange.

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 noticeably. 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**).



Pict. 166



Pict. 167

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

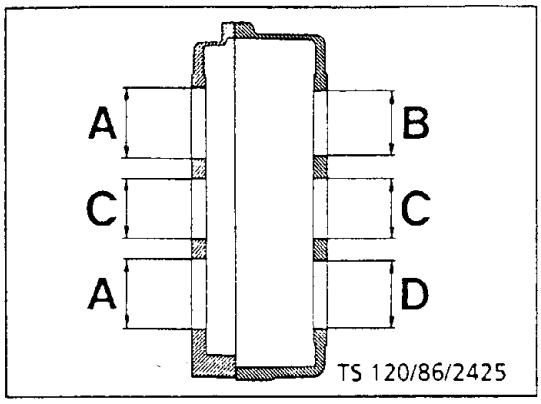
CHECKING:

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...O 129.978 ÷ 130.00
B...O 119.978 ÷ 120.00
C...O 109.978 ÷ 110.00
D...O 124.978 ÷ 125.00



Pict. 77

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.

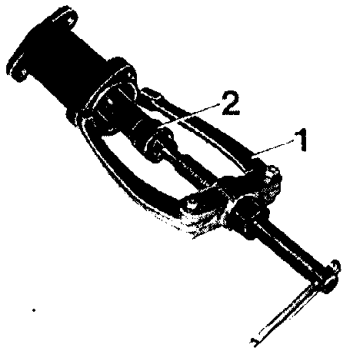
DISMANTLING:

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

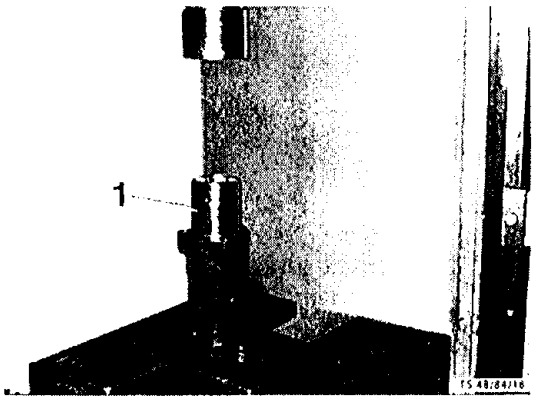
3 Remove sealing sleeves from the piston and from the selector cylinder.

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.



Pict. 78

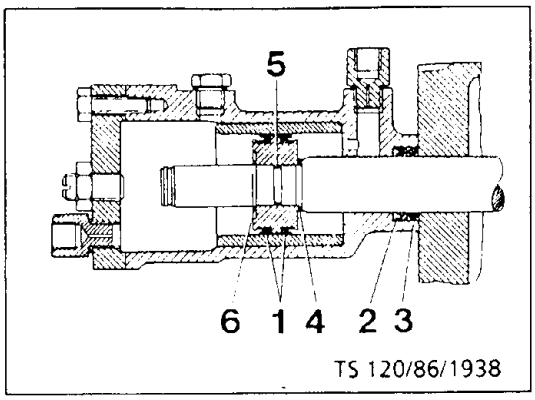


Pict. 79

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.



Pict. 80

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.

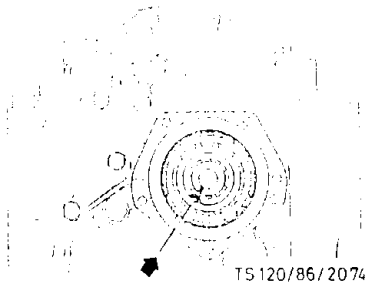
CHECKING:

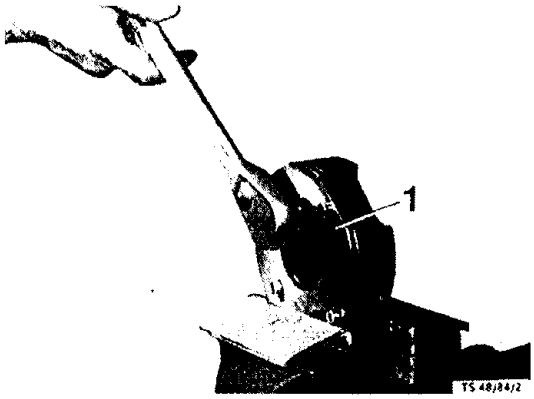
3 Check tooth profiles and thrust surfaces for signs of wear.

ASSEMBLY:

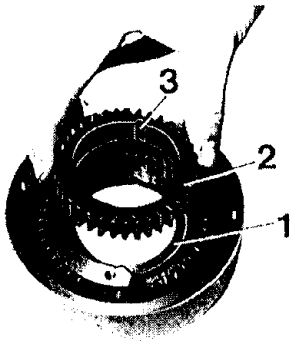
4 Insert the oil pump ring gear (82/1) and the oil pump gear (82/2) in the oil pump housing.

5 Fit oil pump housing

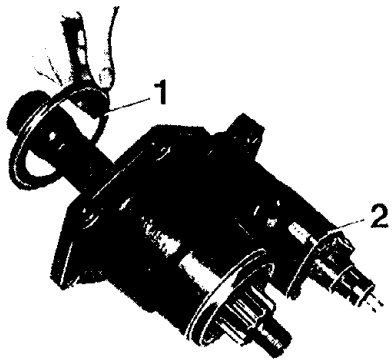




Pict. 81



Pict. 82



Pict. 83

1.3.4 Dismantling, assembling front axle output

Job number: 0720.01.40

DISMANTLING:

1 Remove cover washer (83/1).

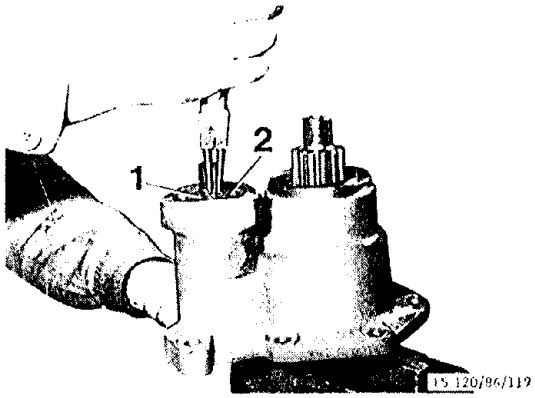
2 Remove cover (83/2).

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.

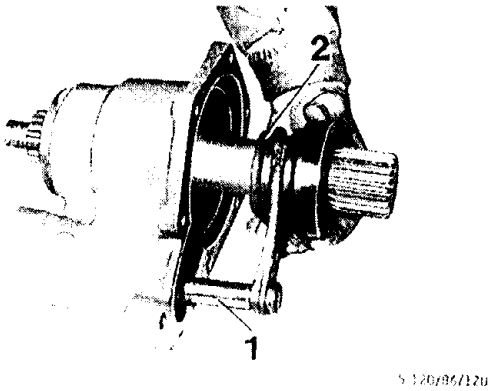
4 Withdraw piston and spring. Remove sealing sleeves from the piston.

5 Withdraw retaining ring with spacer sleeve.



Pict. 84

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

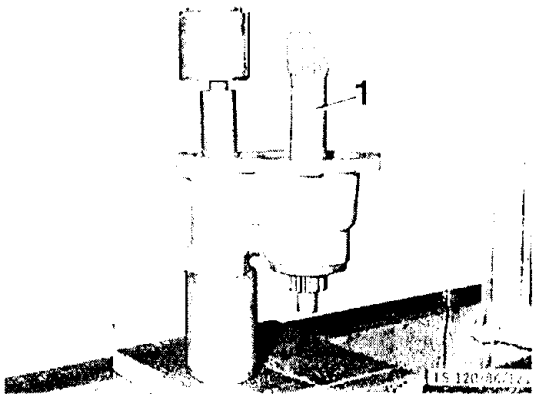


Pict. 85

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.

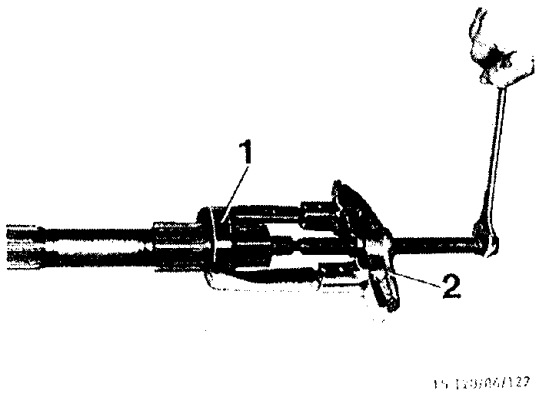


Pict. 86

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.

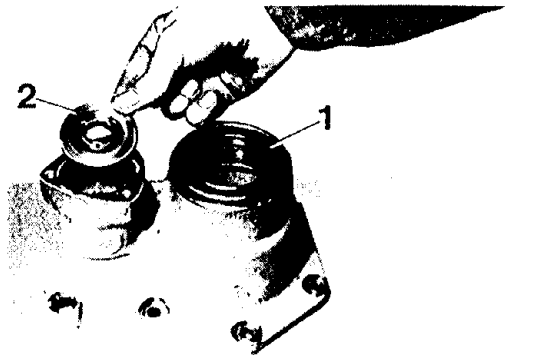


Pict. 87

ASSEMBLY:

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

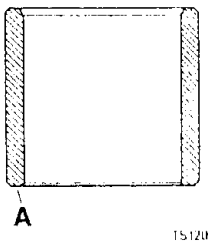
13 Insert cylinder ring (88/2) in the housing with the ring slot of the spring facing upwards.



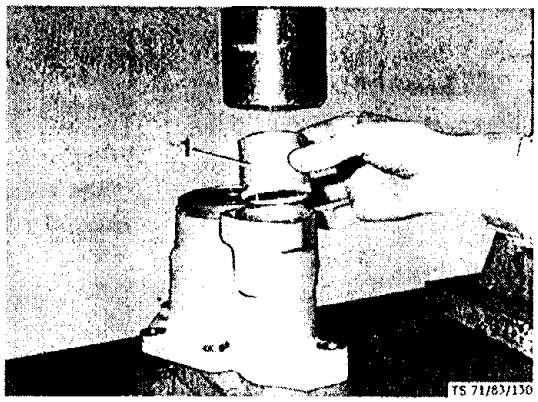
TS 120/86/123

Pict 88

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

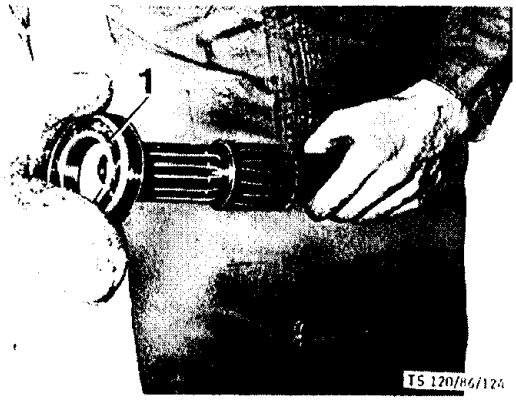


TS120/86/2726



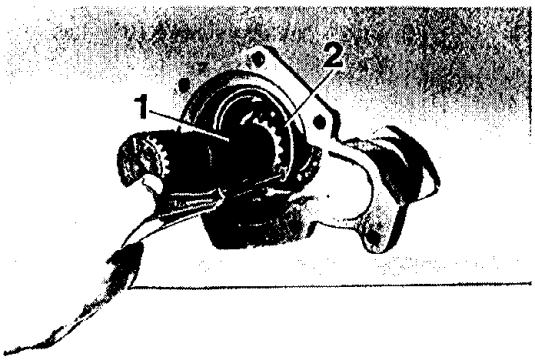
Pict 89

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.



Pict 90

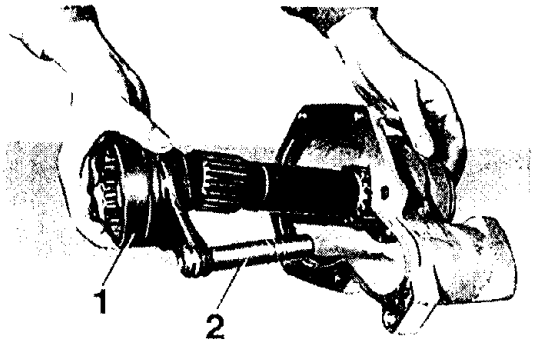
16 Place the output shaft (91/1) of the front wheel output in the bearing housing and fix in position with the retaining ring (91/2).



TS 120/86/125

Pict 91

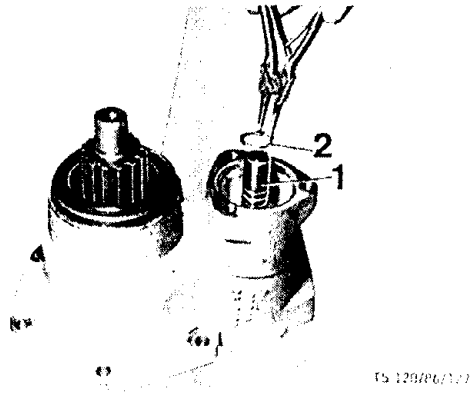
17 Slide the selector sleeve (92/1), with the selector fork (92/2) already fitted, on to the drive shaft.



TS 120/86/126

Pict. 92

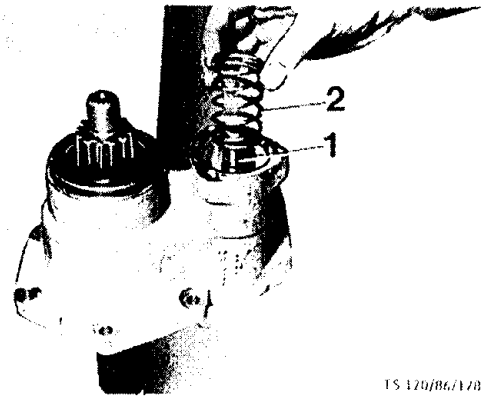
18 Slide spacer sleeve on to the selector fork and fix selector fork (93/1) in position with retaining ring (93/2).



TS 120/86/127

Pict. 93

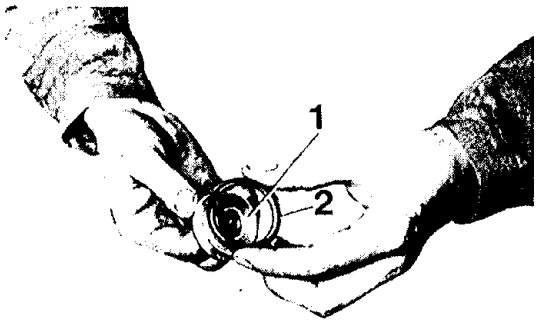
19 Slide sealing ring (94/1) and spring (94/2) over the selector fork.



TS 120/86/128

Pict. 94

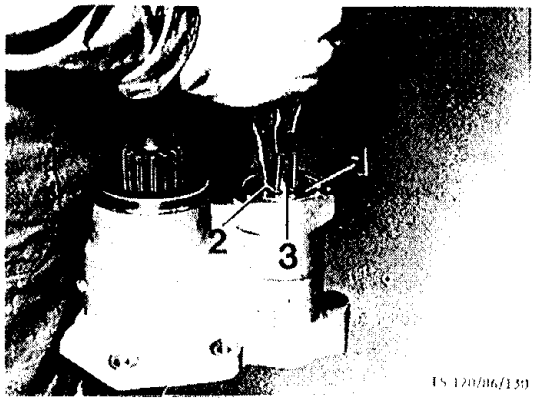
20 Insert sealing sleeve (95/1) in the groove in the piston (95/2).



TS 120/86/129

Pict. 95

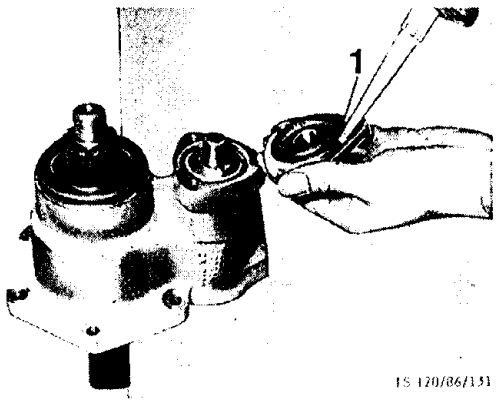
21 Slide piston (96/1) and retaining ring (96/2) on to the selector fork (96/2). Compress the spring with the piston and the retaining ring until the retaining ring locks into the groove in the selector fork.



Pict. 96

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

23 Mount the pressure switch.



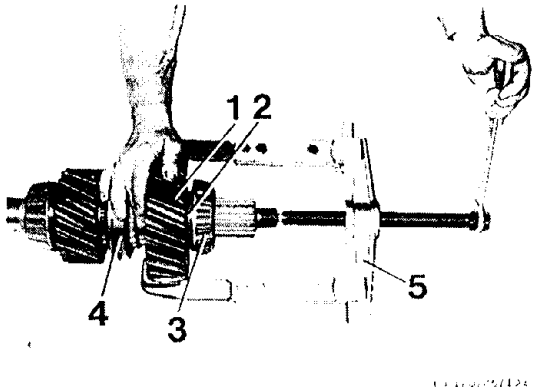
Pict. 97

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).

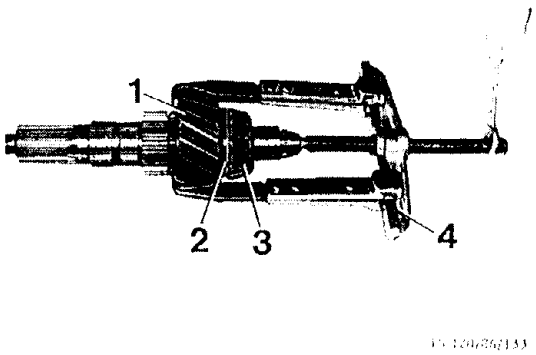


Pict. 98

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).

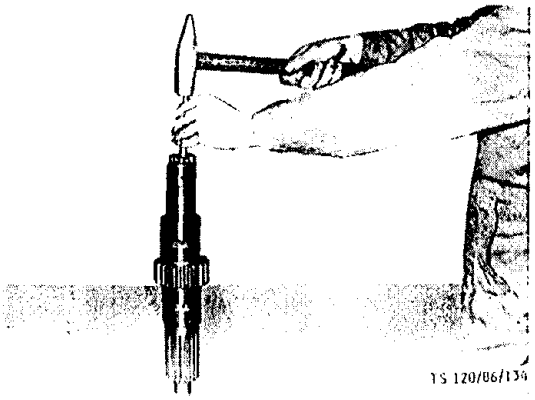
CHECKING:

3 Carry out a visual check of the shafts and drive wheels for damage, wear and grooving.



Pict. 99

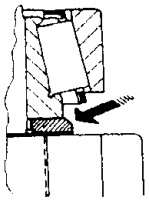
Note: When using a new drive shaft, insert the blind bore lock in the drive shaft.



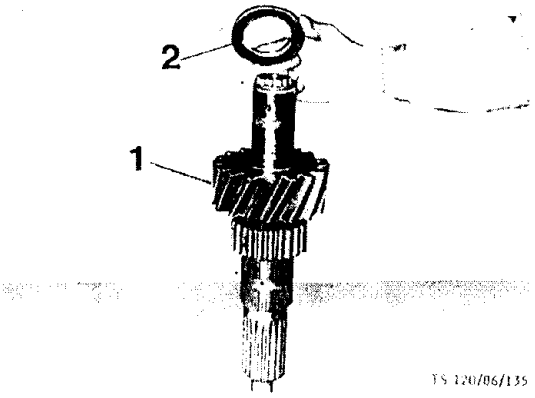
Pict. 100

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.

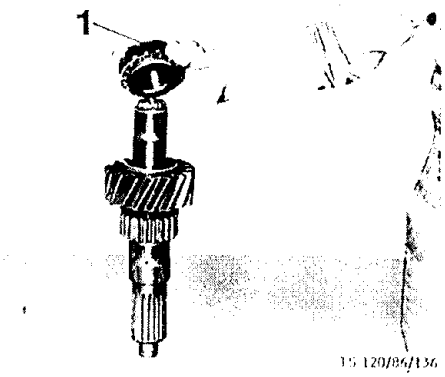


TS120/86/2227



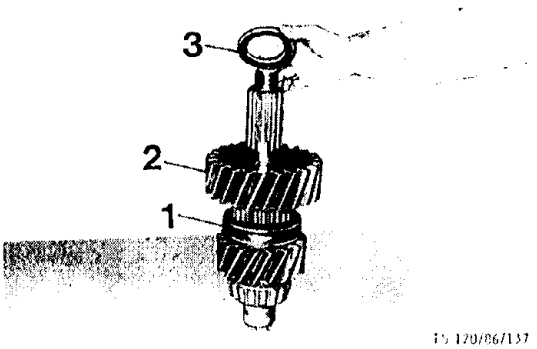
Pict. 101

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



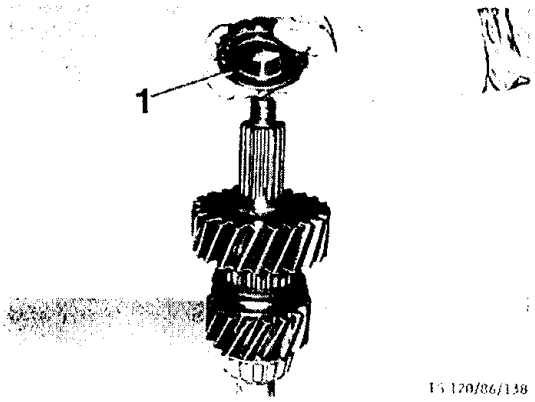
Pict. 102

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.



Pict. 103

7 Warm up taper roller bearing (104/1) to 80°C and slide on to the drive shaft.



Pict 104

I.3.6 Dismantling, assembling twin wheel

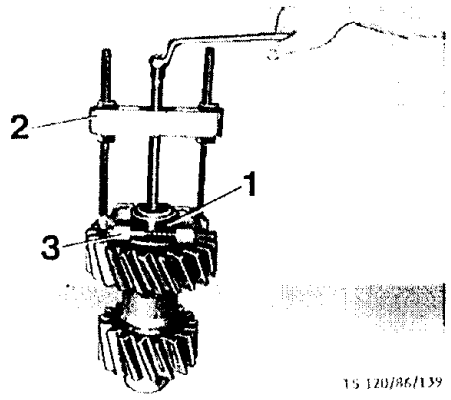
Job number: 0720.02.10

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:

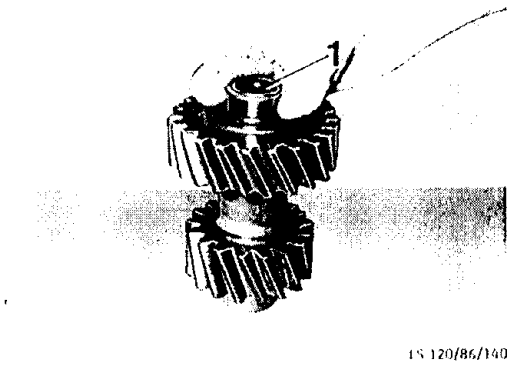
Carry out a visual check of the bearing positions for damage, wear and grooving.



Pict 105

ASSEMBLY:

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



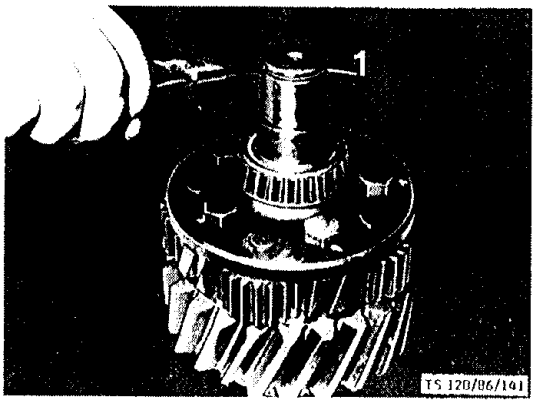
Pict 106

.3.7 Dismantling, assembling planetgears

Job number: 0720.02.15

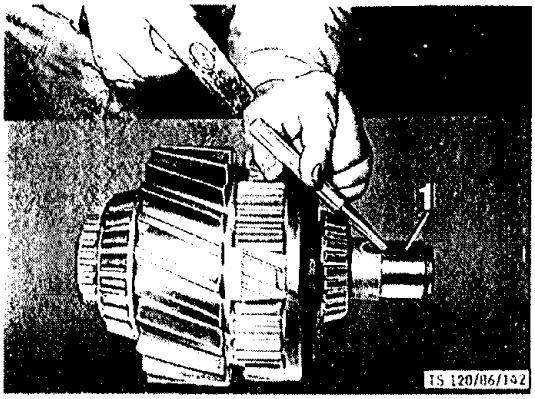
DISMANTLING:

1 Remove retaining ring (107/1).



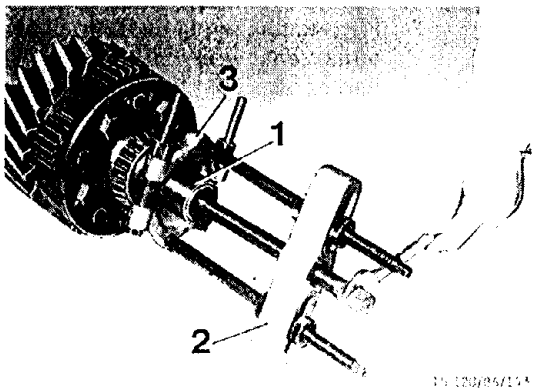
Pict 107

2 Loosen bearing inner ring (108/1).



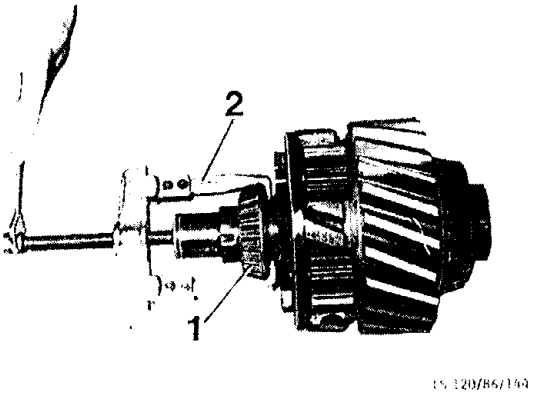
Pict. 108

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



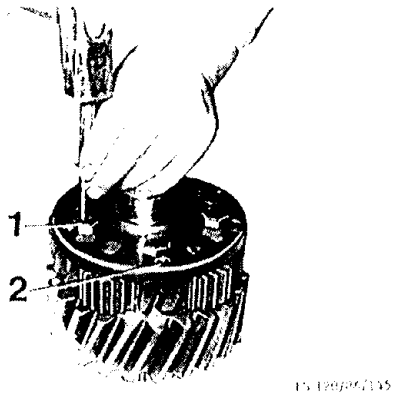
Pict. 109

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.



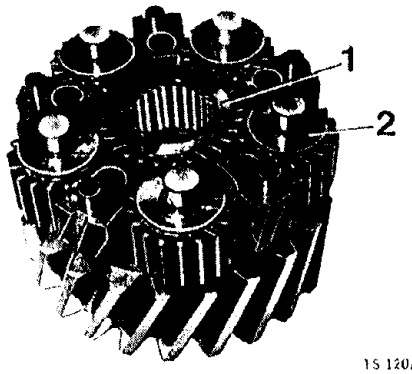
Pict. 110

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).



Pict. 111

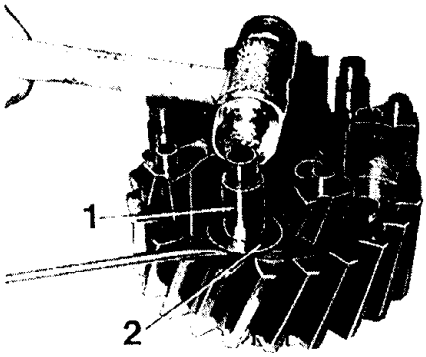
6 Remove sun gear z (no. of teeth) = 28 (112/1), thrust washer, planet wheels (112/2) and the set of rollers with washers.



TS 120/86/146

Pict. 112

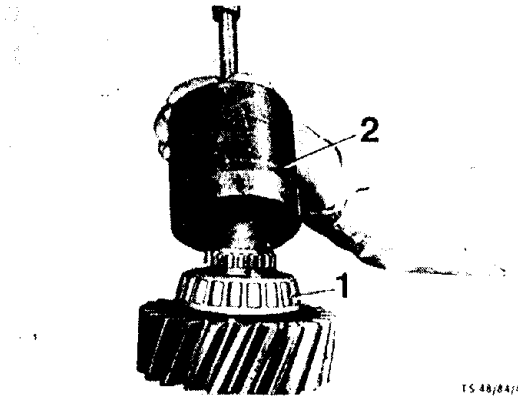
7 Extract planet shaft (113/1) with washers (113/2) and remove seating ball.



TS 120/86/147

Pict. 113

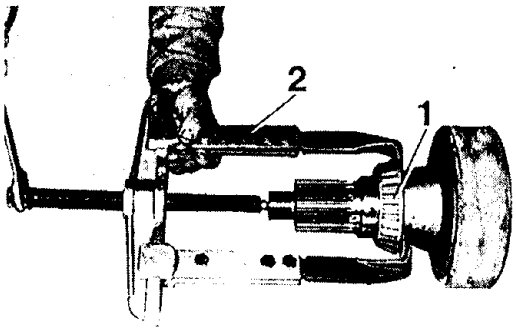
8 Draw taper roller bearing (114/1) from the front planet carrier using taper roller bearing pulling device TS 83 W (114/2).



TS 48/84/4

Pict. 114

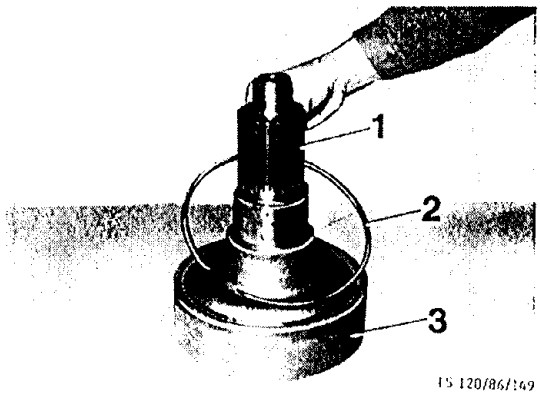
9 Draw taper roller bearing (115/1) off the rear planet carrier using two-arm puller KUKKO 20/3 (115/2).



TS 120/86/148

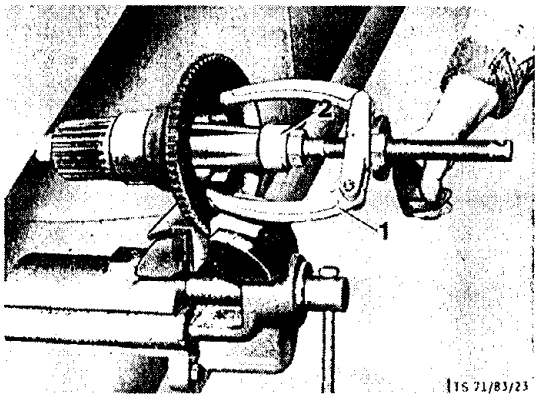
Pict. 115

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).



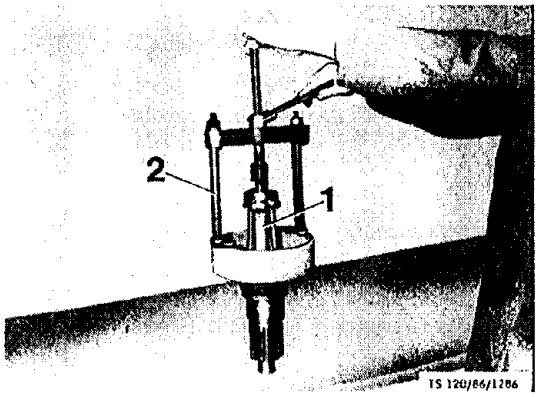
Pict. 116

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



Pict. 117

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).



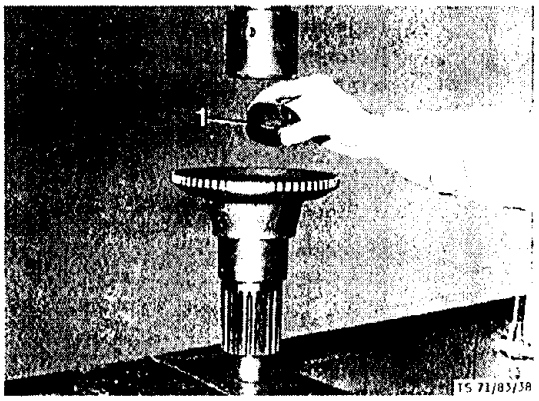
Pict. 118

CHECKING:

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

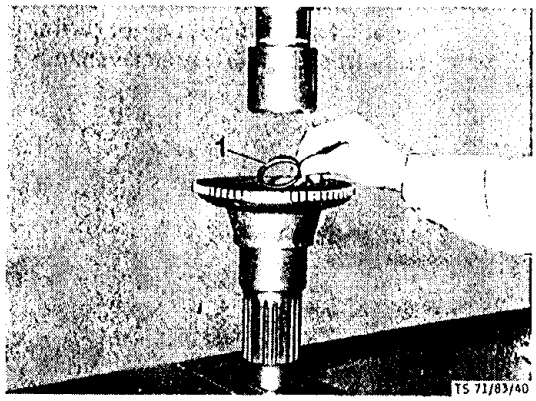
ASSEMBLY:

14 Grease needle sleeve (119/1) and press into the output shaft for the rear axle output.



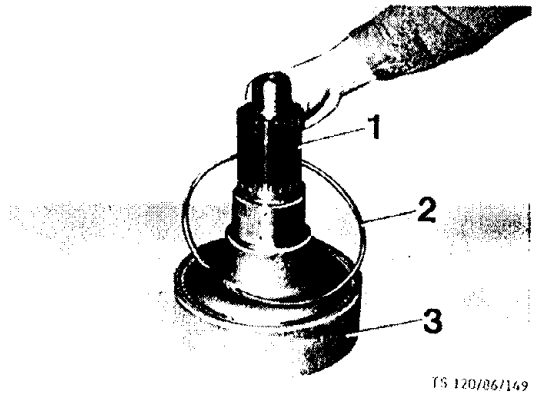
Pict. 119

15 Press sealing ring (120/1) into the output shaft for the rear axle output.



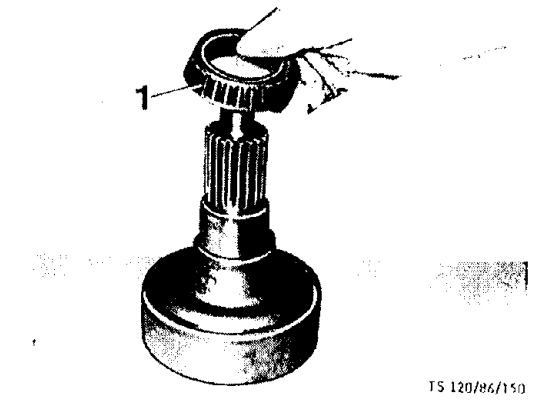
Pict. 120

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).



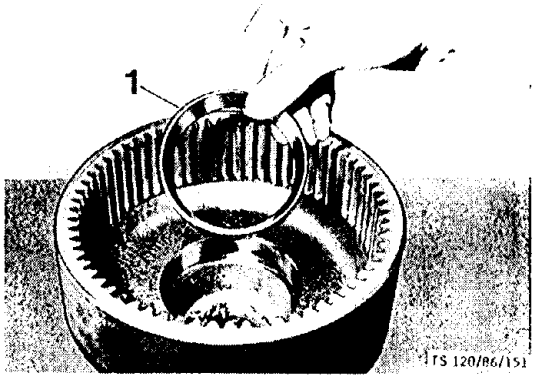
Pict. 121

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



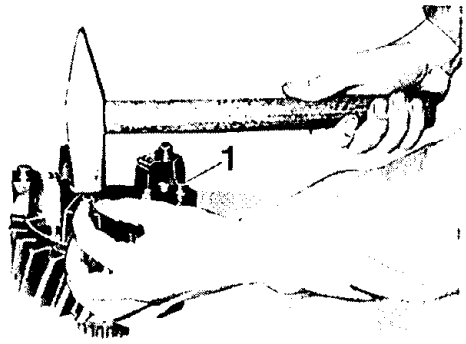
Pict. 122

18 Drive the outer bearing ring (123/1) into the output shaft using a soft metal drift.



Pict. 123

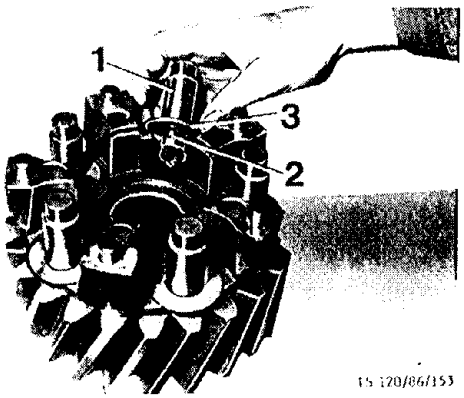
Note: If a new front planet carrier is used, then body-fit pins (124/1) are driven in.



TS 120/86/152

Pict. 124

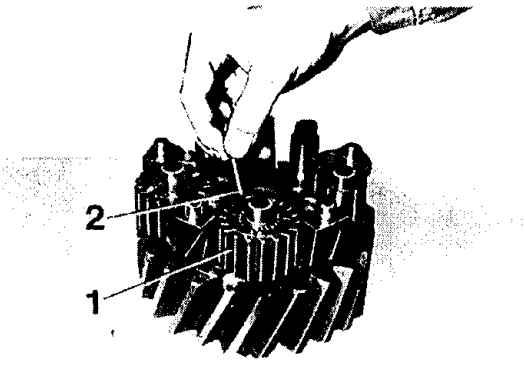
19 Insert seating balls (125/2) in the planet shafts (125/1). Fit the planet bolts with washers (125/3) into the front planet carrier.



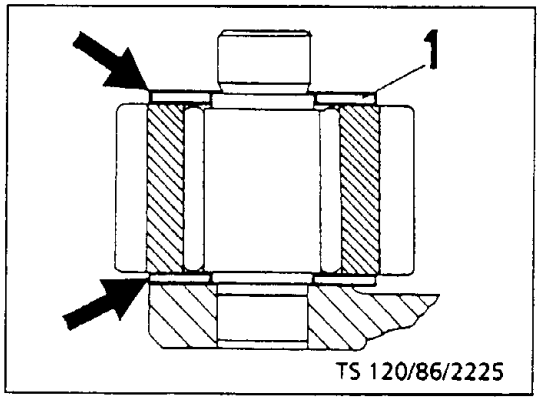
TS 120/86/153

Pict. 125

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).

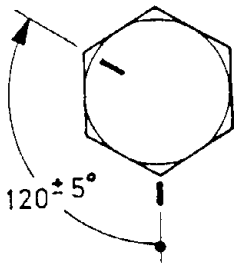


Pict. 126

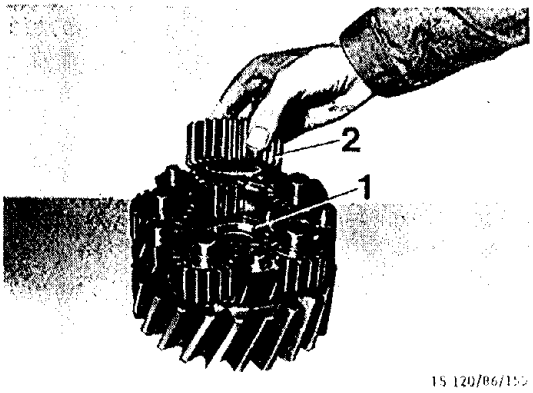


Pict. 127

21 Fit thrust washer (128/1) and sun gear (128/2).



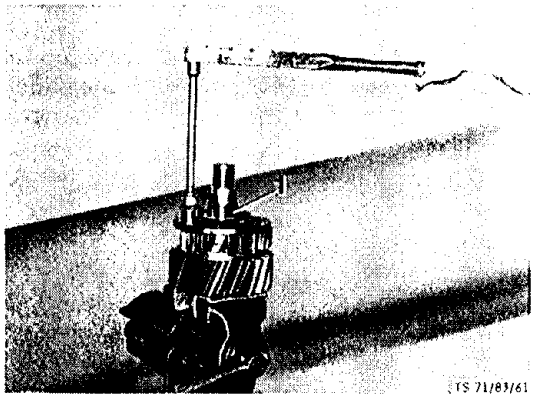
TS400/86/109



TS 120/86/155

Pict. 128

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°.

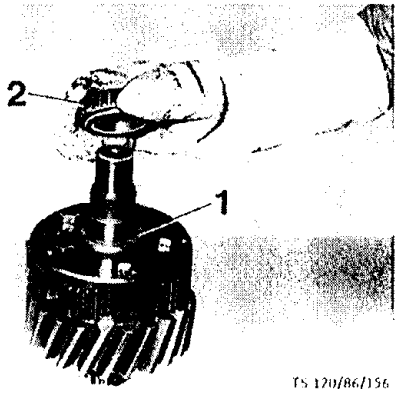


TS 71/83/61

Pict. 129

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

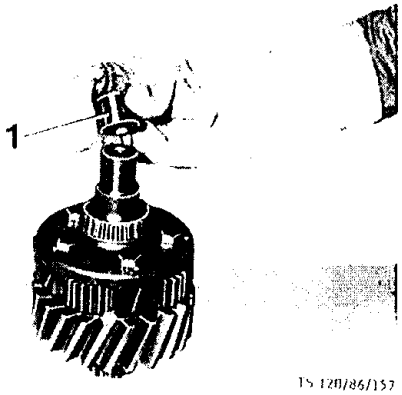
24 Warm up taper roller bearing (130/2) to 80°C and slide on to its seating on the rear planet carrier.



TS 120/86/156

Pict. 130

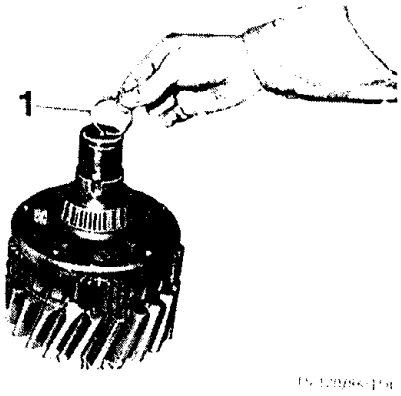
25 Warm up inner ring (131/1) to 80°C and slide on to the stub of the rear planet carrier.



TS 120/86/157

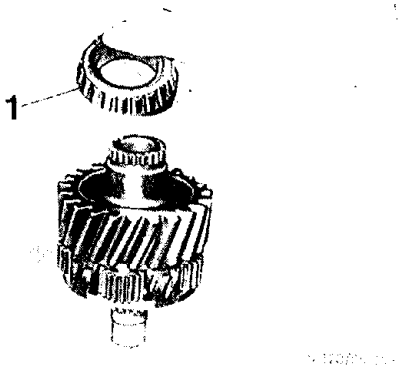
Pict. 131

26 Secure the inner ring with the retaining ring (132/1).



Pict. 132

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.



Pict. 133