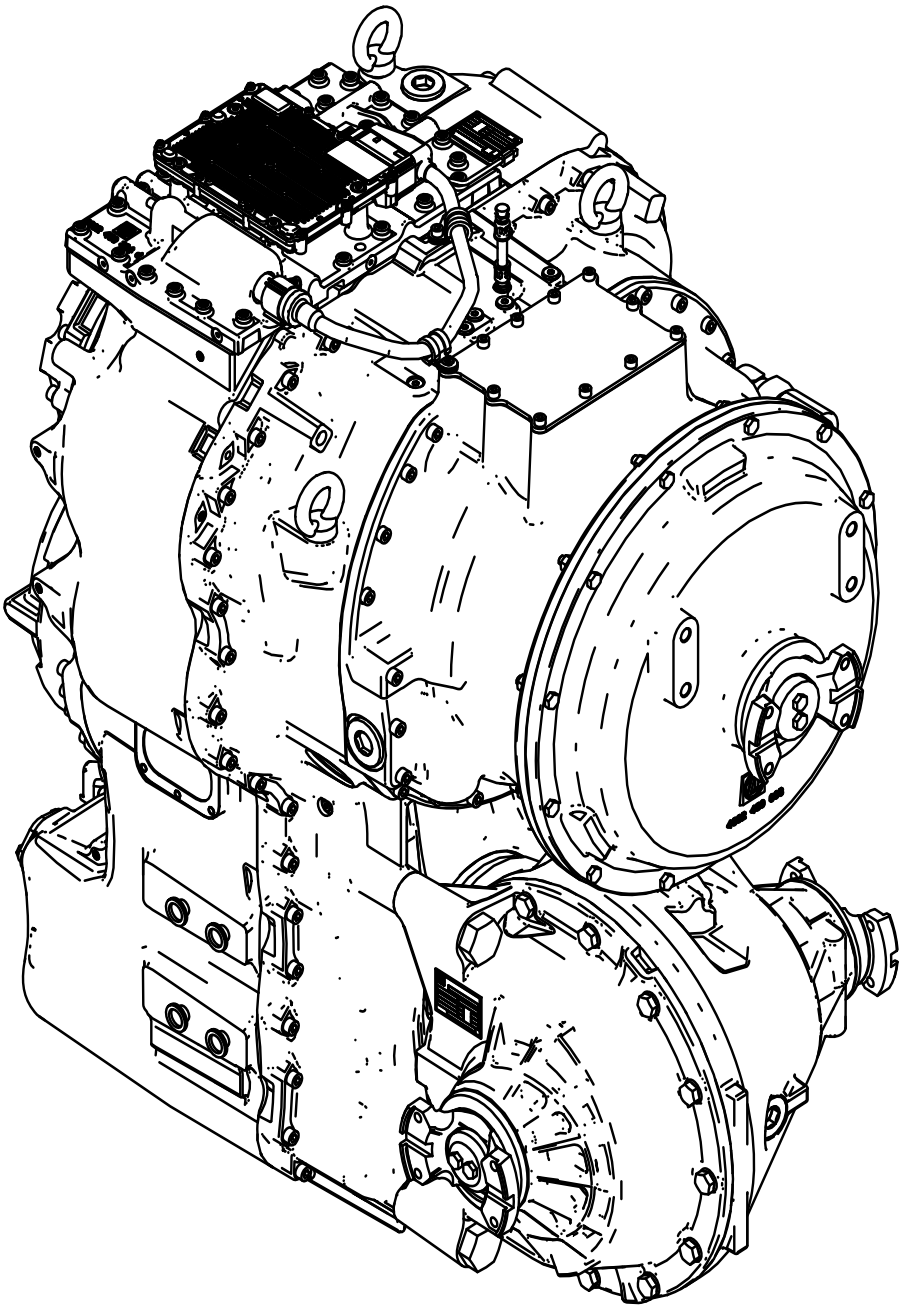
Chapter 2

Transmission



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General

The Service Manual covers all works required for dismantling and the pertaining installation.
When repairing the transmission, ensure utmost cleanliness and that the works are carried out in an expert-like manner. The transmission should only be disassembled for renewing damaged parts. Covers and housing parts installed with seals must be loosened by slight blows with a plastic mallet after screws and nuts have been removed. For removing parts being in tight contact with the shaft such as antifriction bearings, bearing races, and similar, use suitable pulling devices.

Dismantling and mounting works must be carried out at a clean working place. Use the special tools developed for this purpose. Prior to the re-installation of the parts, clean the contact surfaces of housings and covers from the residues of old seals. Remove burrs, if any, or similar irregularities with an oil stone. Clean housings and locking covers with a suitable detergent, in particular corners and angles. Damaged parts or parts heavily worn down must be renewed. Here, the expert must assess, whether parts such as antifriction bearings, thrust washers etc. subjected to normal wear during operation, can be installed again.
Parts such as sealing rings, lock plates, split pins etc. must generally be renewed. Radial sealing rings with worn down or torn sealing lip must also be renewed. Particularly ensure that no chips or other foreign bodies remain in the housing. Lube oil bores and grooves must be checked for unhindered passage.
All bearings must be treated with operating oil prior to installing them:

REFERENCE: For heating up parts such as bearings, housings etc, only a heating furnace or an electric drier is permitted to be used!

CAUTION When assembling the transmission, absolutely observe the indicated torque limits and adjustment data. Screws and nuts must be tightened according to the enclosed standard table, unless otherwise specified.
In view of the risk of functional failures in the control unit, the use of liquid sealing agents is not permitted.
By no means, Molykote is permitted to be used.
Lined plates must not be washed. They must be cleaned with a leather cloth.

DANGER When using detergents, observe the instructions given by the manufacturer regarding handling of the respective detergent.

Structure of the Repair Manual

The structure of this Repair Manual reflects the sequence of the working steps for completely disassembling the dismantled transmission. Dismantling and installing as well as the disassembly and assembly of a main group are always summarized in one chapter.

Special tools required for performing the respective repair works are listed under **„Special tools“** See this chapter, 2.0

Important information on industrial safety

Generally, the persons repairing Hyundai product-sets are responsible on their own for the industrial safety.

The observation of all valid safety regulations and legal impositions is the precondition for avoiding damage to persons and to the product during maintenance and repair works.
Persons performing repair works must familiarize themselves with these regulations.

The proper repair of these Hyundai-products requires the employment of suitably trained and skilled staff.
The repairer is obliged to perform the training.

The following safety references are used in the present Repair Manual:

Serves as **reference** to special working procedures, methods, information, the use of auxiliaries etc..

NOTE — **This word is used for precautions that must be taken to avoid actions which could shorten the life of the dump truck.**

CAUTION — This word denotes safety messages for hazards which could result in minor or moderate injury if the hazard is not avoided. This word might also be used for hazards where the only result could be damage to the dump truck. Illustrations, drawings and parts do not always represent the original; the working procedure is shown. The illustrations, drawings, and parts are not drawn to scale; conclusions regarding size and weight must not be drawn (not even within one representation). The works must be performed according to the description.

REFERENCE: — Prior to starting the checks and repair works, thoroughly study the present instructions.

DANGER — This word denotes safety messages where there is a high probability of serious injury or death if the hazard is not avoided. These safety messages usually describe precautions that must be taken to avoid the hazard. Failure to avoid this hazard may result in serious damage to the dump truck. Is used, if lacking care can lead to **personal injury or danger to life.**

REFERENCE: — **After the repair works and the checks, the expert staff must convince itself that the product is properly functioning again.**

Denomination of standard dimensions

Note: linear density in kg/m; areal density in t/m2

Unit	Character	New	Old	Conversion	Note
Mass	m	kg (Kilogramm)	kg		
Force	F	N (Newton)	kp	1 kp = 9,81 N	
Work	A	J (Joule)	kpm	0,102 kpm = 1J = 1 Nm	
Power	P	KW (Kilowatt)	PS (DIN)	1 PS = 0,7355 KW 1 KW = 1,36 PS	
Torque	T	Nm (Newtonmeter)	kpm	1 kpm = 9,81 Nm	T (Nm) = F (N) . r (m)
Moment(Force)	M	Nm (Newtonmeter)	kpm	1 kpm = 9,81 Nm	M (Nm) = F (N) . r (m)
Pressure (Overpress)	pü	bar	atü	1,02 atü = 1,02 kp/cm2 = 1 bar = 750 torr	
Speed	n	min -1			

Conversion table

25,40 mm	=	1 in (inch)
1 kg (Kilogramm)	=	2,205 lb (pounds)
9,81 Nm (1 kpm)	=	7,233 lbf x ft (pound force foot)
1,356 Nm (0,138 kpm)	=	1 lbf x ft (pound force foot)
1 kg / cm	=	5,560 lb / in (pound per inch)
1 bar (1,02 kp/cm ^{2})	=	14,233 psi (pound force per squar inch lbf/in^2)
0,070 bar (0,071 kp/cm^2)	=	1 psi (lbf/in^2)
1 Liter	=	0,264 Gallon (Imp.)
4,456 Liter	=	1 Gallon (Imp.)
1 Liter	=	0,220 Gallon (US)
3,785 Liter	=	1 Gallon (US)
1609,344 m	=	1 Mile (Landmeile)
0° C (Celsius)	=	+ 32° F (Fahrenheit)
0 ° C (Celsius)	=	273,15 Kelvin

Torque limits for screws.

Table

TORQUE LIMITS FOR SCREWS (IN Nm) ACCORDING TO ZF - STANDARDS 148

Friction value: μ total= 0,12 for screws and nuts **without** after treatment as well as **phosphatized** nuts. **Tightening by hand!** Torque limits, if not especially indicated, can be taken from the following list:

Metric ISO Standard thread

Size	8.8	10.9	12.9
M4	2,8	4,1	4,8
M5	5,5	8,1	9,5
M6	9,5	14	16,5
M7	15	23	28
M8	23	34	40
M10	46	68	79
M12	79	115	135
M14	125	185	215
M16	195	280	330
M18	280	390	460
M20	390	560	650
M22	530	750	880
M24	670	960	1100
M27	1000	1400	1650
M30	1350	1900	2250
M33	1850	2600	3000
M36	2350	3300	3900
M39	3000	4300	5100

Metric ISO Fine thread

Size	8.8	10.9	12.9
M 8 x 1	24	36	43
M 9 x 1	36	53	62
M 10 x 1	52	76	89
M 10 x 1,25	49	72	84
M 12 x 1,25	87	125	150
M 12 x 1,5	83	120	145
M 14 x 1,5	135	200	235
M 16 x 1,5	205	300	360
M 18 x 1,5	310	440	520
M 18 x 2	290	420	490
M 20 x 1,5	430	620	720
M 22 x 1,5	580	820	960
M 24 x 1,5	760	1100	1250
M 24 x 2	730	1050	1200
M 27 x 1,5	1100	1600	1850
M 27 x 2	1050	1500	1800
M 30 x 1,5	1550	2200	2550
M 30 x 2	1500	2100	2500
M33 x 1,5	2050	2900	3400
M 33 x 2	2000	2800	3300
M 36 x 1,5	2700	3800	4450
M 36 x 3	2500	3500	4100
M 39 x 1,5	3450	4900	5700
M 39 x 3	3200	4600	5300

Setting clutch

Designation	Dimensions	Measuring instrument	Comment Chapter/Section
Disk clearance	3.80 mm – 4.60 mm	Dial gauge	8 EP 320/370 A • Assembling clutch
Disk clearance	4.60 mm – 5.50 mm	Dial gauge	8 EP 420/470 A • Assembling clutch
Disk clearance	3.90 mm – 4.70 mm	Dial gauge	8 EP 320/370 A • Assembling clutch
Disk clearance	4.20 mm – 5.00 mm	Dial gauge	8 EP 420/470 A
Disk clearance	3.80 mm – 4.60 mm	Dial gauge	• Assembling clutch
Disk clearance	3.20 mm – 4.80 mm	Dial gauge	• Assembling planetary drive

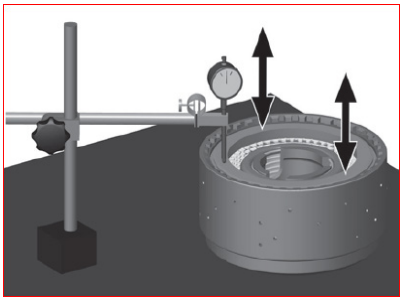


Figure 1

Labeling of type plate

1 = Transmission type
2 = QR-code
3 = ZF parts list number
4 = Overall transmission ratio
5 = Customer nummer)
6 = ZF list of lubricants

Figure 2

Information on spare parts ordering

The following information is required when ordering genuine ZF spare parts:

You will find these informations on the type plate.

1 = Transmission type
2 = Unit number
3 = ZF parts list number
4 = Make and type of spare part
5 = Denomination of spare part
6 = Spare part number
7 = Shipping mode

Please indicate all the a.m. details to avoid any mistakes in the delivery of the ordered spare parts.

Type plate electronic control unit

1 = Designation control unit
2 = Nominal voltage
3 = Transmission product designation
4 = Parts list number
5 = Serial nummer
6 = Software number
7 = Barcode, consisting of parts list number electronic control unit.

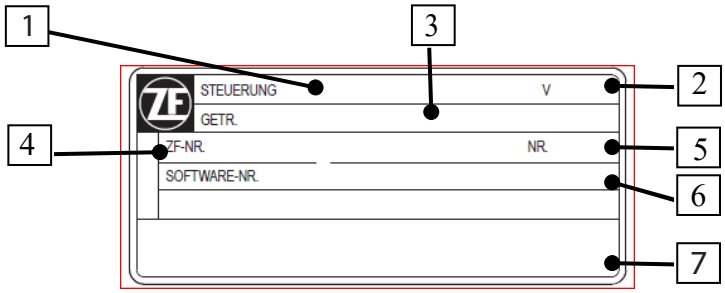


Figure 3

Configuration of transmission

Transmission schematics and gear schematics

Legend:

2 = Engine - dependent PTO
3 = Output flange (rear axle)
4 = Emergency steering pump (option)
5 = Output flanges of LKV axle insert (front axle)
6 = Input flange

Legend of letters:

- AV/V ➔ Input/Forward
- W ➔ converter with lock-up clutch
- RE ➔ retarder
- Clutches ➔ V/R/A/B/C/D/E (V=forward)
- Multi-disc brake ➔ F
- Interaxle differential ➔ G

Transmission schematics

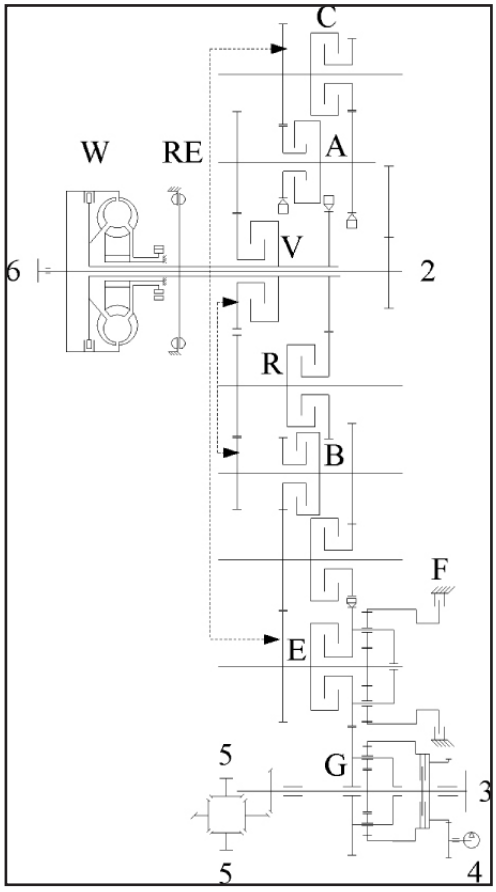


Figure 4

Gear schematics

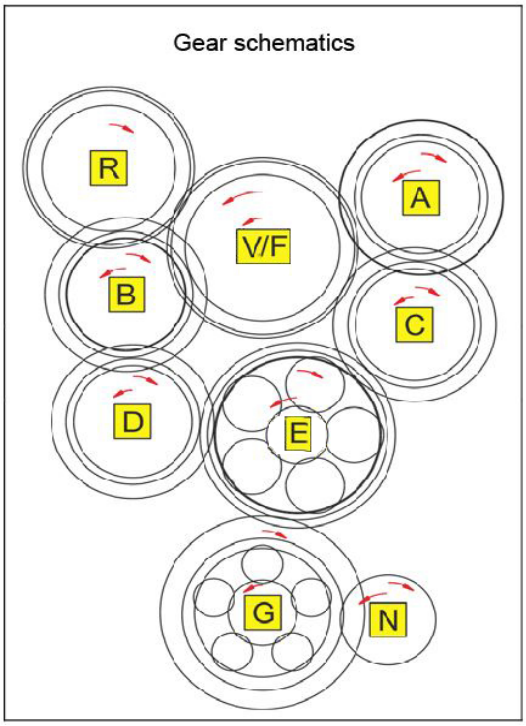


Figure 5

Measuring points and connections

Table

Take measurements when the transmission has reached operating temperature (approx. 80 - 90 °C)

N°	Item designation	Connect	Nm

Measuring points for pressure oil and temperature

53	Clutch - forward V	16+2 bar	M12X1.5
55	Clutch - reverse R	16+2 bar	M12X1.5
56	Clutch A	16+2 bar	M12x1.5
57	Clutch B	16+2 bar	M12x1.5
58	Clutch C	16+2 bar	M12x1.5
59	Clutch D	16+2 bar	M12x1.5
60	Brake F	16+2 bar	M12x1.5
61	Clutch E	16+2 bar	M14x1.5
62	Lubrication	1.5 bar	M14x1.5
64	WK (converter lock-up clutch)	13+1 bar	M12x1.5
65	System pressure	16+2 bar	M14x1.5
66	Clutch (differential lock)	16+2 bar	M12x1.5

10	Breather (transmission)	M10x1	12 Nm
11	Breather (LKV axle insert)	M10X1	12 Nm
15	Connection towards heat exchanger	M48x2	145 Nm
16	Connections from heat exchanger	M48x2	145 Nm
28	Connection towards filter	M42X2	145 Nm
29	Connection from filter	M42x2	145 Nm
30	Connection from filter bypass	M42x2	145 Nm

31	Speed sensor	n1 turbine	M6x12	9.5 Nm
32	Speed sensor	n2 primary step	M6x12	9.5 Nm
33	Speed sensor	n3 secondary step	M6x12	9.5 Nm
34	Speed sensor	n4 output	M6x12	9.5 Nm
70	Temperature sensor	Converter/retarder	M12x1.5	23 Nm
71	Temperature sensor	Oil sump	M12X1.5	23 Nm

Installation sheet

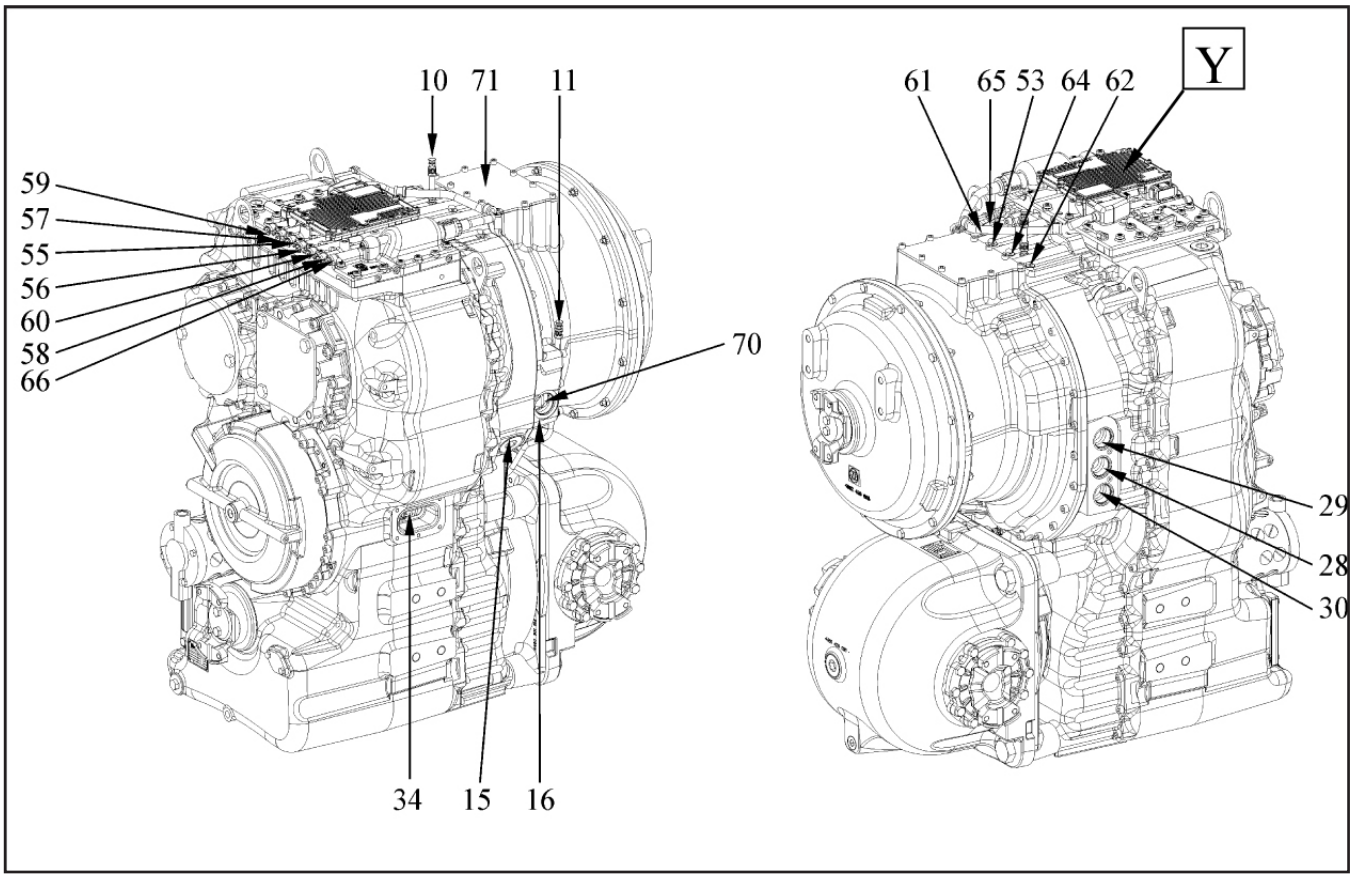


Figure 6

Detail "Y"

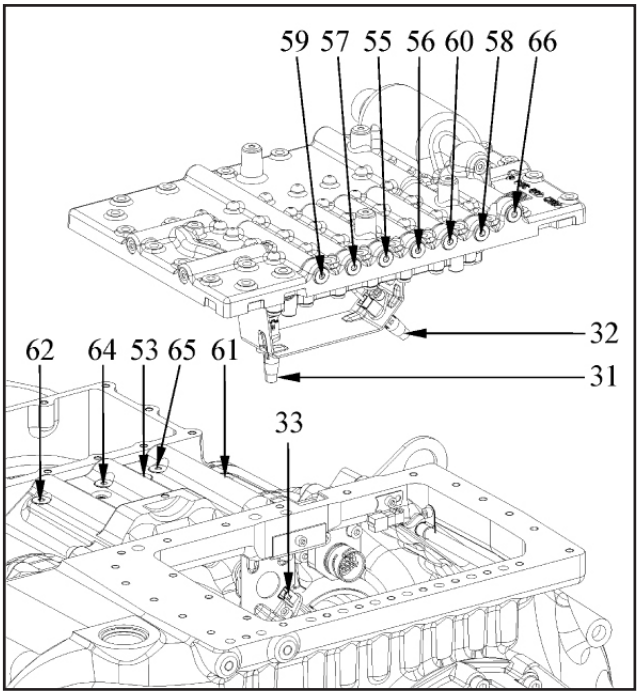
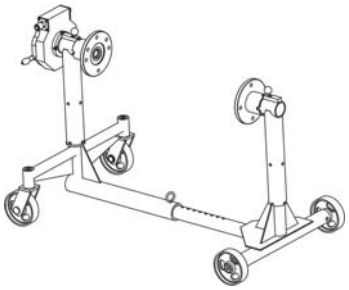
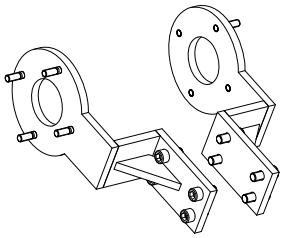
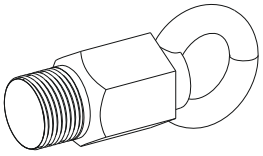
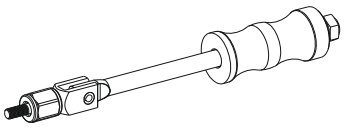
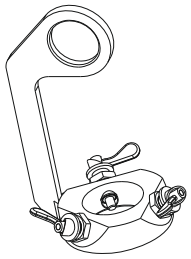
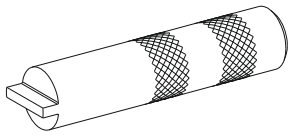
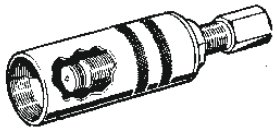


Figure 7

Special tools for disassembly and reassembly
ZF - Ergopower

Cons. No.	Figure	Designation Order no.	Qty.
1		Assembly truck complete with tilting device K9005577	1
2		Clamping device 850329-00266	1
3		Power wrench MX533483	1
4		Eye bolt 850317-00068	1
5		Pulling device K9005609	1

Specjal tools for disassembly and reassembly
ZF - Ergopower

Cons. No.	Figure	Designation Order no.	Qty.
6		Hook 850317-00069	1
7		Pressure piece 850316-00379	1
8		Grab sleeve 850418-00436	1
9		Basic tool K9005615	1
10		Grab sleeve K9006808	1

Specjal tools for disassembly and reassembly
ZF - Ergopower

Cons. No.	Figure	Designation Order no.	Qty.
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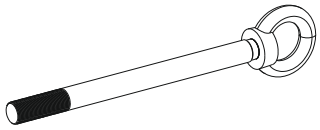
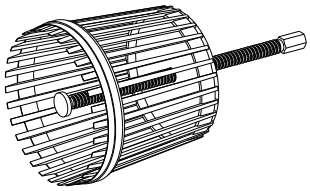
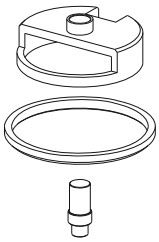
12		Eye bolt 850317-00070	1
13		Extracting device 850316-00380	1
14		Assembly fixture 850317-00071	1
15		Socket insert 850316-00381	1

Specjal tools for disassembly and reassembly
ZF - Ergopower

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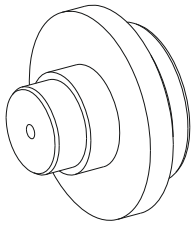
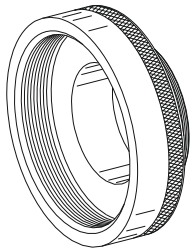
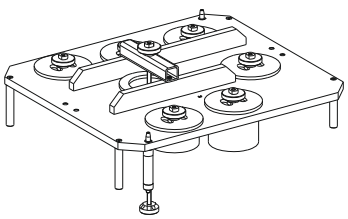
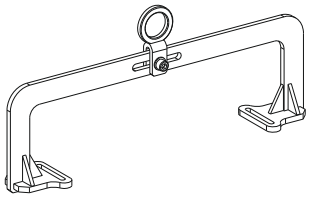
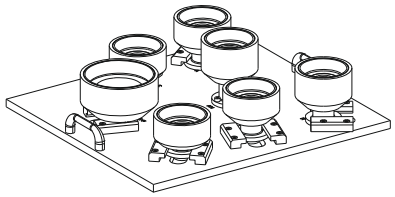
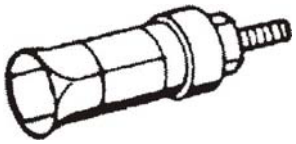
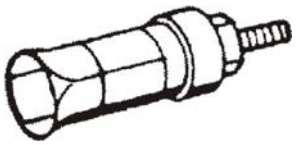
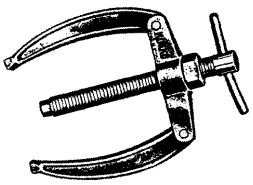
16		Rapid grip 850317-00072	1
17		Pressure piece 850317-00073	1
18		Reduction K9006785	1
19		Reassembly aid 850317-00074	1
20		Mounting device I 850317-00075	1

Specjal tools for disassembly and reassembly
ZF - Ergopower

Cons. No.	Figure	Designation Order no.	Qty.
21		Hook 850317-00076	1
22		Mounting device II 850317-00077	1
23		Internal extractor 850301-00053	1
24		Internal extractor MX504202	1
25		Counter support MX504203	1

Specjal tools for disassembly and reassembly
ZF - Ergopower

Cons. No.	Figure	Designation Order no.	Qty.
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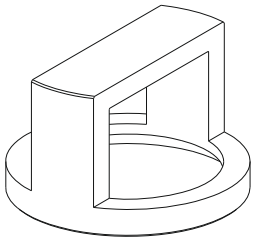
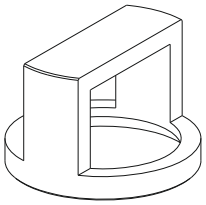
27		Assembly fixture 850317-00079	1
28		Assembly fixture 850317-00080	1
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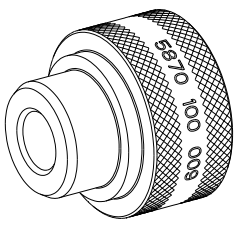
30		Pressure piece 850317-00082	1

Specjal tools for disassembly and reassembly
ZF - Ergopower

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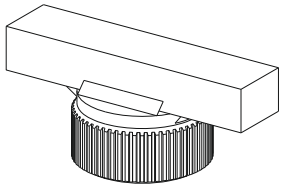
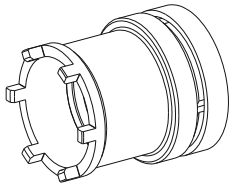
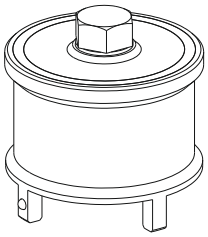
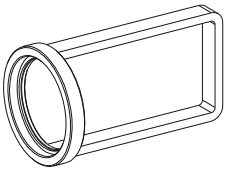
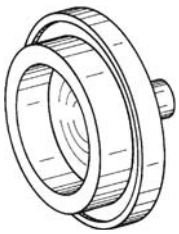
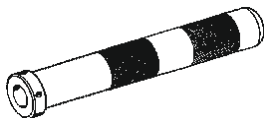
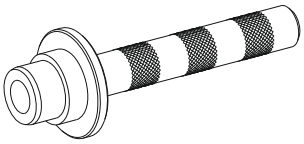
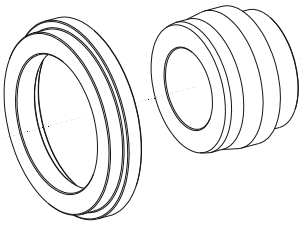
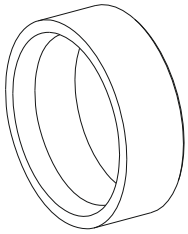
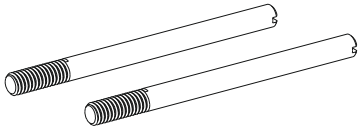
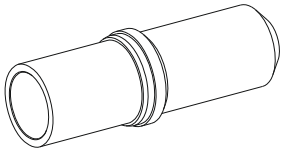
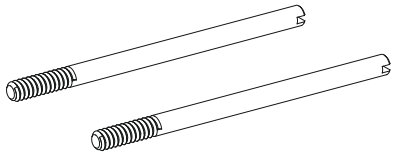
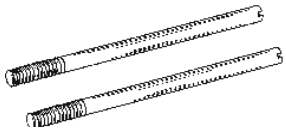
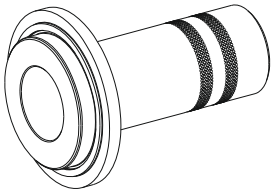
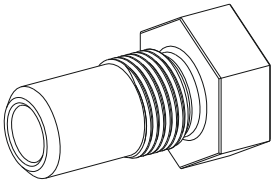
31		Locking device 850317-00083	1
32		Slotted nut wrench 850316-00382	1
33		Wrench insert 850316-00383	1
34		Reassembly aid 860103-01494	1
35		Driver tool 850317-00084	1

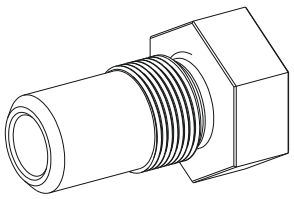
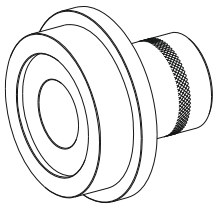
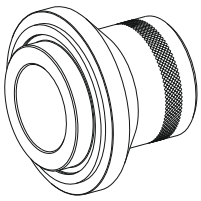
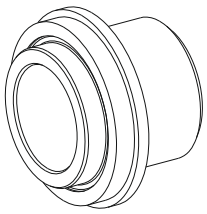
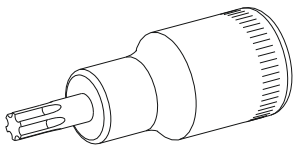
Specjal tools for disassembly and reassembly
ZF - Ergopower

Cons. No.	Figure	Designation Order no.	Qty.
36		Handle 850317-00085	1
37		Driver tool 850317-00086	1
38		Assembly fixture (Slip bushing and pressure piece) 850317-00087	1
39		Slip bushing 850317-00088	1
40		Adjusting screw 120702-00080	1

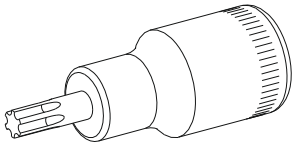
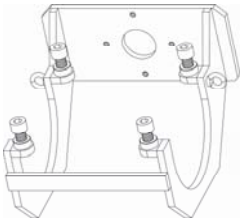
Specjal tools for disassembly and reassembly
ZF - Ergopower

Cons. No.	Figure	Designation Order no.	Qty.
41		Driver tool 850317-00089	1
42		Adjusting screw 120702-00081	1
43		Adjusting screw 120702-00082	1
44		Driver tool 850317-00090	1
45		Pressure piece 850317-00091	1

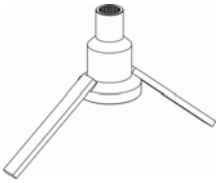
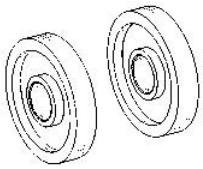
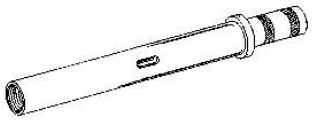
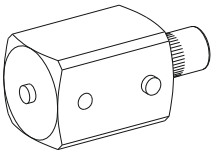
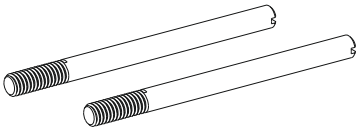
Specjal tools for disassembly and reassembly
ZF - Ergopower

Cons. No.	Figure	Designation Order no.	Qty.
46		Pressure piece 850317-00092	1
47		Driver tool 850317-00093	1
48		Driver tool 850317-00094	1
49		Driver tool 850317-00095	1
50		Socket wrench TX-27 MX504253	1

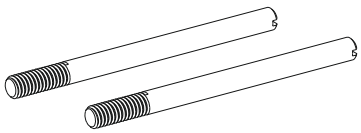
Specjal tools for disassembly and reassembly
ZF - Ergopower

Cons. No.	Figure	Designation Order no.	Qty.
51		Socket wrench TX-40 MX504254	1
52		Clamping device 850317-00096	1
53		Lifting tackle K9005603	1
54		Eye nut 850301-00054	1
55		Socket wrench 850316-00384	1

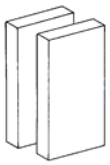
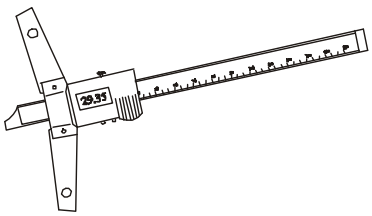
Specjal tools for disassembly and reassembly
ZF - Ergopower

Cons. No.	Figure	Designation Order no.	Qty.
56		Supporting device 850317-00097	1
57		Grab sleeve K9005582	1
58		Adjusting washer MX504727	1
59		Measuring shaft K9005598	1
60		Reducing adapter MX504729	1
61		Adjusting screw K9005638	1

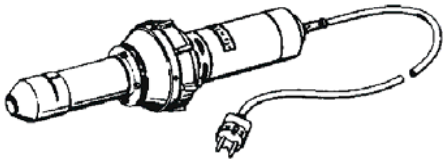
Specjal tools for disassembly and reassembly
ZF - Ergopower

Cons. No.	Figure	Designation Order no.	Qty.
62		Adjusting screw MX504186	1

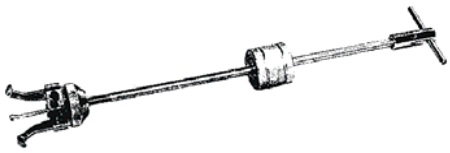
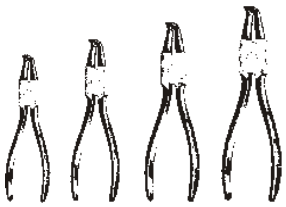
Commercial tools for disassembly and reassembly

Cons. no.	Figure	Designation Order no.	Qty	Chapter/fig.
1		Magnetic stand	1	Universal
2		Dial indicator	1	Universal
3		Gauge blocks 70 mm 100 mm	1	Universal
4		Digital depth gauge 200 mm 300 mm	1	Universal
5		Digital caliper gauge 150 mm 300 mm 500 mm	1	Universal

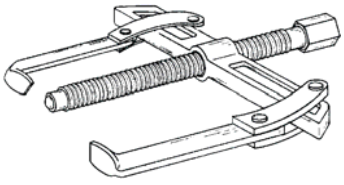
Commercial tools for disassembly and reassembly

Cons. no.	Figure	Designation Order no.	Qty	Chapter/fig.
6		Torque wrench 0.6 -6.0 Nm 1.0 – 12 Nm 3.0 – 23 Nm 5.0 – 45 Nm 10 – 90 Nm 80 – 400 Nm 160 – 800 Nm 750 - 2000 Nm	1	Universal
7		Hot air blower 230 V 115 V	1	Universal
8		Plastic hammer Ø 60 mm	1	Universal
9		Lifting strap	1	Universal

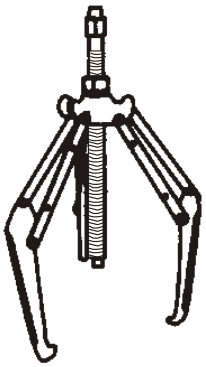
Commercial tools for disassembly and reassembly

Cons. no.	Figure	Designation Order no.	Qty	Chapter/fig.
10		Lifting chain	1	Universal
11		Pry bar	1	Universal
12		Striker	1	Universal
13		Set of internal pliers I1-I2-I3-I4	1	Universal
14		Set of internal pliers I11-I21-I31-I41 90°	1	Universal

Commercial tools for disassembly and reassembly

Cons. no.	Figure	Designation Order no.	Qty	Chapter/fig.
15		Set of external pliers A1-A2-A3-A4	1	Universal
16		Set of external pliers A01-A02-A03-A04 90°	1	Universal
17		Two-armed puller Jaw width 80 mm Throat depth 100 mm Jaw width 120 mm Throat depth 125 mm Jaw width 170 mm Throat depth 125 mm Jaw width 200 mm Throat depth 175 mm Jaw width 350 mm Throat depth 250 mm Jaw width 520 mm Throat depth 300 - 500 mm Jaw width 250 mm Throat depth 200 mm Jaw width 380 mm Throat depth 200 mm	1	Universal

Commercial tools for disassembly and reassembly

Cons. no.	Figure	Designation Order no.	Qty	Chapter/fig.
18		Three armed puller Jaw width 85 mm Throat depth 65 mm Jaw width 130 mm Throat depth 105 mm Jaw width 230 mm Throat depth 150 mm Jaw width 295 mm Throat depth 235 mm Jaw width 390 mm Throat depth 230 mm Jaw width 640 mm Throat depth 290 mm	1	Universal

Removal of transmission, disassembly

NOTE

Place the dump truck on level ground and apply parking brake
Start with the propeller shaft in the articulation hinge.

Release articulation propeller shaft from the transmission output flange.
Start the engine and line up the machine

Apply articulation lock

Turn off main switch in battery case

Raise the dump body and lock it with the safety support.

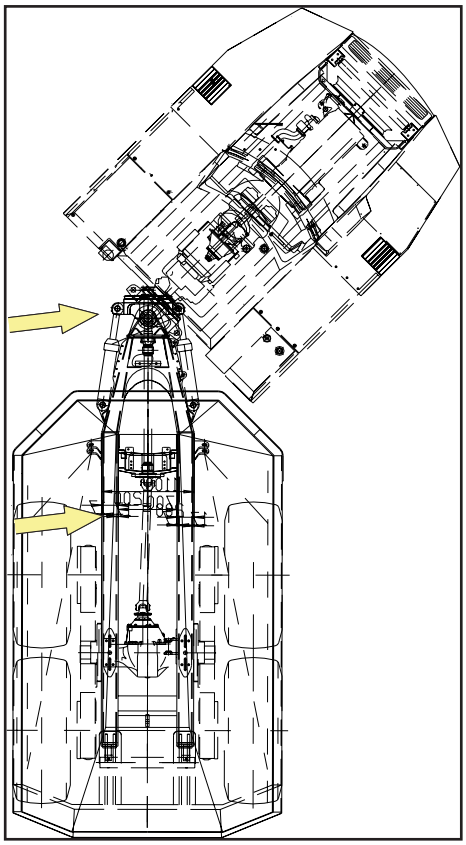


Figure 8

WARNING

Place wheel chocks to the front wheel

WARNING

Never turn off battery main switch when engine is running
Never turn off battery main switch when ignition is on
Leave the battery main switch in ON position as long as the lamp (4) is illuminated or flashing. When the lamp(4) is off, the main switch can safely be turned to OFF position.

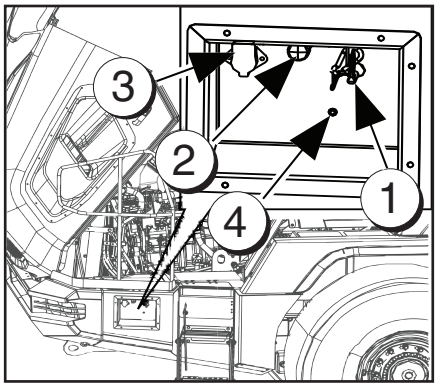


Figure 9

To empty thre three accumulators:

- Repeatedly press the brake pedal until pressure be equal to 0 on the main screen ACC1 and ACC2.
- Repeatedly turn ON/OFF parking brake button until pressure be equal to 0 on the main screen ACC3.
- Completely sink down the front suspension.

(accumulators stationed behind the right mudguard)

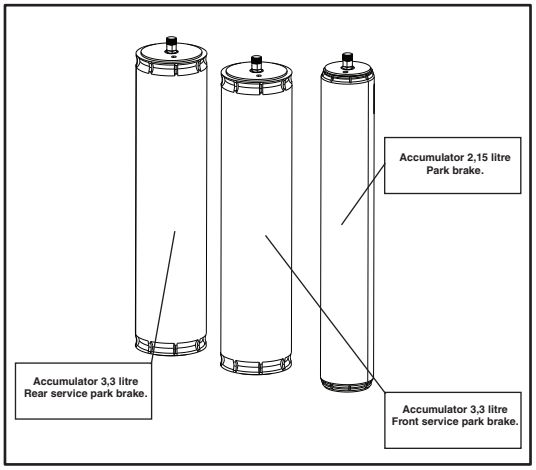


Figure 10

Remove the clamp of the hinge bearing lubrication from the body heating bracket.

Figure 11

Disassemble the body heating (if it is assembled on machine) 4 screws in the body heating bracket. Remove 4 screws in pipe clamps attached to exhaust pipe.

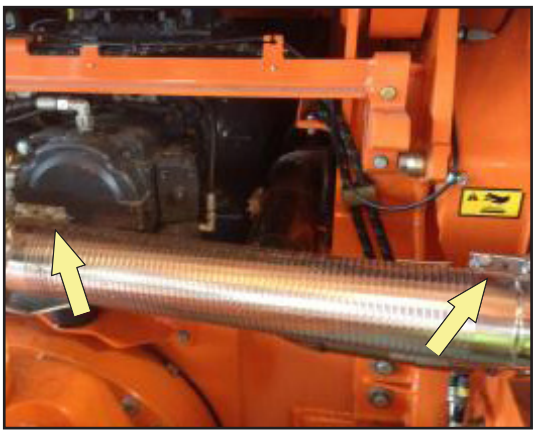


Figure 12

Figure 13

Remove body heating assembly.

Figure 14

Remove the A/C gas.

CAUTION

A/C pressure, remove carefully

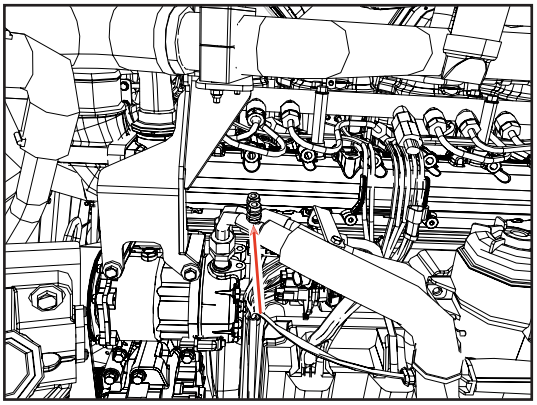


Figure 15

Disconnect the T/M power off / rear drive shaft joint (4 screws). Tie the rear drive shaft on the frame (near the hinge point) to keep it suspended

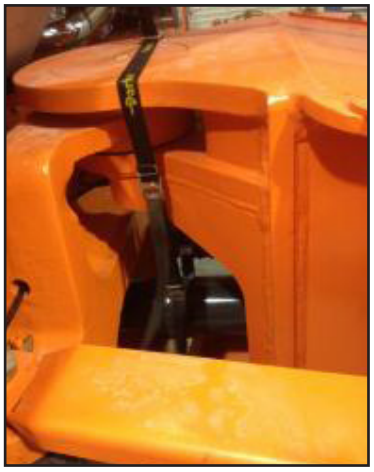


Figure 16

Remove the transmission cover (8 screws) and the bottom guard (4 screws)

- **When assembling, use Loctite™ 262 or Threebond medium 1374 on thread.**
- **Tightening torque (1/2" x 2 1/4" -10.9 UNF): 120 Nm.**

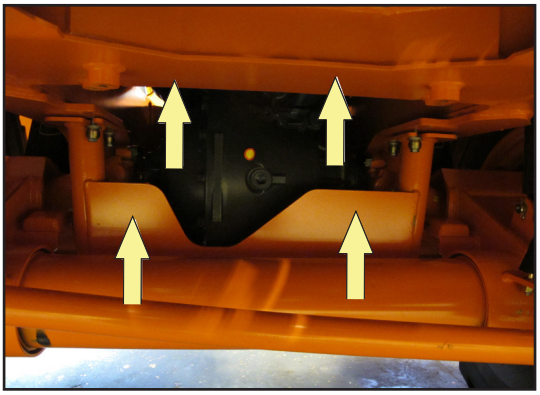


Figure 17

Figure 18

Disassemble the 2 final power drive shaft joints. Turn the wheels to reach the screws, if necessary.

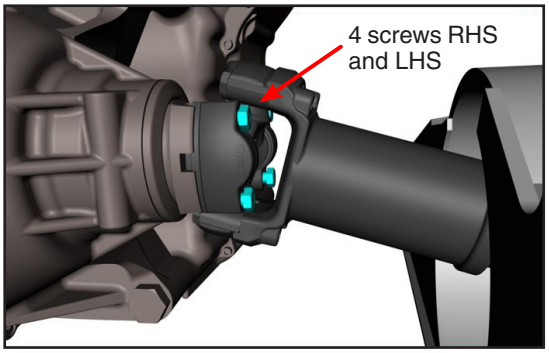


Figure 19

Drain both hydraulic reservoirs. (See chapter 7 maintenance - 2-4000 hour service in the Operating & Maintenance Manual).

	HA30	HA45
• Two chamber tank		
• Volume oil tank	63L	63L
• Volume system	150L	160L

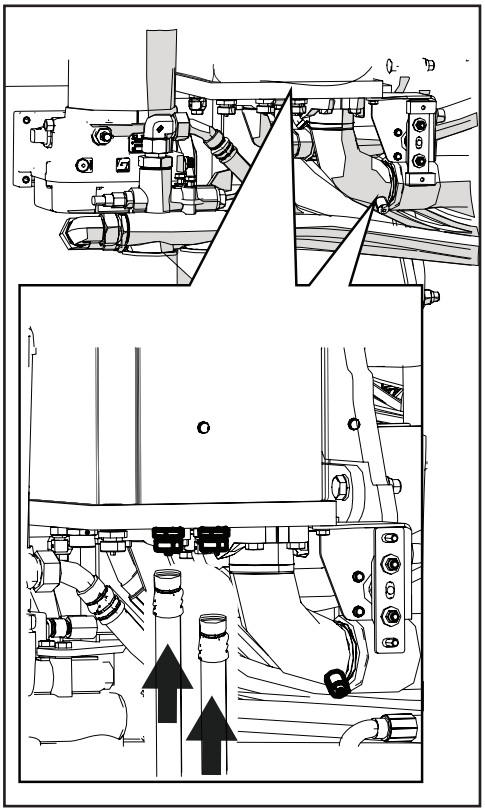


Figure 20

Tilting the cab:
Open the bonnet and remove the cab bolt, LHS and RHS.

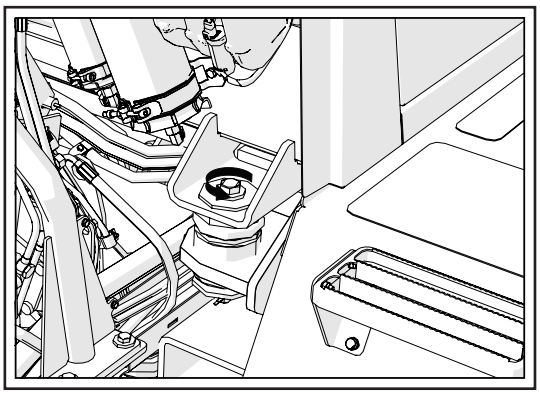


Figure 21

Turn the direction valve on the pump to lifting position.

Figure 22

With the handle, pump and raise the cab.

When lowering the cab, turn the direction valve to the downwards position and use the handle to lower the cab.

Figure 23

Disconnect all hydraulic hoses (12 hydraulic hoses) and cab heating hoses (2 heater hoses) between cab / transmission and other frame components.

CAUTION

Mark position of all hoses and electrical connectors. Make sure you cover all open hydraulic fittings and open hose edges.

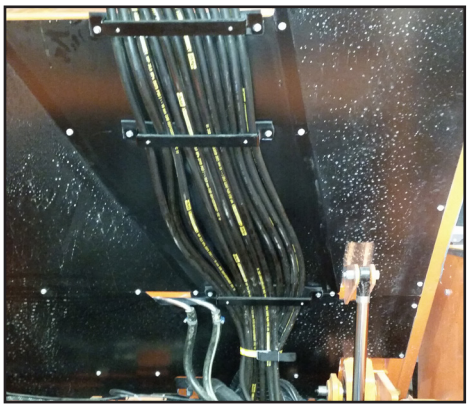


Figure 24

Make sure that no electrical connectors from the rest of the truck are connected to the transmission.

Figure 25

Lower the cab and then disconnect the tilt cylinder rod from the cab. It is located on the left side, over the front left wheel.

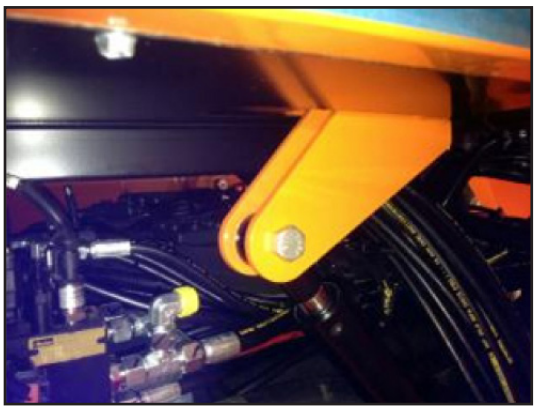


Figure 26

At the bottom of the cab, rear side, remove the cover.

Disconnect the 6 connectors from left to right;
(S1, S2, S3, S4, S5, S6)

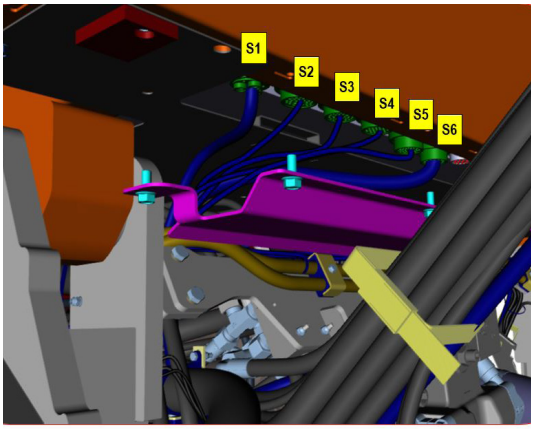


Figure 27

Remove “Out” A/C hose (small fitting) until the wrench toll fits, then remove the “In” A/C hose (large fitting)


Figure 28

Remove the outer snap rings from LH and RH pins that fix the cab to cab hinge point on the front frame.


Figure 29

Remove the pins.

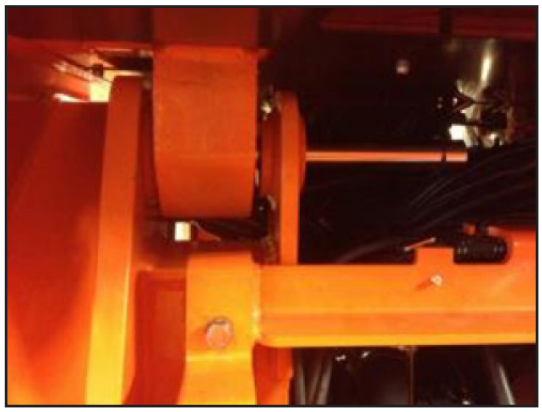


Figure 30

Use the hook points to raise the cab.

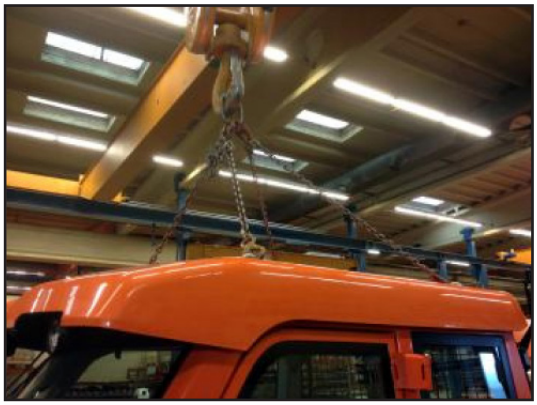


Figure 31

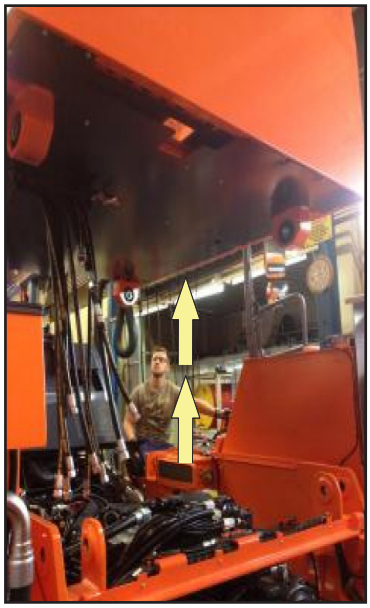


Figure 32

Measure distance between the rear side of T/M and the frame (use this as reference when assembling the new one).

Figure 33

Disconnect all the hydraulic hoses from the transmission.

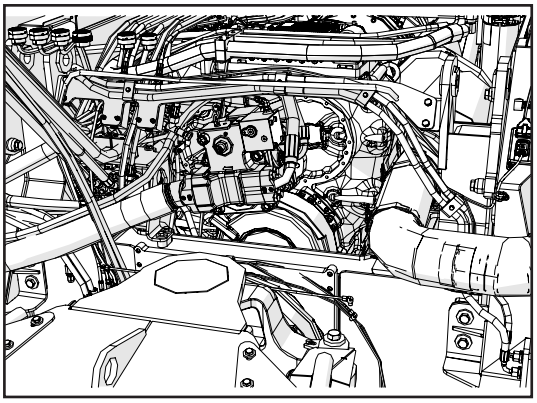


Figure 34

Disassemble the structure bar

Disassemble the four screws which are holding the structure bar and then remove it.

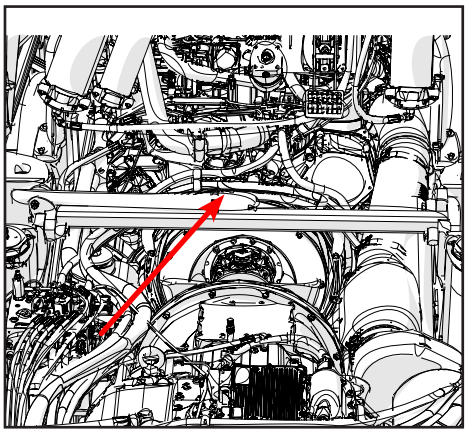


Figure 35

Disassemble the hydraulic hoses

Disassemble dipstick and cover the hole with a plug or similar.

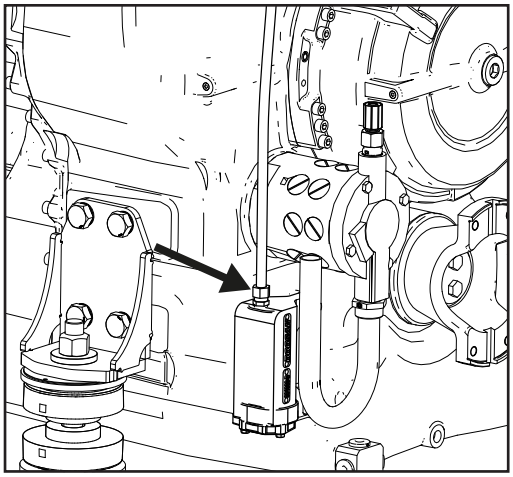


Figure 36

Realease all the hydraulic hoses connected to the transmission.

Realease all of the wiring on the electrical points. (ground cabel and the electrical connections have to be disconnected.)

Figure 37

Disconnect both of the hoses and the the emergency steering pump L-nipple from the articulated hinge side.

Protect the hydraulic nipple on the pump with plastic plug or similar.

NOTE

Remember to mark the hoses.

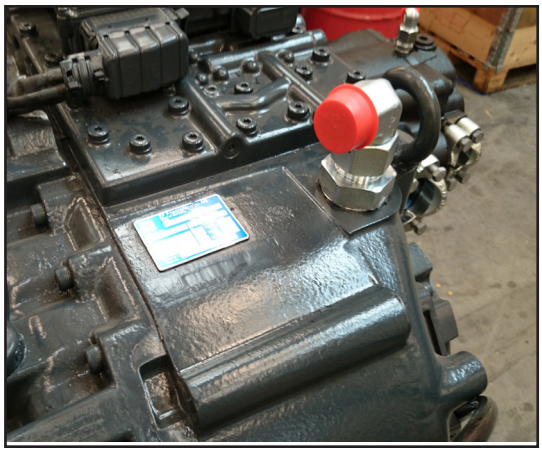


Figure 38

Disassemble transmission from mounting points rear LHS & RHS and front. If shims are used, reassemble them at the same place.

Assembly:
Torque limit: 750 Nm

Figure 39

Dismount the axle catcher bow.

Dismount converter prop. shaft.

Axle catcher screw: M12x45 -10.9
Torque: 114 Nm

Prop shaft screw: 1/2”UNF x64 -10.9
Torque: 141 Nm

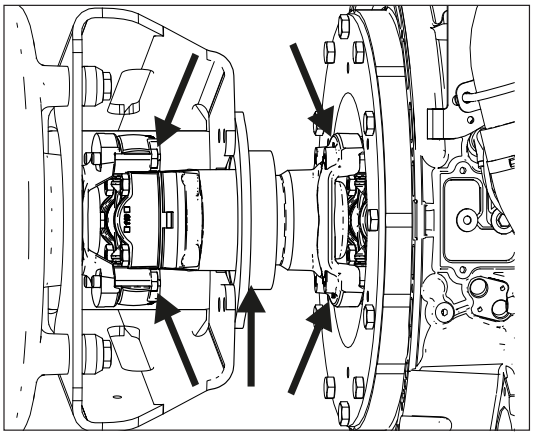


Figure 40

Disassemble the front transmission bracket attachment.

If shims are used, reassemble them at the same place.

Use standard tool as shown on the picture below or similar.

Assembly:
Torque limit (1) 277 Nm
Torque limit (2) 750 Nm

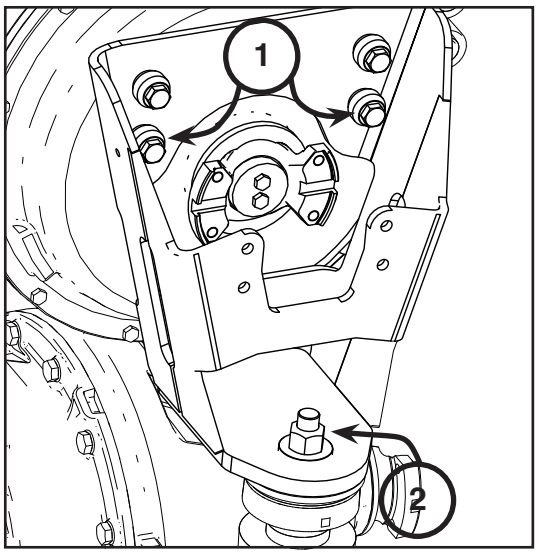


Figure 42

If necessary, loosen the main valve bracket and front bracket connecting transmission to the frame.

Disassemble the bracket by removing the 4 screws connecting the bracket to the transmission.

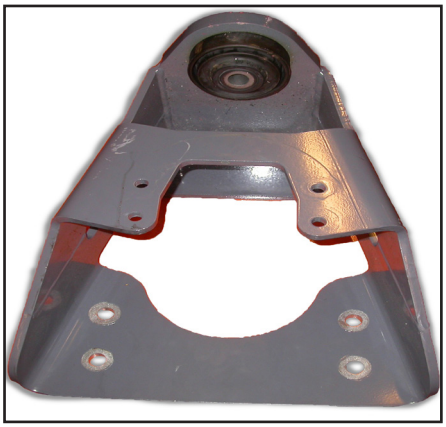


Figure 41

Assemble three eye bolts to transmission and attach the lifting chains.

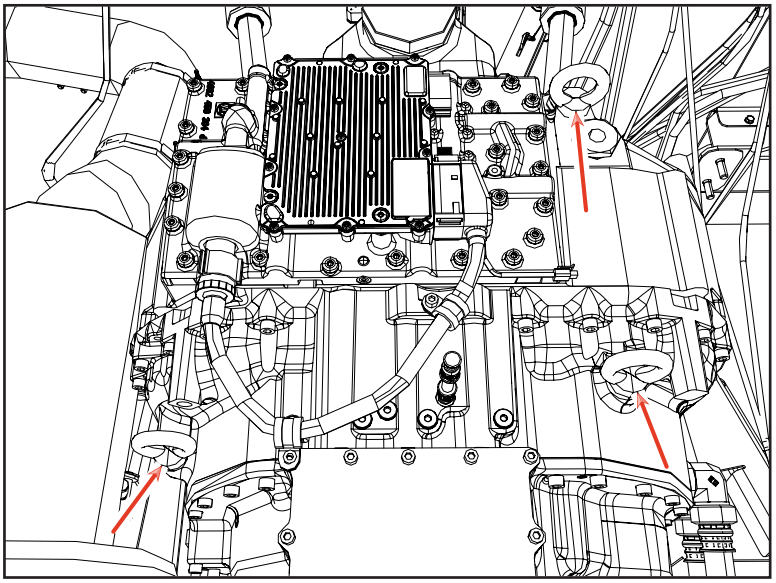


Figure 43

Check that all connections to the front frame equipment are not connected to the transmission.

Assemble the lifting device and adjust the chains to keep the transmission in balance. Start lifting the transmission out of the frame.

Carefully !

Be aware that the transmission have to be moved frontwards and twisted to the right side on front. In this position carefully lift up the transmission.
Be aware of the transmission differential otput flange and the back side.

Pay attention to the length of the chains.

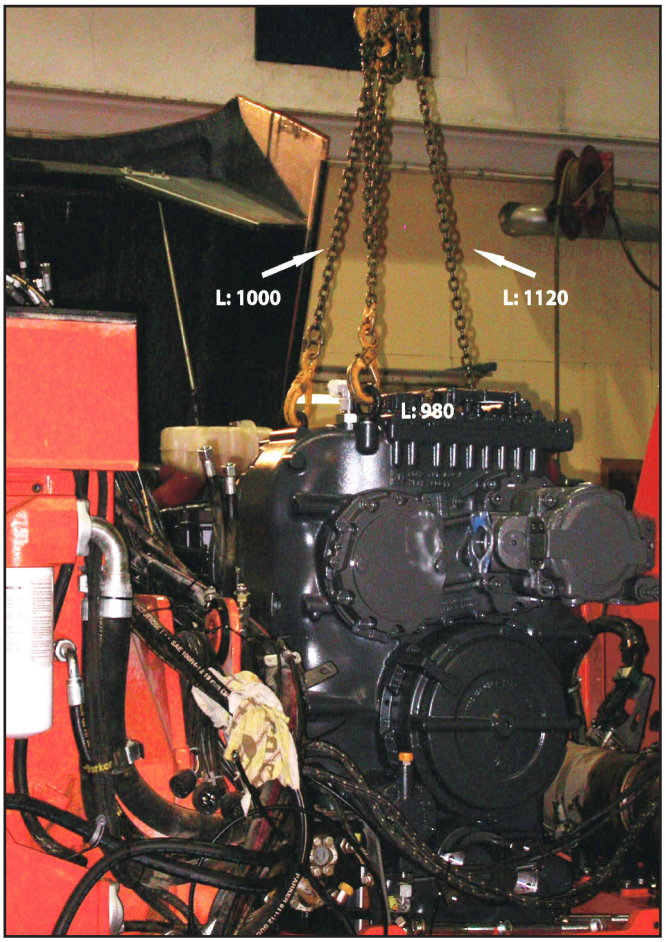


Figure 44

Positioning for disassembly and reassembly

The adjacent (Figure 45) shows the 8 EP-Series after it's removal from the vehicle.

This Repair Manual describes worksteps which can be performed in installed and removed condition.

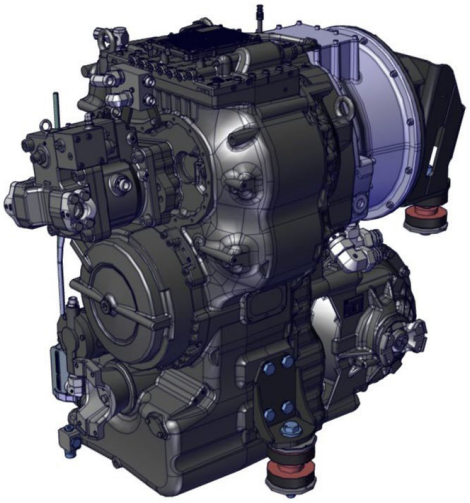


Figure 45

CAUTION

Make sure that the transmission is sufficiently supported/secured by appropriate fixtures to avoid any accidents! When doing repairs on a transmission which is installed in the vehicle, observe the vehicle manufacturer's safety regulations.

Fix the transmission to the assembly truck.

(S) Assembly truck	K9005577
(S) Clamping device	850329-00266

NOTE

Depending on the operations to be done, you may have to drain the oil from transmission and axle insert.

CAUTION

Disposal of oil according to legal requirements.

(Figure 46)➔ L Transmission
(Figure 49)➔ LKV axle insert

Remove screw plugs with O-rings

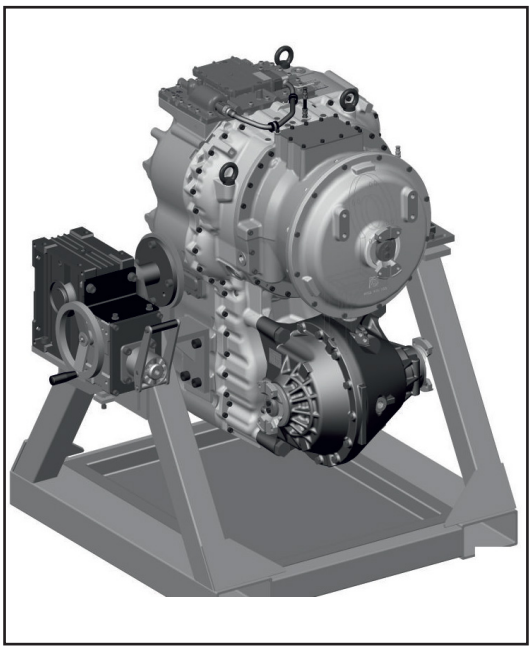


Figure 46

Removal and refitting various components

Transmission

1. Eye bolt M20

2. Breather (M10x1)
   - Tightening torque M_A = 12 Nm

3. Oil filler plug
   - M42x2 with O-ring 38x2.5
   - Tightening torque M_A = 145 Nm

4. Connection Power take-off
   O-ring 154x3 for the pump
¤ Hexagon screw 18x50
¤ Tightening torque M_A = 330 Nm

5. Cover plate gasket
   - Hexagon screw M8/8.8x18
   - Tightening torque M_A = 23 Nm

6. Oil sump
   - Adhesive Thermostat MS-9360

7. Oil drain plug with magnetic insert
   - M38x1.5 with O-ring 35x2
   - Tightening torque M_A = 80 Nm (Loctite 557)

8. Dipstick solution

9. Emergency steering pump
   - Disassembly

¤ Loosen hexagon screws, separate emergency steering pump from transmission and remove O-ring.

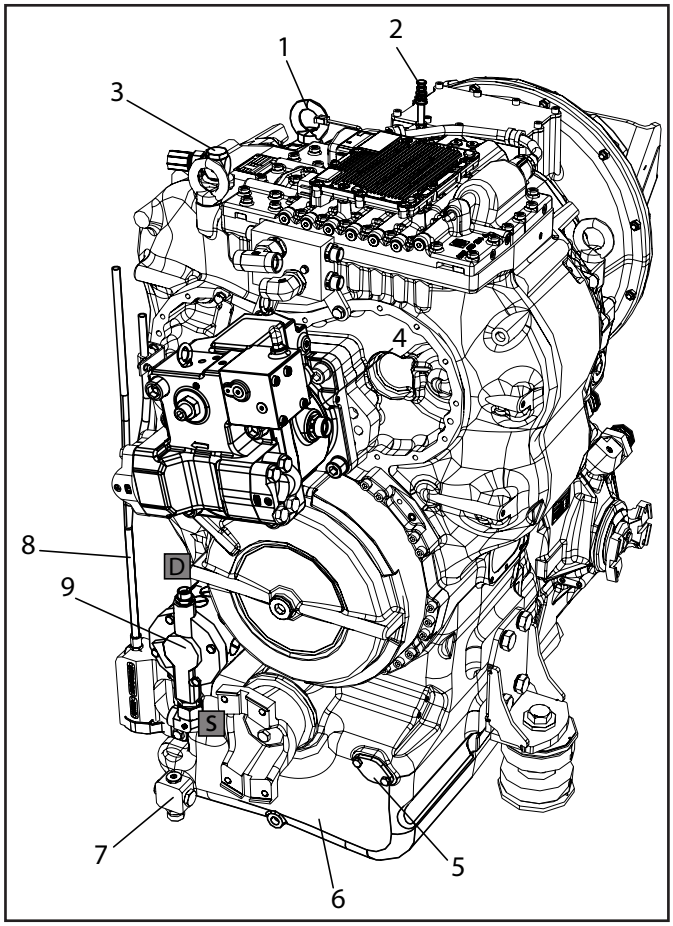


Figure 47

   - Reassembly

¤ Insert O-ring 100x3 (1) into the annular groove of the piston and grease it.
¤ Mount emergency steering pump and fix it with hexagon screws.
¤ Wet mounting thread with Loctite™ 243
¤ Tightening torque (M8/8.8x170) M_A = 23 Nm
¤ Esure correct installation position
D= Pressure port M22x1.5
S= Suction port M28x1.5

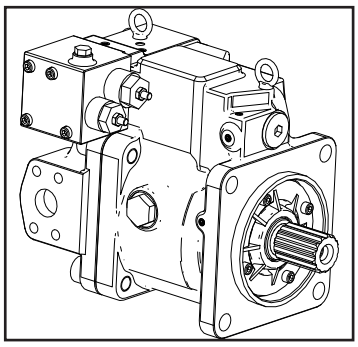


Figure 48

LKV axle insert

1. Transmission oil filler/level check plug
   M42x1.5 with O-ring 38x2.5
   Tightening torque M_A = 150 Nm

2. Oil drain plug with magnetic insert
   M24x1.5 with O-ring 21x2
   Tightening torque M_A = 70 Nm

3. Type plate
   Adhesive Thermostat MS-9360

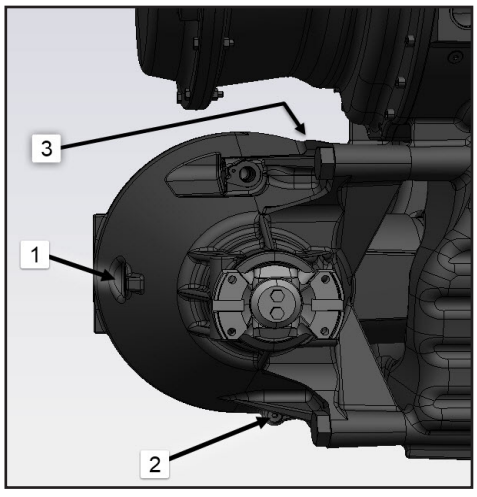


Figure 49

Separate axle insert LKV assy from transmission

1.Totate transmission in 90°
2.Loosen the hexagon screws.

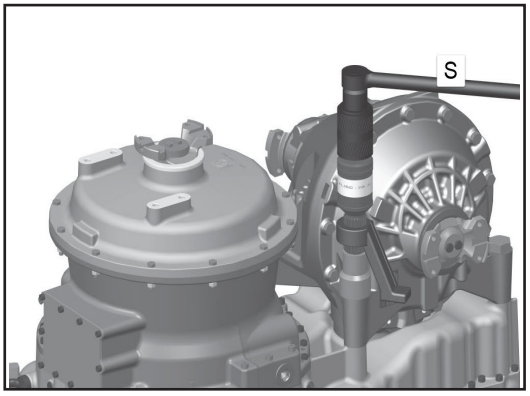


Figure 50

We recommend loosening of the bolted connection with a power wrench.

(S) Power wrench .

3. Remove the hexagon screws (1).
4. Loosen the screw plug and remove (2).

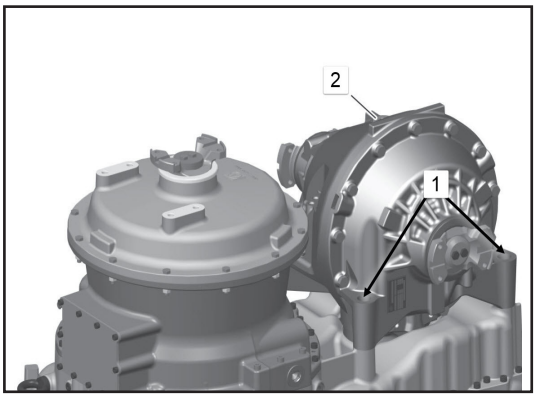


Figure 51

5. Mount the eye bolt and by means of a lifting tackle separate the axle insert from the transmission.

(S) Eye bolt 850317-00068 .

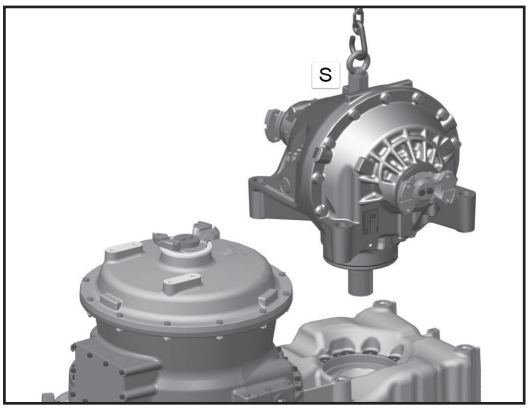


Figure 52

6. Remove the O-ring (2) and the shaft seal (1).

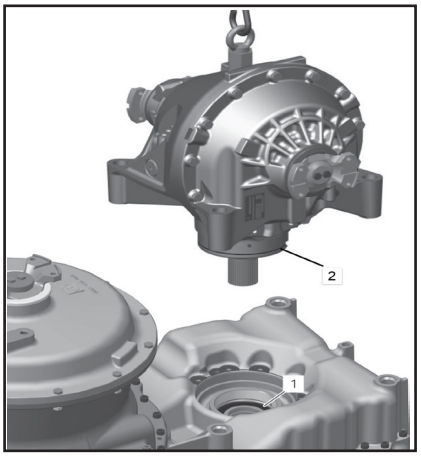


Figure 53

Removal inner components of Trasnsmission

Removal of speed sensor n4-output

1. Loosen cap screws and remove the cover (1) with gasket.

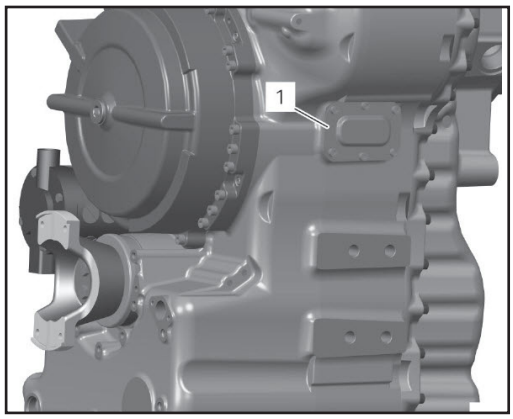


Figure 54

2. Separate plug connection (1).
3. Remove cable clip (2).
4. Pull out retaining plate (3).

5. Loosen cap screw and remove the speed sensor.

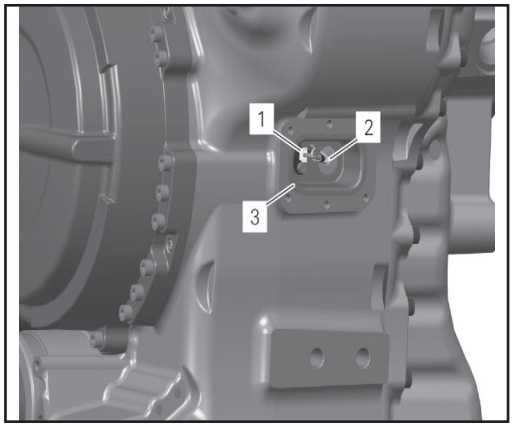


Figure 55

Figure 56

Removing the oil level indicator

1. Loosen hexagon screws and remove cover plate (1) with seal.
2. Loosen hexagon screws and remove the oil level indicator (2).

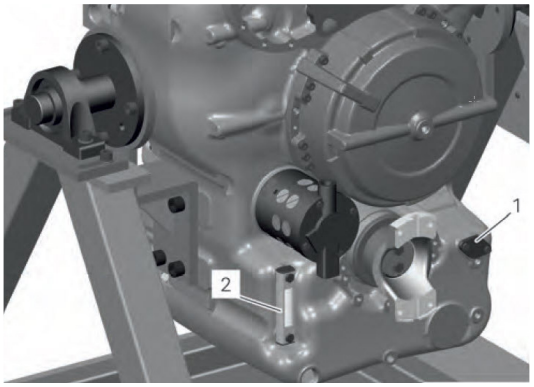


Figure 57

Removing the breather and cover plate

1. Loosen cap screws and cover plate (1) with gasket.
2. Loosen breather (2).
3. Loosen screw plug (3).

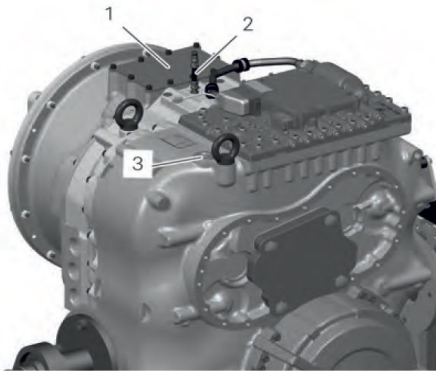


Figure 58

Disassembly of shifting block I and speed sensors

1. Loosen the clip (1), open and separate the lockings of wiring harness (2) (bayonet locking and plug).

2. Loosen the control unit/duct plate bolted connection (3).

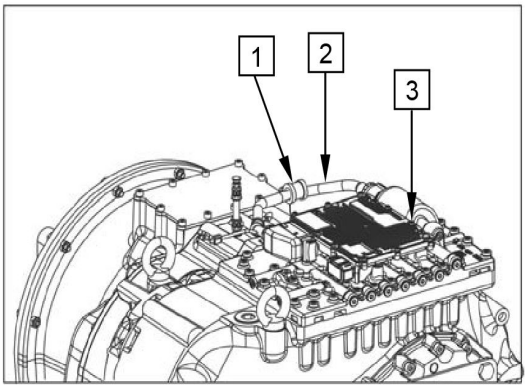


Figure 59

3. Loosen four Torx screwas
4. Remove the Control unit (1).

5. Loosen the duct plate/transmission housing bolted connection (2).

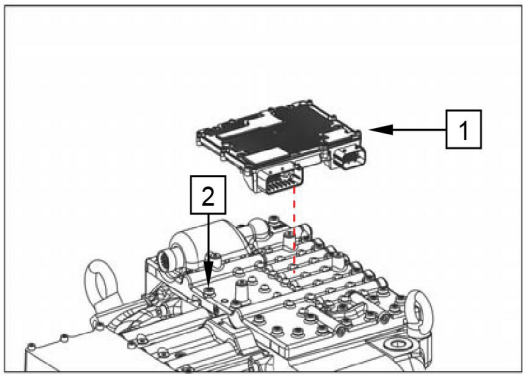


Figure 60

CAUTION

Mount two eyebolts, use a lifting tackle to lift the duct plate (1) until it is possible to open and separate the bayonet locking of wiring harness – shifting block I wiring harness - shifting block II, as well as the lockings of differential lock solenoid valve and speed sensor (see arrow and (Figure 61)

Now remove duct plate (1) and seal (2).

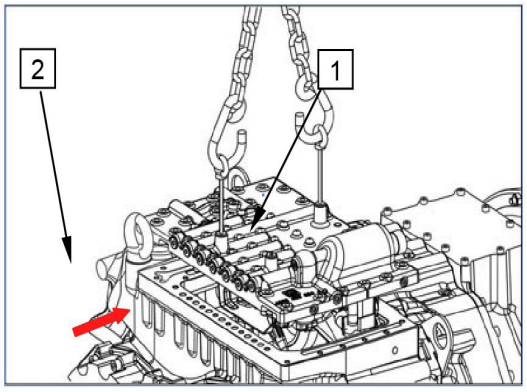


Figure 61

(1) = bayonet locking of shifting block II wiring harness
(2) = plug of differential lock solenoid valve
(3) = plug of speed sensor

6. Loosen the cylindrical screws (4 and 5) and remove speed sensor with fixing plate (6).

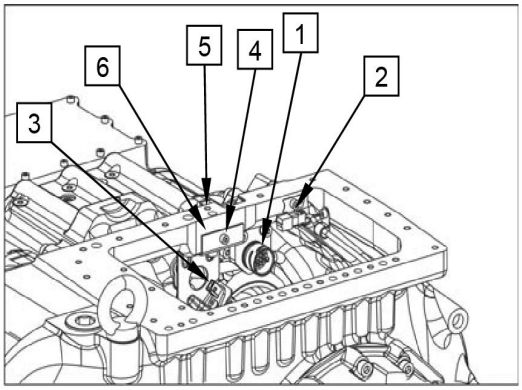


Figure 62

7. Loosen the screw (1) and remove the speed sensor (2).

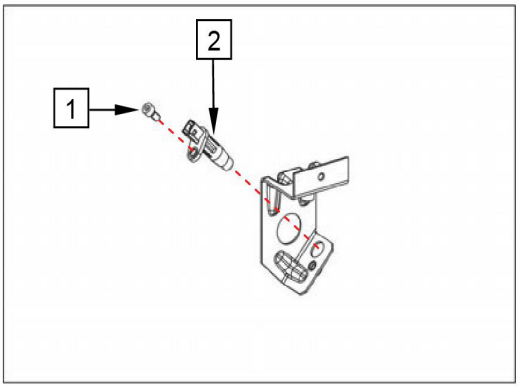


Figure 63

8. Open and separate the lockings of speed sensors (1 and 2) and differential lock solenoid valve (3).

9. Loosen the Torx screws (4) and remove fixing plate (5) with speed sensors.

10. Loosen the cylindrical screws (6) of the fixing bracket.

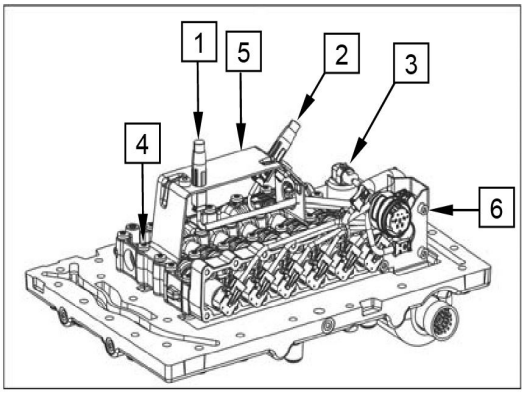


Figure 64

11. Loosen the cylindrical screws (1) and remove the speed sensors (2).

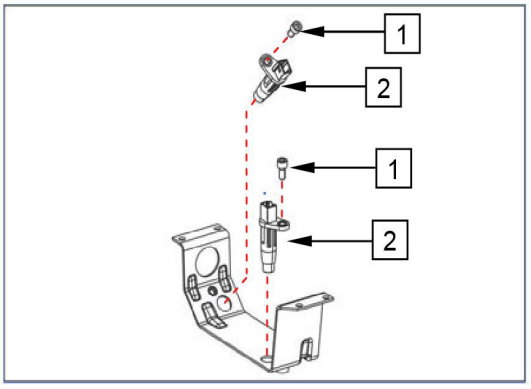


Figure 65

Dismantling the valve block

1. Open all lockings and separate them from pressure controllers and solenoid valve.

2. Remove the fixing bracket (1).

3. Press the bayonet locking of wiring harness out of the hole (see arrow).

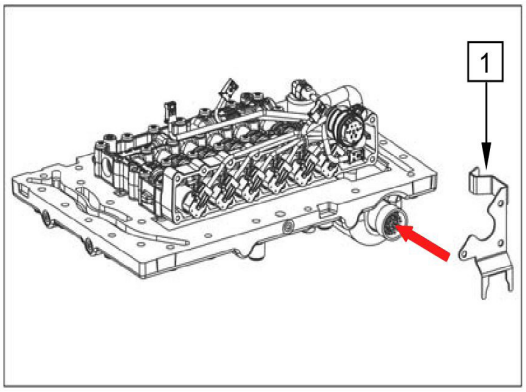


Figure 66

4. Remove wiring harness (1).

5. Loosen the cylindrical screw (2) of the differential lock solenoid valve.

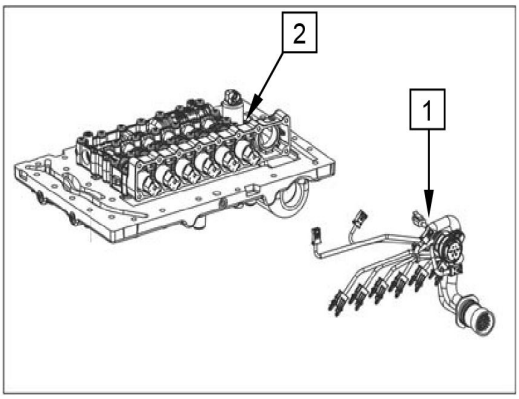


Figure 67

6. Remove the differential lock solenoid valve (1) with bracket (2).

7. Loosen the duct plate/valve block screw connection (3).

8. Remove the cylindrical screws (4) from the clamping plates.

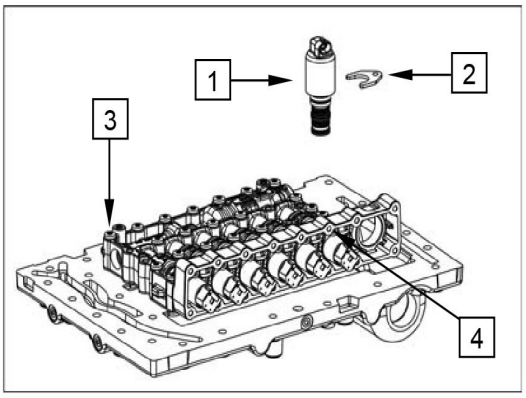


Figure 68

9. Remove valve block (1) and seal (2).

10. Remove screw plugs with O-ring (3).

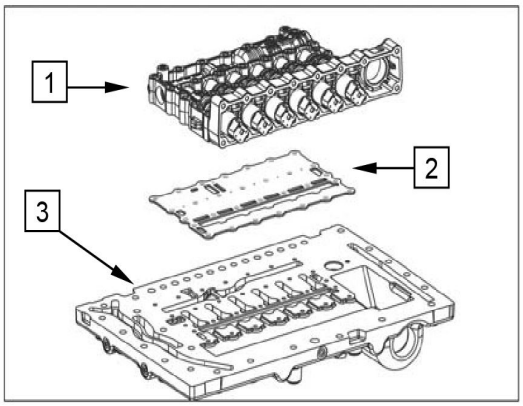


Figure 69

11. Remove all pressure controllers (1) with their clamping plates (2).

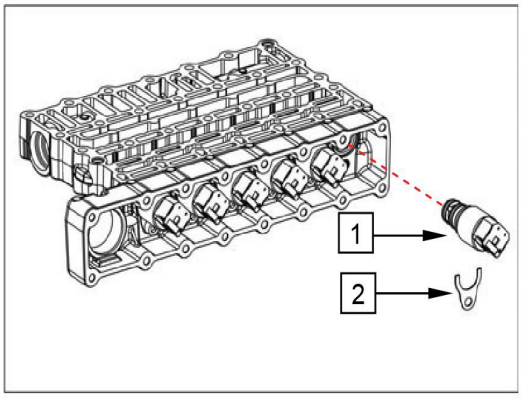


Figure 70

12. Press control piston inwards with mandrel (see arrow) and remove the stop plate (1)

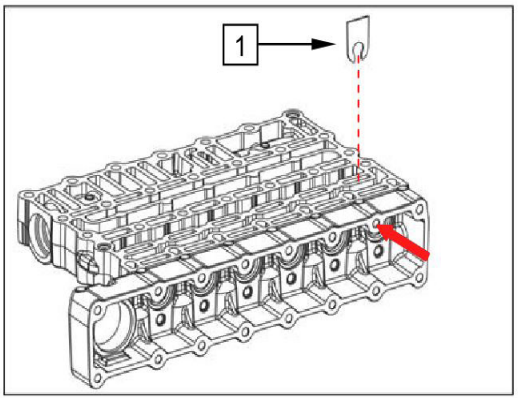


Figure 71

13. Remove all follow-on slides consisting of:
    * piston (1)
    * compression spring (2).

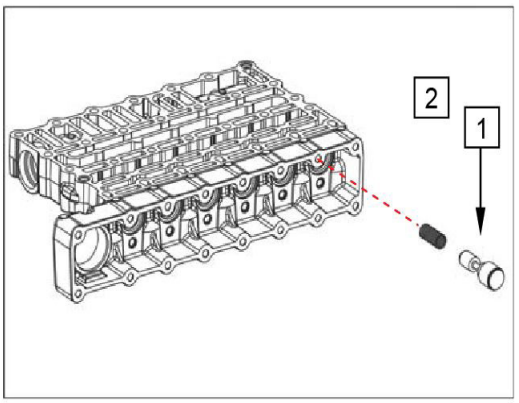


Figure 72

14. Disengage the retaining ring (1).

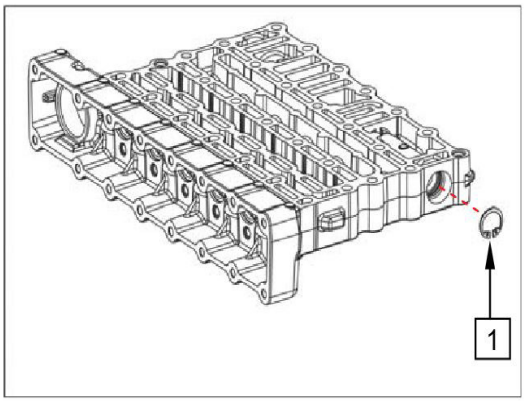


Figure 73

15. Remove the pressure reducing valve consisting of:
    * plug (1)
    * compression spring (2)
    * piston (3).

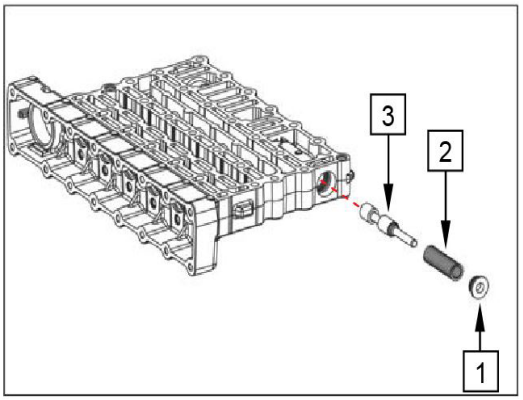


Figure 74

Engine connection

1. Loosen the bolted connection (1) cover/converte bellhousing.

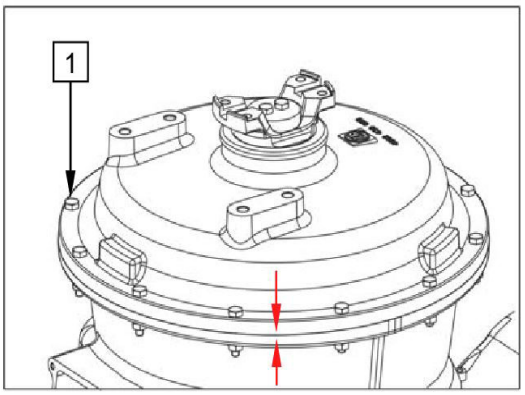


Figure 75

Radial installation position cover/converter bellhousing to be punch marked.

2. By means of a lifting tackle separate cover from the converter bellhousing.

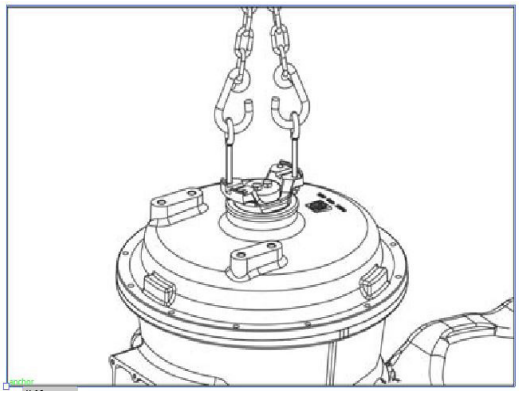


Figure 76

3. Loosen the hexagon screws (1) and remove the washer.

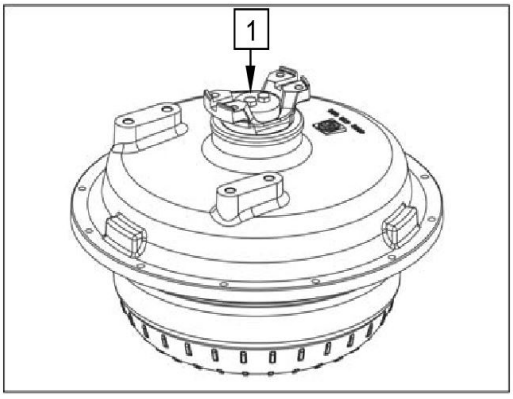


Figure 77

4. Pull off the output flange.

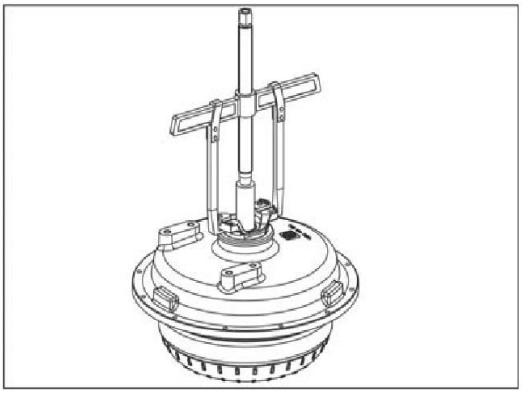


Figure 78

5. Press the input shaft resp. the converter out of the cover (ball bearing).

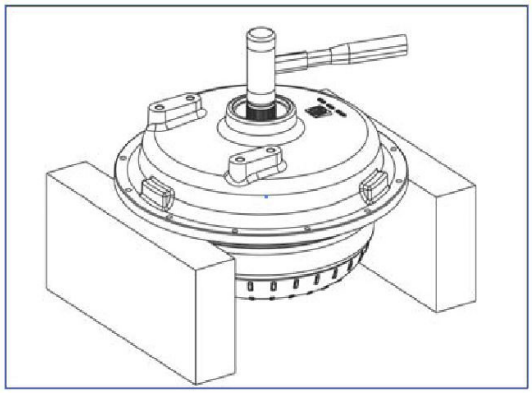


Figure 79

6. Unsnap retaining ring (1) and remove ball bearing (2).

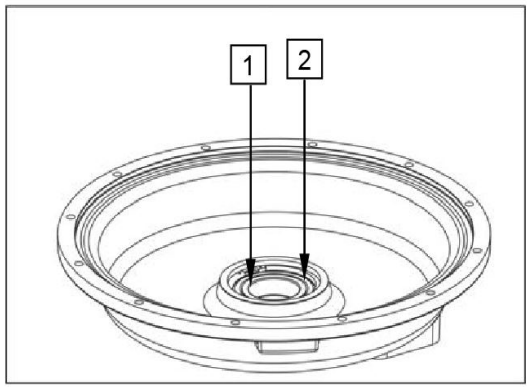


Figure 80

7. Loosen the bolted connection (1) flange shaft/converter and remove the flange shaft.

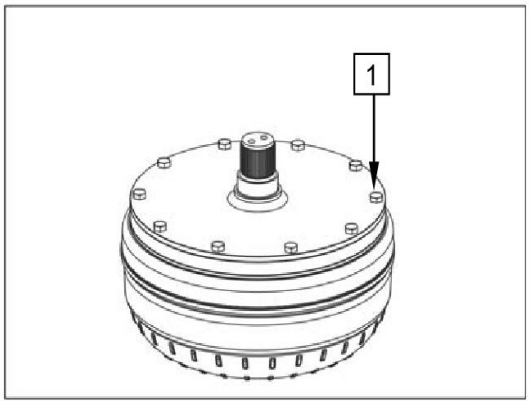


Figure 81

8. Remove the screw plugs (1).

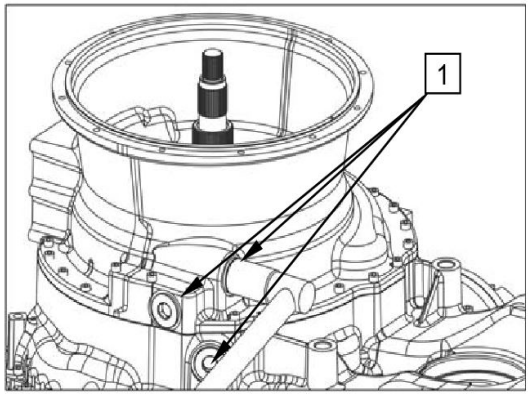


Figure 82

9. Pull the cooler recirculation – pressure pipe (1) out of the converter bellhousing and remove the O-rings.

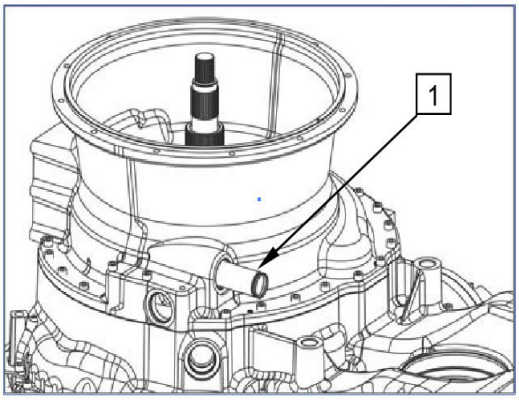


Figure 83

(S) Pulling device K9005609.

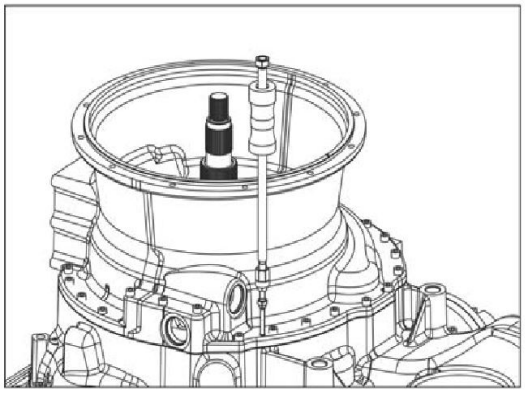


Figure 84

10. Loosen the bolted connection converter bellhousing/transmission housing I.

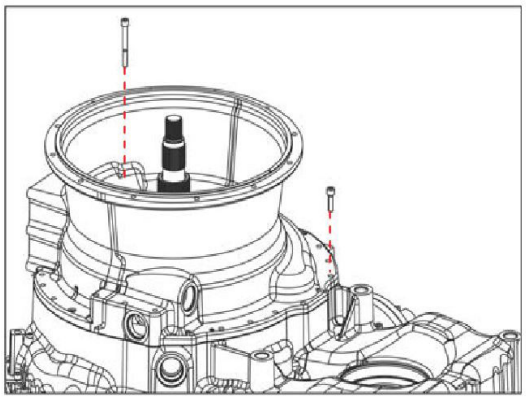


Figure 85

11. Remove the converter bellhousing (1) by means of a lifting tackle.

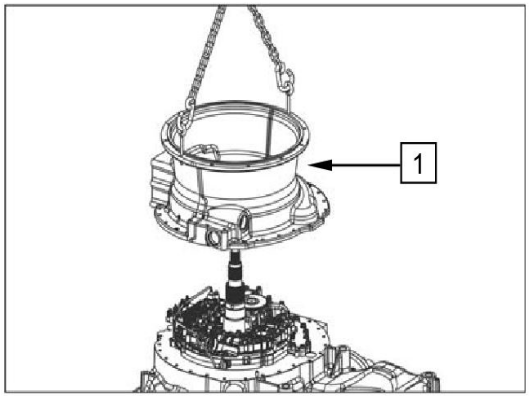


Figure 86

12. Remove shaft seal (1).

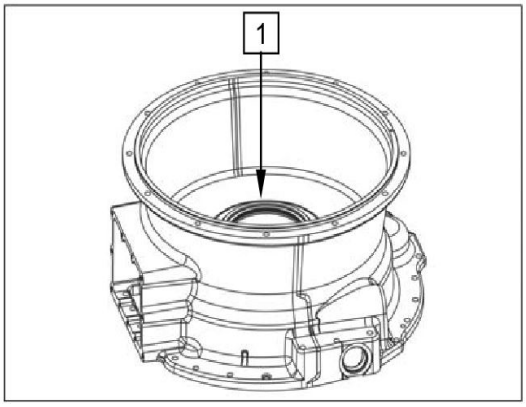


Figure 87

Oil supply

Open and separate plug connections wiring harness/pressure regulator/temperature sensor.

Remove the temperature sensor (1).

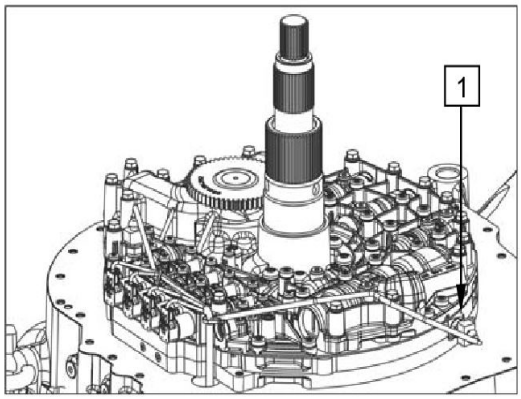


Figure 88

Removal of shifting block II, valve block primary pump and retarder

Loosen the screws and remove shifting block II (1).

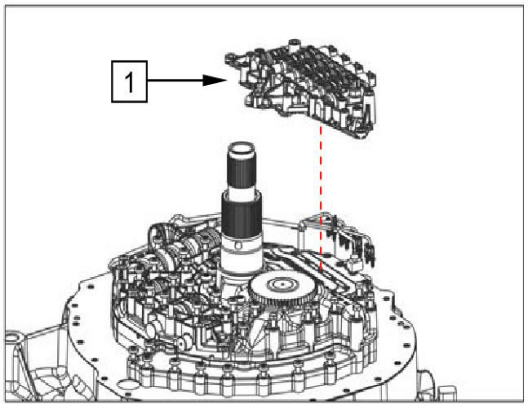


Figure 89

Loosen the screws and remove the valve block (1).

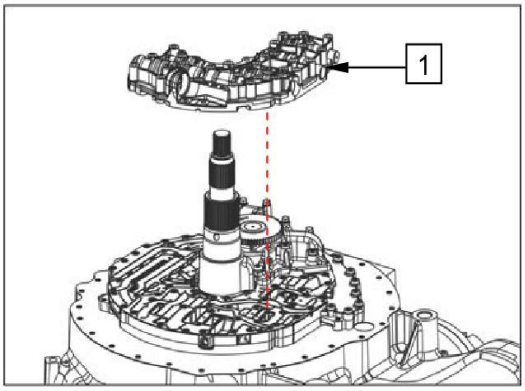


Figure 90

Loosen the screws and by means of the assembly leve separate the primary pump (1) from the pin fixing and remove it.

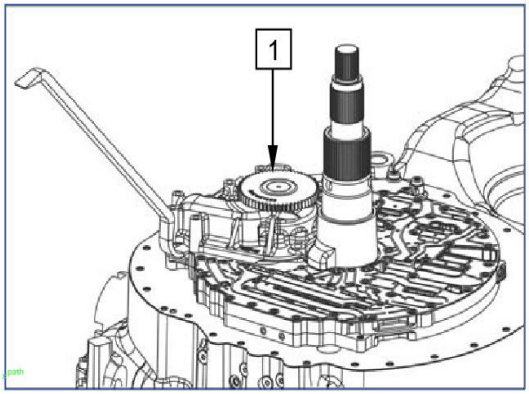


Figure 91

Remove the intermediate sheet (1).

Do not remove the slotted pins (2).

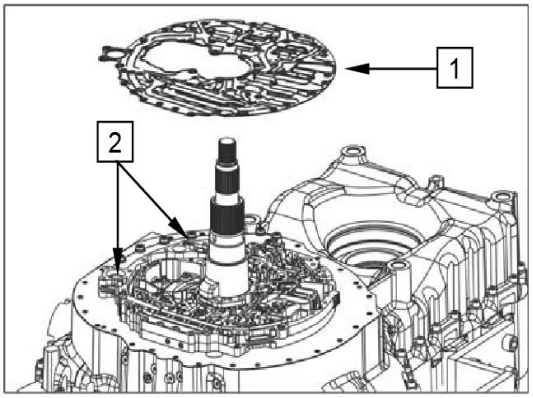


Figure 92

By means of the pulling device remove the cylindrical pins and loosen the screws (1).

(S) Pulling device K9005609

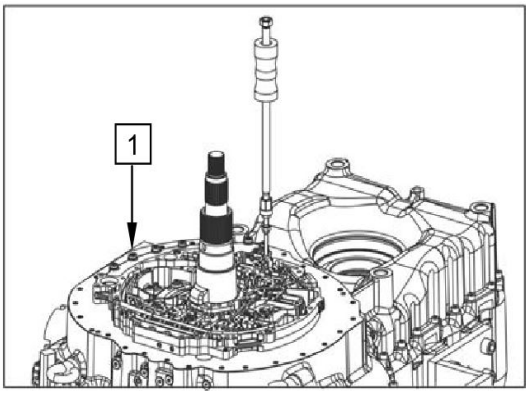


Figure 93

Mount the hook and by means of the lifting tackle remove the oil supply flange with retarder.

(S) Hook 850317-00069

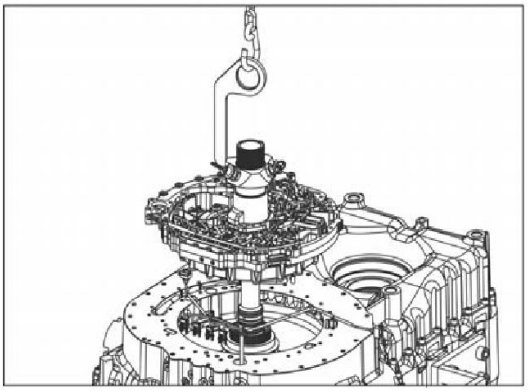


Figure 94

Remove cover plate (1).

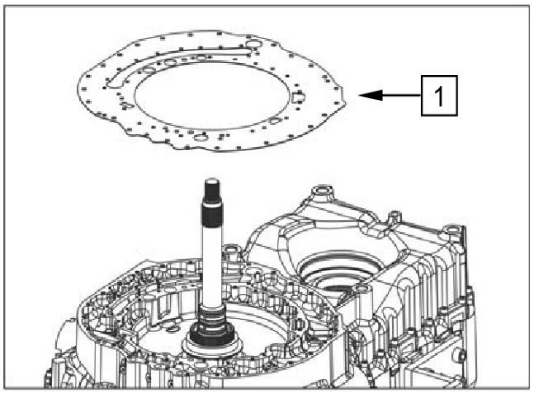


Figure 95

Loosen washer.

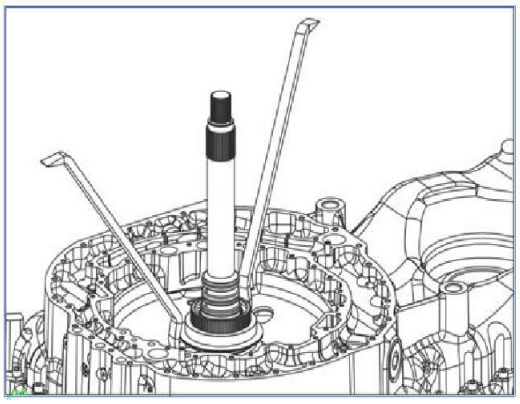


Figure 96

Remove washer (1) and cup springs (2).

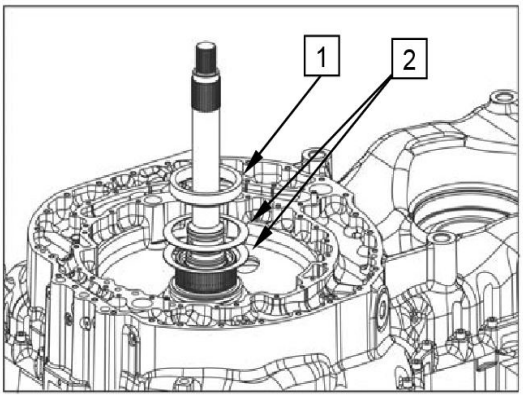


Figure 97

Remove O-ring (1).

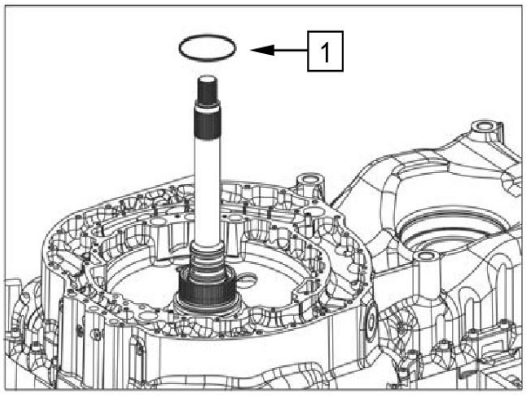


Figure 98

Remove flange bush (1) and snap ring (2).

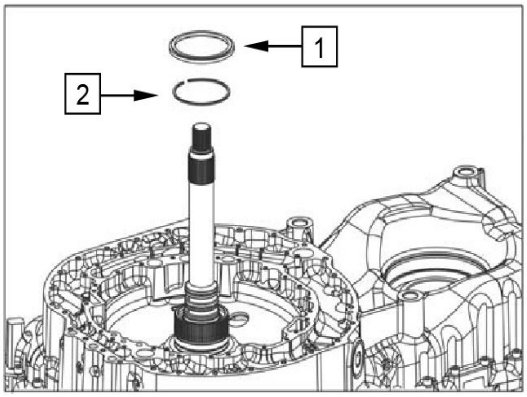


Figure 99

Remove rectangular rings (1 and 2).

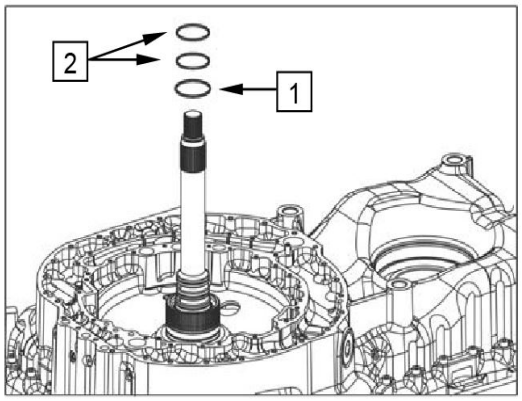


Figure 100

Retarder

Remove rectangular ring (1), loosen the bolted connection sealing washer/oil supply flange (2) and remove the sealing washer (3).

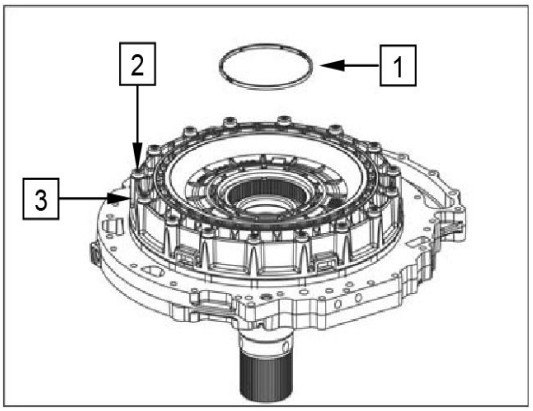


Figure 101

Check sleeve in the sealing washer for wear and remove it if necessary.

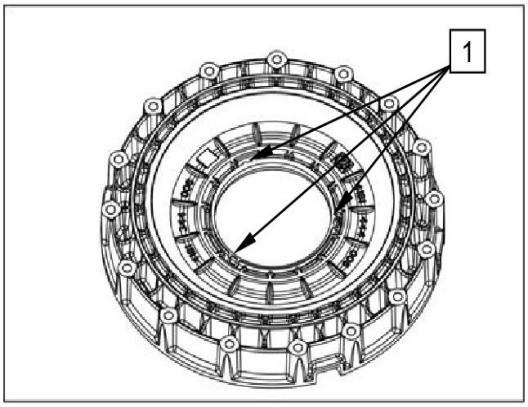


Figure 102

By means of a suitable tool press the sleeve out of the sealing disc.

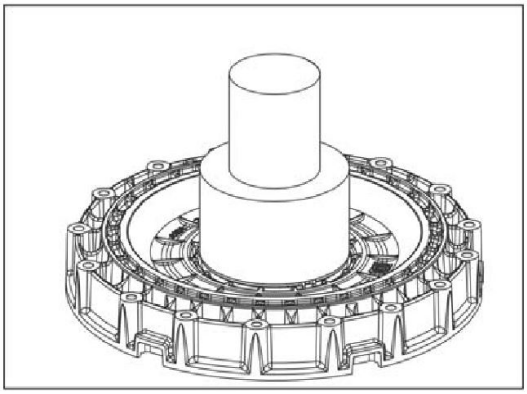


Figure 103

Take off the rotor (1) and remove the axial washer (2).

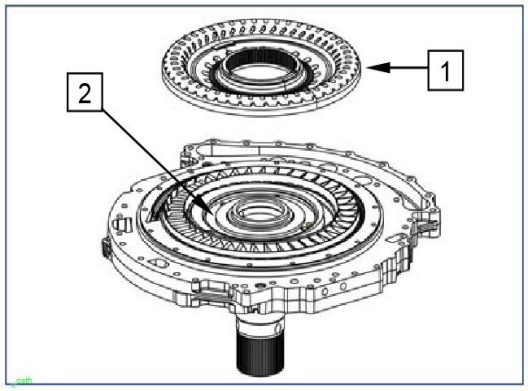


Figure 104

Remove the axial bearing (1) from the rotor.

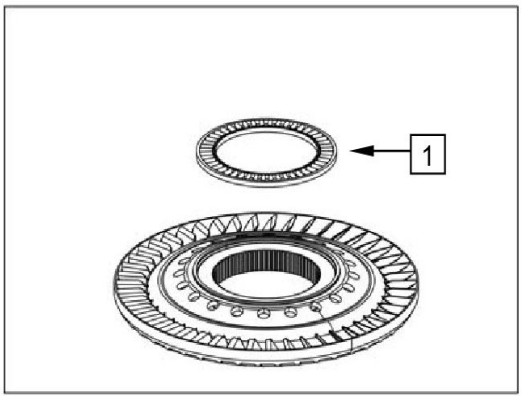


Figure 105

Loosen the bolted connection stator/oil supply flange (1) and remove the stator (2).

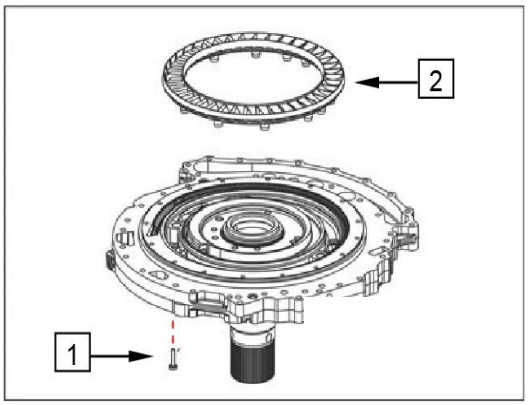


Figure 106

Remove the stator hollow shaft from the oil supply flange.

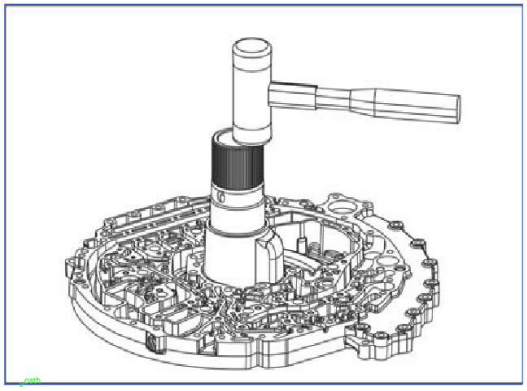


Figure 107

Remove the pins (1) for fixing of the stator hollow shaft only if needed.

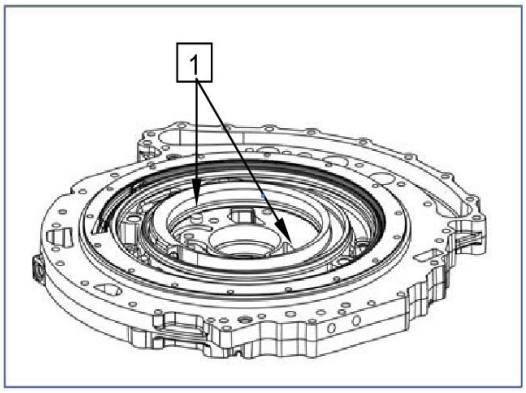


Figure 108

Remove the O-rings (1).

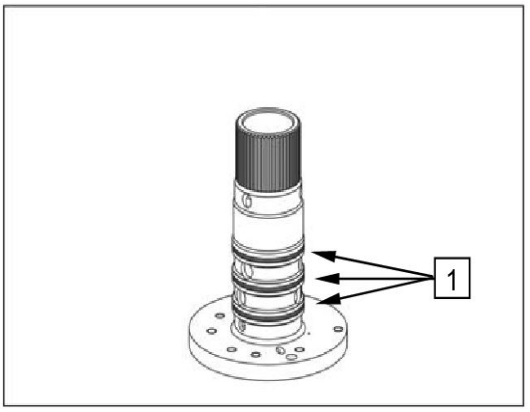


Figure 109

Check oil pipe (1) for wear and remove it, if necessary.

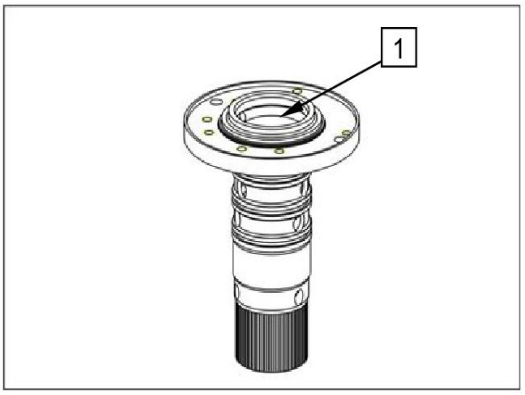


Figure 110

Valve block

Preload cooler safety valve with pressure piece, remove the fixing plate (1) and take out the compression spring with piston.

(S) Pressure piece 850316-00379

CAUTION

Compression spring is under tension and could pop out!

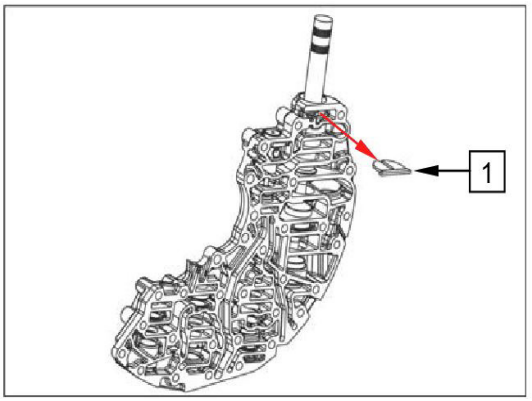


Figure 111

Relieve the converter pressure back-up valve with a suitable pressure piece, remove the fixing plate (1) and take out the compression spring, piston and valve bush.

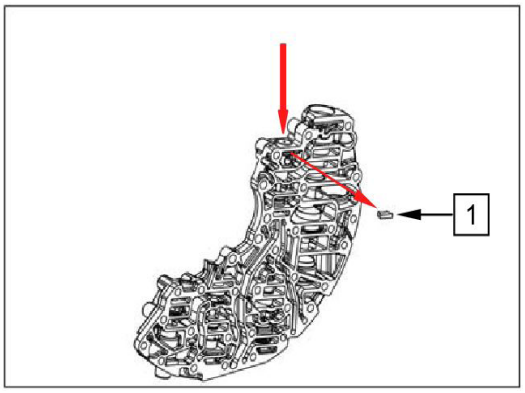


Figure 112

Relieve the converter safety valve with a suitable pressure piece, remove the fixing plate (1) and take out the compression spring, piston and valve bush.

Remove the main pressure valve (2) and the retarder valve (3) analogously.

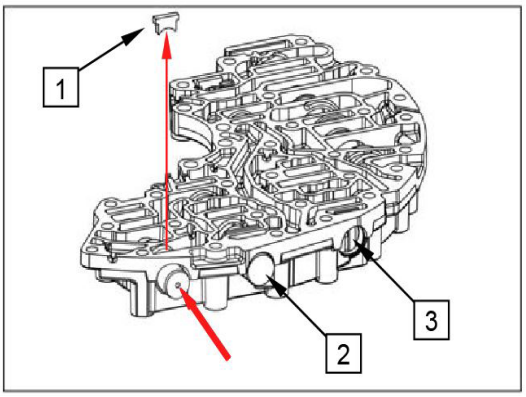


Figure 113

Remove all screw plugs (1).

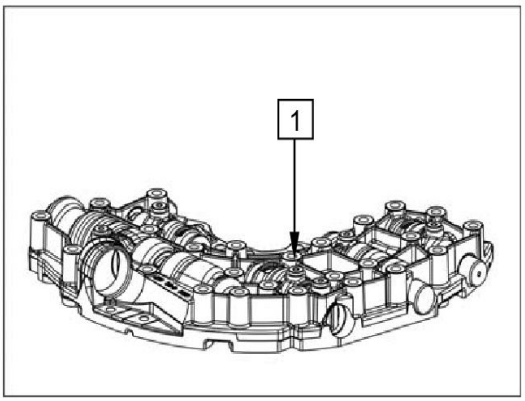


Figure 114

Shifting block II

Remove the temperature sensor (1) and loosen the cylindrical screws (2).

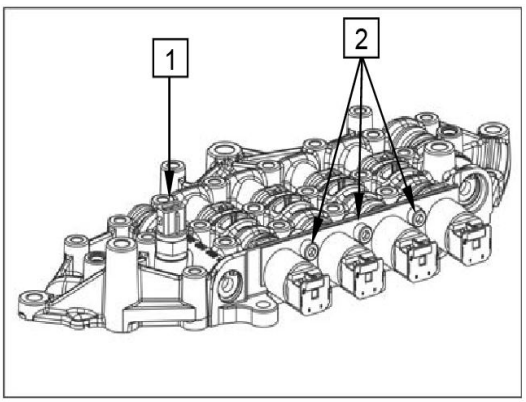


Figure 115

Remove the clamping plate (1) and pull out the pressure regulator (2).

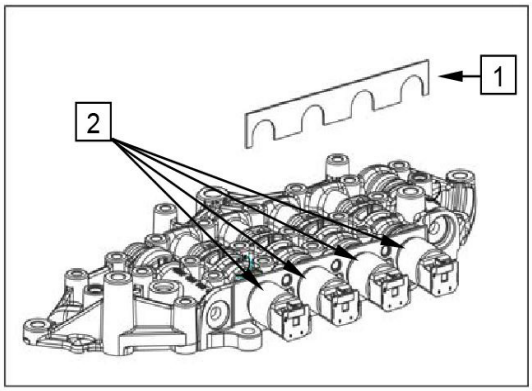


Figure 116

Preload the piston with compression springs (1), and remove the stop plates (2).

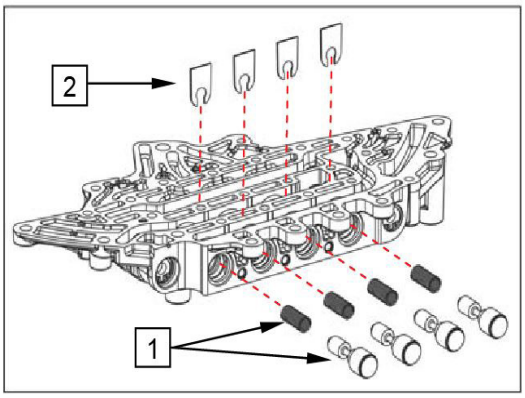


Figure 117

Preload the pressure reducing valve (1) and unsnap retaining ring (2).

Remove the single parts.

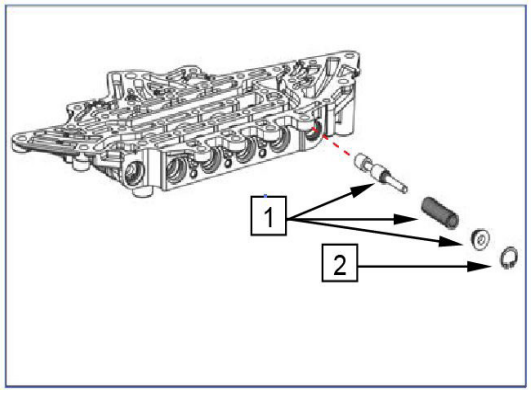


Figure 118

Preload the cooler changeover valve (1) and unsnap the retaining ring (2).

Remove the single parts.

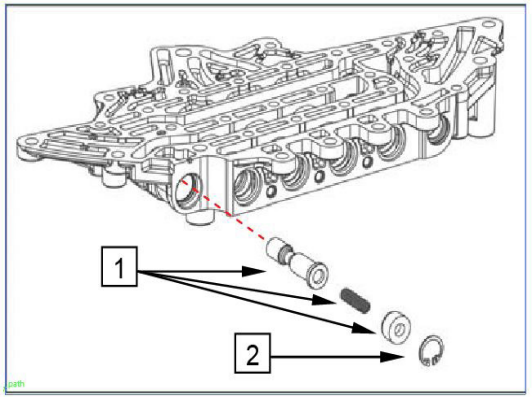


Figure 119

Primary pump

Loosen the cylindrical screws (1).

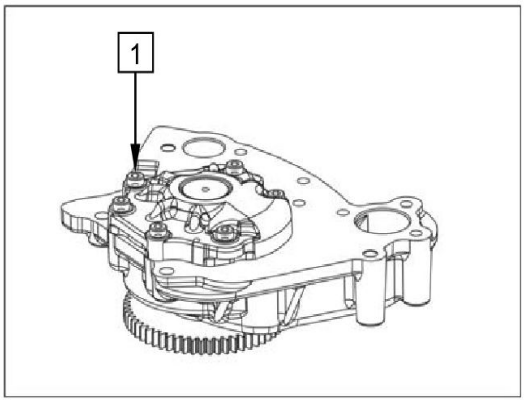


Figure 120

Check the primary pump.

If wear marks should be found in the pump housing, cover or on the inner or outer rotor, the complete primary pump must be replaced.

1 = Cover
2 = Outer rotor
3 = Inner rotor
4 = Pump housing

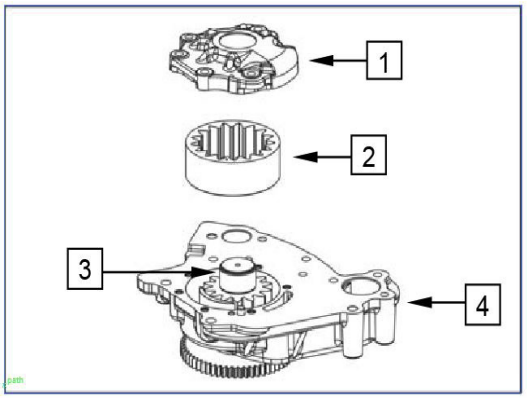


Figure 121

Removing output flanges

Loosen the hexagon screws (1) and remove the washer (2).

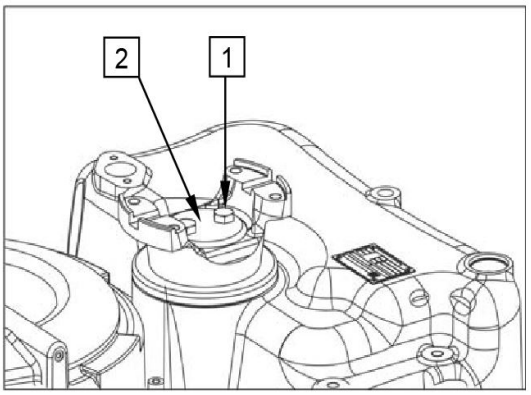


Figure 122

Pull off the output flange (1) and O-ring (2).

Remove the shaft seal (3).

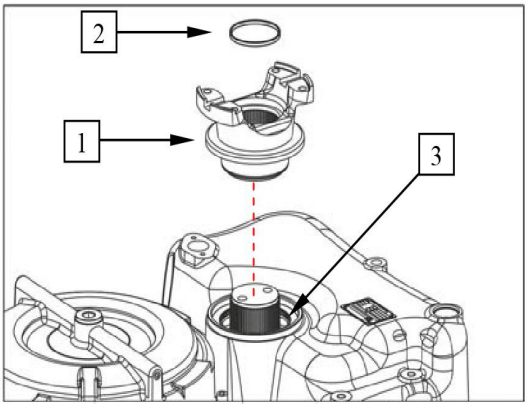


Figure 123

Power take-off

Version with 1st PTO

(1) = 1st PTO

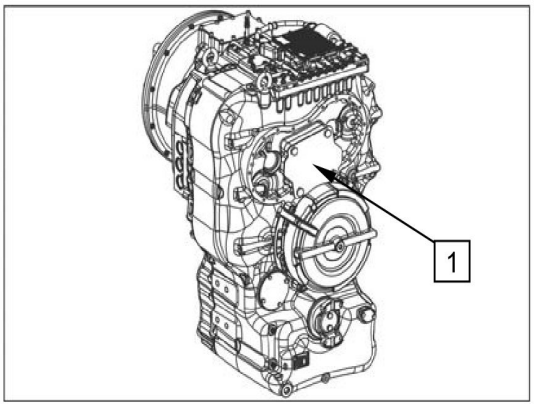


Figure 124

Remove closing components.

(1) = O-ring 154,5x3

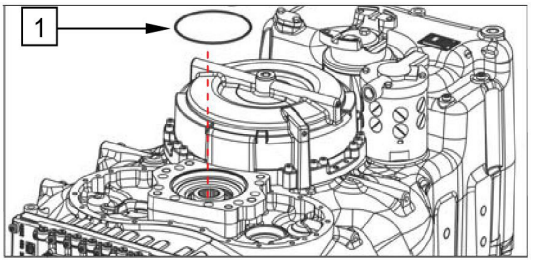


Figure 125

Loosen bolted connection (1) housing II/pump flange and by means of the assembly lever press the pump flange (2) out of the bore and then pull it out.

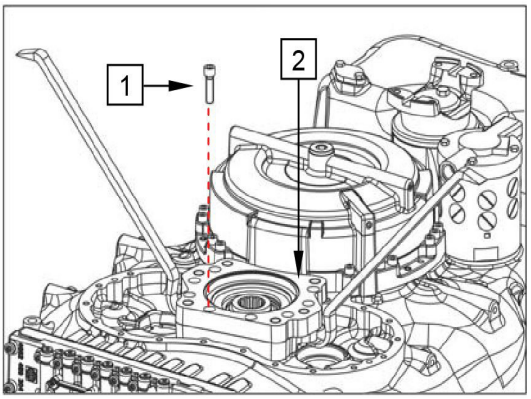


Figure 126

Unsnap the retaining ring (1).

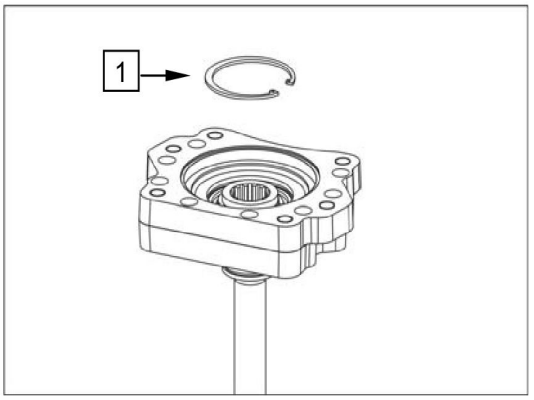


Figure 127

Remove the rectangular ring (1) and O-ring (2).

Press the PTO shaft (3) out of the pump flange (4).

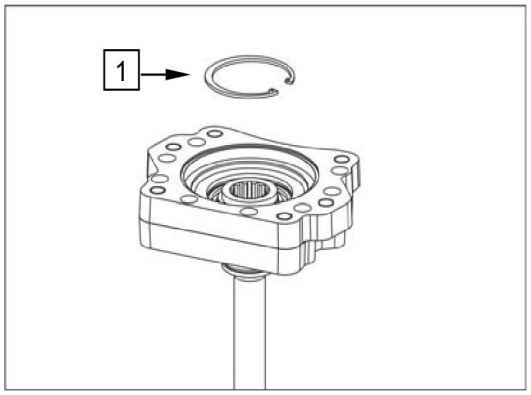


Figure 128

Unsnap the retaining ring (1) and remove the ball bearing (2).

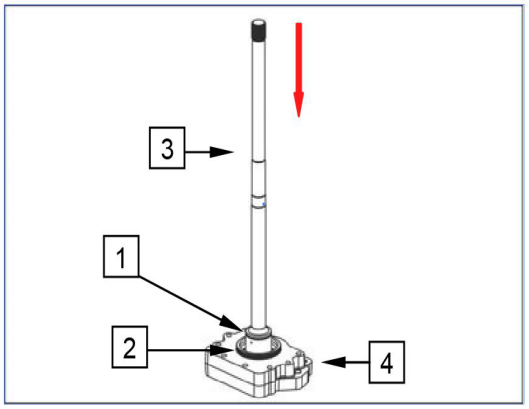


Figure 129

Emergency steering pump

Loosen the bolted connection (1) and remove the emergency steering pump from housing II.

Mark radial installation position (see arrows)!

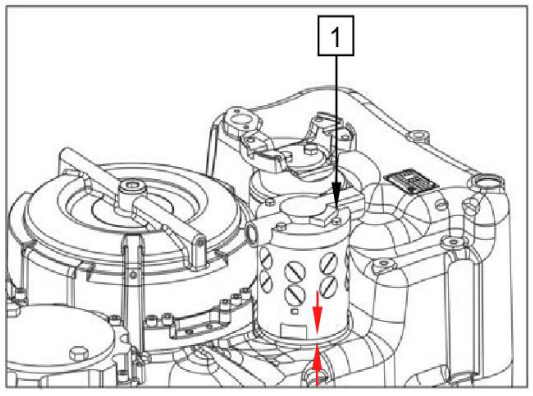


Figure 130

Planetary drive “F”

Separate planetary drive from housing II

Remove the screw plug with O-ring (1).

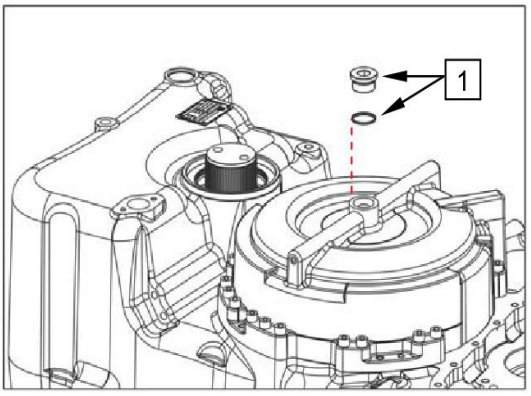


Figure 131

Remove the strain bolt (1) with ½“ extension and long socket wrench WAF19.

Loosen the bolted connection (2) planetary drive housing II.

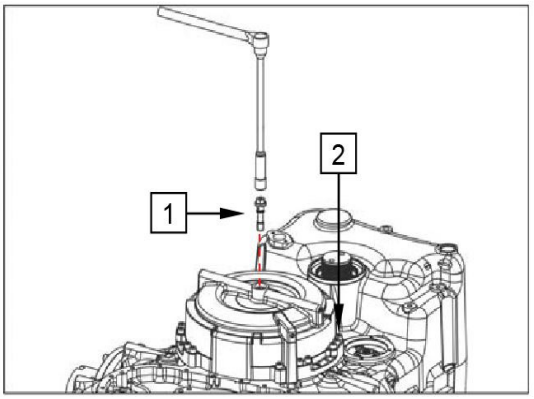


Figure 132

Separate the cover by means of puller screws 3x M10 (1) evenly from the housing.

Mount the eyebolt (S)

(S) Eyebolt 850317-00070

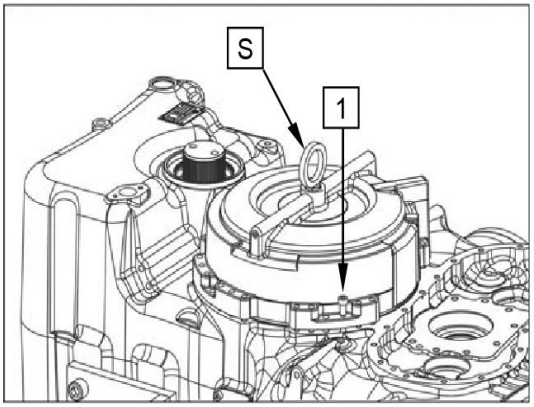


Figure 133

By means of a lifting tackle and assembly lever separate the planetary drive from housing II.

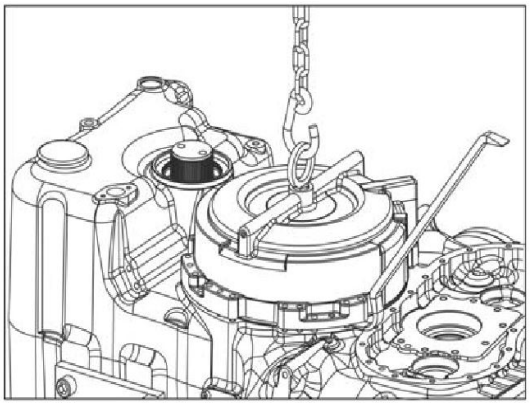


Figure 134

Deposit the planetary drive (1) for further disassembly.
Remove the compression springs (2) and the O-ring (3).

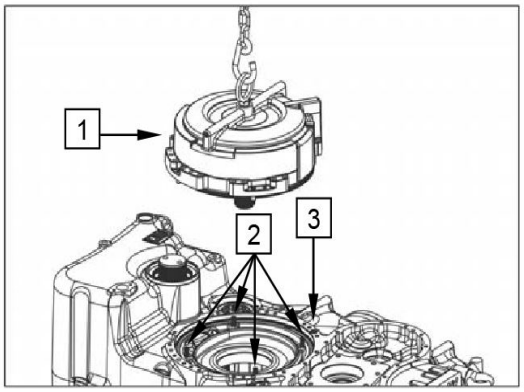


Figure 135

Dismantling planetary drive

Remove the O-ring (1).

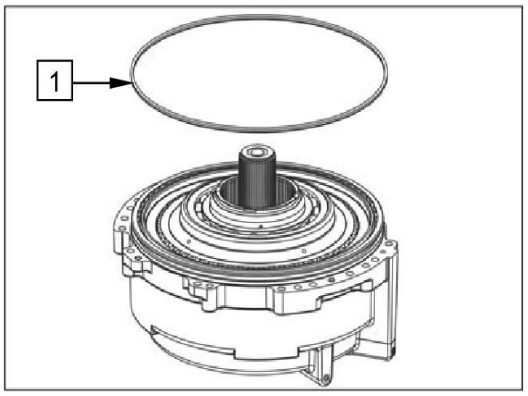


Figure 136

Remove all slotted pins (1).

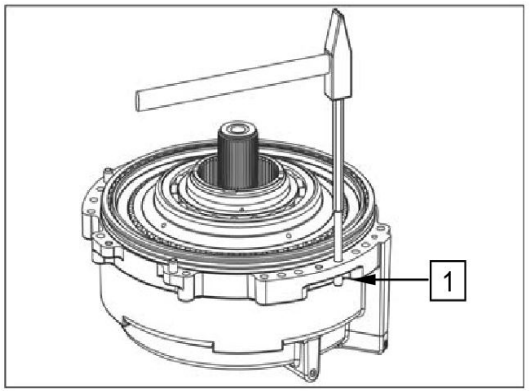


Figure 137

By means of a lifting tackle pull the planetary carrier with ring gear out of the cover.

(S) Eyebolt 850317-00070

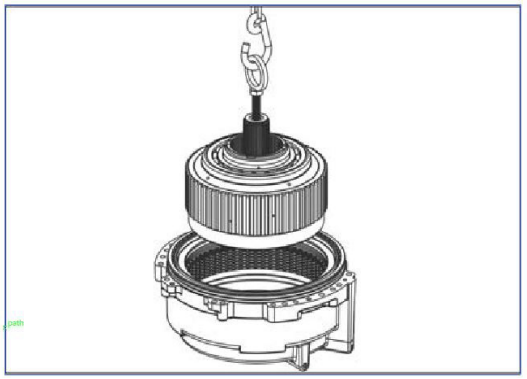


Figure 138

Disengage the snap ring (1).

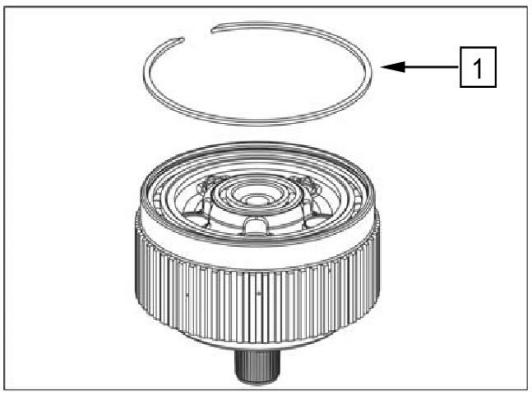


Figure 139

Remove the ball bearing (1) with extracting device.

(S) Extracting device 850316-00380

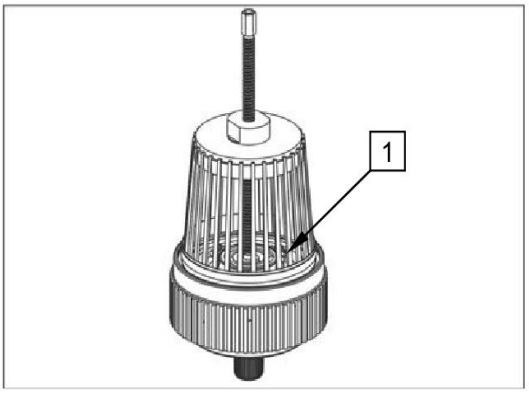


Figure 140

Disengage the locking wire (1) and remove the thrust ring (2).

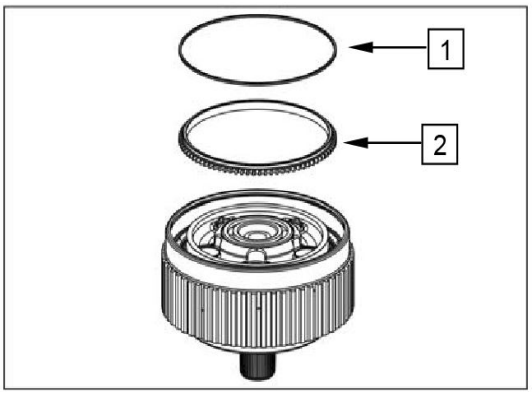


Figure 141

By means of a lifting tackle pull the planetary carrier out of the ring gear.

(S) Eyebolt 850317-00070

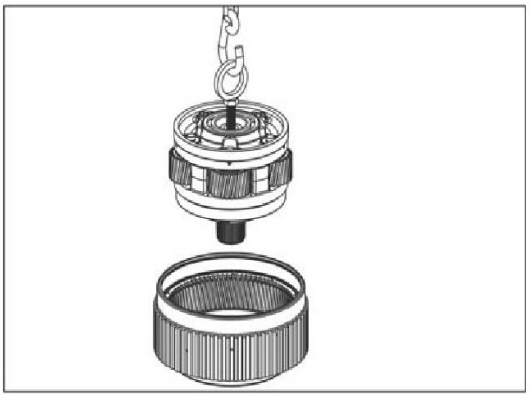


Figure 142

Remove the thrust ring (1) and disengage the locking wire (2).

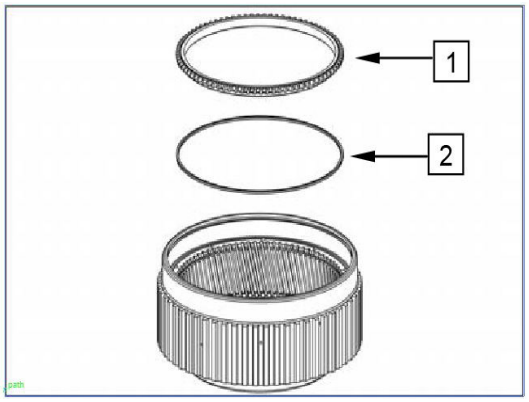


Figure 143

Remove the slotted pins (1) and pull off the ball bearing (2).

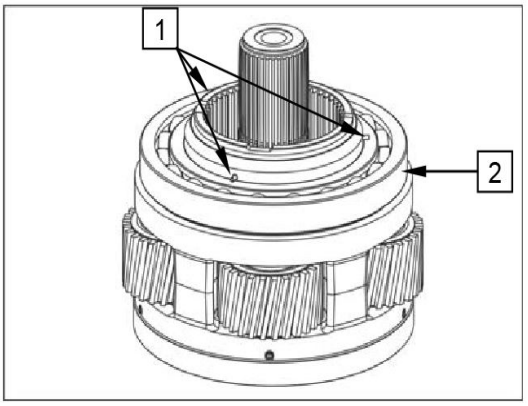


Figure 144

Drive in the slotted pin until contact.

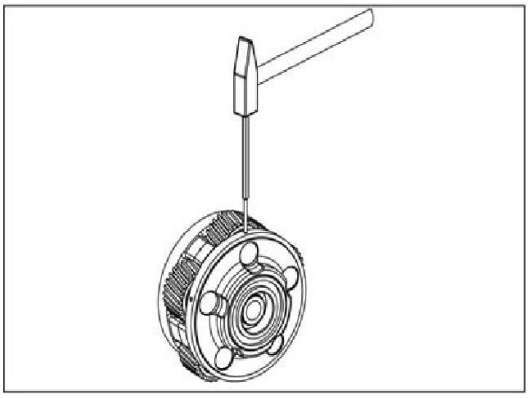


Figure 145

Drive out the planetary pin (1).

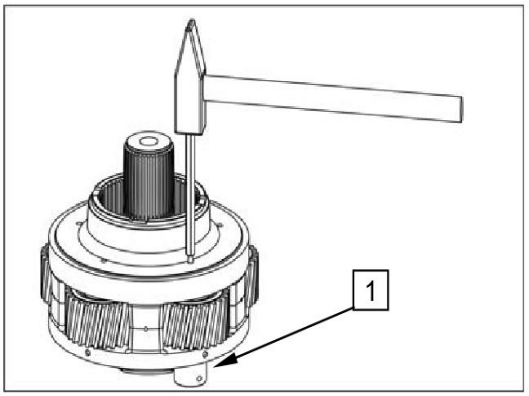


Figure 146

Remove the slotted pin (1).

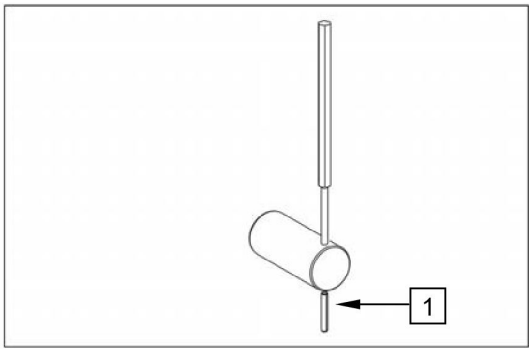


Figure 147

Pull the planet gear (1) out.

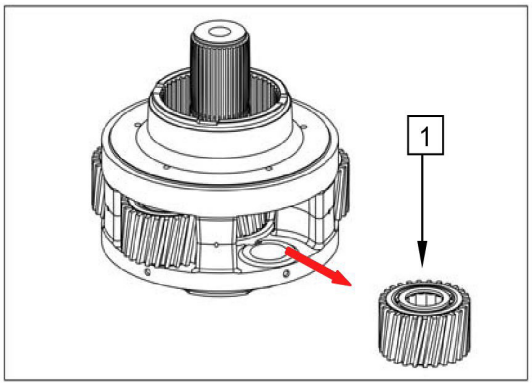


Figure 148

Remove the cylindrical rollers (1) and the intermediate washers (2).

Remove the remaining planet gears (Figure 143 to Figure 149) analogously.

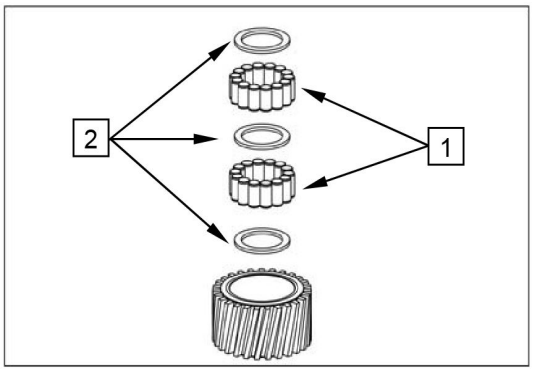


Figure 149

Pull the sun gear (1) out.

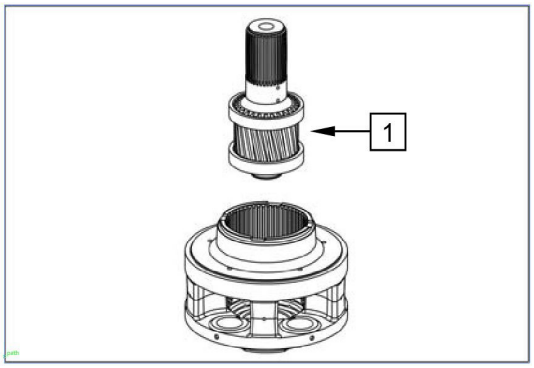


Figure 150

Remove the rectangular ring (1).

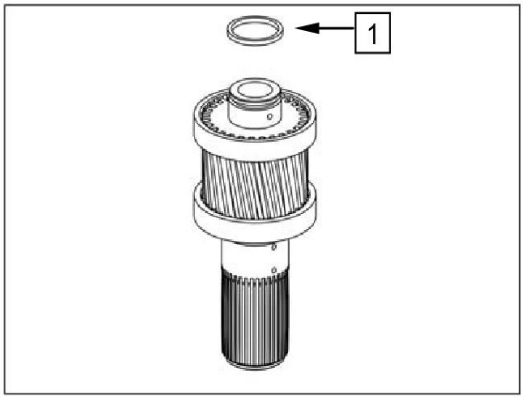


Figure 151

By means of a magnet pull the driving pins (1) out.

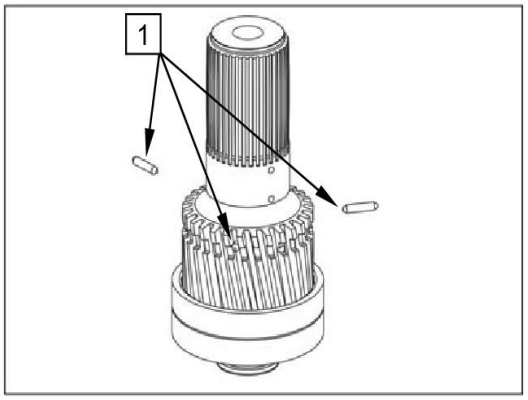


Figure 152

By means of the magnet remove the pressure rings (1) and the remaining driving pins (2).

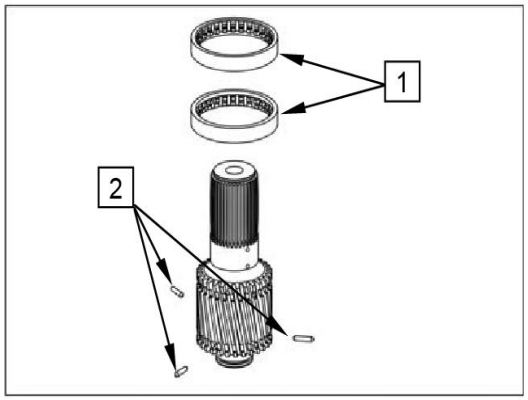


Figure 153

Pull the ball bearing (1) off.

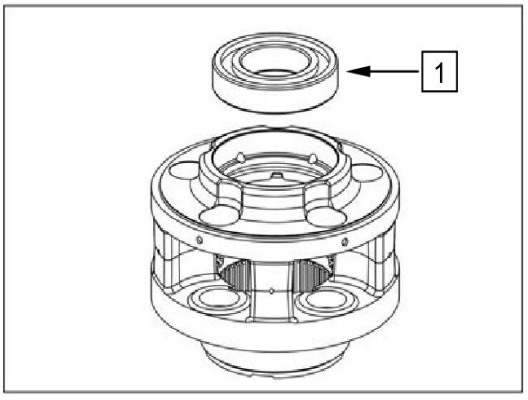


Figure 154

Disengage the snap ring (1), remove the end plate (2) and the disc set (3).

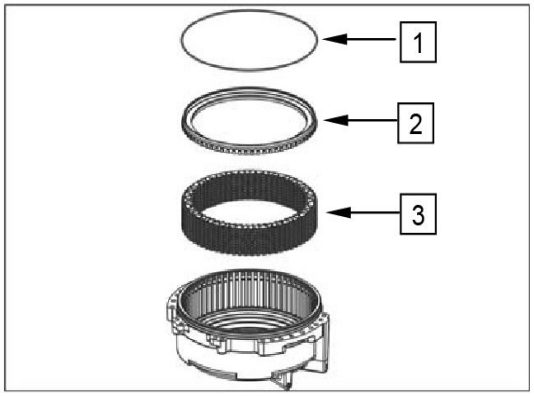


Figure 155

Install guide pin and pressure piece until contact.

(S) Assembly fixture 850317-00071

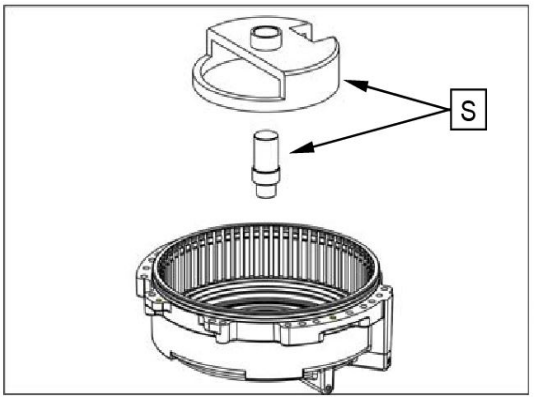


Figure 156

Preload the cup spring under a press and disengage the guide ring (L-ring).

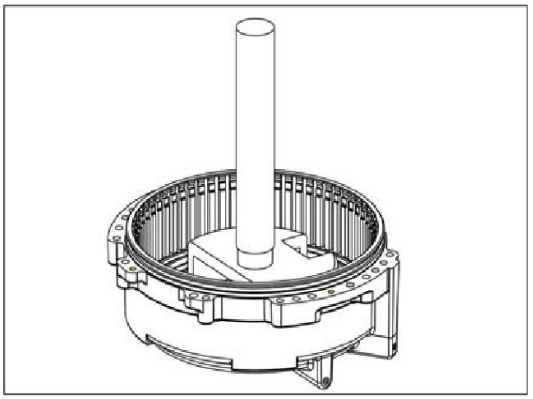


Figure 157

Remove the guide ring (1) and the cup spring (2).

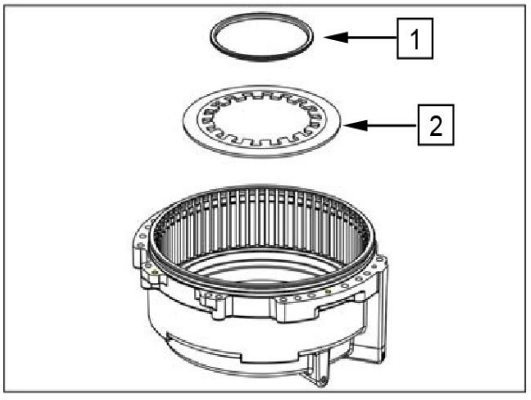


Figure 158

By means of compressed air press the piston out of the cover.

Pressure connection see arrow!

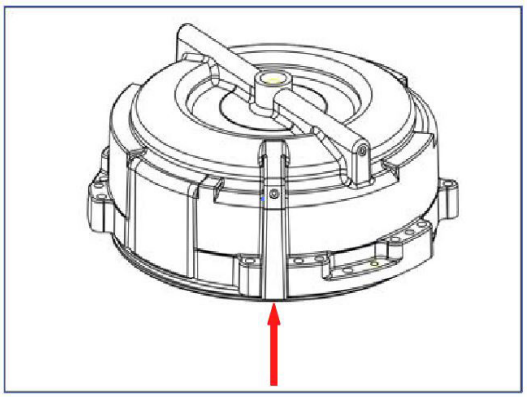


Figure 159

Remove the O-ring (1 and 2).

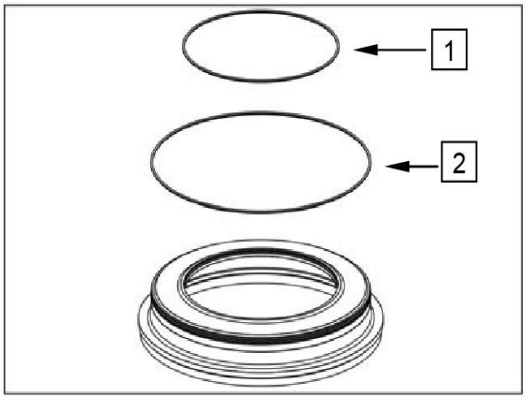


Figure 160

Removal input shaft and clutches

Separate housing I and housing II

Loosen the bolted connection (1) housing I/housing II.

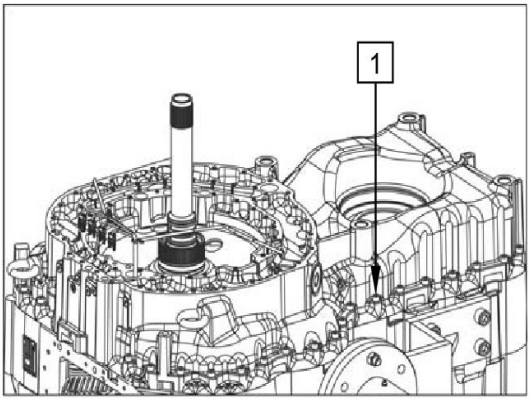


Figure 161

Loosen the 3 remaining cylindrical screws.

(S) Socket insert 850316-00381

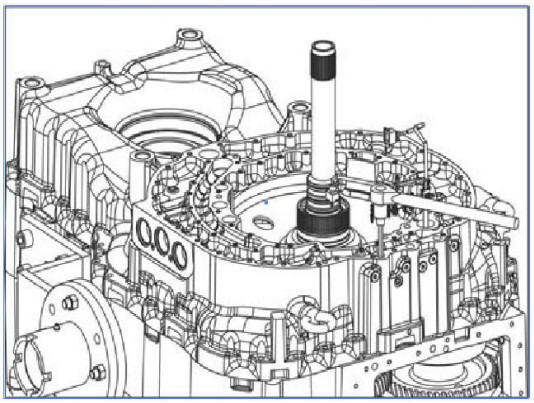


Figure 162

Remove the cylindrical pins (1) by means of the pulling device.

(S) Pulling device K9005609

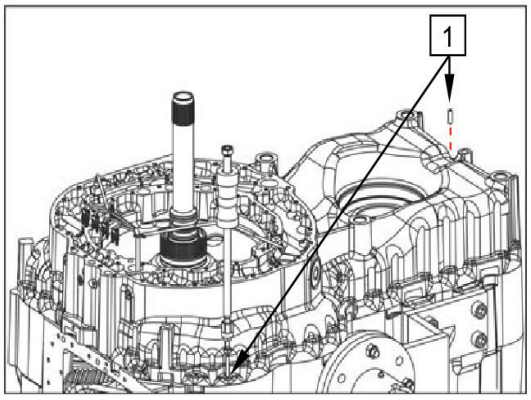


Figure 163

Evenly separate housing I and II by means of the forcing screws M10 (1).

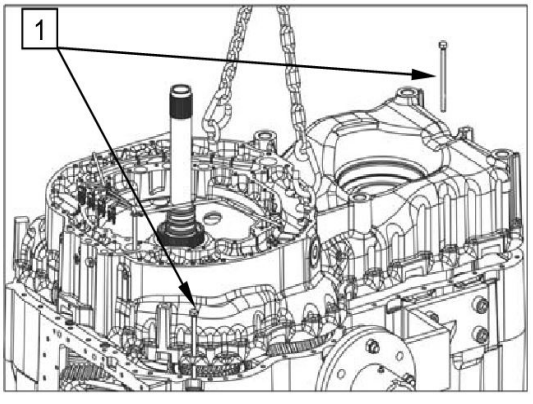


Figure 164

Remove housing I (1) by means of the lifting tackle.

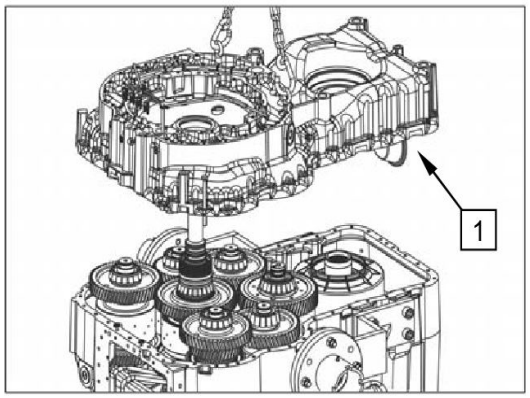


Figure 165

Housing I

Loosen the cylindrical screws of clip (1) and of fixing plate (2).

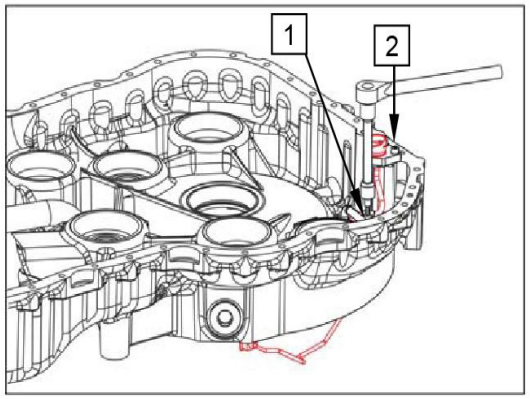


Figure 166

Remove the single parts

1 = Cable Ergopower L II
2 = Fixing plate with cylindrical screws
3 = Clip with cylindrical screw

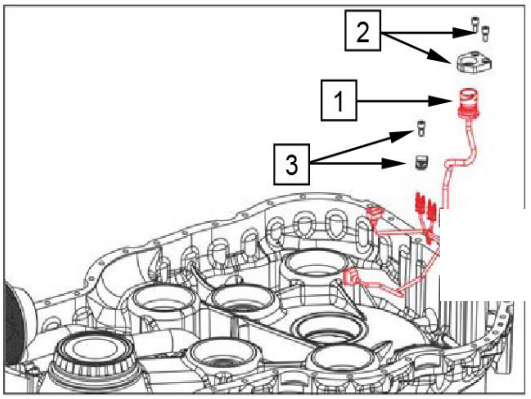


Figure 167

Loosen the cylindrical screw and remove the pipe (1).

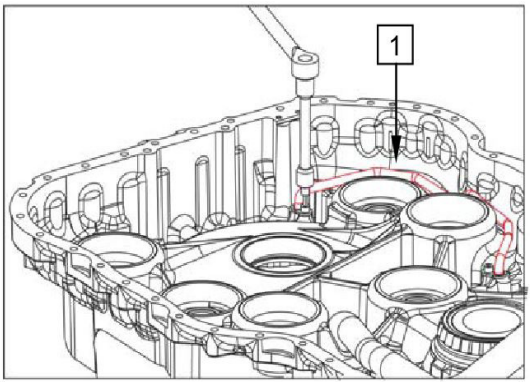


Figure 168

Loosen the cylindrical screws (1) and remove the suction tube (2).

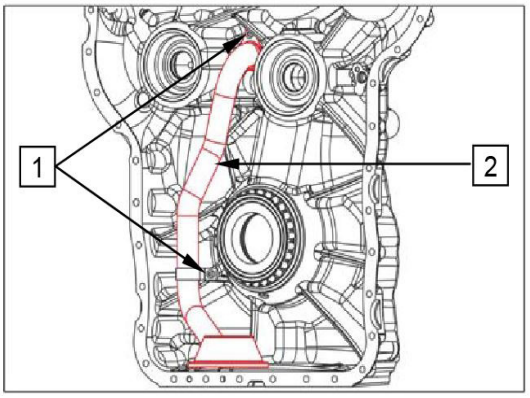


Figure 169

Insert the pressure piece into the bore to support the rapid grip and pull off the bearing inner ring by means of the rapid grip.

(S) Rapid grip	850317-00072
(S) Pressure piece	850317-00073
(S) Basic tool	850316-00110
(S) Reducer	K9006785

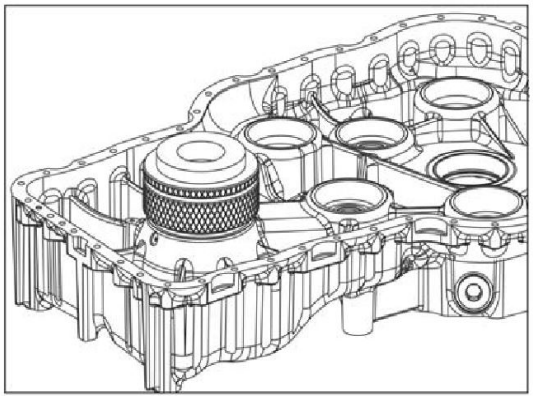


Figure 170

Remove the bearing outer rings from housing I.

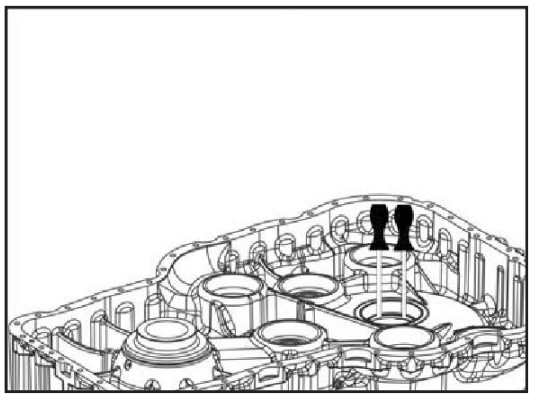


Figure 171

Unsnap the retaining ring (1) and by means of a mandrel drive the ball bearing (2) out of housing I.

NOTE

These components are only installed for versionswithout axle insert LKV!

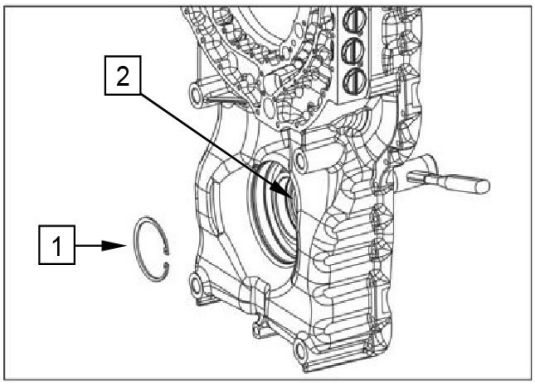


Figure 172

Remove all screw plugs with O-ring (1).

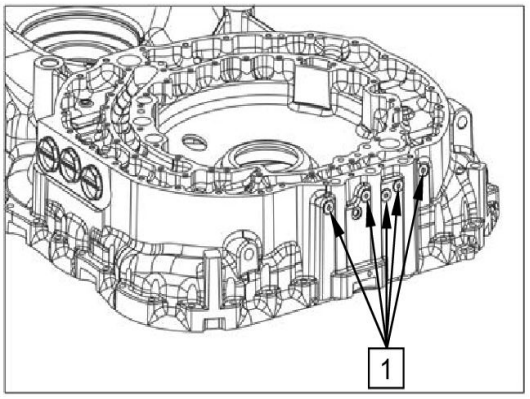


Figure 173

Fasten the input shaft (2) with the lifting strap and slightly preload it with lifting tackle until the snap ring in the annula grooves of the input shafts (1 and 2) is with no pressure.

By means of a screwdriver press the snap ring on the 4 mounting holes (see arrows Figure 174) into the annula grooves of the input shaft (1) from clutch V until the input shaft (2) can be pulled out.

(S) Lifting strap

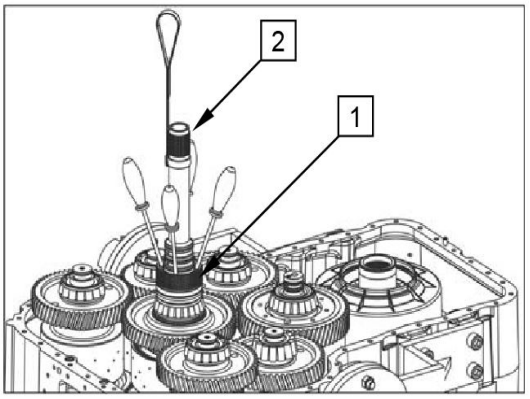


Figure 174

Legend:

1 = Input shaft Clutch V
2 = Input shaft
3 = Snap ring SB 76 (green)

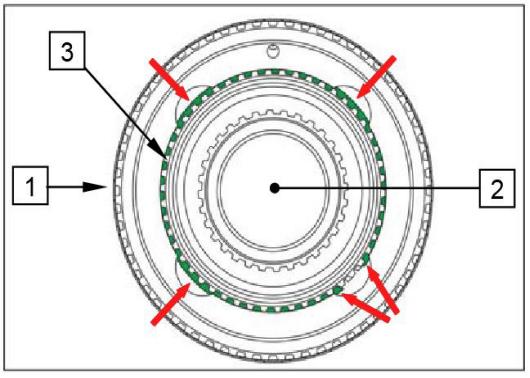


Figure 175

Remove the O-rings (1) and the snap ring (2).

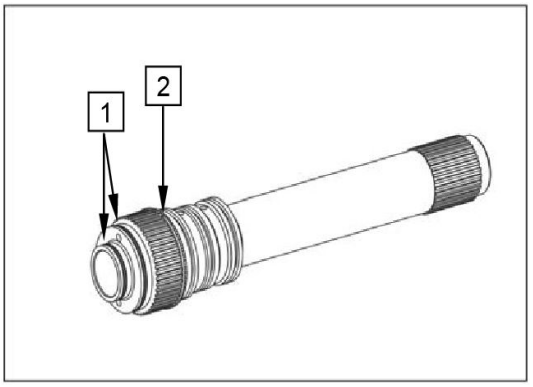


Figure 176

Differential “G”

Remove the screen sheet (1).

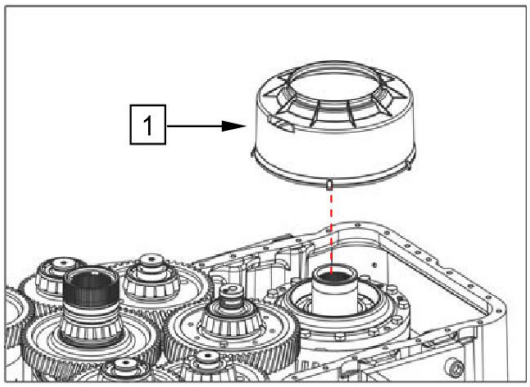


Figure 177

By means of a lifting tackle pull the differential (1) out o the ball bearing seat in housing II and deposit it for furthe disassembly.

Apply slight hits onto the output shaft.

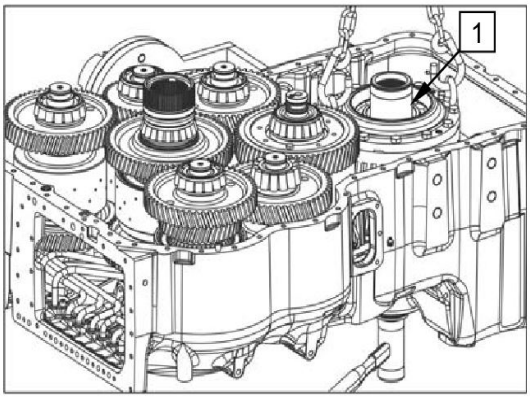


Figure 178

Clutches “V”; “R”; “A”; “B”; “C”; “D”; “E”

Opposite figure shows markings and arrangement of the clutches.

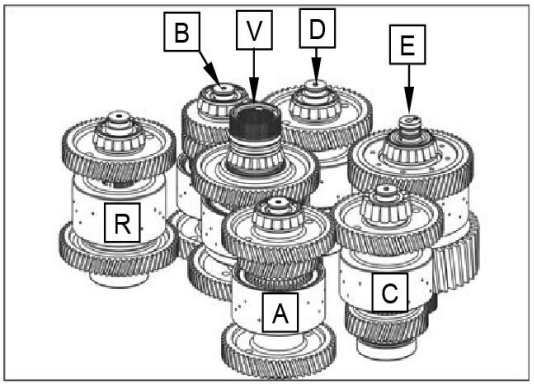


Figure 179

Removal of the clutches with the mounting device is described in (Figure 179)-(Figure 185)

CAUTION

In case of inadequate procedure there is a risk of injury!

Axially fix Clutch “E“ with assembly aid (S1).

(S1) Assembly aid 850317-00074

Mount the hook (S3) onto mounting device I (S2) and by means of a lifting tackle install it to the clutches until contact.

(S2) Mounting device I 850317-00075
(S3) Hook 850317-00076

All additionally required components belong to the scope of parts of the mounting device!

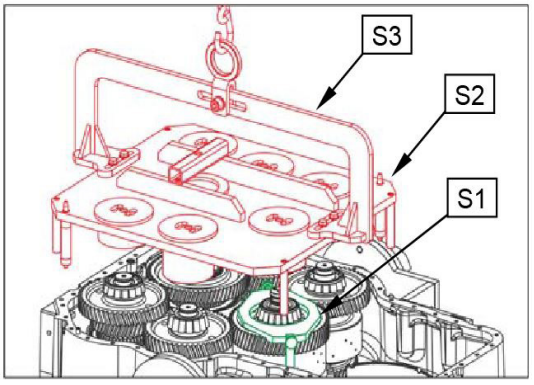


Figure 180

Axially fix clutches “R”; “A”; “B”; “C”; “D”; “E” with knurled nuts (1) to mounting device I.

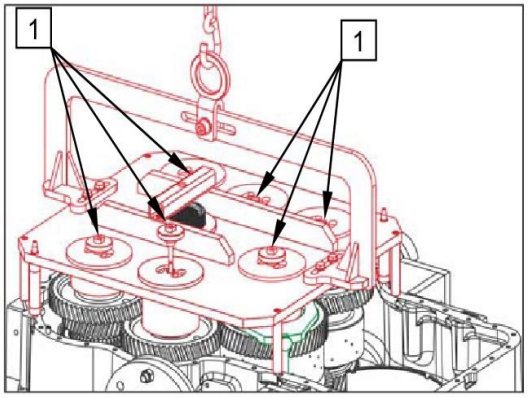


Figure 181

By means of the threaded rod (1) and the knurled nut (2) axially fix clutch ”V“ to mounting device I.

Then by means of a lifting tackle remove the clutches from housing II.

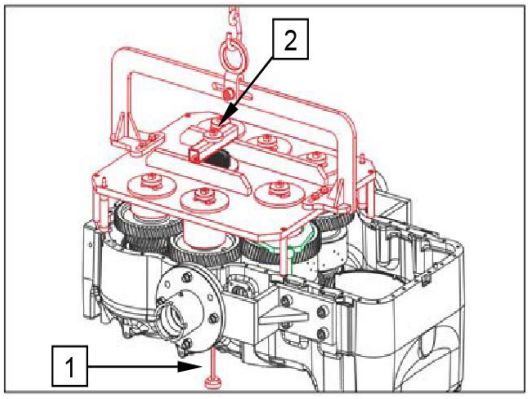


Figure 182

Insert the clutches into mounting device II.

(S) Mounting device II 850317-00077

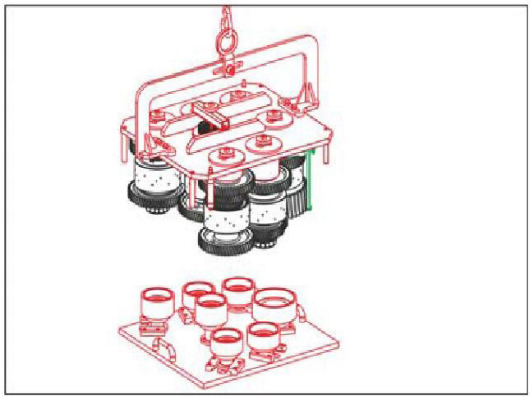


Figure 183

Loosen all knurled nuts and remove the mounting device I.

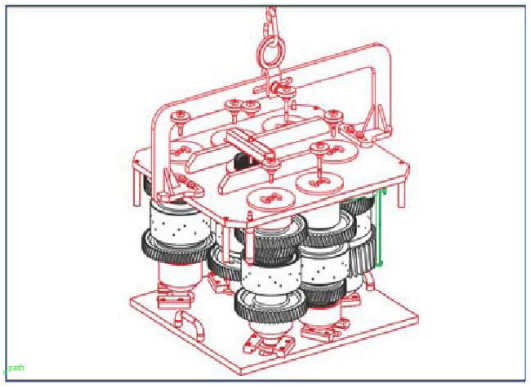


Figure 184

By means of the locating bush press clutch “A“ to the outside (see arrow) and remove it by means of a lifting tackle.

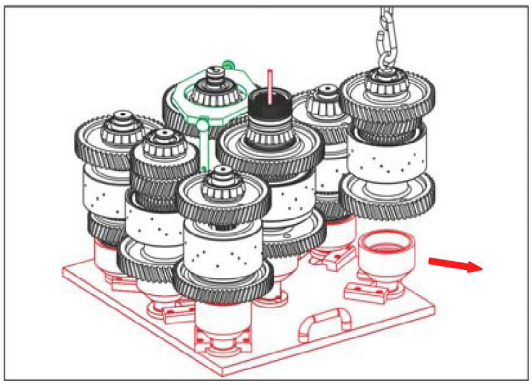


Figure 185

CAUTION

On mounting device I and II the marking of the clutch ist engraved on the respective locating bush.

Remove all other clutches analogously.

Housing II

Insert the pressure piece into the bore to support the rapid grip and pull off the bearing inner ring by means of the rapid grip.

(S) Rapid grip	850317-00072
(S) Pressure piece	850317-00073
(S) Basic tool	850316-00110
(S) Reducer	K9006785

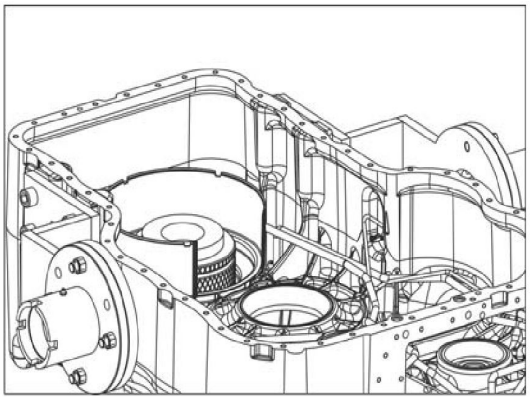


Figure 186

Remove the screen sheet (1).

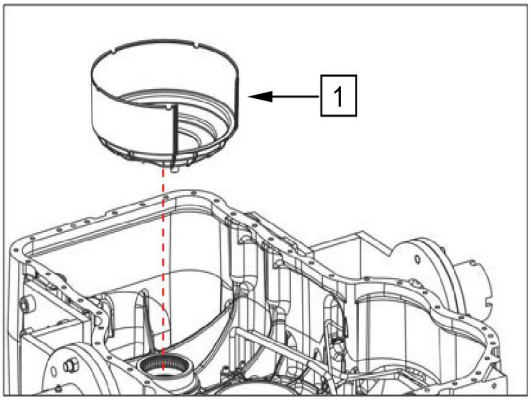


Figure 187

Unsnap the snap ring (1).

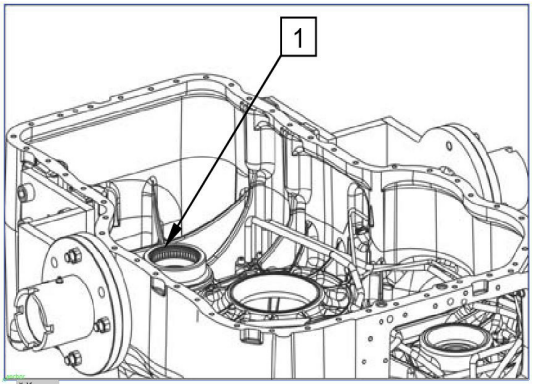


Figure 188

Remove the needle sleeve with pulling device.

(S) Internal extractor 850301-00053
(S) Counter support MX504203

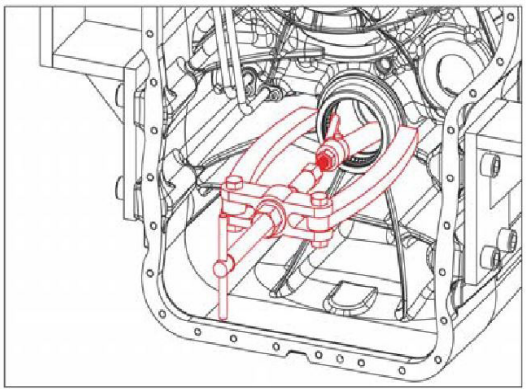


Figure 189

Remove the bearing outer rings from housing II.

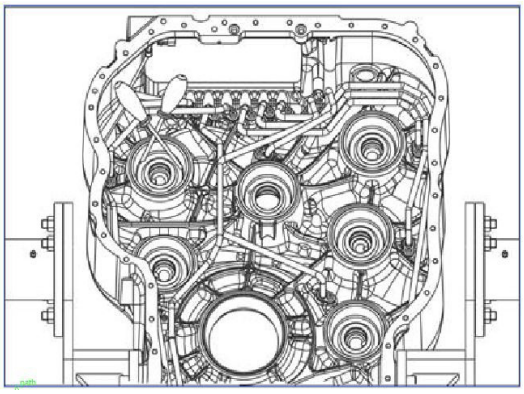


Figure 190

Expand the snap ring (see arrow) until it is unsnapped from the groove of the ball bearing.
By means of slight hits drive the input gear of emergency steering pump rearwards until the snap ring cannot snap in any more.

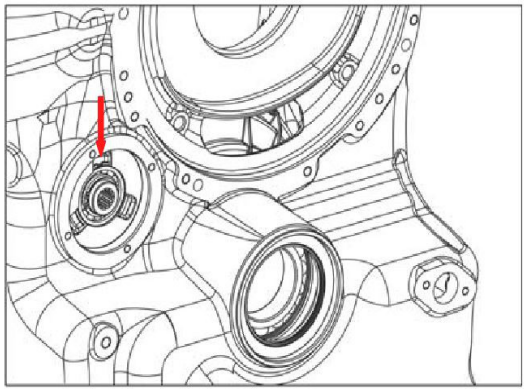


Figure 191

Remove the input gear by means of an assembly lever.

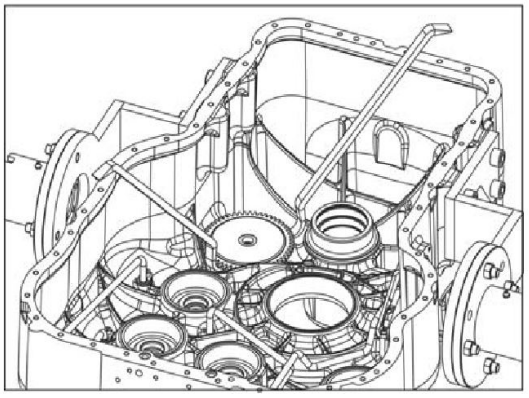


Figure 192

Unsnap the retaining ring (1) and remove the ball bearing (2).

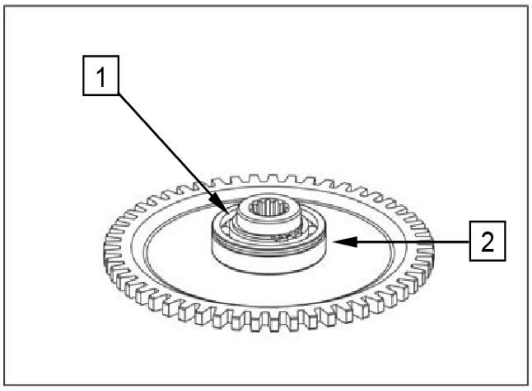


Figure 193

Loosen cylindrical screws of clips (1) and strap (2). Cut through and remove the cable binders (3).

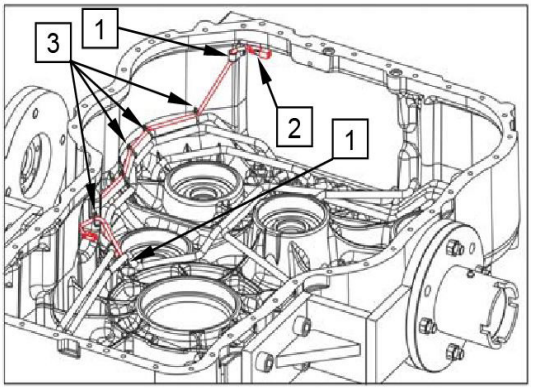


Figure 194

Remove the single parts

1 = Clip with cylindrical screw
2 = Strap with cylindrical screws
3 = Cable Ergopower L II

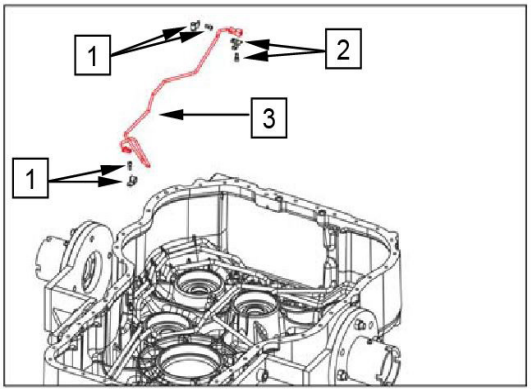


Figure 195

Loosen cylindrical screws (1) and remove all pipes.

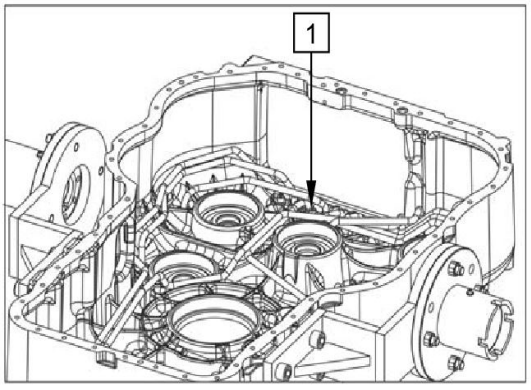


Figure 196

Clutches „V“; „R“; „A“; „B“; „C“; „D“; „E“ and Differential

The opposite figure shows the markings and arrangement of the clutches and of the differential.

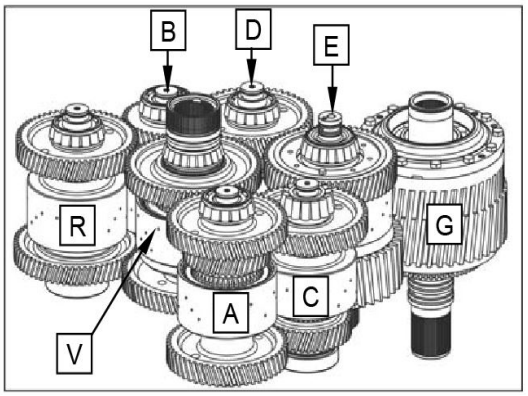


Figure 197

Legend:
V = Clutch Forward
R = Clutch Reverse
A = Clutch 1st and 5th gear (Forward/Reverse)
B = Clutch 2nd and 6th gear (Forward/Reverse)
C = Clutch 3rd and 7th gear (Forward/Reverse)
D = Clutch 4th and 8th gear (Forward/Reverse)
E = Clutch 5th 6th 7th 8th gear (Forward/Reverse)
F = Planetary drive 1st 2nd 3rd 4th gear (Forward/Reverse)
G = Differential
N = Input gear Emergency steering pump

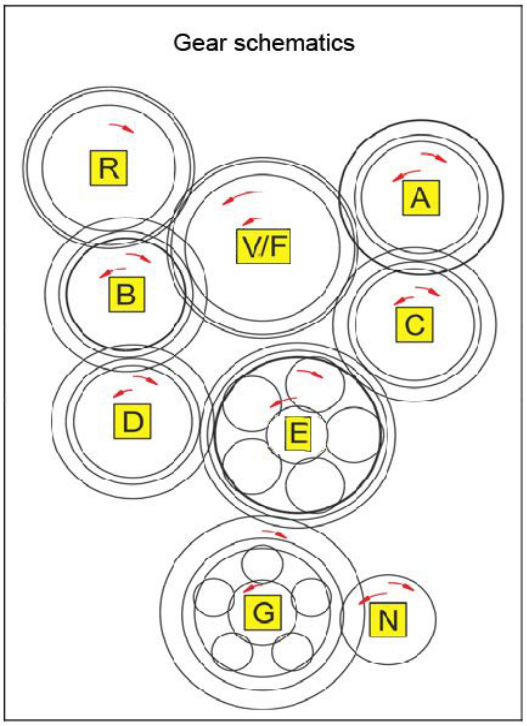


Figure 198

Clutch "E"

Remove the assembly aid (S).

(S) Assembly aid 850317-00074

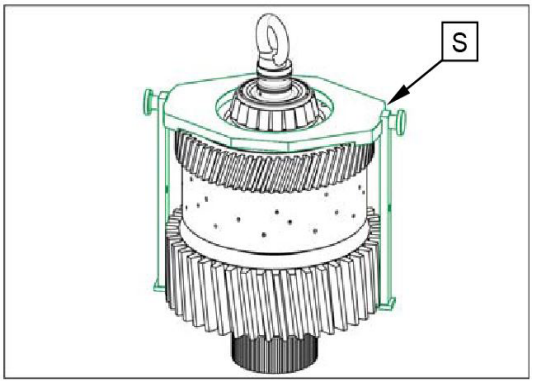


Figure 199

Separate the clutch (1).

1 = Clutch cpl.
2 = Clutch
3 = Inner disc carrier

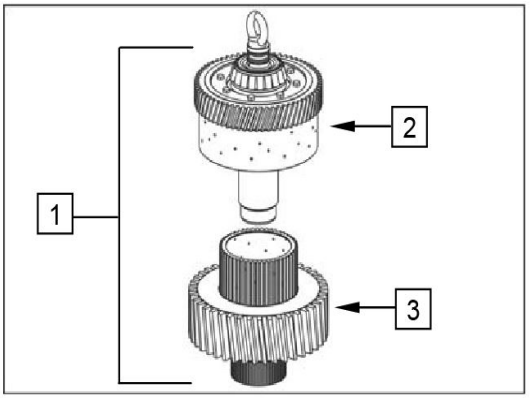


Figure 200

Remove the bearing outer ring (1) and washer (2).

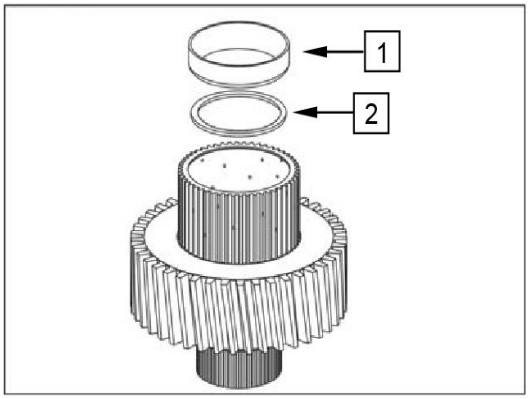


Figure 201

Unsnap the snap ring (1).

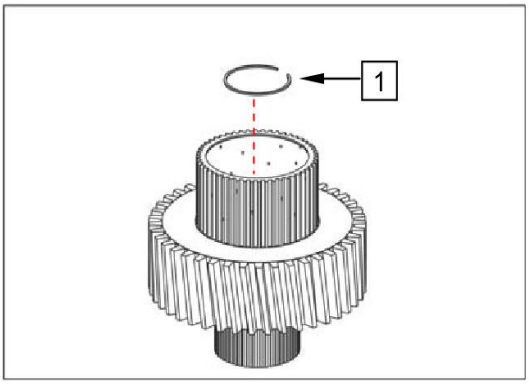


Figure 202

By means of a mandrel drive the needle sleeve out of the disc carrier.

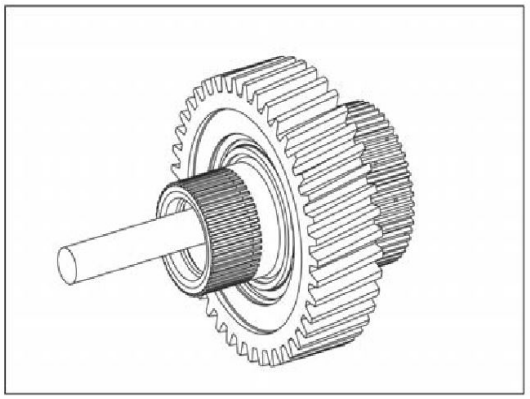


Figure 203

In order to support the rapid grip, insert a suitable pressure piece into the bore and remove the bearing inner ring b means of the rapid grip.

(S) Rapid grip	850317-00072
(S) Basic tool	850316-00110
(S) Reducer	K9006785

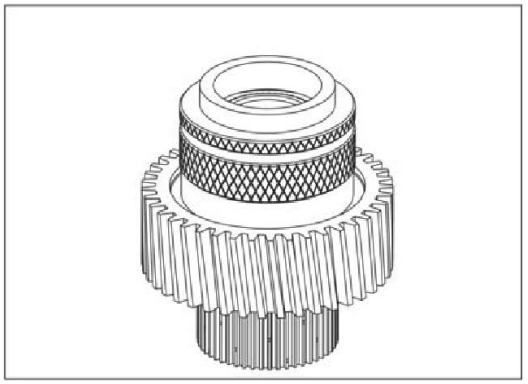


Figure 204

Inner disc carrier is only to be removed if needed!

Unsnap retaining ring (1) and press the inner disc carrier (2) out of the idler (3) under a hydraulic press.

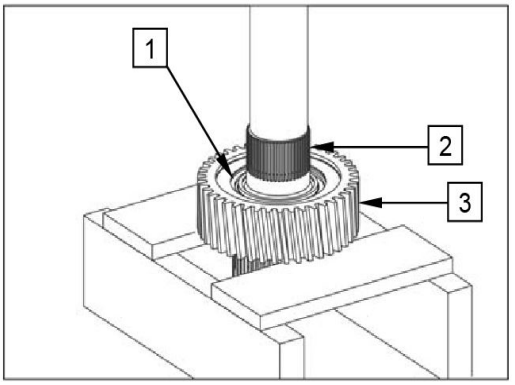


Figure 205

Unsnap and remove both rectangular rings (1).

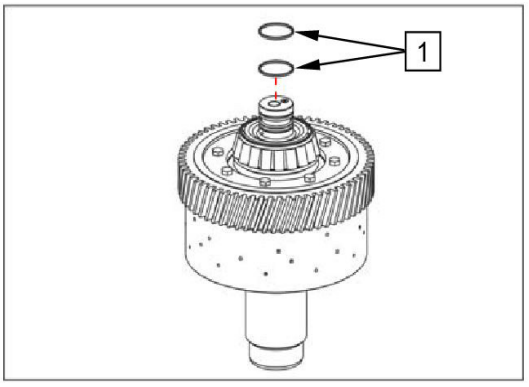


Figure 206

By means of the rapid grip pull off the bearing inner ring.

(S) Rapid grip 850317-00078

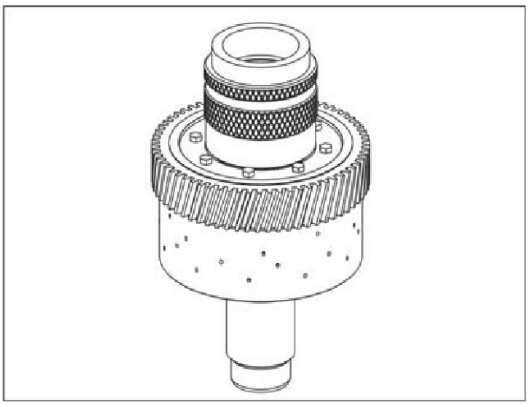


Figure 207

Press the shaft (1) out of the disc carrier under a hydraulic press.

CAUTION

Pay attention to the released shaft (1) and bearing inner ring (2)!

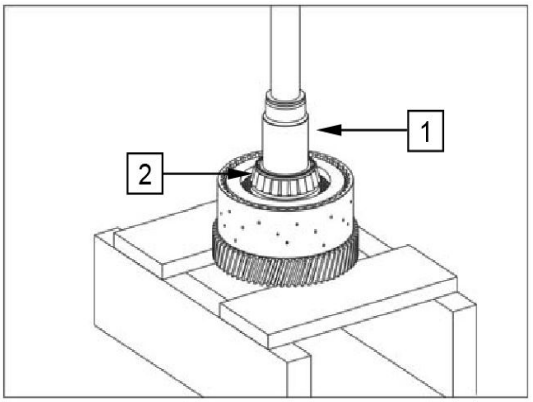


Figure 208

Gear ring is only to be removed if needed

Loosen the bolted connection washer/gear ring/disc carrier (1) and remove the washer (2).

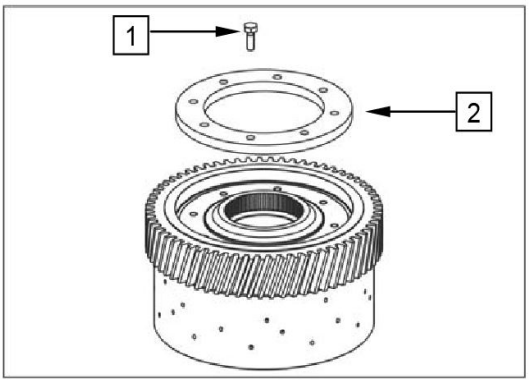


Figure 209

Pull off the gear ring.

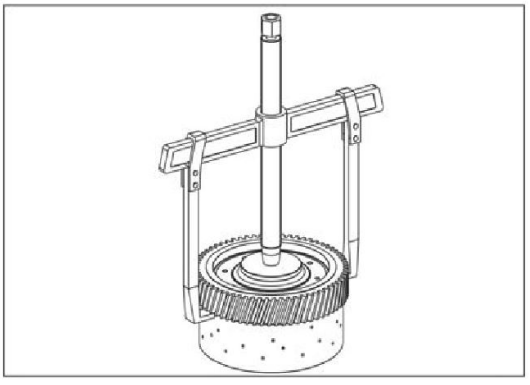


Figure 210

Unsnap and remove the snap ring (1).

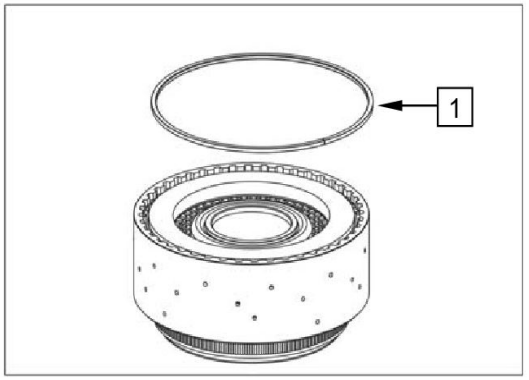


Figure 211

Remove the end shims (1) and the disc set (2).

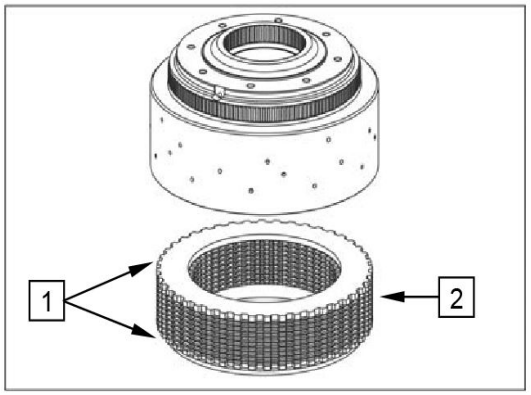


Figure 212

Preload cup springs and unsnap the snap ring (1).

(S) Assembly fixture 850317-00079

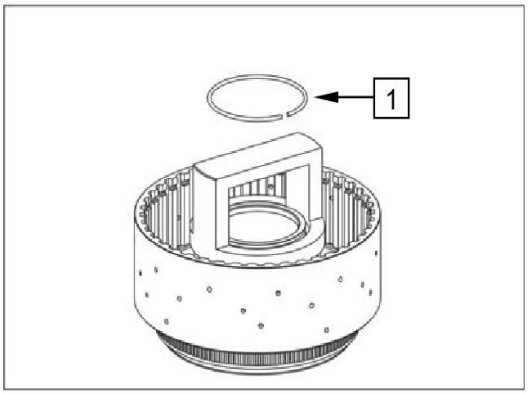


Figure 213

Remove the baffle plate (1) and the cup spring set (2).

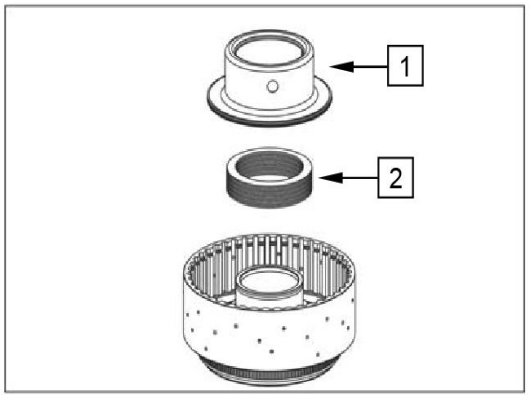


Figure 214

Lift the piston (1) by means of compressed air out of the disc carrier bore and remove it.

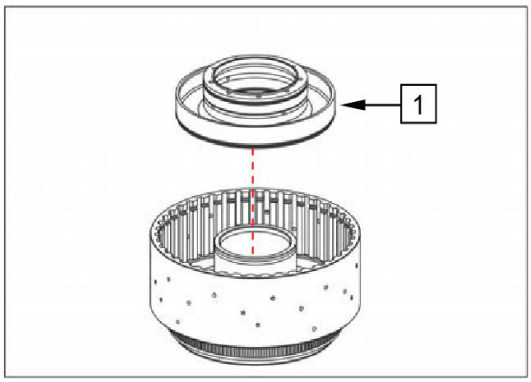


Figure 215

Remove the O-rings (1).

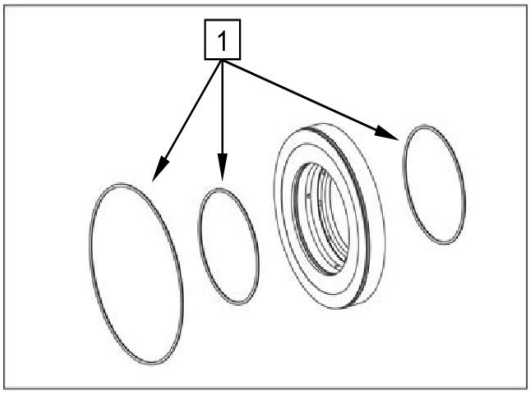


Figure 216

Clutch "R"

Disengage and remove both rectangular rings (1).

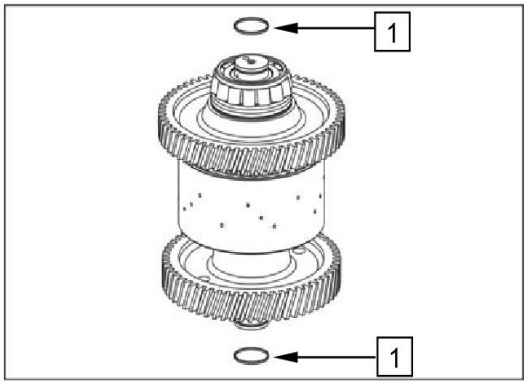


Figure 217

Idler

Pull the bearing inner ring off the shaft.

(S) Grab sleeve 850317-00081

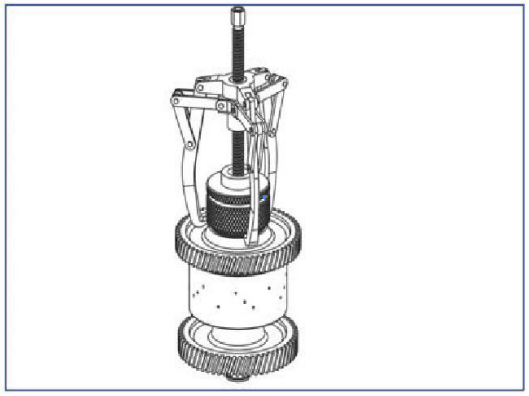


Figure 218

Disassemble snap ring

Flush-mount the snap ring with a screw driver at the 4 installation openings of the washer into the annular groove of the shaft (see arrow (Figure 220)) and at the same time pull off the idler with a three-armed puller.

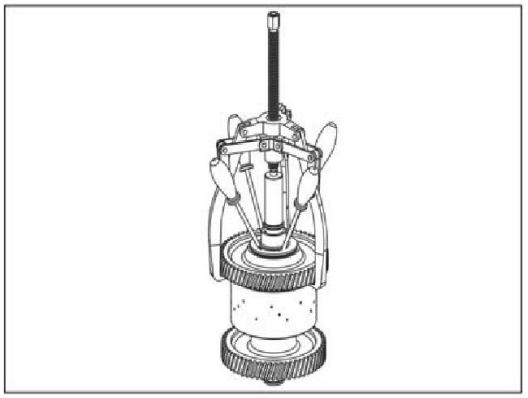


Figure 219

Legend:
1 = Idler
2 = Shaft
3 = Axial bearing cpl.
4 = Washer
5 = Snap ring

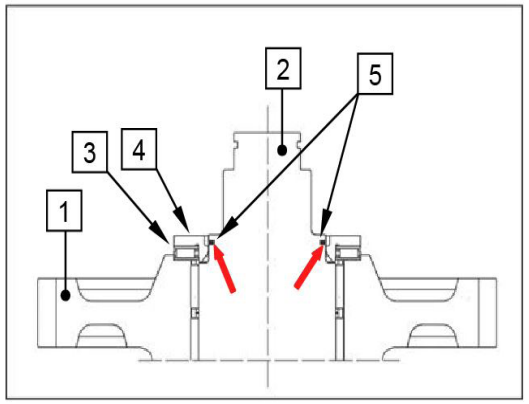


Figure 220

Remove the single parts.

1 = Idler
2 = Snap ring
3 = Axial bearing cpl.
*Axial washers
*Axial bearing
4 = Washer

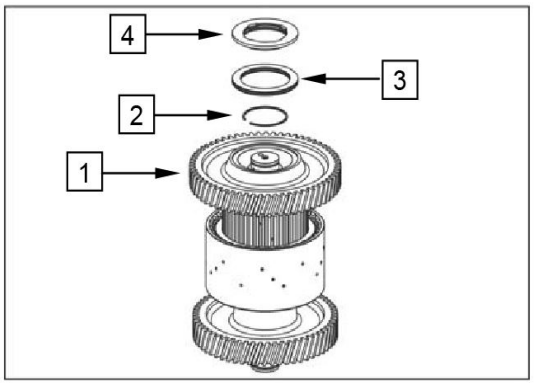


Figure 221

Remove the needle cage (1).

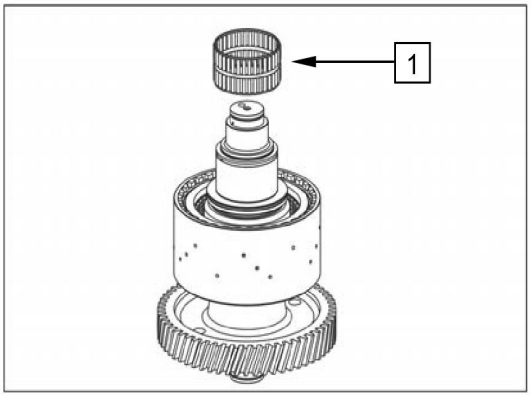


Figure 222

Remove the axial bearing cpl. (1).

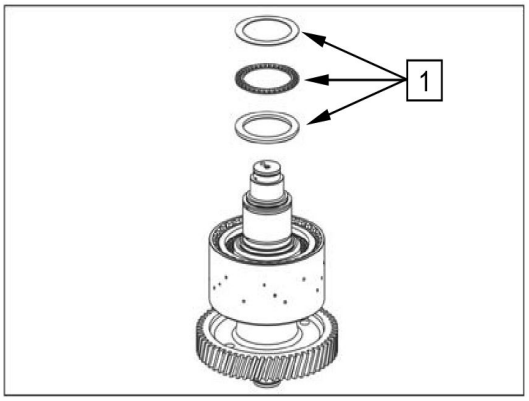


Figure 223

Gear

Remove the bearing inner ring from the shaft.

(S) Grab sleeve 850317-00081

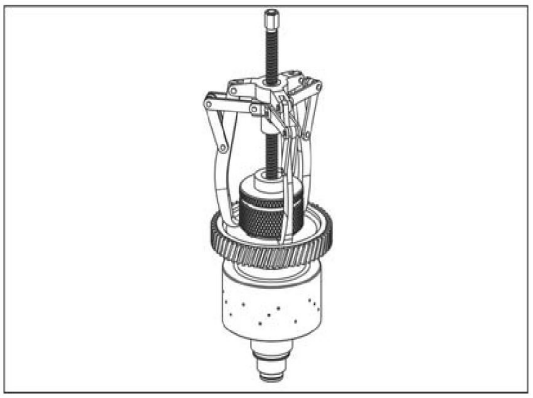


Figure 224

Disassemble snap ring

Flush-mount the snap ring with a screw driver at the 4 installation openings of the washer into the annular groove of the shaft (see arrow (Figure 226)) and at the same time pull off the idler with a three-armed puller.

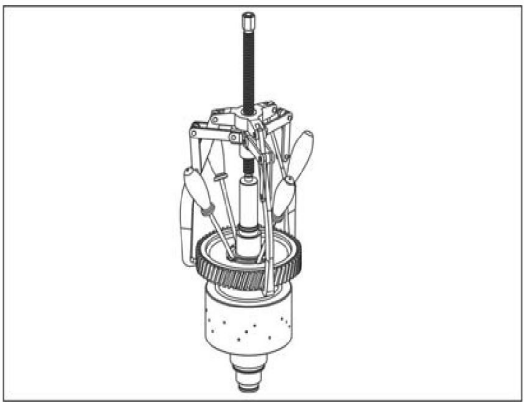


Figure 225

Legend:
1 = Gear
2 = Shaft
3 = Snap ring

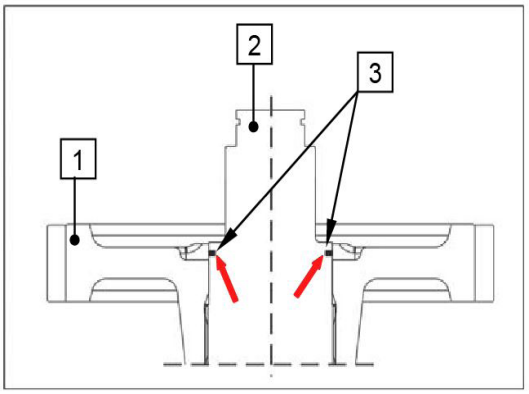


Figure 226

Remove the gear (1) and disengage the snap ring (2).

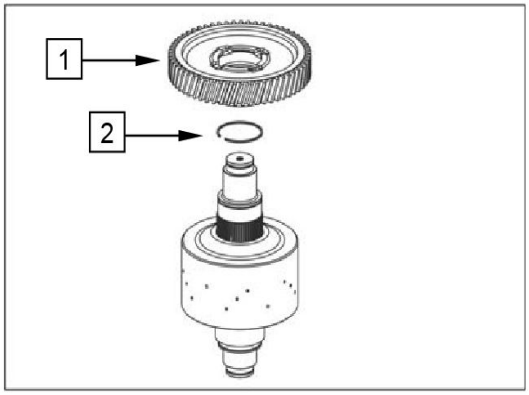


Figure 227

Remove the shaft (1) from the disc carrier under a hydraulic press.

Pay attention to the released shaft (1)!

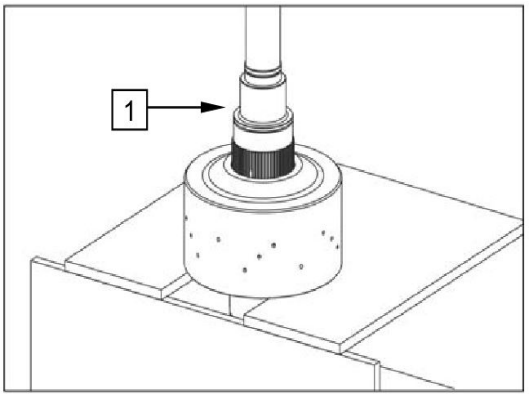


Figure 228

Clutch

Disengage the snap ring (1).

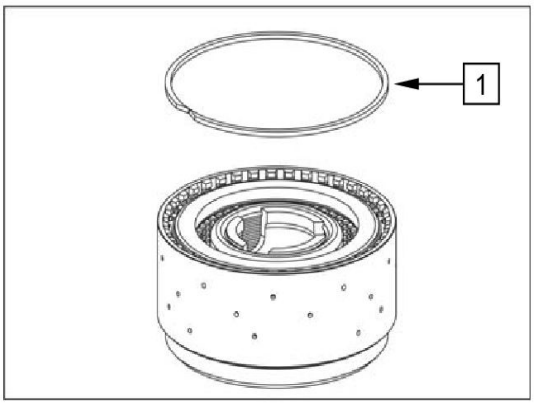


Figure 229

Remove the end plates (1) and the disc set (2).

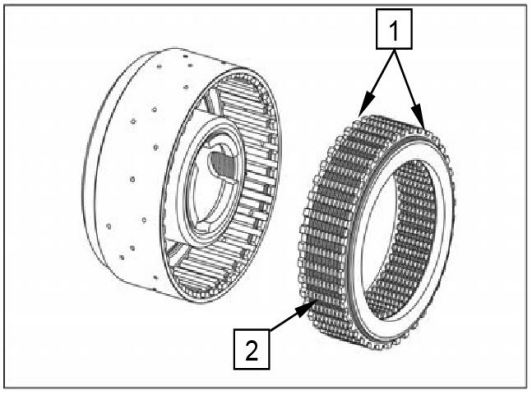


Figure 230

Preload cup springs and disengage the snap ring (1).

(S) Assembly fixture 850317-00080

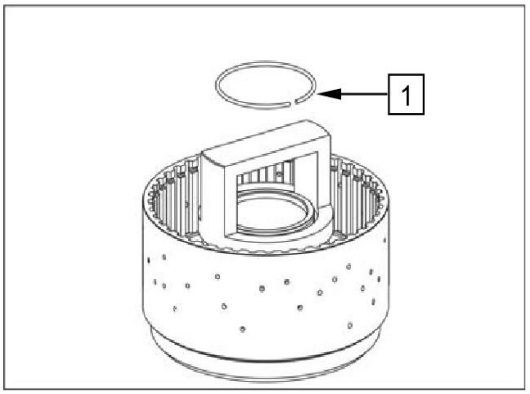


Figure 231

Remove the baffle plate (1) and the cup spring set (2).

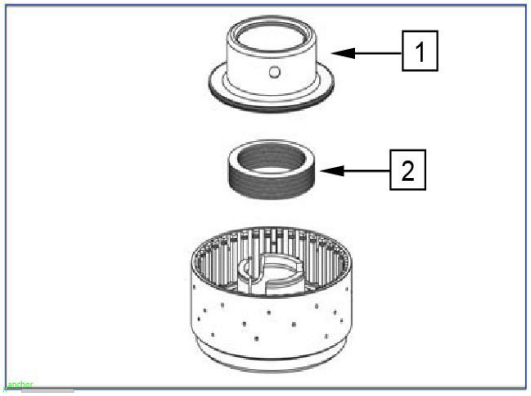


Figure 232

Press the piston (1) by means of compressed air out of the disc carrier hole and remove it.

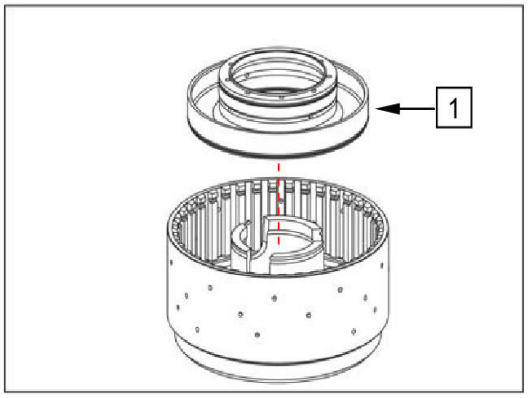


Figure 233

Remove the O-rings (1).

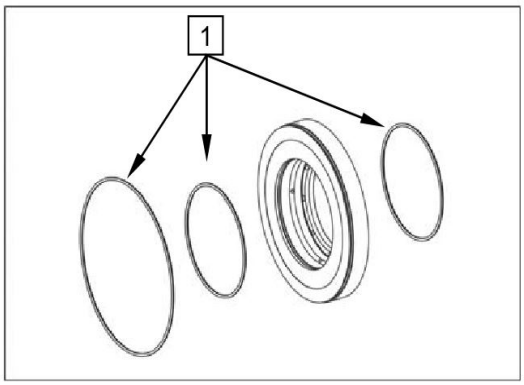


Figure 234

Clutch "B"

Disengage and remove both rectangular rings (1).

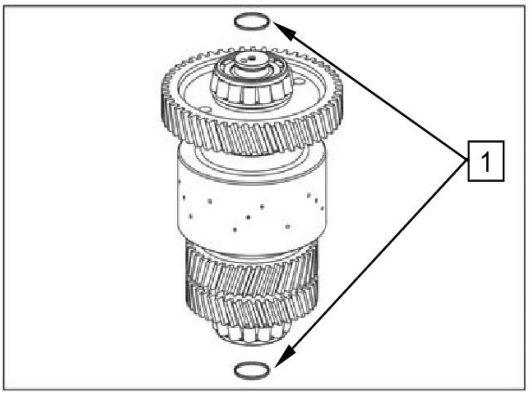


Figure 235

Idler/Gear

Pull the bearing inner ring off the shaft.

(S) Grab sleeve 850317-00081

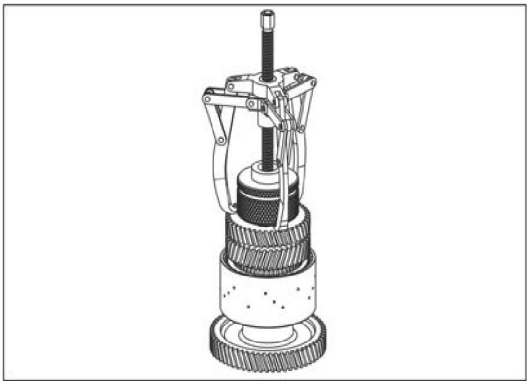


Figure 236

Remove the snap ring Figure 239

On the 4 assembly openings of the gear press the snap ring with a screwdriver flush into the annular groove of the shaft (see arrows Figure 237) and pull off the gear by means o the 3-armed puller at the same time.

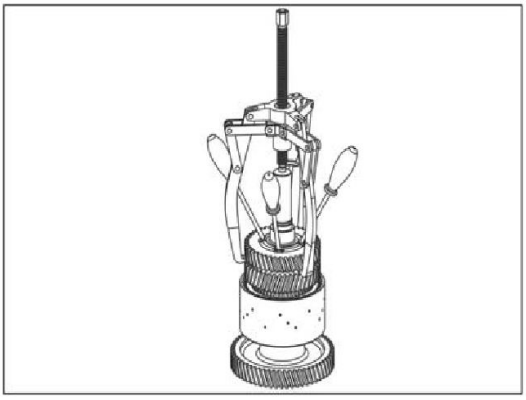


Figure 237

Legend:
1 = Idler
2 = Gear
3 = Shaft
4 = Snap ring

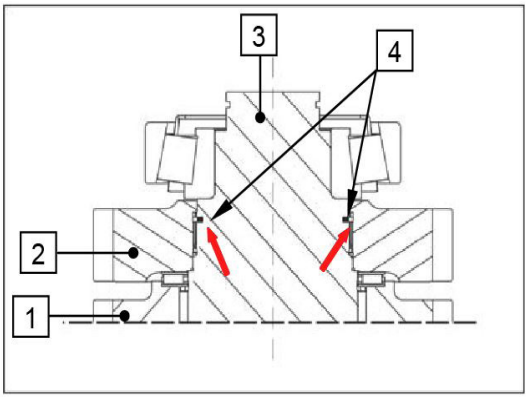


Figure 238

Remove the gear (1) and disengage the snap ring (2).

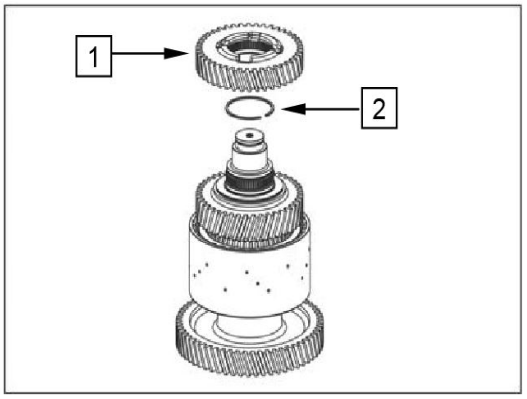


Figure 239

Remove the single parts.

1 = Axial bearing cpl.
*Axial washers
*Axial bearing
2 = Idler
3 = Needle cage
4 = Axial bearing cpl.
*Axial washer
*Axial bearing
*Running disk

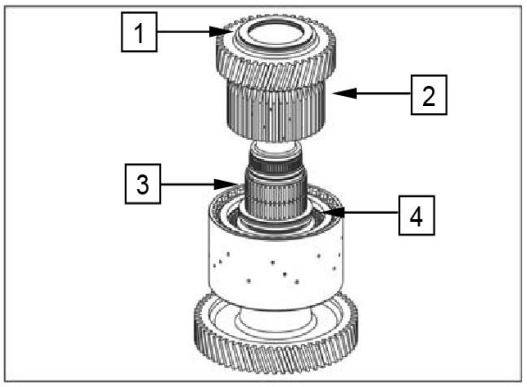


Figure 240

Gear

Pull the bearing inner ring off the shaft.

(S) Grab sleeve 850317-00081

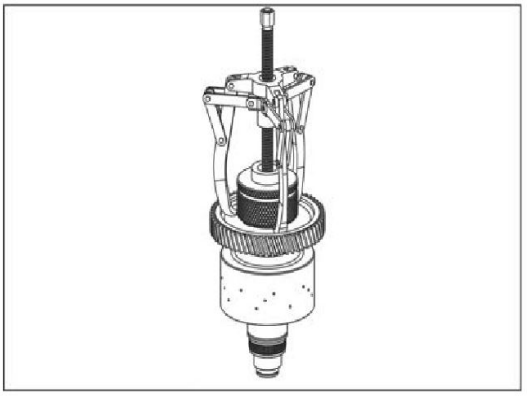


Figure 241

Remove the snap ring Fig. 246.

On the 4 assembly openings of the gear press the snap ring with a screwdriver flush into the annular groove of the shaft (see arrows Figure 243) and pull off the gear by means of the 3-armed puller at the same time.

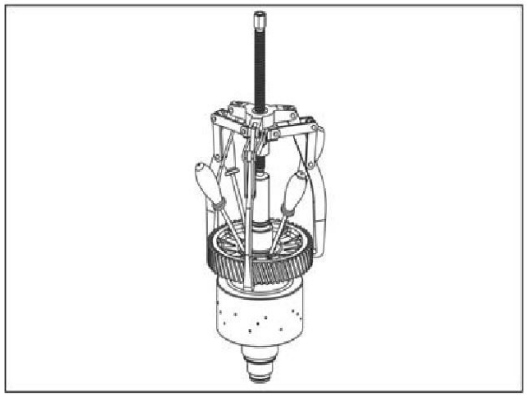


Figure 242

Legend:
1 = Gear
2 = Shaft
3 = Snap ring

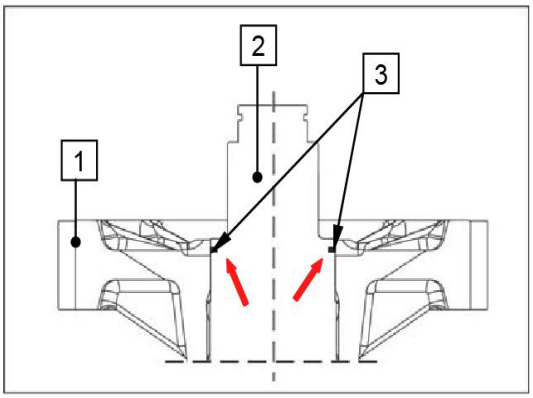


Figure 243

Remove the gear (1) and disengage the snap ring (2).

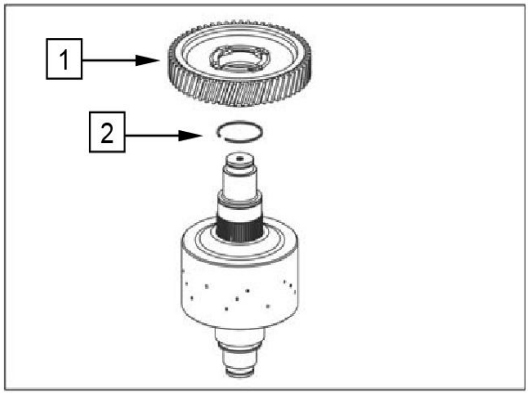


Figure 244

Press the shaft (1) out of the disc carrier under a hydraulic press.

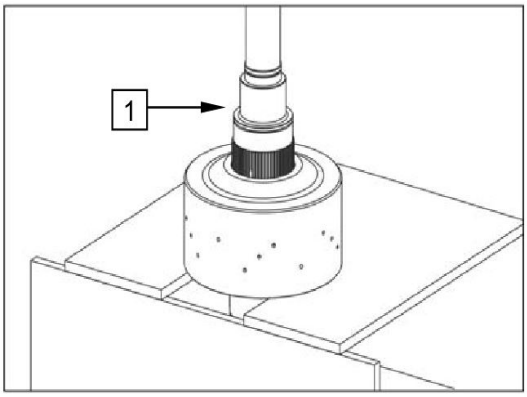


Figure 245

Pay attention to the released shaft (1) !

Clutch

Disengage the snap ring (1).

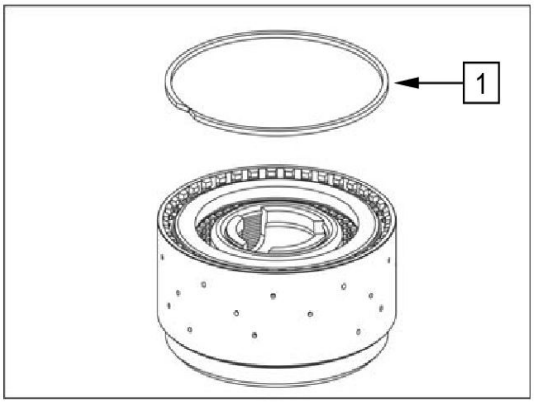


Figure 246

Remove the end plates (1) and the disc set (2).

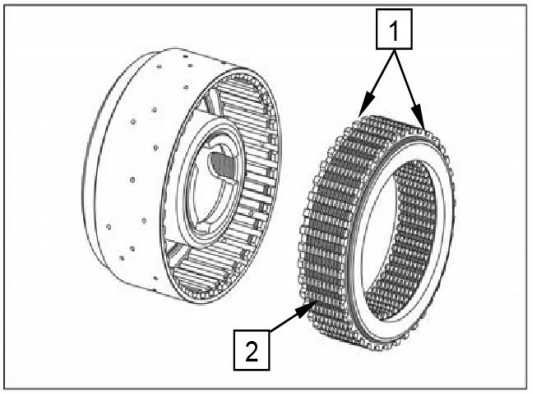


Figure 247

Preload cup springs and disengage the snap ring (1).

(S) Assembly fixture 850317-00080

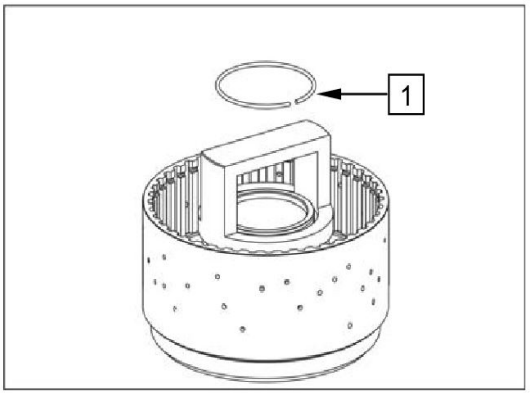


Figure 248

Remove the baffle plate (1) and the cup spring set (2).

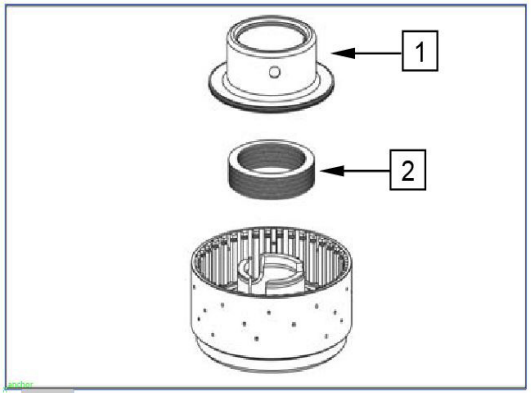


Figure 249

Press the piston (1) by means of compressed air out of the disc carrier hole and remove it.

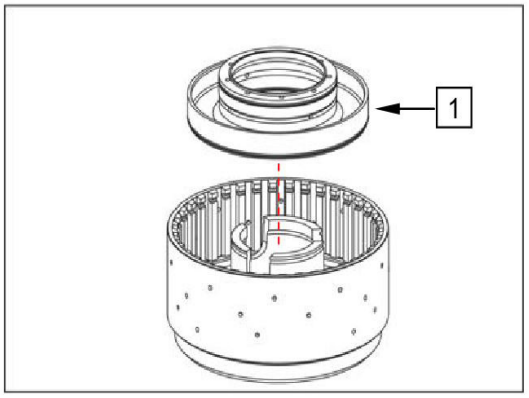


Figure 250

Remove the O-rings (1).

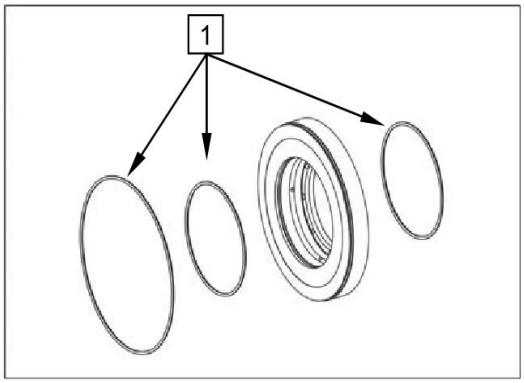


Figure 251

Clutch "V"

Disengage and remove the rectangular ring (1).

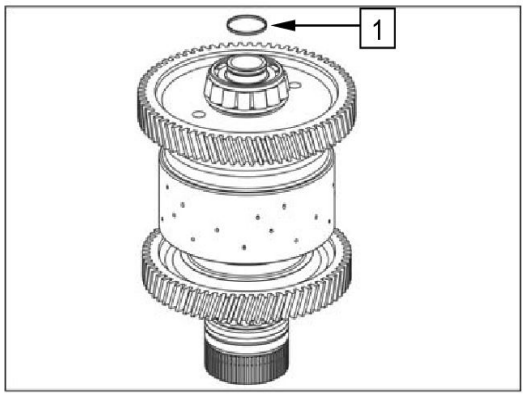


Figure 252

Pull bearing inner ring (1) and gear (2) of the shaft.

(S) Pressure piece 850317-00082

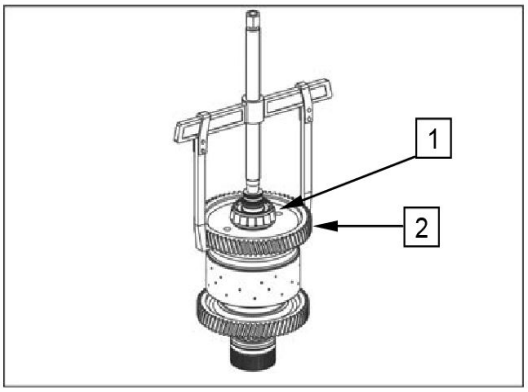


Figure 253

Pull clutch (1) from the shaft.

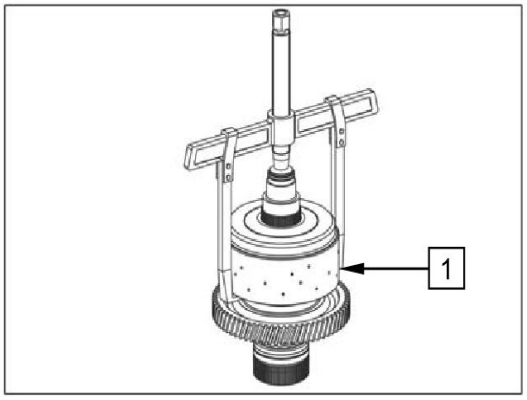


Figure 254

Disengage the snap ring (1).

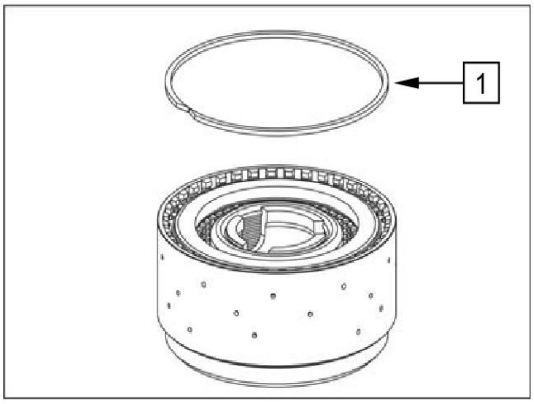


Figure 255

Remove the end plates (1) and the disc set (2).

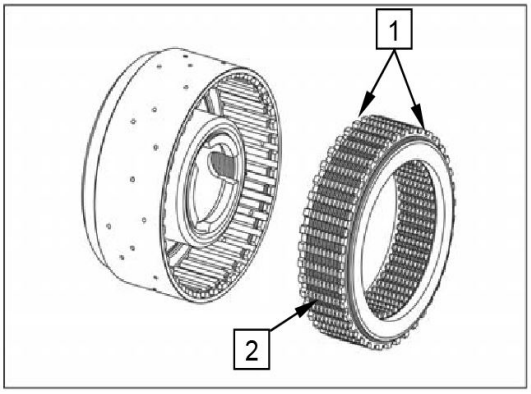


Figure 256

Preload cup springs and disengage the snap ring (1).

(S) Assembly fixture 850317-00080

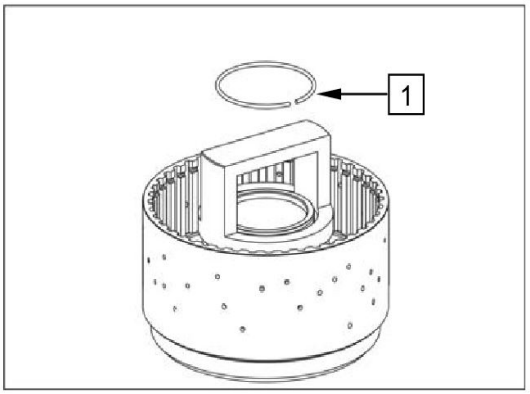


Figure 257

Remove the baffle plate (1) and the cup spring set (2).

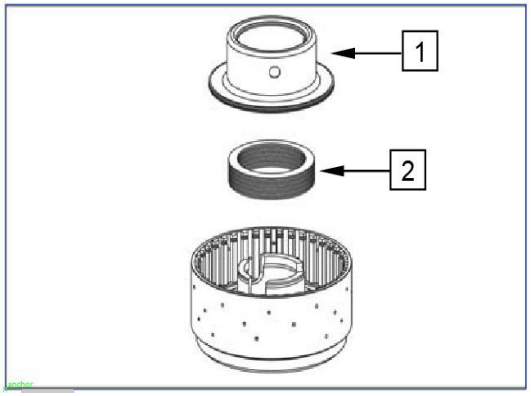


Figure 258

Press the piston (1) by means of compressed air out of the disc carrier hole and remove it.

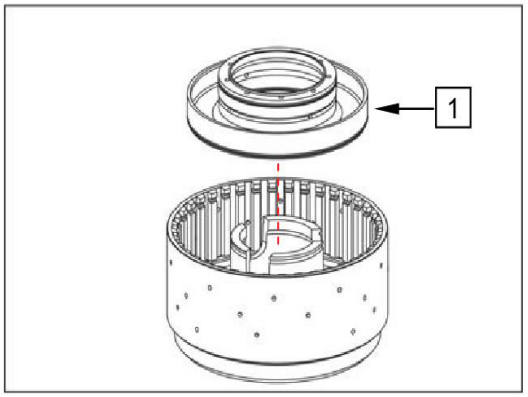


Figure 259

Remove the O-rings (1).

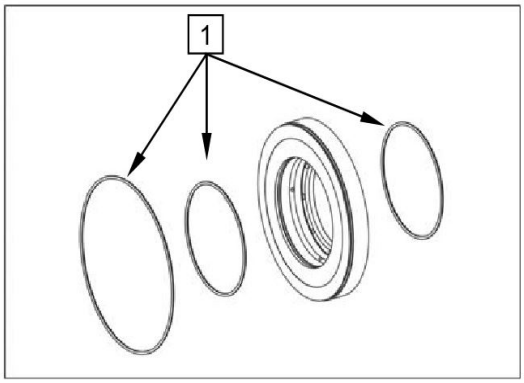


Figure 260

Insert shaft into the locking device (S1).

Mount special tools (S2 and S3) until contact and loosen the slotted nut.

(S1) Locking device 850317-00083
(S2) Slotted nut wrench 850316-00382
(S3) Wrench insert 850316-00383

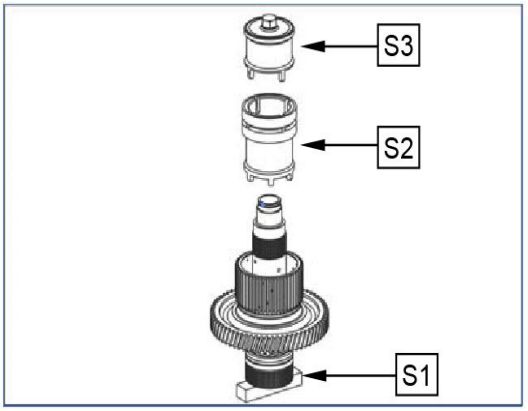


Figure 261

Press the shaft (1) out of the idler (2) under a hydraulic press.

Pay attention to the released components!

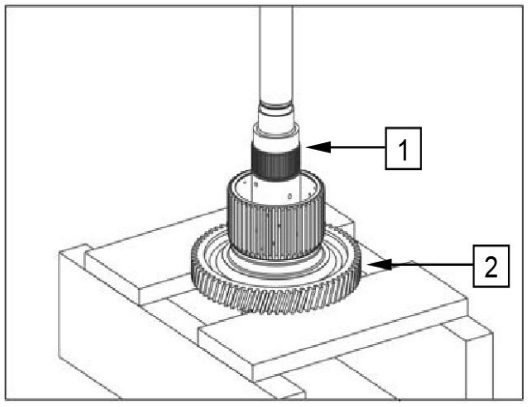


Figure 262

Remove the upper roller bearing (1) and the bearing outer ring (2) from the idler.

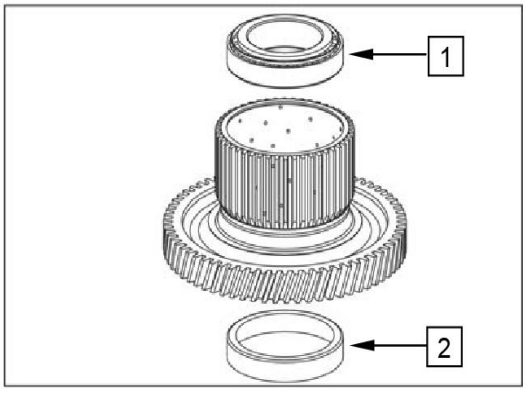


Figure 263

Insert shaft (1) with bearing outer ring (2) into the hydraulic press and press the bearing inner rings off the shaft.

Pay attention to the released shaft!

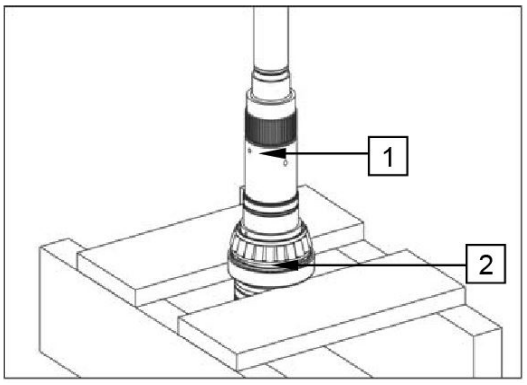


Figure 264

Remove the single parts (1).

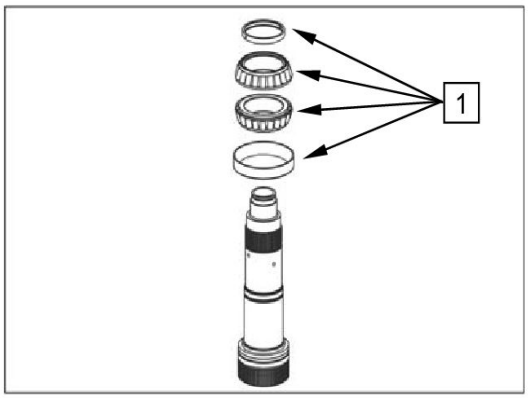


Figure 265

Use a mandrel to drive the sliding bearing (1) out of the shaft.

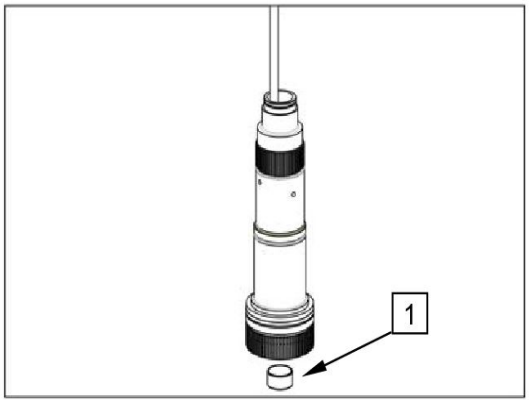


Figure 266

Clutch "C"

Disengage and remove both rectangular rings (1).

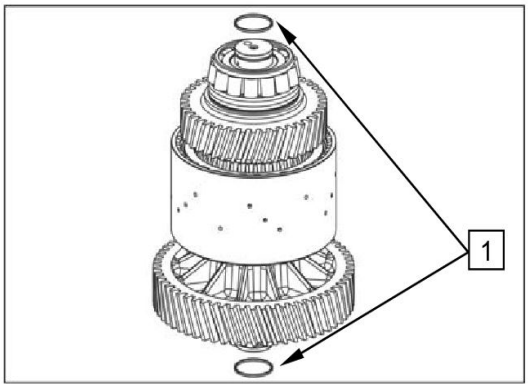


Figure 267

Idler

Pull the bearing inner ring from the shaft.

(S) Grab sleeve 850317-00081

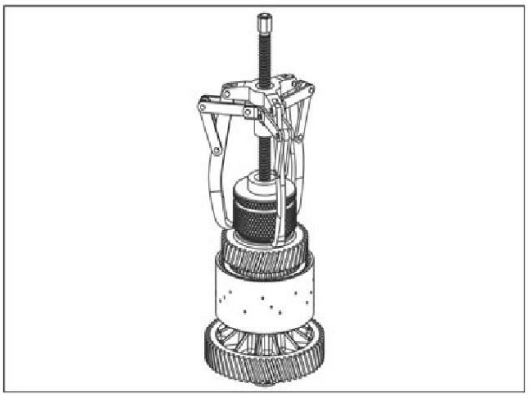


Figure 268

Remove the snap ring Figure 271.

On the 4 assembly openings of the washer press the snap ring with a screwdriver flush into the annular groove of the shaft (see Figure 269) and pull off the idler by means of the 3-armed puller at the same time.

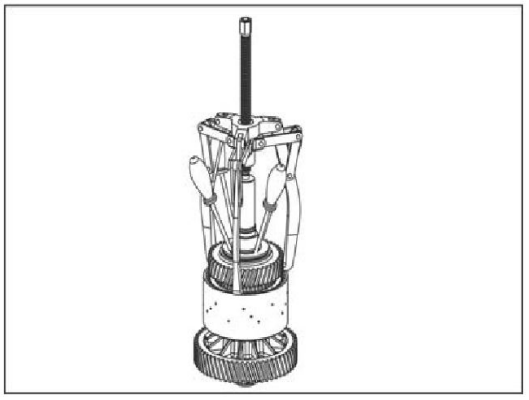


Figure 269

Legend:
1 = Idler
2 = Shaft
3 = Axial bearing cpl.
4 = Washer
5 = Snap ring

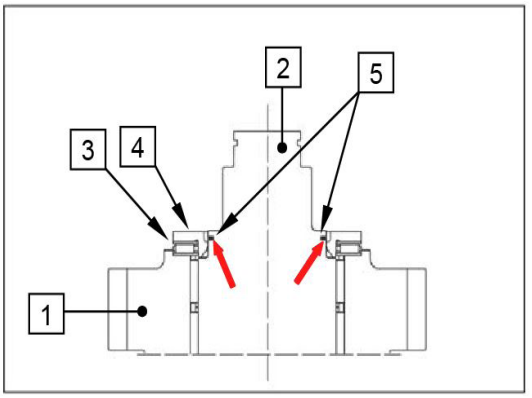


Figure 270

Remove the single parts.

1 = Idler 2 = Snap ring
3 = Axial bearing cpl.
*Axial washers
*Axial bearing
4 = Washer

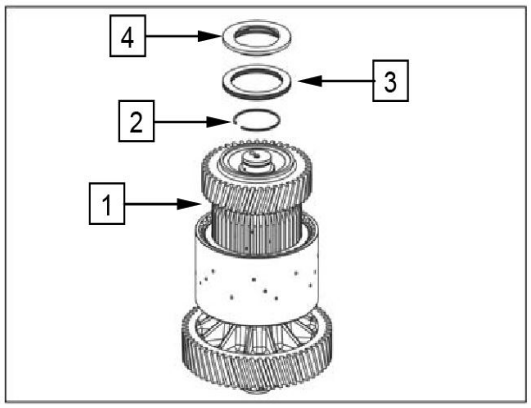


Figure 271

Remove the needle cage (1).

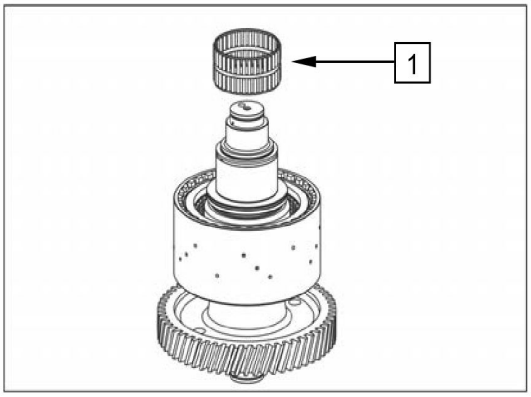


Figure 272

Remove the axial bearing cpl. (1).

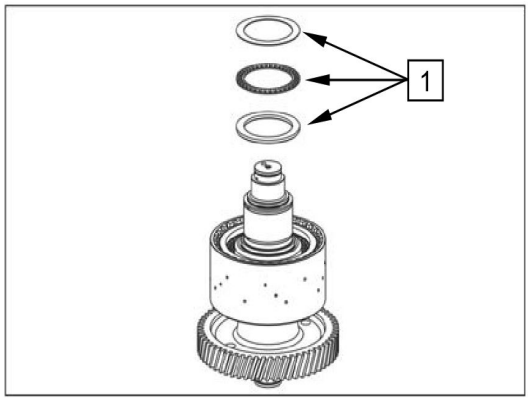


Figure 273

Gear

Pull the bearing inner ring from the shaft.

(S) Grab sleeve 850317-00081

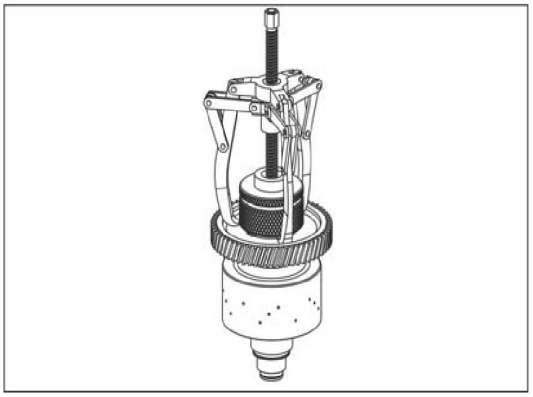


Figure 274

Remove the snap ring Figure 277

On the 4 assembly openings of the gear press the snap ring with a screwdriver flush into the annular groove of the shaft (Figure 275) and pull off the gear by means of the 3-armed puller at the same time.

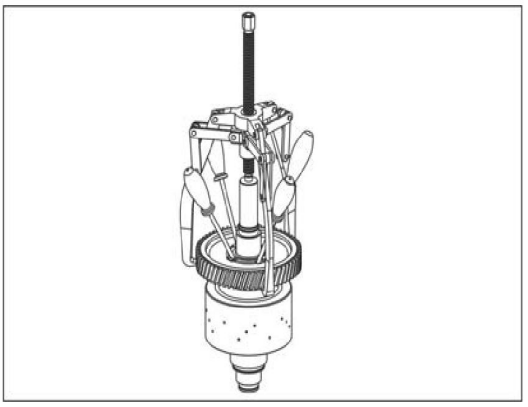


Figure 275

Legend:
1 = Gear
2 = Shaft
3 = Snap ring

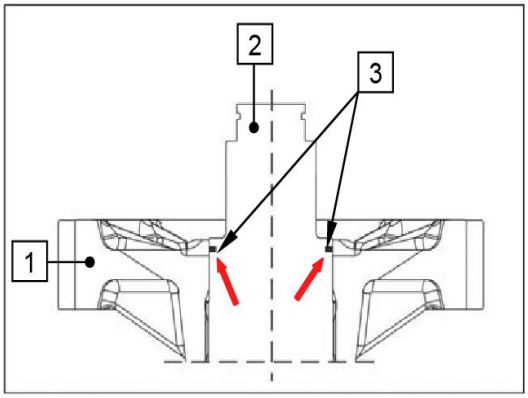


Figure 276

Remove the gear (1) and disengage the snap ring (2).

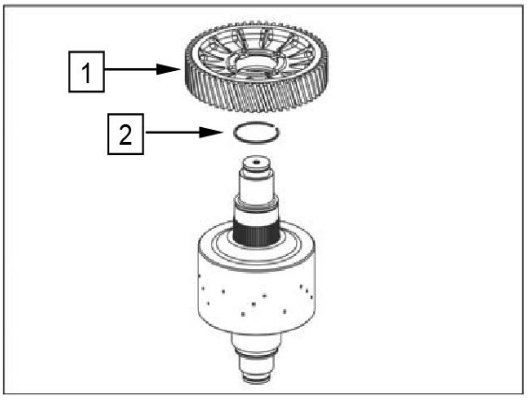


Figure 277

Press the shaft (1) out of the disc carrier under a hydraulic press.

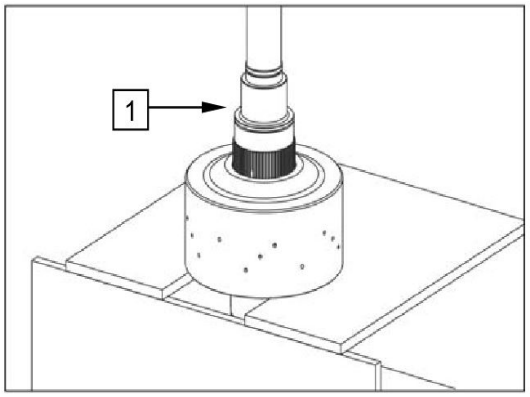


Figure 278

Pay attention to the released shaft (1)!

Clutch

Disengage the snap ring (1).

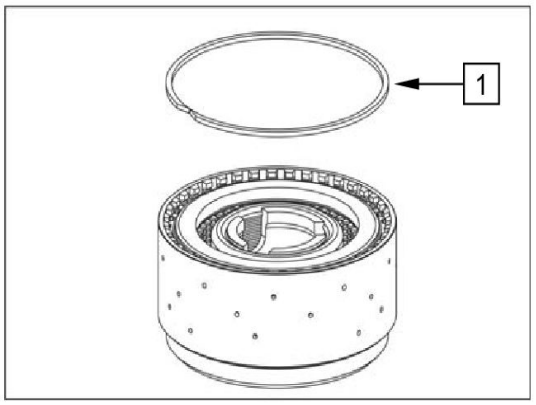


Figure 279

Remove the end plates (1) and the disc set (2).

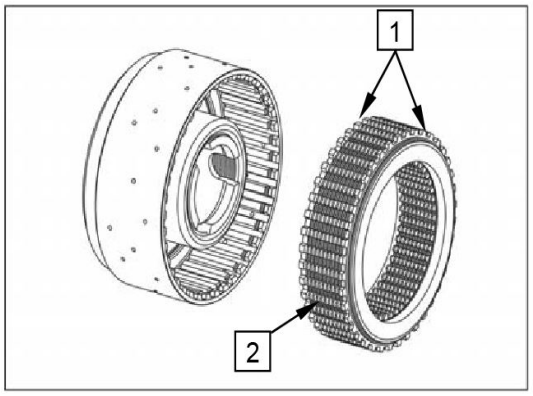


Figure 280

Preload cup springs and disengage the snap ring (1).

(S) Assembly fixture 850317-00080

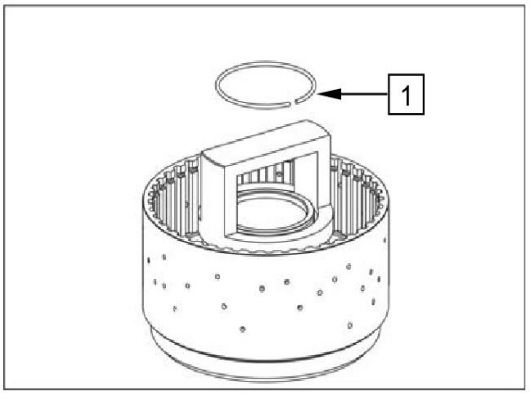


Figure 281

Remove the baffle plate (1) and the cup spring set (2).

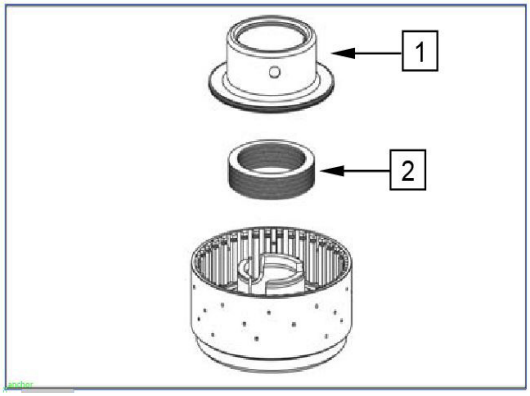


Figure 282

Press the piston (1) by means of compressed air out of the disc carrier hole and remove it.

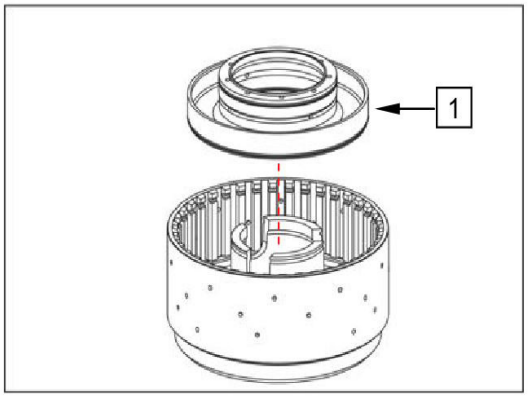


Figure 283

Remove the O-rings (1).

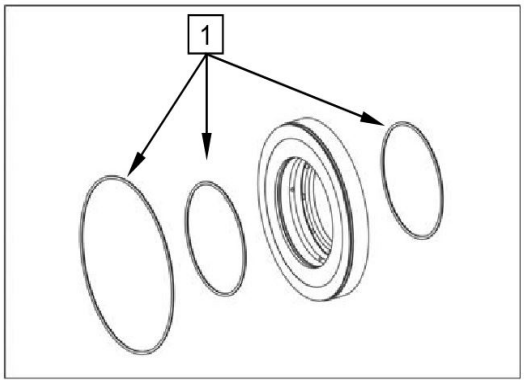


Figure 284

Clutch "D"

Disengage and remove both rectangular rings (1).

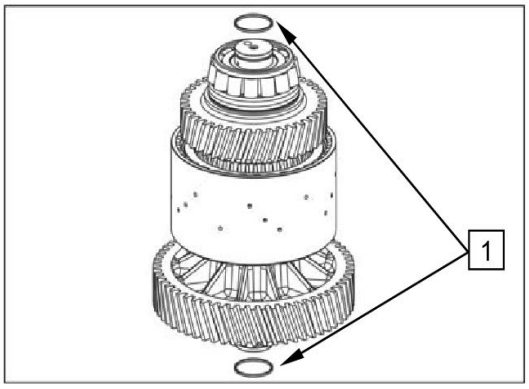


Figure 285

Idler

Pull the bearing inner ring off the shaft.

(S) Grab sleeve 850317-00081

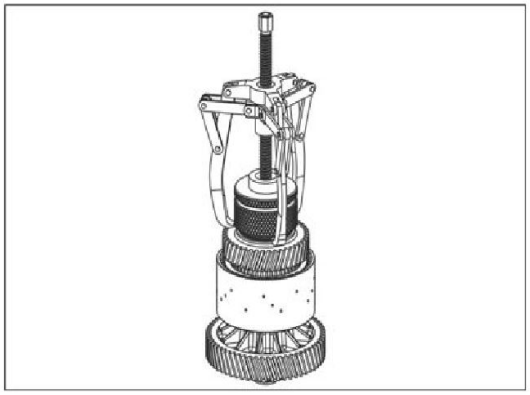


Figure 286

Remove the snap ring Figure 289.

On the 4 assembly openings of the washer press the snap ring with a screwdriver flush into the annular groove of the shaft (see Figure 287) and pull off the idler by means of the 3-armed puller at the same time.

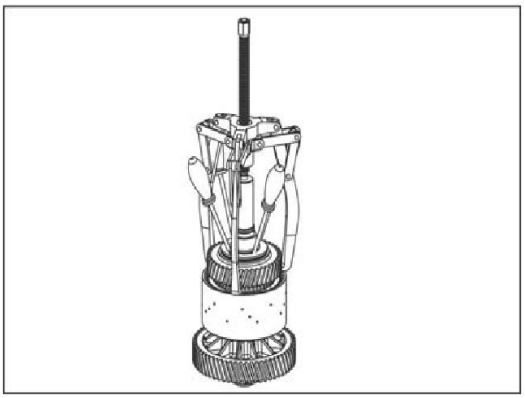


Figure 287

Legend:
1 = Idler
2 = Shaft
3 = Axial bearing cpl.
4 = Washer
5 = Snap ring

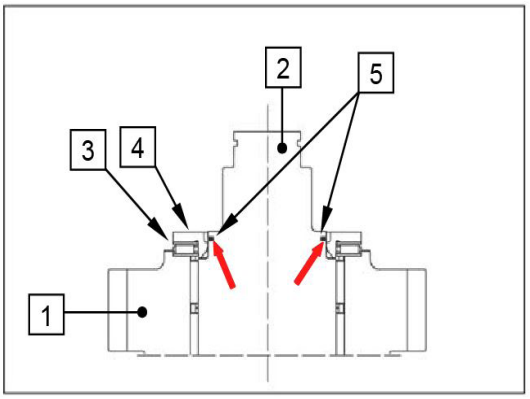


Figure 288

Remove the single parts.

1 = Idler 2 = Snap ring
3 = Axial bearing cpl.
*Axial washers
*Axial bearing
4 = Washer

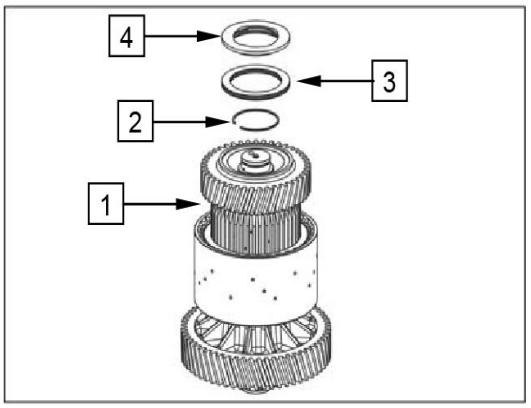


Figure 289

Remove the needle cage (1).

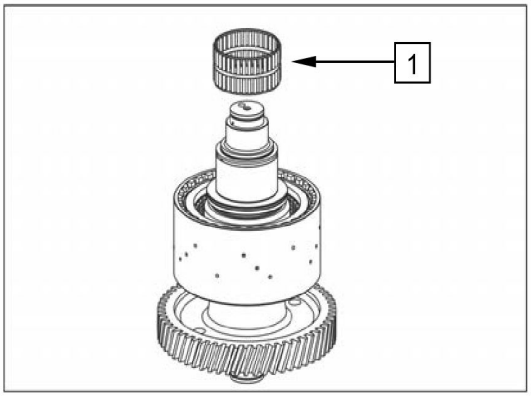


Figure 290

Remove the axial bearing cpl. (1).

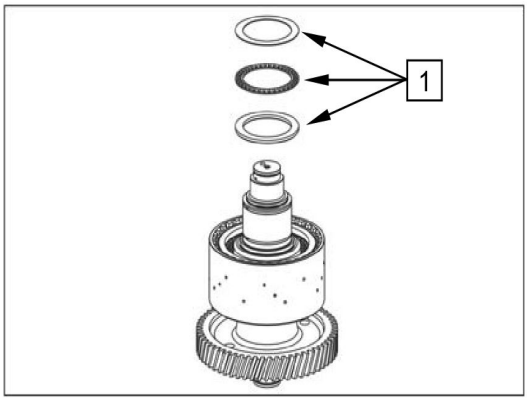


Figure 291

Gear

Pull the bearing inner ring off the shaft.

(S) Grab sleeve 850317-00081

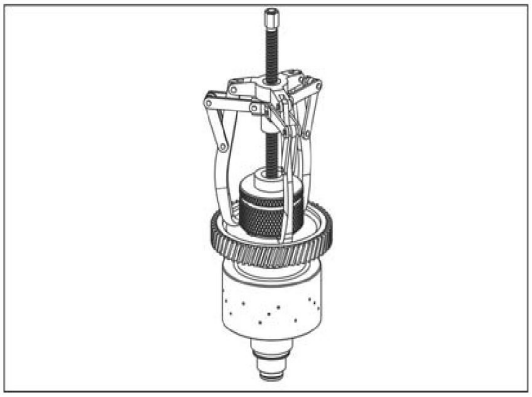


Figure 292

Remove the snap ring Figure 295.

On the 4 assembly openings of the gear press the snap ring with a screwdriver flush into the annular groove of the shaft (see Figure 293) and pull off the gear by means of the 3-armed puller at the same time.

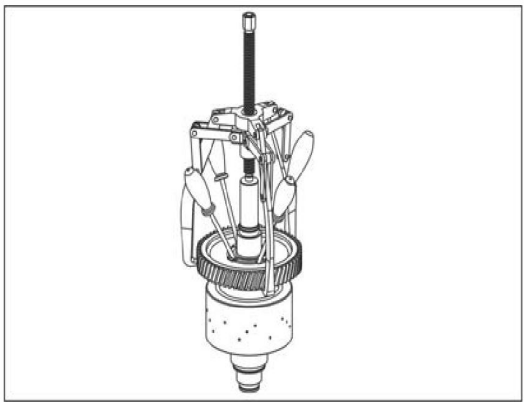


Figure 293

Legend:
1 = Gear
2 = Shaft
3 = Snap ring

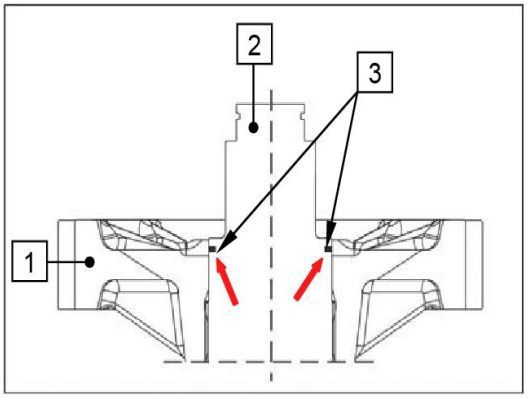


Figure 294

Remove the gear (1) and disengage the snap ring (2).

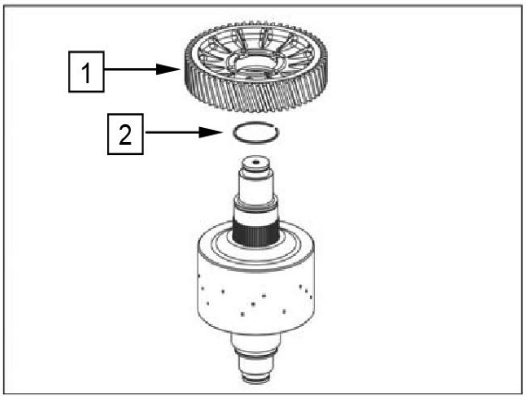


Figure 295

Press the shaft (1) out of the disc carrier under a hydraulic press.

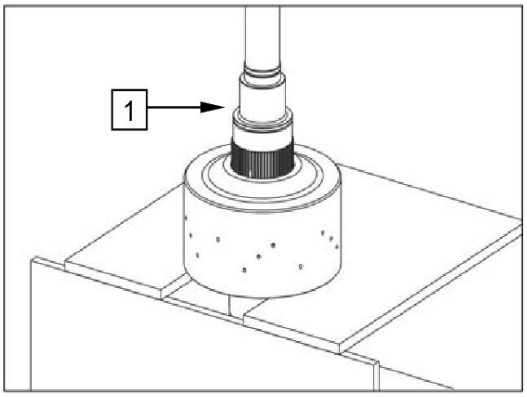


Figure 296

Pay attention to the released shaft (1)!

Clutch

Disengage the snap ring (1).

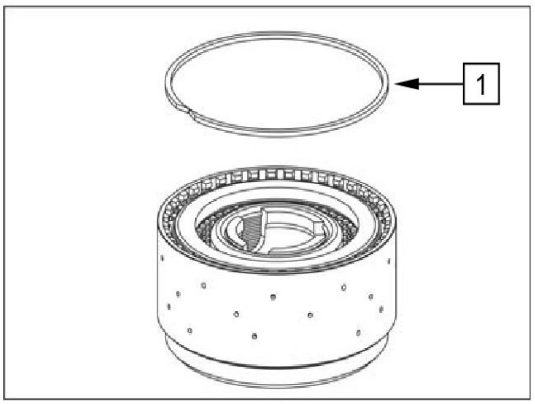


Figure 297

Remove the end plates (1) and the disc set (2).

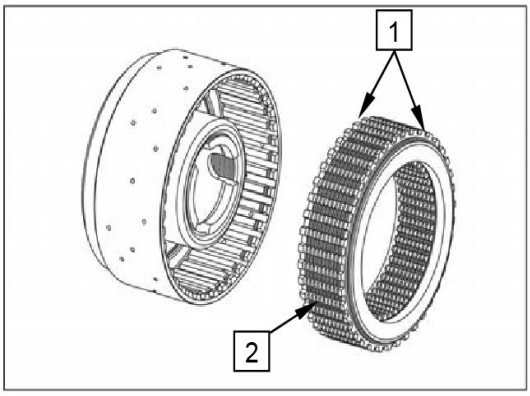


Figure 298

Preload cup springs and disengage the snap ring (1).

(S) Assembly fixture 850317-00080

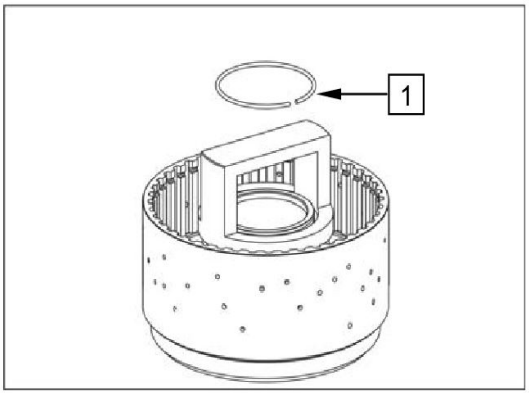


Figure 299

Remove the baffle plate (1) and the cup spring set (2).

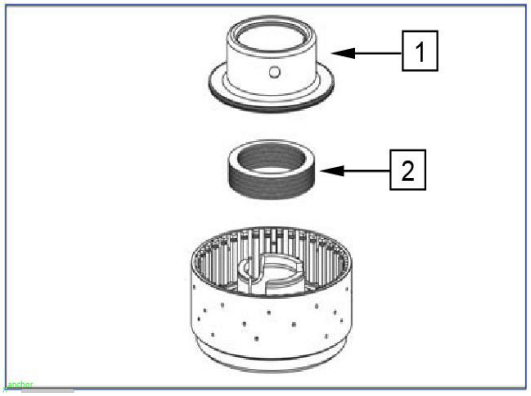


Figure 300

Press the piston (1) by means of compressed air out of the disc carrier hole and remove it.

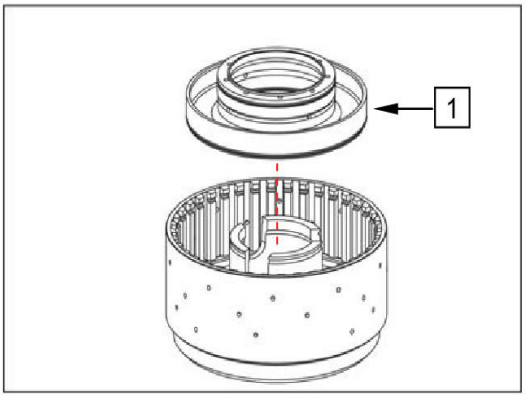


Figure 301

Remove the O-rings (1).

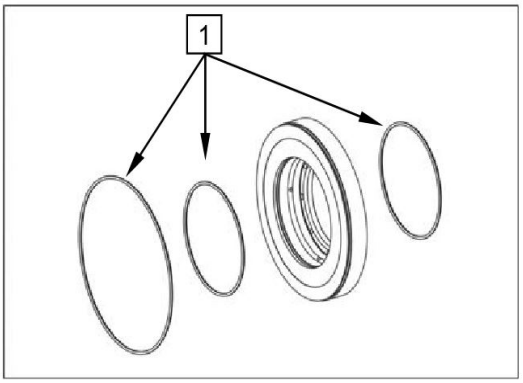


Figure 302

Clutch "A"

Disengage and remove both rectangular rings (1).

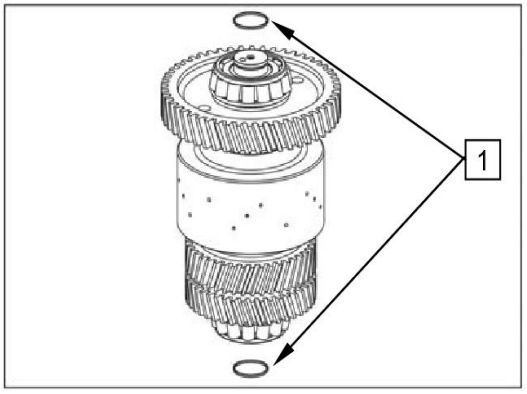


Figure 303

Idler

Pull the bearing inner ring off the shaft.

(S) Grab sleeve 850317-00081

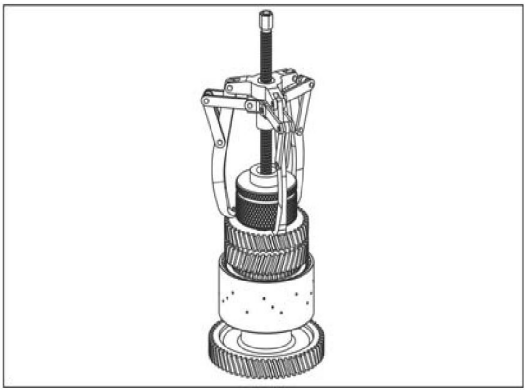


Figure 304

Remove the snap ring Figure 307.

On the 4 assembly openings of the gear press the snap ring with a screwdriver flush into the annular groove of the shaft (see Figure 305) and pull off the gear by means of the 3-armed puller at the same time.

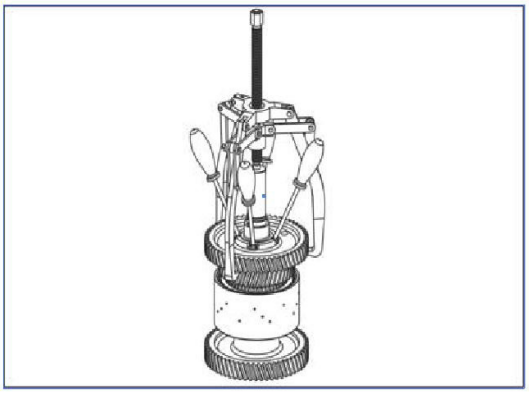


Figure 305

Legend:
1 = Idler
2 = Gear
3 = Shaft
4 = Snap ring

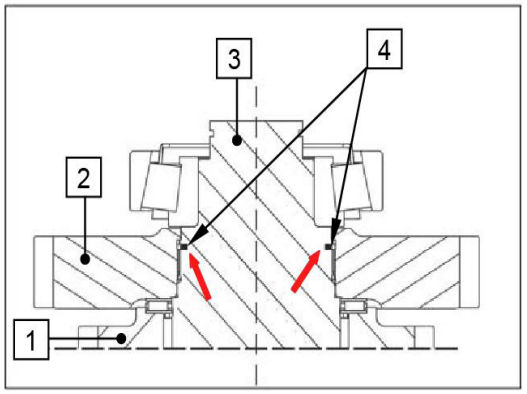


Figure 306

Remove the gear (1) and disengage the snap ring (2).

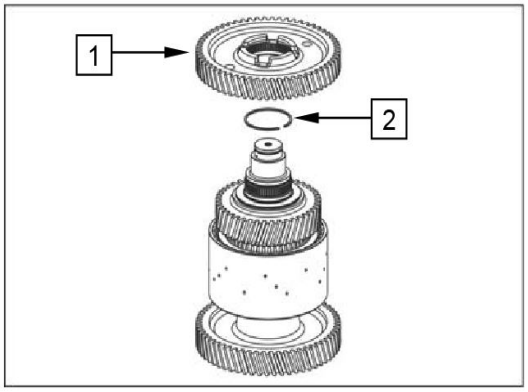


Figure 307

Remove the single parts.

1 = Axial bearing cpl.
*Axial washers
*Axial bearing
2 = Idler
3 = Needle cage
4 = Axial bearing cpl.
*Axial washer
*Axial bearing
*Running disk

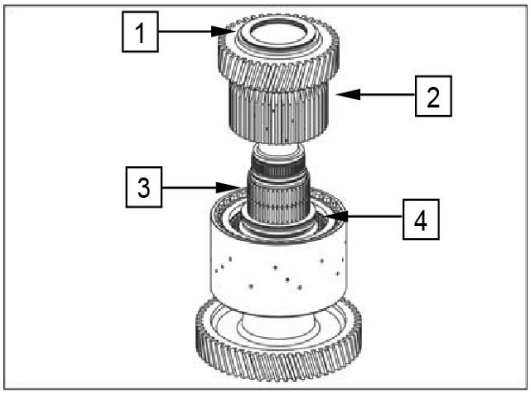


Figure 308

Gear

Pull the bearing inner ring off the shaft.

(S) Grab sleeve 850317-00081

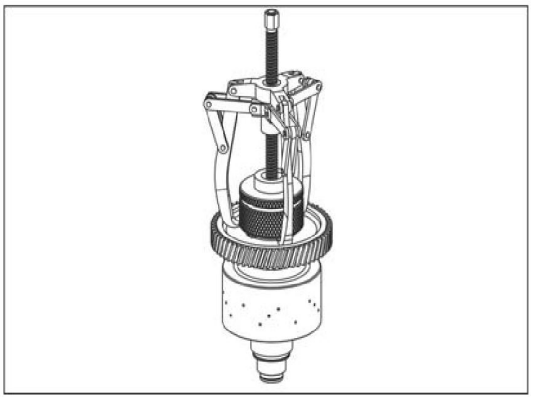


Figure 309

Remove the snap ring Figure 312.

On the 4 assembly openings of the gear press the snap ring with a screwdriver flush into the annular groove of the shaft (see Figure 310) and pull off the gear by means of the 3-armed puller at the same time.

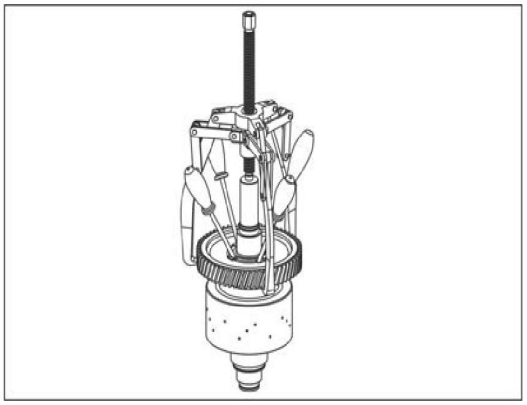


Figure 310

Legend:
1 = Gear
2 = Shaft
3 = Snap ring

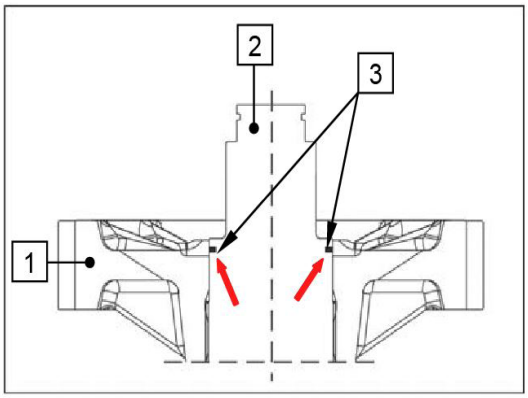


Figure 311

Remove the gear (1) and disengage the snap ring (2).

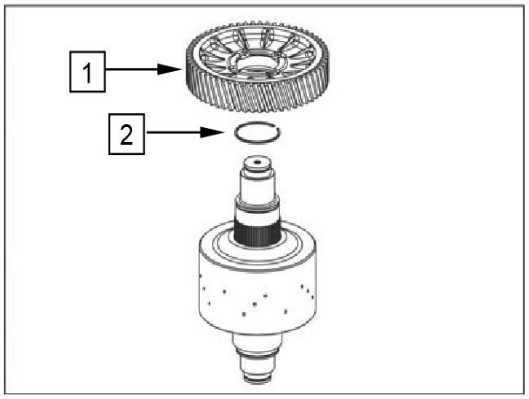


Figure 312

Press the shaft (1) out of the disk carrier under a hydraulic press.

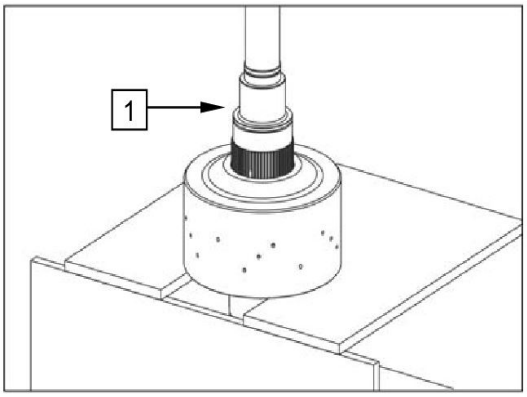


Figure 313

Pay attention to the released shaft (1)!

Clutch

Disengage the snap ring (1).

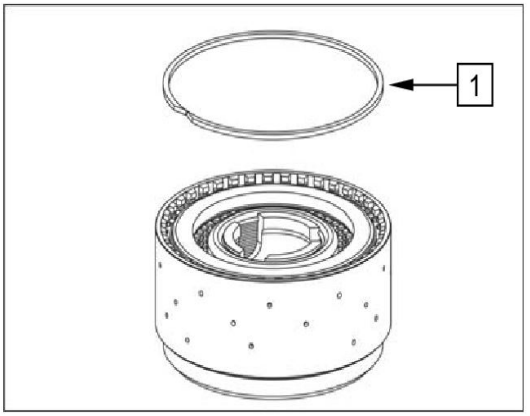


Figure 314

Remove the end plates (1) and the disc set (2).

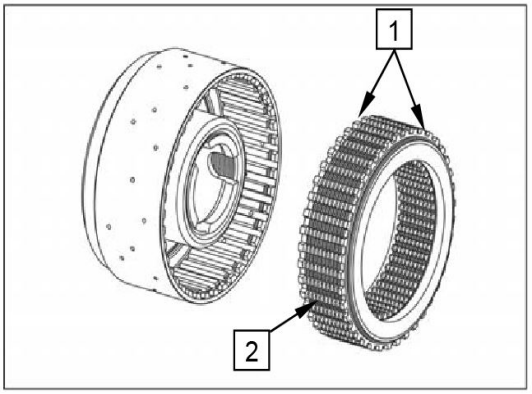


Figure 315

Preload cup springs and disengage the snap ring (1).

(S) Assembly fixture 850317-00080

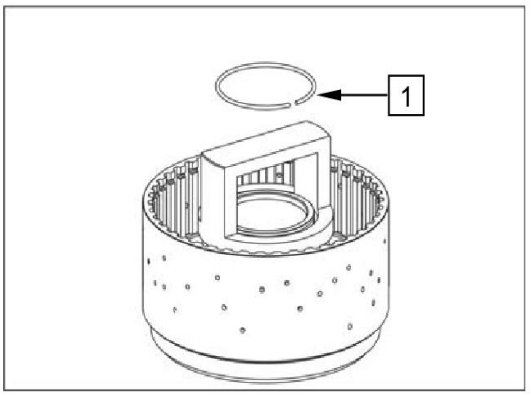


Figure 316

Remove the baffle plate (1) and the cup spring set (2).

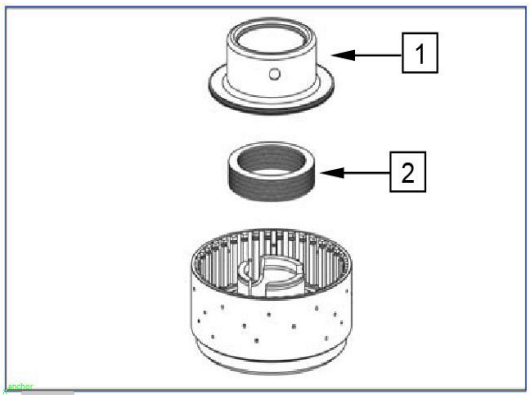


Figure 317

Press the piston (1) by means of compressed air out of the disc carrier hole and remove it.

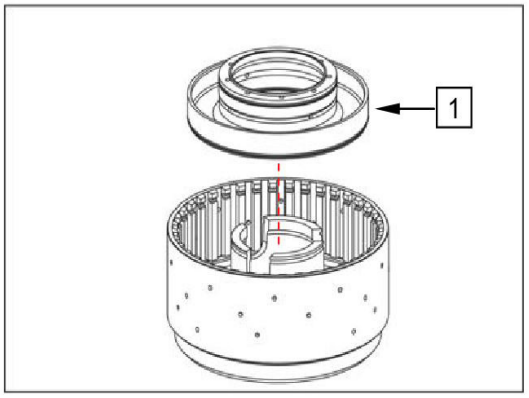


Figure 318

Remove the O-rings (1).

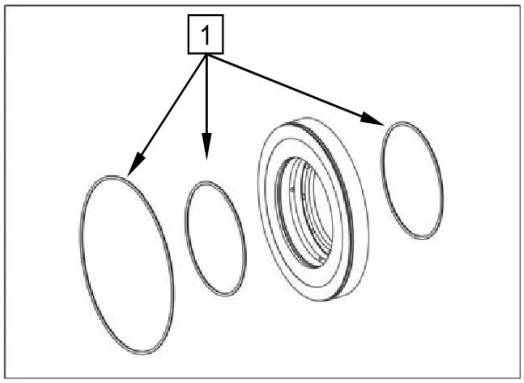


Figure 319

Dismantling differential ”G“

Loosen the hexagon screws (1).

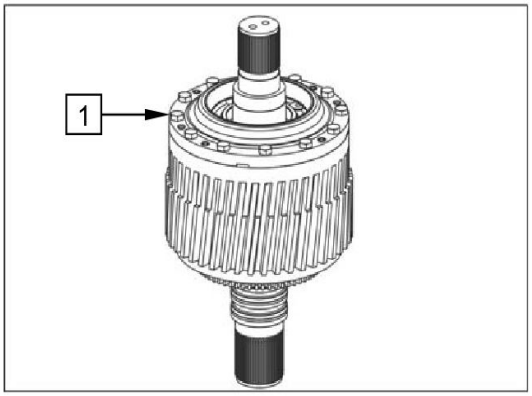


Figure 320

By means of the hexagon screws (3) separate the planet carrier (1) and the output gear (2) evenly.

Pay attention to the released output gear (2)!

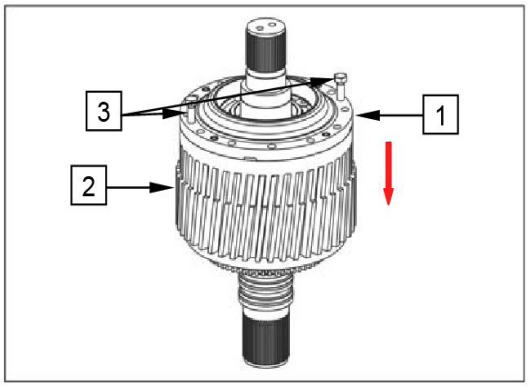


Figure 321

Remove the planet carrier with ring gear (1).

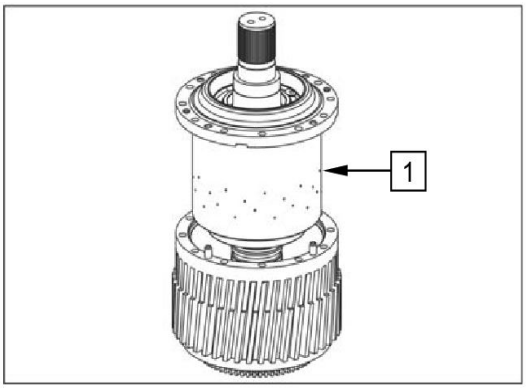


Figure 322

Remove slotted pins (1) only if damaged.

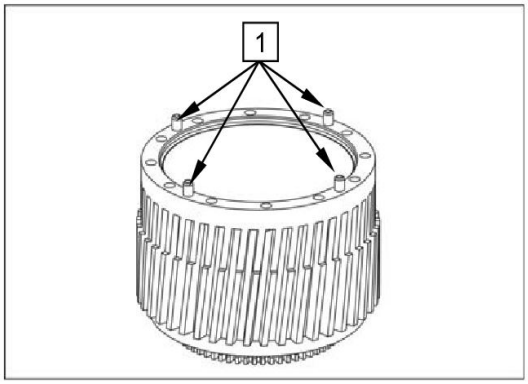


Figure 323

Separate planet carrier (1) from the ring gear (2).

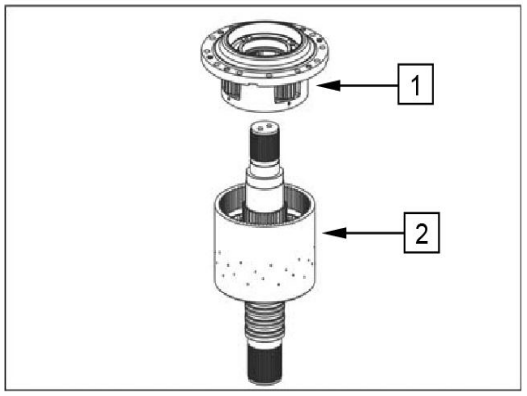


Figure 324

Drive out the slotted pins.

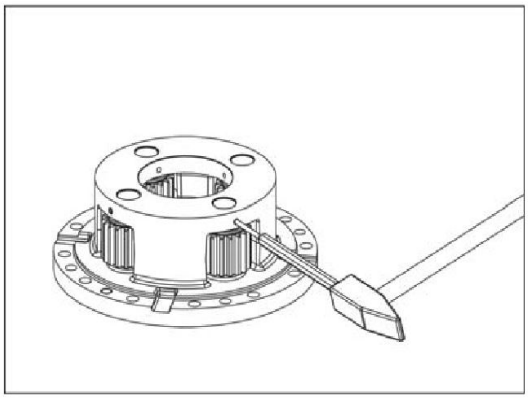


Figure 325

Drive out the planetary pins (1).

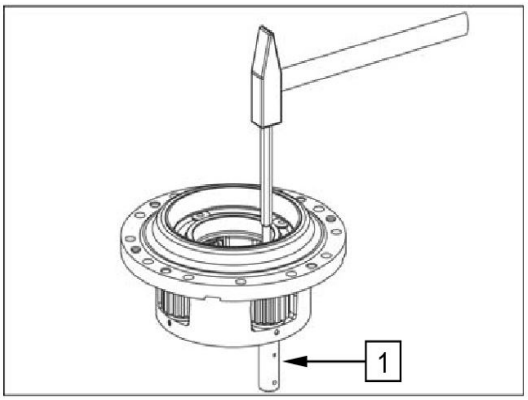


Figure 326

Pull the planet gear out (1).

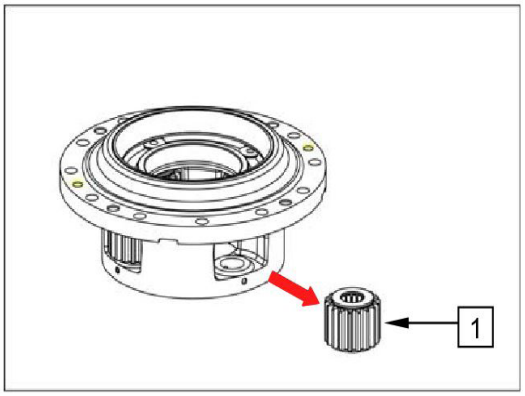


Figure 327

Remove the thrust washers (1) and the needle cages (2).

Remove the remaining planetary gears analogously, Fig. 329 to 333.

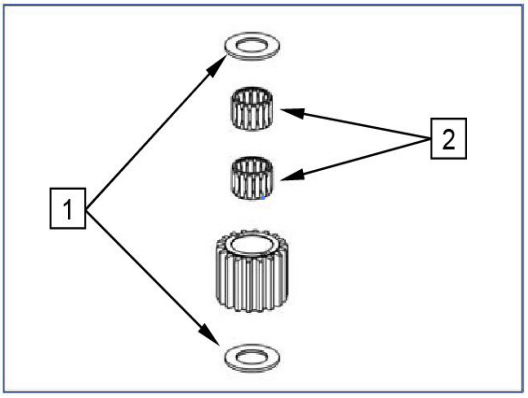


Figure 328

Pull the output shaft (1) out of the ring gear (2).

Disassembly of the output shaft is only required in case of damage!

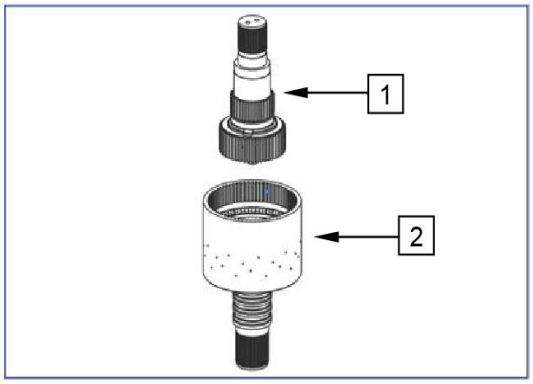


Figure 329

Remove the rectangular rings (1).

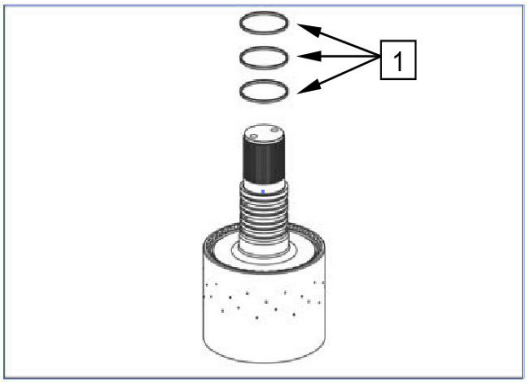


Figure 330

Disengage and remove the snap ring (1).

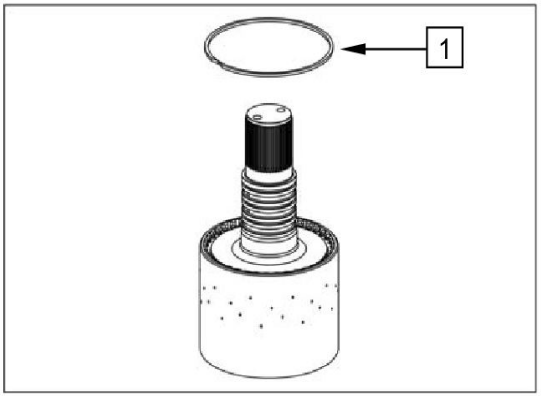


Figure 331

Separate the output gear (1) and the ring gear (2).

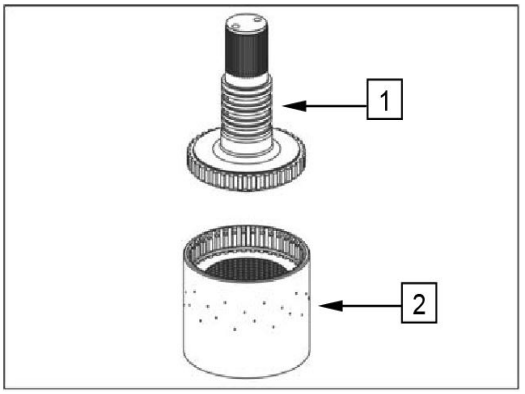


Figure 332

Remove the snap ring (1).

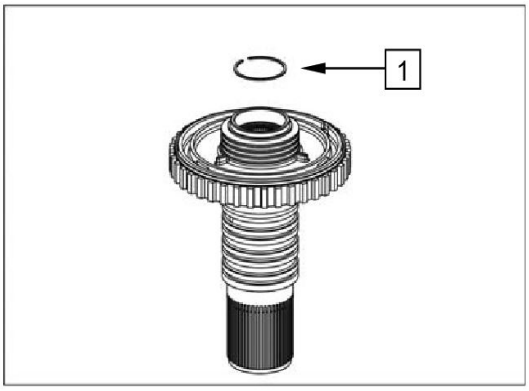


Figure 333

Pull the needle sleeve out of the output shaft by means of a Kukko puller.

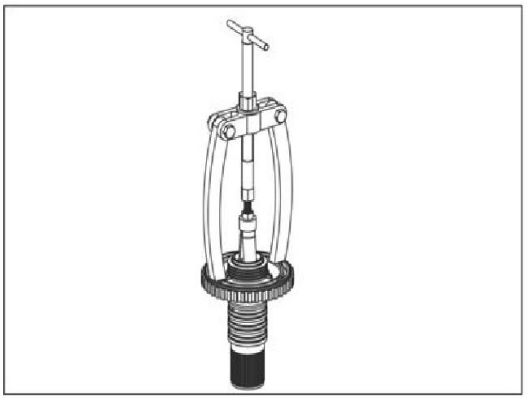


Figure 334

Preload the cup spring set and disengage the L-ring (1).

(S) Assembly aid 860103-01494

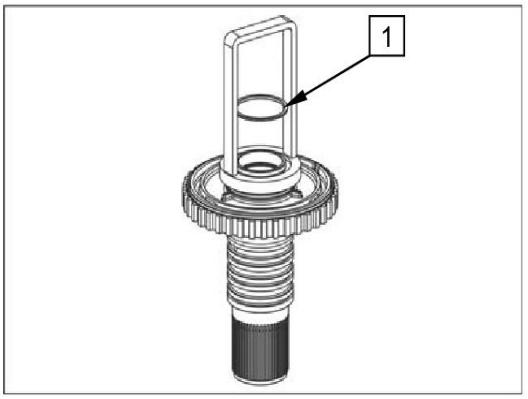


Figure 335

Remove the cup spring set (1).

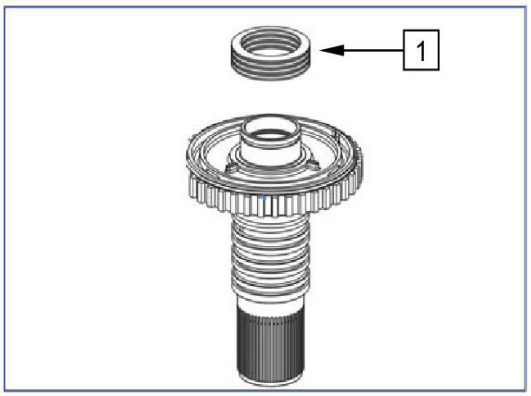


Figure 336

By means of compressed air lift the piston (1) out of the disc carrier hole and remove it.

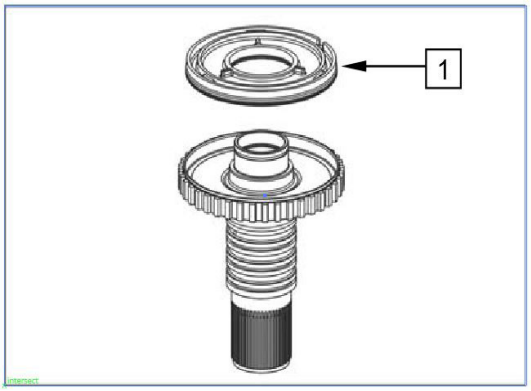


Figure 337

Remove both O-rings (1 and 2).

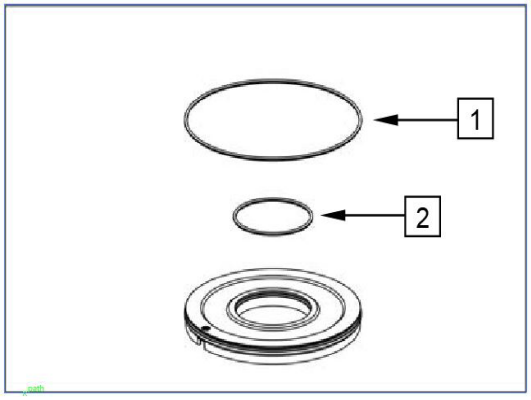


Figure 338

Disengage and remove the snap ring (1).

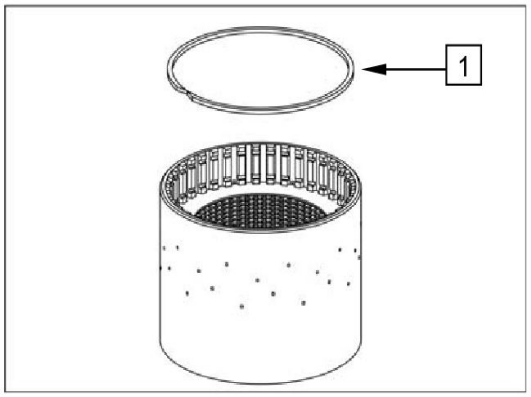


Figure 339

Remove the disc set (1) and the end plate (2).

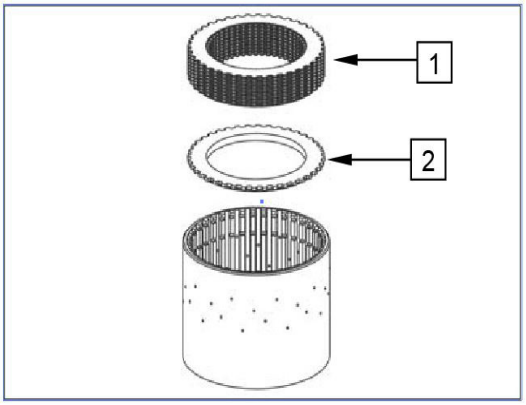


Figure 340

Disengage and remove the snap ring (1).

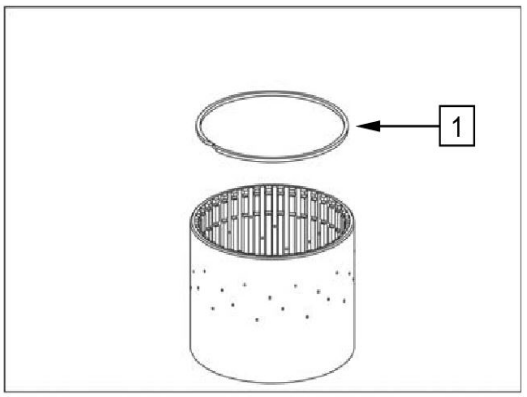


Figure 341

Reassembly of Transmission inner parts

Clutches „V“; „R“; „A“; „B“; „C“; „D“; „E“ and Differential

The opposite figure shows the markings and arrangement of the clutches and of the differential.

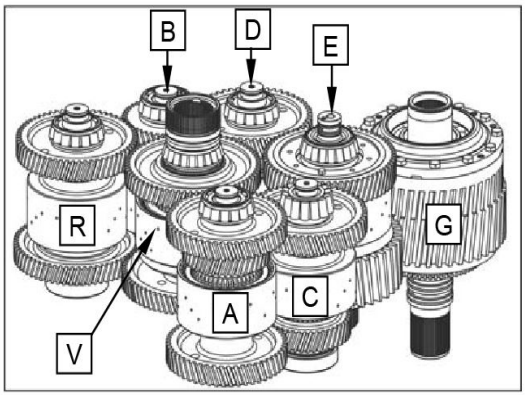


Figure 342

NOTE

The single components are described in anoder Chapters.

Legend:
V/F = Clutch Forward
R = Clutch Reverse
A = Clutch 1st and 5th gear (Forward/Reverse)
B = Clutch 2nd and 6th gear (Forward/Reverse)
C = Clutch 3rd and 7th gear (Forward/Reverse)
D = Clutch 4th and 8th gear (Forward/Reverse)
E = Clutch 5th 6th 7th 8th gear (Forward/Reverse)
F = Planetary drive 1st 2nd 3rd 4th gear (Forward/Reverse)
G = Differential
N = Input gear Emergency steering pump

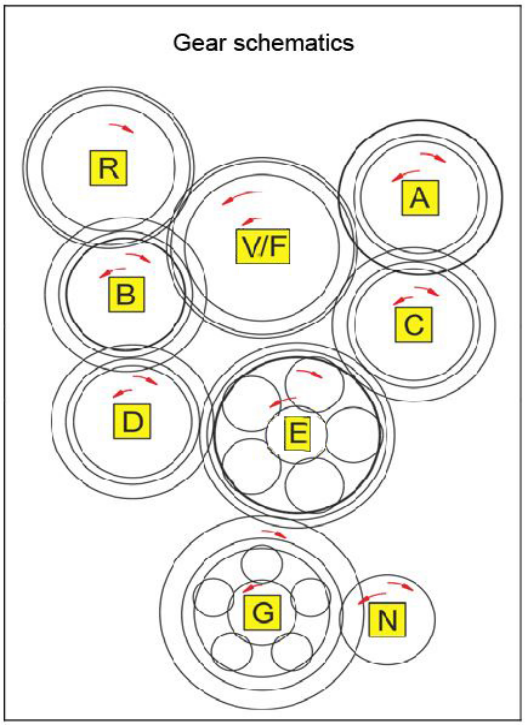


Figure 343

Clutch ”E“

Insert the O-rings (1) into the piston and grease them.

O-ring 110x3 (2x)
O-ring 170x3

See Figure 344.

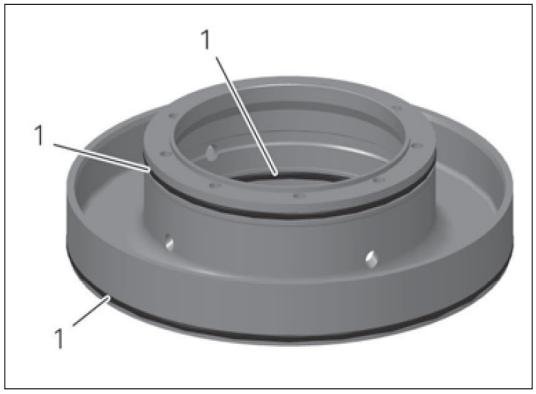


Figure 344

Oil O-rings and piston bearing surfaces.
Press piston into the disc carrier until contact.

(S) Assembly fixture 850317-00079

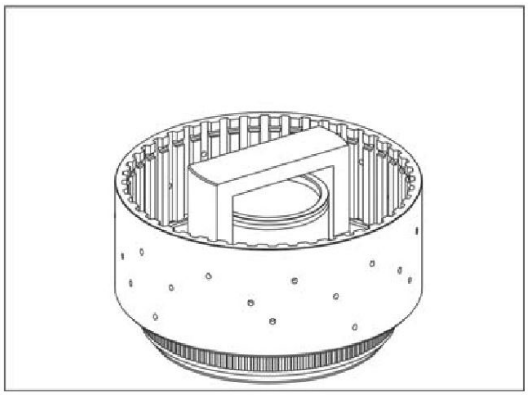


Figure 345

Mount O-ring 160x3 (1) onto the baffle plate (2) and grease it.

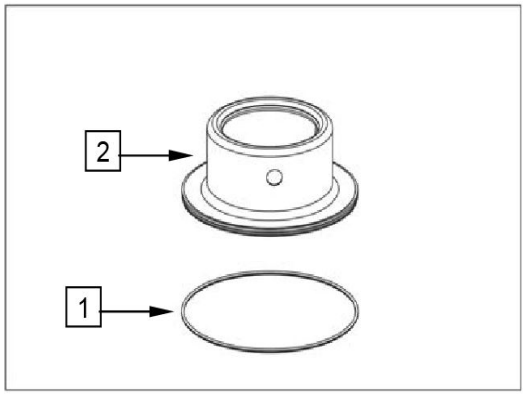


Figure 346

Assemble the cup spring set (1) and the baffle plate (2).

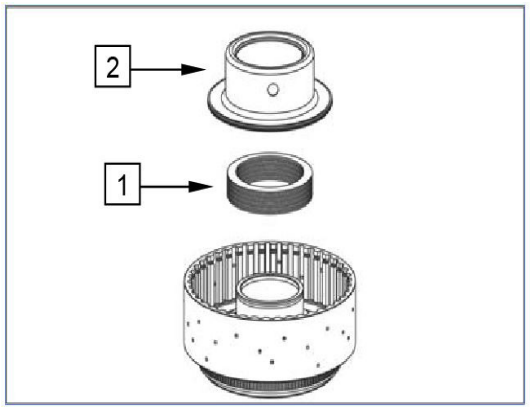


Figure 347

See Figure 348 for installation position of cup spring set!

Legend:

1 = O-ring 110x3
2 = O-ring 170x3
3 = Piston
4 = O-ring 160x3
5 = Baffle plate
6 = Cup spring set
7 = Snap ring A90
8 = Disk carrier with gear ring

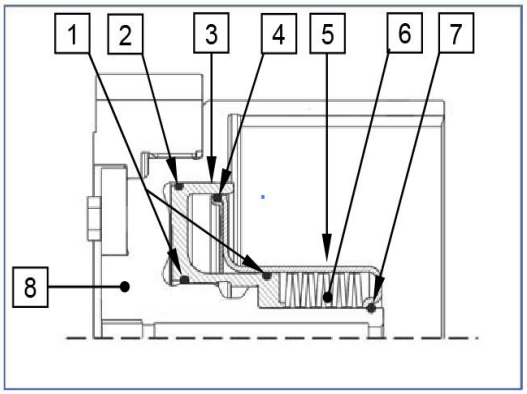


Figure 348

Preload the baffle plate with cup spring set until the snap ring (1) can be engaged into the groove.

(S) Assembly fixture 850317-00079

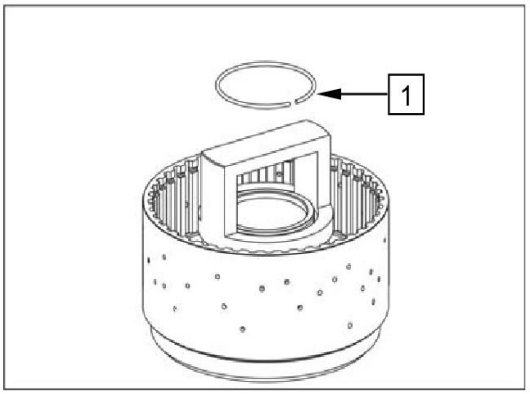


Figure 349

To ensure a correct measuring result, install single parts without oil for the time being.

Assemble the end plate (1).

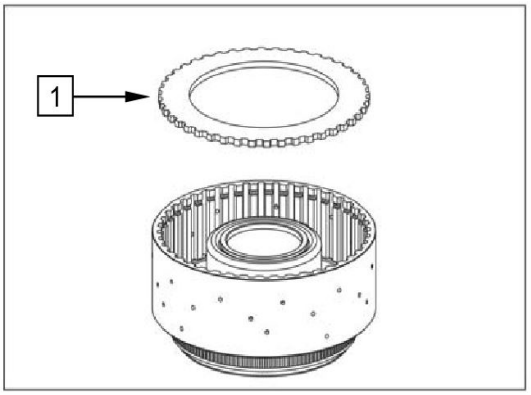


Figure 350

Alternately assemble **HA30F=10 pcs./ DA40F=12 pcs** of inner clutch disks (1) and 10 pcs. of outer clutch disks (2) into the disc carrier (3).

CAUTION

Starting with an inner clutch disc!
Coated side of the inner and outer clutch discs must always be installed showing to the piston!
Depending on the parts list version, a disc arrangement with 9 inner and outer discs may be installed!
Please refer to the relating spare parts list to see the installed disk arrangement!

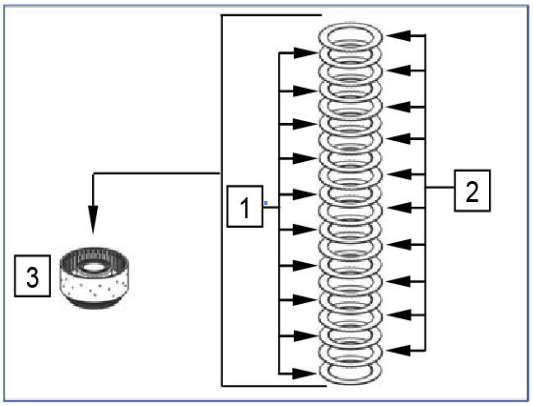


Figure 351

Install the end plate (1) and fasten the disc set with snap ring (2).

Installation position of end plate (1)

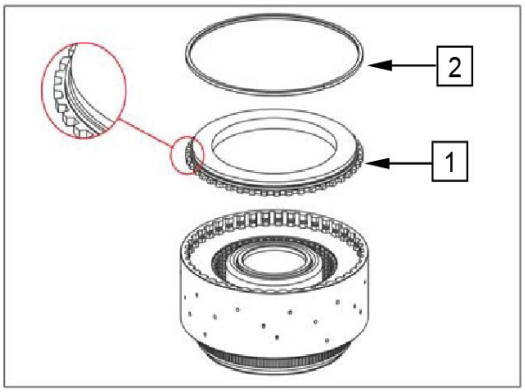


Figure 352

Heat up the gear ring (1) (approx. 120° C) and mount it onto the disc carrier (2) until contact.

WARNING

Use safety gloves!

CAUTION

Adjust the gear ring after cooling down!

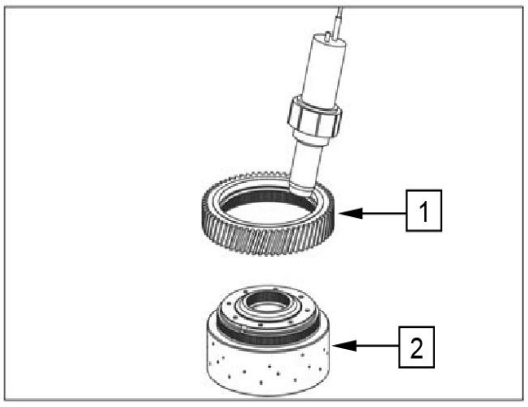


Figure 353

Assemble the washer (1) until contact is obtained and fasten it with the hexagon screws (2).

Tightening torque (M8/10.9x20) M_A= 34 Nm

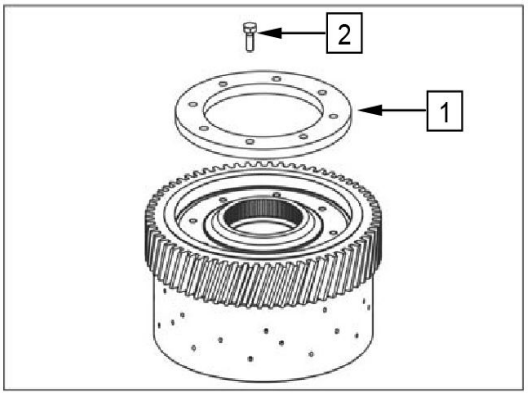


Figure 354

Heat up the teeth of the disc carrier (1) (approx. 120° C).

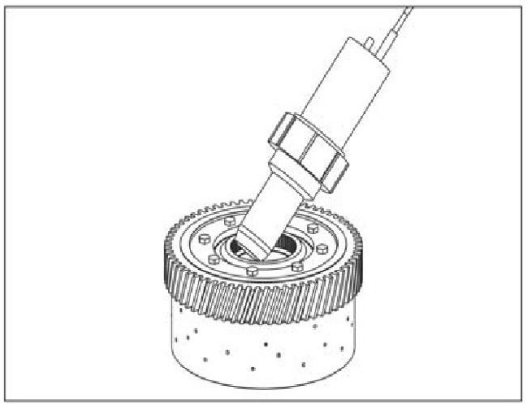


Figure 355

Assemble the disc carrier (1) onto the shaft (2) until contact.

WARNING

Use safety gloves!

CAUTION

Adjust the disk carrier after cooling down!

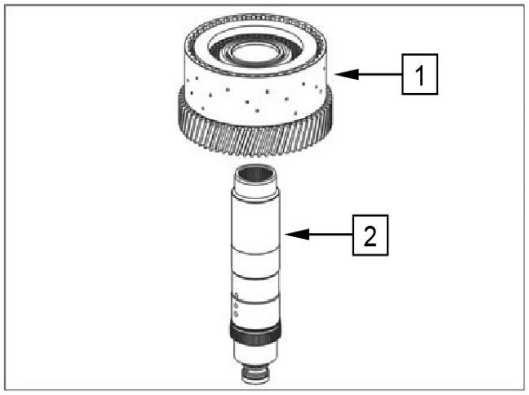


Figure 356

Heat up the bearing inner ring of the taper roller bearing (approx. 120° C).

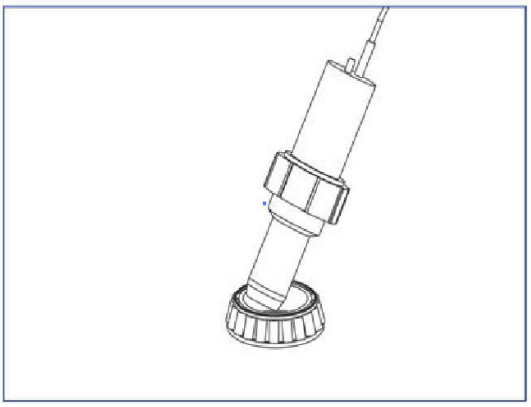


Figure 357

Assemble the bearing inner ring (1) until contact.

WARNING

Use safety gloves!

CAUTION

Adjust the bearing inner ring after cooling down!

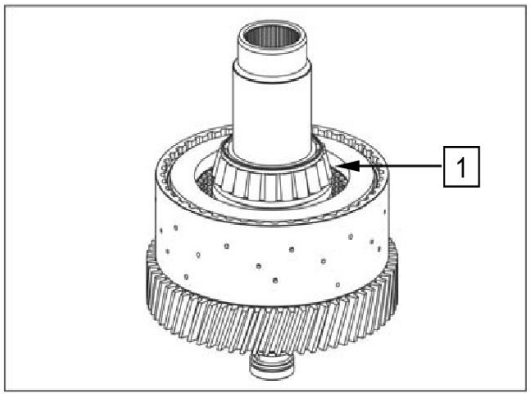


Figure 358

Heat up the internal teeth of the idler (1) (approx. 120° C).

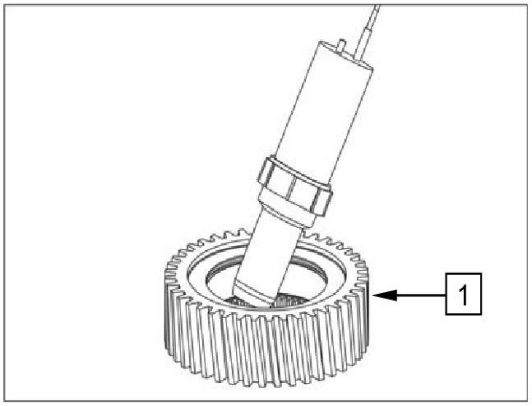


Figure 359

Install the inner disc carrier (1) into the idler (2) until contact is obtained and fasten it with the retaining ring (3).

WARNING

Use safety gloves!

CAUTION

Adjust the disc carrier after cooling down!

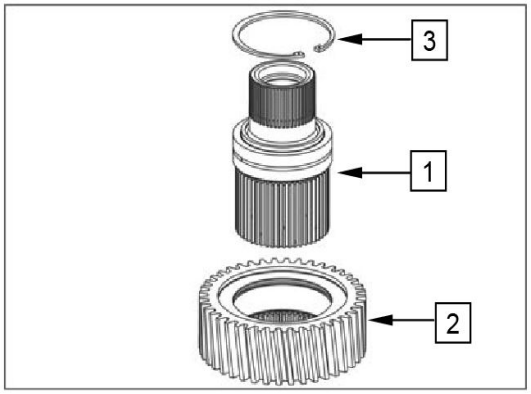


Figure 360

Heat up the bearing inner ring of the taper roller bearing (approx. 120° C).

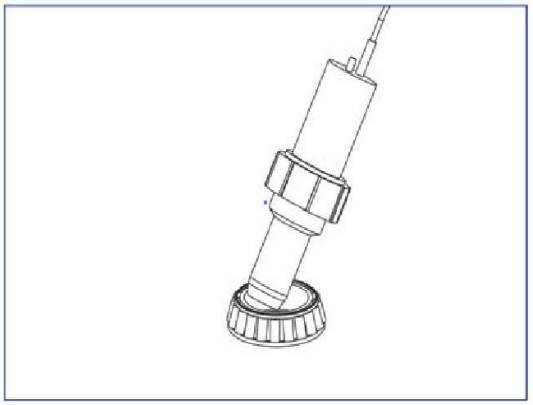


Figure 361

Assemble the bearing inner ring (1) until contact.

WARNING

Use safety gloves!

CAUTION

Adjust the bearing inner ring after cooling down!

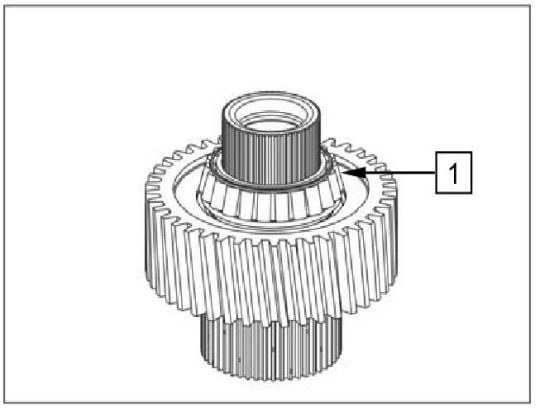


Figure 362

Press the needle sleeve (1) into the idler until contact and oil it.

(S) Driver tool	850317-00084
(S) Handle	850317-00084

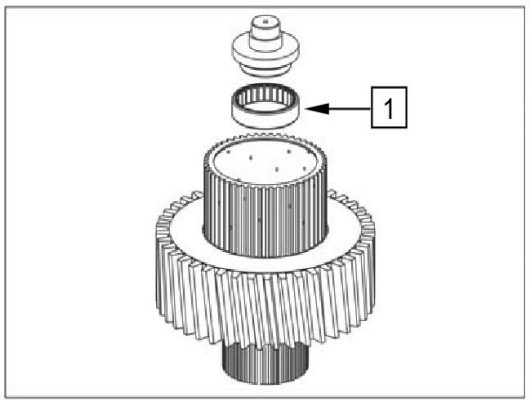


Figure 363

Fasten the needle sleeve with snap ring 85x2 (1).

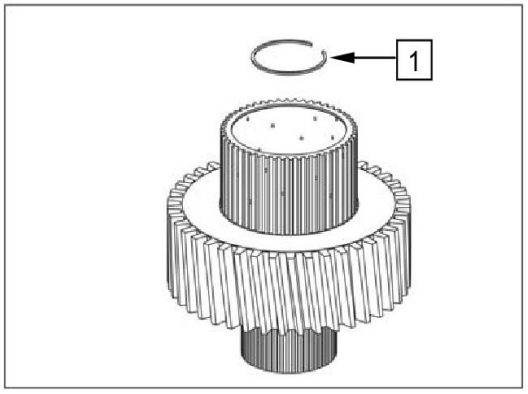


Figure 364

Insert the washer (1) and the bearing outer ring (2) with grease into the idler.

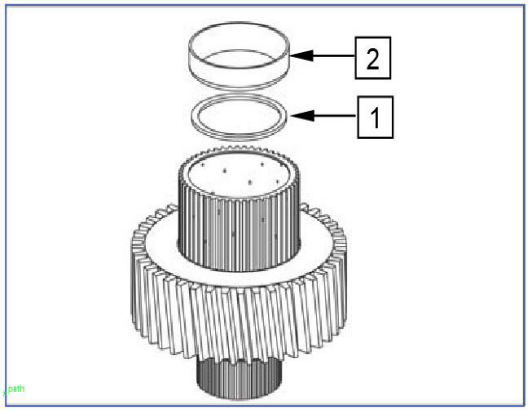


Figure 365

Align the inner clutch discs and assemble the idler (1) until contact is obtained.

By means of short left-hand/right-hand rotations mount the inner clutch discs onto the inner dick carrier.

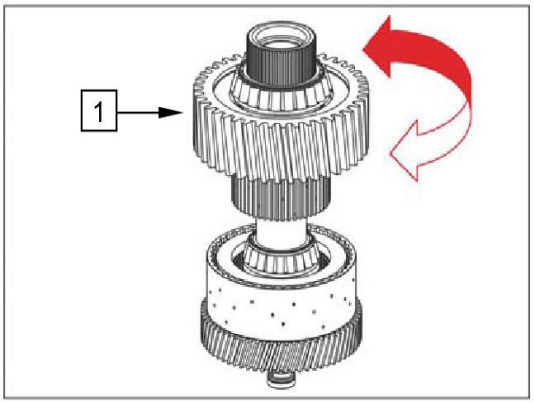


Figure 366

Heat up the bearing inner ring of the taper roller bearing (approx. 120° C).

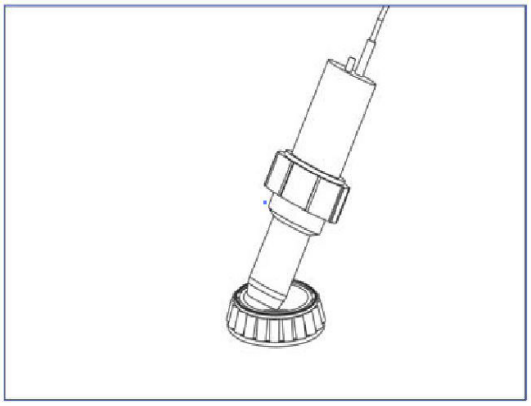


Figure 367

Install the bearing inner ring (1) until contact.

WARNING

Use safety gloves!

CAUTION

Adjust the bearing inner ring after cooling down!

Install, align and grease the rectangular rings 42x2.5 (2).

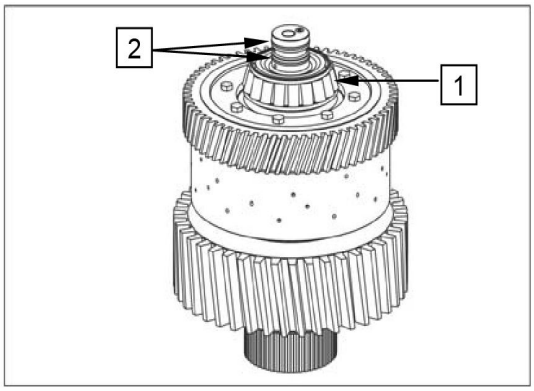


Figure 368

NOTE

Check closing and opening of the clutch by means of compressed air at the hole (see arrow).
Closing and opening of the clutch must be clearly audible.

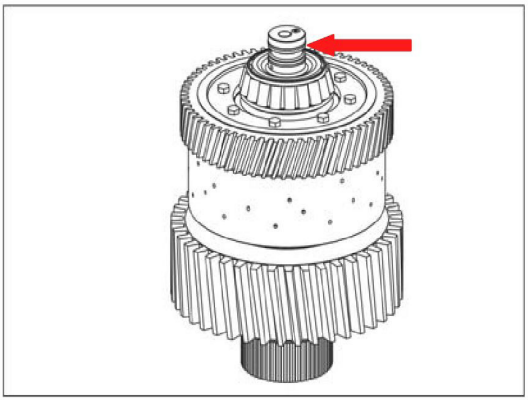


Figure 369

Install the assembly aid.

(S) Assembly aid 850317-00074

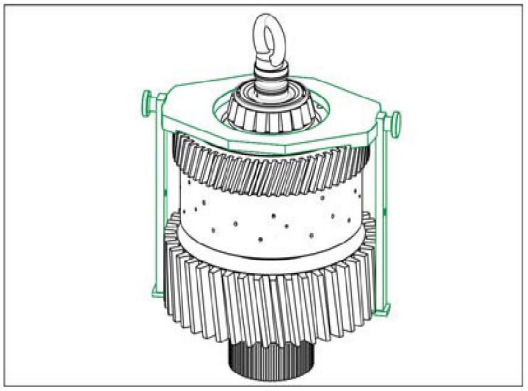


Figure 370

Insert clutches ”E“ into mounting device II.

NOTE

See marking on the mounting device!

(S) Mounting device II 850317-00077

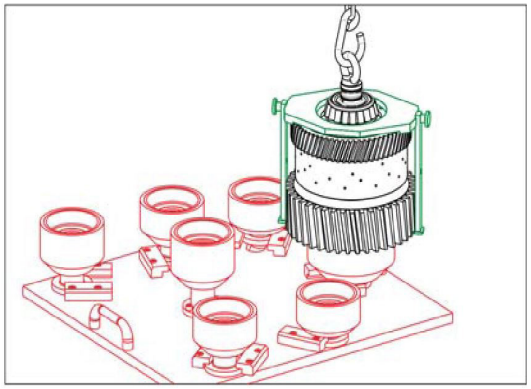


Figure 371

Clutch "R"

Insert the O-rings (1) into the piston and grease them.

O-ring 95x3
O-ring 100x3
O-ring 158x3

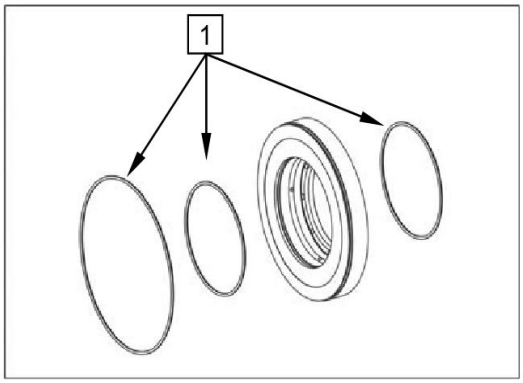


Figure 372

Press piston into the disc carrier until contact.

(S) Assembly fixture 850317-00080

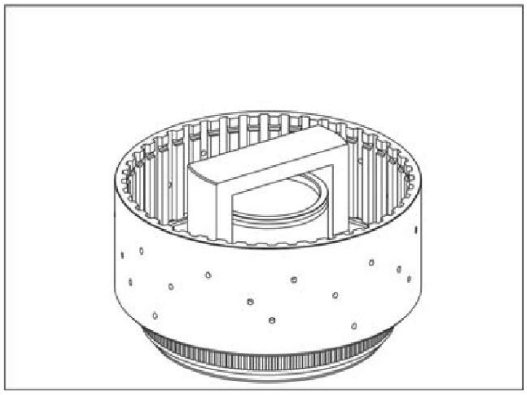


Figure 373

Mount O-ring 147x3 (1) onto the baffle plate (2) and grease it.

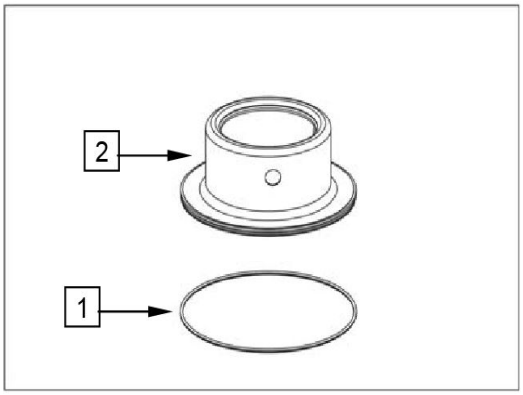


Figure 374

Assemble the cup spring set (1) and the baffle plate (2).

See Figure 376 for installation position of cup spring set!

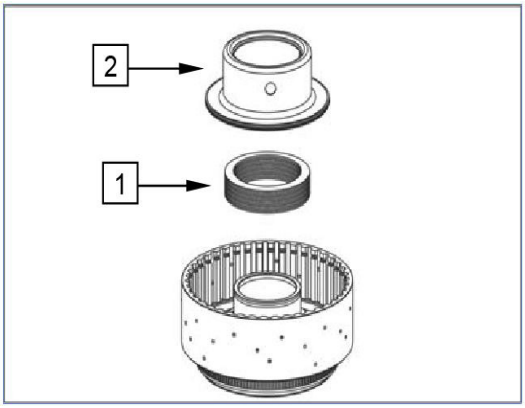


Figure 375

Legend:
1 = O-ring 158x3
2 = Piston
3 = End plate
4 = Inner clutch disk 10x
5 = Outer clutch disk 10x
6 = End plate
7 = Snap ring
8 = Cup spring set
9 = Baffle plate
10 = Snap ring A85
11 = O-ring 95x3
12 = O-ring 100x3
13 = Disk carrier

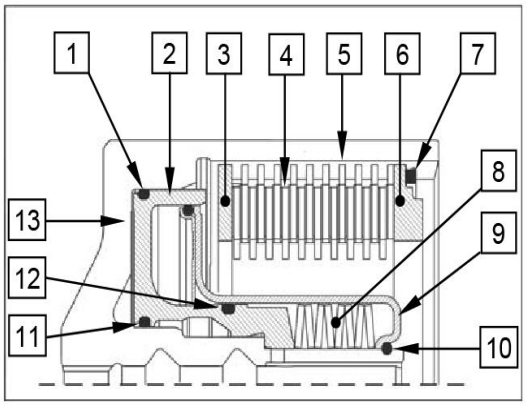


Figure 376

Preload the baffle plate with cup spring set until the snap ring (1) can be engaged into the groove.

(S) Assembly fixture 850317-00080

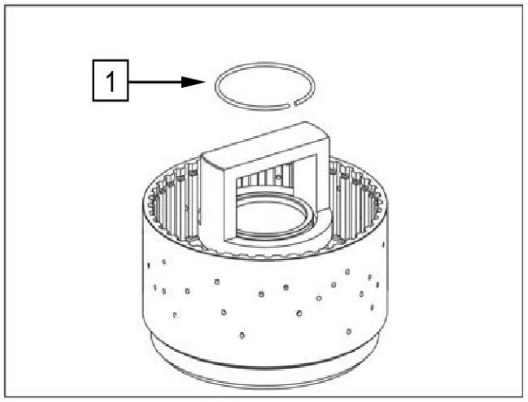


Figure 377

Assemble the end plate (1).

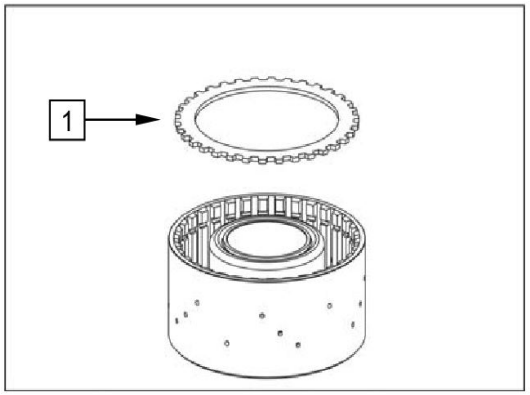


Figure 378

Alternately assemble 10 pcs. of inner clutch discs (1) and 10 pcs. of outer clutch discs (2) into the disc carrier (3).

CAUTION

Starting with an inner clutch disc! Coated side of the inner and outer clutch discs must always be installed showing to the piston! Depending on the parts list version, a disc arrangement with 9 inner and outer discs may be installed! Please refer to the relating spare parts list to see the installed disc arrangement! See (Figure 376)!

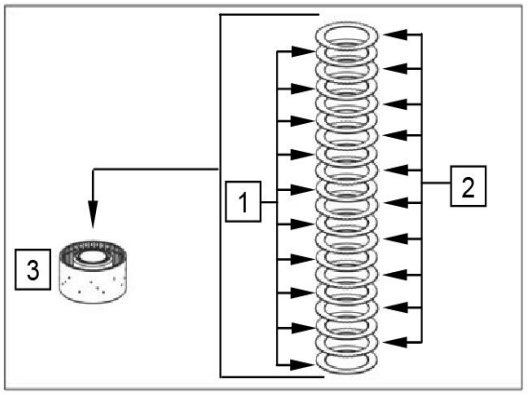


Figure 379

Install the end plate (1) and fasten the disc set with snap ring (2).

Installation position of end plate (1)

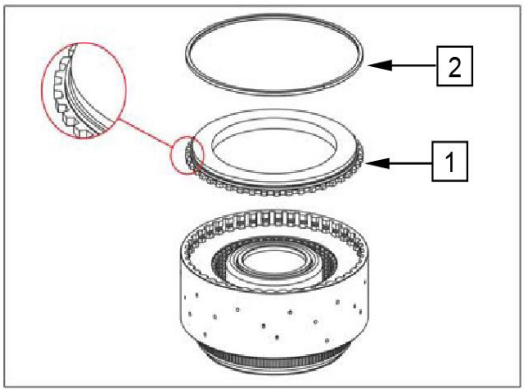


Figure 380

Carry out the next step referring to disc clearance check operation See “Figure 536” on page 174 and “Figure 537” on page 174

Heat up the internal teeth of the clutch (1) (approx. 120° C).

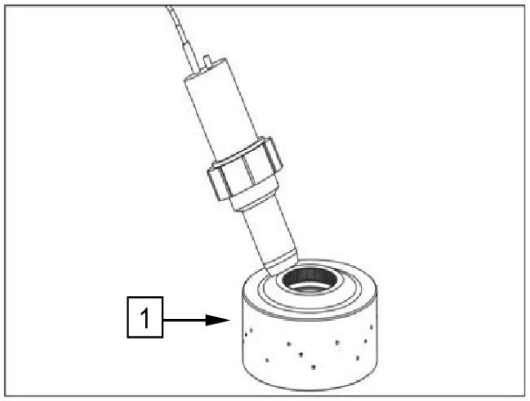


Figure 381

Assemble the clutch (1) until contact.

WARNING

Use safety gloves!

CAUTION

Adjust the clutch after cooling down!

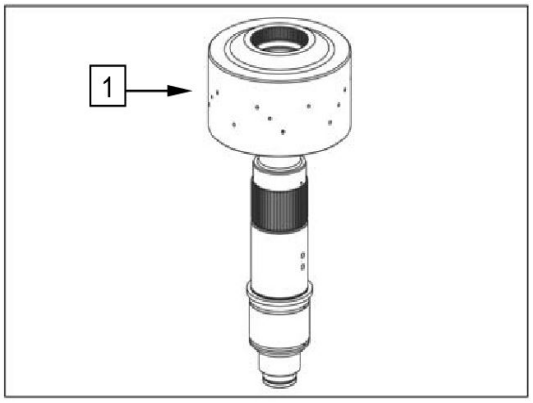


Figure 382

Engage snap ring SB 72 (1) into the recess.

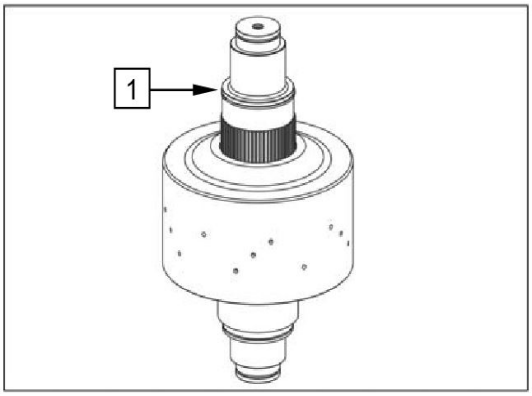


Figure 383

Heat up the internal teeth of the gear (approx. 120° C).

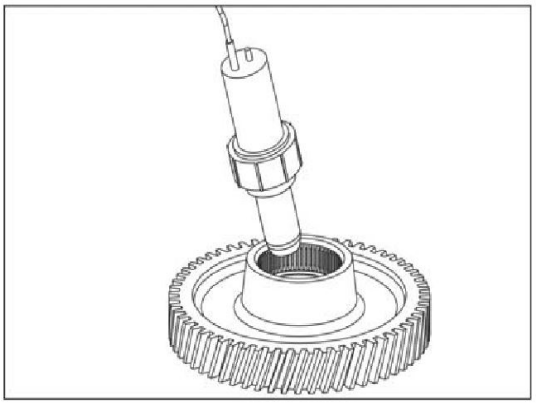


Figure 384

Assemble the gear (1) until the snap ring has engaged into the recess of the gear.

NOTE

Both ends of the snap ring must be located in one of the four mounting holes (see arrows)
The snap ring must be engaged into both recesses of shaft and gear!

CAUTION

Use safety gloves!

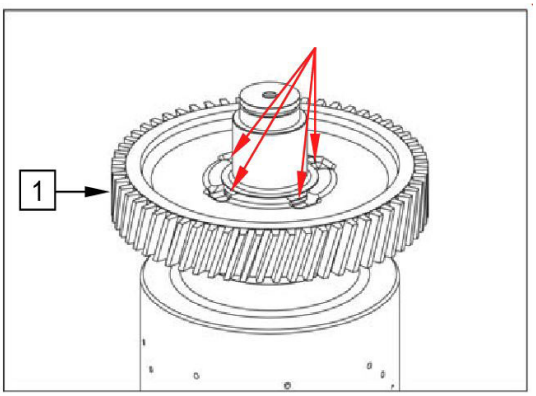


Figure 385

Heat up the bearing inner ring of the taper roller bearing (approx. 120° C).

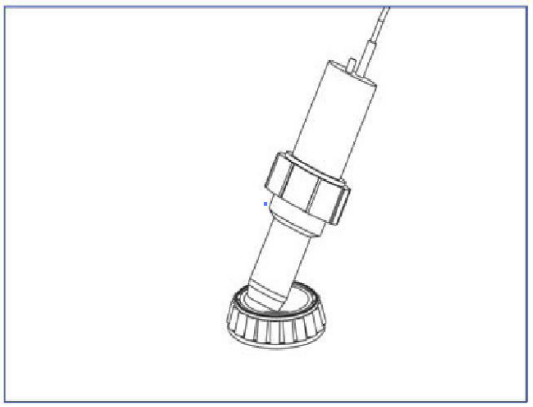


Figure 386

Assemble the bearing inner ring (1) until contact.

WARNING

Use safety gloves!

CAUTION

Adjust the bearing inner ring after cooling down!

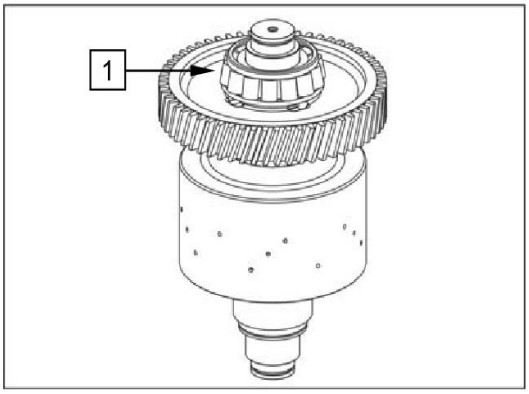


Figure 387

Assemble running disc 80x105x5.75 (1), axial bearing 80x105x4 (2) and axial washer 80x105x1 (3) and oil them.

NOTE

Install running disc (1) with the chamfer showing to the axial bearing (see arrow)

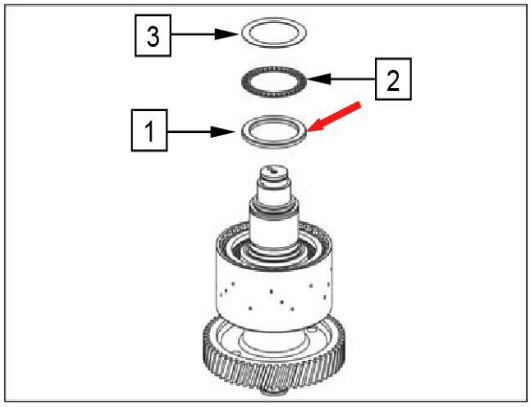


Figure 388

Assemble and oil the needle cage 80x88x46 (1).

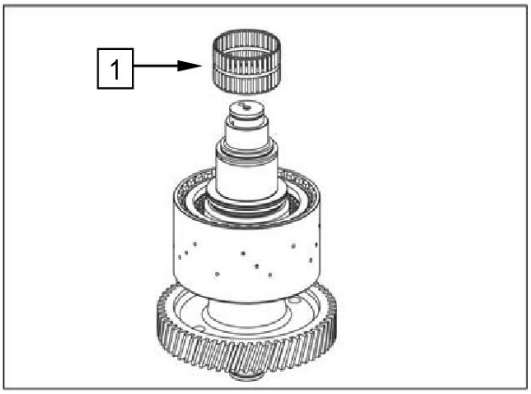


Figure 389

Align the inner clutch discs and assemble the idler (1) until contact is obtained.

By means of short left-hand/right-hand rotations mount the inner clutch discs onto the inner disc carrier.

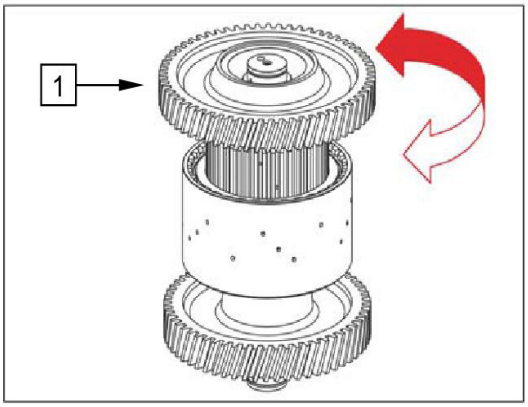


Figure 390

Engage snap ring SB 70 (1) into the recess.

Assemble and oil the axial washer 80x105x1 (2) and the axial bearing 80x105x4 (3).

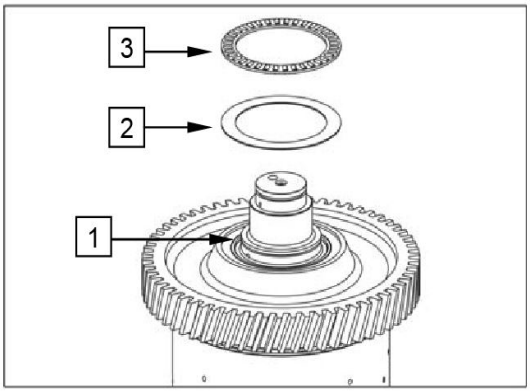


Figure 391

Use grease to fix the axial washer 80x105x1 (1) to washer(2).
By means of a suitable pressure piece the washer (2) must be pressed until contact is obtained, i.e. until the snap ring has engaged into the recess of the washer.

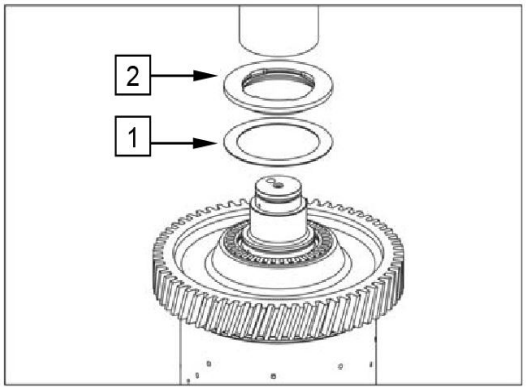


Figure 392

NOTE

Both ends of the snap ring must be located in one of the four mounting holes (see arrows)! The snap ring must be engaged into both recesses of shaft and washer!

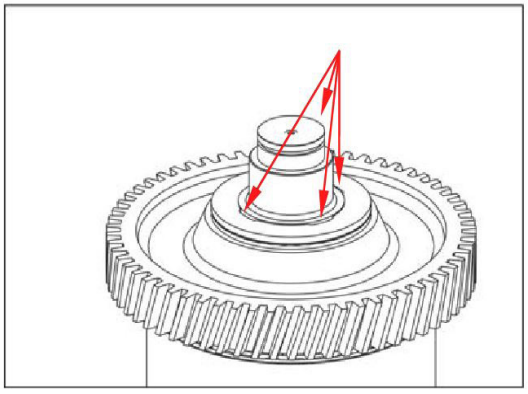


Figure 393

Heat up the bearing inner ring of the taper roller bearing (approx. 120° C).

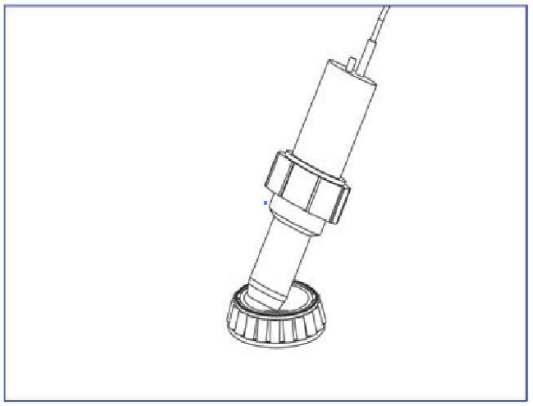


Figure 394

Assemble the bearing inner ring (1) until contact.

WARNING

Use safety gloves!

CAUTION

Adjust the bearing inner ring after cooling down!

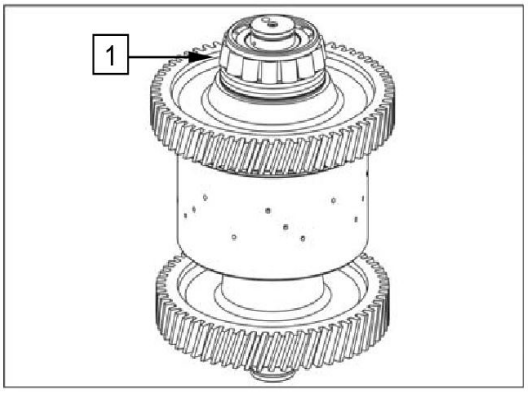


Figure 395

Install, align and grease the rectangular rings 42x2.5 (1).

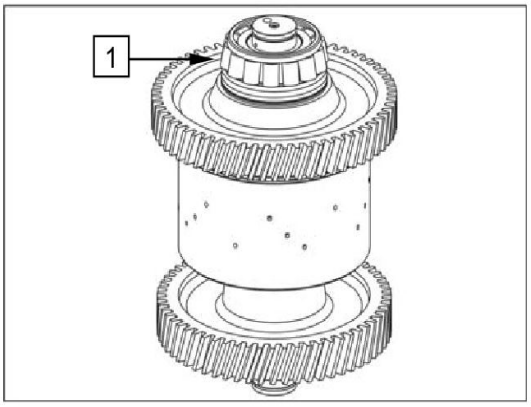


Figure 396

NOTE

Check closing and opening of the clutch by means of compressed air at the hole (see arrow).
Closing and opening of the clutch must be clearly audible.

NOTE

See marking on the mounting device!

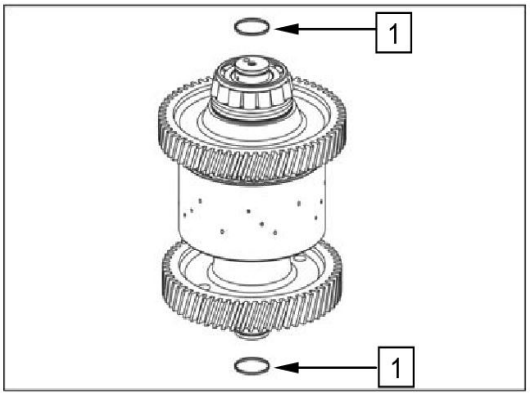


Figure 397

Insert clutches ”R“ into the mounting device II.

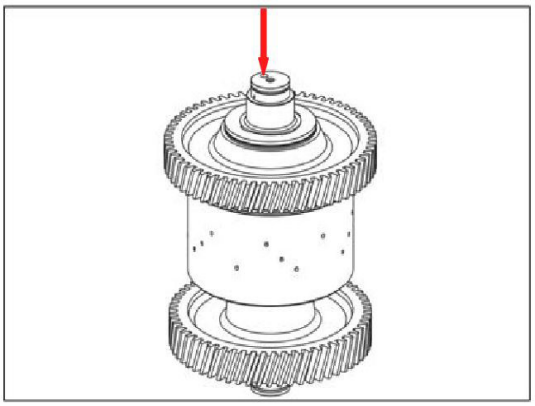


Figure 398

(S) Mounting device II 850317-00077

Clutch "B"

Insert the O-rings (1) into the piston and grease them.

O-ring 95x3
O-ring 100x3
O-ring 158x3

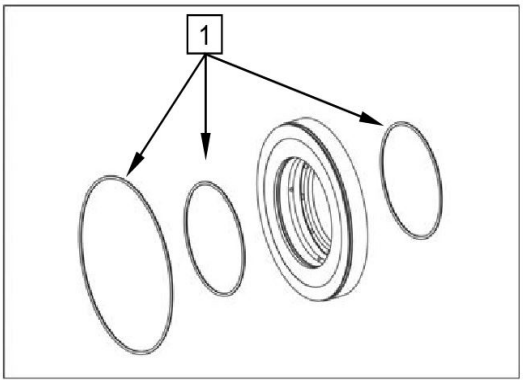


Figure 399

Press piston into the disc carrier until contact.

(S) Assembly fixture 850317-00080

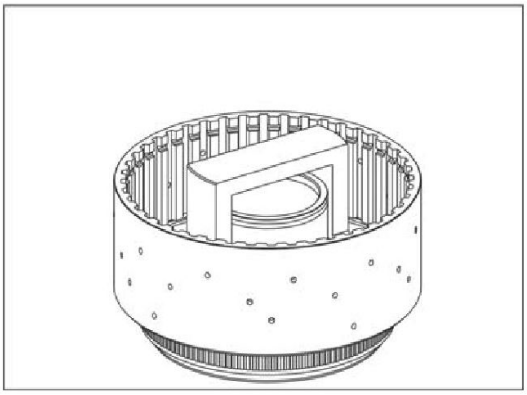


Figure 400

Mount O-ring 147x3 (1) onto the baffle plate (2) and grease it.

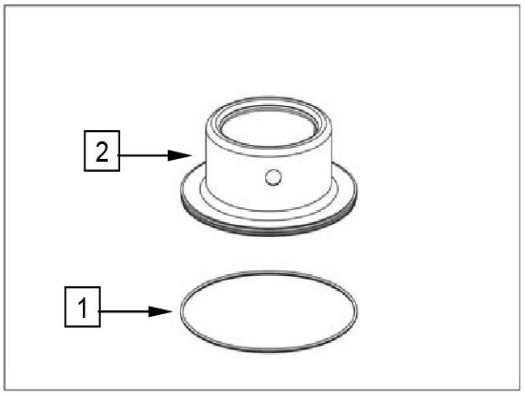


Figure 401

Assemble the cup spring set (1) and the baffle plate (2).

See Figure 403 for installation position of cup spring set!

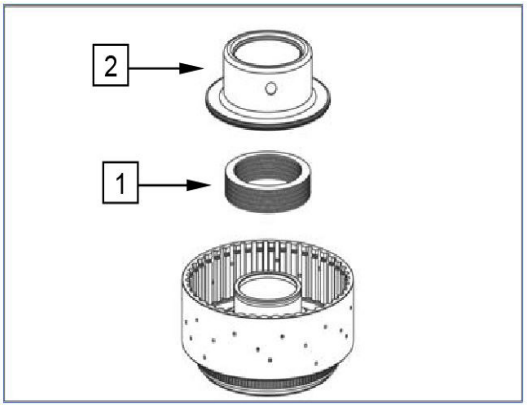


Figure 402

Legend:
1 = O-ring 158x3
2 = Piston
3 = End plate
4 = Inner clutch disc 8x / 10x
5 = Outer clutch disc 8x / 10x
6 = End plate
7 = Snap ring
8 = Cup spring set
9 = Baffle plate
10 = Snap ring A85
11 = O-ring 95x3
12 = O-ring 100x3
13 = Disc carrier

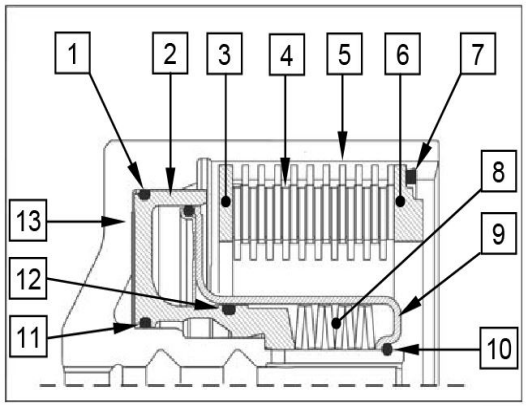


Figure 403

Preload the baffle plate with cup spring set until the snap ring (1) can be engaged into the groove.

(S) Assembly fixture 850317-00080

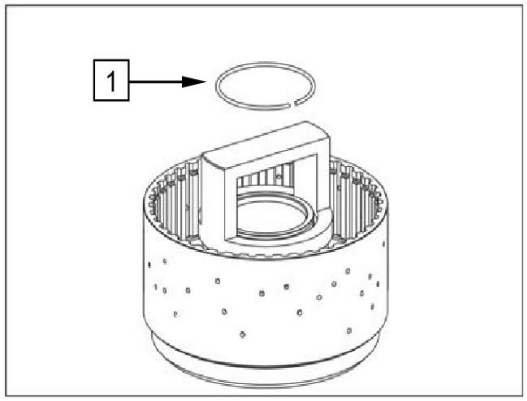


Figure 404

Assemble the end plate (1).

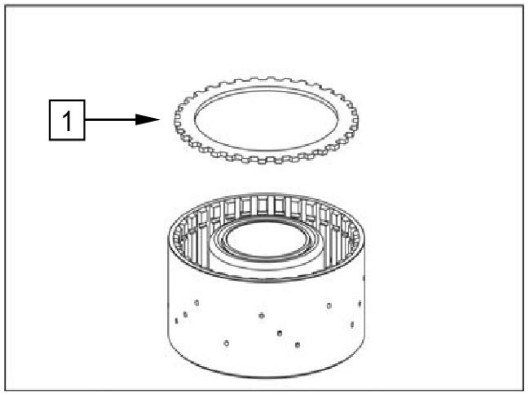


Figure 405

Alternately assemble **HA30F=8 pcs./ DA40F=10 pcs** of inner clutch discs (1) and **HA30F=8 pcs./ DA40F=10 pcs**. of outer clutch discs (2) into the disc carrier (3).

CAUTION

Starting with an inner clutch disc!
Coated side of the inner and outer clutch discs must always be installed showing to the piston!
Depending on the parts list version, a disc arrangement with 7 inner and outer discs may be installed!
Please refer to the relating spare parts list to see the installed disc arrangement!
See (Figure 403)!

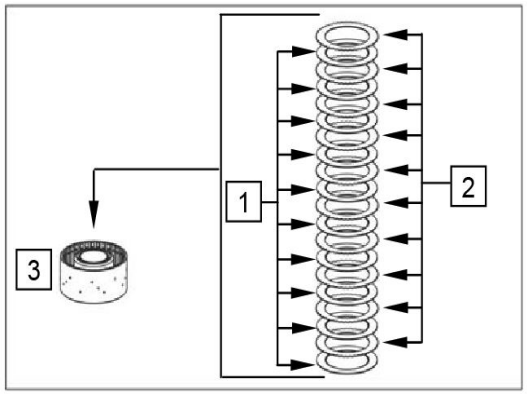


Figure 406

Install the end plate (1) and fasten the disc set with snap ring (2).

Installation position of end plate (1)

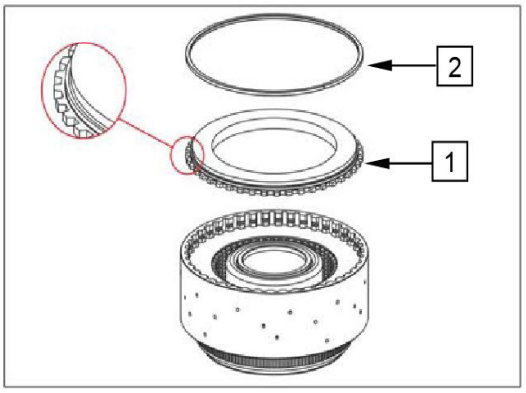


Figure 407

Carry out the next step referring to disc clearance check operation See “Figure 536” on page 174 and “Figure 537” on page 174

Heat up the internal teeth of the clutch (1) (approx. 120° C).

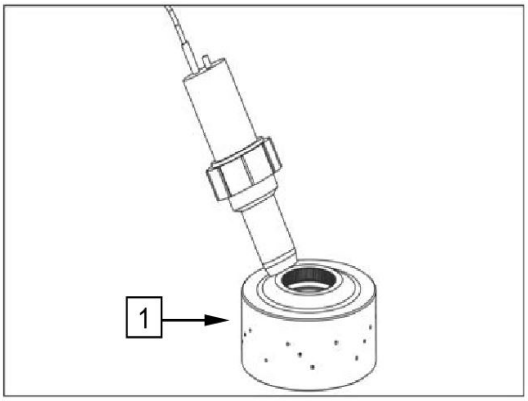


Figure 408

Assemble the clutch (1) until contact.

WARNING

Use safety gloves!

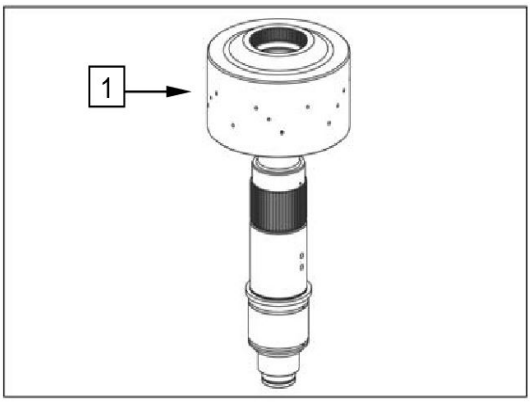


Figure 409

CAUTION

Adjust the clutch after cooling down!

Engage snap ring SB 72 (1) into the recess.

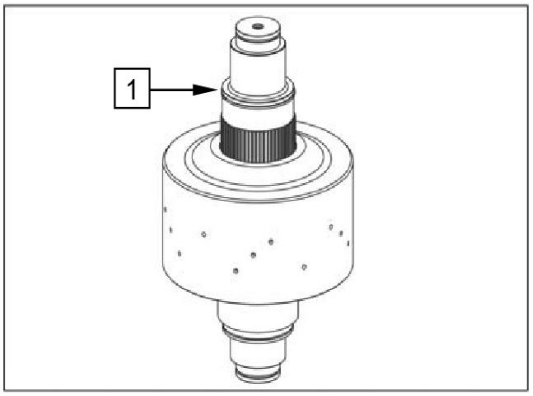


Figure 410

Heat up the internal teeth of the gear (approx. 120° C).

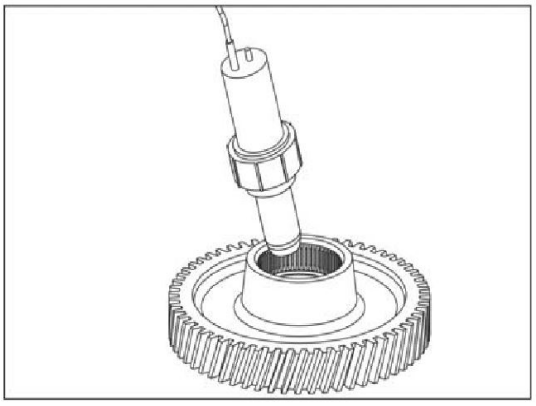


Figure 411

Assemble the gear (1) until the snap ring has engaged into the recess of the gear.

NOTE

Both ends of the snap ring must be located in one of the four mounting holes (see arrows)!
The snap ring must be engaged into both recesses ofshaft and gear!

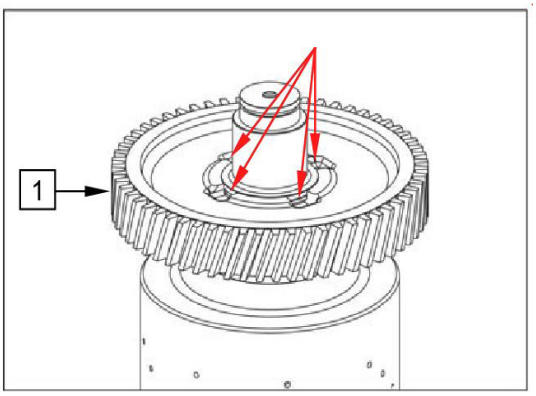


Figure 412

WARNING

Use safety gloves!

Heat up the bearing inner ring of the taper roller bearing (approx. 120° C).

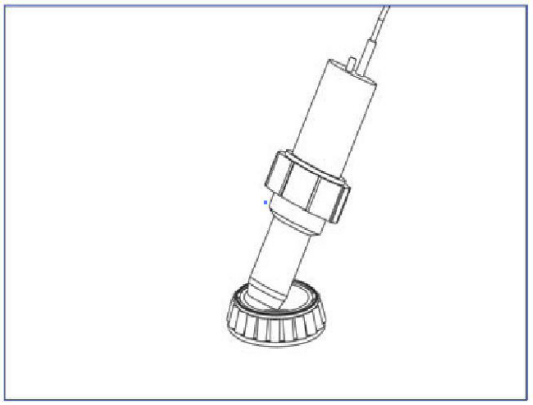


Figure 413

Assemble the bearing inner ring (1) until contact.

WARNING

Use safety gloves!

CAUTION

Adjust the bearing inner ring after cooling down!

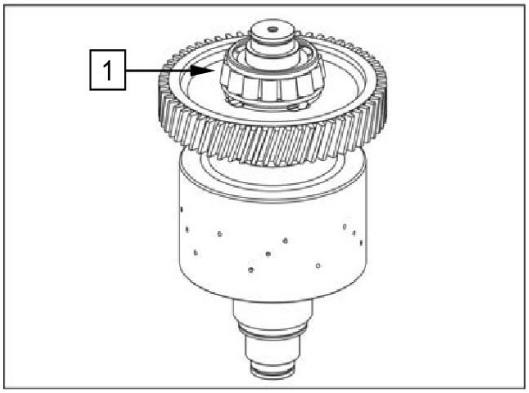


Figure 414

Assemble running disc 80x105x5.75 (1), axial bearing 80x105x4 (2) and axial washer 80x105x1 (3) and oil them.

NOTE

Install running disc (1) with the chamfer showing to the axial bearing (see arrow)

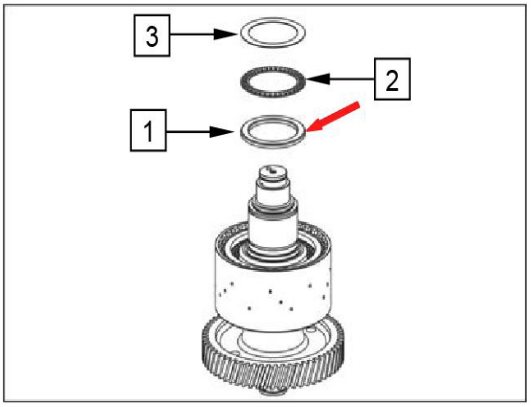


Figure 415

Assemble and oil the needle cage 80x88x46 (1).

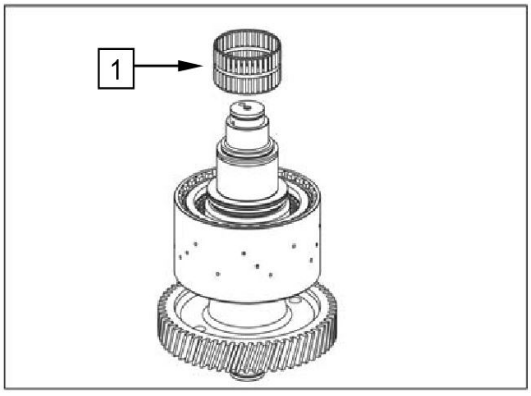


Figure 416

Align the inner clutch discs and assemble the idler (1) until contact is obtained.

By means of short left-hand/right-hand rotations mount the inner clutch discs onto the inner disc carrier.

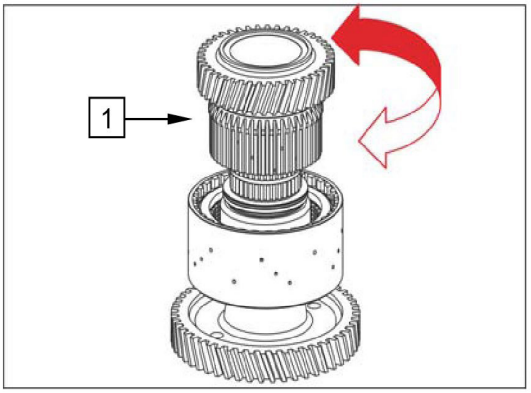


Figure 417

Assemble and oil the axial washer 80x105x1 (1), the axial bearing 80x105x4 (2) and the axial washer 80x105x1 (1).

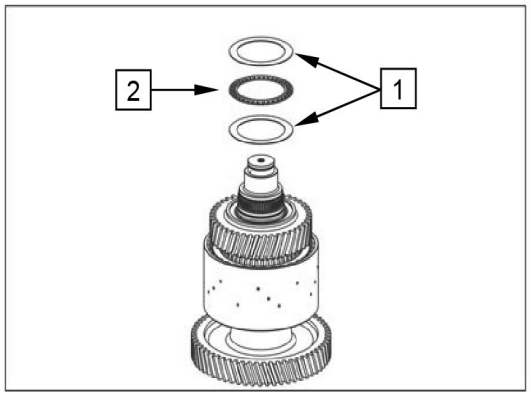


Figure 418

Engage snap ring SB 74 (1) into the recess.

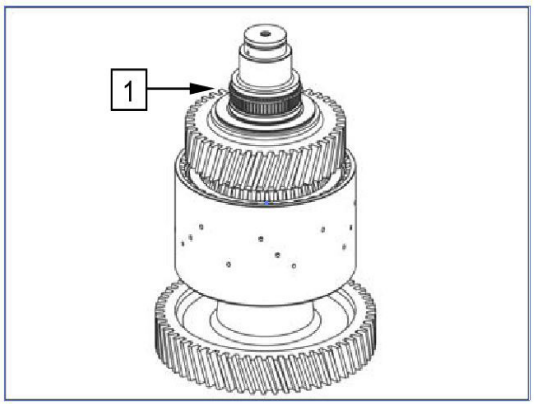


Figure 419

Heat up the internal teeth of the gear (approx. 120° C).

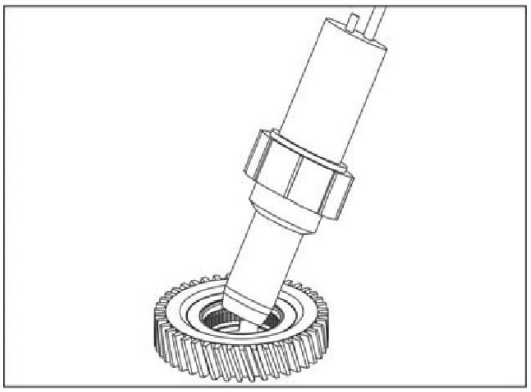


Figure 420

Assemble the gear (1) until the snap ring has engaged into the recess of the gear.

NOTE

Both ends of the snap ring must be located in one of the four mounting holes (see arrows)! The snap ring must be engaged into both recesses ofshaft and gear!

WARNING

Use safety gloves!

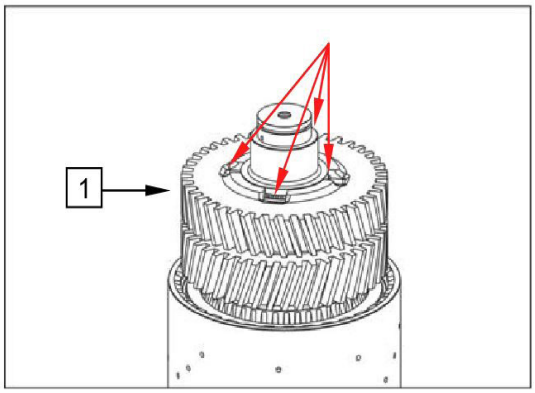


Figure 421

Heat up the bearing inner ring of the taper roller bearing (approx. 120° C).

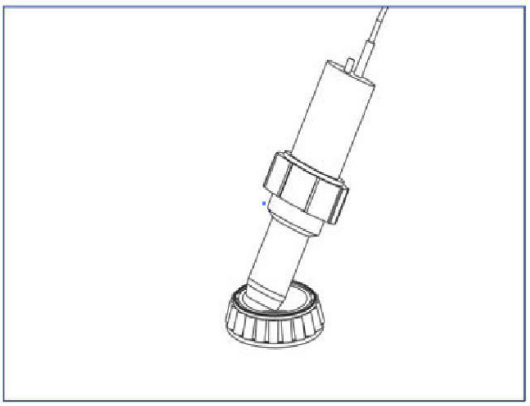


Figure 422

Assemble the bearing inner ring (1) until contact.

WARNING

Use safety gloves!

CAUTION

Adjust the bearing inner ring after cooling down!

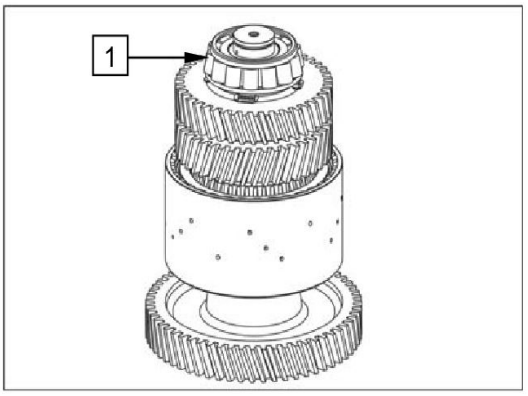


Figure 423

Install, align and grease the rectangular rings 42x2.5 (1).

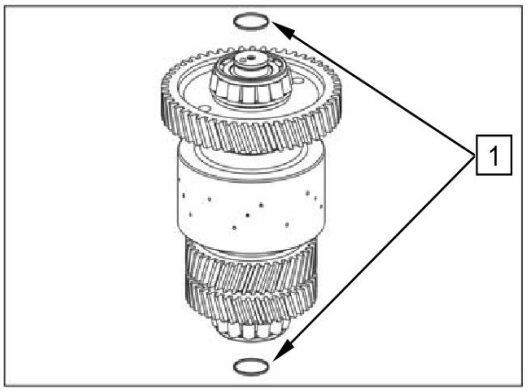


Figure 424

NOTE

Check closing and opening of the clutch by means of compressed air at the hole (see arrow).
Closing and opening of the clutch must be clearly audible.

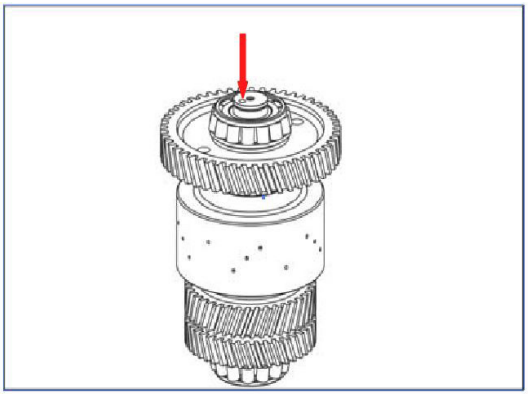


Figure 425

Insert clutches ”E“ into mounting device II.

NOTE

See marking on the mounting device!

(S) Mounting device II 850317-00077

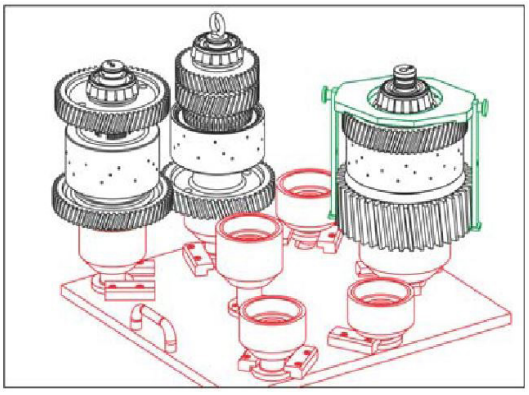


Figure 426

Clutch "V"

Press the sliding bearing (1) into the shaft until contact and oil it.

(S) Driver tool 850317-00086

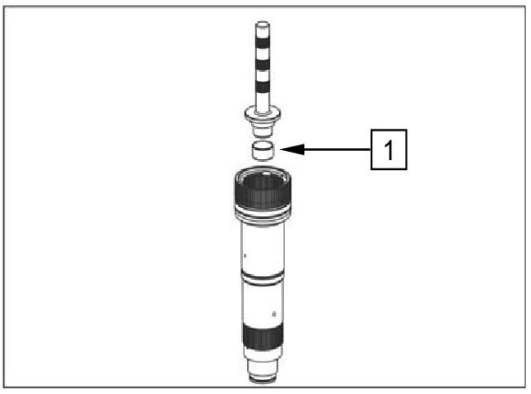


Figure 427

Heat up the bearing inner ring of the taper roller bearing (approx. 120° C).

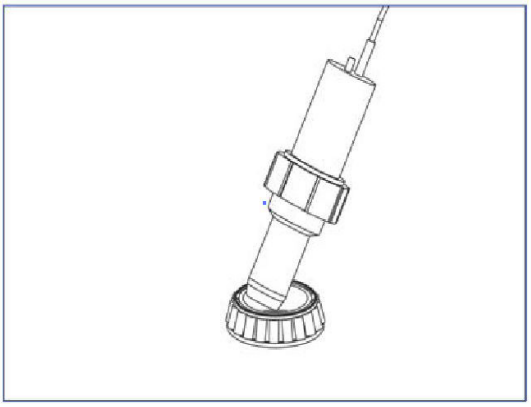


Figure 428

Insert the shaft (1) into the locking device and assemble the bearing inner rings (2) until contact.

Pay attention to the installation position!

WARNING

Use safety gloves!

CAUTION

Adjust the bearing inner ring after cooling down!

Assemble the spacer bush (3).

(S) Locking device 850317-00083

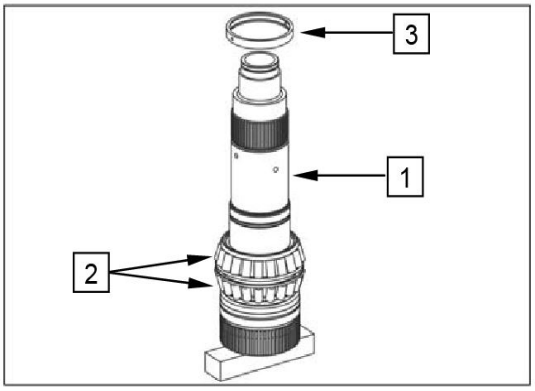


Figure 429

Insert the bearing outer rings (1) with grease into the idler.

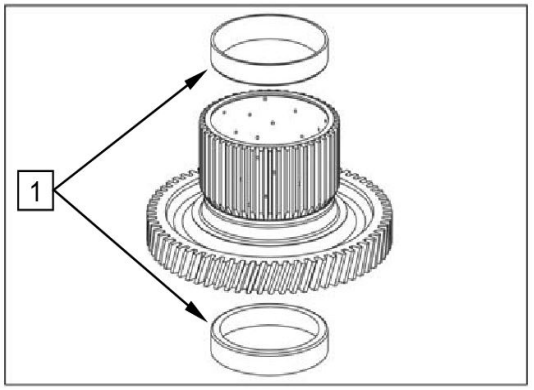


Figure 430

Assemble the idler (1).

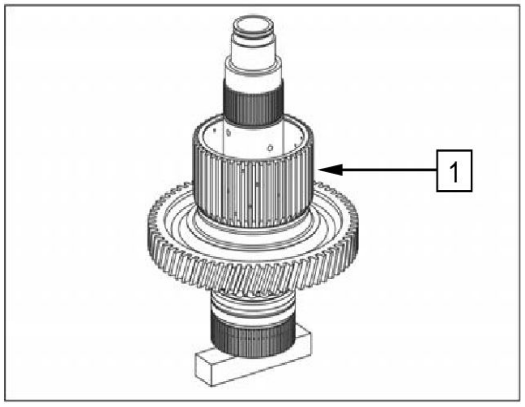


Figure 431

Heat up the bearing inner ring of the taper roller bearing (approx. 120° C).

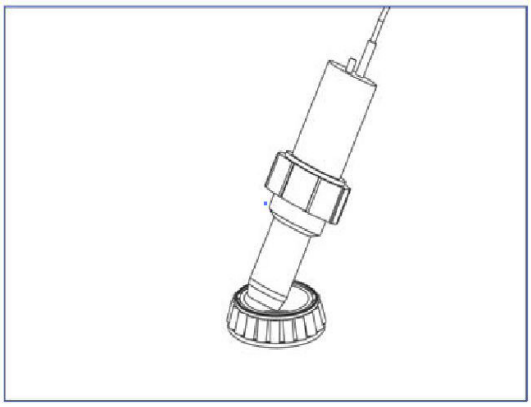


Figure 432

Assemble the bearing inner ring (1) until contact.

WARNING

Use safety gloves!

CAUTION

Adjust the bearing inner ring after cooling down!

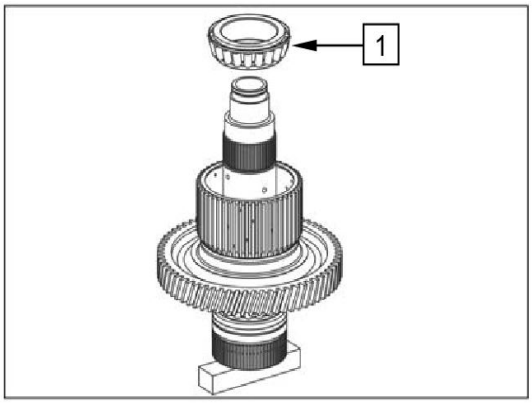


Figure 433

Tighten the slotted nut M80x1.5 (1) by hand and mount the special tools until contact.

NOTE

Install the chamfer (see arrow) inward facing!

(S) Slotted nut wrench 850316-00382
(S) Wrench insert 850316-00383

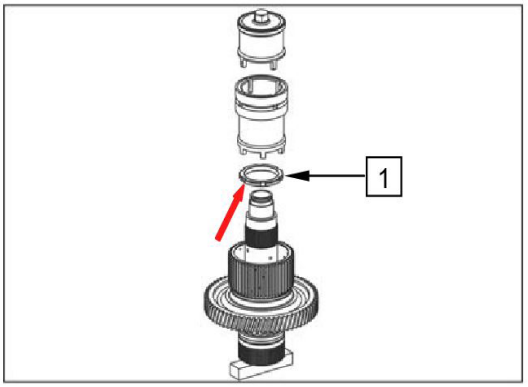


Figure 434

Tighten the slotted nut.

Tightening torque M_A= 1000 Nm

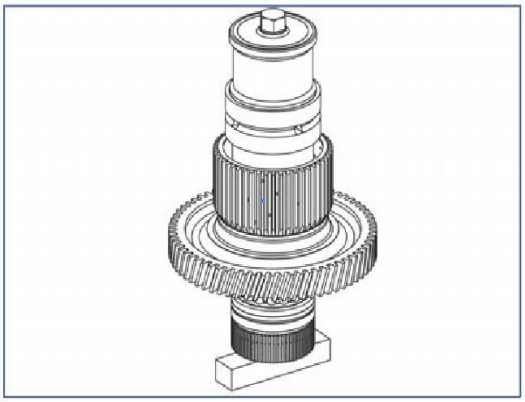


Figure 435

Insert the O-rings (1) into the piston and grease them.

O-ring 110x3 (2x)
O-ring 170x3

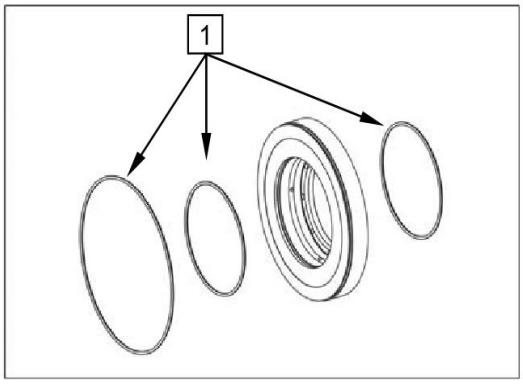


Figure 436

Press piston into the disc carrier until contact.

(S) Assembly fixture 850317-00079

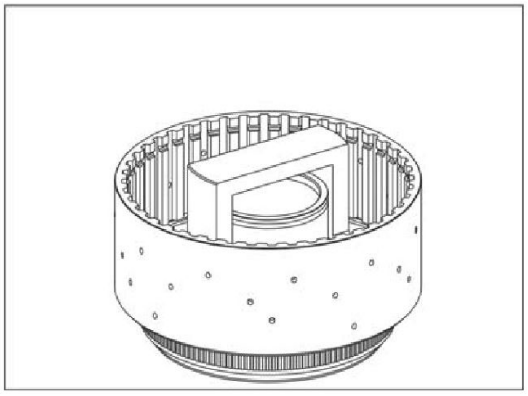


Figure 437

Mount O-ring 160x3 (1) onto the baffle plate (2) and grease it.

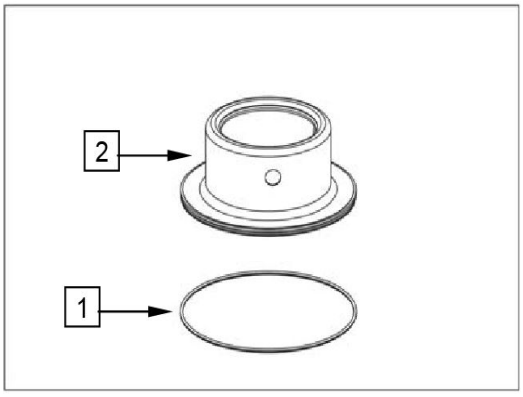


Figure 438

Assemble the cup spring set (1) and the baffle plate (2).

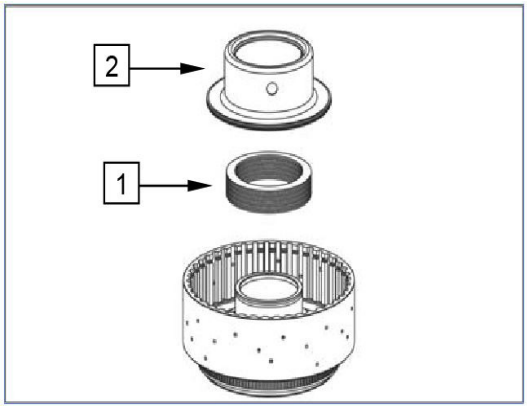


Figure 439

See Figure 440 for installation position of cup spring set!

Legend:

1 = O-ring A90
2 = Baffle plate
3 = Cup spring set
4 = O-ring 160x3
5 = Piston
6 = O-ring 170x3
7 = O-ring 110x3
8 = Disk carrier

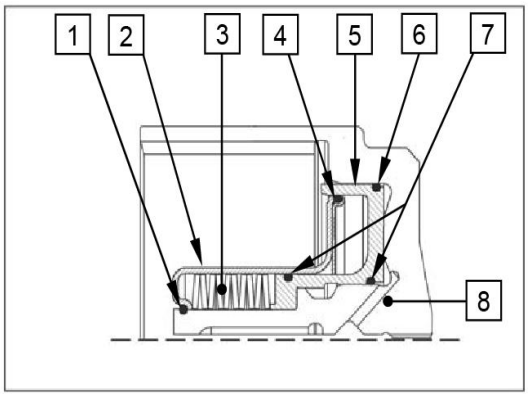


Figure 440

Preload the baffle plate with cup spring set until the snap ring (1) can be engaged into the groove.

(S) Assembly fixture 850317-00079

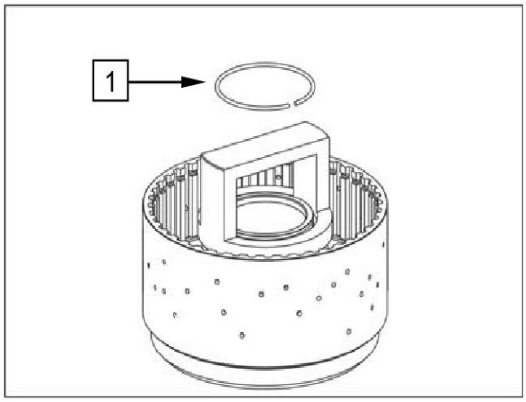


Figure 441

Assemble the end plate (1).

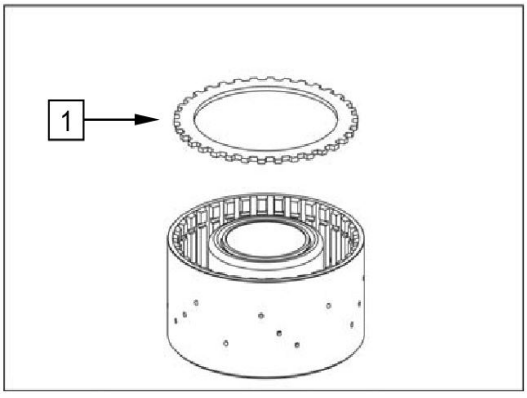


Figure 442

Alternately assemble 10 pcs. of inner clutch discs (1) and 10 pcs. of outer clutch discs (2) into the dick carrier (3).

CAUTION

Starting with an inner clutch disc!
Coated side of the inner and outer clutch discs must always be installed showing to the piston!
Depending on the parts list version, a disc arrangement with 9 inner and outer discs may be installed!
Please refer to the relating spare parts list to see the installed disc arrangement!

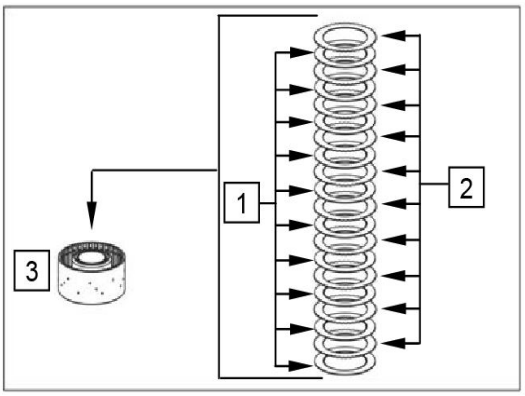


Figure 443

Install the end plate (1) and fasten the disc set with snap ring (2).

Installation position of end plate (1)

Carry out the next step referring to disc clearance check operation See “Figure 536” on page 174 and “Figure 537” on page 174

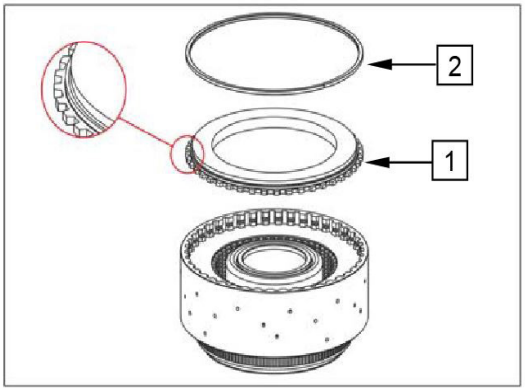


Figure 444

Heat up the internal teeth of the clutch (1) (approx. 120° C).

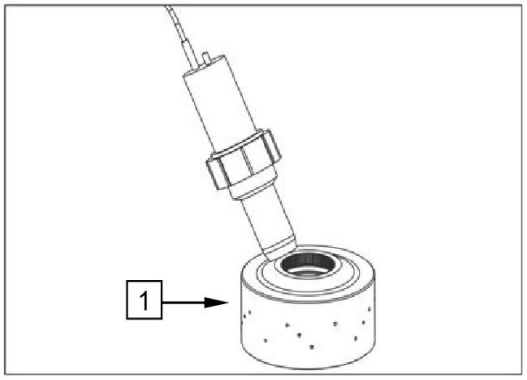


Figure 445

Align the inner clutch discs and assemble the clutch (1) until contact is obtained.

By means of short left-hand/right-hand rotations mount the inner clutch discs onto the inner disc carrier.

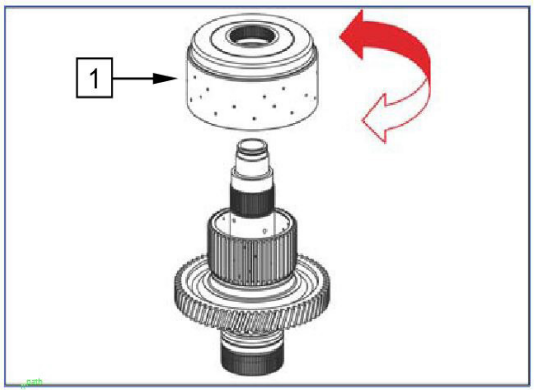


Figure 446

Heat up the internal teeth of the gear (approx. 120° C).

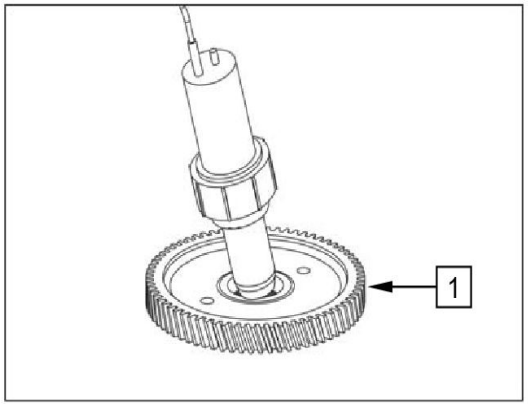


Figure 447

Assemble the gear (1) until contact.

WARNING

Use safety gloves!

CAUTION

Adjust the gear after cooling down!

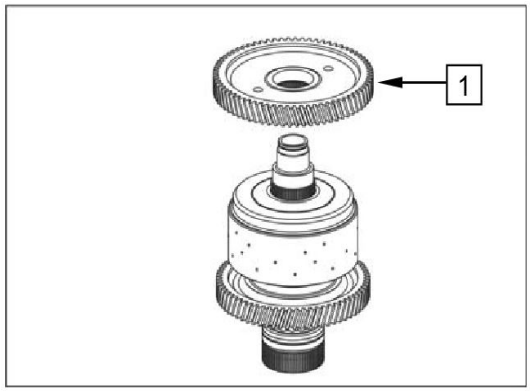


Figure 448

Heat up the bearing inner ring of the taper roller bearing (approx. 120° C).

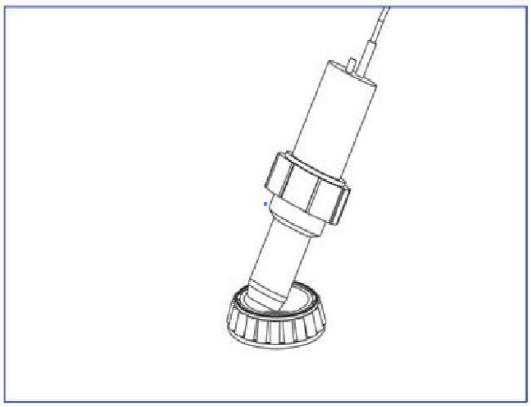


Figure 449

Assemble the bearing inner ring (1) until contact.

WARNING

Use safety gloves!

CAUTION

Adjust the bearing inner ring after cooling down!

Install, align and grease the rectangular ring 50x2.5 (2).

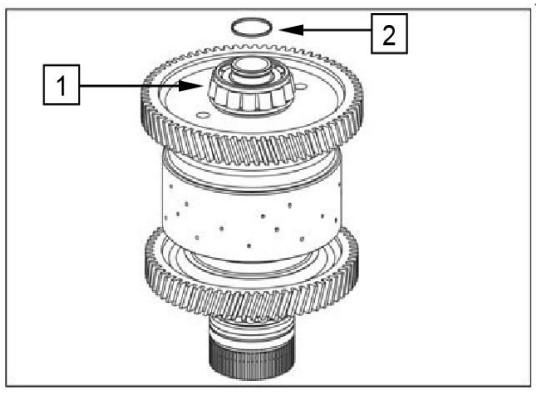


Figure 450

NOTE

Check closing and opening of the clutch by means of compressed air at the hole (see arrow).
Closing and opening of the clutch must be clearly audible.

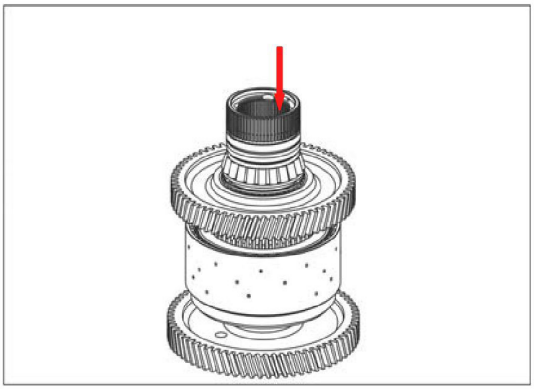


Figure 451

Insert the threaded rod M10x450 (1) into the locating bush ”V“.

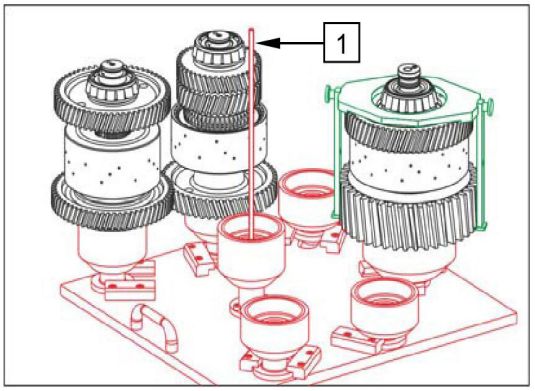


Figure 452

Insert clutches ”V“ into mounting device II.

NOTE

See marking on the mounting device!

(S) Mounting device II 850317-00077

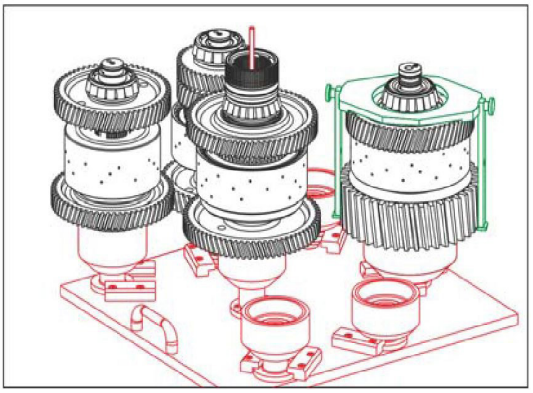


Figure 453

Clutch "C"

Insert the O-rings (1) into the piston and grease them.

O-ring 95x3
O-ring 100x3
O-ring 158x3

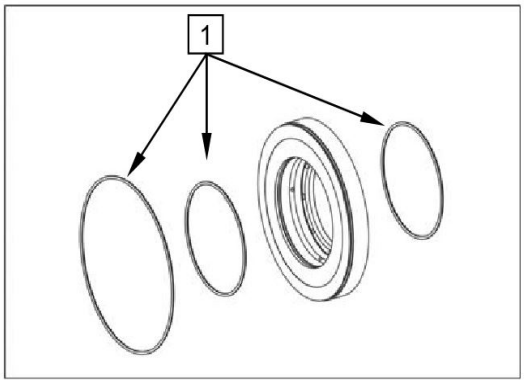


Figure 454

Press piston into the disc carrier until contact.

(S) Assembly fixture 850317-00080

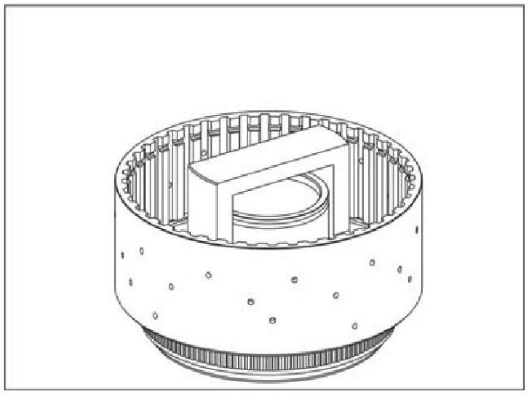


Figure 455

Mount O-ring 147x3 (1) onto the baffle plate (2) and grease it.

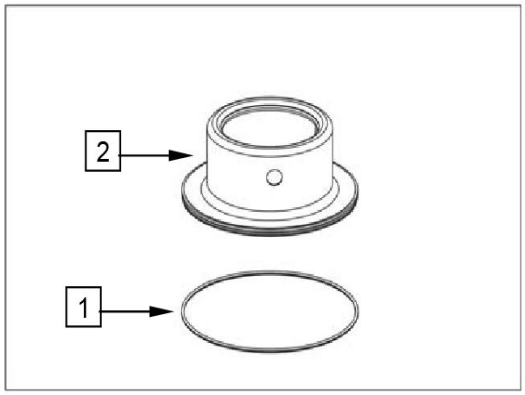


Figure 456

Assemble the cup spring set (1) and the baffle plate (2).

See Figure 458 for installation position of cup spring set!

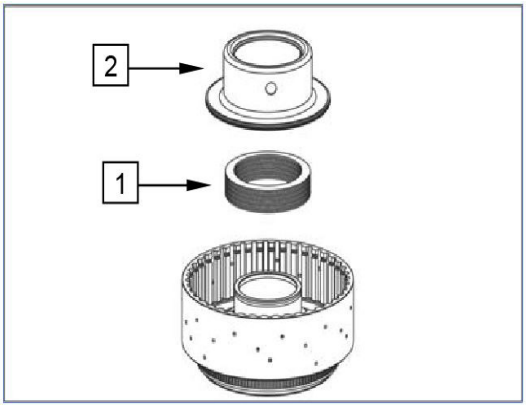


Figure 457

Legend:
1 = O-ring 158x3
2 = Piston
3 = End plate
4 = Inner clutch disc 8x / 10x
5 = Outer clutch disc 8x / 10x
6 = End plate
7 = Snap ring
8 = Cup spring set
9 = Baffle plate
10 = Snap ring A85
11 = O-ring 95x3
12 = O-ring 100x3
13 = Disc carrier

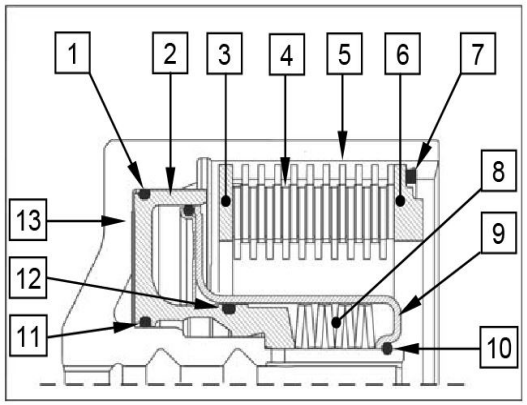


Figure 458

Preload the baffle plate with cup spring set until the snap ring (1) can be engaged into the groove.

(S) Assembly fixture 850317-00080

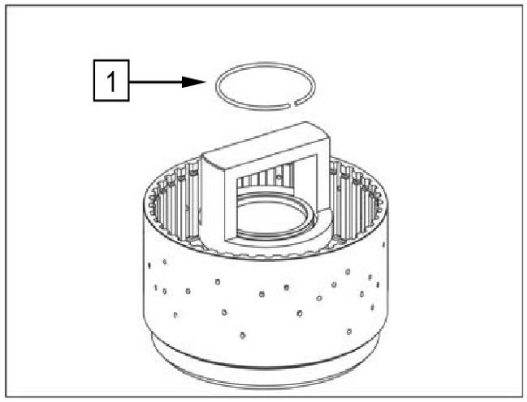


Figure 459

Assemble the end plate (1).

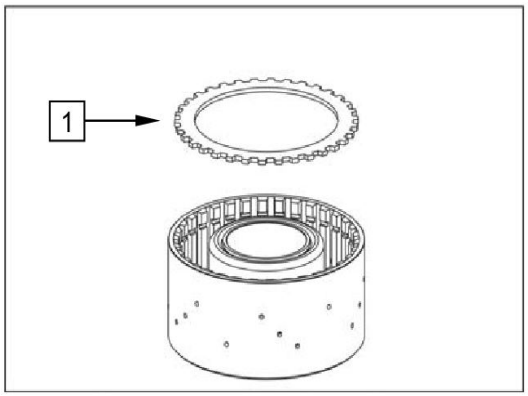


Figure 460

Alternately assemble **HA30=8 pcs./ DA40=10 pcs** of inner clutch discs (1) and **HA30=8 pcs./ HA45=10 pcs**. of outer clutch discs (2) into the disc carrier (3).

CAUTION

Starting with an inner clutch disc!
Coated side of the inner and outer clutch discs must always be installed showing to the piston!
Depending on the parts list version, a disc arrangement with 7 inner and outer discs may be installed!
Please refer to the relating spare parts list to see the installed disc arrangement!
See (Figure 458)!

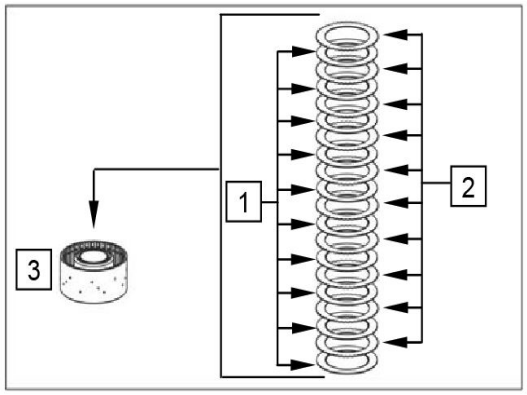


Figure 461

Install the end plate (1) and fasten the disc set with snap ring (2).

Installation position of end plate (1)

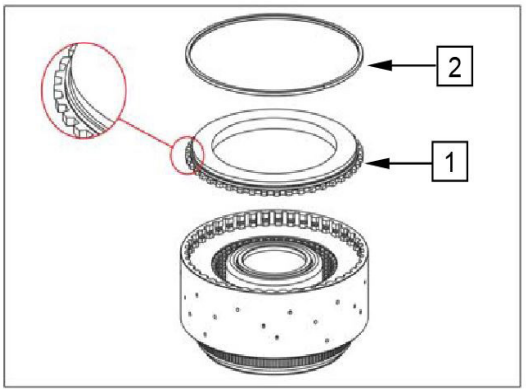


Figure 462

Carry out the next step referring to disc clearance check operation See “Figure 536” on page 174 and “Figure 537” on page 174

Heat up the internal teeth of the clutch (1) (approx. 120° C).

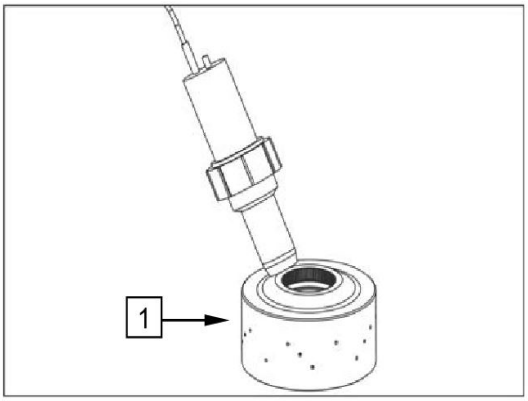


Figure 463

Assemble the clutch (1) until contact.

WARNING

Use safety gloves!

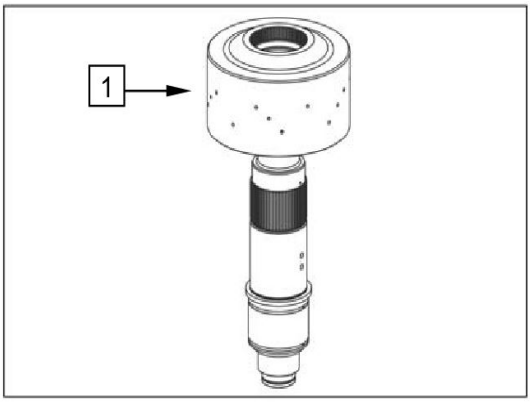


Figure 464

CAUTION

Adjust the clutch after cooling down!

Engage snap ring SB 72 (1) into the recess.

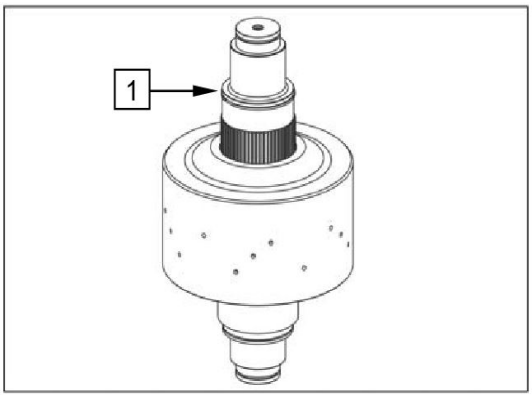


Figure 465

Heat up the internal teeth of the gear (approx. 120° C).

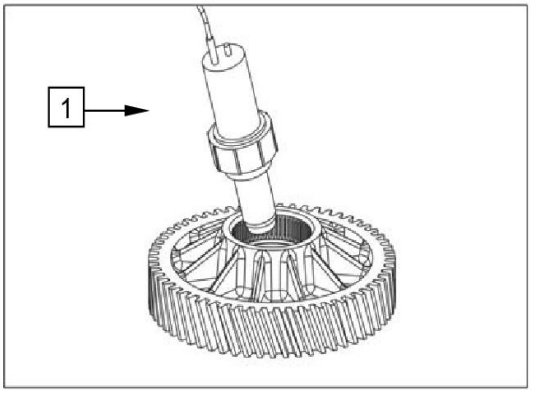


Figure 466

Assemble the gear (1) until the snap ring has engaged into the recess of the gear.

NOTE

Both ends of the snap ring must be located in one of the four mounting holes (see arrows)!
The snap ring must be engaged into both recesses of shaft and gear!

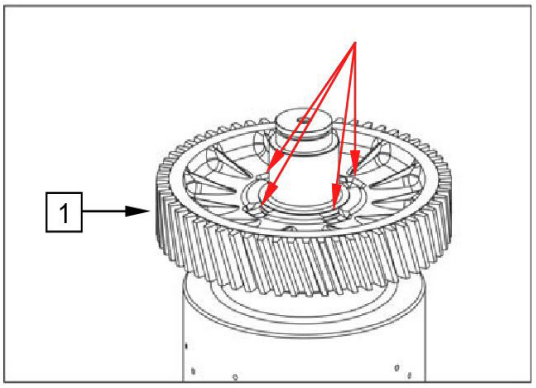


Figure 467

WARNING

Use safety gloves!

Heat up the bearing inner ring of the taper roller bearing (approx. 120° C).

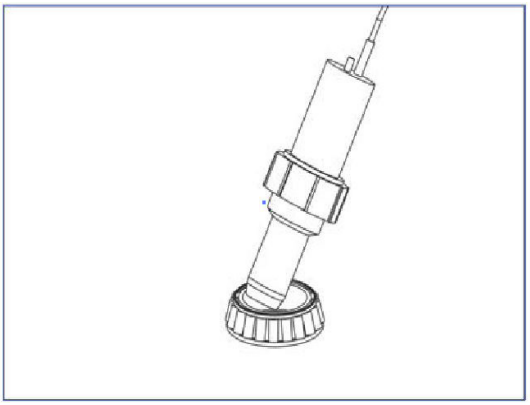


Figure 468

Assemble the bearing inner ring (1) until contact.

WARNING

Use safety gloves!

CAUTION

Adjust the bearing inner ring after cooling down!

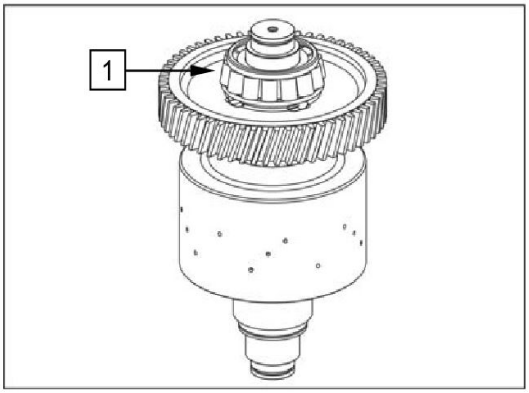


Figure 469

Assemble running disc 80x105x5.75 (1), axial bearing 80x105x4 (2) and axial washer 80x105x1 (3) and oil them.

NOTE

Install running disc (1) with the chamfer showing to the axial bearing (see arrow)

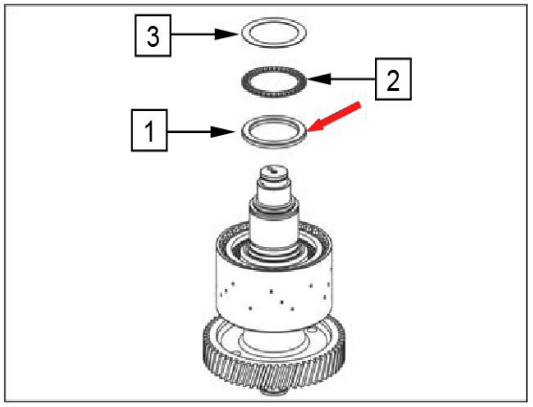


Figure 470

Assemble and oil the needle cage 80x88x46 (1).

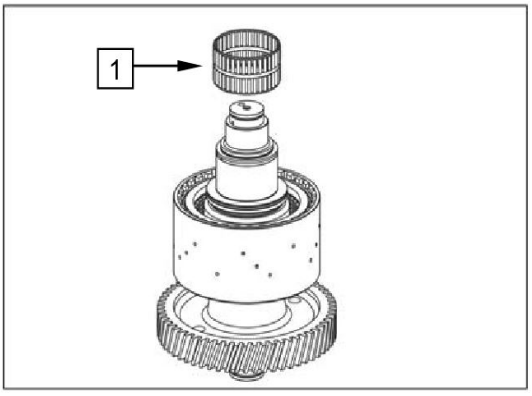


Figure 471

Align the inner clutch discs and assemble the idler (1) until contact is obtained.

By means of short left-hand/right-hand rotations mount the inner clutch discs onto the inner disc carrier.

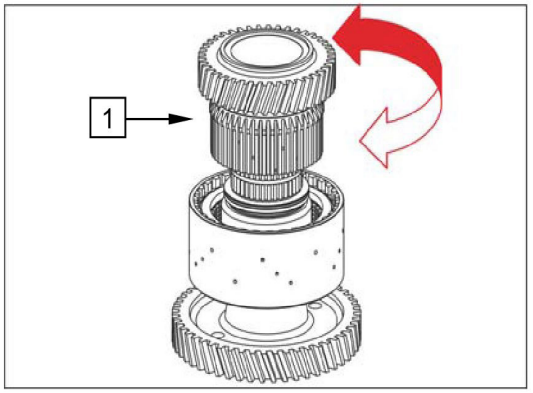


Figure 472

Engage snap ring SB 70 (1) into the recess.

Assemble and oil axial washer 80x105x1 (2) and axial bearing 80x105x4 (3).

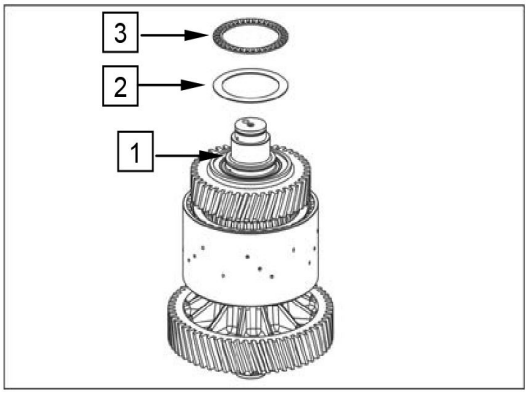


Figure 473

Use grease to fix the axial washer 80x105x1 (1) to washer (2).

By means of a suitable pressure piece the washer (2) must be pressed until contact is obtained, i.e. until the snap ring has engaged into the recess of the washer.

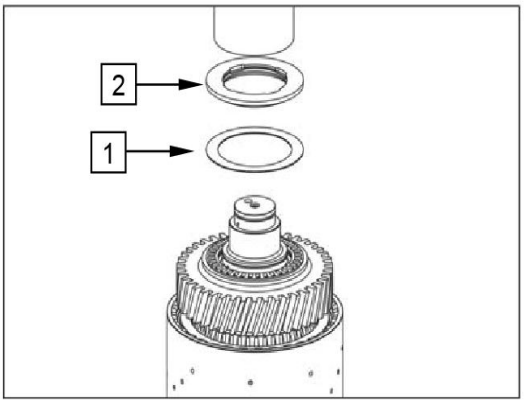


Figure 474

NOTE

Both ends of the snap ring must be located in one of the four mounting holes (see arrows)!
The snap ring must be engaged into both recesses of shaft and gear!

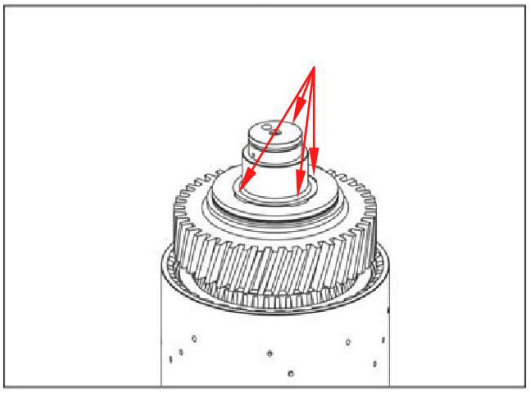


Figure 475

Heat up the bearing inner ring of the taper roller bearing (approx. 120° C).

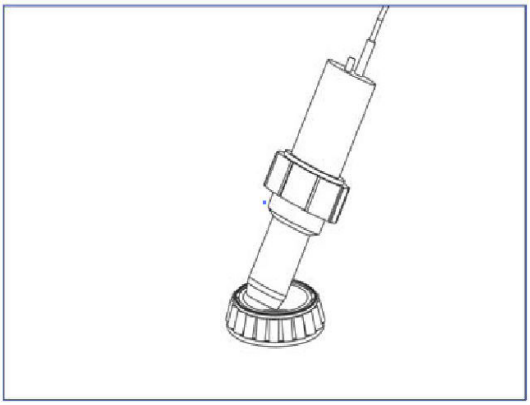


Figure 476

Assemble the bearing inner ring (1) until contact.

WARNING

Use safety gloves!

CAUTION

Adjust the bearing inner ring after cooling down!

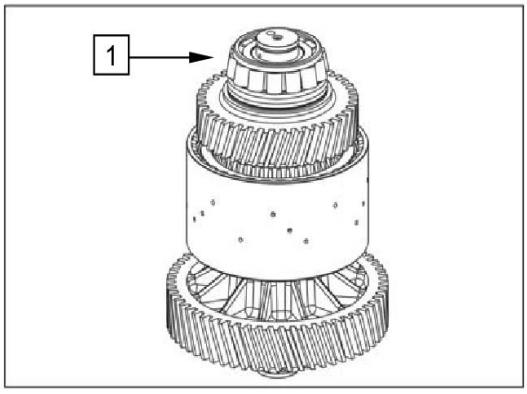


Figure 477

Install, align and grease the rectangular rings 42x2.5 (1).

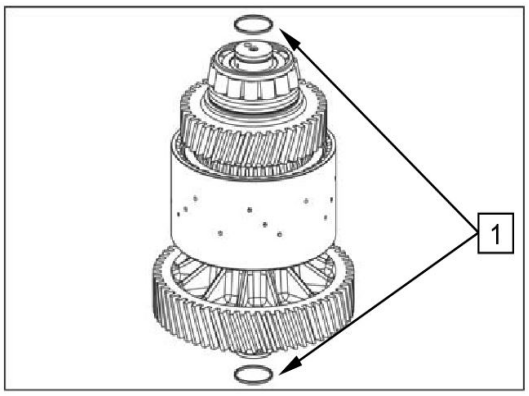


Figure 478

NOTE

Check closing and opening of the clutch by means of compressed air at the hole (see arrow).
Closing and opening of the clutch must be clearly audible.

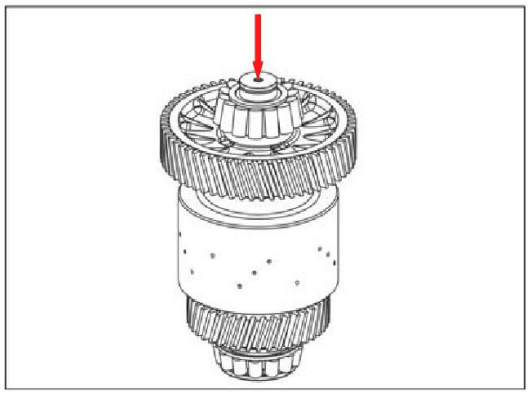


Figure 479

Insert clutches ”C“ into mounting device II.

NOTE

See marking on the mounting device!

(S) Mounting device II	850317-00077

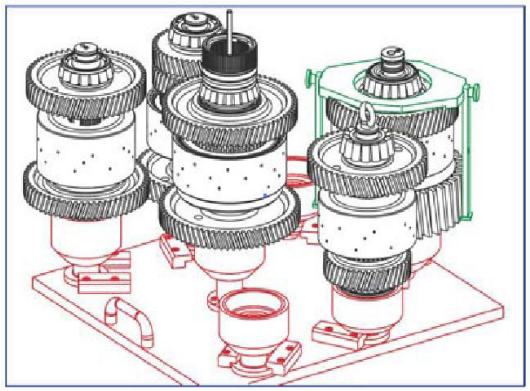


Figure 480

Clutch "D"

Insert the O-rings (1) into the piston and grease them.

O-ring 95x3
O-ring 100x3
O-ring 158x3

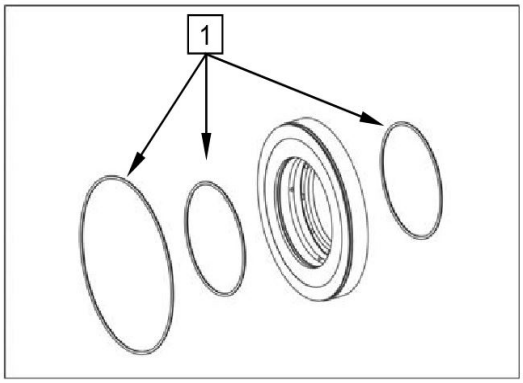


Figure 481

Press piston into the disk carrier until contact.

(S) Assembly fixture 850317-00080

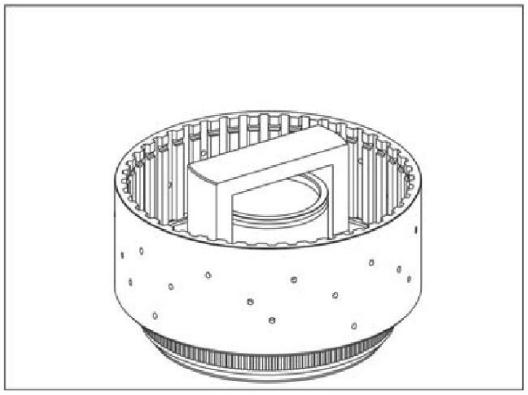


Figure 482

Mount O-ring 147x3 (1) onto the baffle plate (2) and grease it.

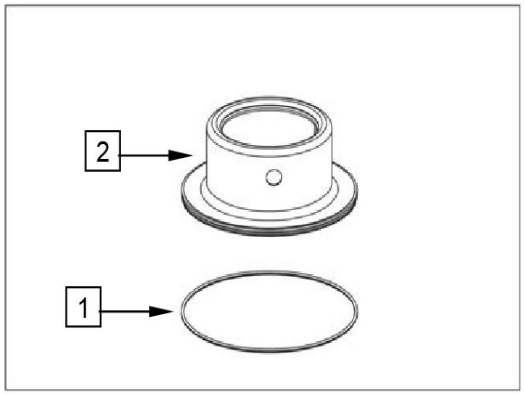


Figure 483

Assemble the cup spring set (1) and the baffle plate (2).

See Figure 485 for installation position of cup spring set!

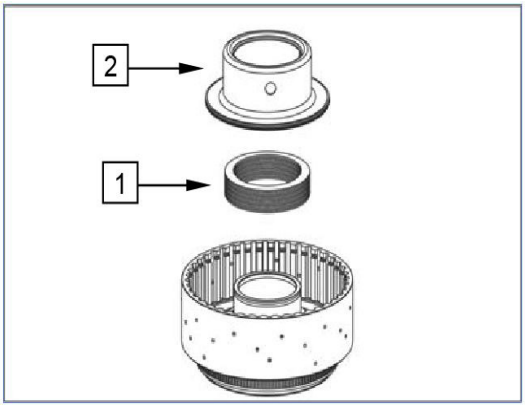


Figure 484

Legend:
1 = O-ring 158x3
2 = Piston
3 = End plate
4 = Inner clutch disc 8x / 10x
5 = Outer clutch disc 8x / 10x
6 = End plate
7 = Snap ring
8 = Cup spring set
9 = Baffle plate
10 = Snap ring A85
11 = O-ring 95x3
12 = O-ring 100x3
13 = Disc carrier

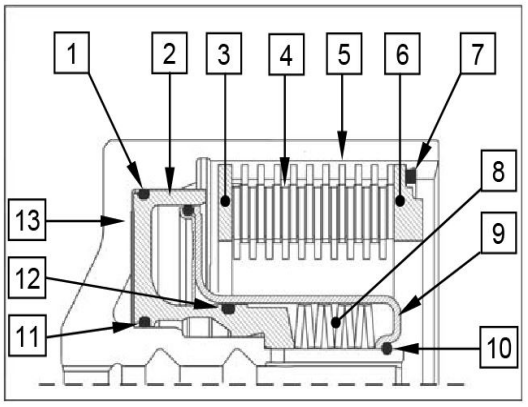


Figure 485

Preload the baffle plate with cup spring set until the snap ring (1) can be engaged into the groove.

(S) Assembly fixture 850317-00080

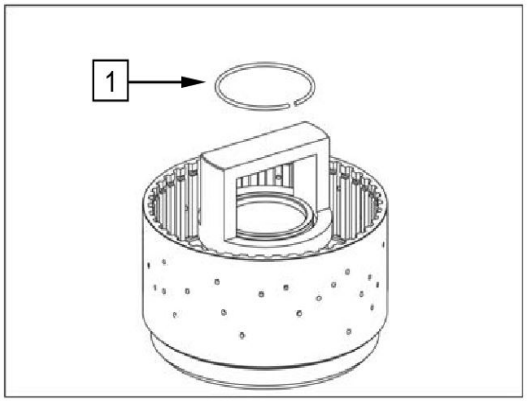


Figure 486

Assemble the end plate (1).

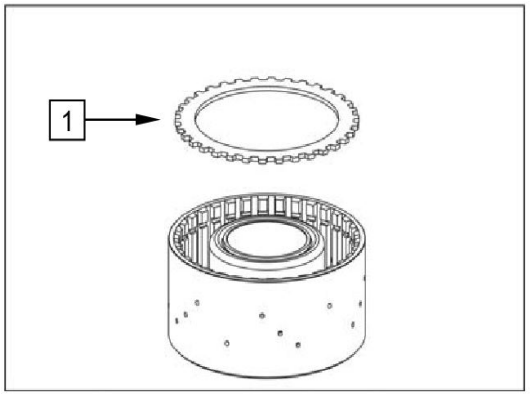


Figure 487

Alternately assemble **HA30F=8 pcs./ DA40F=10 pcs** of inner clutch discs (1) and **HA30F=8 pcs./ DA40F=10 pcs**. of outer clutch discs (2) into the disc carrier (3).

CAUTION

Starting with an inner clutch disc!
Coated side of the inner and outer clutch discs must always be installed showing to the piston!
See (Figure 485)!

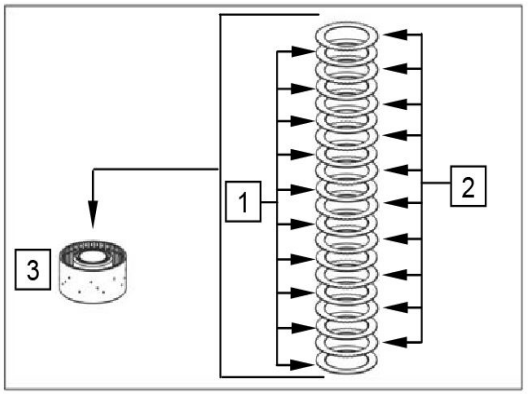


Figure 488

Install the end plate (1) and fasten the disc set with snap ring (2).

Installation position of end plate (1)

Carry out the next step referring to disc clearance check operation See “Figure 536” on page 174 and “Figure 537” on page 174

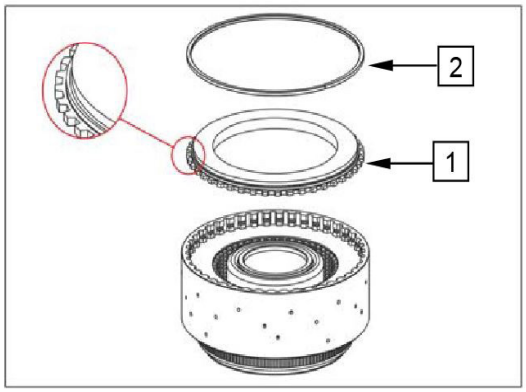


Figure 489

Heat up the internal teeth of the clutch (1) (approx. 120° C).

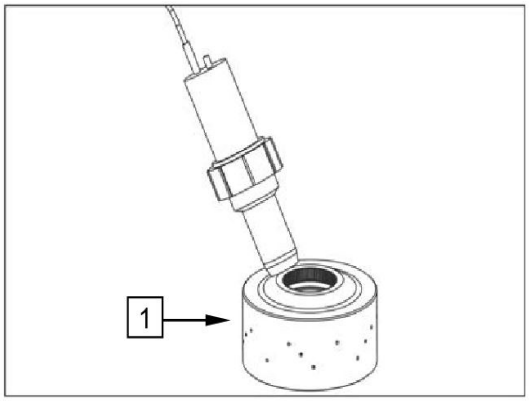


Figure 490

Assemble the clutch (1) until contact.

WARNING

Use safety gloves!

CAUTION

Adjust the clutch after cooling down!

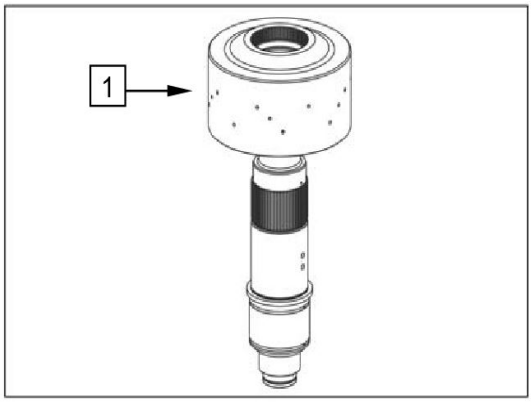


Figure 491

Engage snap ring SB 72 (1) into the recess.

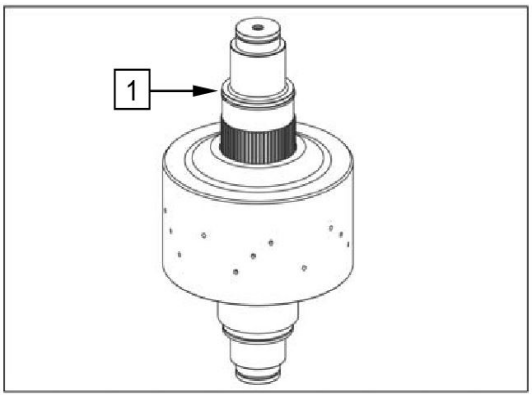


Figure 492

Heat up the internal teeth of the gear (approx. 120° C).

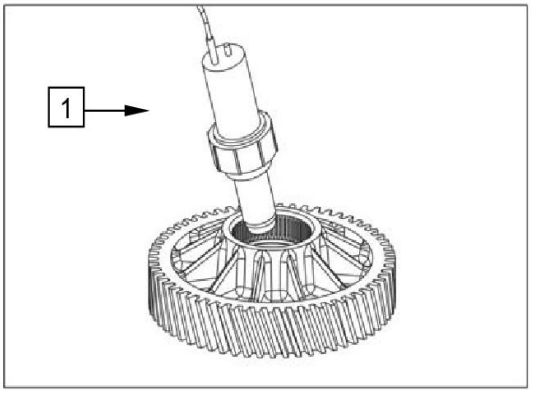


Figure 493

Assemble the gear (1) until the snap ring has engaged into the recess of the gear.

NOTE

Both ends of the snap ring must be located in one of the four mounting holes (see arrows)!
The snap ring must be engaged into both recesses of shaft and gear!

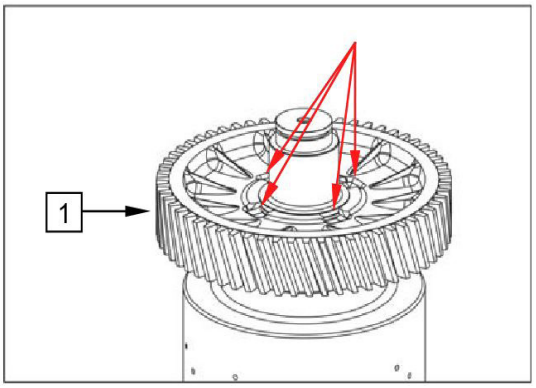


Figure 494

WARNING

Use safety gloves!

Heat up the bearing inner ring of the taper roller bearing (approx. 120° C).

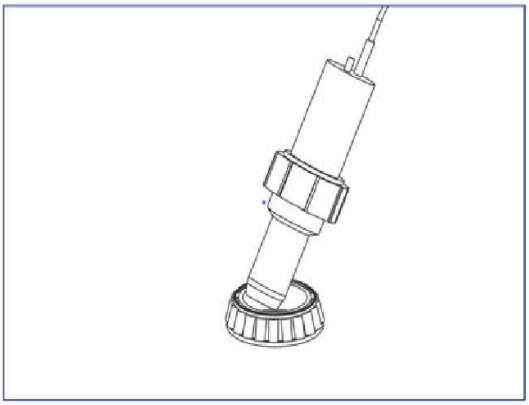


Figure 495

Assemble the bearing inner ring (1) until contact.

WARNING

Use safety gloves!

CAUTION

Adjust the bearing inner ring after cooling down!

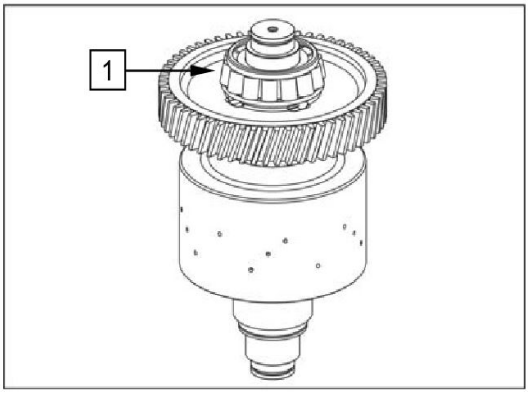


Figure 496

Assemble running disc 80x105x5.75 (1), axial bearing 80x105x4 (2) and axial washer 80x105x1 (3) and oil them.

NOTE

Install running disc (1) with the chamfer showing to the axial bearing (see arrow)

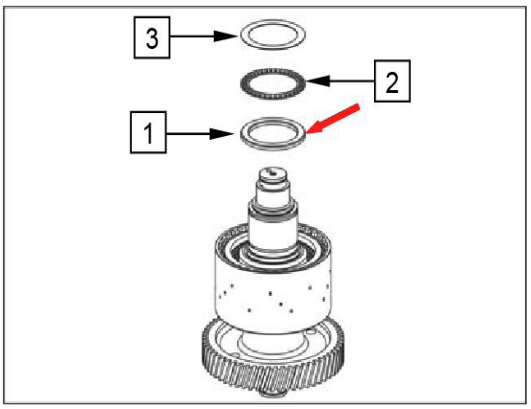


Figure 497

Assemble and oil the needle cage 80x88x46 (1).

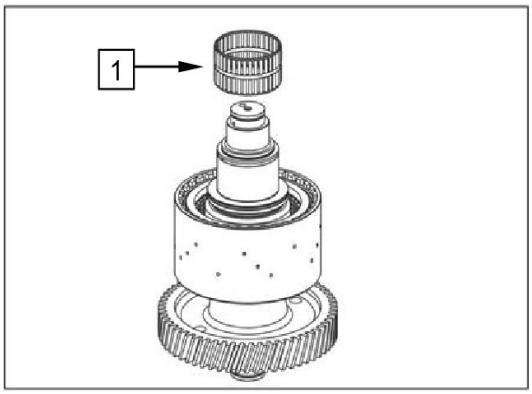


Figure 498

Align the inner clutch discs and assemble the idler (1) until contact is obtained.

By means of short left-hand/right-hand rotations mount the inner clutch discs onto the inner disc carrier.

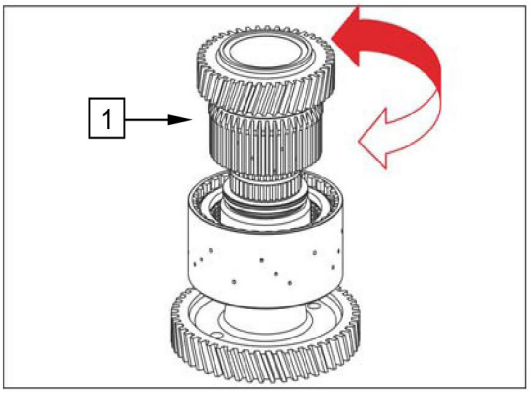


Figure 499

Engage snap ring SB 70 (1) into the recess.

Assemble and oil axial washer 80x105x1 (2) and axial bearing 80x105x4 (3).

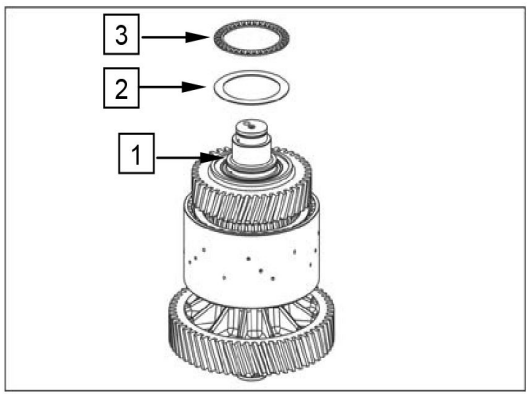


Figure 500

Use grease to fix the axial washer 80x105x1 (1) to washer (2).

By means of a suitable pressure piece the washer (2) must be pressed until contact is obtained, i.e. until the snap ring has engaged into the recess of the washer.

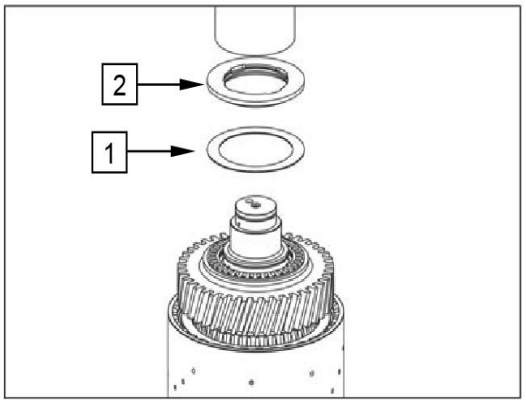


Figure 501

NOTE

Both ends of the snap ring must be located in one of the four mounting holes (see arrows)!
The snap ring must be engaged into both recesses ofshaft and gear!

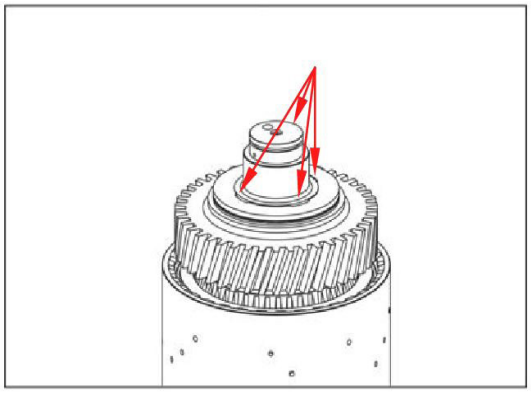


Figure 502

Heat up the bearing inner ring of the taper roller bearing (approx. 120° C).

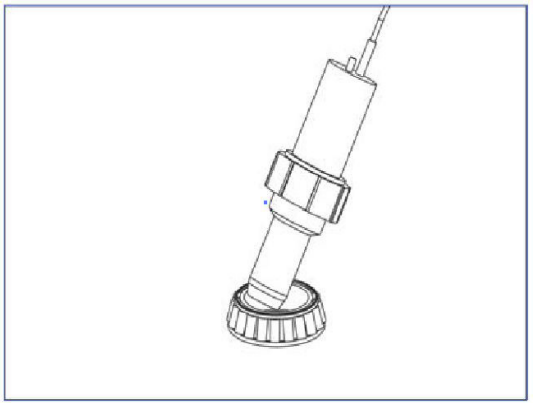


Figure 503

Assemble the bearing inner ring (1) until contact.

WARNING

Use safety gloves!

CAUTION

Adjust the bearing inner ring after cooling down!

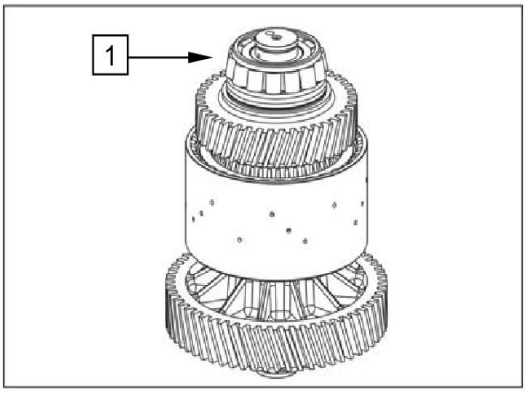


Figure 504

Install, align and grease the rectangular rings 42x2.5 (1).

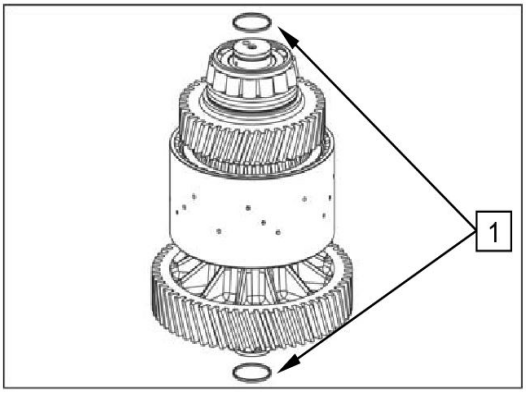


Figure 505

NOTE

Check closing and opening of the clutch by means of compressed air at the hole (see arrow).
Closing and opening of the clutch must be clearly audible.

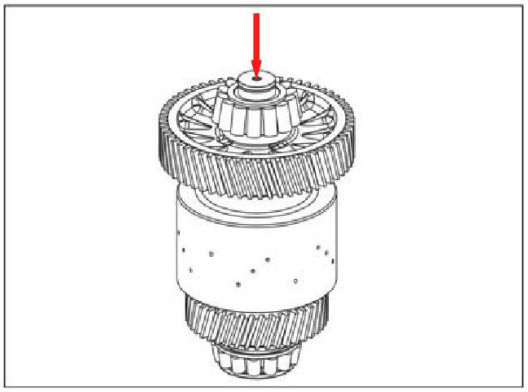


Figure 506

Insert clutches ”D“ into mounting device II.

NOTE

See marking on the mounting device!

(S) Mounting device II 850317-00077

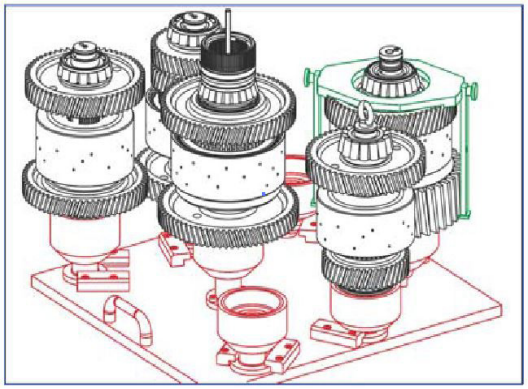


Figure 507

Clutch "A"

Insert the O-rings (1) into the piston and grease them.

O-ring 95x3
O-ring 100x3
O-ring 158x3

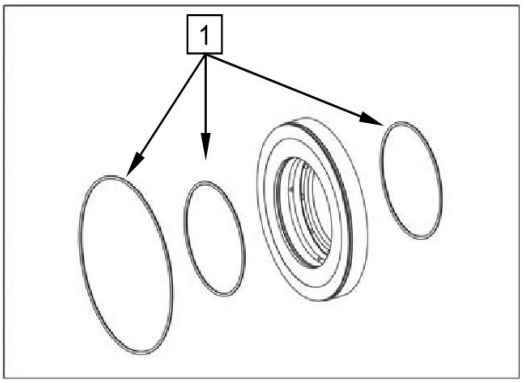


Figure 508

Press piston into the disc carrier until contact.

(S) Assembly fixture 850317-00080

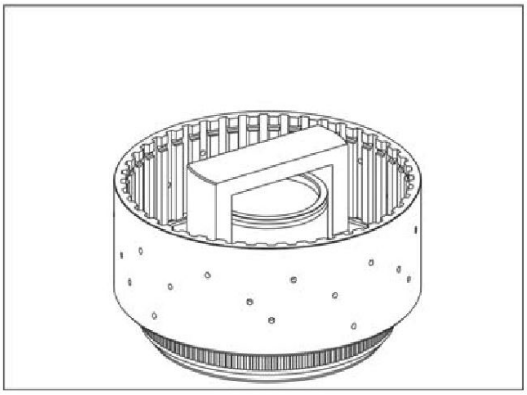


Figure 509

Mount O-ring 147x3 (1) onto the baffle plate (2) and grease it.

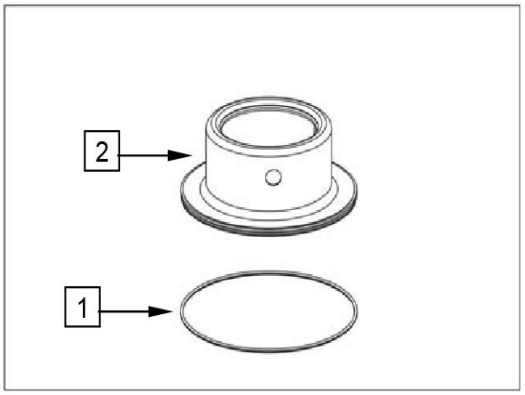


Figure 510

Assemble the cup spring set (1) and the baffle plate (2).

See Figure 512 for installation position of cup spring set!

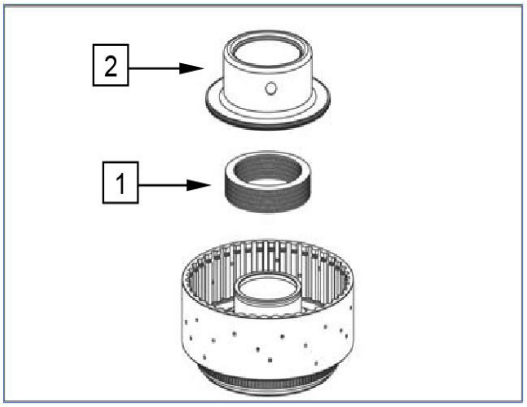


Figure 511

Legend:
1 = O-ring 158x3
2 = Piston
3 = End plate
4 = Inner clutch disc 10x
5 = Outer clutch disc 10x
6 = End plate
7 = Snap ring
8 = Cup spring set
9 = Baffle plate
10 = Snap ring A85
11 = O-ring 95x3
12 = O-ring 100x3
13 = Disc carrier

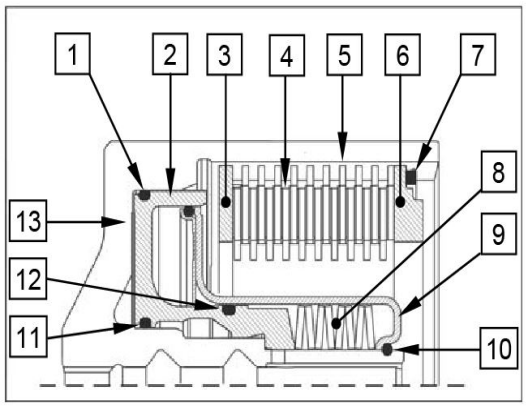


Figure 512

Preload the baffle plate with cup spring set until the snap ring (1) can be engaged into the groove.

(S) Assembly fixture 850317-00080

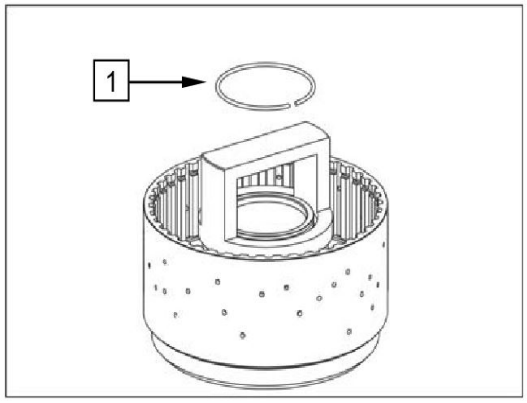


Figure 513

Assemble the end plate (1).

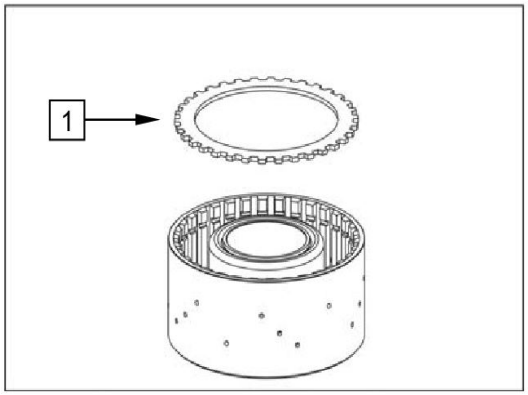


Figure 514

Alternately assemble 10 pcs of inner clutch discs (1) and 10 pcs. of outer clutch discs (2) into the disc carrier (3).

CAUTION

Starting with an inner clutch disc!
Coated side of the inner and outer clutch discs must always be installed showing to the piston!
Depending on the parts list version, a disc arrangement with 8 inner and outer discs may be installed!
Please refer to the relating spare parts list to see the installed disc arrangement!
See (Figure 512)!

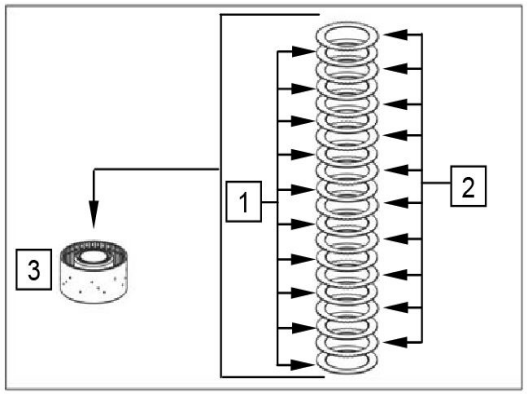


Figure 515

Install the end plate (1) and fasten the disc set with snap ring (2).

Installation position of end plate (1)

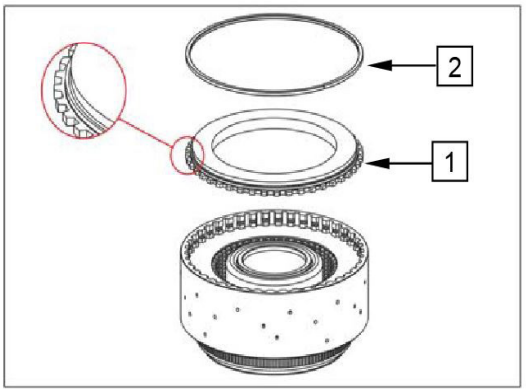


Figure 516

Carry out the next step referring to disc clearance check operation See “Figure 536” on page 174 and “Figure 537” on page 174

Heat up the internal teeth of the clutch (1) (approx. 120° C).

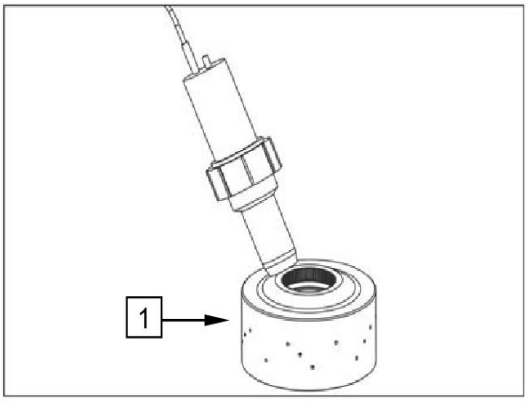


Figure 517

Assemble the clutch (1) until contact.

WARNING

Use safety gloves!

CAUTION

Adjust the clutch after cooling down!

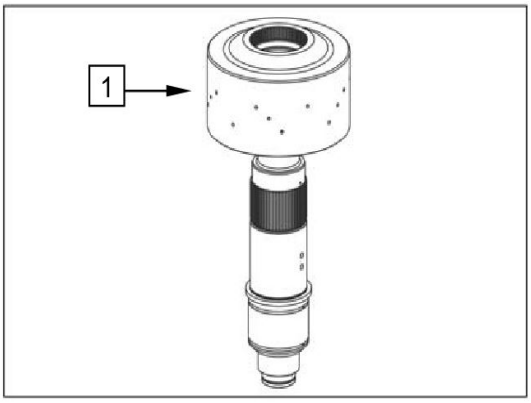


Figure 518

Engage snap ring SB 72 (1) into the recess.

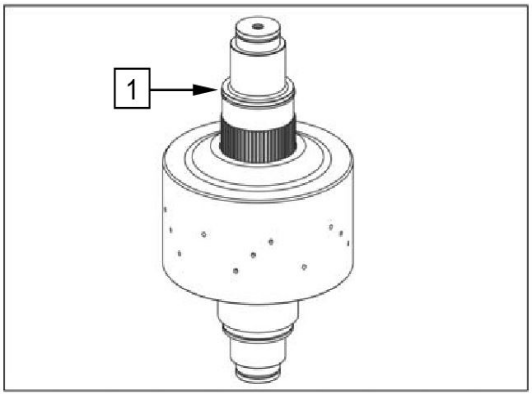


Figure 519

Heat up the internal teeth of the gear (approx. 120° C).

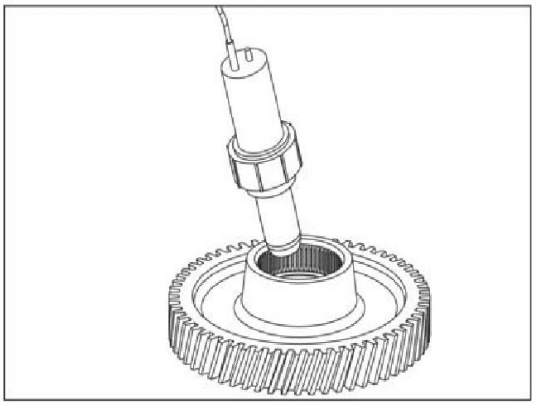


Figure 520

Assemble the gear (1) until the snap ring has engaged into the recess of the gear.

NOTE

Both ends of the snap ring must be located in one of the four mounting holes (see arrows)!
The snap ring must be engaged into both recesses of shaft and gear!

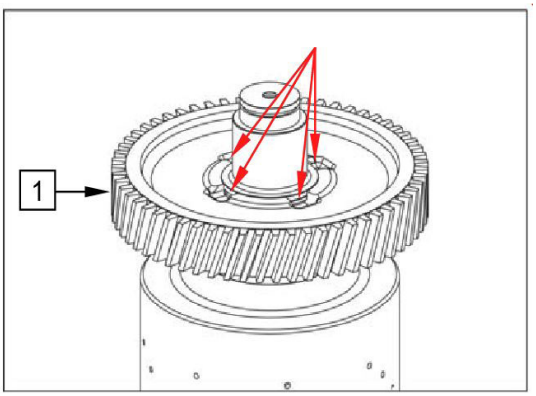


Figure 521

WARNING

Use safety gloves!

Heat up the bearing inner ring of the taper roller bearing (approx. 120° C).

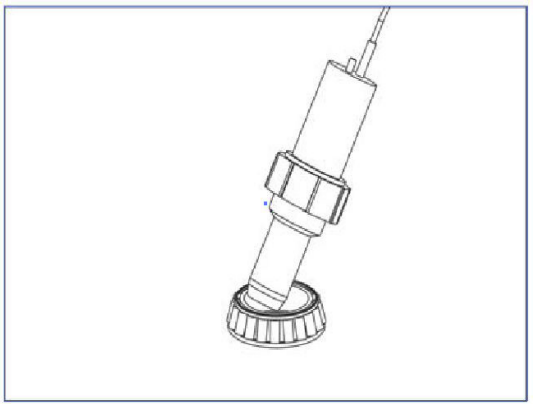


Figure 522

Assemble the bearing inner ring (1) until contact.

WARNING

Use safety gloves!

CAUTION

Adjust the bearing inner ring after cooling down!

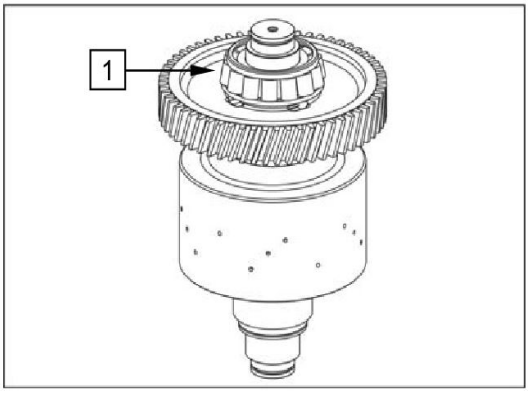


Figure 523

Assemble running disc 80x105x5.75 (1), axial bearing 80x105x4 (2) and axial washer 80x105x1 (3) and oil them.

NOTE

Install running disc (1) with the chamfer showing to the axial bearing (see arrow)

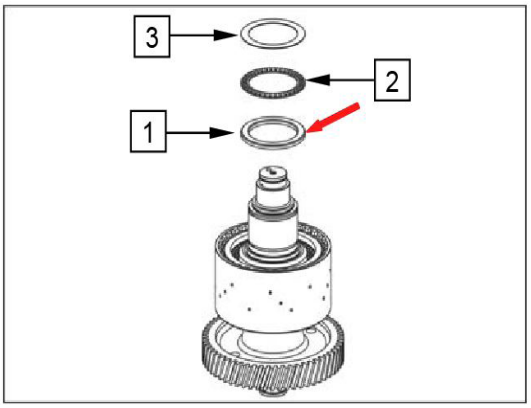


Figure 524

Assemble and oil the needle cage 80x88x46 (1).

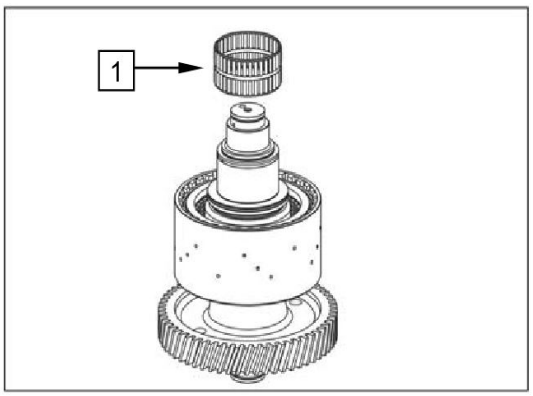


Figure 525

Align the inner clutch discs and assemble the idler (1) until contact is obtained.

By means of short left-hand/right-hand rotations mount the inner clutch discs onto the inner disc carrier.

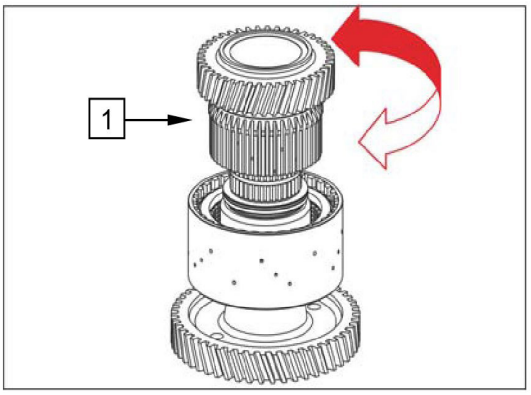


Figure 526

Assemble and oil the axial washer 80x105x1 (1), the axial bearing 80x105x4 (2) and the axial washer 80x105x1 (1).

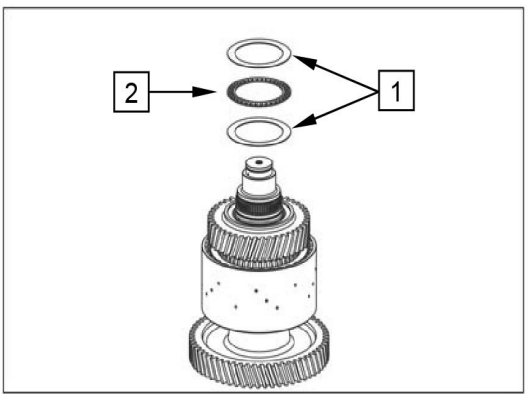


Figure 527

Engage snap ring SB 74 (1) into the recess.

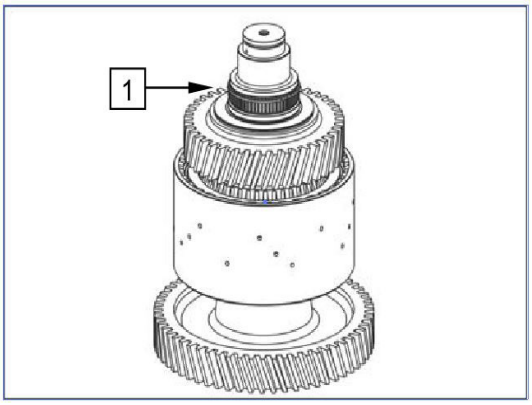


Figure 528

Heat up the internal teeth of the gear (approx. 120° C).

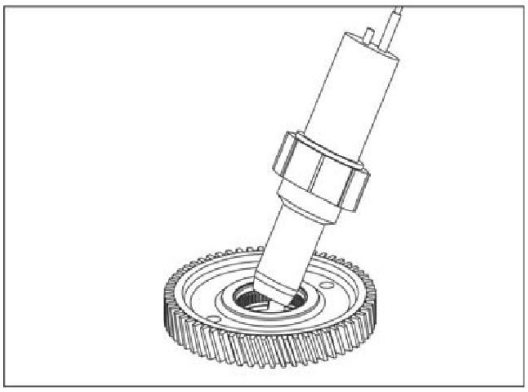


Figure 529

Assemble the gear (1) until the snap ring has engaged into the recess of the gear.

NOTE

Both ends of the snap ring must be located in one of the four mounting holes (see arrows)!
The snap ring must be engaged into both recesses of shaft and gear!

WARNING

Use safety gloves!

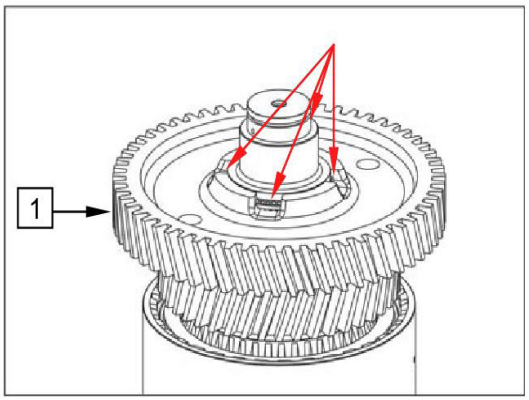


Figure 530

Heat up the bearing inner ring of the taper roller bearing (approx. 120° C).

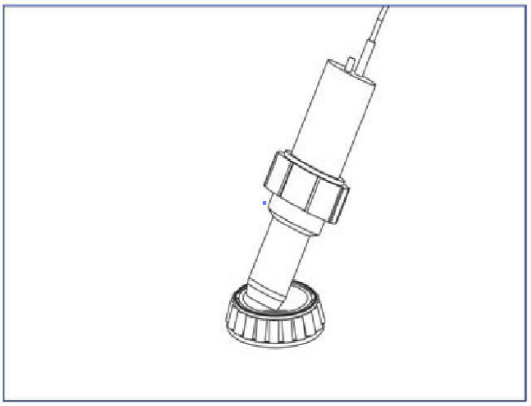


Figure 531

Assemble the bearing inner ring (1) until contact.

WARNING

Use safety gloves!

CAUTION

Adjust the bearing inner ring after cooling down!

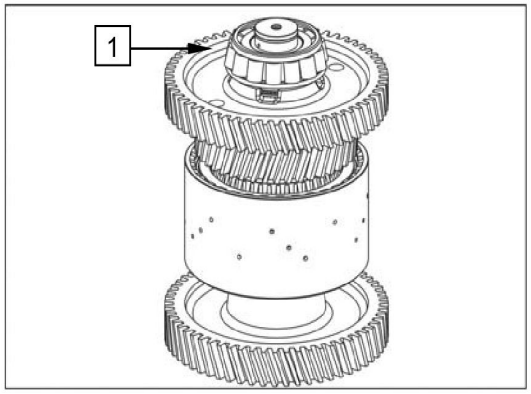


Figure 532

Install, align and grease the rectangular rings 42x2.5 (1).

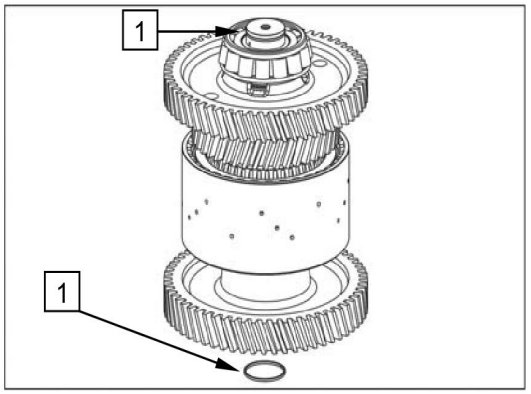


Figure 533

NOTE

Check closing and opening of the clutch by means of compressed air at the hole (see arrow).
Closing and opening of the clutch must be clearly audible.

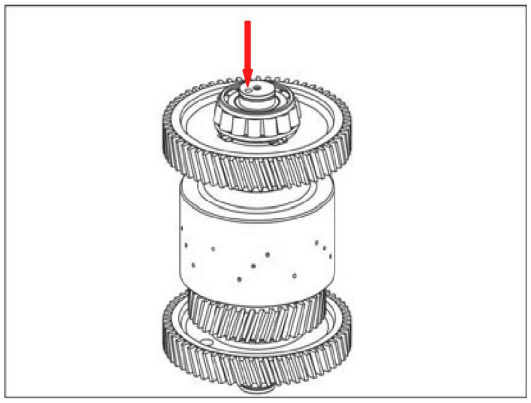


Figure 534

Insert clutches ”A“ into mounting device II.

NOTE

See marking on the mounting device!

(S) Mounting device II 850317-00077

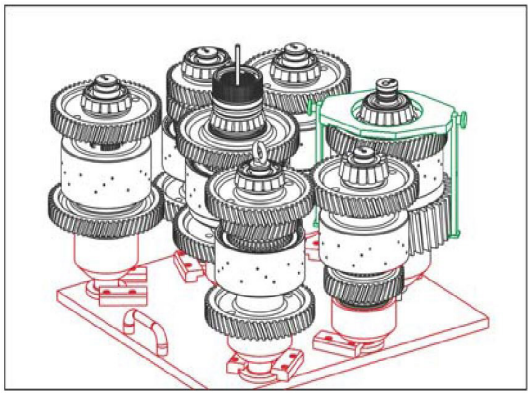


Figure 535

Check of the disk clearance all clutches

Used snap ring (1) thickens
Clutch **E** - 4,00 mm
Clutch **R** - 3,00 mm
Clutch **B** - 3,00 mm
Clutch **V** - 3,70 mm
Clutch **C** - 3,00 mm
Clutch **D** - 3,00 mm
Clutch **A** - 3,00 mm

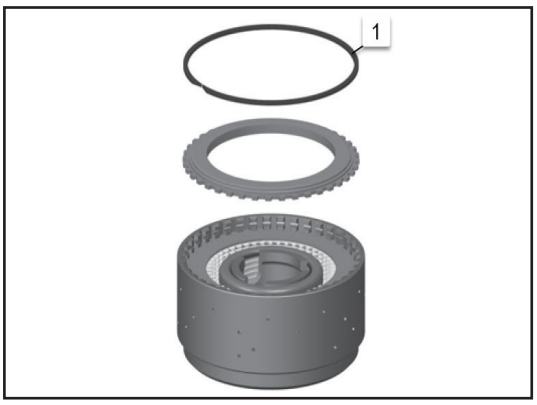


Figure 536

Position dial gauge at end plate.

Preload disk package with 100 N and set indication to zero.

For 8 EP 320/370 A lift end plate evenly and check required disk clearance:
Clutch E - 3.90 mm – 4.70 mm.
Clutch R - 3.90 mm – 4.70 mm.
Clutch B - 3.90 mm – 4.70 mm.
Clutch V - 3.80 mm – 4.60 mm.
Clutch C - 3.90 mm – 4.70 mm.
Clutch D - 3.90 mm – 4.70 mm.
Clutch A - 3.90 mm – 4.70 mm.

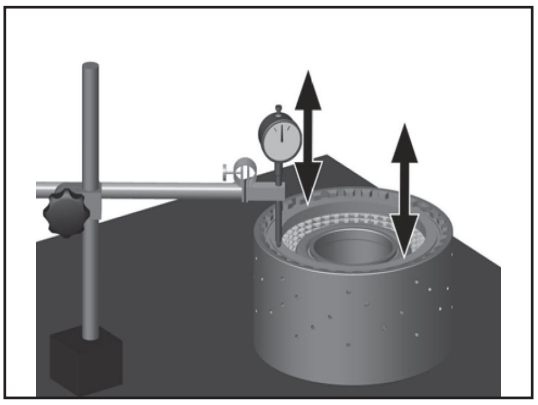


Figure 537

For 8 EP 420/470 A lift end plate evenly and check required Disk clearance:
Clutch E - 4.20 mm – 5.00 mm.
Clutch R - 4.20 mm – 5.00 mm.
Clutch B - 4.20 mm – 5.00 mm.
Clutch V - 3.80 mm – 4.60 mm.
Clutch C - 4.20 mm – 5.00 mm.
Clutch D - 4.20 mm – 5.00 mm.
Clutch A - 4.20 mm – 5.00 mm.

NOTE

If the required disk clearance is not achieved, replace the snap ring (1) as specified below:
• If the disk clearance is too small, install a thinner snap ring.
• If the disk clearance is too big, install a thicker snap ring.

Assembling differential ”G“

Engage snap ring 208x4.1 (1) into the lower groove of the ring gear (2).

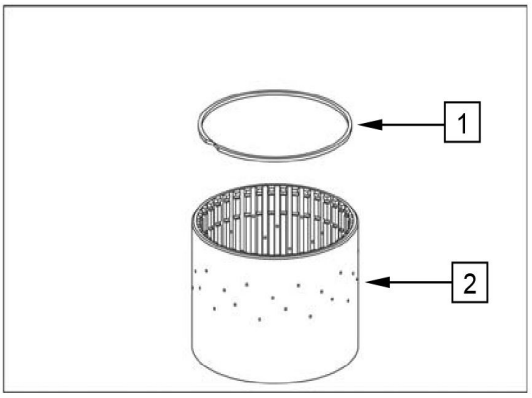


Figure 538

Assemble the end plate (1).

Installation position of end plate (1)

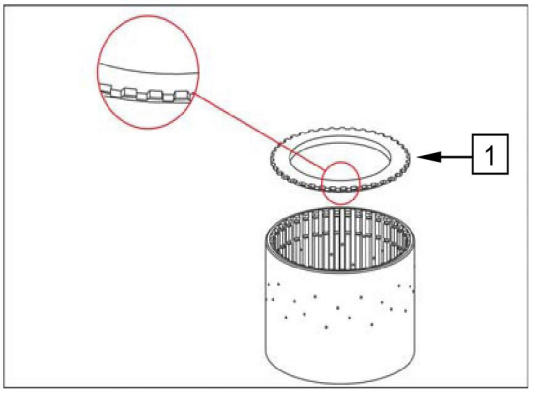


Figure 539

Alternately assemble 9 pcs. of inner clutch discs (1) and 9 pcs. of outer clutch discs (2) into the disc carrier (3).

CAUTION

Starting with an inner clutch disc!
Coated side of the inner and outer clutch discs must always be installed showing to the end plate!
See Figure 539.

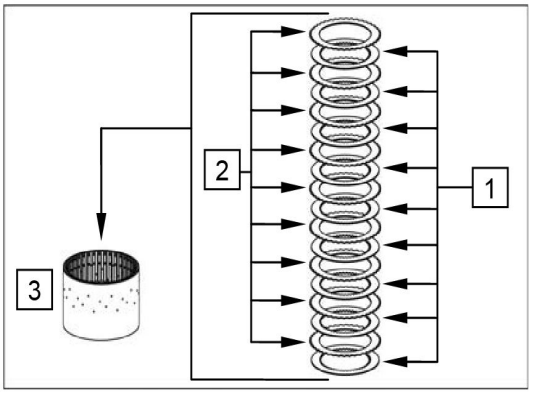


Figure 540

Engage the snap ring 208x4.1 (1).

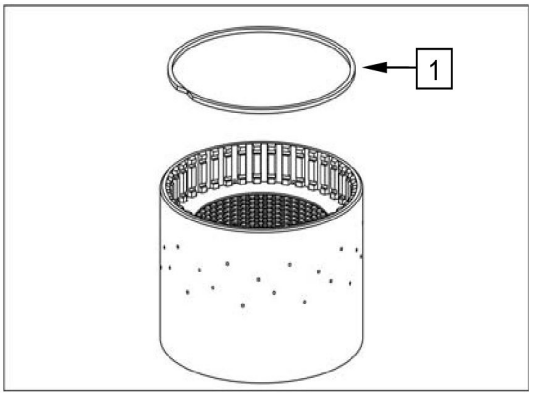


Figure 541

Legend:
1 = Ring gear
2 = Snap ring 208x4.1
3 = Outer clutch disc 9x
4 = Inner clutch disc 9x
5 = Snap ring 206x4
6 = Output shaft
7 = Piston with drain valve and O-rings
8 = Needle sleeve 50x58x20
9 = L-ring
10 = Cup spring set

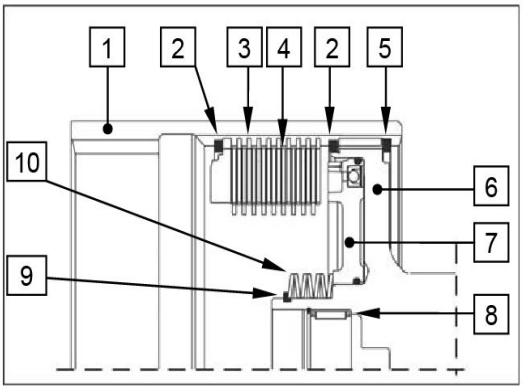


Figure 542

Place both O-rings (1 and 2) into the recesses of the piston and oil them.

1 = 80x3
2 = 182x3

NOTE

Check function of drain valve (see arrow) – ball must not get jammed!

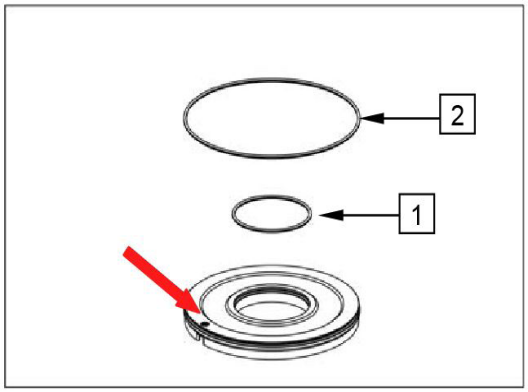


Figure 543

IInstall piston (1) into the output shaft.

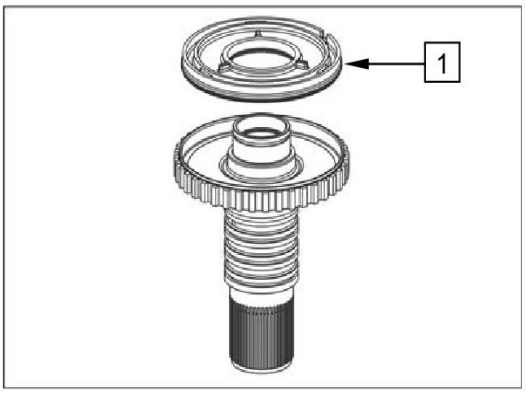


Figure 544

By means of an assembly aid install the piston under a hand press into the output shaft.

(S) Assembly aid 860103-01494

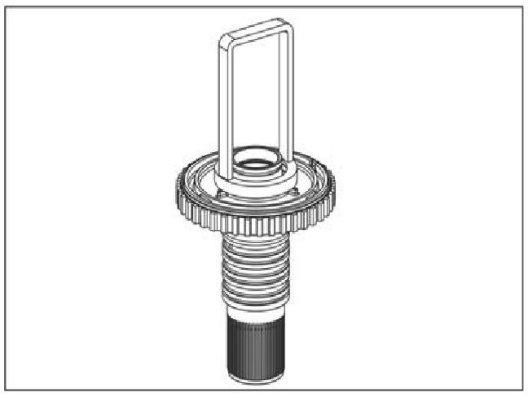


Figure 545

Place slip bushing (S) onto the output shaft.

Assemble cup spring set (1) and L-ring (2).

Installation position of L-ring and cup spring set see Figure 546.

(S2) Slip bushing, see Figure 546.

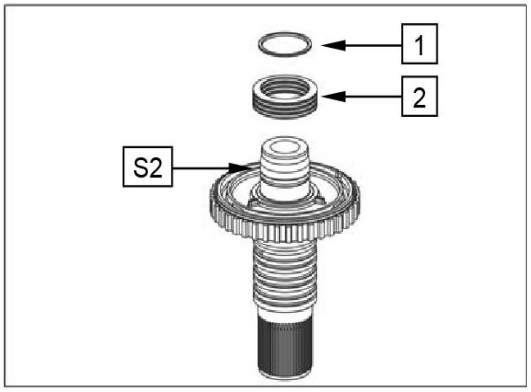


Figure 546

Preload the compression spring by means of assembly aid (S1) and pressure piece (S2) until the L-ring has engaged into the annular groove.

(S1) Assembly aid 860103-01494
(S2) Assembly fixture 850317-00087
(Slip bushing and pressure piece)

CAUTION

Generally, a new L-ring has to be installed!

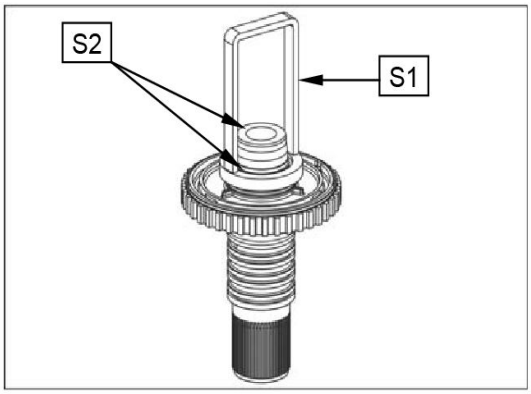


Figure 547

Install the needle sleeve 50x58x20 (1) by means of the pressure piece and oil it.

NOTE

The exact installation position is only obtained when using the specified pressure piece (S)!

(S) Pressure piece 850317-00073

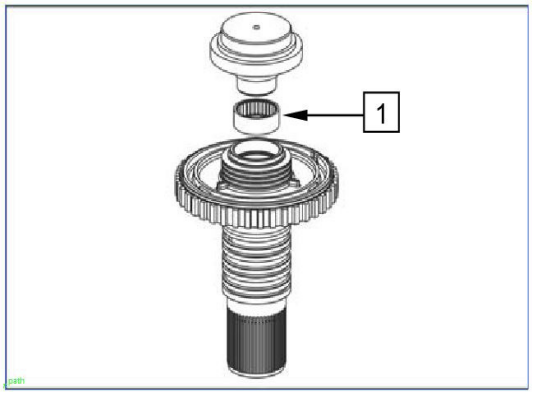


Figure 548

Fasten the needle sleeve with snap ring SB 58 (1).

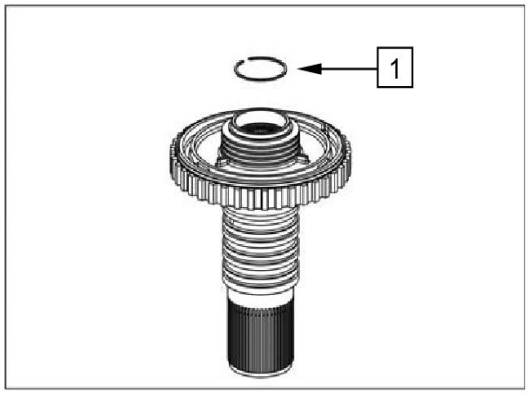


Figure 549

Assemble the output shaft (1) into the ring gear (2) until contact is obtained.

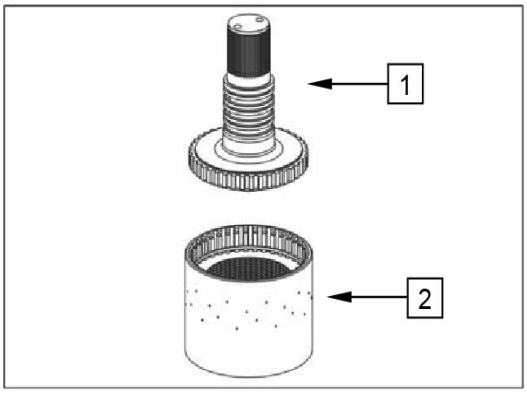


Figure 550

Ring gear/output shaft (2) to be axially fixed with snap ring 206x4 (1).

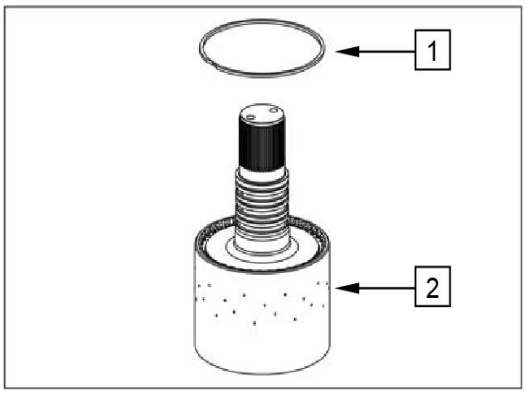


Figure 551

Install, align and grease the rectangular rings 88x4 (1).

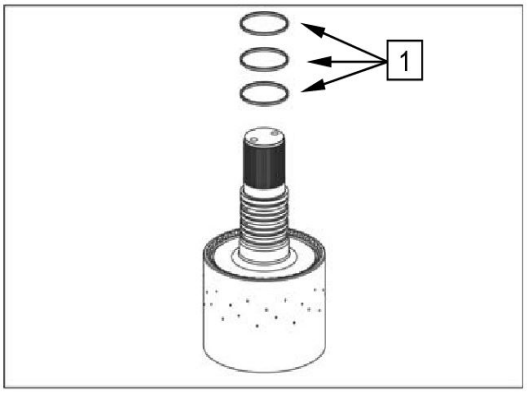


Figure 552

NOTE

Preassemble the output shaft Figure 550 - Figure 551!

Heat up the internal teeth of the disc carrier (approx. 120°C).

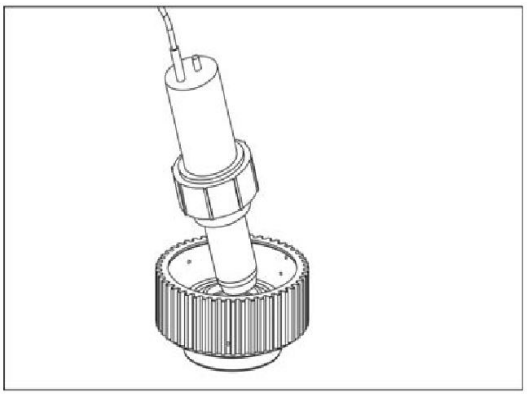


Figure 553

Assemble the disc carrier (1) onto the sun gear shaft (2) until contact is obtained.

WARNING

Use safety gloves!

CAUTION

Adjust the disc carrier after cooling down!

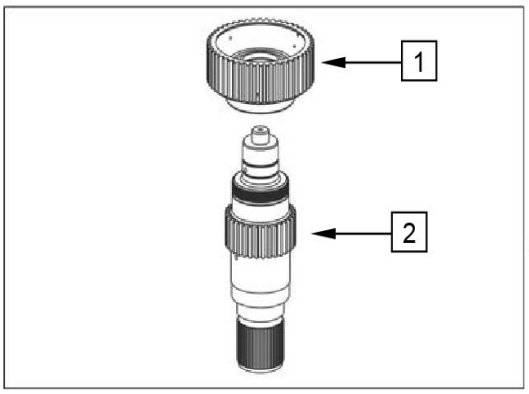


Figure 554

Axially fix the output shaft with the V-ring.

Legend:
1 = Output shaft cpl.
2 = V-ring
3 = Disc carrier
4 = Sun gear shaft

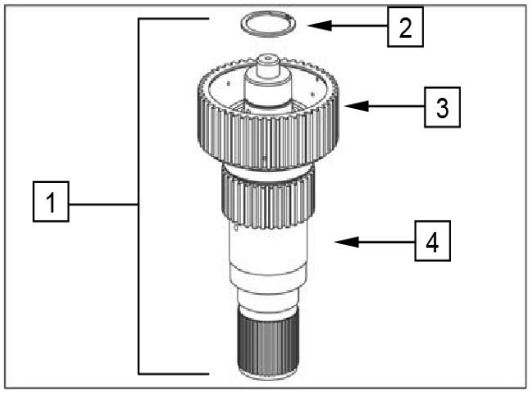


Figure 555

Align the inner clutch discs and assemble the output shaf (1) until contact is obtained.

By means of short left-hand/right-hand rotations mount the inner clutch discs onto the output shaft.

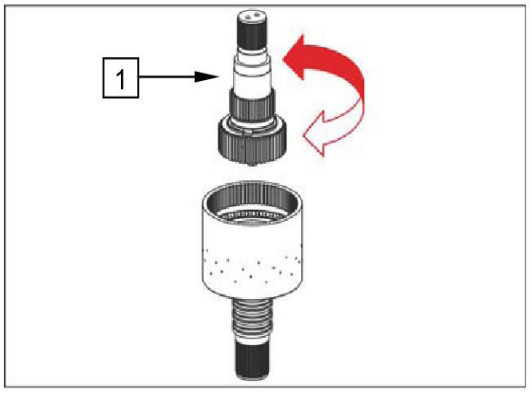


Figure 556

NOTE

Preassemble the planet carrier Figure 554 - Figure 556.

Preassemble the planetary gears (1).

1 = Planetary gear (4x)
2 = Thrust washer (8x)
3 = Needle cage 25x33x20

Oil the needle cage!

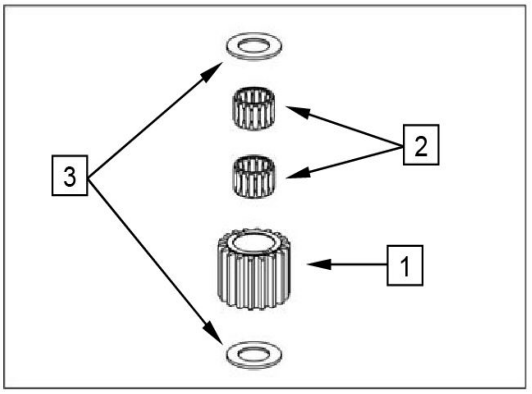


Figure 557

Insert the preassembled planetary gear (1) into the plane carrier.

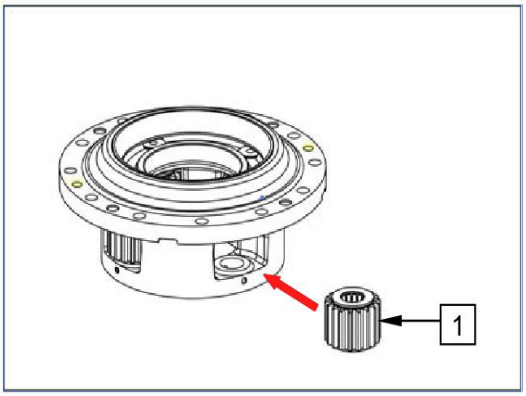


Figure 558

Position and centrally align the planetary gear and fasten it by means of the planetary pins (1).

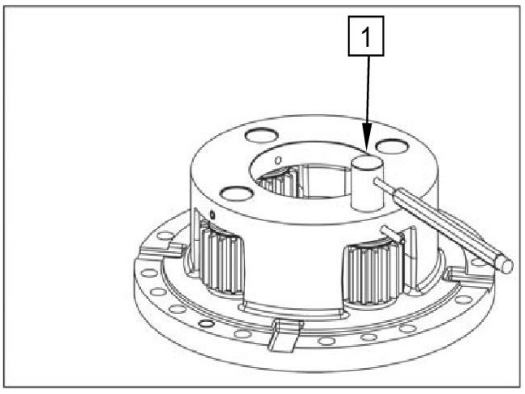


Figure 559

Fasten all planetary pins (1) by means of slotted pins 5x30 (2).

NOTE

Drive in the slotted pins until they are flush.
Install all planetary gears analogously!

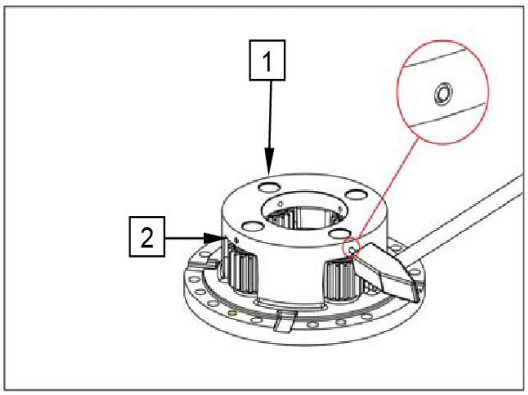


Figure 560

Insert the preassembled output shaft I and II with ring gear (1) into the output gear (2).

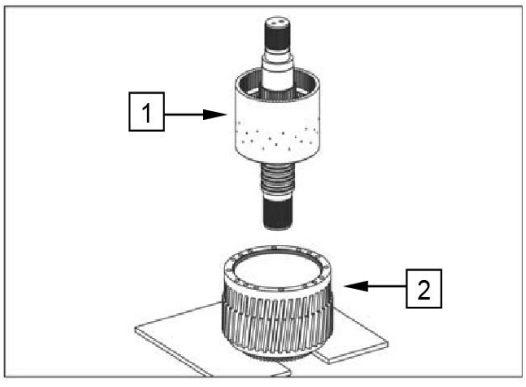


Figure 561

Install two adjusting screws and mount the planet carrier (1) into the ring gear until contact.

Pay attention to the hole pattern!

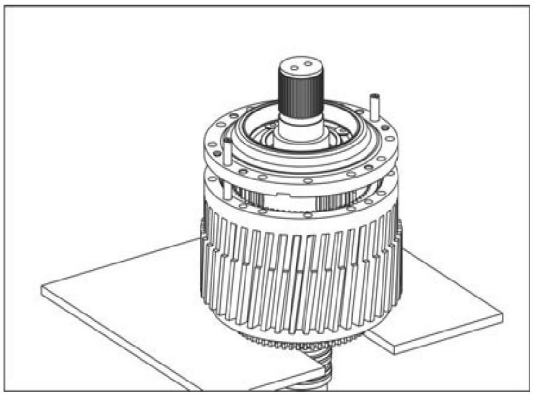


Figure 562

Drive in the slotted pins 12x30 until contact.

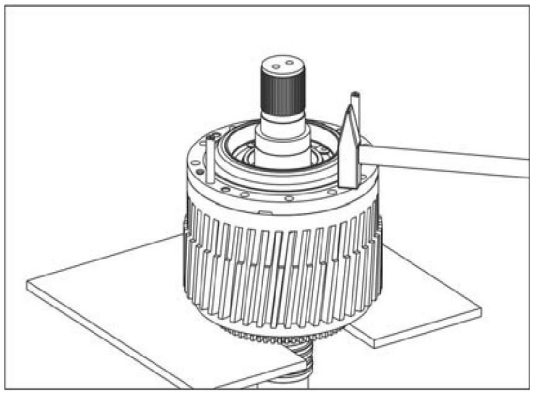


Figure 563

Fasten the differential by means of the press.
Fasten the planet carrier/output gear with screws.
Tightening torque M12/10.9x40 MA = 120 Nm

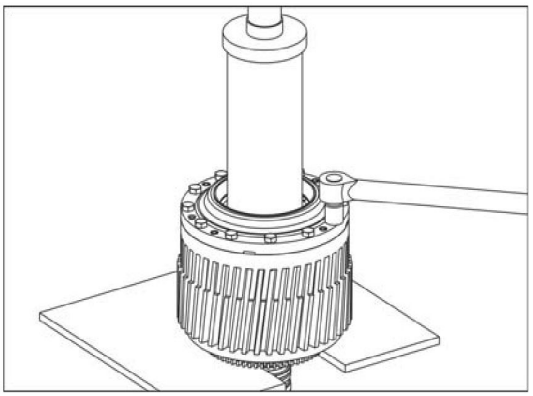
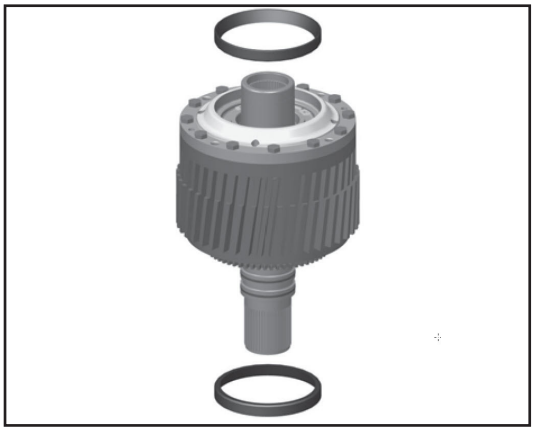


Figure 564

Insert bearing outer rings.



Installation input shaft and clutches

Housing II

Mount the O-rings 11x3 (1) onto the connection socket of the pipe (2) and grease them.

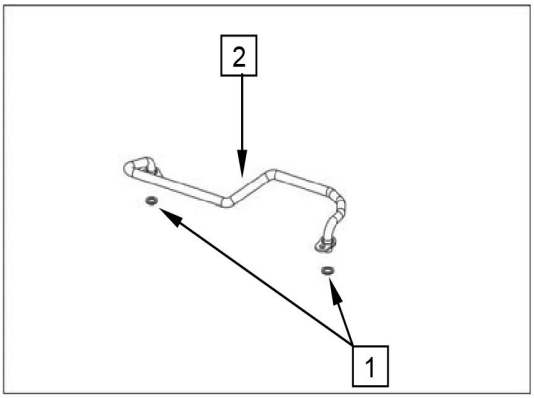


Figure 565

Insert the oil pipe (1) into housing II and fasten it by means of the cylindrical screws (2).

Tightening torque (M8/8.8x16) MA = 23 Nm

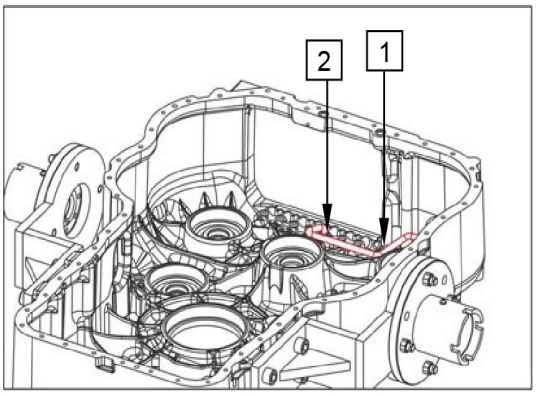


Figure 566

Install all oil pipes as described in Figure 566.

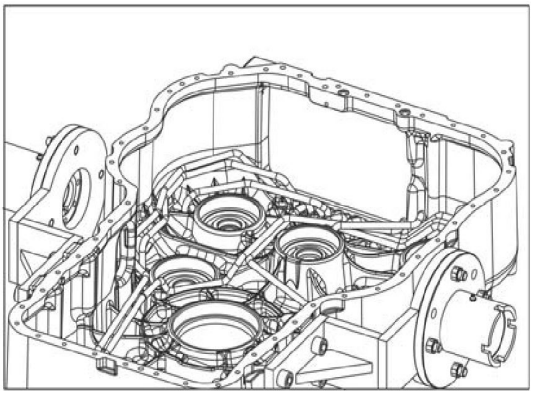


Figure 567

Fasten wiring harness Ergopower II L by means of clips (1) and strap (2) with the cylindrical screws in housing II.

Tightening torque (M6/8.8x12) MA= 9.5 Nm

Fasten wiring harness L II by means of cable binders (3) additionally.

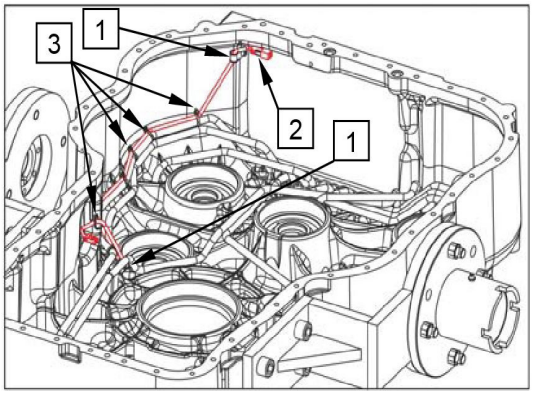


Figure 568

Snap ring SP 62 (see arrow) must snap into the recess.

Expand snap ring and assemble ball bearing 35x62x14 until snap ring has snapped into groove of the ball bearing.

Heat up bearing inner ring of ball bearing (approx. 120° C).

WARNING

Risk of injury!

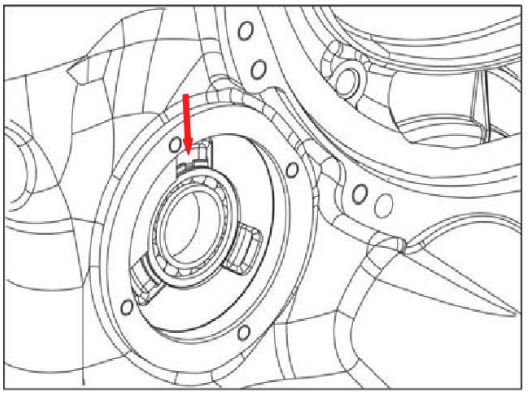


Figure 569

Install the input gear of the emergency steering pump into the ball bearing until contact is obtained.

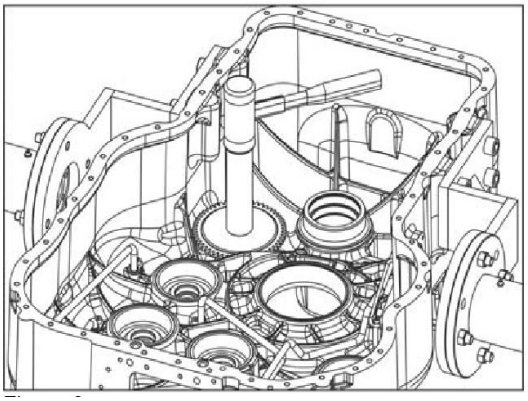


Figure 570

Axially fix the input gear (1) by means of retaining ring 35x1.5 (2).

Legend:
1 = Input gear emergency steering pump
2 = Retaining ring 35x1.5
3 = Ball bearing 35x62x14
4 = Snap ring SP 62

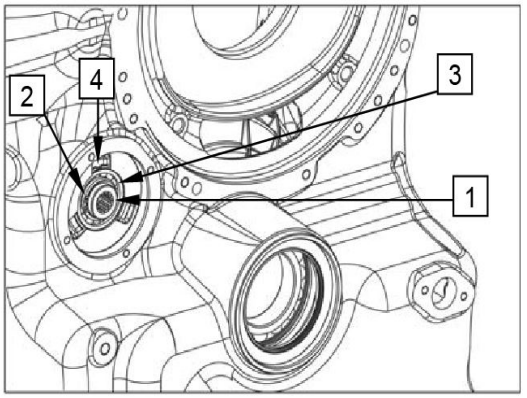


Figure 571

By means of a suitable pressure piece install the ball bearing 75x130x25 (1) into transmission housing II until contact is obtained and lock it with the retaining ring 130x4 (2).

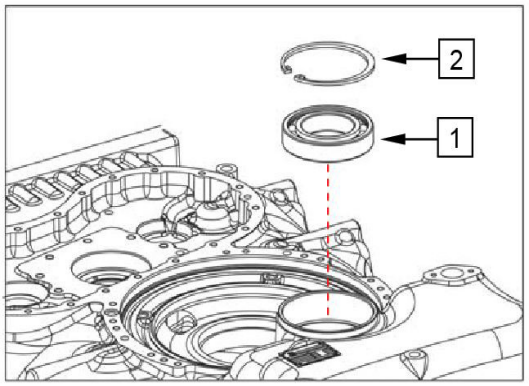


Figure 572

Insert all bearing outer rings into the bearing bores of housing II.

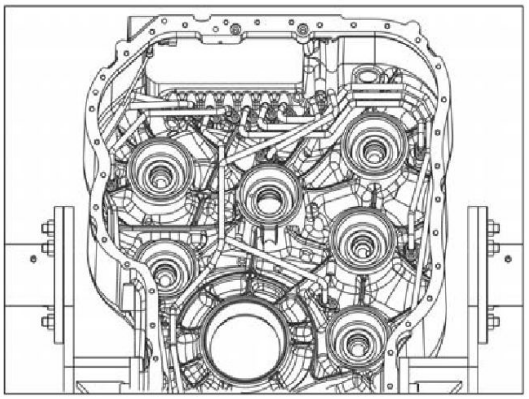


Figure 573

Install the needle bearing 90x100x16 (1) by means of the pressure piece and oil it.

NOTE

The exact installation position is only obtained when using the specified pressure piece (S)!

(S) Pressure piece 850317-00073

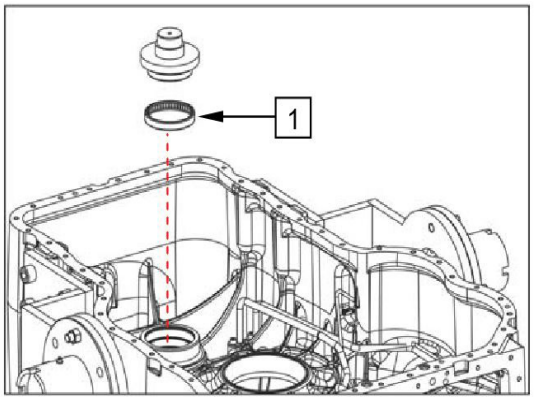


Figure 574

Fasten the needle bearing with snap ring (1).

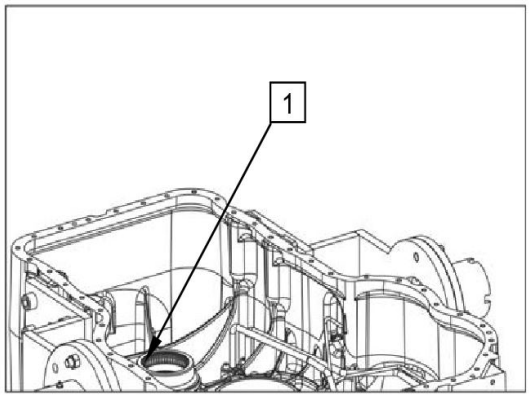


Figure 575

Put on the screen sheet (1) until contact.

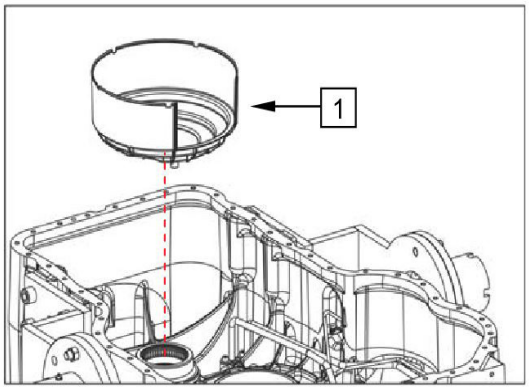


Figure 576

Heat up the bearing inner ring (approx. 120° C).

WARNING

Use safety gloves!

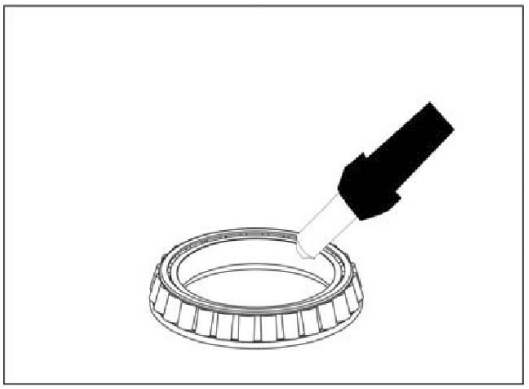


Figure 577

Assemble bearing inner ring (1) until contact is obtained.

CAUTION

Install the bearing inner ring subsequently after cooling down!

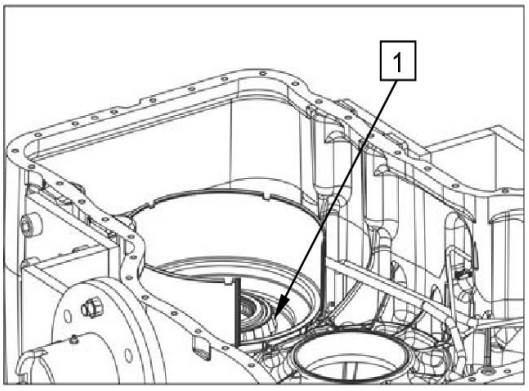


Figure 578

Clutches “V”;“R”;“A”;“B”;“C”;“D”;“E”

NOTE

Installation of the clutches by means of the mounting device is described in (Figure 579) - (Figure 581)

WARNING

Due to the installation circumstances it is not possible to install single clutches without using the special tool.

In case of inadequate procedure there is a risk of injury!

Install all clutches on the mounting device II until contact.

Press all locating bushes inward (see arrow).

(S) Mounting device II 850317-00077

For installation position of the different clutches please refer to the respective Chapter “Reassembly clutches“!

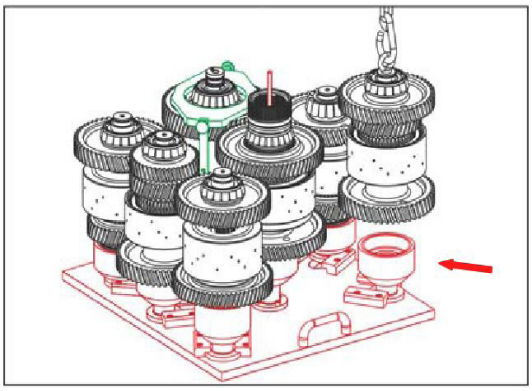


Figure 579

Install the mounting device I until contact and lock all clutches by means of the knurled nuts.

(S) Mounting device I 850317-00077

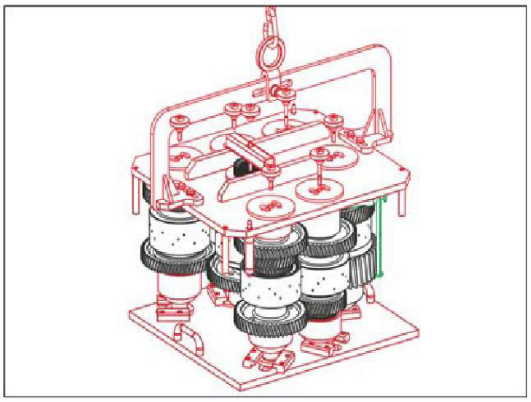


Figure 580

Install clutches in housing II until contact.

Loosen the knurled nuts and remove mounting device I.

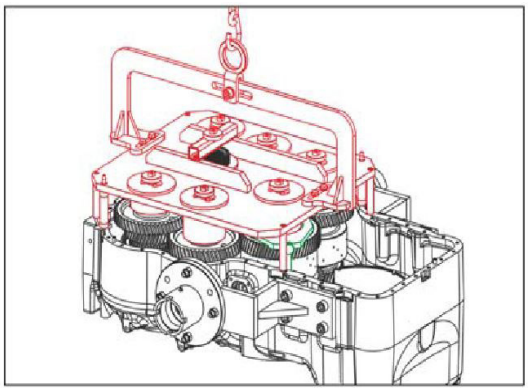


Figure 581

Remove the assembly aid from clutch “E” (1).

(S1) Assembly aid 850317-00074

NOTE

Visual inspection clearance oil pipes/clutches

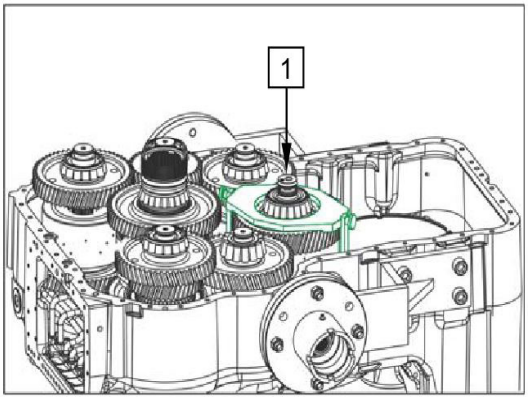


Figure 582

Heat up the bearing inner ring (approx. 120° C).

WARNING

Use safety gloves!

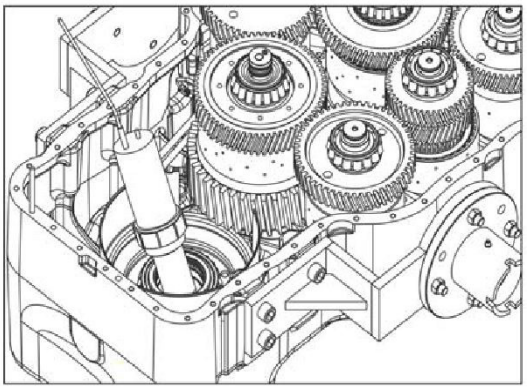


Figure 583

By means of the lifting tackle install Differential “G” into the gear train and the input gear of the emergency steering pump until contact.

NOTE

Only when output gear differential “G” / input gear emergency pump are aligned, the exact installation position of the differential in housing II is guaranteed. (See Figure 585)

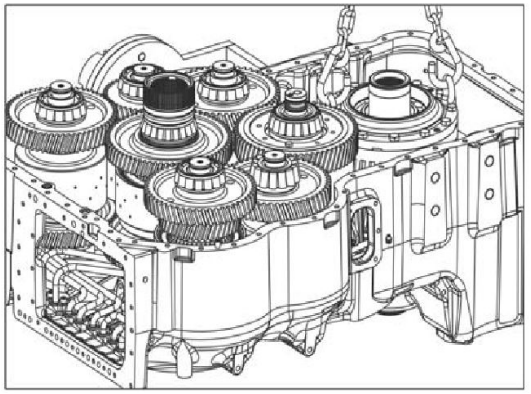


Figure 584

1 = Input gear emergency steering pump
2 = Output gear differential “G” for emergency steering pump
3 = Screen sheet

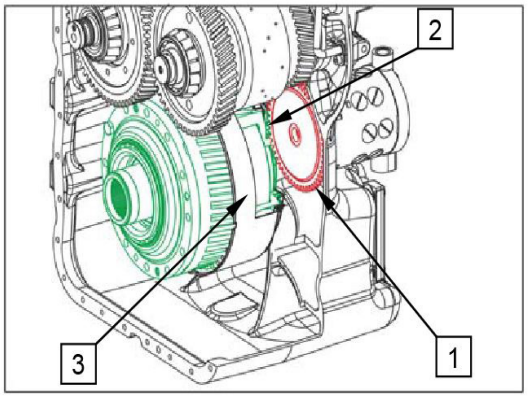


Figure 585

Mount O-rings 38x2 und 59x2 (1) onto the input shaft (3) and grease them.

Snap ring SB 76 (2) has to be snapped into the groove.

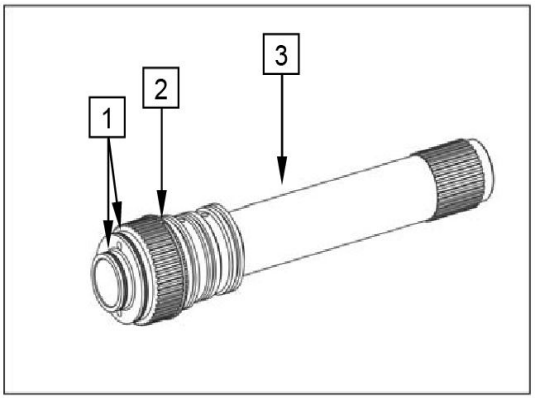


Figure 586

Assemble input shaft (1) with slip bushing until the snap ring has snapped into the recess of the input shaft (2) clutch “V”.

Input shaft (1) is axially fixed!

NOTE

Both ends of the snap ring must be placed in one of the four mounting holes – see Figure 588!

(S) Slip bushing	850317-00088

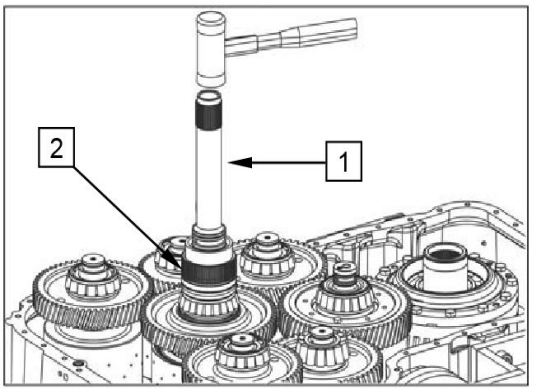


Figure 587

Legend:

1 = Input shaft clutch “V”
2 = Input shaft
3 = Snap ring SB 76 (green)

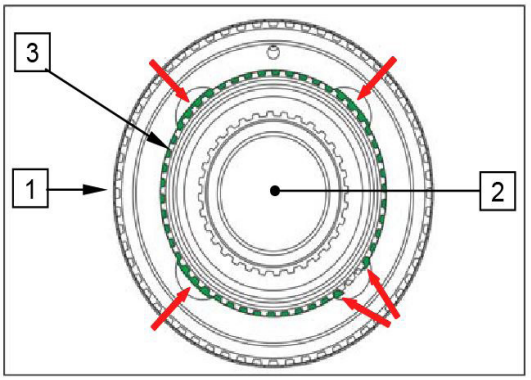


Figure 588

Housing I

Put on the screen sheet (1) until contact.

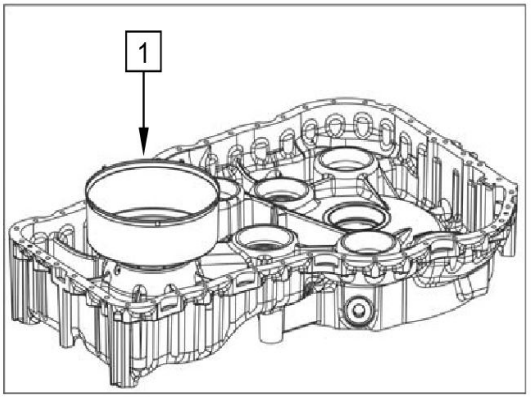


Figure 589

Heat up the bearing inner ring (approx. 120° C).

WARNING

Use safety gloves!

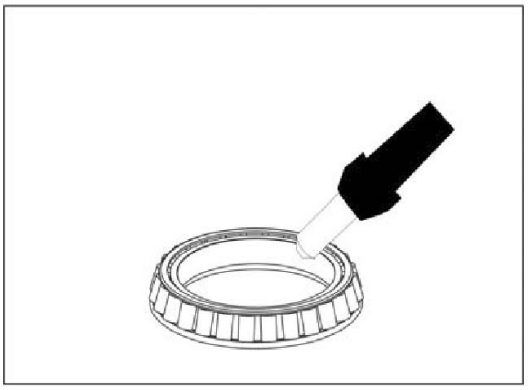


Figure 590

Assemble bearing inner ring (1) until contact is obtained.

CAUTION

Install the bearing inner ring subsequently after cooling down!

Insert all bearing outer rings (2) with grease into the bearing bores of housing II.

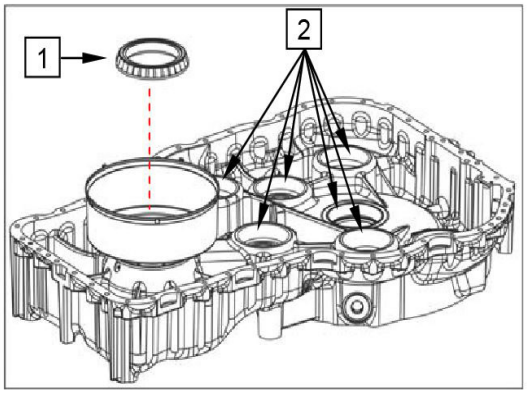


Figure 591

Mount O-ring 37x3 (1) onto the connection socket and grease it.

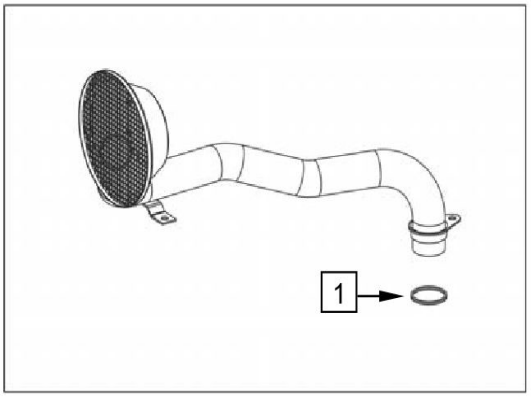


Figure 592

Fasten the suction tube (1) by means of the cylindrical screws (2) in housing I.

Tightening torque (M8/8.8x16) MA = 23 Nm

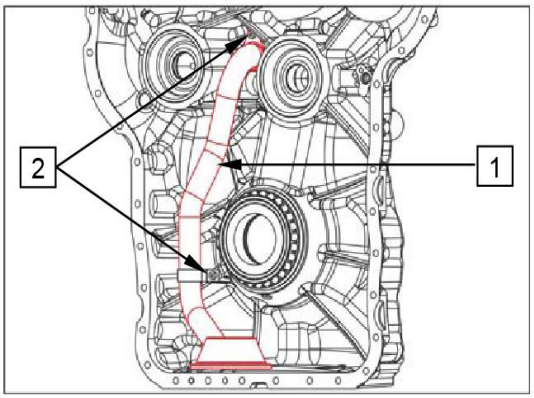


Figure 593

Mount O-rings 11x3 (1) onto the connection socket of the tube and grease them.

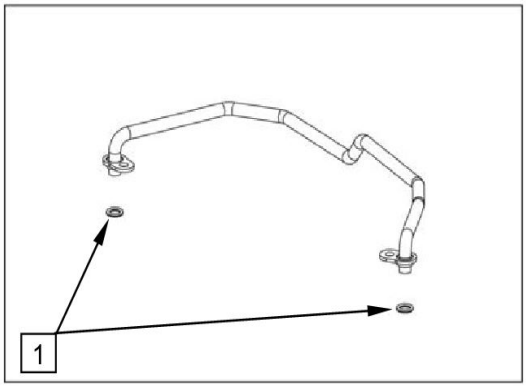


Figure 594

Install the tube in housing I until contact and fasten it by means of cylindrical screws.

Tightening torque (M8/8.8x16) MA= 23 Nm

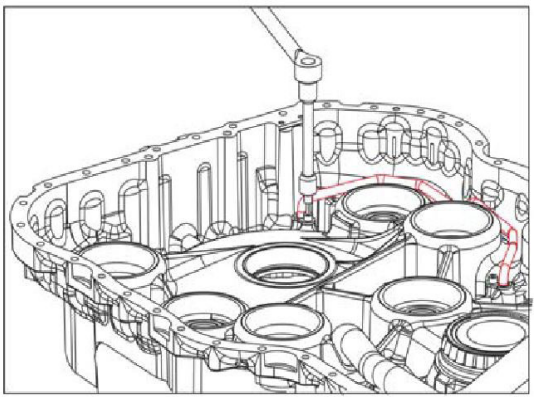


Figure 595

Cable with fastening parts.

1 = Cable Ergopower L II
2 = Fixing plate with cylindrical screws
3 = Clip with cylindrical screw

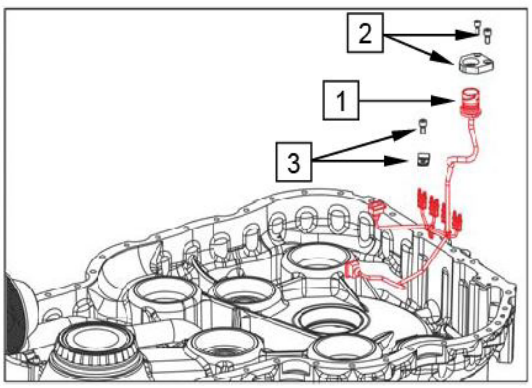


Figure 596

Install cable Ergopower L II until contact and fasten it with clip (1) and fixing plate (2).

Cylindrical screws fixing plate
Tightening torque (M8/8.8x20) MA = 23 Nm

Cylindrical screw clip
Tightening torque (M8/8.8x16) MA = 23 Nm

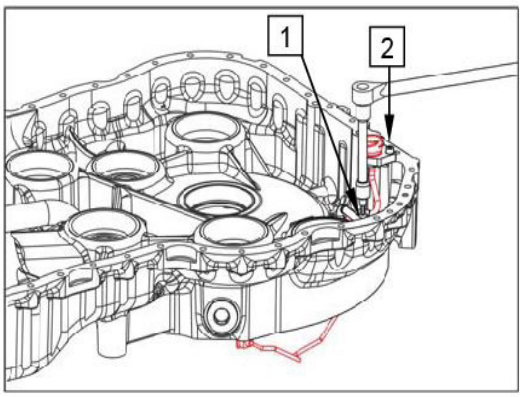


Figure 597

Install all screw plugs M14x1.5 with O-ring 11x2 (1).

Tightening torque MA = 25 Nm

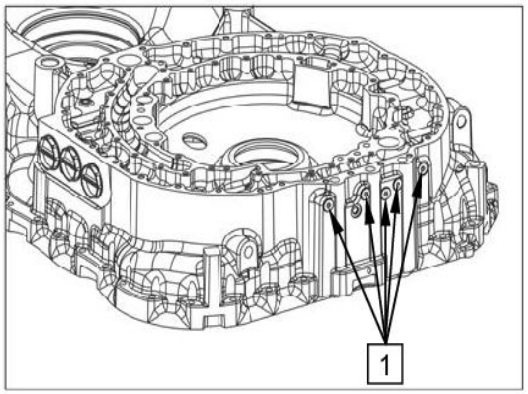


Figure 598

Assemble housing I and housing II

Install two adjusting screws.

Place O-rings 14x3.5 (1) into the recess and grease them. Wet the locating face with Loctite 574.

By means of lifting tackle install housing I (2) until contact.

Pay attention that screen sheets of the differential are aligned!

(S) Adjusting screws 120702-00080

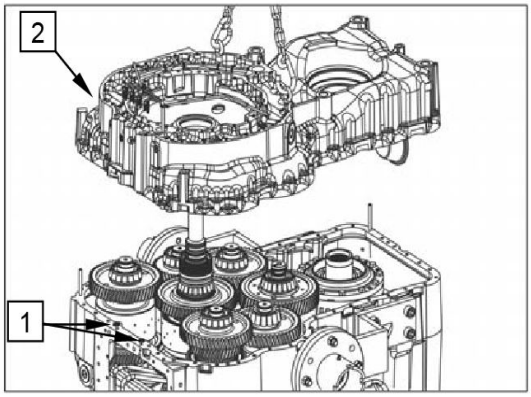


Figure 599

Install both pins 10x36 (1).

Bolt together housing I/housing II by means of the cylindrical screws (2).

Tightening torque (M10/8.8x50) MA = 46 Nm

See Fig. 620 and 621!

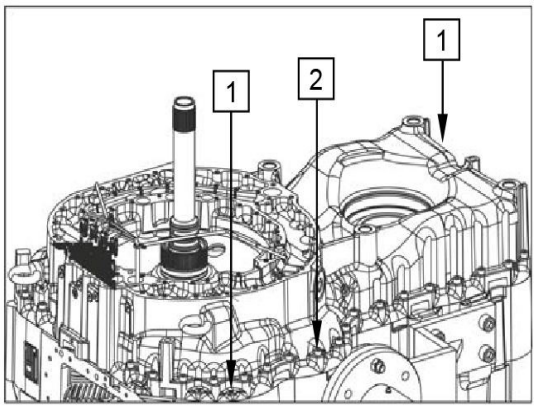


Figure 600

Tighten the 3 remaining cylindrical screws.

(S) Socket insert 850316-00381

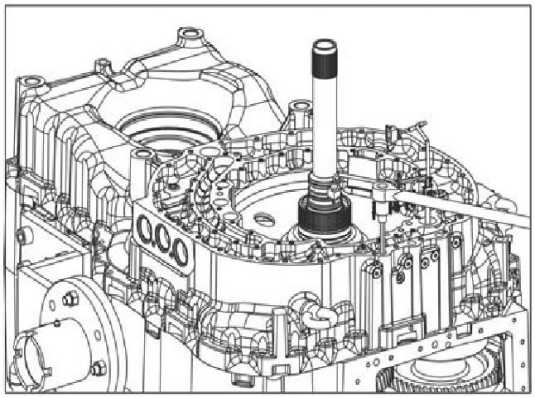


Figure 601

Oil supply

Shifting block II

1 = Cooler changeover valve 1.5 bar
2 = Pressure regulator with follow-on slide ”Y10“- Retarder
3 = Pressure regulator with follow-on slide ”Y7“- Clutch „V“
4 = Pressure regulator with follow-on slide ”Y9“- Lock-up clutch
5 = Pressure regulator with follow-on slide ”Y8“- Clutch ”E“
6 = Pressure reducing valve 9 bar

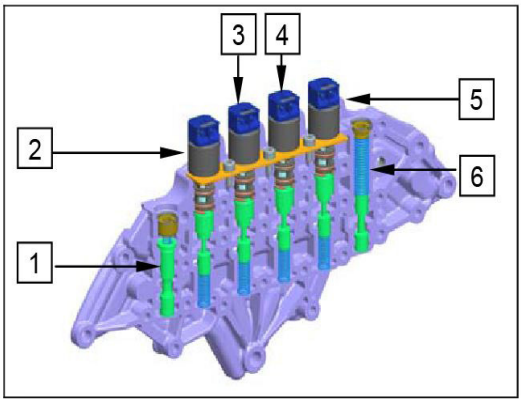


Figure 602

Push components of the cooler changeover valve into the bore.

1 = Piston
2 = Compression spring
3 = Plug

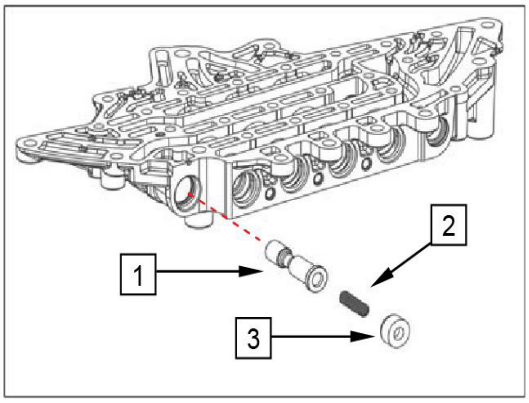


Figure 603

Preload the cooler changeover valve and fasten it with the retaining ring 18x1 (1).

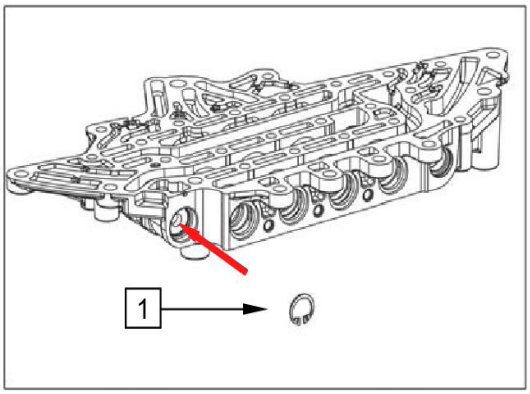


Figure 604

Push components of the pressure reducing valve into the bore.

1 = Piston
2 = Compression spring
3 = Plug

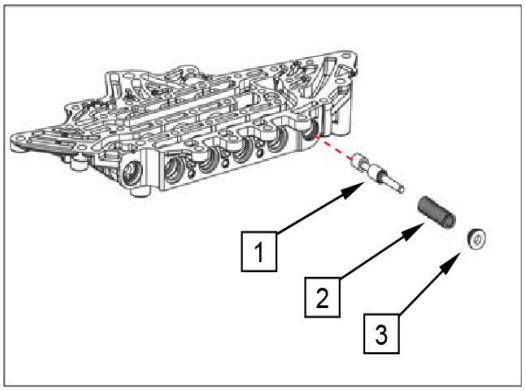


Figure 605

Preload the pressure reducing valve and fasten it with the retaining ring 18x1 (1).

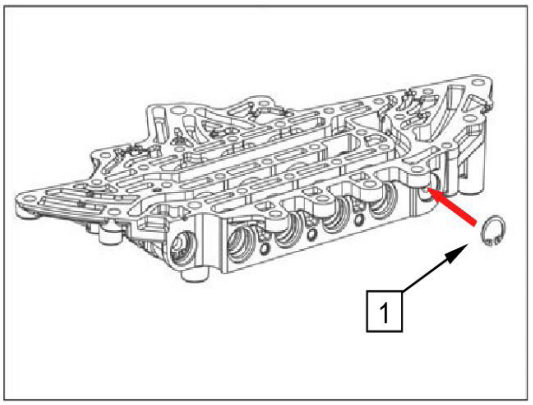


Figure 606

Push the follow-on slide – compression spring and piston - (1) into the bores.

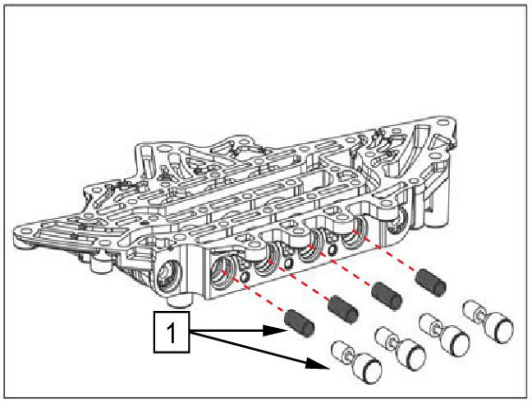


Figure 607

Preload the follow-on slide and fasten it with the stop plates (1).

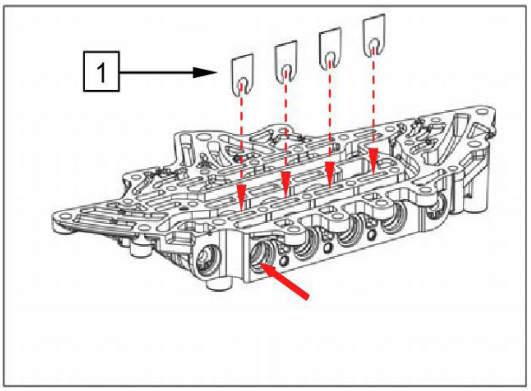


Figure 608

Insert the pressure regulator (1) into the valve block and fasten it with the clamping plate (2).

Observe the installation position of the pressure regulators (see arrow).

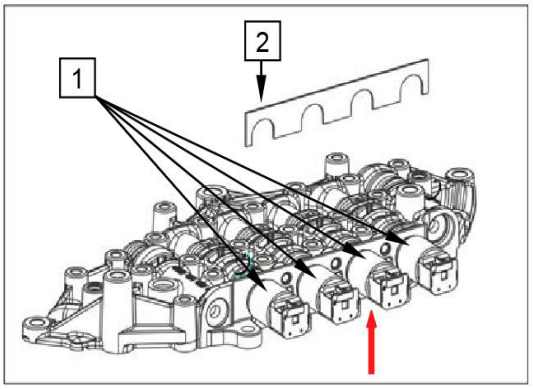


Figure 609

Lock the clamping plate with cylindrical screws (1).

Tightening torque (M6/8.8x12) MA = 9.5 Nm

Install the temperature sensor (oil sump) with O-ring 9.5x2 (2).

Tightening torque (M12x1.5) MA = 23 Nm

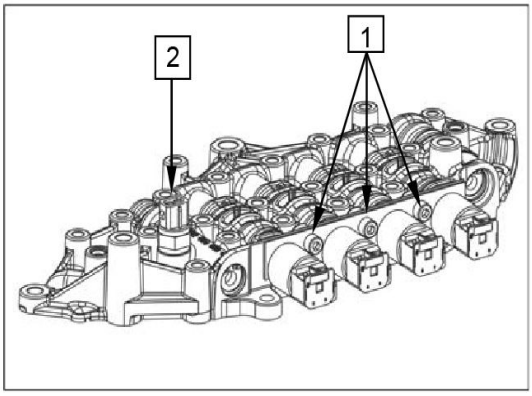


Figure 610

Valve block

1 = Cooler changeover valve 2.7 bar
2 = Converter pressure back-up valve 4.5 bar
3 = Retarder valve 2.5 bar
4 = Main pressure valve 16+2 bar
5 = Converter safety valve 12 bar

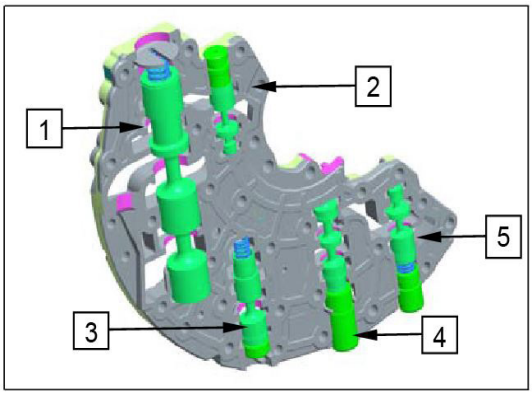


Figure 611

Push components of the converter pressure back-up valve into the bore.

1 = Piston
2 = Compression spring
3 = Valve bush

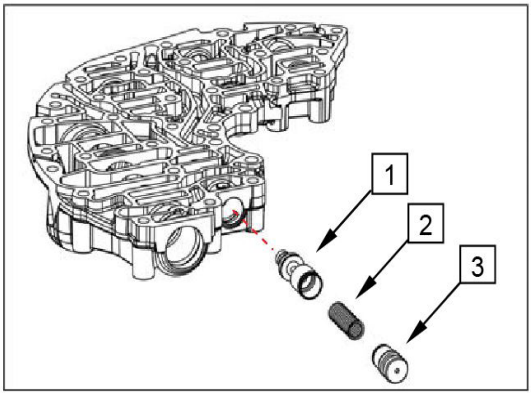


Figure 612

Preload the converter pressure back-up valve by means of a suitable pressure piece and fasten it with the fixing plate (1).

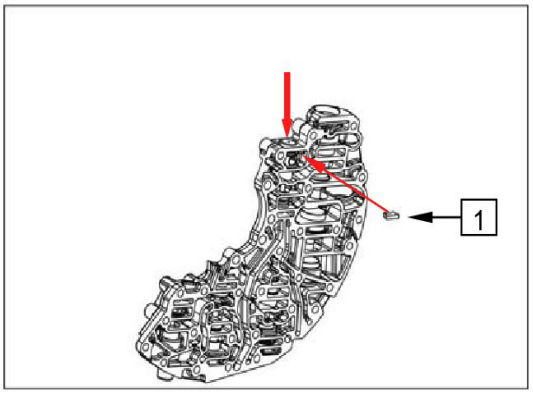


Figure 613

Push components of the cooler changeover valve into the bore.

1 = Piston
2 = Compression spring

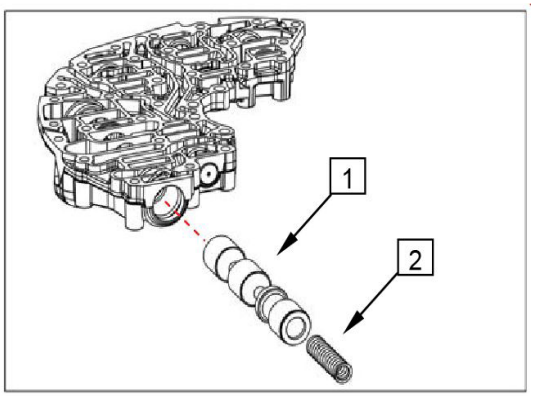


Figure 614

Preload cooler changeover valve with the pressure piece and fasten it with the fixing plate (1).

(S) Pressure piece 850316-00379

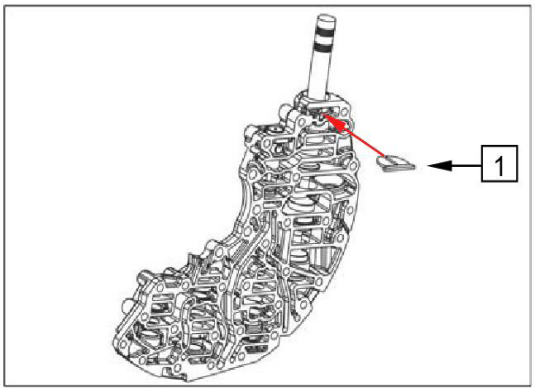


Figure 615

Push components of the main pressure valve (1), converte safety valve (2) and retarder valve (3) into the bores.
1 = Main pressure valve with fixing plate
*Piston
*Compression spring
*Valve bush
2 = Converter safety valve with fixing plate
*Control piston
*Compression spring
*Valve bush
3 = Retarder valve with fixing plate
*Compression spring
*Piston
*Piston

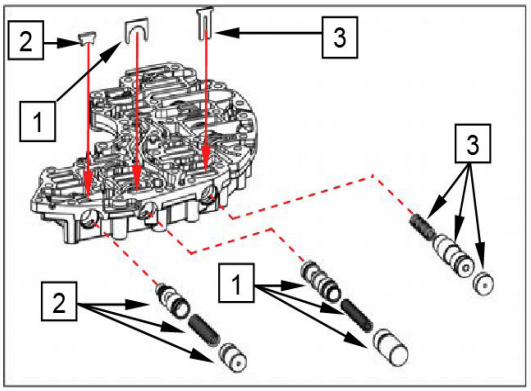


Figure 616

Preload the converter safety valve by means of a suitable pressure piece and fasten it with the fixing plate (1).

Install the main pressure valve (2) and the retarder valve (3) analogously (Figure 616).

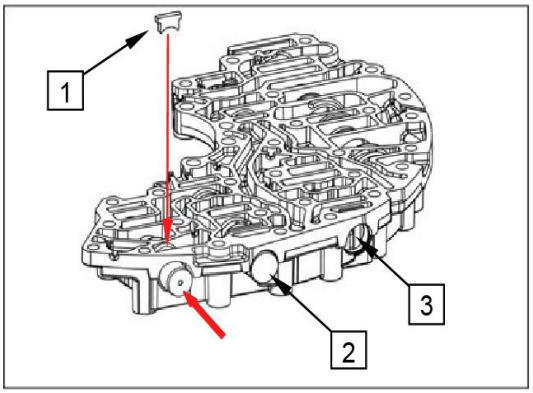


Figure 617

Install the screw plugs M10x1 with O-ring 8x1.5 (1).

Tightening torque MA = 9.5 Nm

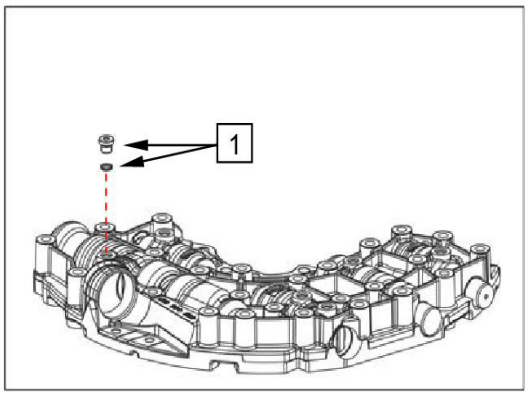


Figure 618

Retarder

Wet the oil pipe (1) with oil and press it into the stato hollow shaft (2) until contact is obtained.

Mount O-rings 70x3 (3) onto the stator hollow shaft and grease them.

(S) Driver tool 850317-00089

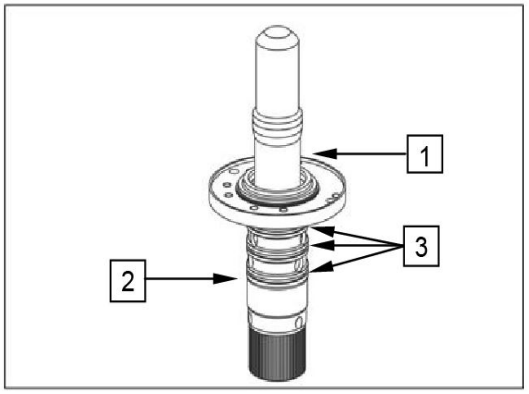


Figure 619

Fix two adjusting screws into the stator hollow shaft (1) and press it into the oil supply flange (2) until contact is obtained.

Pay attention to the hole pattern!

(S) Adjusting screw 120702-00080

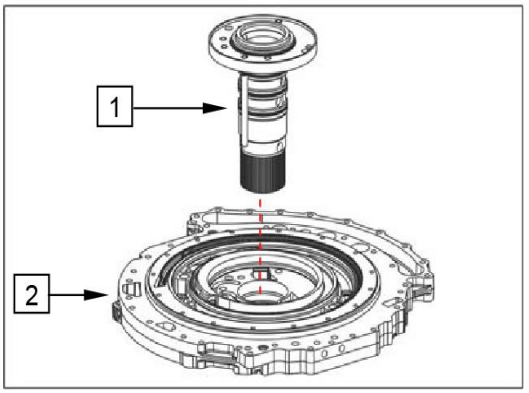


Figure 620

Install the slotted pins 12x24 (1).

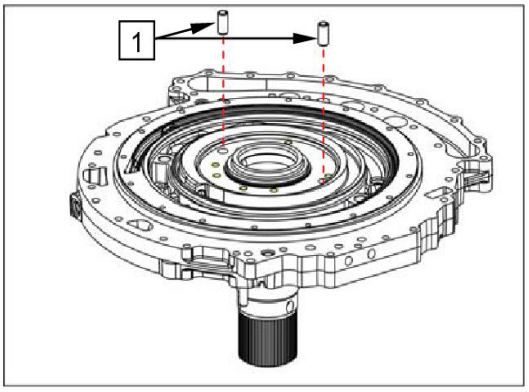


Figure 621

Install two adjusting screws.

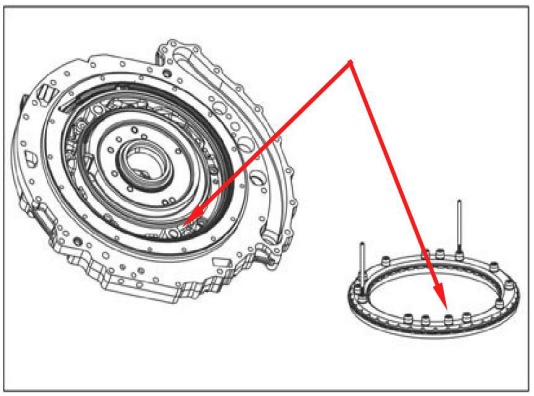


Figure 622

NOTE

Observe installation position stator/oil supply flange! See hole pattern (arrows)!

(S) Adjusting screw 120702-00081

Insert the stator (1) into the oil supply flange (2).

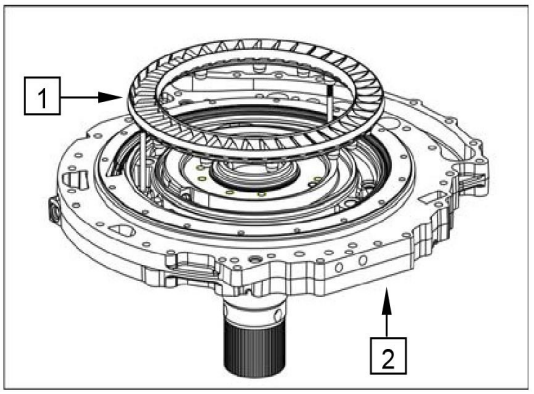


Figure 623

Install the bolted connection/oil supply flange with torx screws (1 and 2).

1 = M6/10.9x25
2 = M6/10.9x18

Tightening torque MA = 9.5 Nm

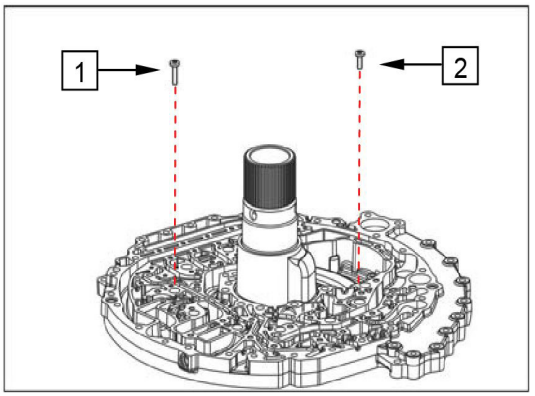


Figure 624

Insert the axial bearing (1) into the rotor and oil it.

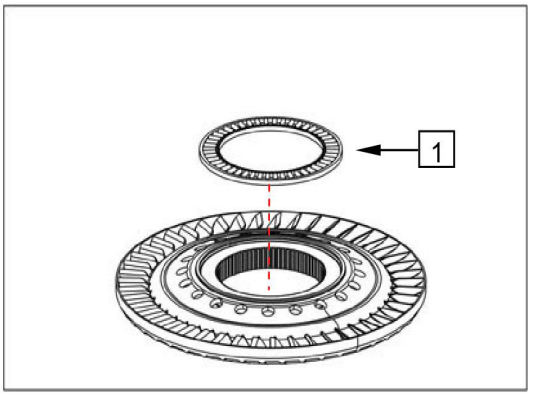


Figure 625

Assemble the axial washer (1), oil it and put on the roto (2).

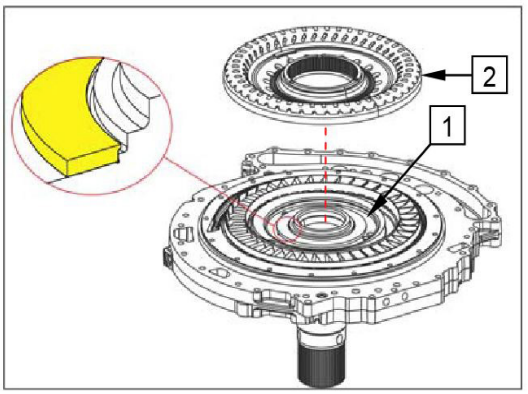


Figure 626

NOTE

Observe installation position axial washer (1)! See detail

By means of a suitable tool press the sleeve (1) into the sealing disc (2) until contact is obtained.

Pay attention to the position of the fixing straps 3x!

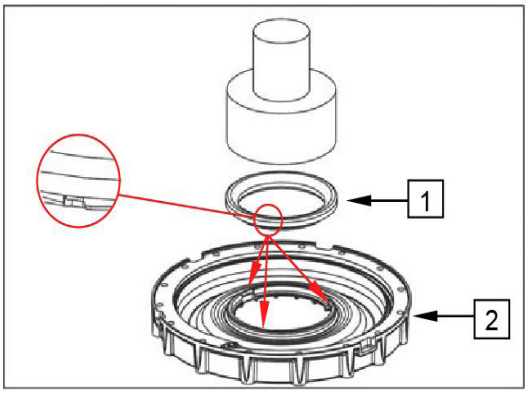


Figure 627

Check position of the straps (1) on the pressed-in oil supply flange.

To lock the sleeve bent three straps outward.

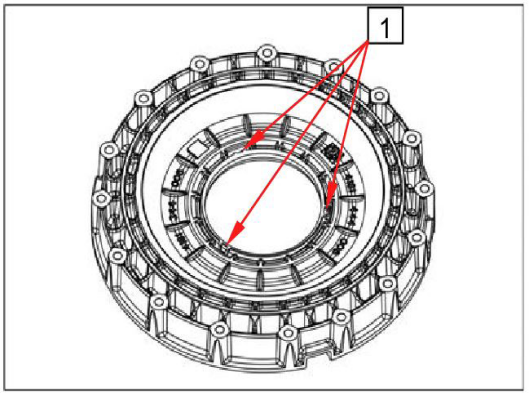


Figure 628

Put on the sealing disc (1) and fasten it with torx screws (2).

Tightening torque (M8/10.9x60) MA = 23 Nm

Insert the rectangular ring (3) and grease it.

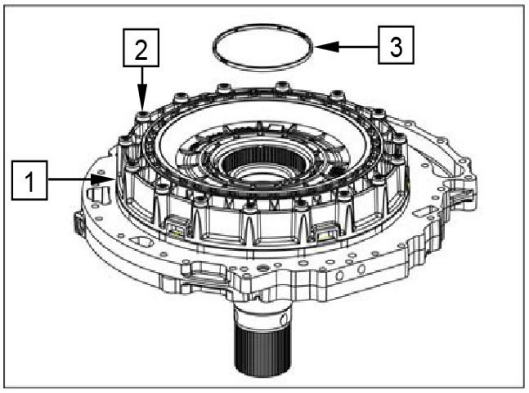


Figure 629

Primary pump

Insert the inner rotor (1) and the outer rotor (2) into the pump housing (3).

NOTE

Chamfer on the outer rotor (see arrow) shows downwards!

Install cover (4) to the pump housing until contact.

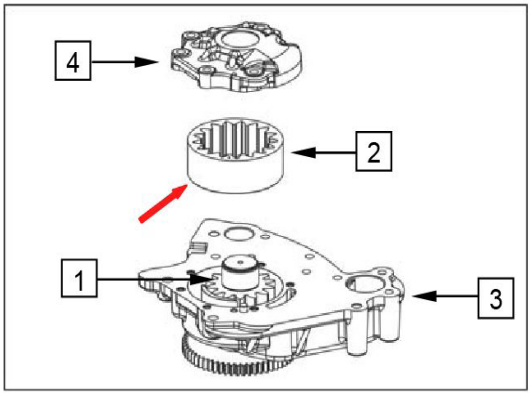


Figure 630

Install the bolted connection cover/pump housing (1).

Tightening torque MA = 20 ± 2 Nm

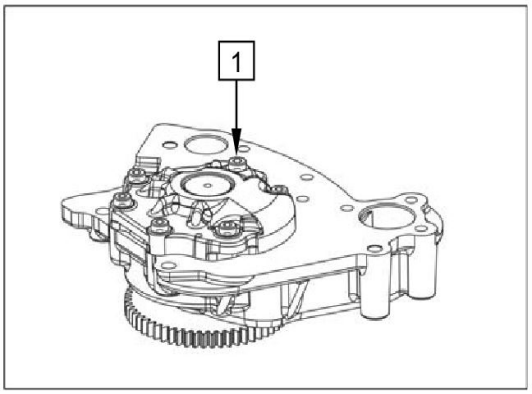


Figure 631

Installation retarder, primary pump, valve block and shifting block II

Snap in the snap ring (1) and mount the flange bush (2)

Pay attention to installation position of the flange bush (2). (see Figure 632).

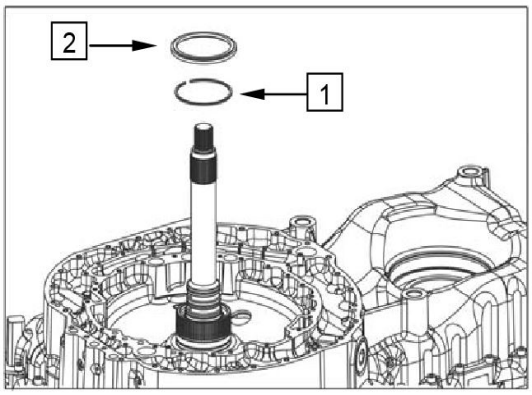


Figure 632

Mount O-ring 95x3 (1) onto the input shaft of clutch “V” and grease it.

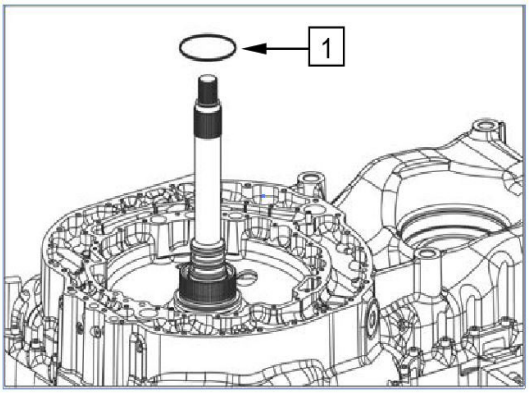


Figure 633

Assemble cup springs (1) and washer (2) to the input shaft of clutch "V".

Pay attention to installation position of cup springs and washer. (see Figure 634)

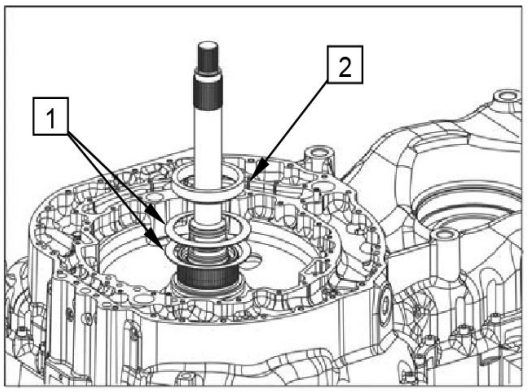


Figure 634

Legend:
1 = Rectangular ring 65x3
2 = Rectangular ring 70x3
3 = Bush
4 = O-ring 95x3
5 = Cup springs (2 pcs.)
6 = Flange bush
7 = Snap ring
G = Housing I
A = Input shaft clutch "V"
AN = Input shaft
P = PTO shaft

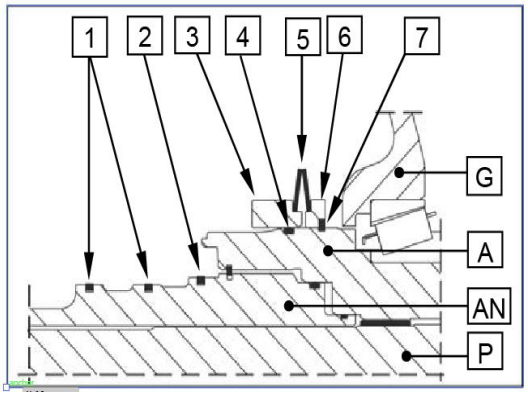


Figure 635

Install the rectangular rings (1 and 2).

1 = 65x3
2 = 70x3

Align and grease the rectangular rings.

See Figure 636.

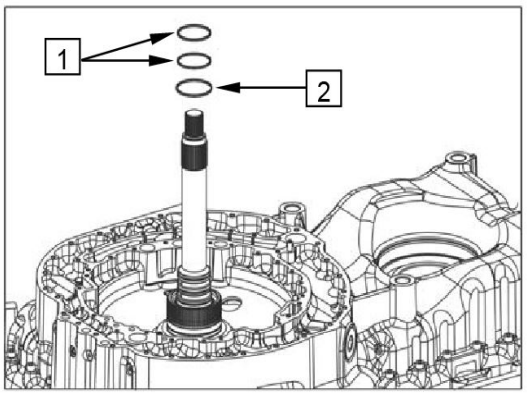


Figure 636

Install the adjusting screws and mount the cover plate (1) until contact is obtained.

(S) Adjusting screw 120702-00080 (M10)
(S) Adjusting screw 120702-00082 (M8)

NOTE

It is forbidden to reinstall the cover plate after opening of the bolted connection oil supply flange/housing I. In case of repair a new cover plate is generally to be installed!

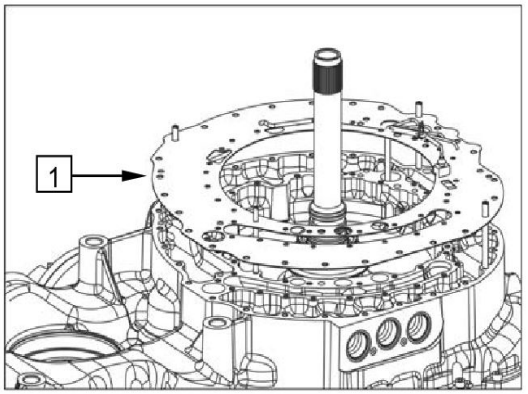


Figure 637

By means of the lifting tackle install oil supply flange on housing I until contact.

(S) Hook 850317-00069

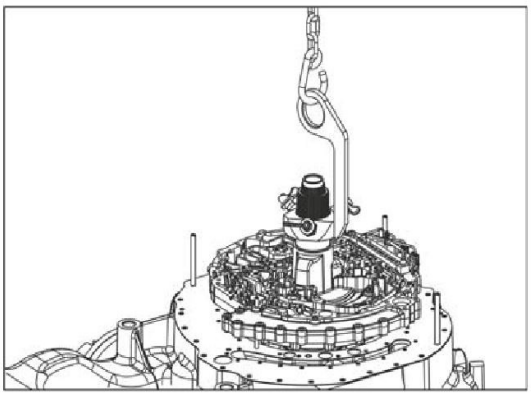


Figure 638

Install the pins 10x36 (1).

By means of the torx screws (2) fasten the oil supply flange on housing I.

Tightening torque (M8/10.9x45) MA = 23 Nm

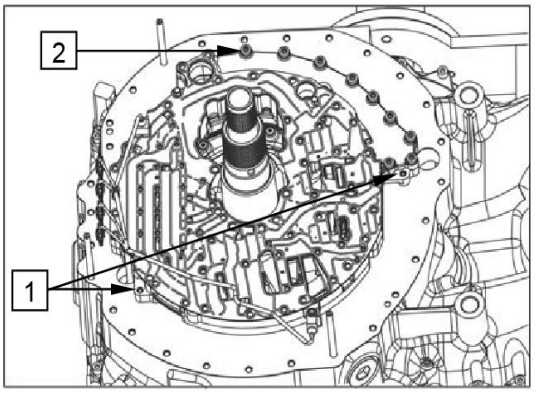


Figure 639

Install intermediate sheet (1) until contact.

WARNING

It is forbidden to reinstall the intermediate sheet. In case of repair a new intermediate sheet is generally to be installed!

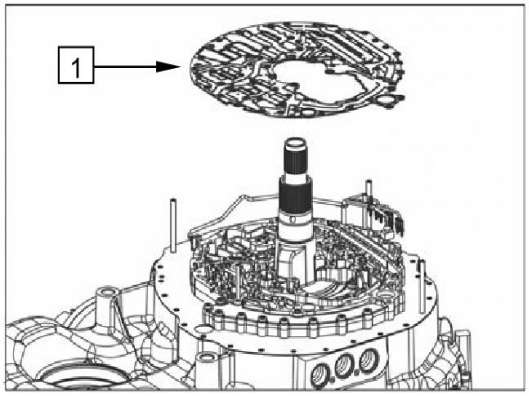


Figure 640

Installed the slotted pins 10x16 (1).

Put the primary pump (2) onto the slotted pins and install it until contact.

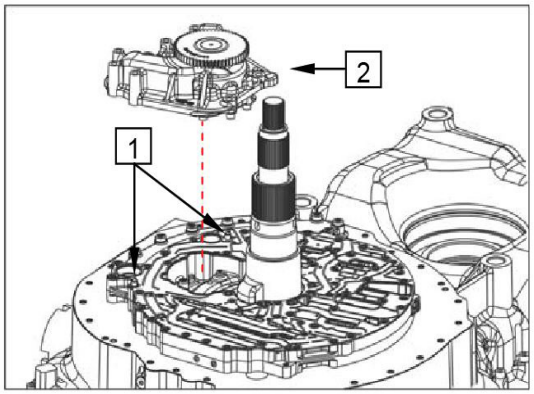


Figure 641

Fasten the primary pump.

1 = Hexalobular screw (M10/10.9x60)
*Tightening torque MA = 46 Nm
2 = Hexagon screw with washer (M8/10.9x100)
*Tightening torque MA = 23 Nm
3 = Torx screw (M8/10.9x60)
*Tightening torque MA = 23 Nm

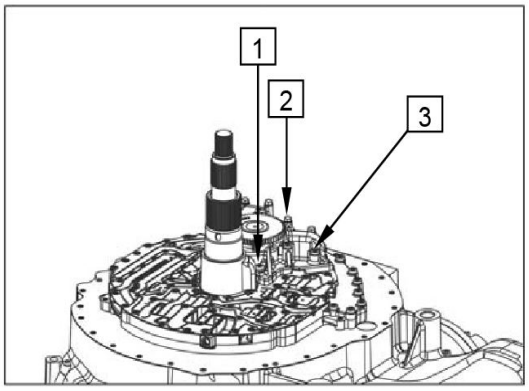


Figure 642

Install valve block (1) until contact and mount the bolted connection valve block/oil supply flange (2).

Torx screws (M8/10.9x60)
Hexagon screw with washer (M8/10.9x100)
*Tightening torque MA = 23 Nm
Hexalobular screw (M10/10.9x60)
*Tightening torque MA = 46 Nm

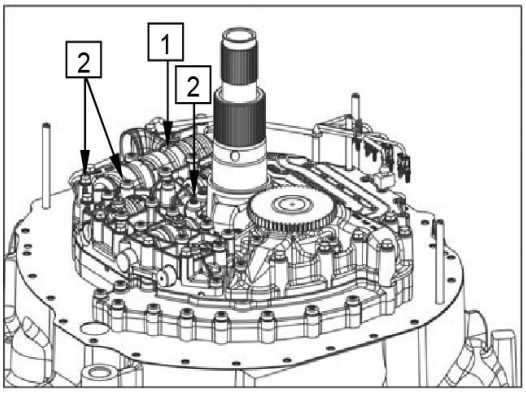


Figure 643

Install shifting block II (1) until contact and mount the bolted connection valve block/oil supply flange (2).

Torx screws M6/10.9x50)
*Tightening torque MA = 9.5 Nm
Torx screws (M8/10.9x60)
Hexagon screw with washer (M8/10.9x100)
Cylindrical screw with washer (M8/8.8x65)
*Tightening torque MA = 23 Nm

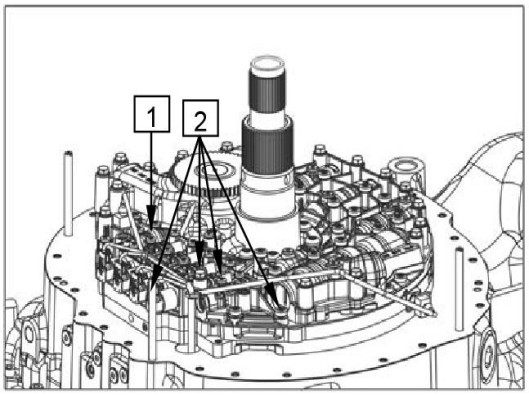


Figure 644

Install the temperature sensor - converter/retarder - with O-ring 9.5x2

*Tightening torque (M12x1.5) MA = 23 Nm

Close all lockings of the plug connections wiring harness/pressure regulators/temperature sensors.

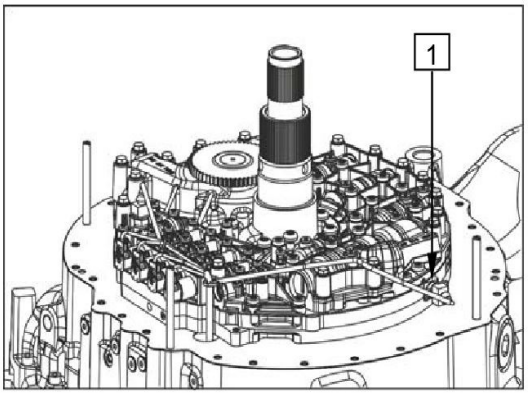


Figure 645

Engine connection

Install the shaft seal by means of the driver tool (S), with the sealing lip showing to the oil sump.

Wet outer diameter (rubber coated) with spirit and grease the sealing lip!

Shaft seal 135x170x12

(S) Driver tool 850317-00090

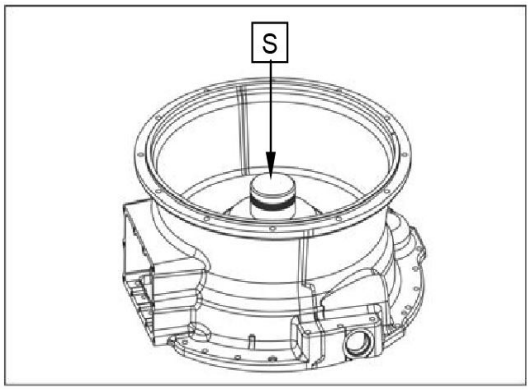


Figure 646

Instalation position is on the shaft seal. See Figure 647

NOTE

Exact installation position is obtained when using the specified driver tool (S)!

Legend:
1 = Shaft seal 135x170x12
2 = Converter bellhousing
3 = Pressure pipe (cooler recirculation)

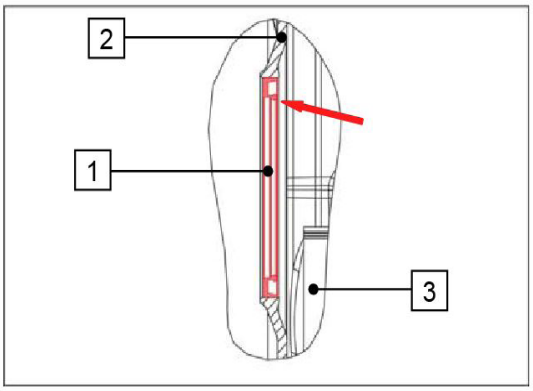


Figure 647

Mount two adjusting screws and install the converter bellhousing until contact.

(S) Adjusting screw 120702-00080

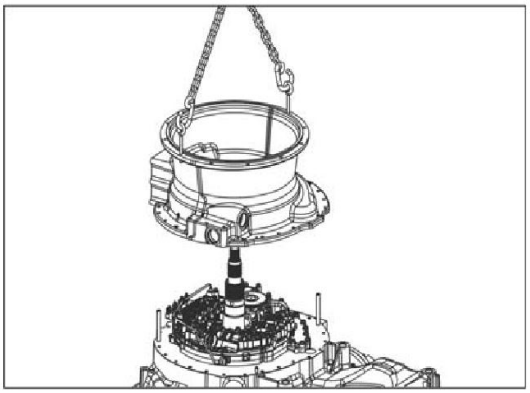


Figure 648

Install the pins 10x36 (1).

Fasten the converter bellhousing by means of cylindrical screws (2 and 3).

Tightening torque (M10/8.8x30) MA = 46 Nm
Tightening torque (M10/8.8x85) MA = 46 Nm

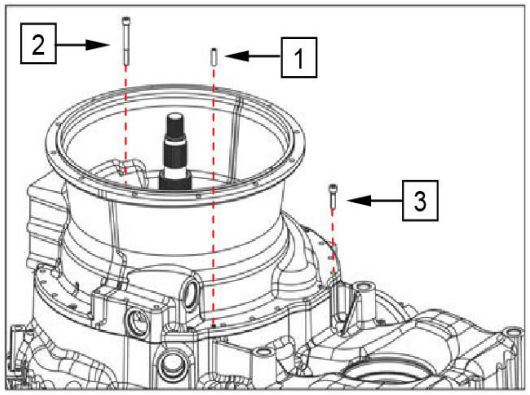


Figure 649

Assemble both O-rings 35x2 (1) to the pressure pipe (2) and grease them.

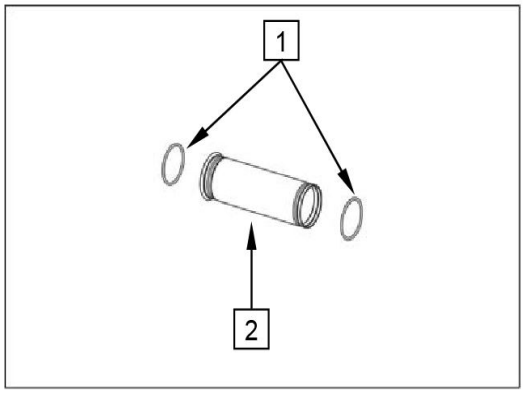


Figure 650

Install the pressure pipe (1) into the converter bellhousing until contact.

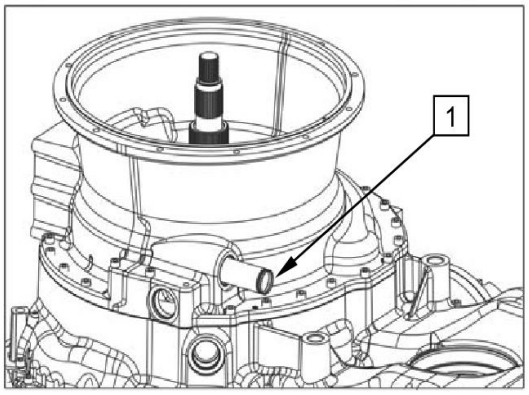


Figure 651

Install the screw plugs M48x2 with O-ring 42x2.5.

Tightening torque (M10/8.8x30) MA =145 Nm

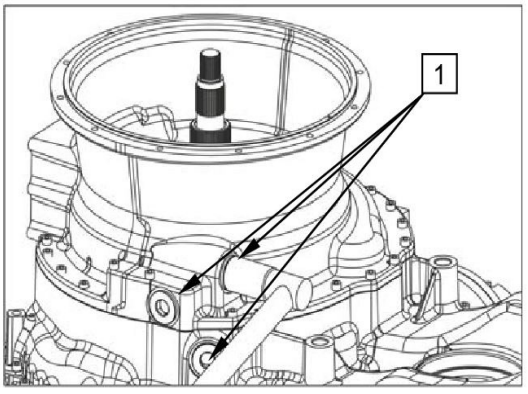


Figure 652

By means of the hexagon screws (3) fasten the flange shaft (1) to the converter (2).

Tightening torque (M12/10.9x30) MA =120 Nm

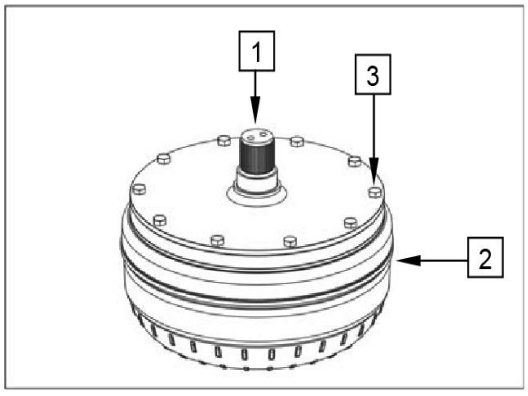


Figure 653

Insert the ball bearing (1) into the cover (2) and fix it with the retaining ring 120x4 (3).

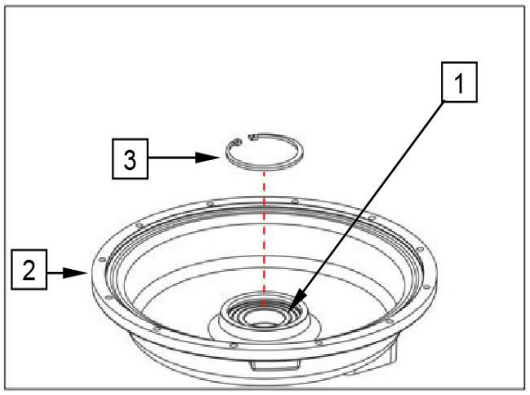


Figure 654

Put the cover (1) over the converter and press it until contact by means of a suitable sleeve.

NOTE

Sleeve must support on the bearing inner ring!

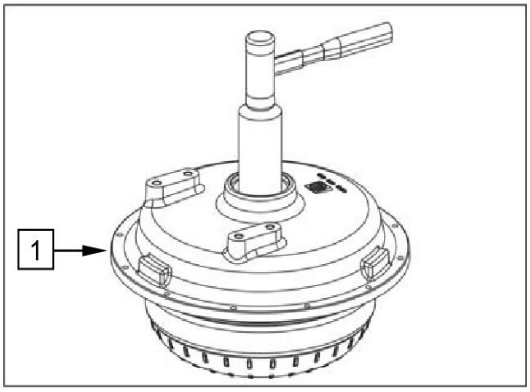


Figure 655

Press the screen sheet (1) onto the input flange (2).

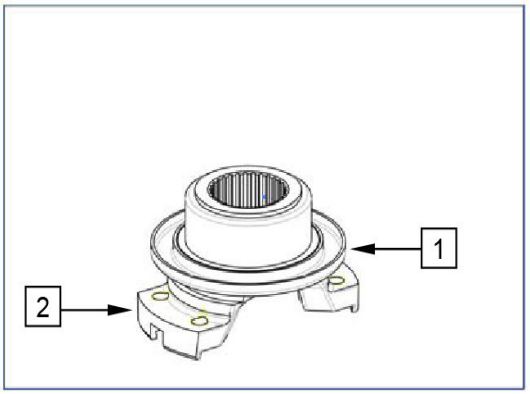


Figure 656

Heat up the input flange (approx. 120° C).

WARNING

Use safety gloves!

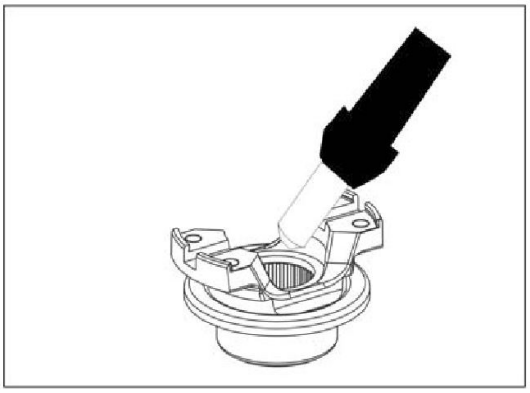


Figure 657

Install the input flange (1) until contact.

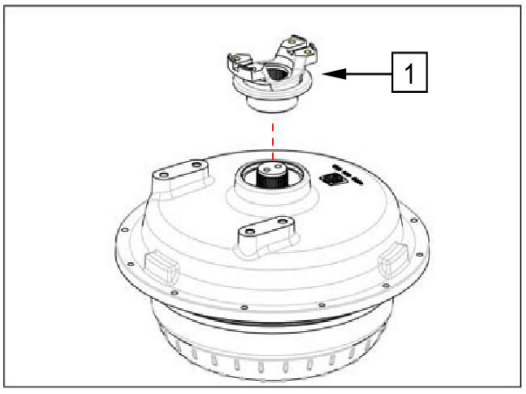


Figure 658

Fasten the input flange (3) by means of washer (1) , hexagon screws (2). and lock washer (4) from machine 7X1739 / 8X1713

Prior to the reassembly oil the hexagon screws.

Tightening torque (M8/10.9x55) MA = 68 Nm

NOTE

New hexagon screws have generally to be installed!

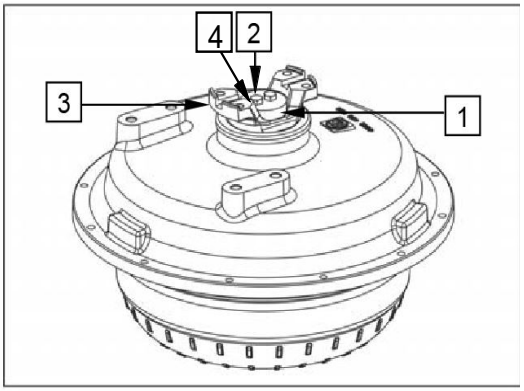


Figure 659

Insert the converter by means of the lifting tackle, until the cover (1) is installed to the converter bellhousing (2).

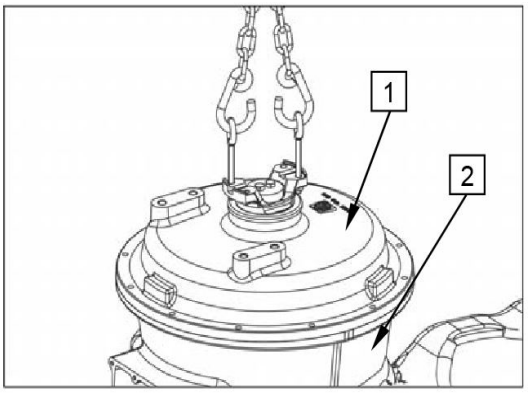


Figure 660

Bolt together the converter bellhousing and the cover b means of the hexagon screws M10x50 and hexagon nuts M10 (1).

Pay attention to the radial installation position, see markings made at disassembly (arrows)!

Tightening torque (M10/ 8.8) MA = 46 Nm

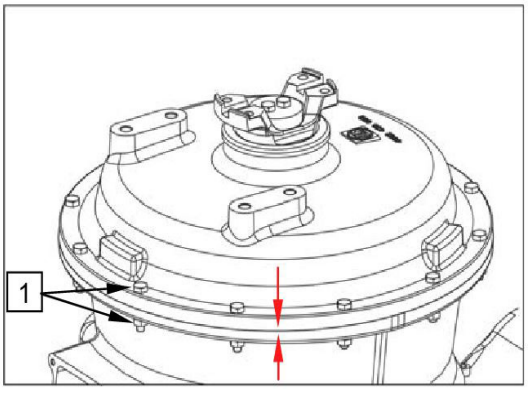


Figure 661

Planetary drive “F”

By means of a suitable pressure piece, press the ball bearing 60x110x22 (1) into the planet carrier until contact.

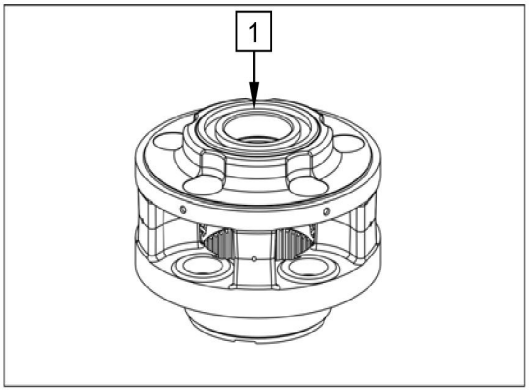


Figure 662

Insert driving pins 23.7x4.7 (1) with grease into the sun gear.

Assemble the pressure rings (2).

Installation position of pressure rings – see Figure 663!

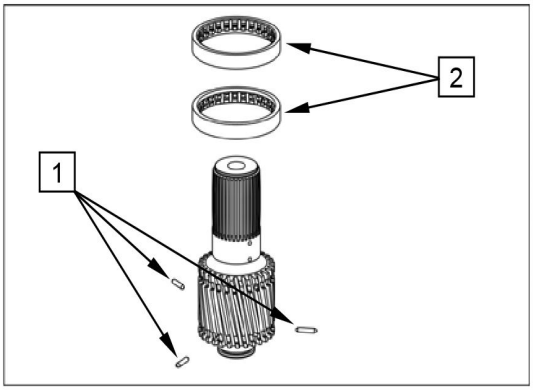


Figure 663

Insert the remaining driving pins 23.7x4.7 (1) with grease into the sun gear.

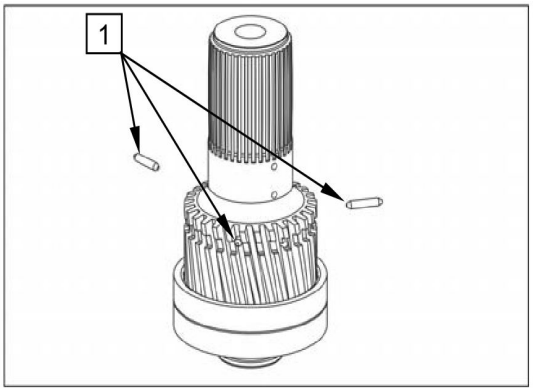


Figure 664

Installation position of pressure rings.

Legend:
1 = Sun gear
2 = Driving pins 6x
3 = Pressure rings

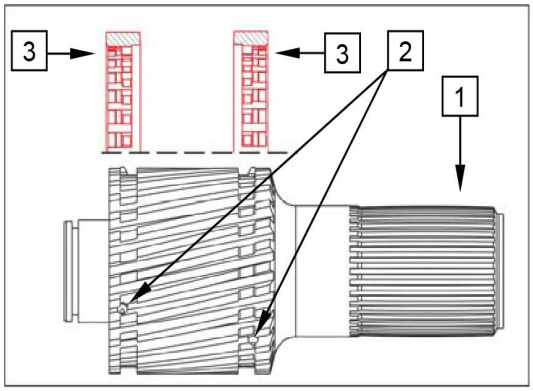


Figure 665

Preassemble the planet gears (1).

1 = Planet gear (5x)
2 = Intermediate washer 47x35.1x2.5 (15x)
3 = Roller 10x20 (140x)

Insert the bearing with grease into the planet gear!

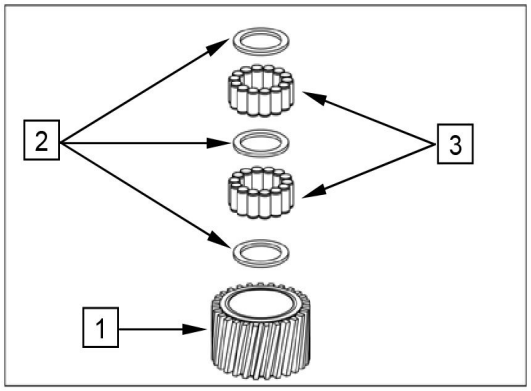


Figure 666

Install, align and grease the rectangular ring 38.9x45x3.5 (1).

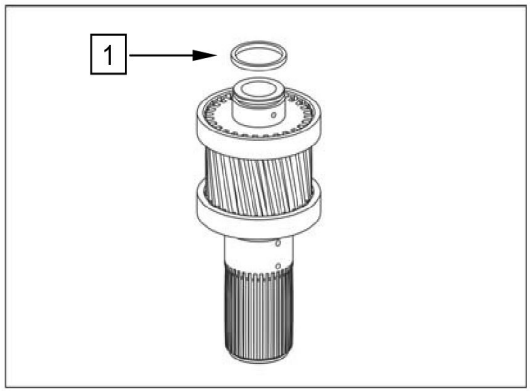


Figure 667

Insert the preassembled sun gear (1) into the plane carrier.

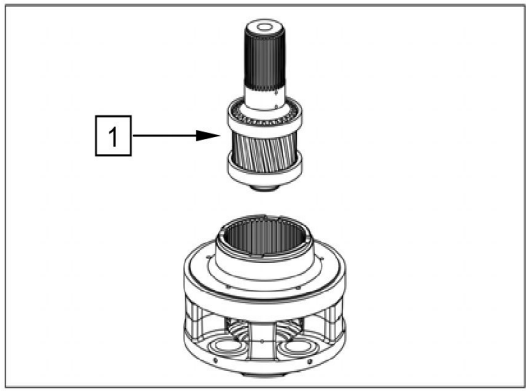


Figure 668

Install pressure rings (1) at the bottom and at the top until contact and insert the preassembled planet gear (2) into the planet carrier.

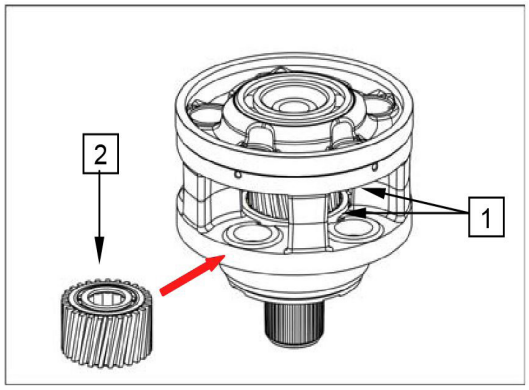


Figure 669

Position and centrically align the planet gear (1) and fasten it by means of the planetary pins (2).

NOTE

Install all planet gears analogously!

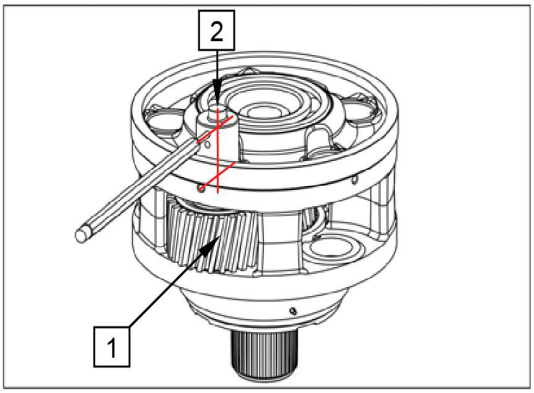


Figure 670

Fasten all planetary pins (1) by means of the slotted pins 5x30 (2).

NOTE

Drive the slotted pins in flush see detail Figure 671.

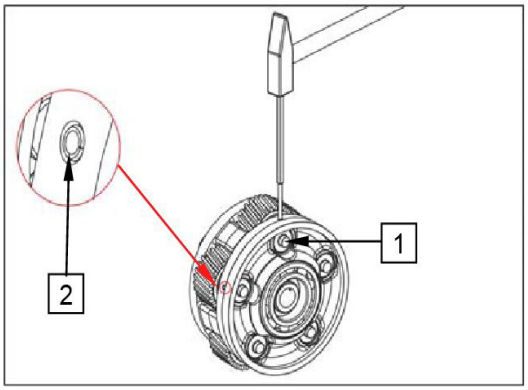


Figure 671

Heat up the ball bearing (approx. 120°C).

WARNING

Use safety gloves!

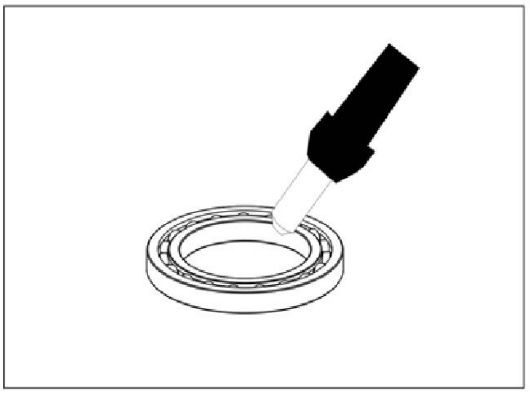


Figure 672

Assemble the ball bearing 140x219x22 (1) until contact and axially fasten it by means of the slotted pins 3x16 (2).

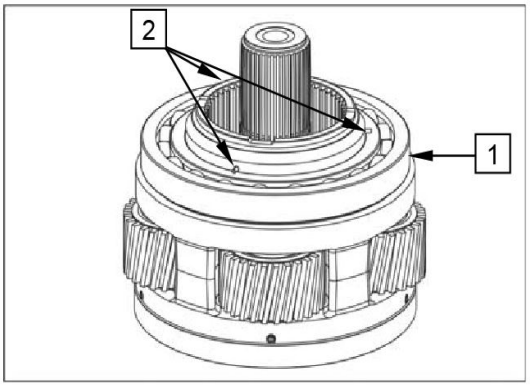


Figure 673

Drive all slotted pins into the holes to installation dimension 5^{+5} mm.

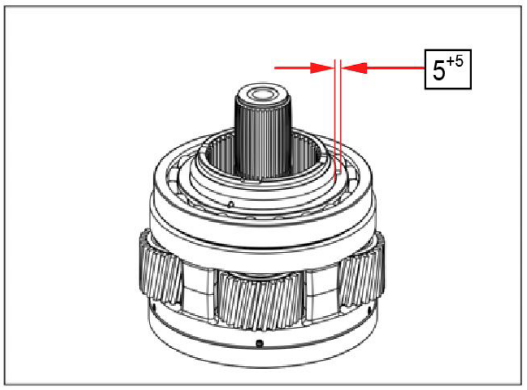


Figure 674

Engage the locking wire 243x1 (1) into the lower annula groove and insert the thrust ring (2).

Installation position of thrust ring. See Figure 675!

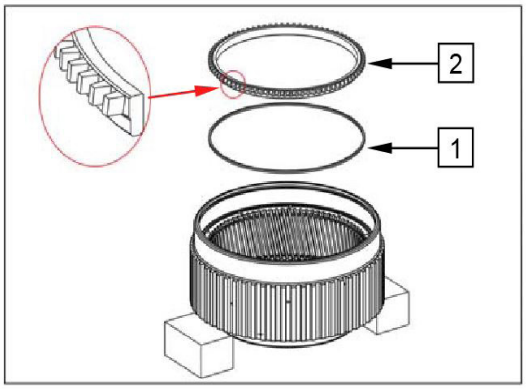


Figure 675

By means of the lifting tackle insert the preassembled planet carrier into the ring gear.

(S) Eyebolt 850317-00070

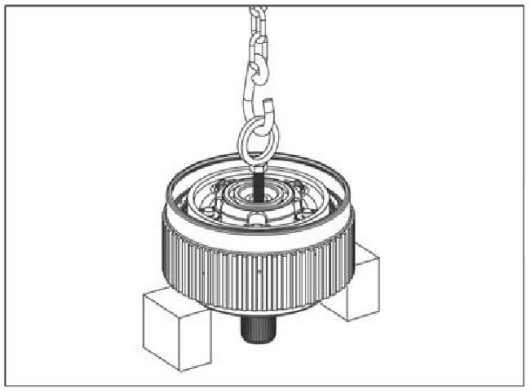


Figure 676

Insert the thrust ring (1) and engage the locking wire 243x1 (2) into the annular groove.

Installation position of thrust ring. See Figure 677!

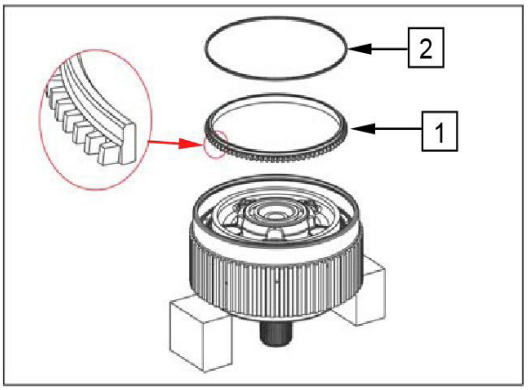


Figure 677

By means of a suitable pressure piece press the ball bearing 229x270x24 (1) into the ring gear until contact and axially fix it with the snap ring SB 270 (2).

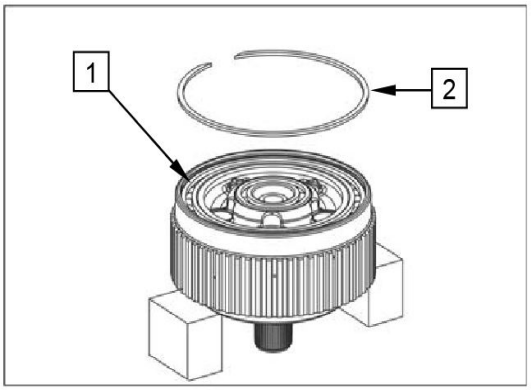


Figure 678

Mount O-rings (1 and 2) onto the piston and grease them.

1 = O-ring 214x3
2 = O-ring 290x3

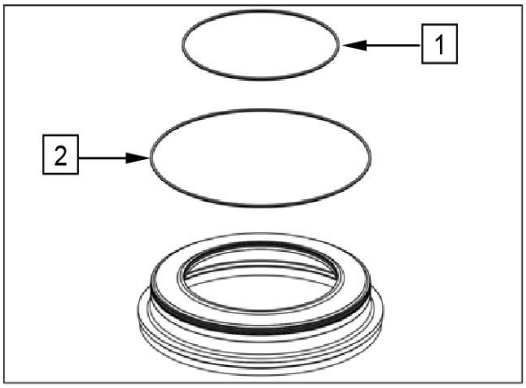


Figure 679

Insert the preassembled piston into the cover and by means of the assembly fixture press it in until contact under a press.

(S) Assembly fixture 850317-00071

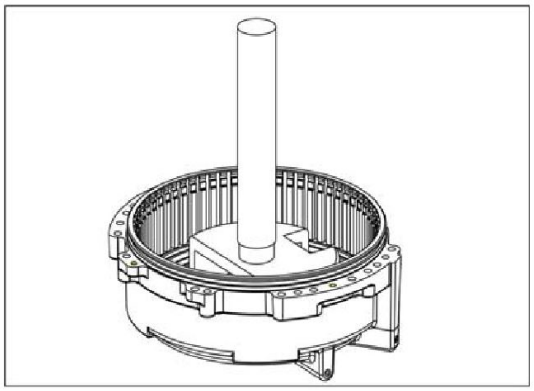


Figure 680

Put the cup spring (1) and the guide ring (2) into the piston and align them.

Installation position of cup spring and piston – see Figure 681!

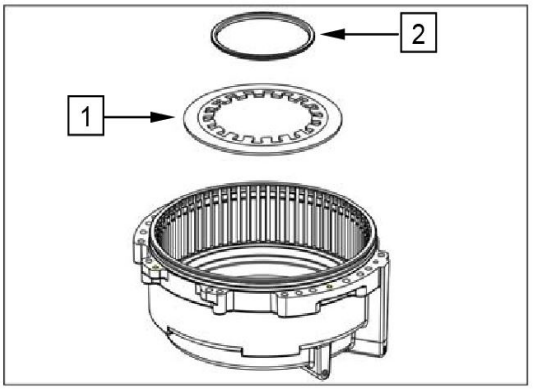


Figure 681

Install the guide pin, the guide ring and the pressure piece until contact.

(S) Assembly fixture 850317-00071

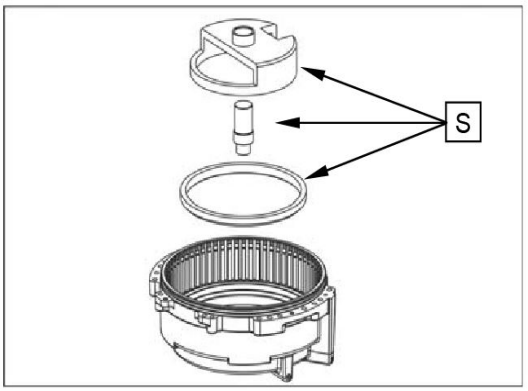


Figure 682

By means of the assembly fixture preload the cup spring under a press and engage the guide ring into the annula groove of the cover.

NOTE

Check seat of the guide ring!

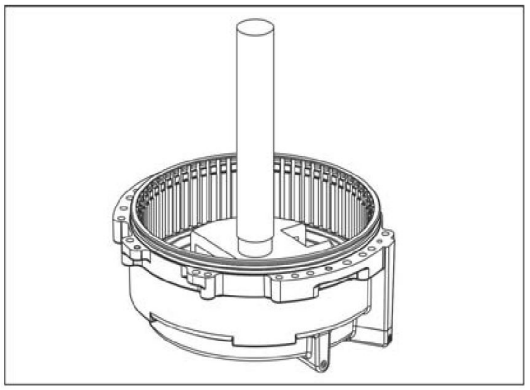


Figure 683

Installation position of cup spring and guide ring

1 = Cover
2 = Piston
3 = O-ring 290x3
4 = O-ring 214x3
5 = Guide ring (L-ring)
6 = Cup spring

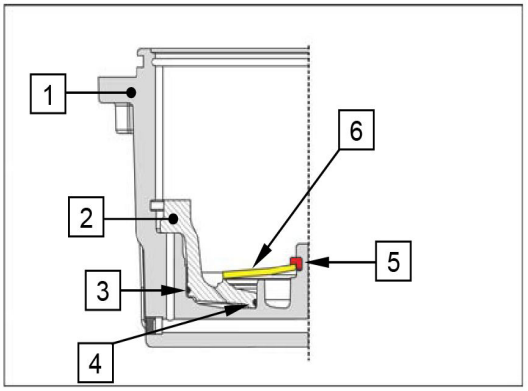


Figure 684

Heat up the bearing inner ring of the ball bearing (approx. 120°C).

WARNING

Use safety gloves!

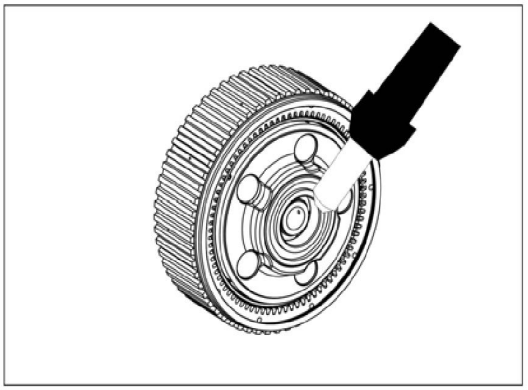


Figure 685

By means of the lifting tackle insert the preassembled planet carrier with ring gear into the cover until contact.

(S) Eyebolt 850317-00070

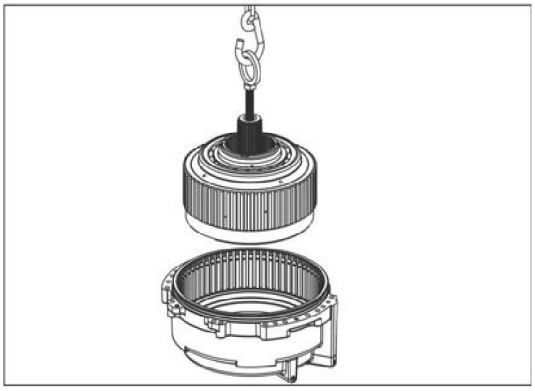


Figure 686

NOTE

Setting of disc clearance = 3.2 ... 4.8 mm

Install disc package.

NOTE

To ensure a correct measuring result, install disc package without oil for the time being!

The number and arrangement of discs is indicated in the respective spare parts list.

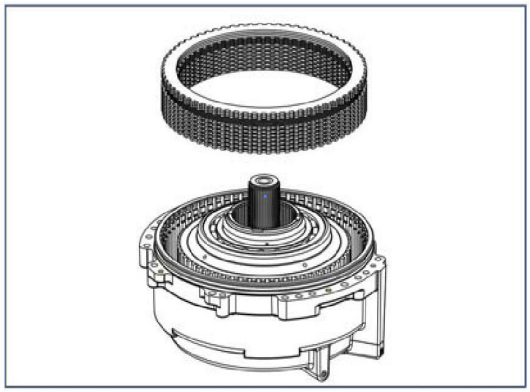


Figure 687

Insert the end plate (1) and axially fix it with the snap ring 354x3,2 (2).

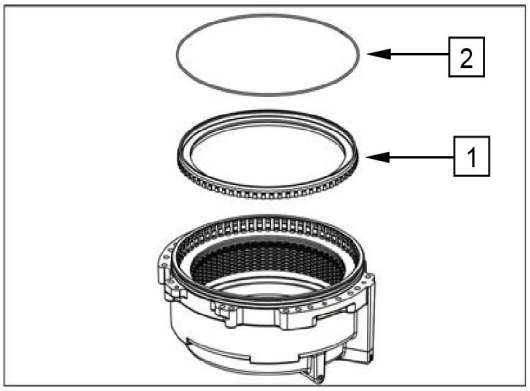


Figure 688

Press on end plate with approx. 100 N (10 kg) and set dial indicator to „zero“.

Then press end plate against snap ring (upwards) and read disc clearance on the dial indicator.

In case of deviations from the required disc clearance, correct with appropriate outher clutch disc.

After having set the disc clearance, remove the disc package.

Oil discs acc. to ZF list of lubricants TE-ML 03.
Reinstall the disc package.

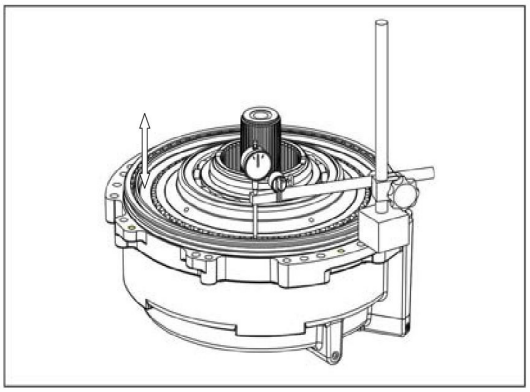


Figure 689

Mount the O-ring 350x5 (1) and grease it.

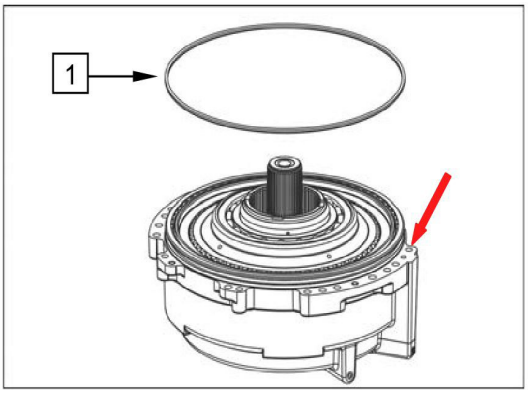


Figure 690

NOTE

Check closing and opening of the clutch by means of compressed air at the hole (see arrow). Closing and opening of the clutch must be clearly audible.

Mount planetary drive to housing II

Insert the compression springs Insert the compression spring 24x3.5 with grease into the recess.

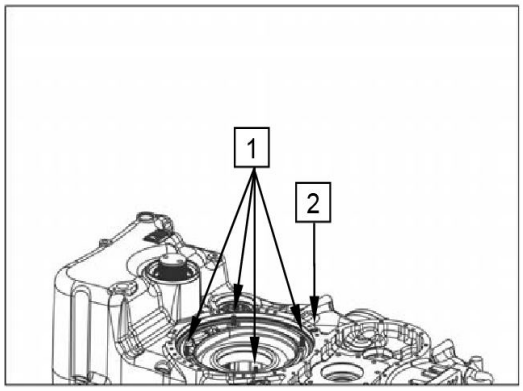


Figure 691

Turn in the eyebolt until contact.

(S) Eyebolt 850317-00070

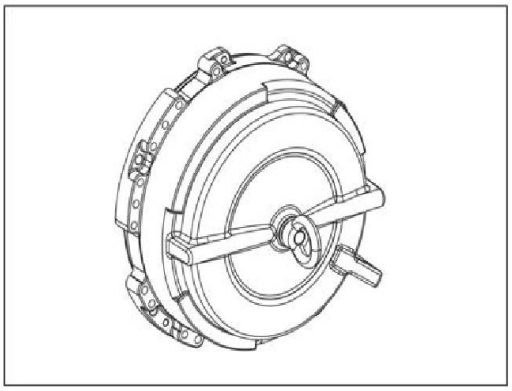


Figure 692

By means of the lifting tackle insert the planetary drive (1) into the disc carrier of clutch ”E“ and install it on housing II until contact.

Drive the slotted pins 12x30 (2) into housing II until contact.

(S) Adjusting screws 120702-00080

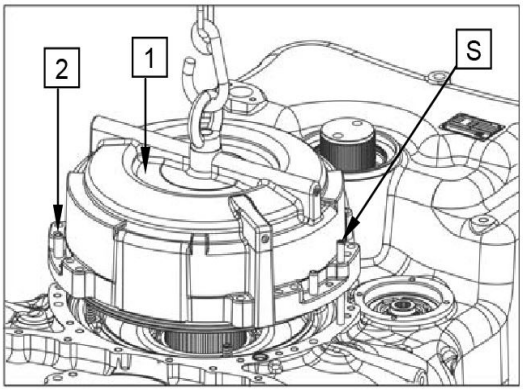


Figure 693

Fasten the planetary drive with the cylindrical screws (1).

Tightening torque (M10/8.8x50) MA = 46 Nm

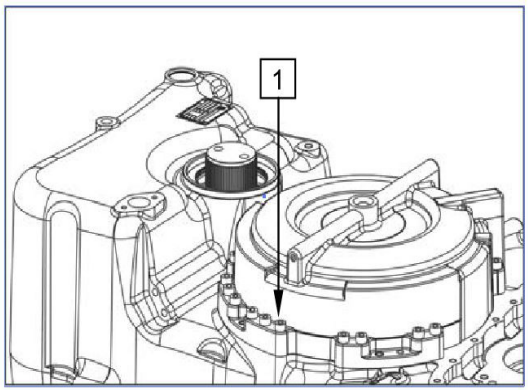


Figure 694

Turn the drain bolt (1) with ½“ extension and long socke wrench SW19 into the shaft of clutch ”E“ and hand-tighten it.

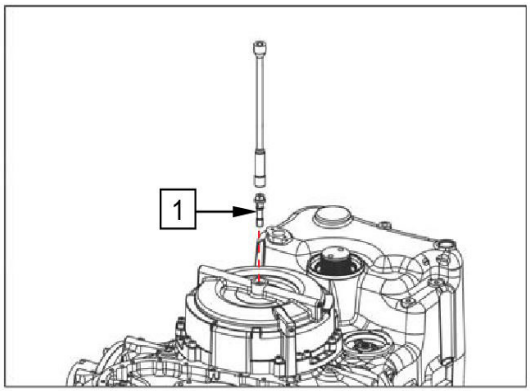


Figure 695

Assemble the pressure piece (S) onto the extension and tighten it by means of an open end wrench (for tightening of the strain bolt the planetary drive is held in place).

Tighten the strain bolt.

Tightening torque MA = 62 Nm

(S) Pressure piece 850317-00092

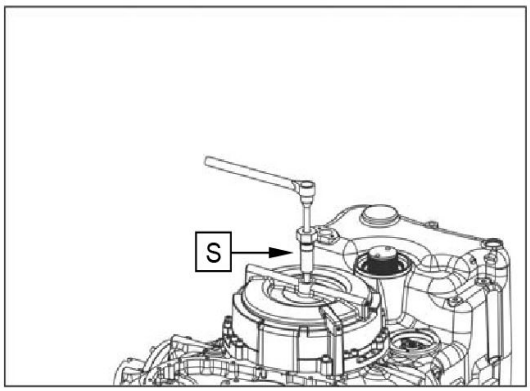


Figure 696

Install the screw plug M33x2 with O-ring 30x2.5 (1).

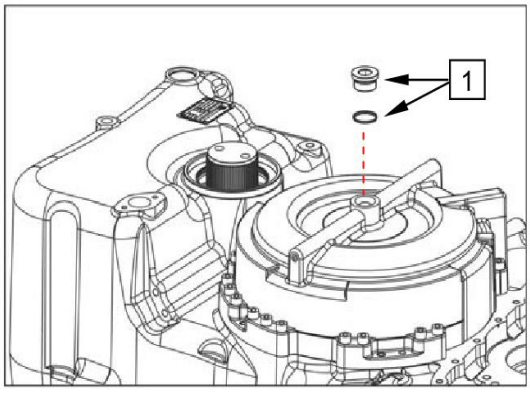


Figure 697

Output to front and rear axle

Output to front axle with axle insert LKV

Install shaft seal 85x120x12 (1) by means of the driver tool with sealing lip showing to the oil sump (see Figure 698)

(S) Driver tool 850317-00093

Wet outer diameter (rubber coated) with spirit!

NOTE

Exact installation position is obtained when using the specified driver tool (S)!

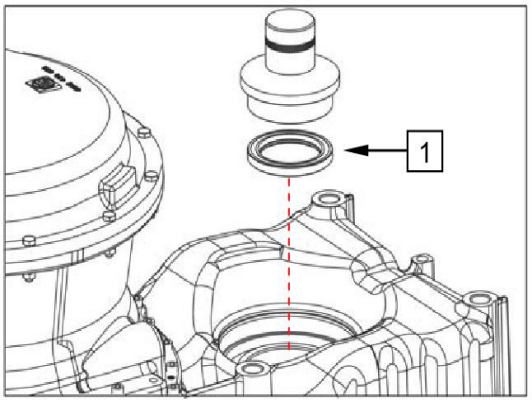


Figure 698

Legend (Fig. Figure 699)

1 = Transmission housing
2 = Shaft seal 85x120x12
3 = Taper roller bearing
4 = Planet carrier
5 = Output shaft

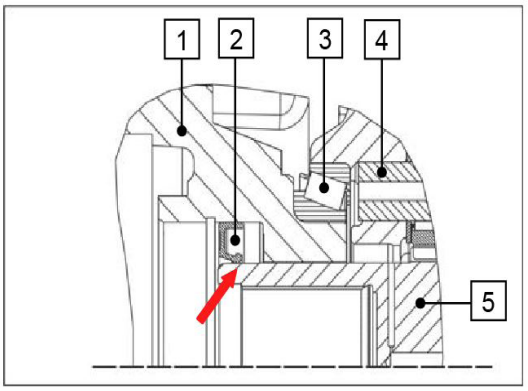


Figure 699

Legend see Figure 700.

1 = Transmission housing
2 = Taper roller bearing
3 = Shaft seal 100x130x12
4 = Output shaft

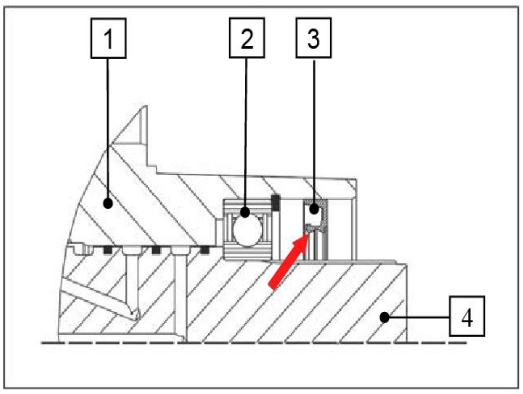


Figure 700

Press the screen sheet (1) onto the output flange (2).

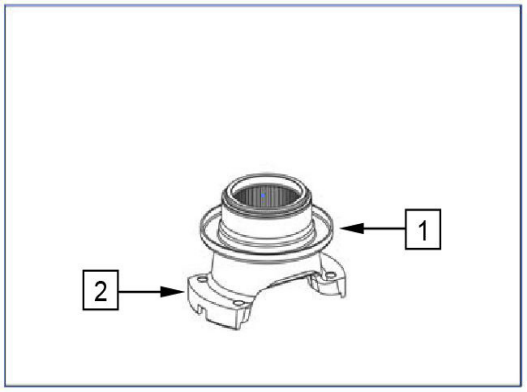


Figure 701

Assemble the output flange (1) until contact and insert the O-ring 69x3 (2) into the gap of output flange and shaft.

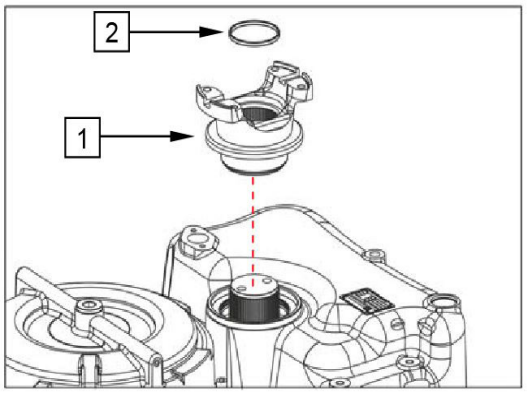


Figure 702

Fasten the output flange (1) by means of washer (2) and hexagon screws (3).

Prior to the reassembly oil the hexagon screws.

Tightening torque (M12/10.9x65) MA = 120 Nm

NOTE

New hexagon screws have generally to be installed!

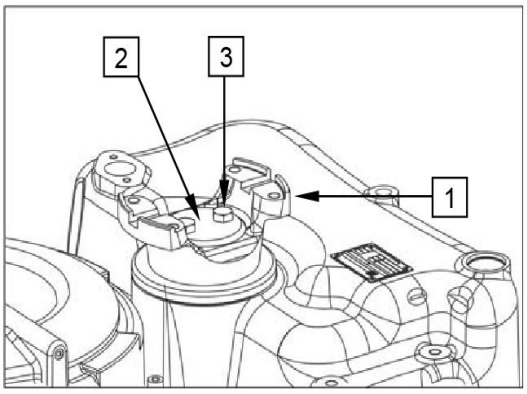


Figure 703

Power take-off

1 = 1st Power take-off

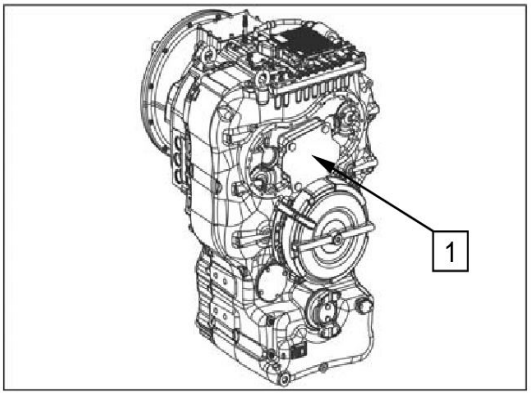


Figure 704

Press the ball bearing 65x100x18 (1) onto the PTO-shaf (2) until contact and fasten it with the retaining ring 62x2.5 (3)

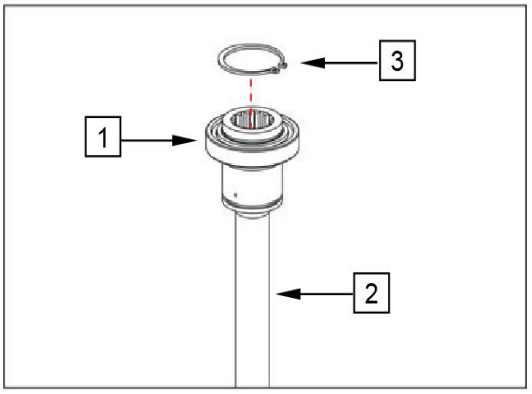


Figure 705

Press the preassembled PTO-shaft (1) into the pump flange (2).

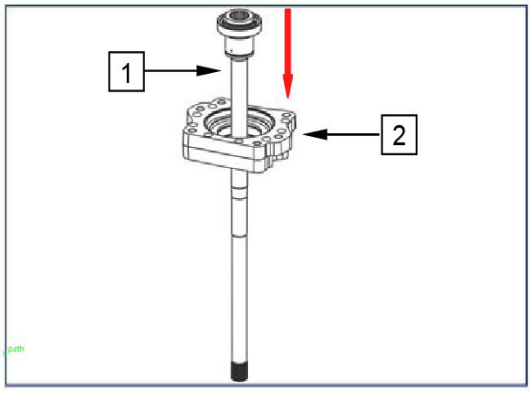


Figure 706

Fasten the PTO-shaft in the pump flange with the retaining ring 100x3 (1).

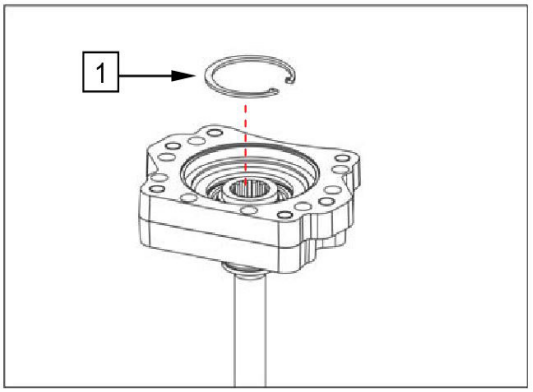


Figure 707

Mount and grease the O-ring 108x3 (1).

Install, align and grease the rectangular ring 65x3 (2).

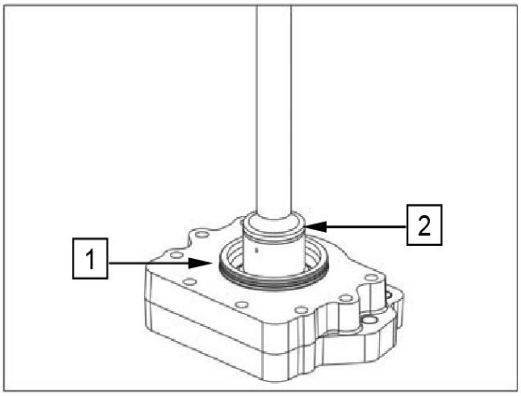


Figure 708

Install screw plug (1) into the housing II.

NOTE

Depending on the versions the number of screw plugs may differ. The required number is indicated in the corresponding spare parts list!

Install the preassembled PTO-shaft (2) in housing II until contact.

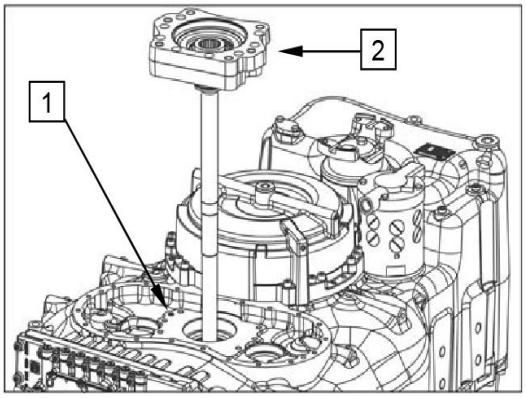


Figure 709

Install the bolted connection pump flange/housing II (1) with the cylindrical screws.

Tightening torque (M12/8.8x45) MA = 79 Nm

Insert O-ring 155x3 (2) into the annular groove and grease it.

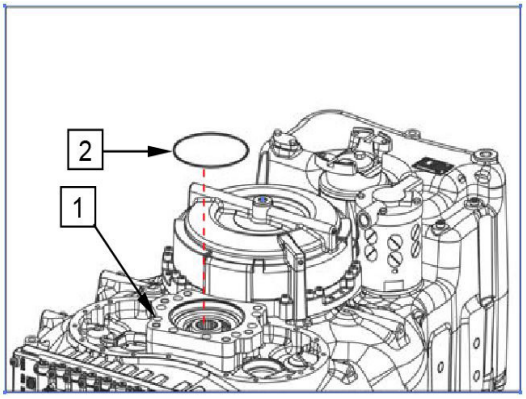


Figure 710

PTO-gear – 1st power take-off

Heat up the bearing inner ring (approx. 120° C).

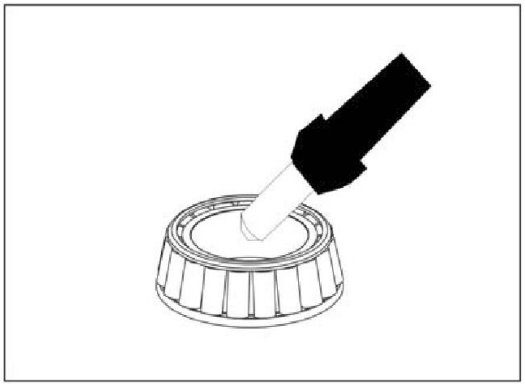


Figure 711

Assemble the bearing inner ring (1) until contact.

WARNING

Use safety gloves!

CAUTION

Install the bearing inner ring subsequently after cooling down!

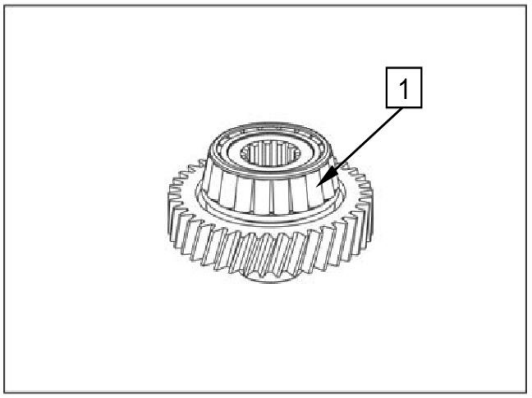


Figure 712

Assemble the opposite side analogously.

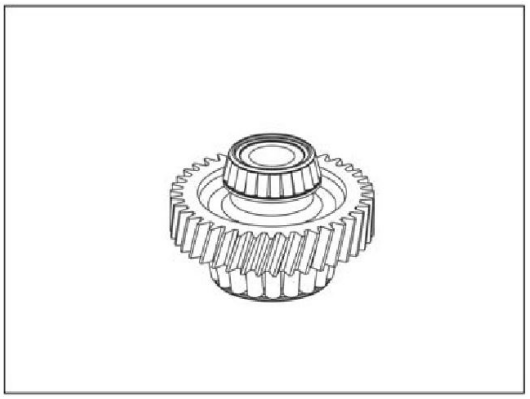


Figure 713

PTO-input shaft

Heat up the bearing inner ring (approx. 120° C).

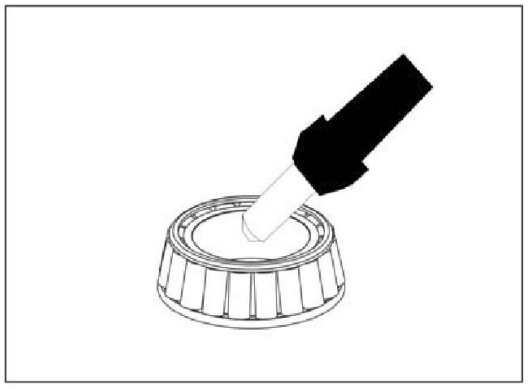


Figure 714

Assemble the bearing inner ring (1) until contact.

WARNING

Use safety gloves!

CAUTION

Install the bearing inner ring subsequently after cooling down!

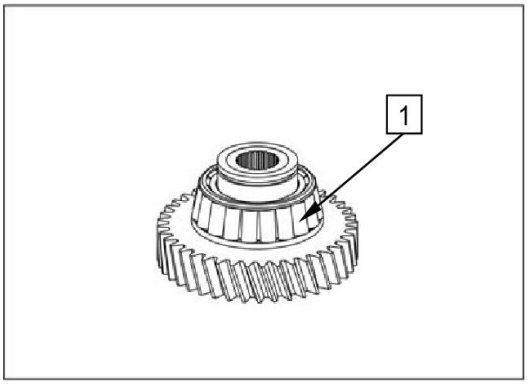


Figure 715

Push PTO-gear (1) onto PTO-shaft (2) and fasten with retaining ring 35x1.5 (3).

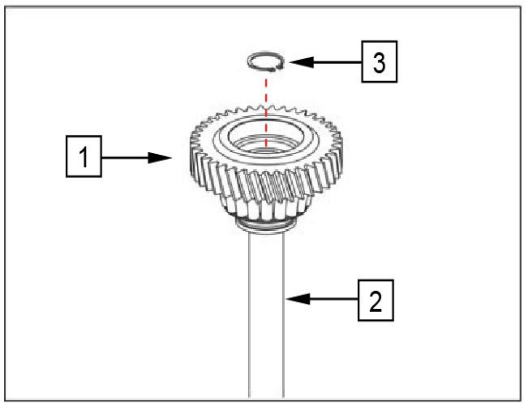


Figure 716

Insert the bearing outer ring (1).

Install, align and grease the rectangular ring 65x3 (2).

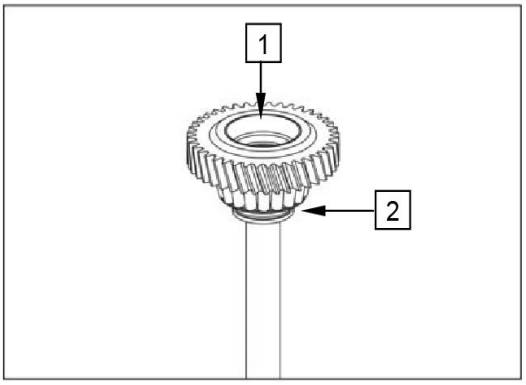


Figure 717

Emergency steering pump

Insert the O-ring 100x3 (1) into the annular groove of the piston pump and grease it.

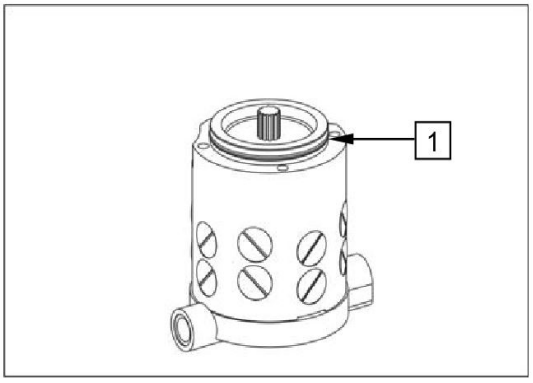


Figure 718

Insert the emergency steering pump (1) and install it until contact.

NOTE

Connections of the emergency steering pump
= Pressure connection M22x1.5
= Suction connection M26x1.5 - Transmissionsump

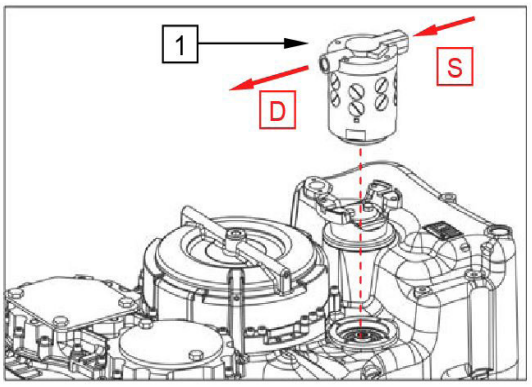


Figure 719

Fasten the emergency steering pump with the hexagon screws (1).

Tightening torque (M8/8x170) ..... MA = 25 Nm

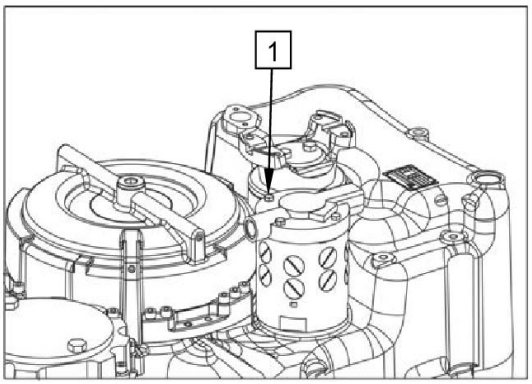


Figure 720

Reassembly of shifting block I and speed sensors:

Shifting block I

1 = pressure controller with follow-on slide
2 = pressure reducing valve
3 = wiring harness ErgoControl II
- A = connection of wiring harness shifting block II
- B = connection of control unit (TCU)

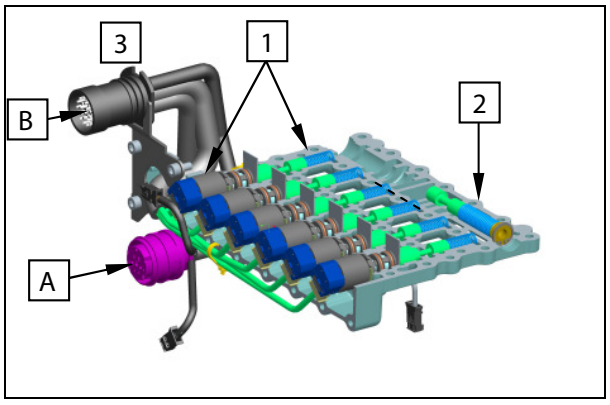


Figure 721

Insert the pressure reducing valve consisting of:
- plug (1)
- compression spring (2)
- piston (3)

into the valve block (4).

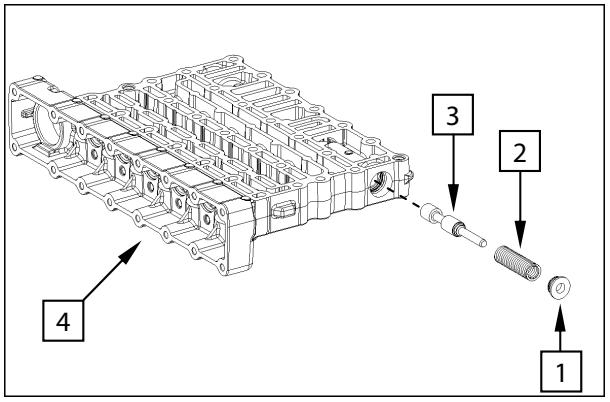


Figure 722

Fasten the pressure reducing valve with retaining ring 18x1 (1).

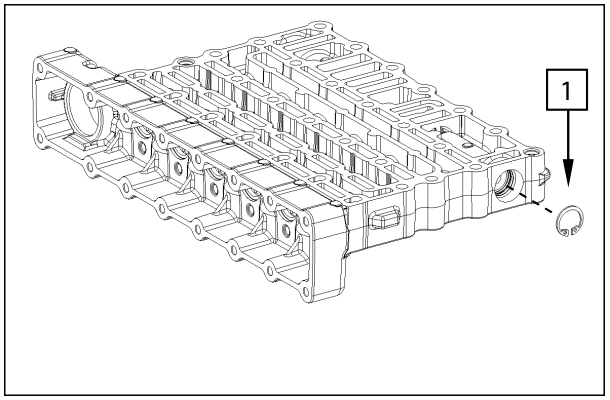


Figure 723

All follow-on slides consisting of:
- piston (1)
- compression spring (2)

to be inserted into the valve block (3).

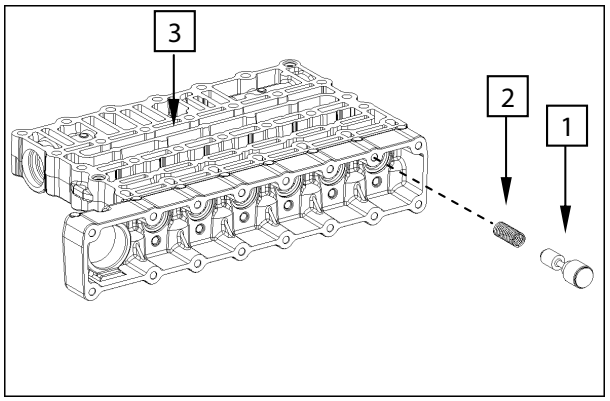


Figure 724

Preload all follow-on slides (see arrow) and x them with stop plates (1).

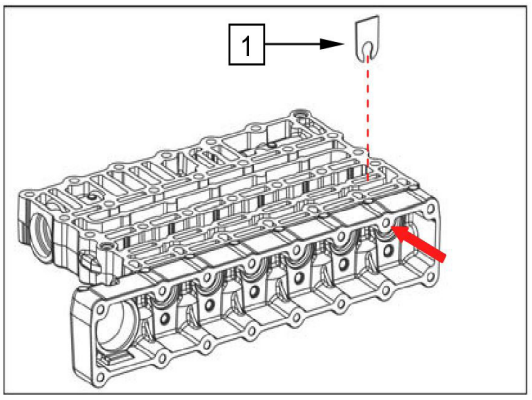


Figure 725

Insert all pressure controllers (1) with clamping plates (2) into the valve block and fix them with the cylindrical screw (3)

Tightening torque: MA = 9.5 Nm

Pay attention to the installation position of pressure regulators – plug-in connection (see arrow).

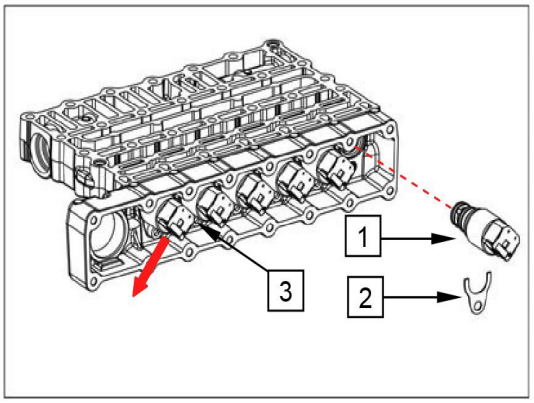


Figure 726

Legend

1= Pressure regulator Y1 - Clutch ”C“
2= Pressure regulator Y2 - Clutch “F“
3= Pressure regulator Y3 - Clutch ”A“
4= Pressure regulator Y4 - Clutch “R“
5= Pressure regulator Y5 - Clutch ”B“
6= Pressure regulator Y6 - Clutch “D“

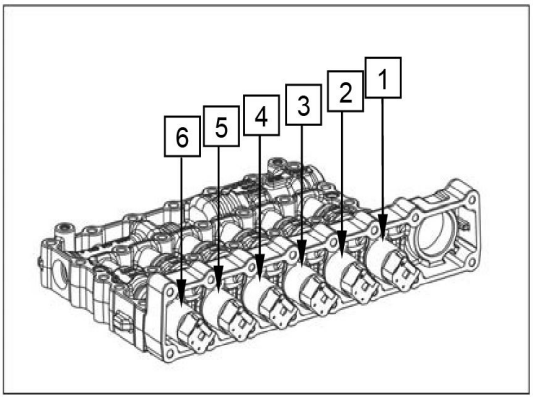


Figure 727

IInstall the adjusting screws and assemble the intermediate sheet (1) and valve block (2).

(S) Adjusting screws 120702-00081

WARNING

It is forbidden to reinstall the intermediate sheet after opening of the bolted connection duct plate/valve block. In case of repair a new intermediate sheet is generally to be installed!

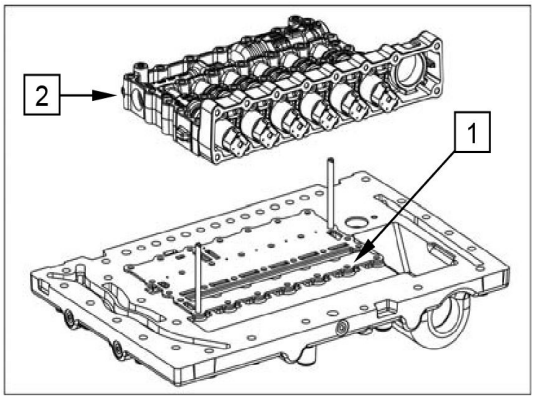


Figure 728

Fasten the bolted connection duct plate/valve block.

Tightening torque (M6/10.9x50) MA = 9.5 Nm

(S) Socket wrench TX-27 MX504253

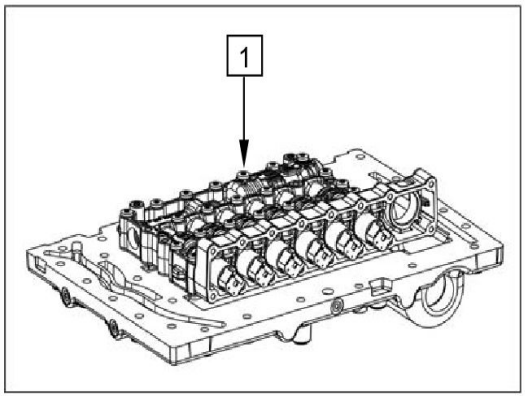


Figure 729

Insert the differential lock solenoid valve (1) with the bracket (2) into the valve block and fasten it with the cylindrical screws (3).

Tightening torque (M6/8.8x12) MA = 9.5 Nm

Pay attention to the installation position of the solenoid valve – plug-in connection (see arrow).

Install all screw plugs M12x1.5 with O-ring 9.5x2 (4).

Tightening torque MA = 12 Nm

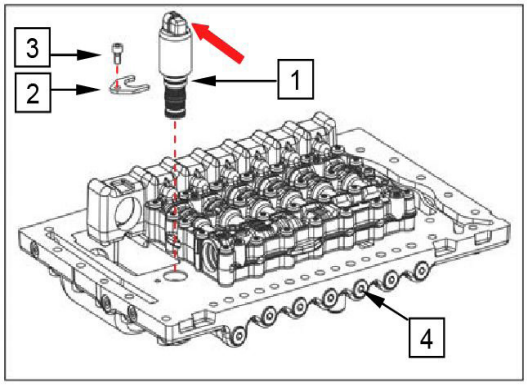


Figure 730

Insert the wiring harness (1) from the opposite side into the duct plate, fix it with the fixing bracket (2) and fasten it with the cylindrical screws (3).

Tightening torque (M6/8.8x12) MA = 9.5 Nm

Close lockings of the plug connections wiring harness/pressure regulator/differential lock solenoid valve.

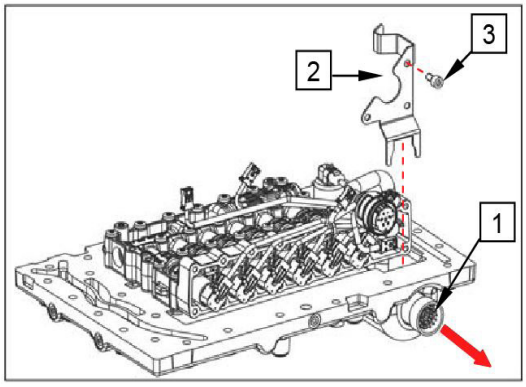


Figure 731

Fasten the speed sensors (1 and 2) to the fixing plate (3) with the cylindrical screws (4).

Tightening torque (M6/8.8x12) MA = 9.5 Nm

Legend speed sensors:
1 = Speed sensor - n1 turbine
2 = Speed sensor - n2 primary step

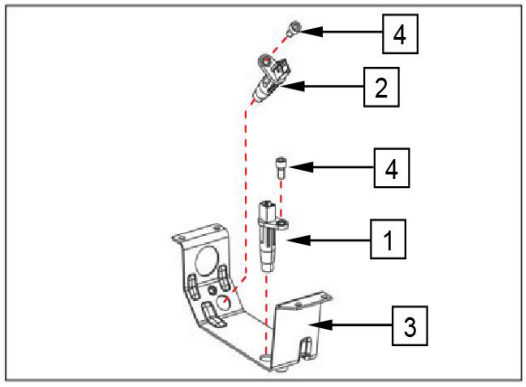


Figure 732

Install speed sensors with fixing plate (1) to the valve block until contact and fasten it with the torx screws (2).

Tightening torque (M6/10.9x50) MA = 9.5 Nm

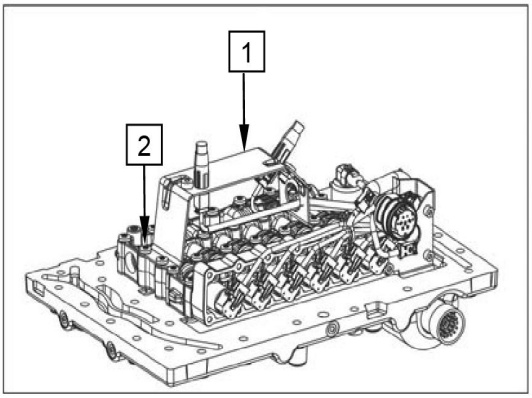


Figure 733

Fasten the speed sensor (2) to the fixing plate (3) with the cylindrical screw (1).

Tightening torque (M6/8.8x12) MA = 9.5 Nm

Legend speed sensor:
2 = Speed sensor – n3 secondary step

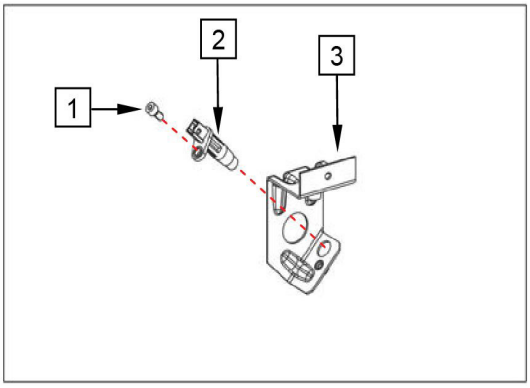


Figure 734

Install speed sensor with fixing plate (1) to the transmission housing until contact and fasten it with the cylindrical screws (2 and 3).

2 = Tightening torque (M6/8.8x12) MA = 9.5 Nm
3 = Tightening torque (M6/8.8x35) MA = 9.5 Nm

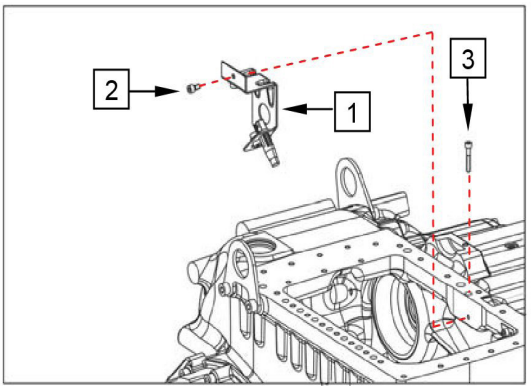


Figure 735

Install seal (1) until contact.

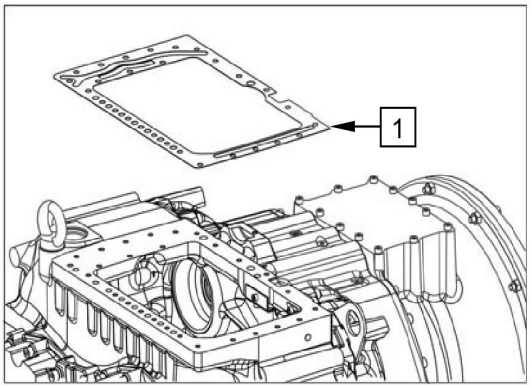


Figure 736

NOTE

Mount two eye bolts and by means of a lifting tackle install the duct plate (1) until contact, so that the bayonet locking of wiring harness – shifting block I wiring harness - shifting block II, as well as the lockings of differential lock solenoid valve and speed sensor can be closed.

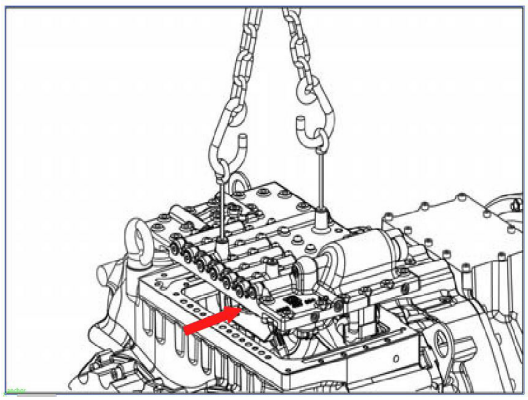


Figure 737

Mount two adjusting screws and install the duct plate (1) to the transmission housing until contact.

(S) Adjusting screws 120702-00082

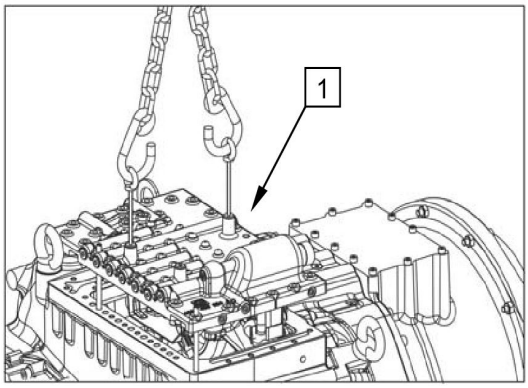


Figure 738

Fasten the bolted connection duct plate/transmission housing (2) with torx screws (1) evenly.

Tightening torque (M8/10.9x35) MA = 23 Nm

(S) Socket wrench TX-40 MX504254

Install the control unit ErgoControl II (2) until contact.

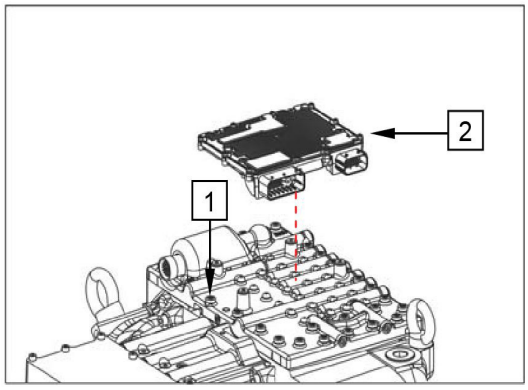


Figure 739

Fasten the bolted connection control unit/duct plate (1) with torx screws evenly.

Tightening torque (M6/10.9x25) MA = 9.5 Nm

(S) Socket wrench TX-27 MX504253

Close lockings of the wiring harness (2) (bayonet locking and plug).

By means of cylindrical screws fasten wiring harness (2) with clip (3) on the transmission housing.

Tightening torque (M8/8.8x16) MA = 23 Nm

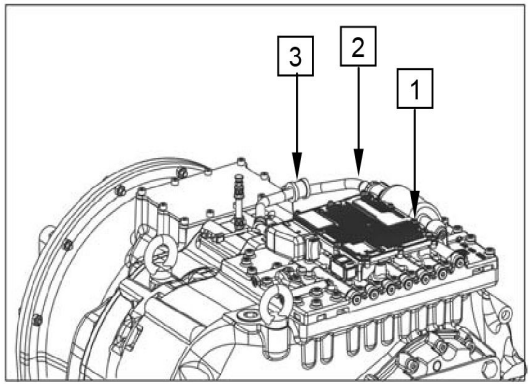


Figure 740

Refitting of speed sensor n4-output

Insert the speed sensor (2) into the fixing plate (3) and fix it with cylindrical screw (1).

Tightening torque (M6/8.8x12) M = 9.5 Nm

Legend of speed sensor:
2 = speed sensor - n4 output

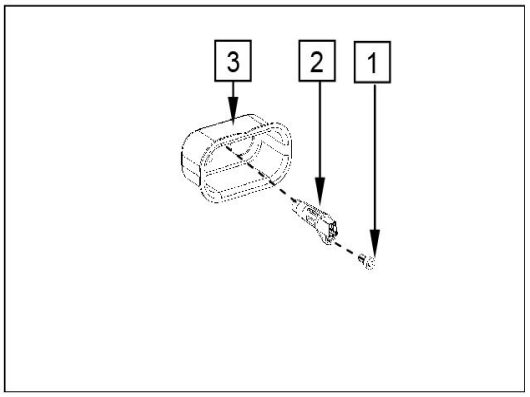


Figure 741

Insert fixing plate (1) into the transmission housing and lock speed sensor (2) with the wiring harness plug.

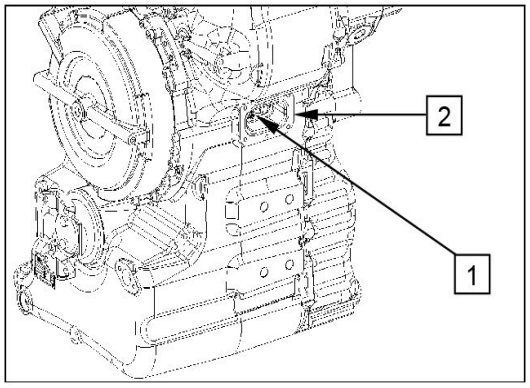


Figure 742

Bring seal (1) and cover (2) into contact position at the transmission housing.

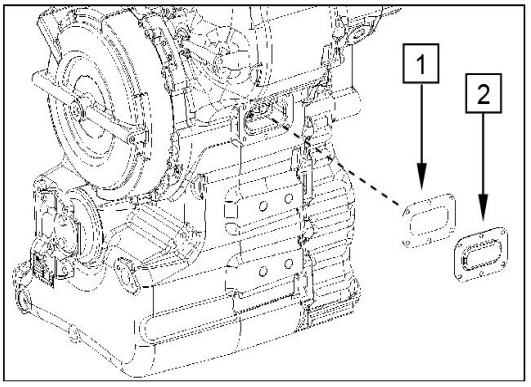


Figure 743

Fix cover with cylindrical screws (1).

Tightening torque (M8/8.8x16) MA = 23 Nm

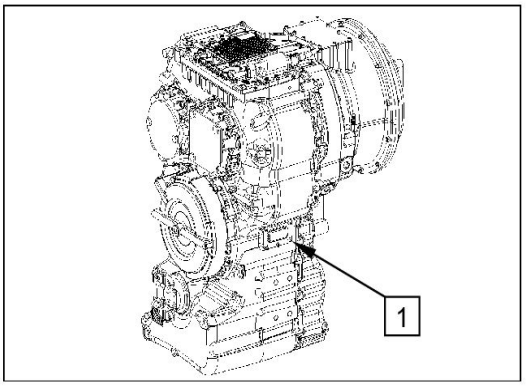


Figure 744

Refitting breather, Oil sight level glass, Cover plate and screw plug

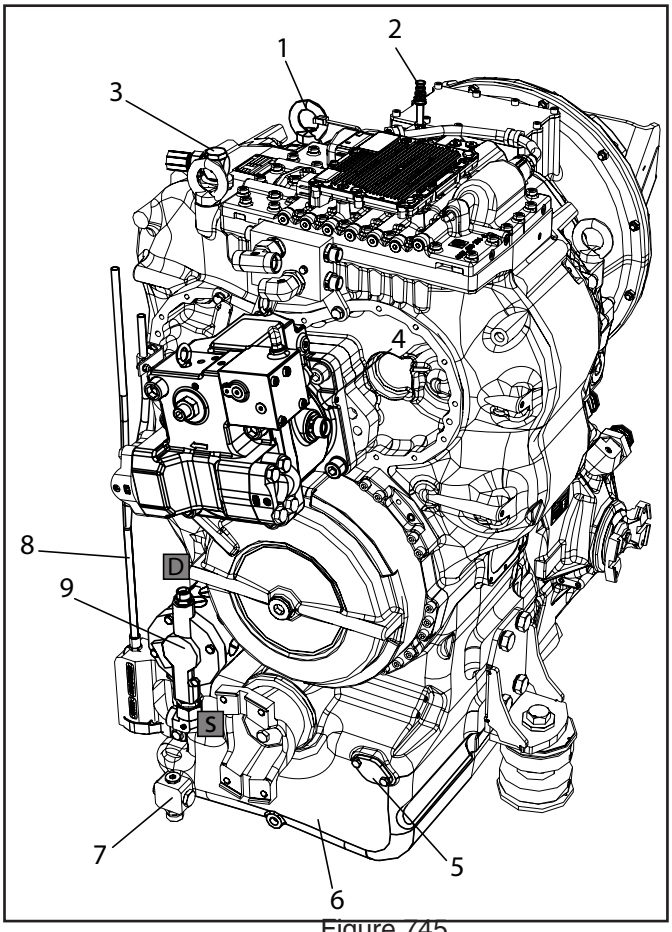


Figure 745

1. Eye bolt M20

2. Breather (M10x1)
   - Tightening torque M_A = 12 Nm

3. Oil filler plug
   - M42x2 with O-ring 38x2.5
   - Tightening torque M_A = 145 Nm

4. Connection Power take-off
   O-ring 154x3 for the pump
¤ Hexagon screw 18x50
¤ Tightening torque M_A = 330 Nm

5. Cover plate gasket
   - Hexagon screw M8/8.8x18
   - Tightening torque M_A = 23 Nm

6. Oil sump
   - Adhesive Thermostat MS-9360

7. Oil drain plug with magnetic insert
   - M38x1.5 with O-ring 35x2
   - Tightening torque M_A = 80 Nm (Loctite 557)

8. Dipstick solution See Figure 746

9. Emergency steering pump
   - Reassembly

¤ Insert O-ring 100x3 (1) into the annular groove of the piston and grease it.
¤ Mount emergency steering pump and fix it with hexagon screws.
¤ Wet mounting thread with Loctite™ 243
¤ Tightening torque (M8/8.8x170) M_A = 23 Nm
¤ Esure correct installation position
D= Pressure port M22x1.5
S= Suction port M28x1.5

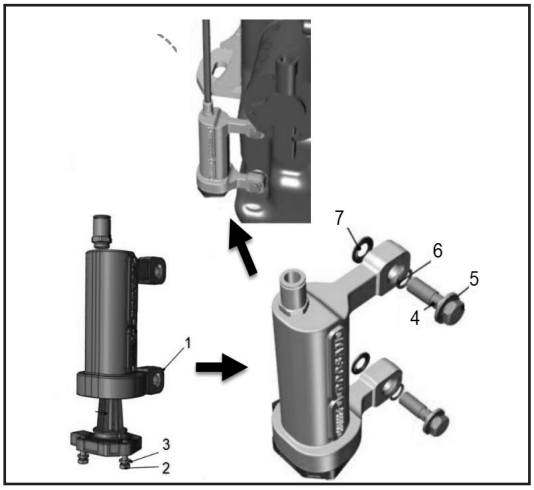


Figure 746

Refitting transmission Dipstick

1. Mount level sensor and connector to housing (1) with screw (2) and the washer (3)
   Tightening torque M_A = 8 Nm
2. Mount housing (1) for level sensor to transmission using screw (4) washer (5) and seal washer (7).
   Tightening torque M_A = 20 Nm

CAUTION

Before putting the transmission into operation, fill it with oil (For fluid type and specifications, refer to the Hyundai Operating & Maintenance Manual Chapter 6)

Check oil level with dipstick located on hydraulic tank and make sure correct amount is filled.

Figure 747

Disassembly of LKV Axle Insert

Disassembly

Place the axle insert into the clamping device by means of the lifting tackle and fix it

(S) Assembly truck K9005577
(S) Clamping device 850317-00096.

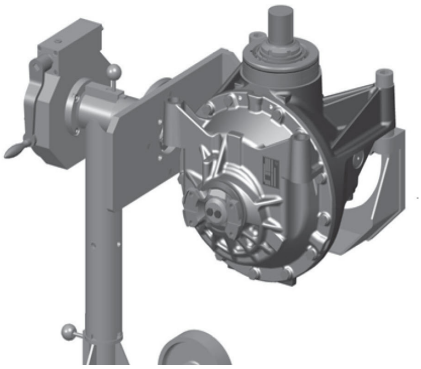


Figure 748

1.Loosen hexagon screws (1) and remove washer (2).

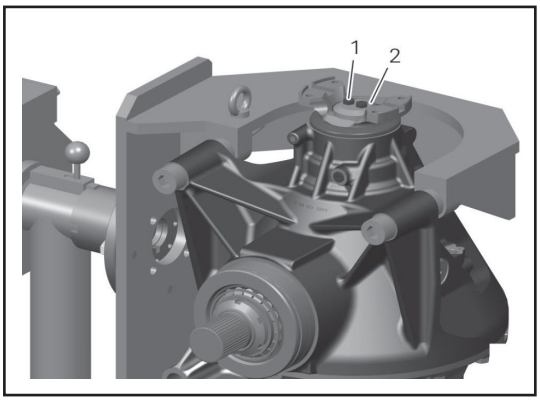


Figure 749

2.Remove the O-ring (1).
3.Pull off output flange (2).
4.Remove shaft seal ring (3) from housing hole.

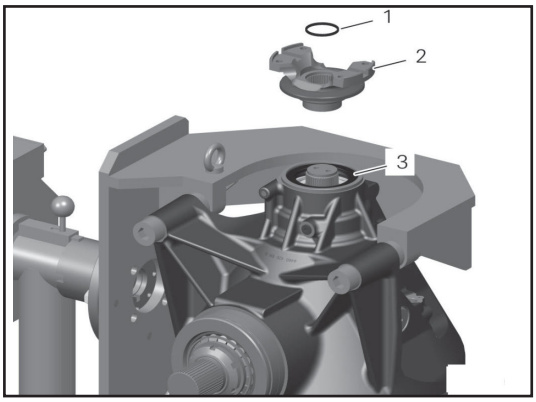


Figure 750

5. Loosen hexagon screws (1) and remove washer (2).

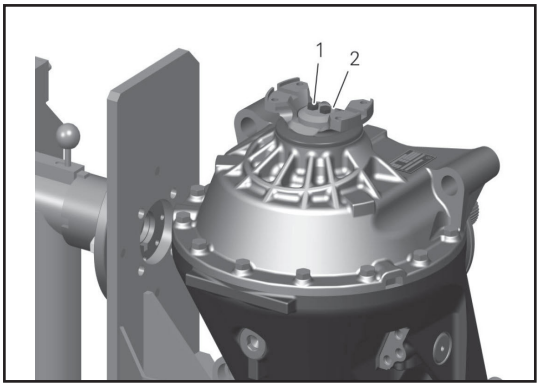


Figure 751

6. Remove O-ring (1).
7. Pull off output flange (2).
8. Remove shaft seal ring (3) from housing hole.

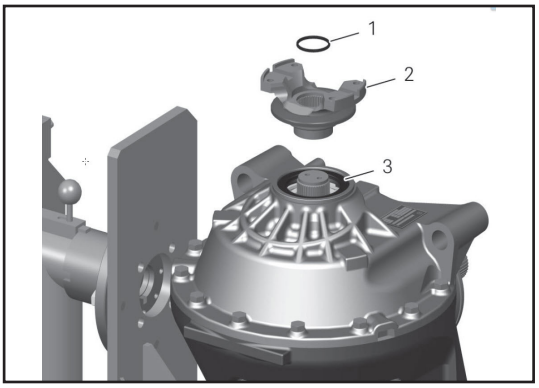


Figure 752

9. Loosen hexagon screws.
MX504209

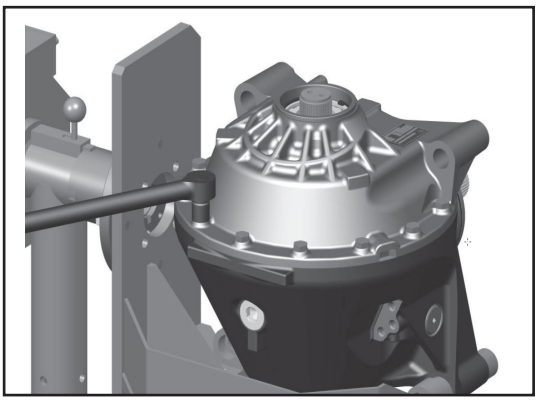


Figure 753

10. Remove housing with lifting beam MX504209 and crane.

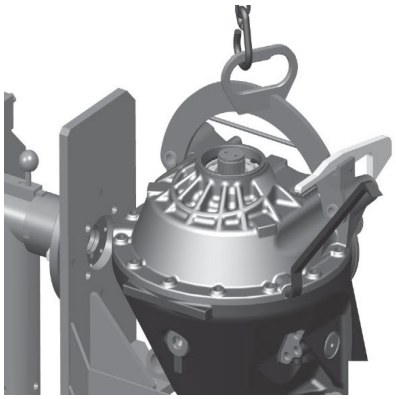


Figure 754

11. Pull bearing outer ring out of housing bore.
12. Remove shim.

Figure 755

13. Remove retaining ring (1).
14. Pull ball bearing (2) out of housing bore.
15. Force out slotted pins (3).

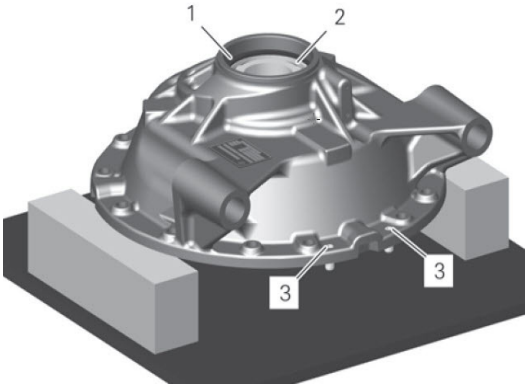


Figure 756

WARNING

Risk of injury due to parts flying away. Slight or moderate injury possible. Wear protective goggles.

16. Remove supporting ring (1).
17. Remove O-ring (2).

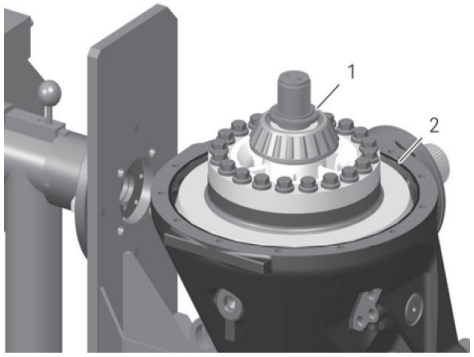


Figure 757

18. Pull output shaft (1) out of the differential.
19. Remove retaining ring (2).

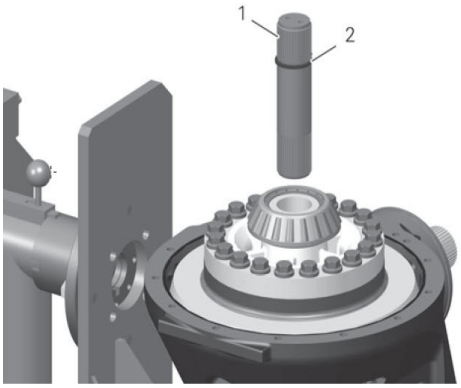


Figure 758

20 . Remove differential from the housing with extracting device K9005604, eyebolt 940301-14681 and crane.

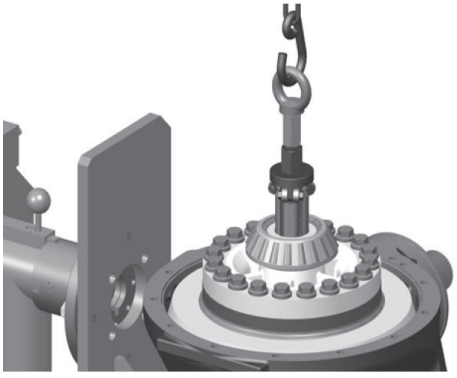


Figure 759

21. Pull bearing outer ring out of housing bore.
22. Remove shim.

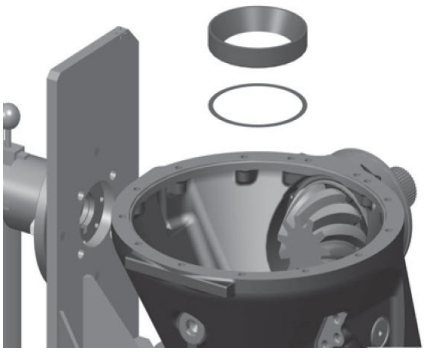


Figure 760

23. Remove retaining ring (1).

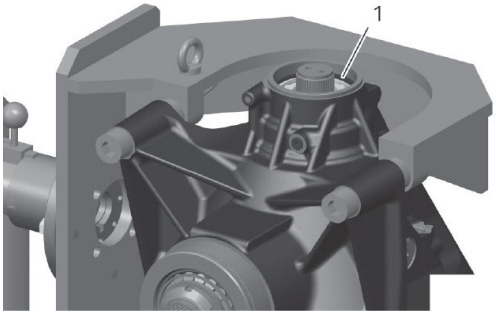


Figure 761

24. Pull output shaft with ball bearing and supporting ring out of the housing.

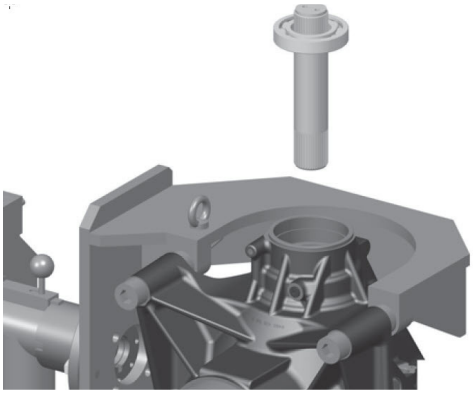


Figure 762

25. Remove retaining ring (1) from output shaft.

Figure 763

Dismantling multi-disk differential lock

1. Pull both tapered roller bearings off differential using gripping device 940301-14686 and basic device 940301-14707.

Figure 764

WARNING

Risk of crushing due to hydraulic tool. Slight to moderate injury possible. Do not reach into danger area.

2. Use press to fix differential.
3. Loosen locking screws.
4. Remove housing cover.

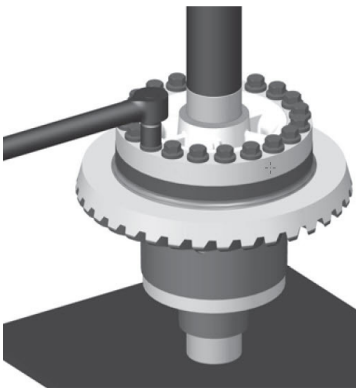


Figure 765

5. Remove axle bevel gear with pressure ring, disk package and thrust washers from the differential housing.

Figure 766

6. Remove spider shafts and differential bevel gears.

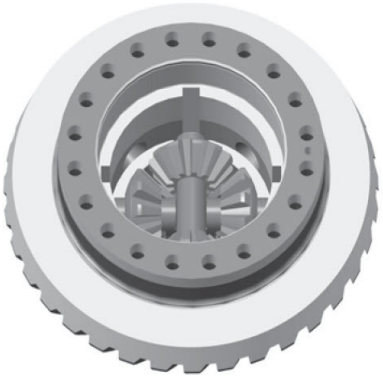


Figure 767

7. Remove axle bevel gear.

Figure 768

8. Remove pressure ring.
9. Remove disk package.
10. Remove thrust washers.

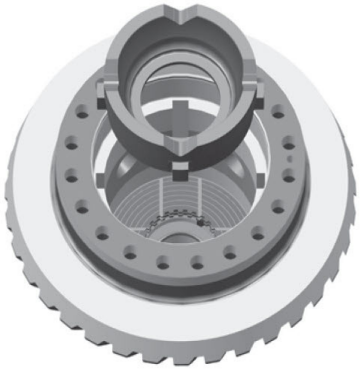


Figure 769

11. Press crown wheel from differential housing.

WARNING

Risk of crushing due to hydraulic tool. Slight to moderate injury possible. Do not reach into danger area.

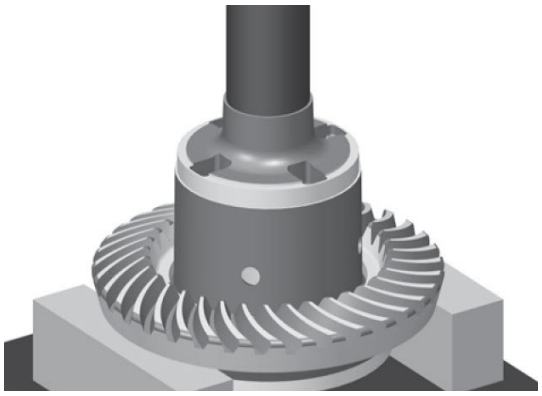


Figure 770

12. Remove ring.

Figure 771

Disassembling input

1. Loosen slotted nut with support fixture 850316-00415 and power screwdriver .

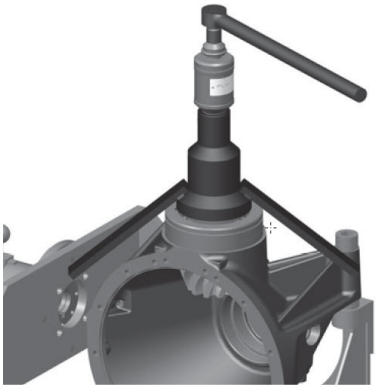


Figure 772

2. Press the pinion out of the housing with press-out device and remove the releasing bearing inner ring.

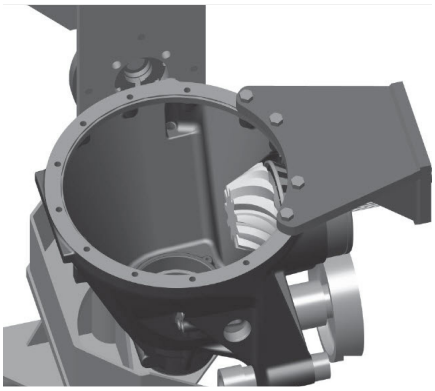


Figure 773

3. Remove washer from the pinion.

Figure 774

4. Pull bearing inner ring off the pinion with gripping device and basic tool 850316-00110.

Figure 775

5. Force out bearing outer ring (1) and remove releasing washer.

WARNING

Risk of injury due to parts flying away. Slight or moderate injury possible. Wear protective goggles.

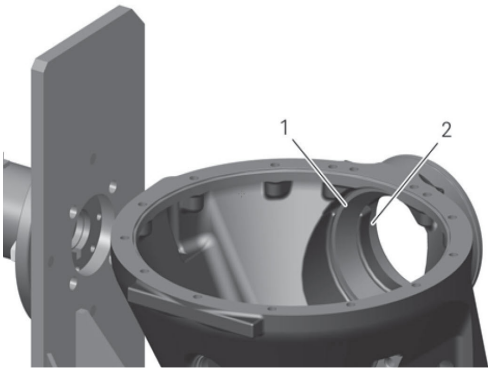


Figure 776

Removing the breather

1. Force out the breather (1) in the direction of the arrow.

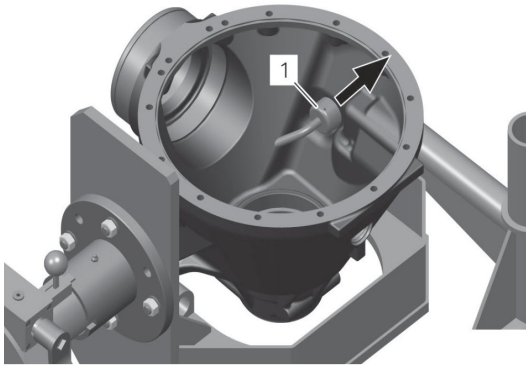


Figure 777

Assembling of LKV Axle Insert

1. Bolt two 5870.204.040 [Fixing pin] into the crown wheel.
2. Fit ring.

Figure 778

WARNING

Risk of burn injuries due to contact with hot surfaces. Slight or moderate injury possible.Wear protective gloves.

Risk of crushing due to hydraulic tool. Slight to moderate injury possible. Do not reach into danger area.

3. Heat crown wheel and press onto differential housing until contact is obtained.

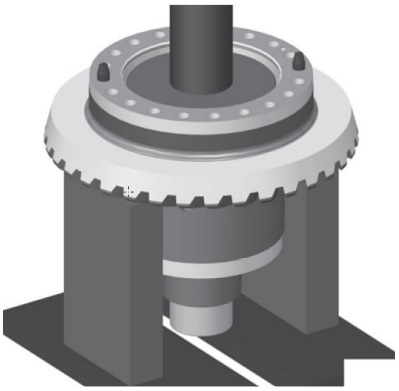


Figure 779

4. Place thrust washers in the differential housing.

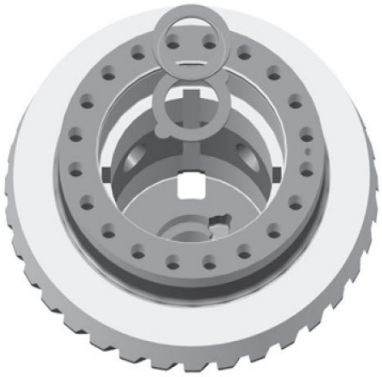


Figure 780

5. Insert outer and inner disks so that the grooves on the inner diameter of the inner disks are aligned.

For the arrangement refer to the current spare parts list.

The thickness of the disk packages must not exceed a maximum of 0.1 mm.

Figure 781

6. Insert pressure ring.

Figure 782

7. Insert axle bevel gear into gearing of the inner disks.

Figure 783

8. Assemble spider shafts and differential bevel gears and insert into pressure ring.

Figure 784

9. Insert axle bevel gear.

Figure 785

10. Insert pressure ring.

Figure 786

11. Insert outer and inner disks so that the grooves on the inner diameter of the inner disks are aligned.

For the arrangement refer to the current spare parts list.

The thickness of the disk packages must not exceed a maximum of 0.1 mm.

Figure 787

Setting disk clearance

12. Measure distance A from the mounting face of the differential housing to the plane surface of the outer disk using depth gage and Straightedge MX504170.

Distance A = e. g. 49.30 mm

Figure 788

Setting disk clearance

12. Measure distance A from the mounting face of the differential housing to the plane surface of the outer disk using depth gage and Straightedge MX504170.

Distance A = e. g. 49.30 mm

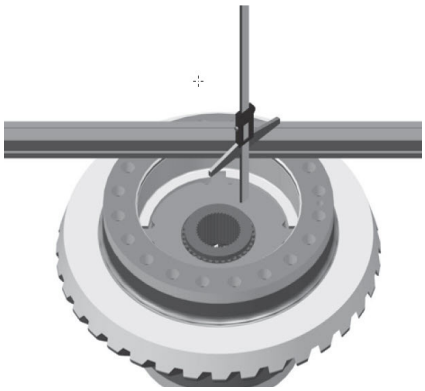


Figure 789

Setting disk clearance

13. Measure distance B from the contact surface of the outer disk to the mounting face of the housing cover using depth gage.

Distance B = e.g. 48.95 mm.

Calculation example:
Disk clearance = Distance A – Distance B
Disk clearance = 49.30 mm – 48.95 mm
Disk clearance = 0.35 mm

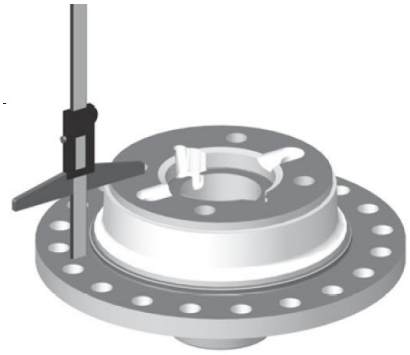


Figure 790

If the required disk clearance is not achieved, replace the outer disk as specified below:
• If the disk clearance is too small, install a thinner outer disk.
• If the disk clearance is too big, install a thicker outer disk.

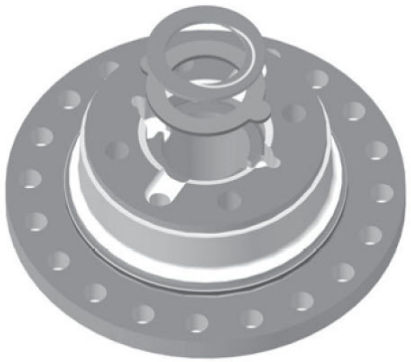


Figure 791

The thickness of the disk packages must not exceed a maximum of 0.1 mm.

15. Apply grease to the bottom sides of the thrust washers.
16. Insert thrust washers into the housing cover.

17. Screw in two units Fixing pin K9005638.
18. Slide on the housing cover.

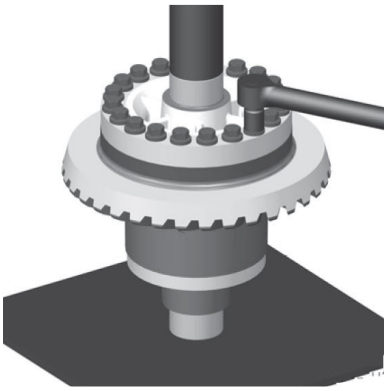


Figure 792

WARNING

Risk of burn injuries due to contact with hot surfaces.
Slight or moderate injury possible.Wear protective gloves.

Use press to fix differential.

20. Turn in new locking screws and tighten. Tightening torque: 400 Nm

WARNING

Risk of burn injuries due to contact with hot surfaces.
Slight or moderate injury possible.Wear protective gloves.

Figure 793

21. Heat both tapered roller bearings and slide on until contact is obtained.

1. Apply LOCTITE 262 to the breather (contact surface with housing).
2. Insert the breather (1) flush with the housing in the direction of the arrow.

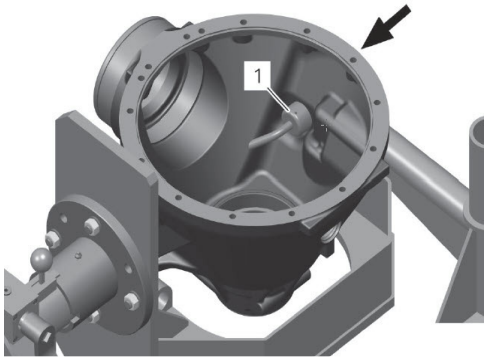


Figure 794

Installing input

Installing disk for contact pattern.

1. Insert shim (1) with e. g. s = 1.0 mm into bearing hole.

When dismantling use disassembled shims. Replace damaged shims by new shims with identical thickness.

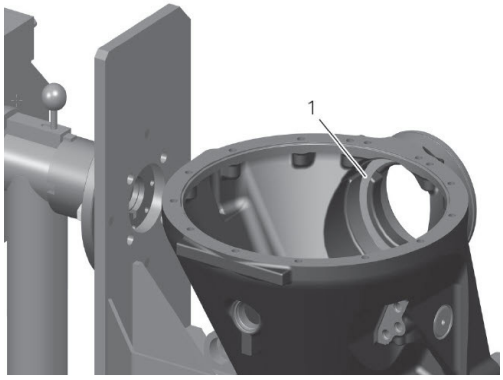


Figure 795

WARNING

Risk of burn injuries due to contact with hot surfaces. Slight or moderate injury possible. Wear protective gloves.

2. Heat bearing hole.
3. Insert bearing outer ring (1) in the housing hole until contact is obtained.

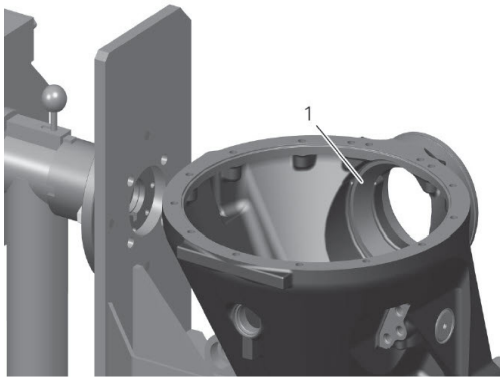


Figure 796

WARNING

Risk of burn injuries due to contact with hot surfaces. Slight or moderate injury possible. Wear protective gloves.

4. Heat bearing hole.
5. Insert bearing outer ring (1) in the housing hole until contact is obtained.

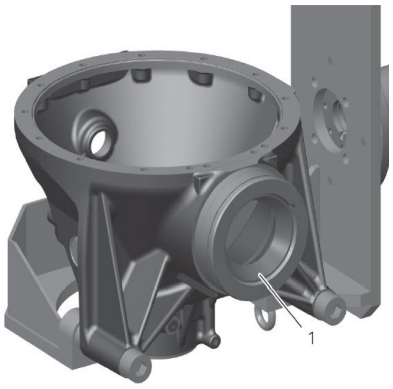


Figure 797

WARNING

Risk of burn injuries due to contact with hot surfaces.
Slight or moderate injury possible. Wear protective gloves.

Setting rolling torque of pinion bearing

6. Heat bearing inner ring and slide it onto the pinion until contact is obtained.

Adjust bearing inner ring after cooling down.

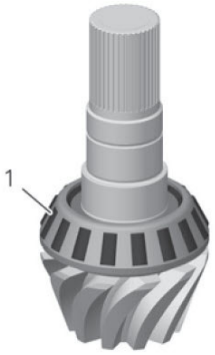


Figure 798

7. Slide disk (1) at e.g. s = 1.0 mm onto the pinion.

When dismantling use disassembled shims. Replace damaged shims by new shims with identical thickness.

Figure 799

8. Insert the pinion (1).

WARNING

Risk of burn injuries due to contact with hot surfaces.
Slight or moderate injury possible. Wear protective gloves.

9. Heat bearing inner ring (2).
10. Hold the pinion (1) in stop position and slide on the bearing inner ring (2).

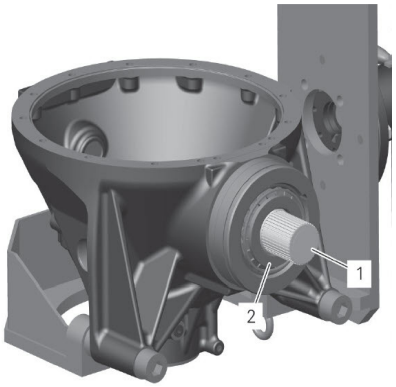


Figure 800

11. Use Support fixture 850316-00415 and power screwdriver to tighten the slotted nut.

Tightening torque: 1,000 Nm

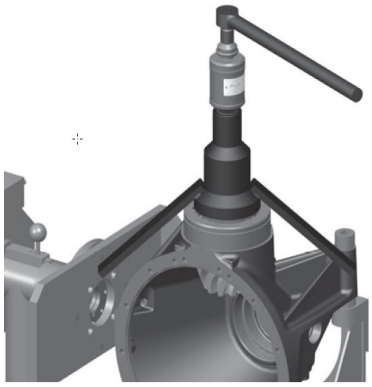


Figure 801

12. Check required rolling torque of pinion bearing 3.5 Nm to 4.5 Nm.

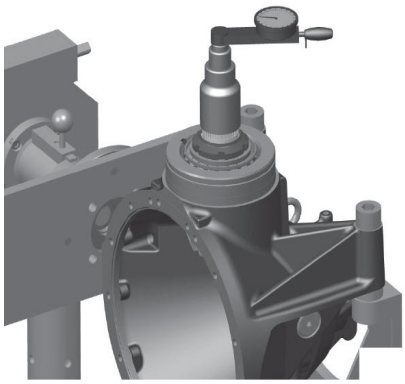


Figure 802

If the required rolling torque is not achieved, replace the disk as specified below:
• In case of an insufficient rolling torque, install a thinner shim.
• In case of an excessive rolling torque, install a thicker shim.

When assembling new bearings try to achieve the upper value of the rolling torque.

Adjusting differential bearing rolling torque and backlash.

13. Differential bearing rolling torque and backlash result from crown wheel deviation.

See table below for the corresponding thickness of the shims.

Read crown wheel deviation behind installation dimension 106 [mm] (1). Crown wheel deviation = e. g. “-10” = -0.10 mm.

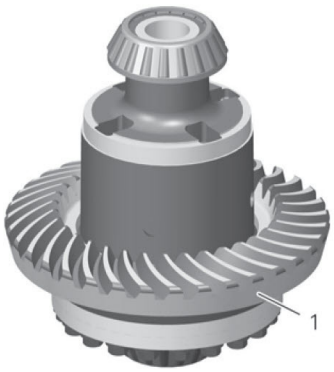


Figure 803

If no deviation is indicated, the deviation is equal to the value “0“.

Crown wheel marking	Deviation crown wheel [mm]	Shim on differential cage side [mm]	Shim on crown wheel side [mm]
-20	-0.2	0.8	1.2
-10	-0.1	0.9	1.0
-	0.0	1.0	1.0
10	0.1	1.1	0.9

14. Insert the shim determined for backlash on the differential cage side into the bearing hole.
15. Insert bearing outer ring until contact is obtained.

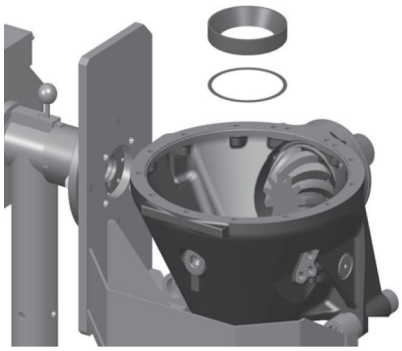


Figure 804

16. Cover several drive and coast flanks on the crown wheel with marking ink.
17. Insert differential in the housing with Extracting device K9005604, Eyebolt 940301-14681 and crane.

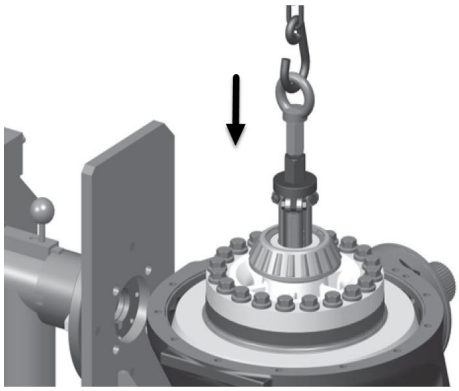


Figure 805

18. Insert the shim determined on the crown wheel side in the bearing hole.
19. Insert bearing outer ring until contact is obtained.

Figure 806

20. Screw in two units Fixingpin.
21. Install the housing with Lifting beam and crane.
22. Secure the housing with six hexagon screws.
    Tightening torque: 185 Nm

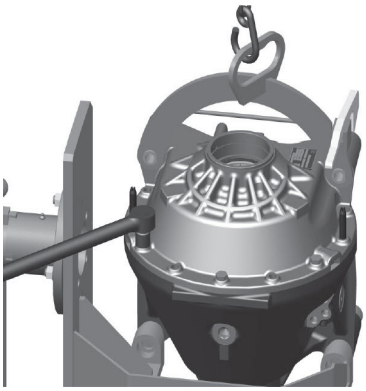


Figure 807

Checking backlash on the slotted nut

23. Place a dial gauge on a groove.

24. Backlash 0.24 mm to 0.44 mm with gear ratio of bevel gear set i = 3.18 mm. Backlash 0.26 mm to 0.49 mm with gear ratio of bevel gear set i = 3.5 mm.

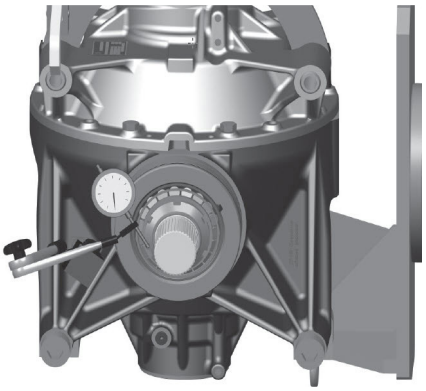


Figure 808

If the required backlash is not reached, replace the disk as specified below:

- **In case of an insufficient backlash,**
  - **install a thicker shim.**
  - **Install a thinner shim for differential bearing rolling torque.**
- **In case of an excessive backlash,**
  - **install a thinner shim.**
  - **Install a thicker shim for differential bearing rolling torque.**

Checking contact pattern

25. Rotate pinion several times in both directions.

26. Loosen hexagon screws.
27. Remove the housing with Lifting beam and crane.

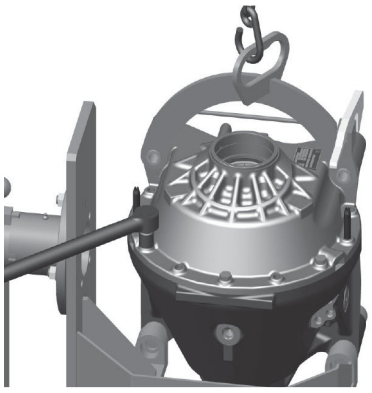


Figure 809

28. Remove differential from the housing with Extracting device K9005604, Eyebolt 940301-14681 and crane.

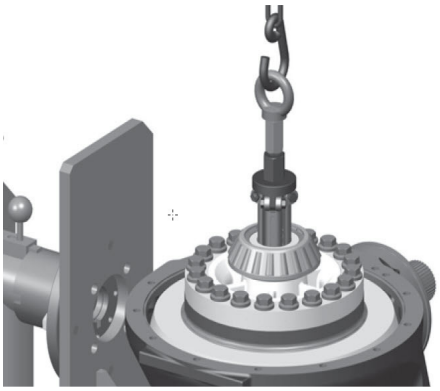


Figure 810

29. Check contact pattern (refer to section **Contact pattern examples of Gleason Tooth System** (Gleason-gearing),page 158).

Correct deviations from the contact pattern.
If the shim for the contact pattern is changed, proceed as follows:
- Adapt spacer ring for rolling torque
- Check rolling torque

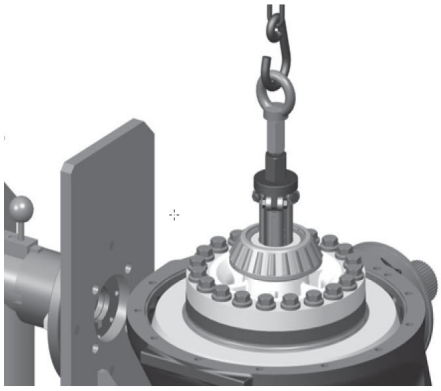


Figure 811

30. Grease O-ring (1).
31. Slide O-ring (1) onto housing.

Figure 812

32. Insert differential in the housing with Extracting device K9005604, Eyebolt 940301-14681 and crane.
33. Install the housing with Lifting beam and crane.

WARNING

Risk of injury due to parts flying away. Slight or moderate injury possible. Wear protective goggles.

34. Drive clamping pins (1) in flush.
35. Screw in and tighten hexagon screws.
Tightening torque: 185 Nm

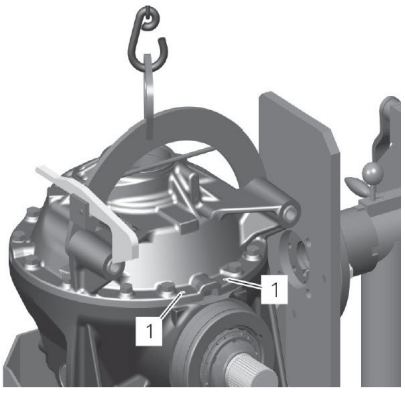


Figure 813

Assembling output

1. Insert securing ring (1) in output shaft.

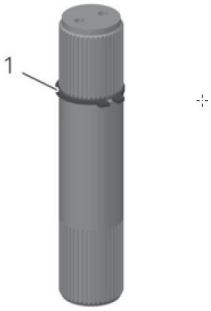


Figure 814

2. Insert output shaft (1) in axle bevel gear.

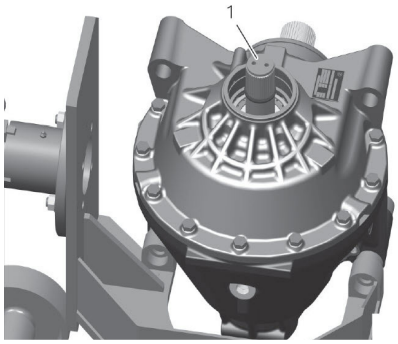


Figure 815

3. Slide on supporting ring (1).

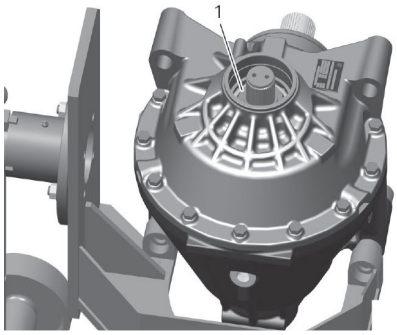


Figure 816

4. Insert ball bearing (1) in bearing hole until contact is obtained.
5. Insert retaining ring (2).

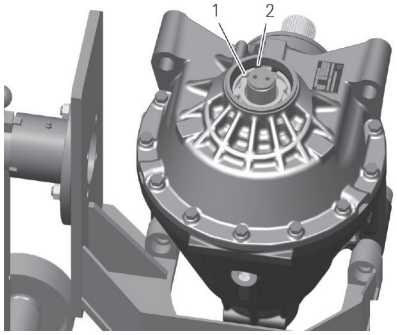


Figure 817

Carry out the following two work steps immediately one after the other.

6. Apply PHÖNIX SPIRITUS to the outer diameter of the shaft seal.

Insert shaft seal with the seal lip facing the oil chamber.

7. Insert shaft seal ring with Driver tool

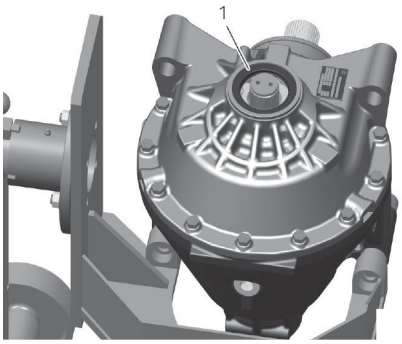


Figure 818

8. Press screening plate (1) onto the output flange until contact is obtained.

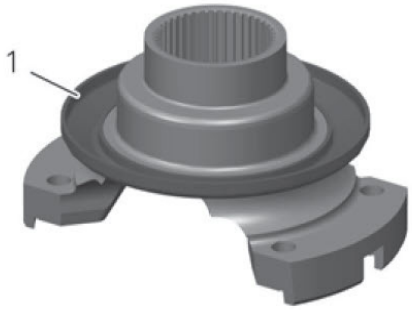


Figure 819

9. Push output flange (2) onto output shaft.
10. Insert O-ring (1) into the space between output flange and output shaft.

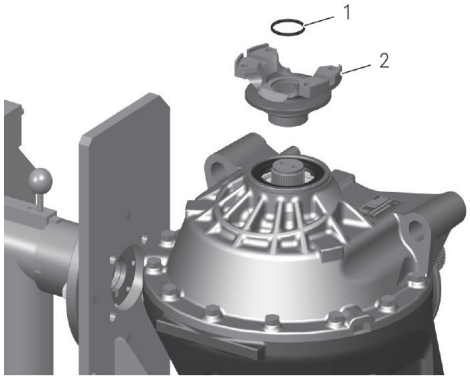


Figure 820

11. Position disk and the washer(2).
12. Screw in and tighten hexagon screws (1).
    Tightening torque: 58 Nm

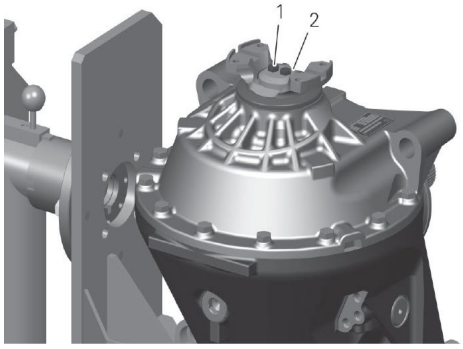


Figure 821

13. Insert securing ring (1) in output shaft.

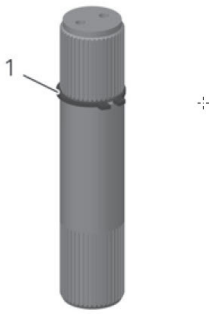


Figure 822

14. Insert output shaft (1) in axle bevel gear.

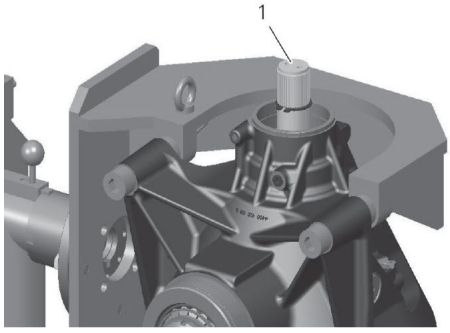


Figure 823

15. Slide on supporting ring (1).

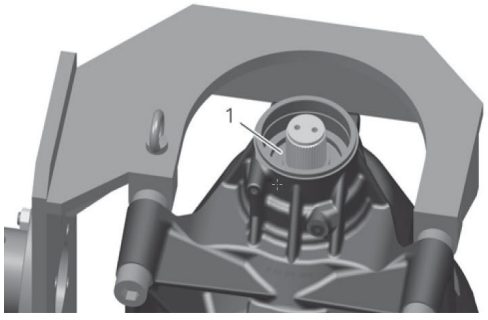


Figure 824

16. Insert ball bearing (1) in bearing hole until contact is obtained.
17. Insert retaining ring (2).

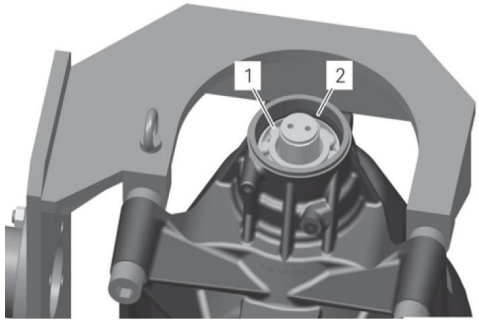


Figure 825

Carry out the following two work steps immediately one after the other.

18. Apply PHÖNIX SPIRITUS to the outer diameter of the shaft seal.

Insert shaft seal with the seal lip facing the oil chamber.

19. Insert shaft seal ring with Driver tool

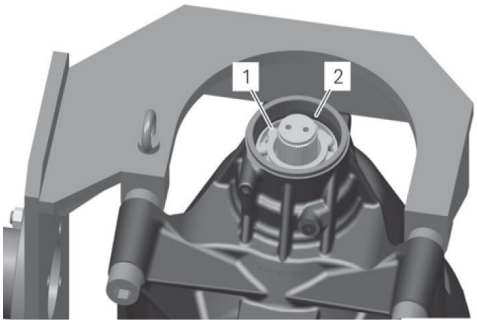


Figure 826

20. Press screening plate (1) onto the output flange until contact is obtained.

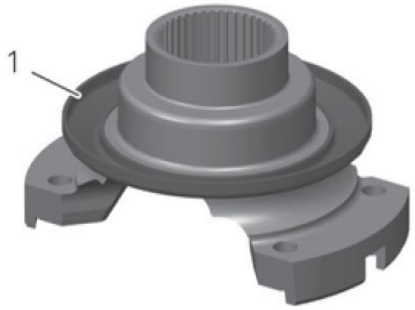


Figure 827

21. Push output flange (2) onto output shaft.
22. Insert O-ring (1) into the space between output flange and output shaft.

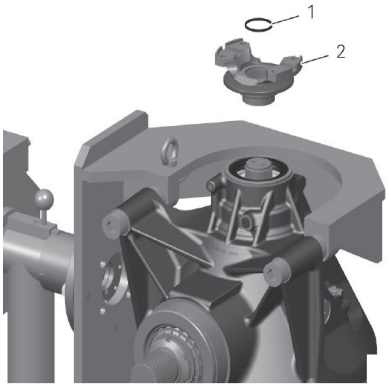


Figure 828

23. Position disk and the washer(2).
24. Screw in and tighten hexagon screws (1).
    Tightening torque: 58 Nm

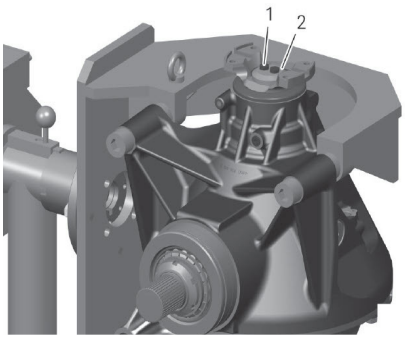


Figure 829

25. Screw in and tighten screw plug with O-ring (1).
    Tightening torque: 35 Nm
26. Screw in and tighten screw plug with O-ring (2).
    Tightening torque: 50 Nm

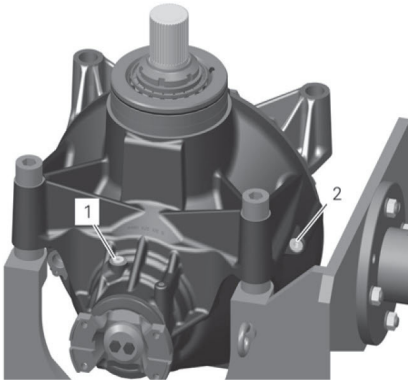


Figure 830

Mounting the axle drive

1. Oil O-ring (1) and fit it in the annular groove.
2. Mount the axle drive with Eyebolt and crane.

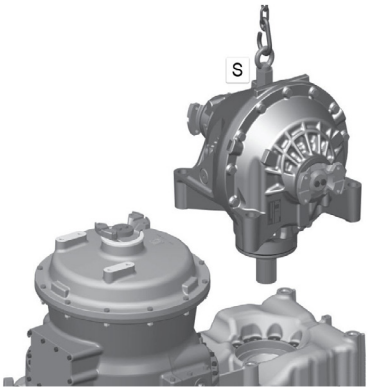


Figure 831

3. Screw in and tighten new, oiled hexagon screws with Power screwdriver.
    Tightening torque: 1,900 Nm

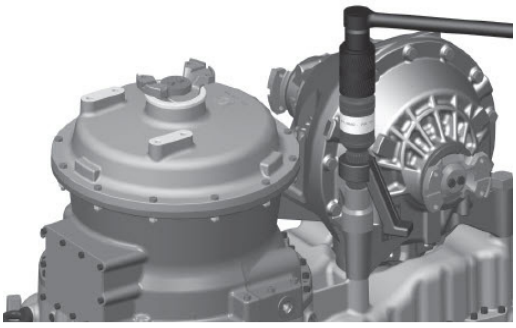


Figure 832

4. Bolt in screw plug with O-ring (1) and tighten.
    Tightening torque: 150 Nm
5. Bolt in screw plug with O-ring (2) and tighten.
    Tightening torque: 50 Nm

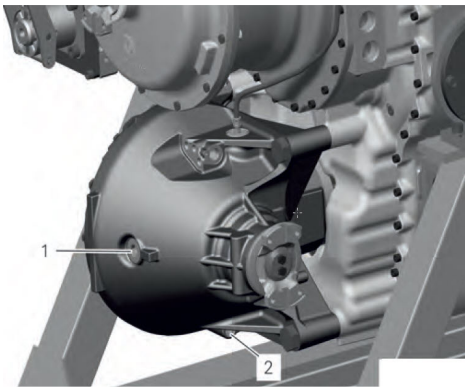


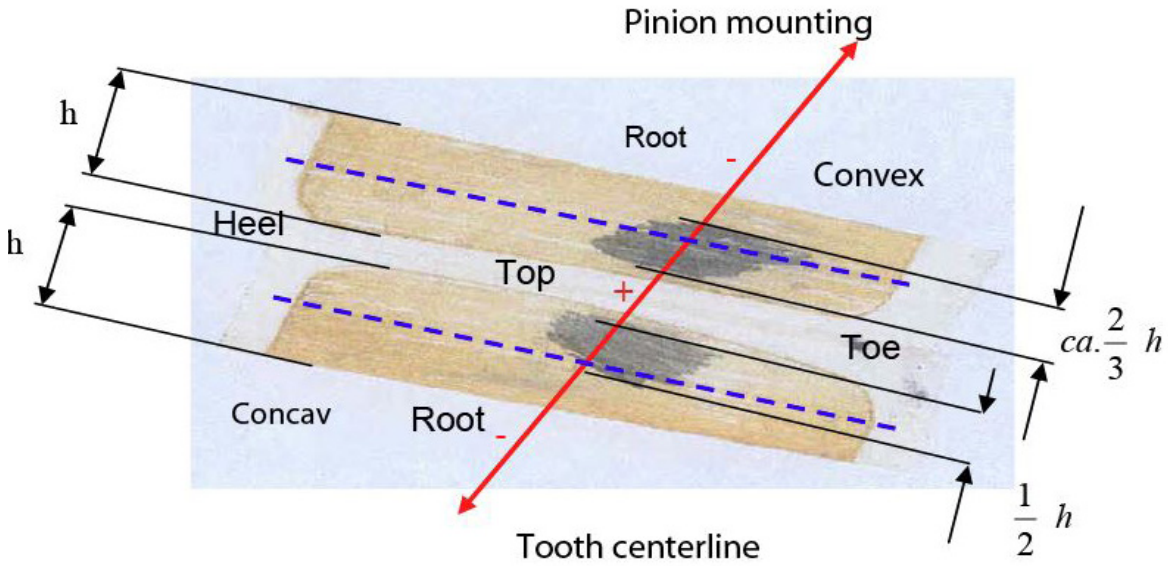
Figure 833

Contact pattern examples of Gleason Tooth System

Field of application:

The contact pattern examples are applicable for all bevel gear sets in MT and MS axles which have a ratio between 1.5 < i < 6.
Furthermore, the examples are only valid for ground bevel gear sets. (The examples are just partially applicable for lapped contact patterns).

Ideal contact pattern:



Contact pattern setting:

The contact patterns are viewed on the crown wheel flanks.
The contact pattern must be tangent to the middle of tooth (t ooth centerline), otherwise it is too close to the tooth top or root.
Furthermore, the contact pattern should cover at least 50% of the flank in h-direction (inspection criterion).

General:

By shifting the pinion the contact pattern is moved to the root or top.
Pinion mounting distance in +: = reduce pinion shim thickness
Pinion mounting distance in -: = increase pinion shim thickness

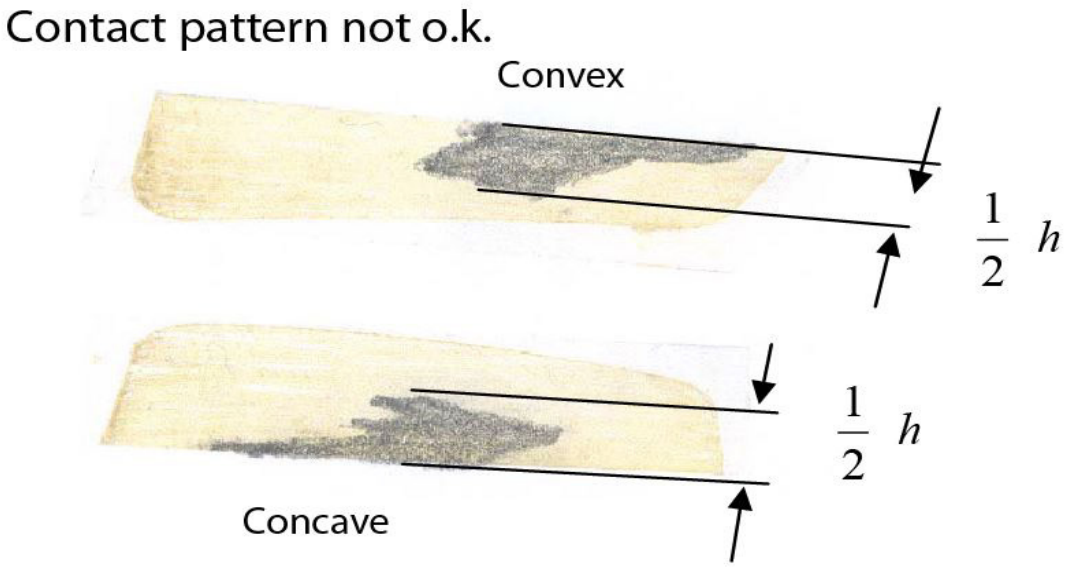
Flank glossary:

Convex flank = drive side
Concave flank = coast side
Toe = crown wheel inner side
Heel = crown wheel outer side

Note:

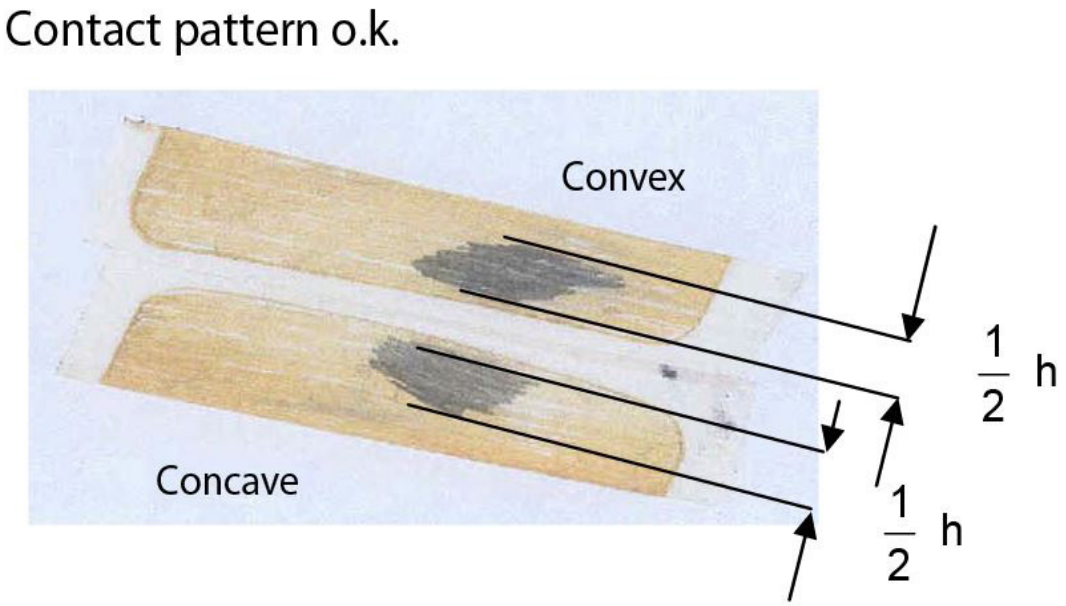
The following pages describe three different examples of contact patterns!

EXAMPLE 1: DEDENDUM TOOTH POSITION



The contact pattern on the convex and concave flank is too close to the root, although more than 50% of the flank in h-direction is covered. An adjustment is necessary!
Feature: On the convex flank the contact pattern is tangent to the toe, on the concave flank it is tangent to the heel.

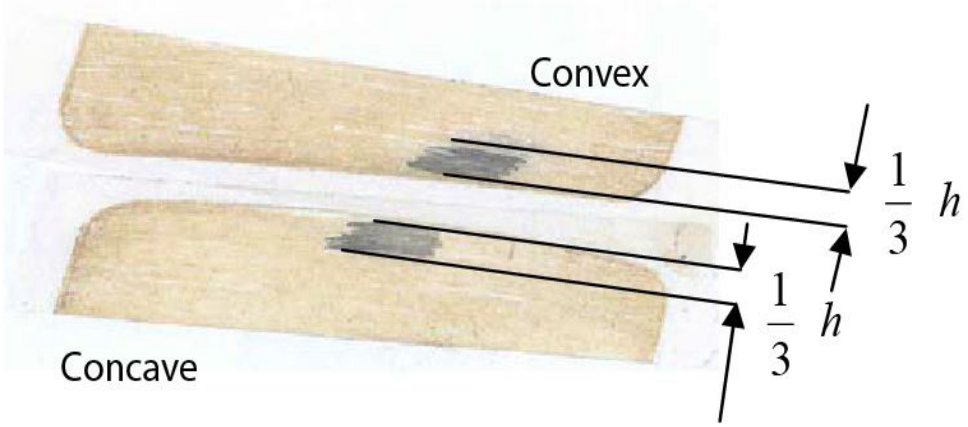
Adjustment: Install thinner pinion shim!



The contact pattern is in the flank without bridging and a minimum of 50% of the flank in h-direction is covered. The example shows a relatively small contact pattern. However, the contact pattern is tangent to the tooth centerline and would cover the flank optimally in case of a higher load (see sketch).

EXAMPLE 2: ADDENDUM TOOTH POSITION

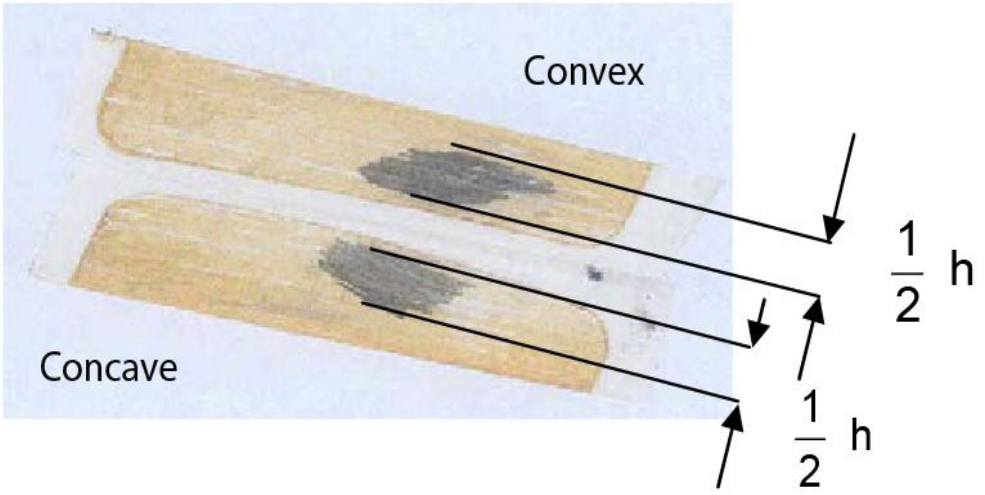
Contact pattern not o.k.



The contact pattern convex and concave is too close to the top. The contact pattern is too small and is not tangent to the middle of tooth.
An adjustment is necessary!

Adjustment: Install thicker pinion shim!

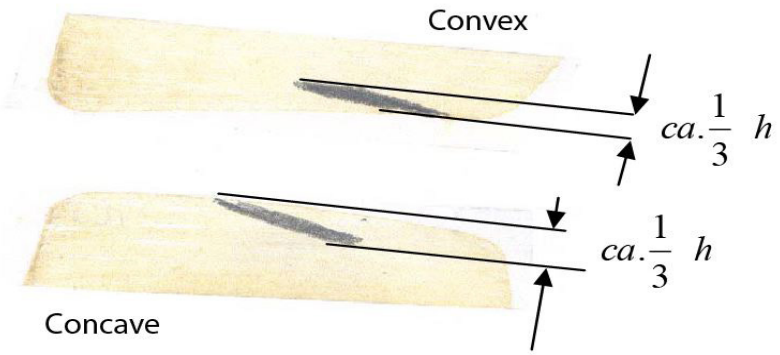
Contact pattern o.k.



The convex contact pattern must be tangent to the tooth centerline.
A minimum of 50% of the tooth depth (flank) is covered.

EXAMPLE 3: "LINE" CONTACT PATTERN

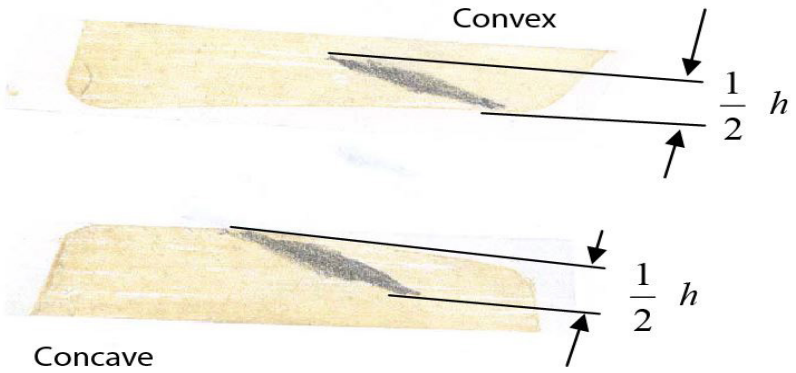
Contact pattern not o.k.



The contact pattern convex and concave is too close to the top. The contact pattern is too small and is not tangent to the middle of tooth.
An adjustment is necessary!

Adjustment: Install thicker pinion shim!

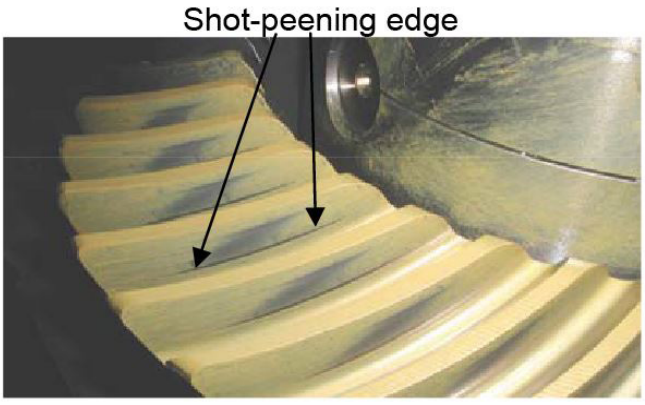
Contact pattern o.k.



The convex contact pattern must be tangent to the tooth centerline.
A minimum of 50% of the tooth depth (flank) is covered.
The contact pattern in this example is still acceptable but not ideal.
However, the contact pattern should not be any closer to the top.

Note:

An edge on the root of the tooth caused by the shot-peening process is allowed (see example).



Transmission assembly

NOTE

Place the dump truck on level ground and apply parking brake
Start with the propeller shaft in the articulation hinge.

Release articulation propeller shaft from the transmission output flange.

Apply articulation lock

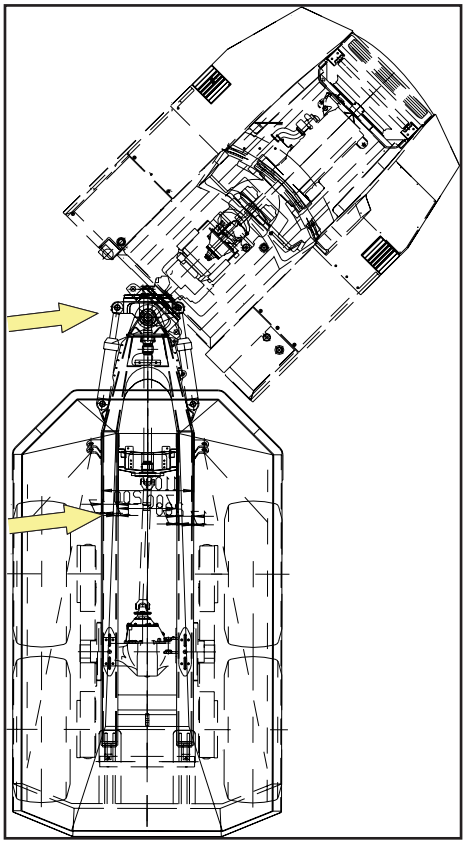


Figure 834

CAUTION

Place wheel chocks to the front wheel

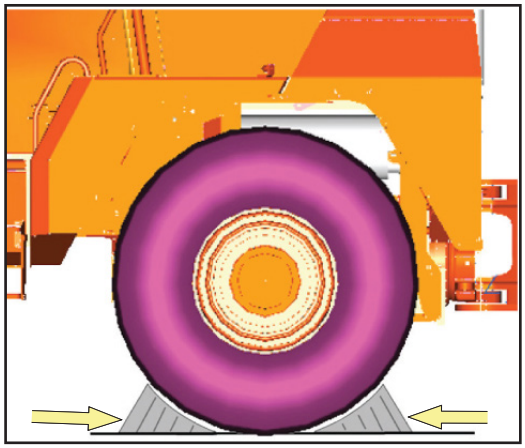


Figure 835

Before assembling the new transmission you should remove the hydraulic pump from the disassembled transmission.

Make sure hydraulic pump is intact then install it on the new transmission.

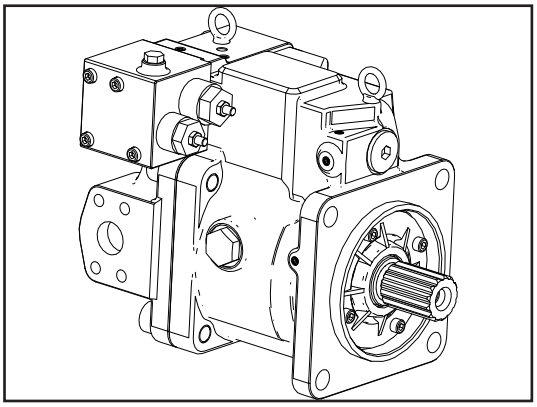


Figure 836

Remove old sealant and clean flange surface of hydraulic pump. Same procedure on transmission flange end.

Renew the O-ring (8) refer to parts catalogue

Screw in and tighten screw (9)

Allen wrench: 14mm
Torque: 330Nm

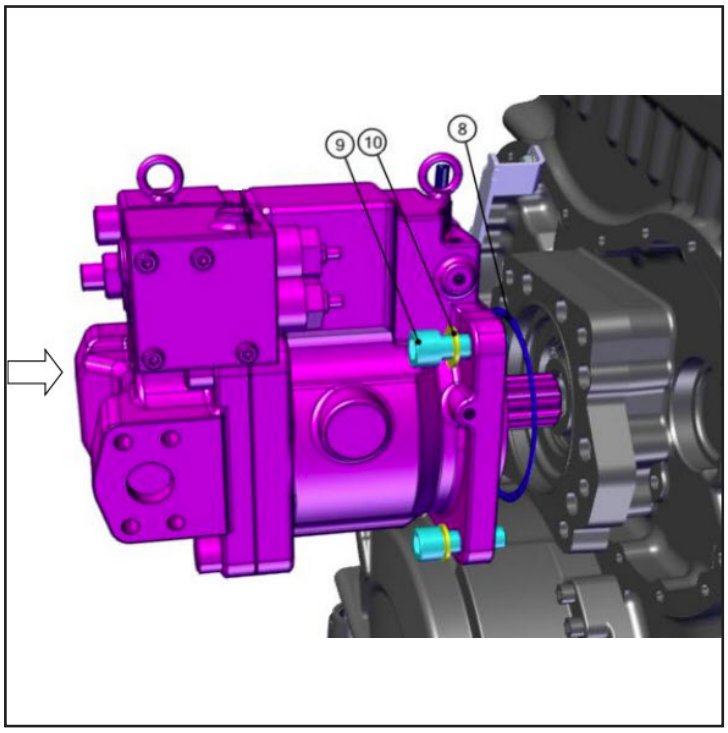


Figure 837

Fill front differential:
(For fluid type, quantity and specifications, refer to the Hyundai Operating & Maintenance Manual Chapter 6)

Hook chains into the 3 eyebolts on transmission. Adjust the chains to keep transmission in level.

Carefully place transmission on the 3 mounting points.

If shims were used on screws when disassembled, use the same shims when reassembling.

Figure 838

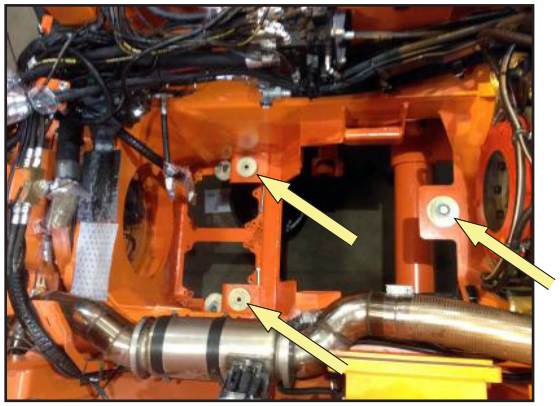


Figure 839

Assemble the bracket between engine and transmission.

Figure 840

Fix adjustment tools to align the transmission and engine.

2x HA30 MX531192
2x HA45 MX529833

One on transmission flange and one on engine flange.

Mount centering mandrel f/eng.-tran. Use shim so mandrels aligns to center up/down (+) 4mm (when tightening engine moves about 3-5mm down)

Tolerance for engine installation is 3,5mm ± 1.5 Centerline ø4

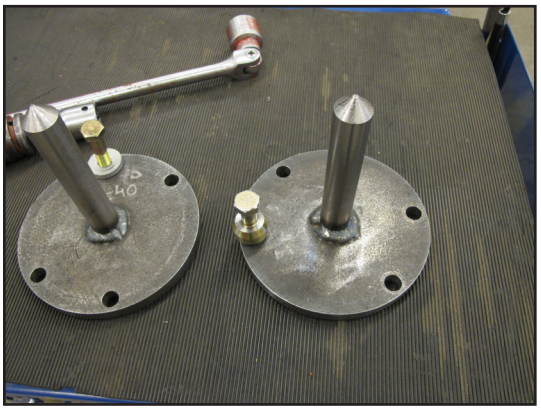


Figure 841

Engine angle of inclination is 5 degrees on the HA30 (4,7° - 5,2°) or 3 degrees on the DA40 (2,7° - 3,2°) down in front relative to transmission.

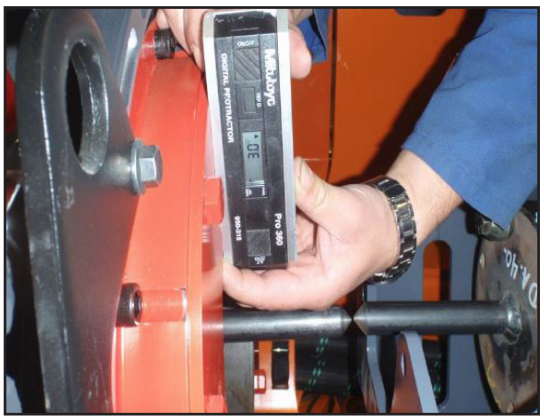


Figure 842

Adjust sideways (aligned to center) And adjust forward/backward about 3,5mm between the tip's (approx.323mm flange to flange top). Check forward mounts, should be about in center.

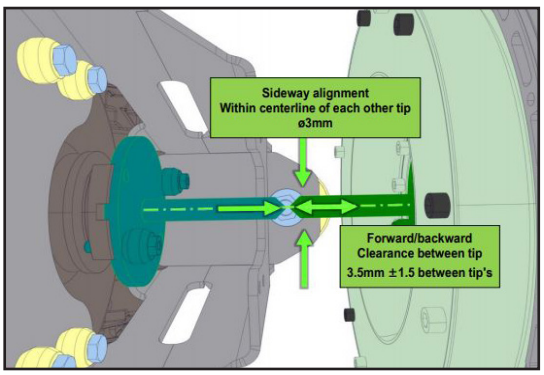


Figure 843

HA30

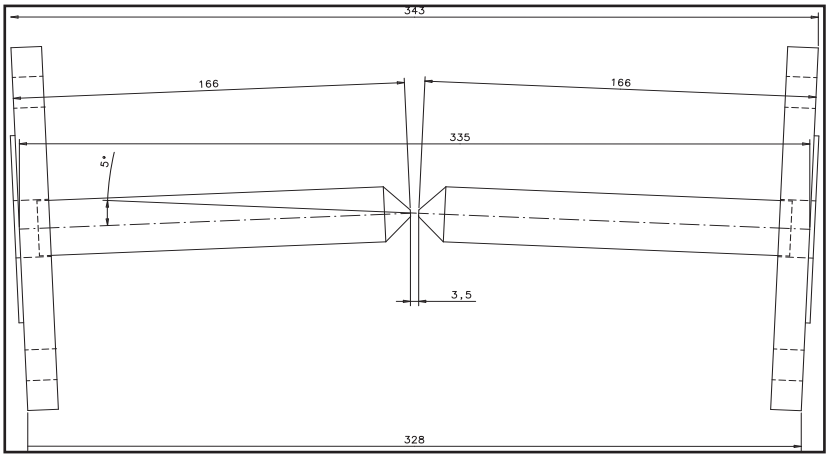


Figure 844

Assemble the power drive shaft connecting engine and transmission (4 screws on engine flange and 4 screws on transmission flange) with torque 141Nm.

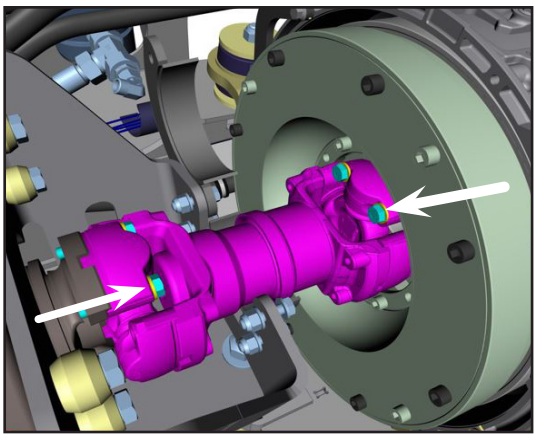


Figure 845

Adjust rear drive shaft into position on transmission flange.

Assemble the rear drive shaft with 2 screws on each side (4 screws) Torque: 141 Nm

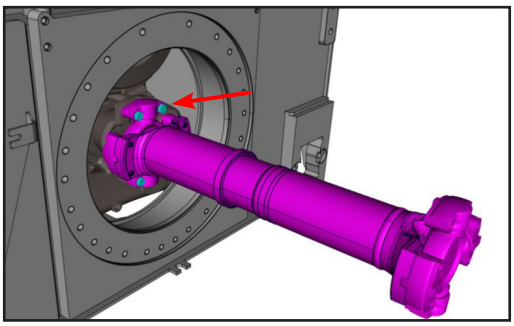


Figure 846

Attach wires and hoses to their previous state if they were cut.

Assemble Cooling hoses, hydraulic hoses and electrical connectors back to original position.

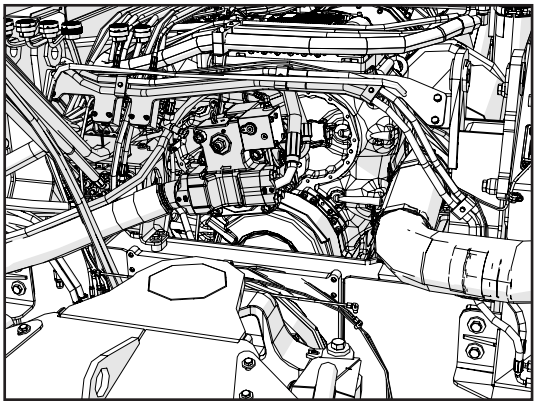


Figure 847

Relieve tension on the front frame with 2 jacks then assemble tension bar with 4 bolts (2 on each side)

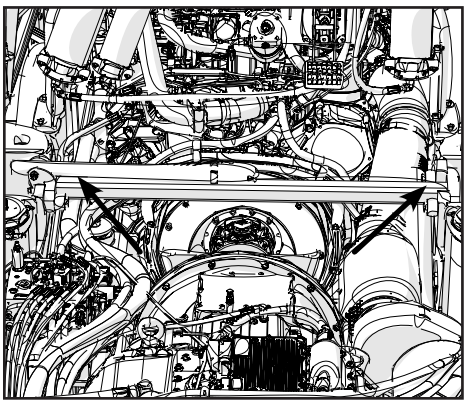


Figure 848

Assemble the driver cab and put the LH and RH pins to the cab hinge with snap rings.

Make sure the snap ring is placed in the pin groove.

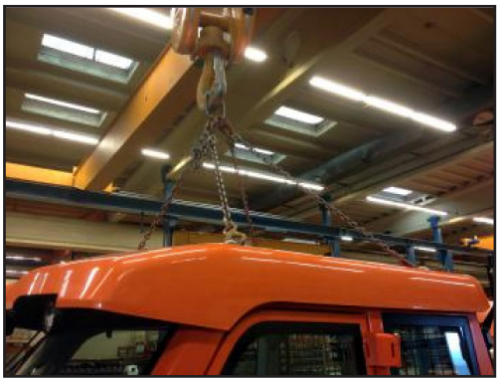


Figure 849

Figure 850

Assemble the “IN” A/C hose (large fitting), “OUT” A/C hose (small fitting), reconnect the 6 connectors from left to right (S1, S2, S3, S4, S5, S6)

Assemble the protection cover to original position.

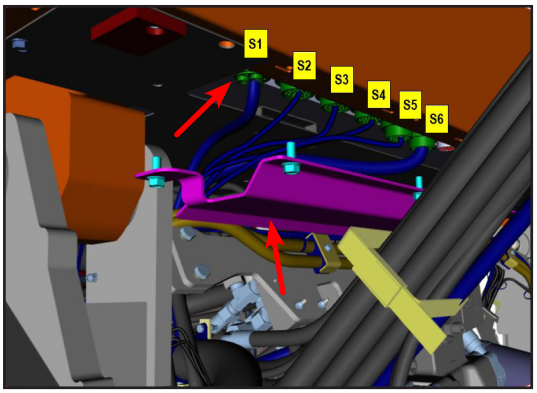


Figure 851

Assemble the cab tilt cylinder and tilt the cab up.

Figure 852

Connect all the hydraulic hoses from the cab and the heating system to the cab. Make sure you follow position markup that is applied during disassembly.

Refill hydraulic tank
(For fluid type and specifications, refer to the Hyundai Operating & Maintenance Manual Chapter 6)

Refill A/C system

Figure 853

Assemble the final 2 drive shaft points on each side of transmission (LH and RH). Turn flange to reach screws if necessary.

Torque: 141Nm

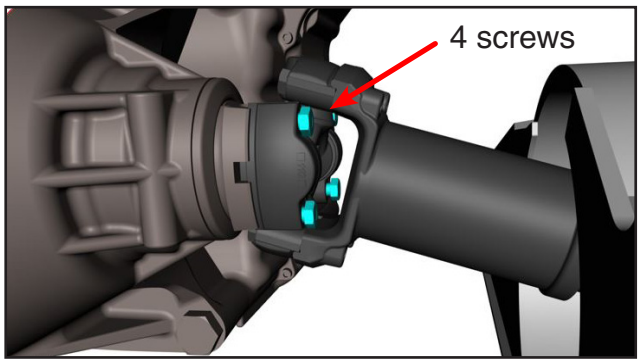


Figure 854

Assemble transmission cover and bottom guard.

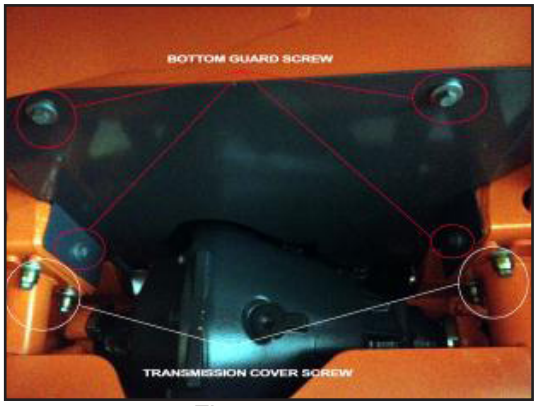


Figure 855

Figure 856

Assemble the body heating assembly (if it was assembled on the machine)
Assemble 4 screws on exhaust pipe clamps

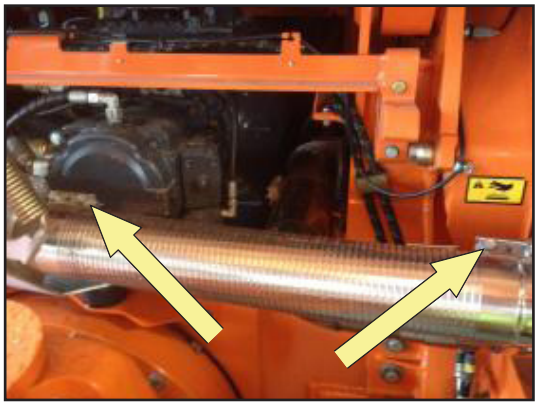


Figure 857

Assemble the body heating bracket. (4 screws)

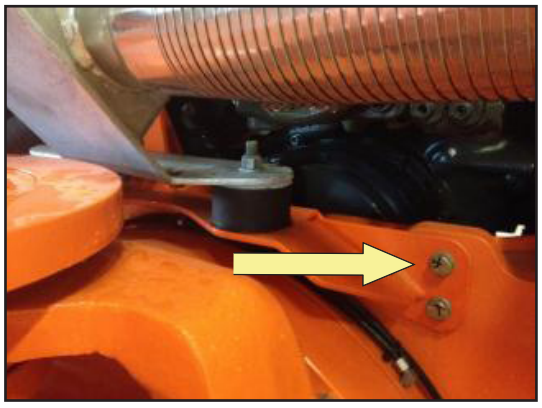


Figure 858

Assemble the clamp of the hinge bearing lubrication from the body heating bracket.

Figure 859

NOTE

Remember to bleed the system after transmission reassembly

Bleeding emergency steering pump:

1. Carefully open plug on emergency steering pump.
2. Close when system is purged of any air bubbles.
3. Start and run the engine, perform steps 1-2 again after engine is stopped.

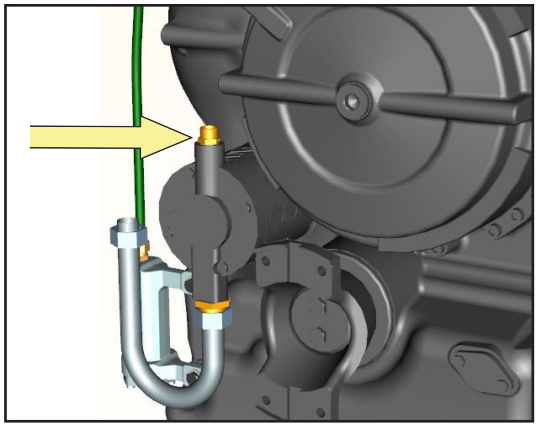


Figure 860

CAUTION

Remember to re-check the hydraulic level after turning ON the machine after the transmission replacement.

Clutch calibration

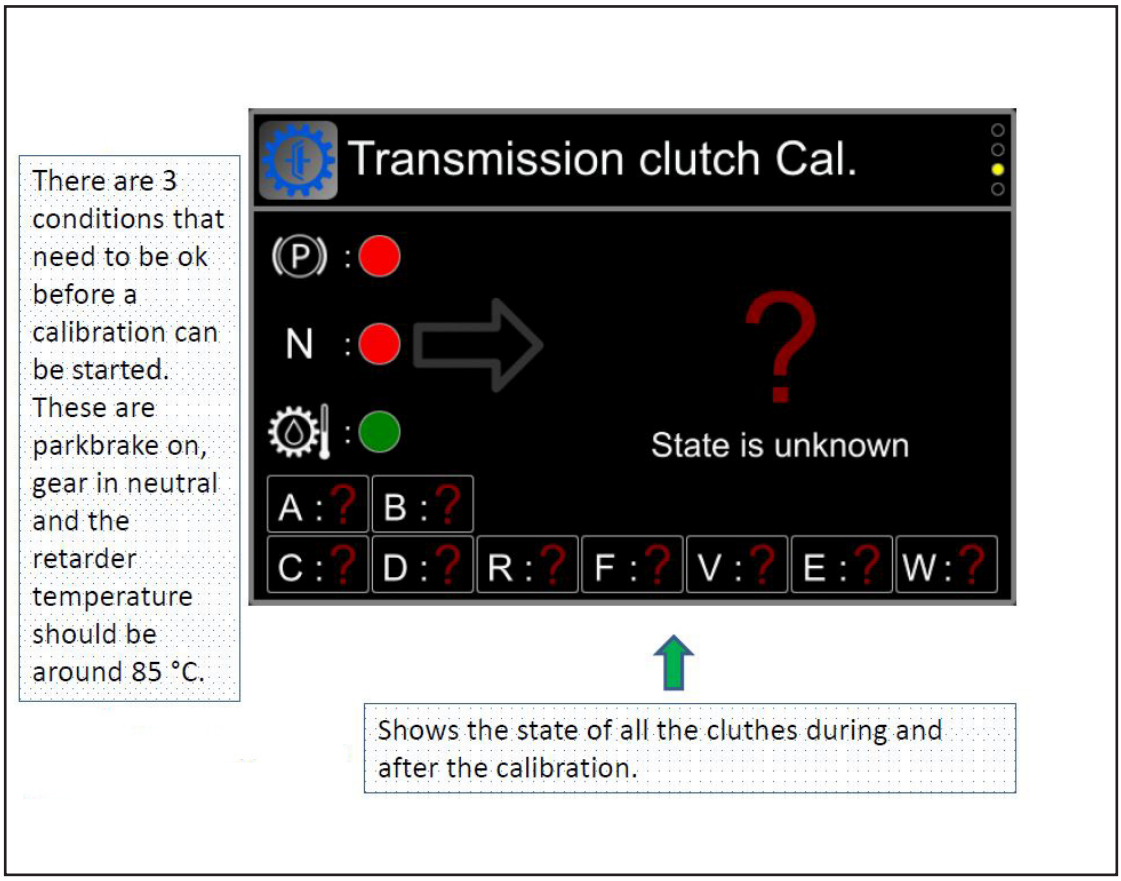


Figure 861

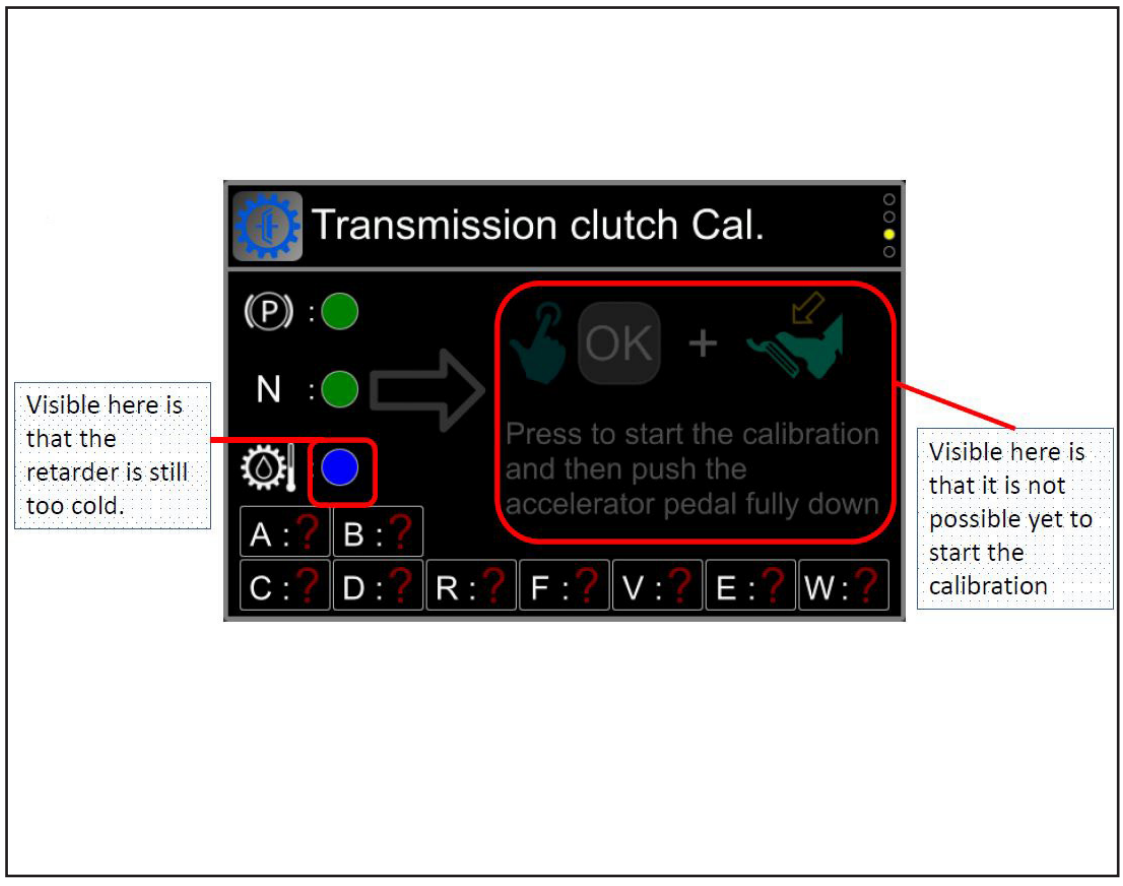


Figure 862

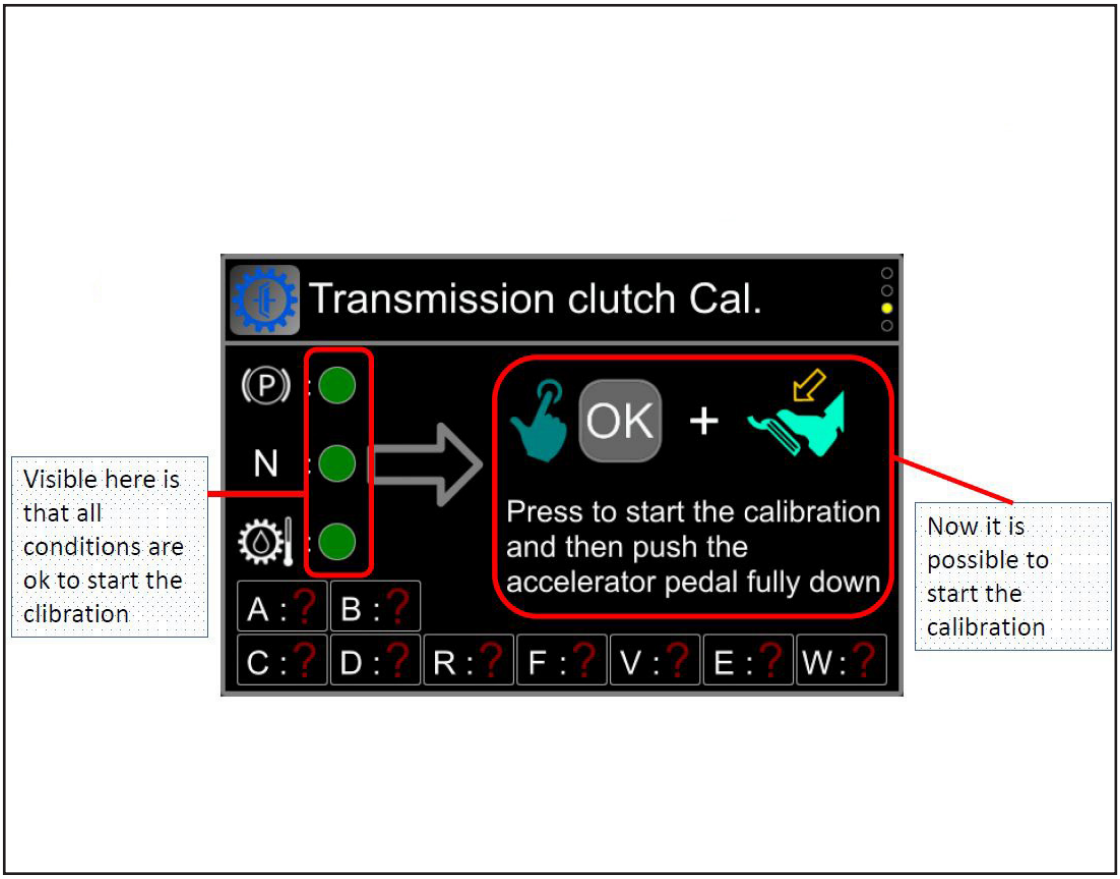


Figure 863

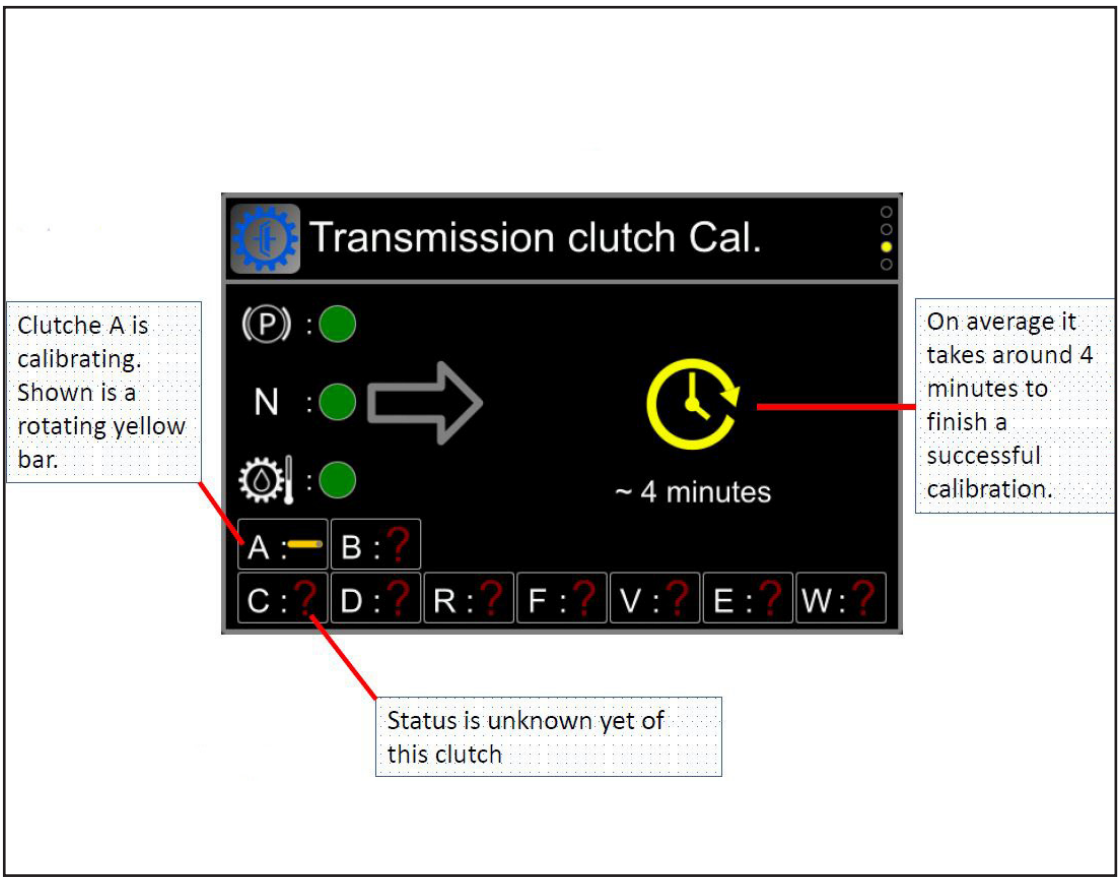


Figure 864

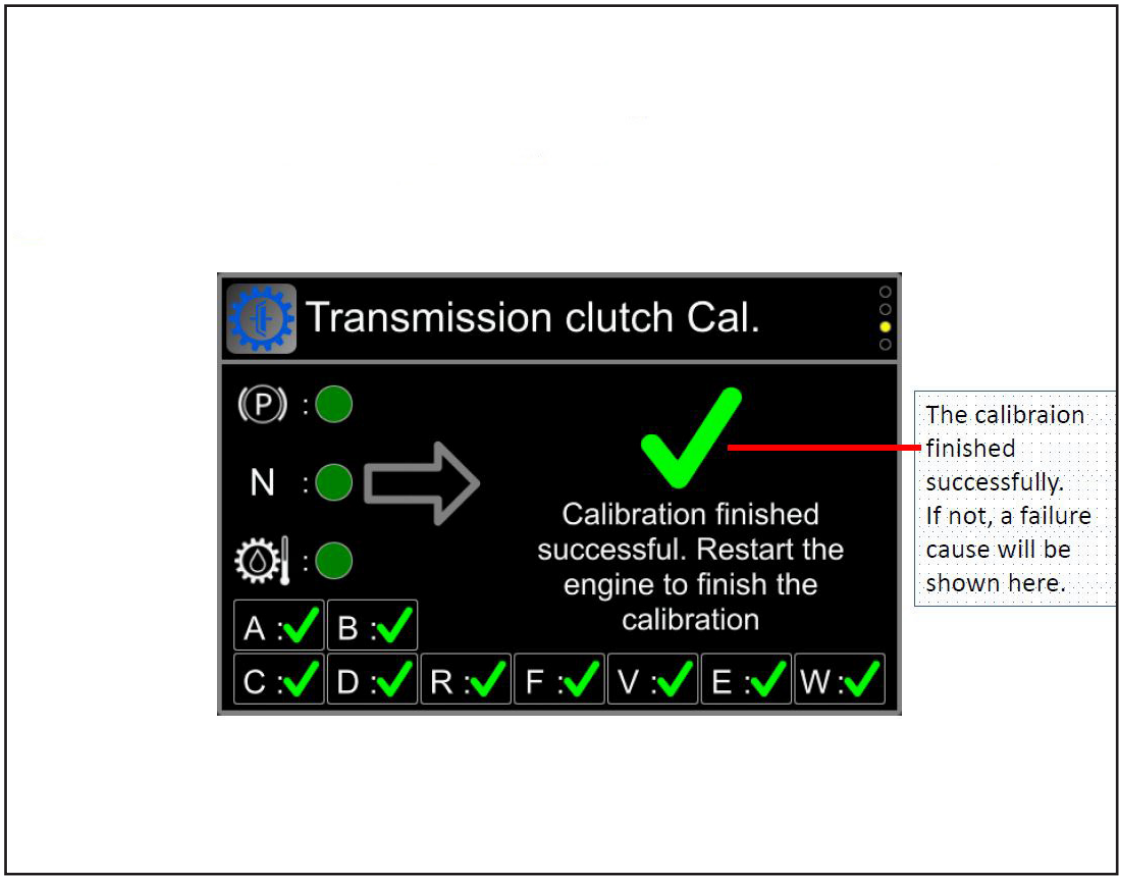

Transmission clutch Cal.
(P) :
N :
:
A : B :
C : D : R : F : V : E : W :
Calibration finished successful. Restart the engine to finish the calibration
The calibraion finished successfully. If not, a failure cause will be shown here.

Figure 865

Transmission oil check

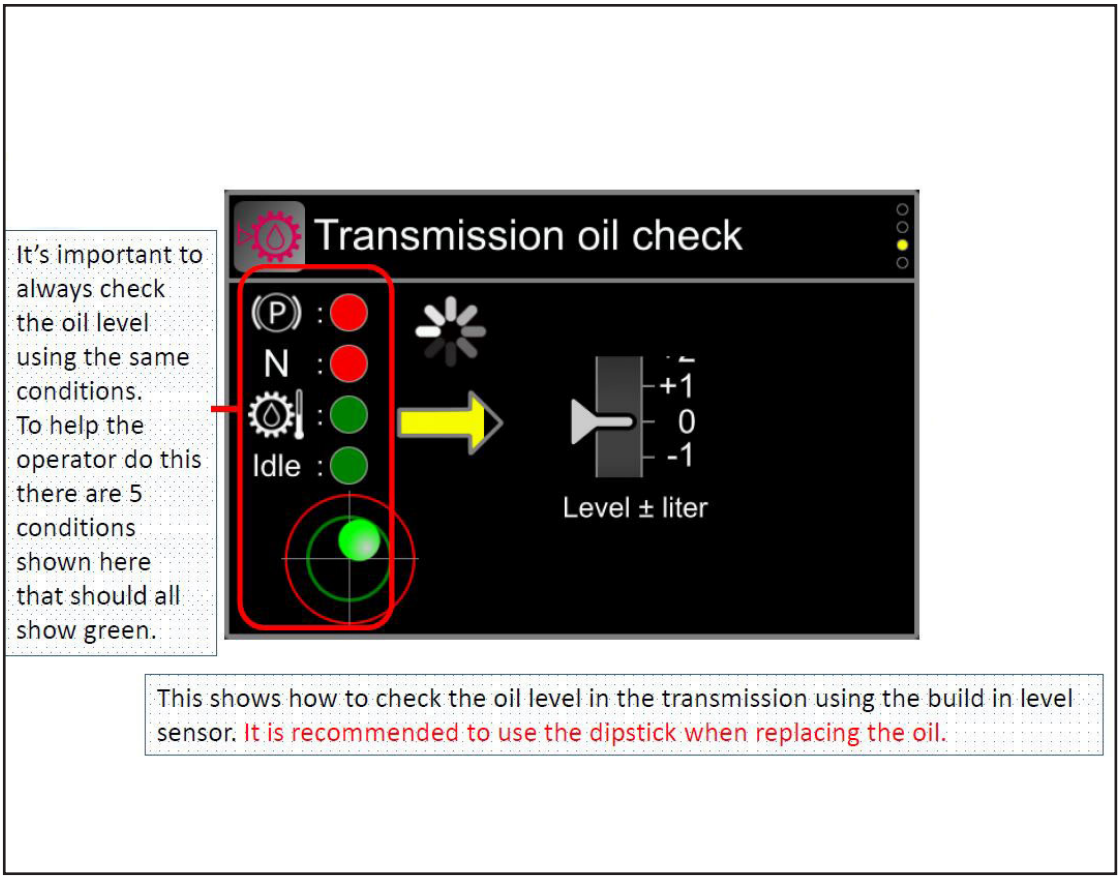


Figure 866

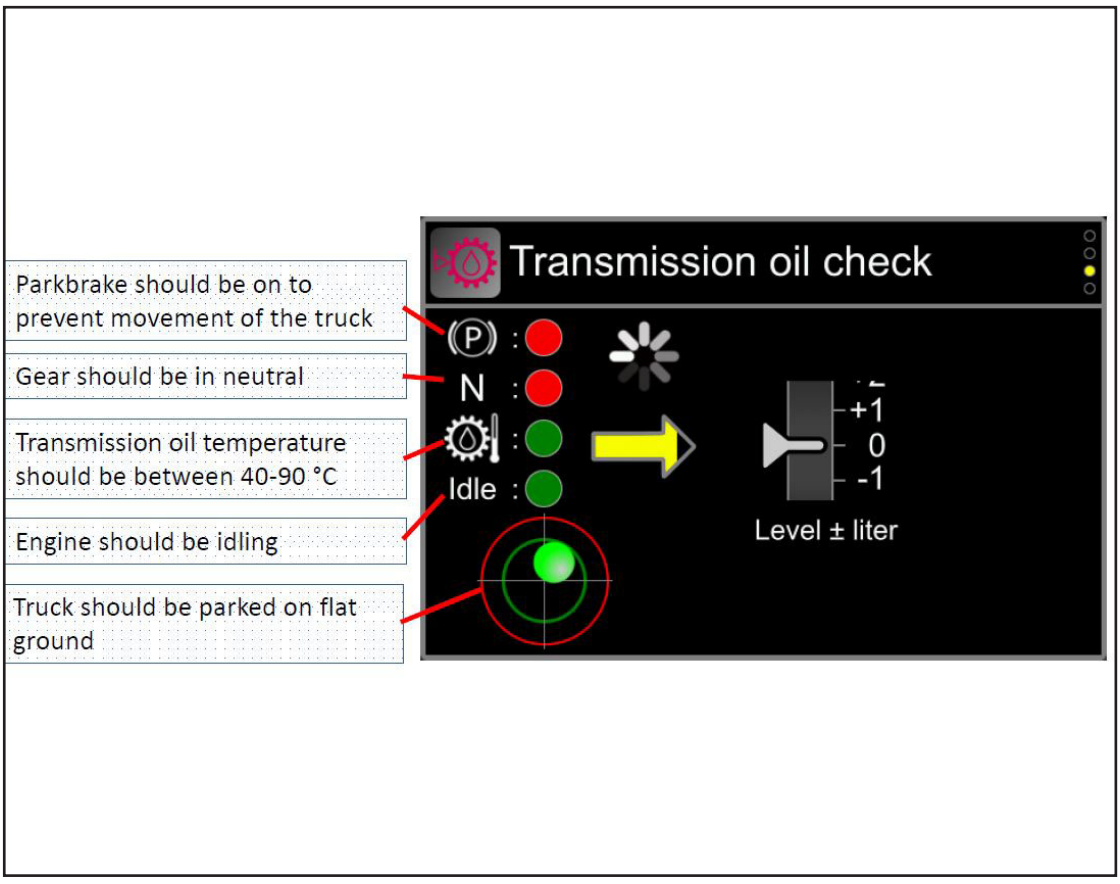


Figure 867

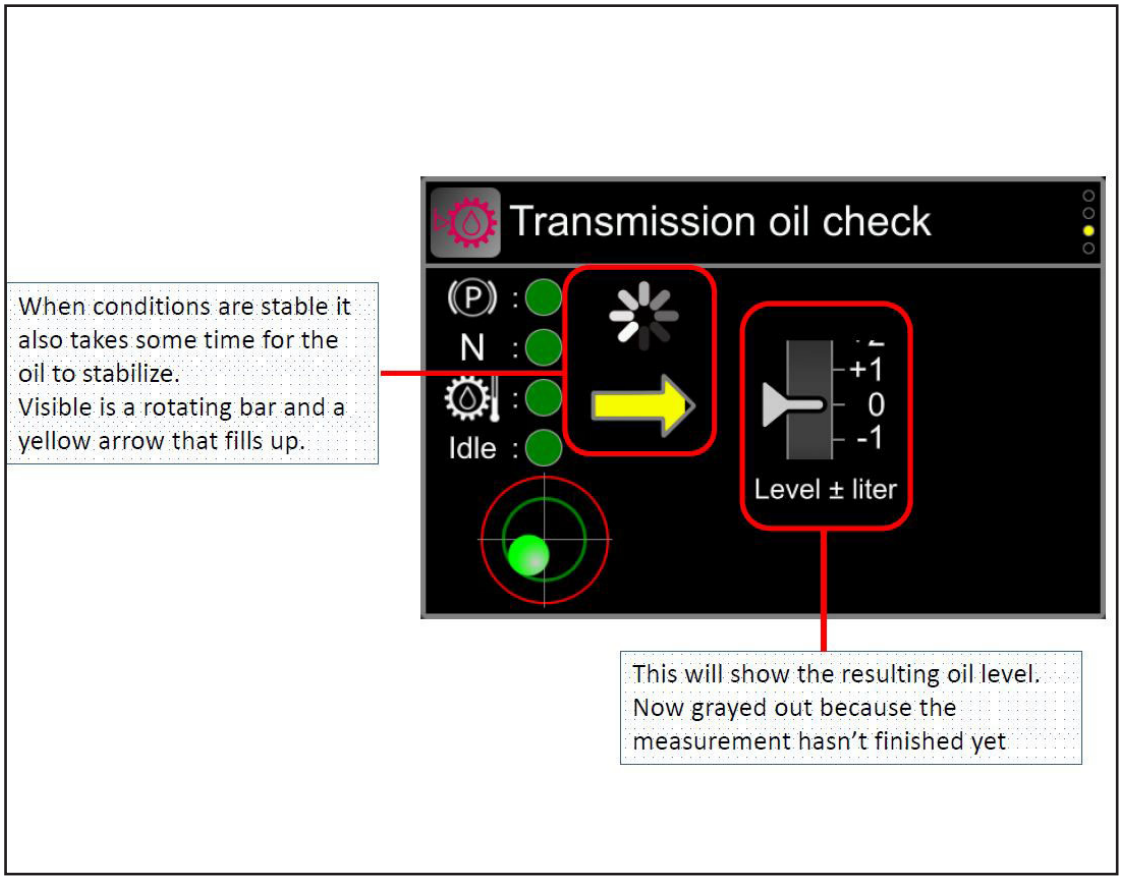


Figure 868

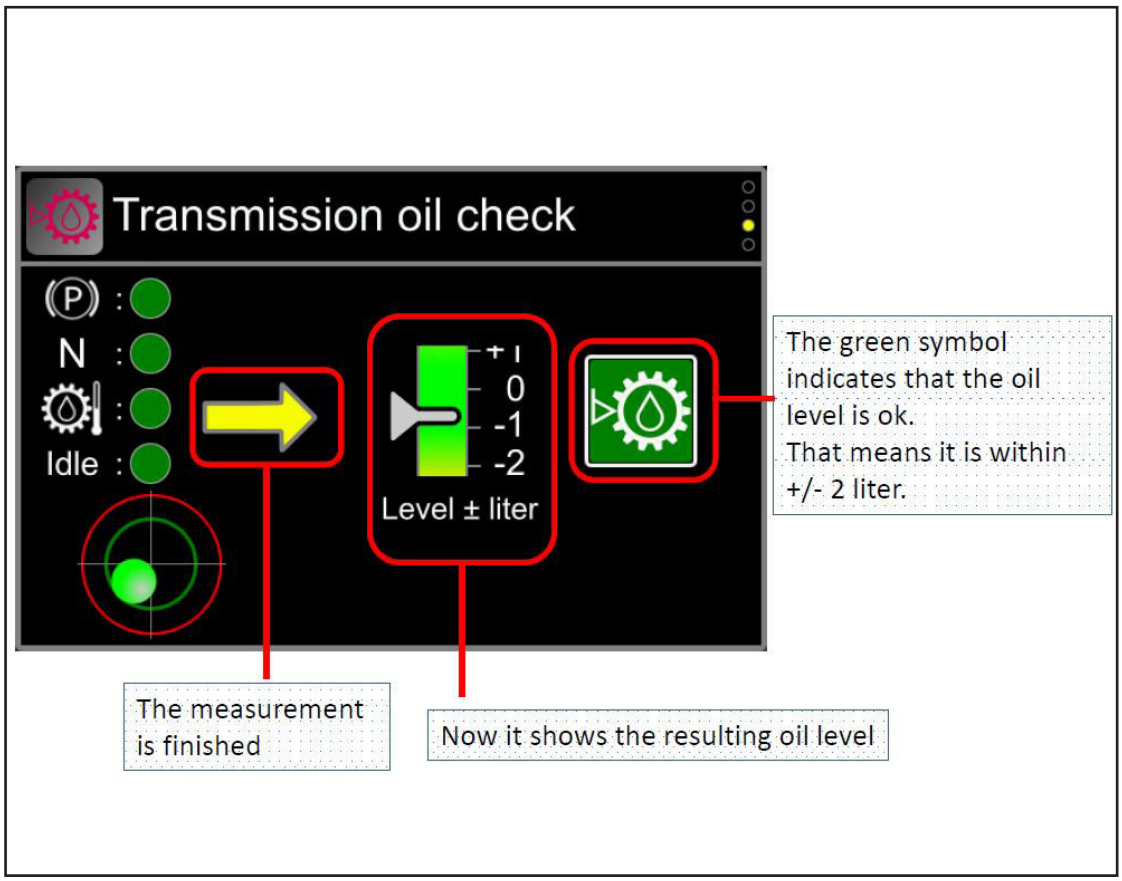


Figure 869

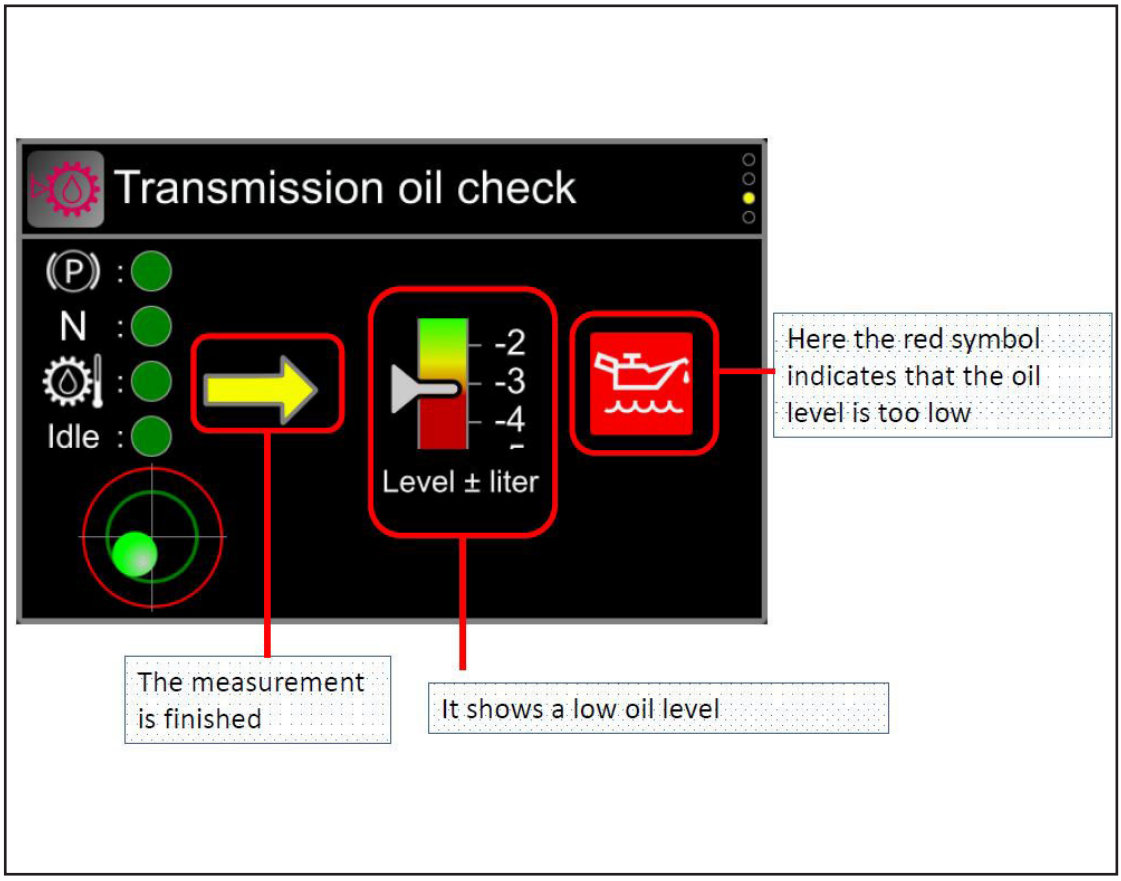


Figure 870

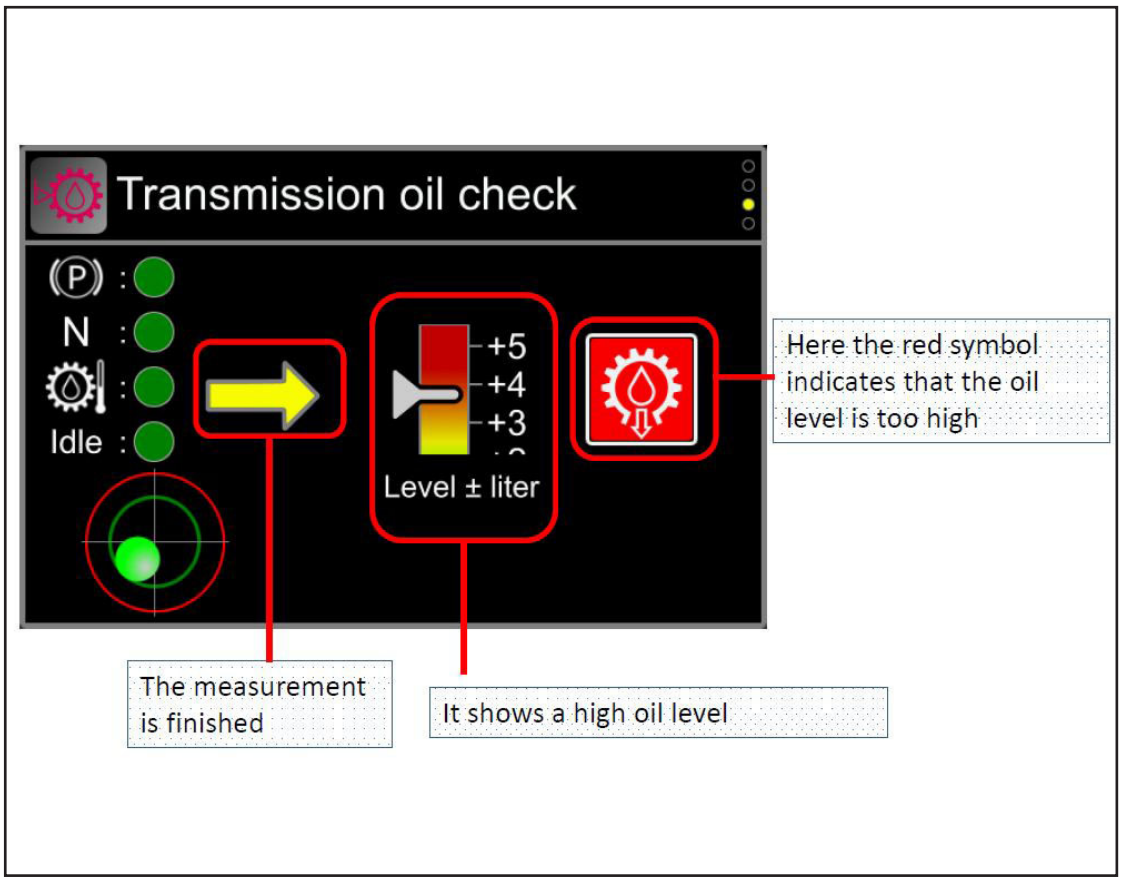


Figure 871