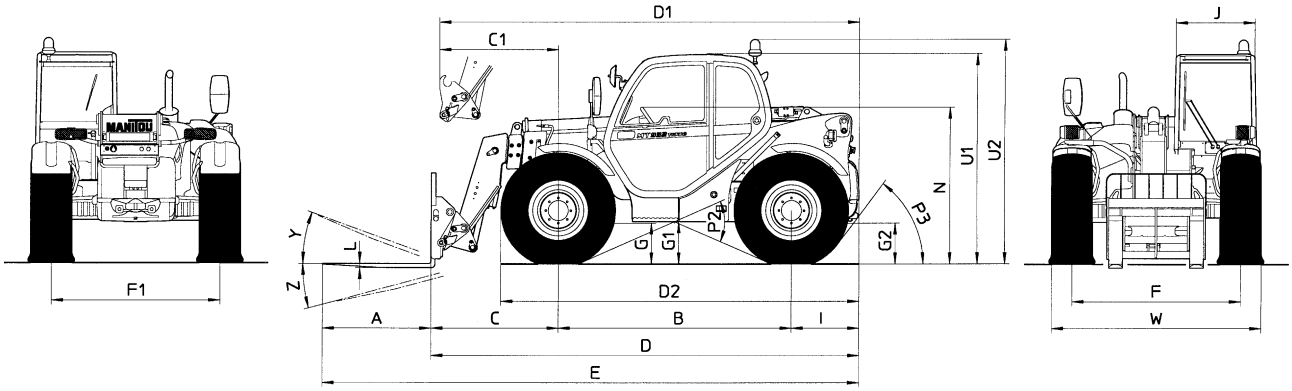
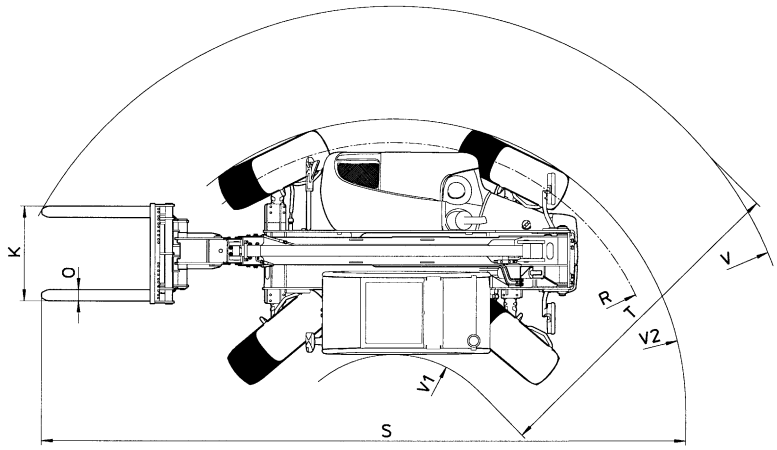
GROUP 0

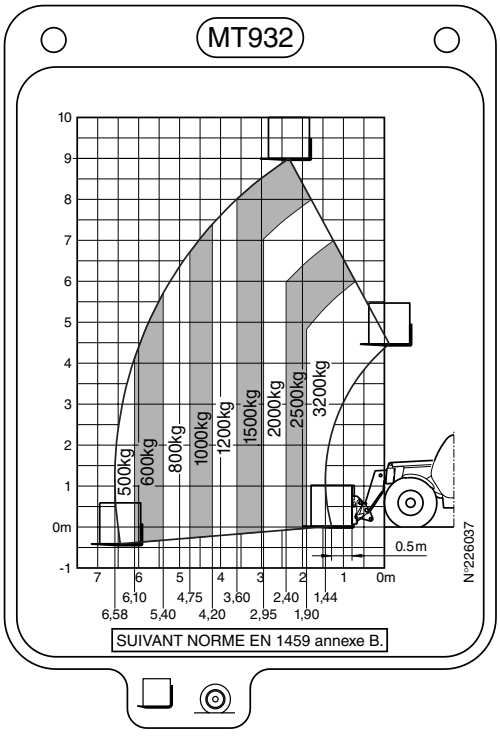
GENERAL POINTS

DIMENSIONS AND LOAD CHART

MT 932 *Série 1*
MT 932 Turbo *Série 1*







	MT 932 Série A
A	1200 mm
B	2560 mm
C	1393 mm
C1	1297 mm
D	4713 mm
D1	4617 mm
D2	3905 mm
E	5913 mm
F	1846 mm
F1	1846 mm
G	460 mm
G1	440 mm
G2	445 mm
I	760 mm
J	865 mm
K	1040 mm
L	45 mm
N	1690 mm
O	125 mm
P2	47,5 °
P3	53 °
R	3475 mm
S	7548 mm
T	4185 mm
U1	2300 mm
U2	2550 mm
V	4770 mm
V1	1205 mm
V2	3675 mm
W	2260 mm
Y	11,9 °
Z	113,7 °

MLT 629 *Série 1*

FRONT AND REAR TYRES

	DIMENSIONS	PRESSURE	TYRE LOAD		PRESSURE ON THE CONTACT SURFACE HARD GROUND	PRESSURE ON THE CONTACT SURFACE LIGHT GROUND	AREA OF THE CONTACT SURFACE HARD GROUND	AREA OF THE CONTACT SURFACE LIGHT GROUND
STANDARD	**15,5/80-24 SGI TL 12PR GOODYEAR**	**4 Bar**	Front unladen	1600 kg	7,6 kg/cm2	2,1 kg/cm2	210 cm2	770 cm2
			Front laden	4050 kg	11,4 kg/cm2	3,1 kg/cm2	356 cm2	1320 cm2
			Rear unladen	1600 kg	7,6 kg/cm2	2,1 kg/cm2	210 cm2	770 cm2
			Rear laden	600 kg	7,5 kg/cm2	2,1 kg/cm2	80 cm2	290 cm2
OPTION	**14,9x24 T35 Stabilarge 18PR DUNLOP**	**3,4 Bar**	Front unladen	1600 kg	5,7 kg/cm2	2 kg/cm2	280 cm2	810 cm2
			Front laden	4050 kg	8,9 kg/cm2	3 kg/cm2	455 cm2	1360 cm2
			Rear unladen	1600 kg	5,7 kg/cm2	2 kg/cm2	280 cm2	810 cm2
			Rear laden	600 kg	4,4 kg/cm2	1,5 kg/cm2	138 cm2	400 cm2
	400/70-20 T37 150B TL DUNLOP	**3,25 Bar**	Front unladen	1600 kg	7,3 kg/cm2	2,3 kg/cm2	220 cm2	690 cm2
			Front laden	4050 kg	10,1 kg/cm2	3,2 kg/cm2	400 cm2	1270 cm2
			Rear unladen	1600 kg	7,3 kg/cm2	2,3 kg/cm2	220 cm2	690 cm2
			Rear laden	600 kg	5,6 kg/cm2	1,8 kg/cm2	107 cm2	335 cm2
	440/70-24 T37 147B TL DUNLOP	**2,8 Bar**	Front unladen	1600 kg	6,3 kg/cm2	1,8 kg/cm2	255 cm2	890 cm2
			Front laden	4050 kg	9 kg/cm2	2,6 kg/cm2	450 cm2	1550 cm2
			Rear unladen	1600 kg	6,3 kg/cm2	1,8 kg/cm2	255 cm2	890 cm2
			Rear laden	600 kg	4,7 kg/cm2	1,3 kg/cm2	128 cm2	445 cm2
	460/70 R24 IT520 TL 150A8 GOODYEAR	**3,3 Bar**	Front unladen	1600 kg	8,6 kg/cm2	2,3 kg/cm2	185 cm2	710 cm2
			Front laden	4050 kg	11,9 kg/cm2	3,1 kg/cm2	341 cm2	1310 cm2
			Rear unladen	1600 kg	8,6 kg/cm2	2,3 kg/cm2	185 cm2	710 cm2
			Rear laden	600 kg	7,9 kg/cm2	2,1 kg/cm2	76 cm2	290 cm2
	17,5LR24 XM27 TL 145A8 MICHELIN	**3,5 Bar**	Front unladen	1600 kg	1,6 kg/cm2	kg/cm2	1020 cm2	cm2
			Front laden	4050 kg	3,1 kg/cm2	kg/cm2	1310 cm2	cm2
			Rear unladen	1600 kg	1,6 kg/cm2	kg/cm2	1020 cm2	cm2
			Rear laden	600 kg	0,7 kg/cm2	kg/cm2	900 cm2	cm2
	500-60/22,5 TWIN 404 12PR TRELLEBORG	**2,5 Bar**	Front unladen	1600 kg	2,7 kg/cm2	1,4 kg/cm2	593 cm2	1143 cm2
			Front laden	4050 kg	2,7 kg/cm2	1,4 kg/cm2	1500 cm2	2893 cm2
			Rear unladen	1600 kg	2,7 kg/cm2	1,4 kg/cm2	593 cm2	1143 cm2
			Rear laden	600 kg	2,7 kg/cm2	1,4 kg/cm2	222 cm2	429 cm2
	445/70R24 IT510 151G GOODYEAR	**4,1 Bar**	Front unladen	1600 kg	8,4 kg/cm2	2,8 kg/cm2	190 cm2	570 cm2
			Front laden	4050 kg	9,8 kg/cm2	3,3 kg/cm2	412 cm2	1239 cm2
			Rear unladen	1600 kg	8,4 kg/cm2	2,8 kg/cm2	190 cm2	570 cm2
			Rear laden	600 kg	6,5 kg/cm2	2,2 kg/cm2	93 cm2	275 cm2
	15,5R25 XHA MICHELIN	**2,75 Bar**	Front unladen	1600 kg	kg/cm2	kg/cm2	cm2	cm2
			Front laden	4050 kg	kg/cm2	kg/cm2	cm2	cm2
			Rear unladen	1600 kg	kg/cm2	kg/cm2	cm2	cm2
			Rear laden	600 kg	kg/cm2	kg/cm2	cm2	cm2
	1200R20 X MINE D2 MICHELIN	**5 Bar**	Front unladen	1600 kg	kg/cm2	kg/cm2	cm2	cm2
			Front laden	4050 kg	kg/cm2	kg/cm2	cm2	cm2
			Rear unladen	1600 kg	kg/cm2	kg/cm2	cm2	cm2
			Rear laden	600 kg	kg/cm2	kg/cm2	cm2	cm2

HYDRAULIC CIRCUIT

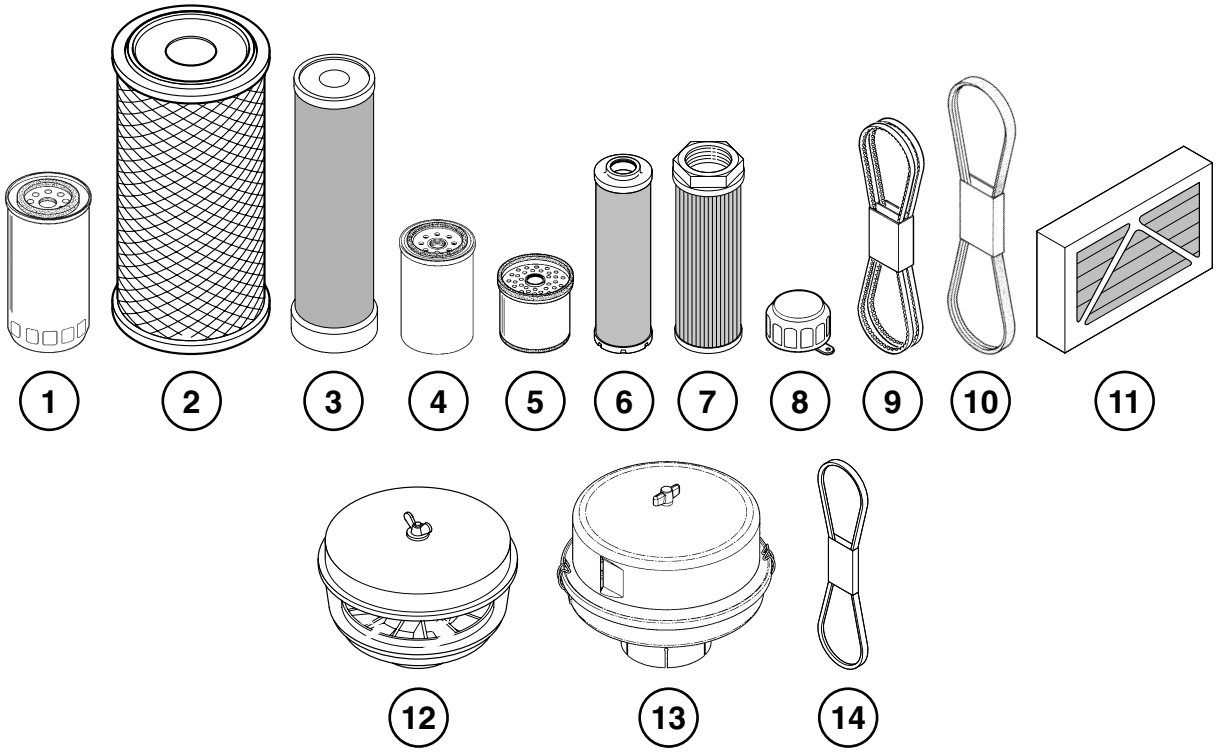
- Type of pump	Gear pump with flow divider
. Capacity	43,77 cm^3
- Lifting, tilting, telescoping, attachment circuit	
. Max. rating capacity unladen	105 L/mn
. Pressure	250 Bar
- Steering circuit	
. Max. rating capacity unladen	105 L/mn
. Pressure	140 Bar
- Braking circuit	
. Max. rating capacity unladen	105 L/mn
. Pressure	40 Bar
- Filtration	
. Return	20 Micron
. Suction	125 Micron

SPECIFICATIONS

- Level of sound pressure in the driver's cab *(According to standard prEN 12053 : 1995)*	82,5 dBA	
- Travel speed of the lift truck		
. Forward	25 km/h	
. Reverse	25 km/h	
- Standard lift height	6900 mm	
- Rated capacity with standard attachment	3000 kg	
- Load center	500 mm	
- Weight of forks (Each)	72 kg	
- Lifting motions (Jib retracted)		
. Unladen lifting	6,7 s	39,8 m/mn
. Load lifting	7,3 s	36,5 m/mn
. Unladen lowering	5 s	53,3 m/mn
. Load lowering	4,7 s	56,7 m/mn
- Telescoping motions (Lifting jib)		
. Unladen extending	6,3 s	26,2 m/mn
. Laden extending	6,8 s	24,2 m/mn
. Unladen retracting	3,3 s	50 m/mn
. Laden retracting	3 s	55 m/mn
- Reverse tilt time unladen	3 s	48,7 °/s
- Forward tilt time unladen	2,6 s	56,2 °/s
- Lift truck weight with standard attachment		
. Unladen	7130 kg	
. Rated load	10130 kg	
- Axle weight with attached equipment (Transport position)		
. Front unladen	3320 kg	
Rated load	8665 kg	
. Rear unladen	3810 kg	
Rated load	1465 kg	
- Tensible strain at coupling hook		
. Unladen	5500 daN	
. Rated load	6800 daN	
- Break out force with bucket *(According to standard ISO 8313)*	4050 daN	

FILTERS CARTRIDGES AND BELTS

MLT 633 / 730 .120 LS *Série 1*
MLT 633 / 730 .120 LS POWERSHIFT *Série 1*



DESIGNATION	PART NUMBER	CLEAN	CHANGE
1 - Engine oil filter	476 954		400 H
2 - Dry air filter cartridge	563 416	50 H *	400 H *
3 - Safety dry air filter cartridge	563 415		800 H *
4 - Transmission oil filter	561 749		400 H
5 - Fuel filter cartridge	49 660		400 H
6 - Hydraulic return oil filter cartridge	563 482		400 H
7 - Suction strainer for hydraulic oil tank	224 726	800 H	
8 - Filter cap for hydraulic oil tank	62 415		800 H
9 - Alternator belt	563 270		
10 - Fan belt **(1ST ASSEMBLY "9J1800")**	223 258		
10 - Fan belt **(2ND ASSEMBLY "2-9J1795")**	229 300		
11 - Cab ventilation filter (Without air conditioning)	225 052	400 H	
11 - Cab ventilation filter (With air conditioning)	225 052	50 H	200 H
12 - Cyclonic pre-filter	224 713	10 H	
13 - Automatic vacuum-cleaning pre-filter (OPTION)	226 611		
14 - Compressor belt (OPTION AIR CONDITIONING)	503 965		

* : This periodicity is given for information only (See chapter : SERVICING SCHEDULE in paragraph : 3 - MAINTENANCE) for cleaning and changing.

HYDRAULIC CIRCUIT

- Type of pump	Variable displacement piston pump
. Capacity	60 cm3
- Lifting, tilting, telescoping, attachment circuit	
. Max. rating capacity unladen	144 L/min
. Pressure	270 Bar
- Steering circuit	
. Max. rating capacity unladen	144 L/min
. Pressure	140 Bar
- Braking circuit	
. Max. rating capacity unladen	144 L/min
. Pressure	40 Bar
- Filtration	
. Return	20 µ **(Up to machine Nr : 164449)**
	15 µ **(From machine Nr : 164450)**
. Suction	125 µ

SPECIFICATIONS

- Level of sound pressure in the driver's cab LpA
(According to standard prEN 12053 : 1995)

MLT 633 LS Turbo Série A	81 dB
MLT 633 -120 LS Série A	79,5 dB
MLT 633 -120 LS POWERSHIFT Série A	79,5 dB

- Level of sound power in the LwA environment
(According to directive 2000 / 14 CE guaranteed)

MLT 633 LS Turbo Série A	106 dB
MLT 633 -120 LS Série A	107 dB
MLT 633 -120 LS POWERSHIFT Série A	107 dB

- Travel speed of the lift truck
(Except particular conditions)

. Forward	**MLT 633 LS Turbo Série A**	27,3 km/h
	MLT 633 -120 LS Série A	34,3 km/h
	MLT 633 -120 LS POWERSHIFT Série A	38,1 km/h
. Reverse	**MLT 633 LS Turbo Série A**	27,3 km/h
	MLT 633 -120 LS Série A	34,3 km/h
	MLT 633 -120 LS POWERSHIFT Série A	24 km/h

- Standard lift height	6050 mm	
- Rated capacity with standard attachment	3300 kg	
- Load center	500 mm	
- Weight of forks (Each)	72 kg	
- Lifting motions (Jib retracted)		
. Unladen lifting	6,1 s	41,5 m/mn
. Laden lifting	7,5 s	33,8 m/mn
. Unladen lowering	5 s	50,7 m/mn
. Laden lowering	4,6 s	55 m/mn

- Axle weight with attached equipment (Transport position)
  - . Front unladen 3330 kg
    - Rated load 8640 kg
  - . Rear unladen 3810 kg
    - Rated load 1500 kg

- Tensible strain at coupling hook
  - . Unladen **MLT 730 LS Turbo Série A** 5600 daN
    - **MLT 730 -120 LS Série A** 5500 daN
    - **MLT 730 -120 LS POWERSHIFT Série A** 5500 daN
  - . Rated load **MLT 730 LS Turbo Série A** 8400 daN
    - **MLT 730 -120 LS Série A** 8600 daN
    - **MLT 730 -120 LS POWERSHIFT Série A** 8600 daN

- Break out force with bucket 5650 daN
  (According to standard ISO 8313)

REMOVAL OF THE I.C. ENGINE

10-2-13-M29 EN

M29	MT 732 *Série 1 et A* MT 732 Turbo *Série 1 et A* MT 932 *Série 1 et A* MT 932 Turbo *Série 1 et A*	MLT 629 *Série 1 et A* MLT 629 Turbo *Série 1 et A* MLT 629 120 LS *Série A* MLT 633 Turbo LS *Série 1 et A* MLT 633 Turbo POWERSHIFT *Série 1* MLT 633 120 LS *Série 1 et A* MLT 633 120 LS POWERSHIFT *Série 1 et A*	MLT 730 *Série 1 et A* MLT 730 Turbo *Série 1 et A* MLT 730 Turbo LS *Série 1 et A* MLT 730 Turbo POWERSHIFT *Série 1 et A* MLT 730 120 LS *Série 1 et A* MLT 730 120 LS POWERSHIFT *Série 1 et A*
M30	MT 732 *Série 1 et A* MT 732 Turbo *Série 1 et A* MT 932 *Série 1 et A* MT 932 Turbo *Série 1 et A*		
M31		MLT 629 *Série 1 et A* MLT 629 Turbo *Série 1 et A* MLT 629 120 LS *Série A* MLT 633 Turbo LS *Série 1 et A* MLT 633 Turbo POWERSHIFT *Série 1* MLT 633 120 LS *Série 1 et A* MLT 633 120 LS POWERSHIFT *Série 1 et A*	MLT 730 *Série 1 et A* MLT 730 Turbo *Série 1 et A* MLT 730 Turbo LS *Série 1 et A* MLT 730 Turbo POWERSHIFT *Série 1 et A* MLT 730 120 LS *Série 1 et A* MLT 730 120 LS POWERSHIFT *Série 1 et A*
M32	MT 732 *Série 1 et A* MT 732 Turbo *Série 1 et A* MT 932 *Série 1 et A* MT 932 Turbo *Série 1 et A*	MLT 629 *Série 1 et A* MLT 629 Turbo *Série 1 et A* MLT 633 Turbo POWERSHIFT *Série 1*	MLT 730 *Série 1 et A* MLT 730 Turbo *Série 1 et A* MLT 730 Turbo POWERSHIFT *Série 1 et A*
M33		MLT 629 120 LS *Série A* MLT 633 Turbo LS *Série 1 et A* MLT 633 120 LS *Série 1 et A* MLT 633 120 LS POWERSHIFT *Série 1*	MLT 730 Turbo LS *Série 1 et A* MLT 730 120 LS *Série 1 et A* MLT 730 120 LS POWERSHIFT *Série 1 et A*
M34	MT 732 *Série 1 et A* MT 732 Turbo *Série 1 et A* MT 932 *Série 1 et A* MT 932 Turbo *Série 1 et A*	MLT 629 *Série 1 et A* MLT 629 Turbo *Série 1 et A* MLT 629 120 LS *Série A* MLT 633 Turbo LS *Série 1 et A* MLT 633 120 LS *Série 1 et A*	MLT 730 *Série 1 et A* MLT 730 Turbo *Série 1 et A* MLT 730 Turbo LS *Série 1 et A* MLT 730 120 LS *Série 1 et A*
M35		MLT 633 Turbo POWERSHIFT *Série 1 et A* MLT 633 120 LS POWERSHIFT *Série 1*	MLT 730 Turbo POWERSHIFT *Série 1 et A* MLT 730 120 LS POWERSHIFT *Série 1 et A*
M36	MT 732 *Série 1 et A* MT 732 Turbo *Série 1 et A* MT 932 *Série 1 et A* MT 932 Turbo *Série 1 et A*	MLT 629 *Série 1 et A* MLT 629 Turbo *Série 1 et A* MLT 633 Turbo LS *Série 1 et A* MLT 633 Turbo POWERSHIFT *Série 1*	MLT 730 *Série 1 et A* MLT 730 Turbo *Série 1 et A* MLT 730 Turbo LS *Série 1 et A* MLT 730 Turbo POWERSHIFT *Série 1 et A*
M37		MLT 629 120 LS *Série A* MLT 633 120 LS *Série 1 et A* MLT 633 120 LS POWERSHIFT *Série 1*	MLT 730 120 LS *Série 1 et A* MLT 730 120 LS POWERSHIFT *Série 1 et A*

21 Cooling system

General description 219

Thermostats

21-1 To remove, to fit and to test 220

Coolant pump - early gear driven pumps

21-2 To remove and to fit 221

Coolant pump - latest gear driven pumps

21-3 To remove and to fit 222

Coolant pump - belt driven

21-4 To remove and to fit 224

Coolant pump - belt driven high position

21- 5 To remove and to fit 226

Coolant pump - early gear driven pumps

21-6 To dismantle and to assemble 229

Coolant pump - latest gear driven pumps

21-7 To dismantle and to assemble 232

Coolant pump - belt driven

21-8 To dismantle and to assemble 237

Fan

21-9 To remove and to fit 240

Fan drive (engines with gear driven coolant pumps)

21-10 To remove and to fit 240

Lubricating oil cooler

21-11 To remove and to fit - four cylinder turbocharged engines 241
21-12 To remove and to fit - six cylinder engines 242
21-13 To remove and to fit - pressed steel cover type 243
21-14 To remove and to fit - canister type.. 245
21-15 To dismantle and to assemble - four cylinder turbocharged engines 246
21-16 To dismantle and to assemble - six cylinder turbocharged engines 247

Cooler by-pass valve

21-17 To remove and to fit 247
21-18 To dismantle and to assemble pressed steel cooler type 248

Thread sealant

When setscrews or studs are fitted into holes which are tapped through the cylinder block, a suitable sealant must be used to prevent leakage.

Micro encapsulated anaerobic sealant (M.E.A.S) fasteners have been introduced instead of jointing compounds or other sealants when the fasteners are fitted in through holes into oil or coolant passages. The identification of these fasteners, as supplied, is by a red, blue, or other colour sealant around the fastener threads.

With M.E.A.S. sealed studs, the sealed end must be fitted into the cylinder head / cylinder block etc. Ensure that the threaded holes have a 1,59 mm (0.0625 in) 45° chamfer, to ensure that when the new fasteners are fitted the M.E.A.S. sealant is not removed. If the fasteners have to be removed and fitted again, the threads must be cleaned and a suitable sealant used.

Valve springs

To change the valve springs (with cylinder head fitted) 12-6

Special tools

Valve spring compressor, PD.6118B

Stud adaptor used with PD.6118B, PD.6118-7

Setscrew adaptor used with PD.6118B, PD.6118-8

Note: Paragraphs 1 to 12 refer to a change of valve springs for a single cylinder.

Warning! *Wear eye protection during this operation.*

1 Remove the rocker cover, see operation 12-1.

2 Rotate the crankshaft in the normal direction of rotation until the inlet valve of the relevant cylinder has just opened and the exhaust valve has not fully closed. In this position the piston will be at approximately top dead centre (TDC).

3 Remove the rocker assembly, see operation 12-2.

4 Fit the valve spring compressor (A1) and the relevant adaptor (A2 or A3).

5 Compress the valve spring and remove the collets. Ensure that the valve spring is compressed squarely or damage to the valve stem can occur.

Caution: *Do not rotate the crankshaft while the valve springs are removed.*

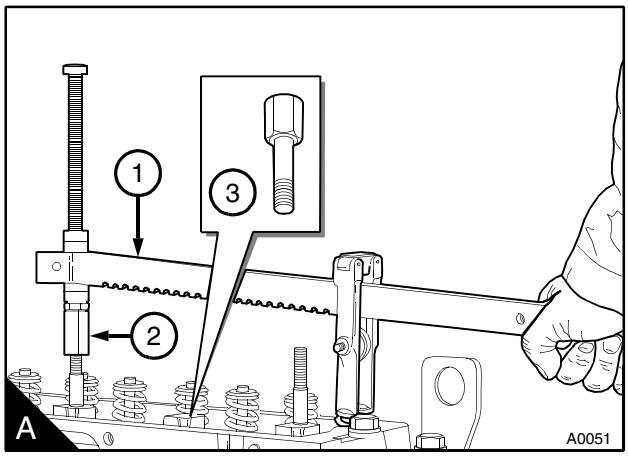
6 Release the valve spring compressor and remove the valve spring caps and valve spring.

Caution: *The outer diameter of the exhaust valve guide is 1 mm larger than the inlet valve guide. To prevent leakage past the inlet valve stem it is important that the larger exhaust valve seal is not fitted onto the inlet guide. The seals have a colour code for identification.*

7 Fit new valve stem seals on the valve guides. ensure that the brown seal is fitted to the exhaust valve and green seal is fitted to the inlet valves.

8 Put the new valve springs in position.

Continued

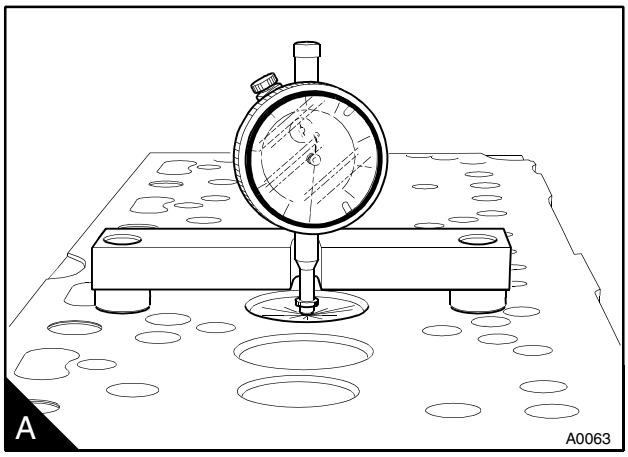


To inspect and to correct 12-9

Special tools:

Gauge, valve depth, PD.41D

Dial gauge for use with PD.41D, PD.208



1 Check the depth of the valves below the face of the cylinder head before the valve springs are removed.

2 Ensure that the heads of the valves and the bottom face of the cylinder head are clean.

3 Put the valve depth gauge on the face of the cylinder head and zero the dial gauge.

4 Carefully put the valve depth gauge in position over the head of each valve (A) and make a note of the measurement. The maximum depth, in service, is given in the data and dimensions.

5 If a valve is below the depth limit, check the valve depth with a new valve in position. If the valve depth is still below the limit and a valve seat insert is fitted, the insert must be renewed.

6 Check the valves for cracks. Check the stems of the valves for wear and for correct fit in their valve guides.

Caution: *Renew damaged valves, the special heat resistant layer on the face of the valve will be detroyed if valves are lapped.*

7 Check that the seat faces of the valves are not badly burnt or damaged. Seat faces of valves which are damaged can be ground on a special machine. When new valves are fitted, the valve depths must be checked after the valve springs are fitted.

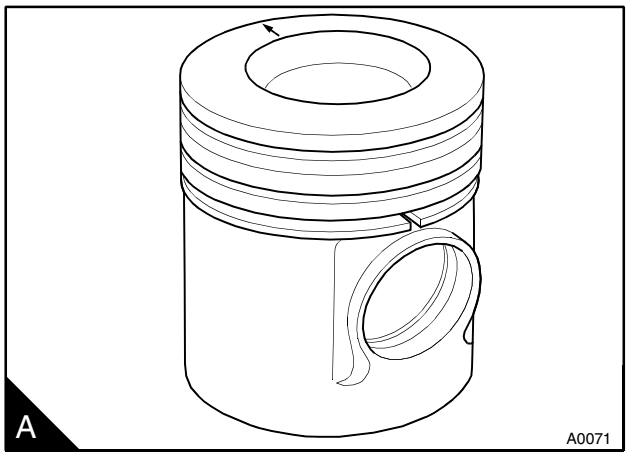
8 Check that the load on the valve springs is correct at their fitted length, see the data and dimensions. Fit new valve springs at every complete engine overhaul.

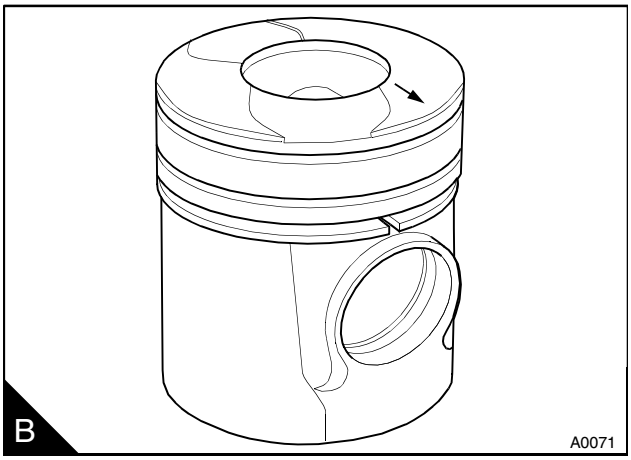
13

Piston and connecting rod assemblies

General description

The pistons used in the New 1000 Series engines have a "Fastram" combustion chamber in the top of the piston (A). The piston (B) for engine types AR and AS has two recesses in the top face for the valves. The combustion chamber is designed to give an efficient mix of fuel and air.





The pistons and connecting rods are matched to the relevant cylinder.

The pistons have two compression rings and an oil control ring. The groove for the top ring has a hard metal insert to reduce wear of the groove. The piston skirt has a layer of graphite to improve the wear characteristics.

Axial location of the fully floating gudgeon pin is by circlips. The gudgeon pin is off-centre to reduce the noise level.

Piston cooling jets are fitted in the cylinder block to spray lubricating oil onto the inner surface of the pistons.

Note: Engine types AR and AS have only one cooling jet fitted to spray the number one piston.

The correct piston height is important to ensure that the piston does not contact the cylinder head and to ensure the efficient combustion of fuel.

The piston height is controlled by the length of the connecting rod. In the factory there are six length grades of connecting rods and one piston are used to obtain the correct piston height.

To obtain the different grades, the small-end bush is machined off-centre. The amount that the bush is off-centre gives the different length grades.

In service, a partially finished small-end bush is available, which can be fitted to the original connecting rod and machined to obtain the correct length grade, see operation 13-10. Specialist equipment and personnel with the correct training are needed to machine the partially finished small-end bush. Connecting rod kits are also available with the small end bush fitted and machined to obtain the correct connecting rod grade. For further information refer to your nearest Perkins distributor.

Continued

Piston cooling jets

To remove and to fit 13-11

To remove

Release the valve assembly and remove the piston cooling jet assembly (A).

Notes:

- The crankshaft is removed in (A) to show clearly the piston cooling jet.
- Engine types AR and AS have a single piston cooling jet, fitted to the number one cylinder position. The piston cooling jet positions for cylinders 2, 3 and 4 have a blanking plug fitted.

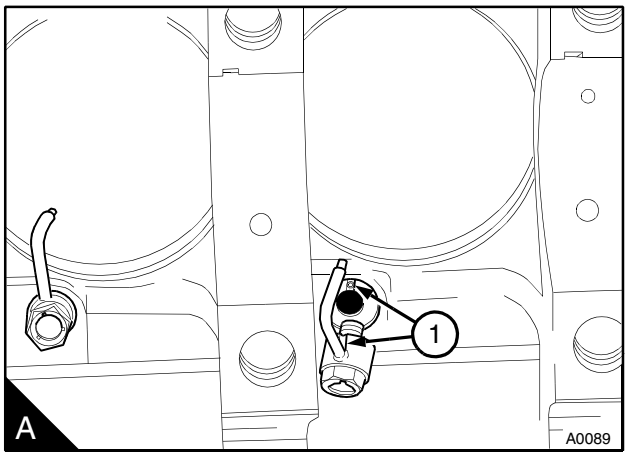
To fit

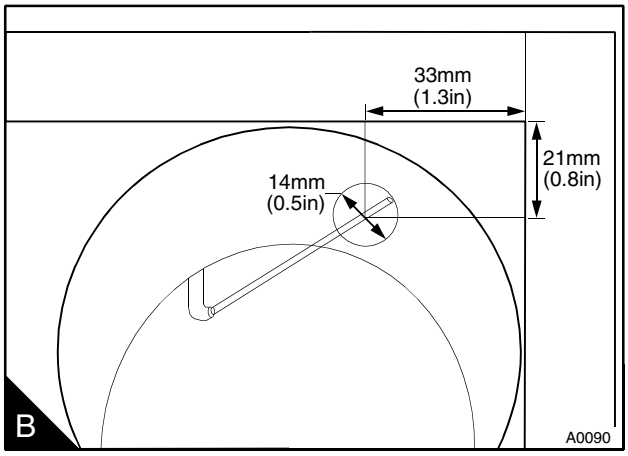
1 Check that the ball moves freely against spring pressure in the valve assembly and that the jet tube is not damaged. Renew the valve assembly and/or the body as necessary.

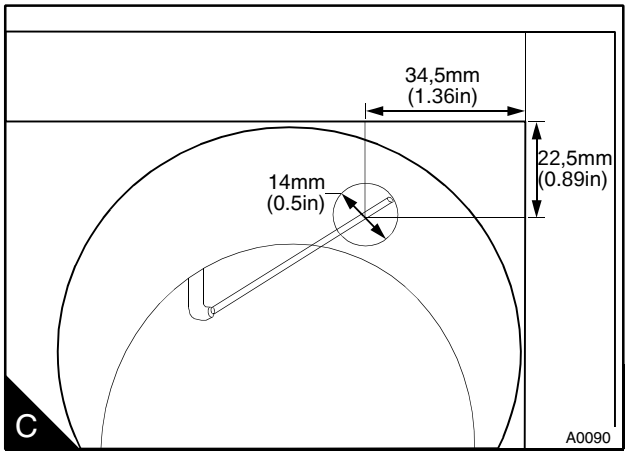
2 Fit the piston cooling jet; ensure that the assembly is fitted correctly on the dowel in the cylinder block. Tighten the valve assembly to 20 Nm (15 lbf ft) 2,0 kgf m.

To check the jet alignment 13-12

Insert a 1,70 mm (0.067 in) diameter rod, of suitable length, into the jet. If a suitable rod is not available, reduce the end of a thicker rod to 1,70 mm (0.067 in) diameter for a length of 16,00 mm (0.630 in). When the rod is inserted into the jet it must extend out of the top of the cylinder within the area shown in B. For engine types AR and AS use the dimensions shown in C.





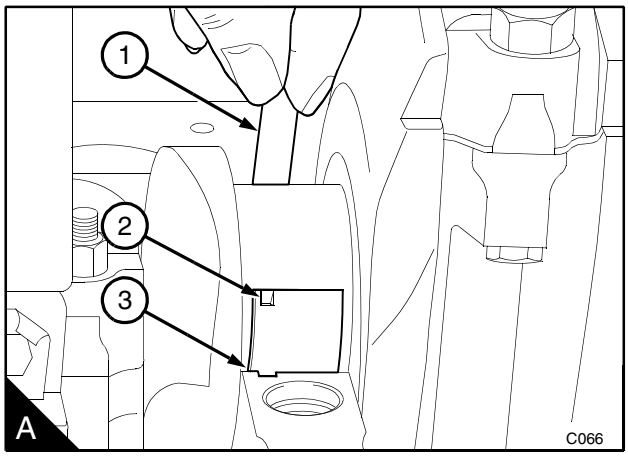


Main bearings

To remove and to fit
(with the crankshaft in position) 14-8

If the rear main bearing is to be removed with the crankshaft in position, the flywheel, the flywheel housing, the rear oil seal housing and the bridge piece will have to be removed.

Except for engines with a balancer unit fitted, the front main bearing can only be removed if a suitable spanner is available that will enable the torque to be applied correctly to the setscrews of the main bearing cap. If a suitable spanner is available, the front main bearing cap can be removed together with the oil pump. For six cylinder engines, it will be necessary to remove the suction pipe and strainer and the delivery pipe. For four cylinder engines, either the balancer unit or the suction pipe and strainer, the delivery pipe and the relief valve will have to be removed.



To remove

1 Drain the lubricating oil and remove the sump, see operation 19-3.

2 Remove all necessary components to get access to the specific bearing cap.

3 Release the setscrews of the bearing cap and remove the bearing cap. Remove the lower half of the shell bearing from the cap.

4 With a suitable tool (A1), push the upper half of the shell bearing from the side opposite to the location tag (A2) to remove the bearing tag from its recess (A3) in the bearing housing. Carefully rotate the crankshaft to release the bearing from its housing. Keep the bearing halves in their relevant positions.

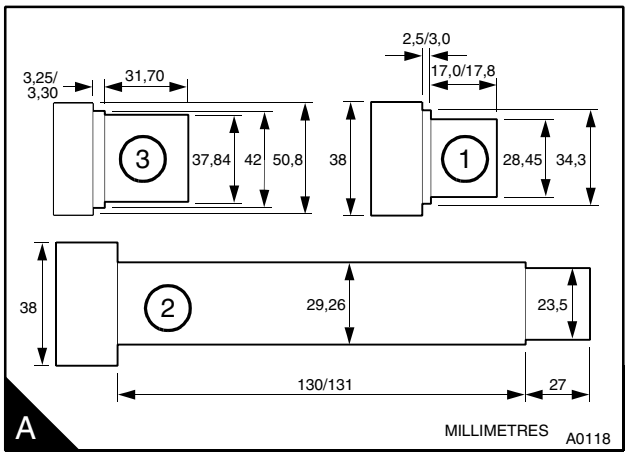
To remove and to fit the needle roller bearings for the drive shaft 14-15

1 Press out the bearings with a suitable adaptor.

2 Clean the parent bores and lubricate them with clean engine lubricating oil.

3 Make a suitable adaptor to the dimensions given in (A2). Fit the rear bearing (page 100/A7) onto the adaptor with the stamped face of the bearing towards the shoulder of the adaptor. Press the bearing into the parent bore in a continuous movement until the shoulder of the adaptor is against the front face of the balancer frame. In this position the front face of the bearing should be 130,0/131,0 mm (5.12/5.16 in) from the front face of the balancer frame (page 100/A).

4 Make a suitable adaptor to the dimensions given in (A1). Fit the front bearing (page 100/A10) onto the adaptor with the stamped face of the bearing toward the shoulder. Press the bearing into the parent bore in a continuous movement until the shoulder of the adaptor is against the front face of the balancer frame. In this position the front face of the bearing should be 2,5/3,0 mm (0.01/0.12 in) from the front face of the balancer frame (page 100/A).



4 Check the idler gear end-float (A) and the timing gear backlash (B).

5 Fit the timing case cover, see operation 15-1.

6 Fit the coolant pump, see operation 21-2.

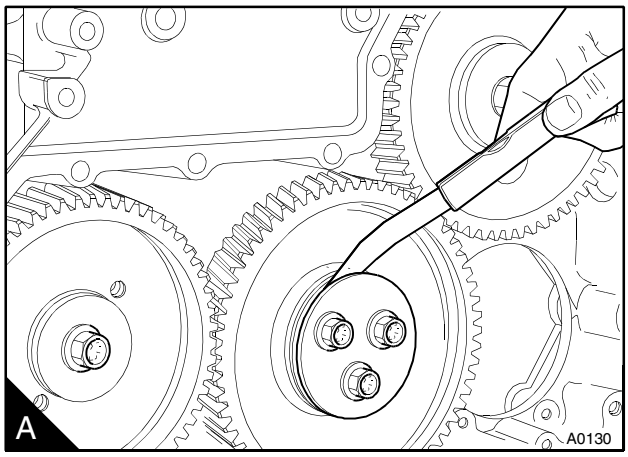
7 Fit the crankshaft pulley, see operation 14-1 or operation 14-2.

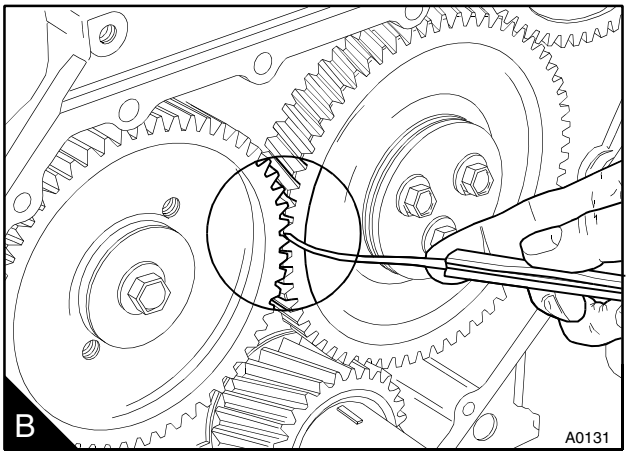
8 Where necessary, fit the fan drive pulley, see operation 21-10.

9 Fit the drive belts, see operation 23-3 and adjust the belt tension, see operation 23-2.

10 Fit the fan, see operation 21-9.

11 Fill the cooling system.





Cylinder block

To dismantle and to assemble 16-1

Consumable products:

POWERPART Nutlock

Note: If the cylinder block is to be renewed, it may be necessary to change the grade connecting rods, see operation 13-7. This will occur if the correct piston height above the block face cannot be maintained with the original piston and connecting rod assemblies, see operation 13-4.

To dismantle

1 Drain the cooling system and the lubricating oil.

2 Remove the engine from the vehicle or machine.

3 Remove the alternator drive belts and the alternator and its mounting brackets, see section 23.

4 Remove the fan, the fan drive and the water pump, see section 21.

5 Remove the compressor or the exhauster, where fitted, see section 24.

6 Remove the fuel filter, the atomisers and the fuel injection pump, see section 20.

7 Remove the lubricating oil cooler, where fitted, see operation 21-11.

8 Remove the lubricating oil filter assembly and the lubricating oil sump, see section 19.

9 If necessary, remove the turbocharger, see operation 18-1.

10 Remove the fuel lift pump, see operation 20-4

11 Remove the starter motor, see operation 23-6.

12 Remove the cylinder head assembly, see operation 12-7.

13 Remove the timing case and the timing gears, see section 15.

14 Remove the lubricating oil pump and the pressure relief valve, see section 19, or remove the balancer unit, see operation 14-12.

15 Remove the piston and connecting rod assemblies, see operation 13-3.

16 Remove the camshaft and the tappets, see operation 15-10.

17 Remove the flywheel and the flywheel housing, see section 22.

18 Remove the rear oil seal assembly and the crankshaft, see section 14.

19 Remove the piston cooling jets, see operation 13-11.

20 Inspect the cylinder block, see operation 16-2.

17

Engine timing

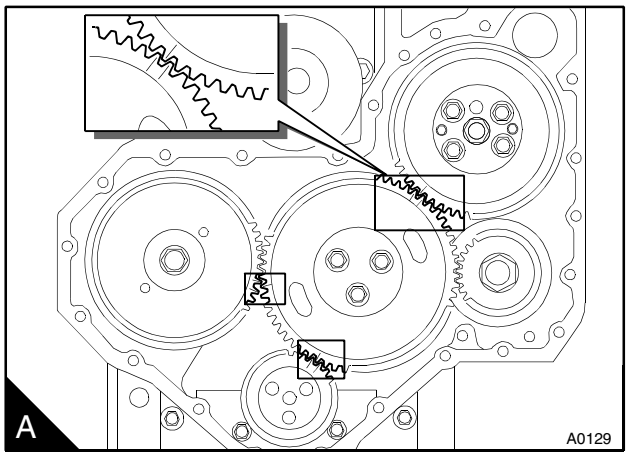
General description

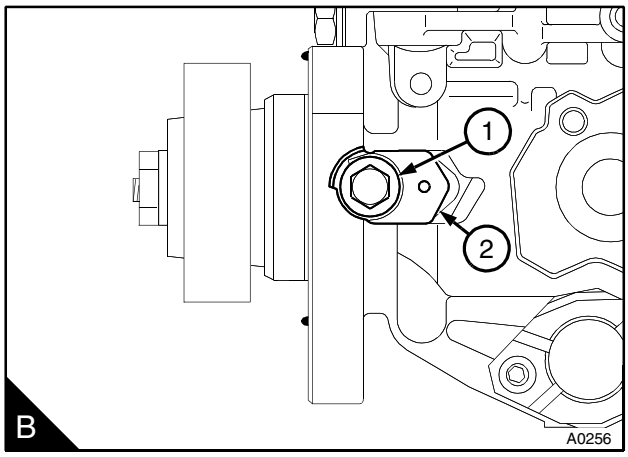
To reach the accurate fuel injection needed for engines to conform to emissions legislation, the latest fuel injection pumps operate at a static timing very close to TDC.

The timing gears are stamped with timing marks to ensure that they are assembled correctly (A). The marked teeth of the crankshaft, the camshaft and the fuel pump gears will be in mesh with the idler gear when number 1 piston is close to top dead centre (TDC) on the compression stroke. The marked teeth of the idler gear may not necessarily be in mesh in this position, because of the different speeds at which the gears rotate.

The fuel injection pump is timed at TDC on the compression stroke of number 1 cylinder. It is important that fuel injection timing is accurate to conform to emissions legislation. Always use operation 17-1 or operation 17-2 to obtain TDC on the compression stroke of number 1 cylinder accurately.

Caution: *The fuel injection pump has a lock screw (B1) which locks the shaft.* ***It is important that the lock screw is released*** *and the pump shaft is free to turn. The drive shaft of the pump must not be rotated without the spacer (B2) in position under the locking screw. If the drive shaft is rotated with the locking screw tightened on to the shaft, the drive shaft will be damaged.*





Continued

Turbocharger faults

The chart below is given to assist in the correct diagnosis of turbocharger faults.

If the inside of the induction manifold is wet, check that there is not a fuel leak from the fuelled starting aid, if there is one fitted, see operation 23-9.

Problems	Possible causes code numbers
Not enough power	1, 4, 5, 6, 7, 8, 9, 10, 11, 18, 20, 21, 22, 25, 26, 27, 28, 34, 35, 36
Black smoke	1, 4, 5, 6, 7, 8, 9, 10, 11, 18, 20, 21, 22, 25, 26, 27, 28, 34, 35, 36
Blue smoke	1, 2, 4, 6, 8, 9, 17, 19, 20, 21, 22, 30, 31, 32, 34
High lubricating oil consumption	2, 8, 15, 17, 19, 20, 28, 29, 31, 32, 34
Too much lubricating oil at turbine end	2, 7, 8, 17, 19, 20, 22, 28, 30, 31, 32
Too much lubricating oil at compressor end	1, 2, 4, 5, 6, 8, 19, 20, 21, 28, 31, 32
Not enough lubrication	8, 12, 14, 15, 16, 23, 24, 29, 32, 33, 37, 38
Lubricating oil in the exhaust manifold	2, 7, 17, 18, 19, 20, 22, 28, 31, 32
Inside of the induction manifold wet	1, 2, 3, 4, 5, 6, 8, 10, 11, 17, 18, 19, 20, 21, 28, 32, 34, 39, 40
Damaged compressor impeller	3, 4, 6, 8, 12, 15, 16, 20, 21, 23, 24, 29, 32, 33, 37, 38
Damaged turbine rotor	7, 8, 12, 13, 14, 15, 16, 18, 20, 22, 23, 24, 25, 27, 29, 32, 33, 37, 38
Rotating assembly does not turn freely	3, 6, 7, 8, 12, 13, 14, 15, 16, 18, 20, 21, 22, 23, 24, 29, 32, 33, 37, 38
Worn bearings, bearing bores, journals	6, 7, 8, 12, 13, 14, 15, 16, 23, 24, 29, 33, 37, 38
Noise from turbocharger	1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 20, 21, 22, 23, 24, 29, 32, 33, 34, 37, 38
Sludge or carbon deposit in bearing housing	2, 11, 13, 14, 15, 17, 18, 24, 29, 33, 37, 38

Lubricating oil pump

To remove and to fit 19-6

For four cylinder engines fitted with a balancer unit, the oil pump is integral with the balancer unit, see section 14 for removal instructions.

The lubricating oil pump has a channel (B1) in the body of the pump. Lubricating oil from the front main bearing passes down the channel in the body of the pump to an oil hole in the idler shaft. The lubricating oil then passes through the hole in the idler shaft to the bush in the idler gear.

To remove

1 Drain the lubricating oil and remove the lubricating oil sump, see operation 19-3.

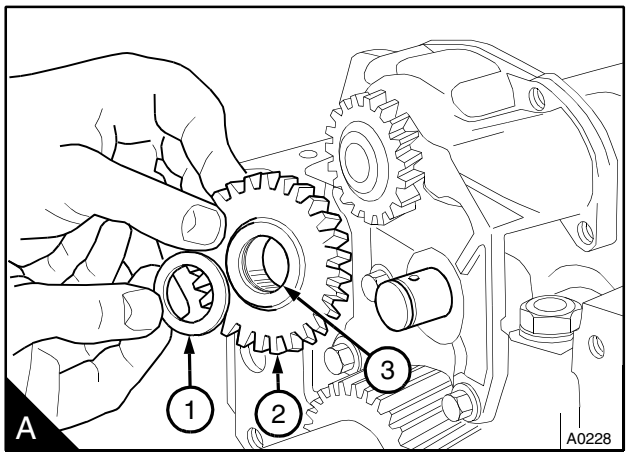
2 Remove the suction pipe and strainer, see operation 19-4.

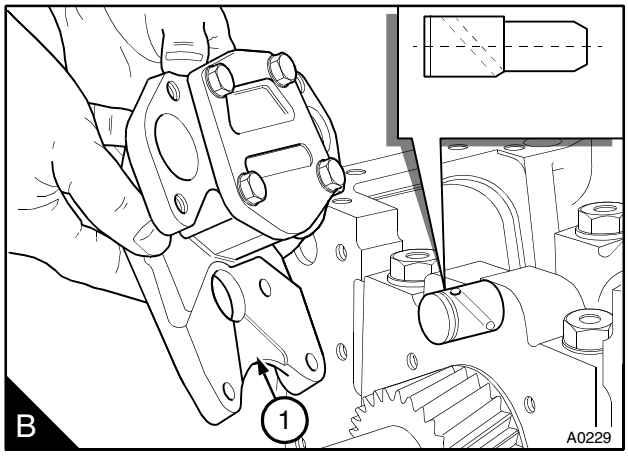
3 For four cylinder engines: Remove the oil pressure relief valve, see operation 19-9, and the delivery pipe. For six cylinder engines: Remove the delivery pipe of the oil pump.

4 The oil pump is fitted to number 1 main bearing cap. The oil pump can be removed with the main bearing cap, if a suitable spanner is available that will enable the torque to be applied correctly to the setscrews of the main bearing cap when it is fitted. If a suitable spanner is not available, the timing case must be removed, see operation 15-9.

5 Release the circlip which retains the idler gear of the oil pump and remove the washer (A1) and the idler gear (A2).

6 Release the setscrews and remove the oil pump (B).





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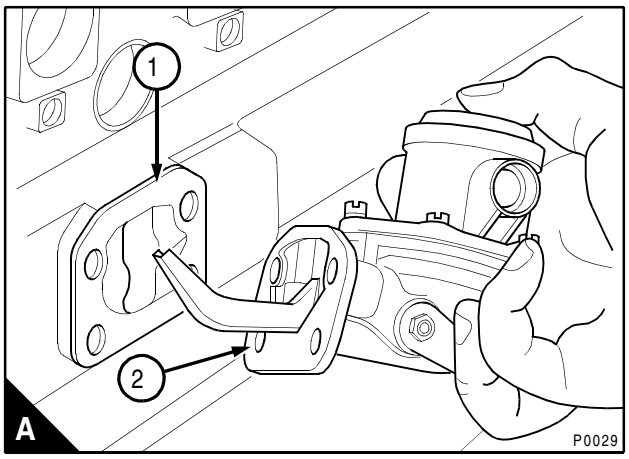
Fuel lift pump

To remove and to fit 20-4

Consumable products:

POWERPART nutlock



1 If a heat shield is fitted, remove it. Disconnect the fuel pipes from the fuel lift pump.

2 Release the setscrews, remove the fuel lift pump (A). The lift pump may be difficult to remove from the engine. If this occurs, the crankshaft must be rotated until the camshaft eccentric, which operates the lift pump, is in a position that will free the rocker lever of the lift pump.

3 Ensure that the camshaft eccentric is in the minimum lift position before the lift pump is fitted. Clean the joint face of the lift pump (A2) and the cylinder block and fit the lift pump together with a new joint (A1). Apply POWERPART Nutlock to the first three threads of the setscrews and tighten them gradually and evenly to 22 Nm (16 lbf ft) 2,2 kgf m.

4 Connect the fuel pipes and, if necessary, fit the heat shield.

5 Release the vent screw on the fuel filter head and operate the priming lever of the fuel lift pump to eliminate any air between the lift pump and the fuel filter. Operate the lift pump until fuel, free of air, comes from the vent screw. Tighten the vent screw.

6 Operate the engine and check for any fuel or air leakage.

Caution: *The fuel pump gear must be fitted to the engine before the crankshaft is rotated.*

8 Carefully turn the gear counter-clockwise, by hand (A1), to remove the backlash between the idler gear and the fuel pump gear. Do not rotate the crankshaft or the fuel pump shaft. Tighten the setscrews for the fuel pump gear to 28 Nm (20 lbf ft) 2,8 kgf m.

9 Remove the timing pin.

10 Fit the gear cover to the cover of the timing case. For gear driven coolant pumps: Fit the coolant pump, see operation 21-3.

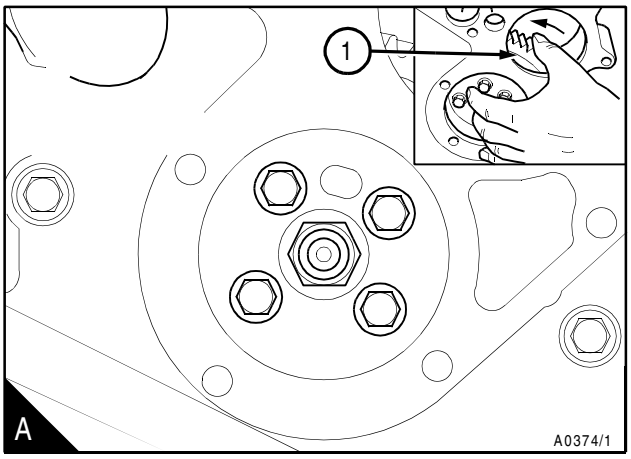
Caution: *Do not tighten the union nuts of the high-pressure pipes more than the recommended torque tension. If there is a leakage from the union nut, ensure that the pipe is correctly aligned with the atomiser inlet. Do not tighten the atomiser union nut more, as this can cause a restriction at the end of the pipe. This can affect the fuel delivery.*

11 Fit all the pipes. Connect the control rod of the fuel injection pump. Fit the cables and connection for the cold start device and electrical stop solenoid to the pump. Ensure that a spanner is used to prevent movement of the pump outlets when the high-pressure pipes are fitted and tighten the union nuts to 22 Nm (16 lbf ft) 2,2 kgf m.

12 Eliminate air from the fuel system, see operation 20-12.

13 Fit the cylinder head rocker cover.

14 Operate the engine and check for leakage. With the engine at the normal temperature of operation, check that the idle speed and the maximum no-load speed are correct, see operation 20-11.



21

Cooling system

General description

Coolant from the bottom of the radiator passes through the centrifugal coolant pump, which is fitted onto the front of the timing case to assist the flow of the coolant through the system.

The pump is gear driven from the gear of the fuel injection pump.

On certain four cylinder applications the pump is driven by a "V" belt from the crankshaft pulley. Some engines are fitted with a belt driven coolant pump in a high position, these are identified by the thermostat housing which is part of the pump rear body. The rear body of these pumps has a connection to a coolant transfer plate, which allows coolant from the pump impeller to pass into the cylinder block.

Two types oil cooler are available for use on four cylinder engines: An integral oil cooler which is fitted to the left side of the cylinder block or a separate (cassette type cooler) fitted to the filter head.

The integral oil cooler has an aluminium cover with plate element and is fitted to the left side of the cylinder block.

The latest integral oil coolers for 6 cylinder engines have a pressed steel cover.

Four cylinder engines

From the pump, the coolant passes through a passage in the timing case to the water jacket in the left side of the cylinder block. Coolant pumps driven by a "V" belt do not pass the coolant through a passage in the timing case but direct to the front of the cylinder block. The coolant continues to the rear of the cylinder block where some of the coolant passes into the lubricating oil cooler, if one is fitted. Some of the coolant passes around the element of the integral cooler and then to the rear of the cylinder block.

Some four cylinder engines have a cassette type oil cooler fitted between the oil filter canister and the oil filter head. If the cassette oil cooler is fitted on the left side of the engine, coolant from the by-pass connection at the rear of the coolant pump passes through a pipe to the oil cooler. If the cassette oil cooler is fitted to the right side of the engine, a pipe is connected between the thermostat housing and the oil cooler. The coolant passes around the plates of the cooler and passes through a pipe to the cylinder block.

The coolant then passes from the rear of the cylinder block and into the cylinder head. The coolant leaves the cylinder head at the front and passes into the thermostat housing.

If the thermostat is closed, the coolant goes directly through a by-pass to the inlet side of the coolant pump. If the thermostat is open, the thermostat closes the by-pass and the coolant passes to the top of the radiator.

Some engines are fitted with two thermostats.

Six cylinder engines

On six cylinder engines the coolant divides as it enters the cylinder block. Most of the coolant passes along the right hand side of the cylinder block and around the outside of the cylinders to the rear of the cylinder block.

The remainder of the coolant passes along a passage on the left hand side of the cylinder block to the lubricating oil cooler.

The coolant flows around the element of the lubricating oil cooler to the rear of the cylinder block. The coolant then passes to the rear of the cylinder head.

Coolant passes forward through the cylinder head and into the thermostat housing. These engines have one thermostat. If the thermostat is closed, the coolant goes, through a by-pass, directly to the inlet side of the coolant pump. If the thermostat is open, the coolant passes to the top of the radiator.

Some engines are fitted with two thermostats.

Coolant pump - latest gear driven pumps

The coolant pump will need an overhaul if coolant or engine lubricating oil leaks from the hole (A3) in the body of the pump. When this occurs coolant or lubricating oil has passed through the coolant seal (A4) or the oil seal (A2).

To dismantle and to assemble 21-7

To dismantle

Special tool:

Coolant seal replacer tool, PD. 247

Consumable products:

POWERPART Retainer (high strength)
POWERPART Flange sealant

1 Remove the two studs from the pump body.

2 Use a lever under the edge of the pressed steel cover (A1) and remove the cover, there are three recesses (B1) around the edge of the pump body to give access for a lever. Discard the cover after removal.

3 Remove the impeller (A5) from the pump shaft: Drill four 6.35 mm (0.25 in) holes at equal distance around the end of the pump shaft, between the shaft and the hub for the impeller. These holes will break the interference fit between the impeller and the pump shaft and allow removal of the impeller.

Caution: *Do not damage the sealing face of the coolant seal housing during removal of the seal.*

4 To remove the coolant seal (A4), it will be necessary to break the carbon seal and use an extractor to remove the centre sleeve of the seal from the body of the shaft. This will loosen the grip of the seal on the shaft. To remove the body of the seal, drill three 3.175 mm (0.125 in) holes through the top of the coolant seal 120° apart. Fit three 25.4 mm (1.00 in) self-tapping screws. Insert a suitable lever through the coolant inlet of the pump body and gradually and evenly apply the lever under the head of each self-tapping screw to remove the seal. Discard the seal.

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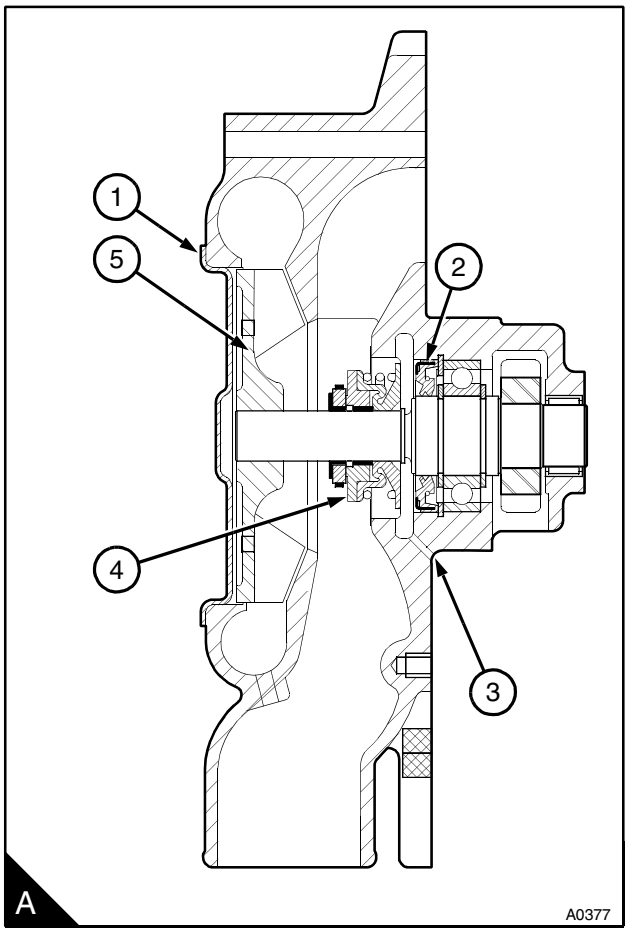
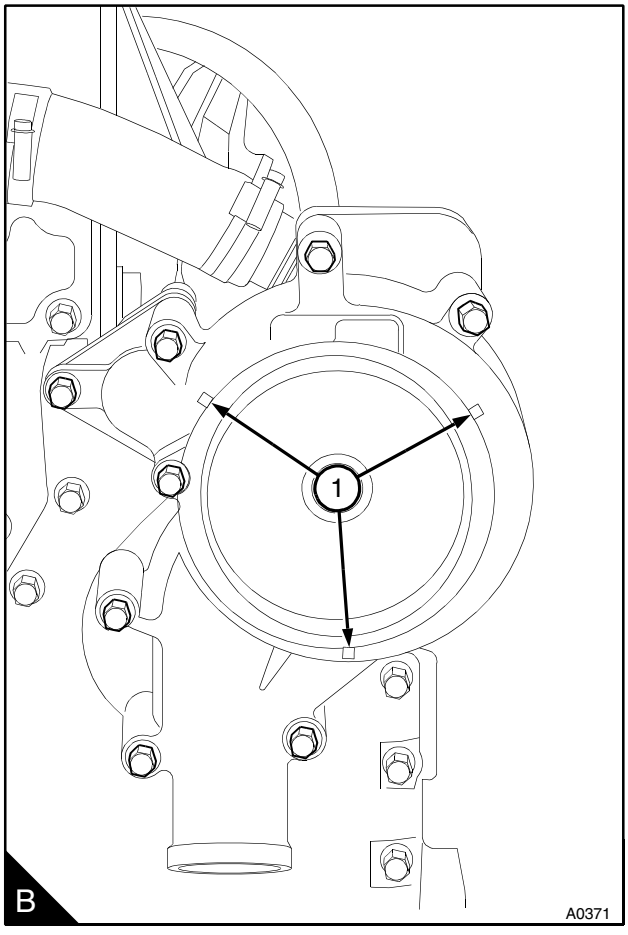
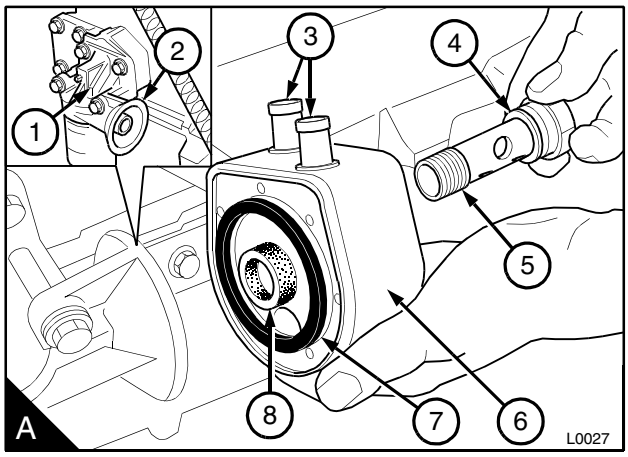




To remove and to fit - canister type 21-14



To remove

1 Drain the cooling system.

2 Release the hose clips of the coolant pipes at the oil cooler (A3). Release the threaded adaptor (A5) from the lubricating oil cooler and pull the oil cooler (A6) from the hose connections and the filter head (A1).

To fit

1 Clean the joint face of the filter head (A2).

2 Check the washer (A4) and the seals (A7 and A8) for damage. Renew the washer and the seals if they are damaged or worn. Lightly lubricate the seals with clean lubricating oil.

3 Push the hose connections for the coolant pipes onto the lubricating oil cooler. Hold the oil cooler in position against the filter head and fit the threaded adaptor. Tighten the threaded adaptor to 37 Nm (27 lbf ft) 3,8 kgf m. Ensure that the hose connections are fitted correctly and tighten the hose clips.

4 Fill the cooling system.

Flywheel

To remove and to fit 22-1

Warning! *The flywheel is heavy, use lift equipment or get help to assist with the lift operation before removal of the flywheel fasteners.*

To remove

1 Remove two opposite setscrews from the flywheel and fit temporarily two guide studs to ensure safety when the flywheel is removed and fitted.

2 Remove the remainder of the setscrews and washers and remove the flywheel.

3 Check the flywheel and ring gear for damage and renew, if necessary.

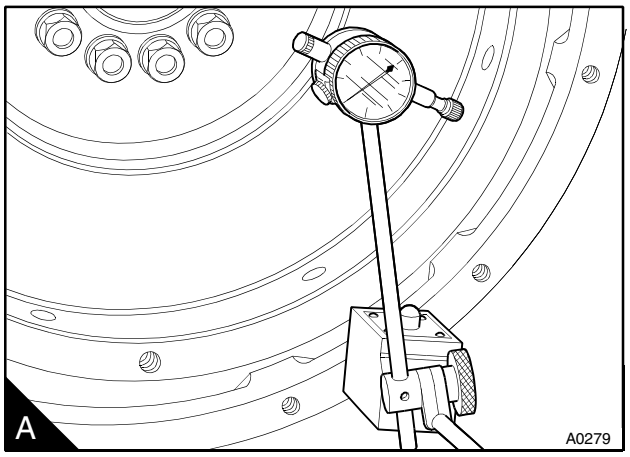
To fit

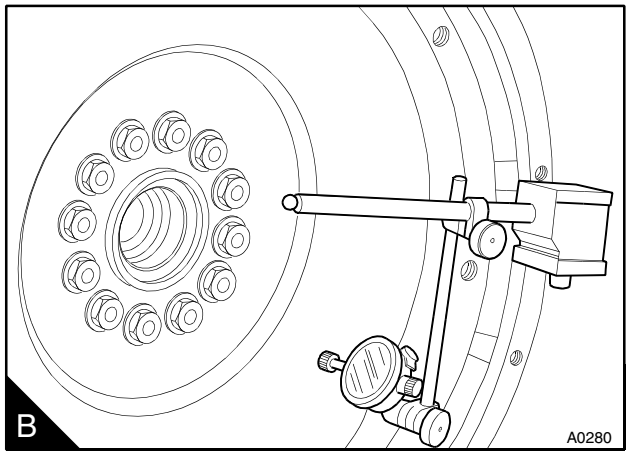
1 Ensure that the location faces of the crankshaft and the flywheel are clean and free from damage.

2 Fit the flywheel over the guide studs. Fit four setscrews and their washers. Remove the guide studs and fit the remainder of the setscrews and the washers. Tighten the setscrews to 105 Nm (77 lbf ft) 10,7 kgf m.

3 Check the flywheel run-out with a dial test indicator (A). This must be less than 0,30 mm (0.012 in) total indicator reading.

4 Check the alignment of the flywheel face (B). The error in alignment must not be more than 0,03 mm (0.001 in) total indicator reading for every 25 mm (1.0 in) of the flywheel radius from the crankshaft axis to the indicator plunger. During this check, keep the crankshaft pressed toward the front to remove the effect of crankshaft end-float.





Ring gear

To remove and to fit 22-2

To remove

Warning! *Wear eye protection during this operation.*

Before the ring gear is removed, check the position of the chamfer on the teeth.To remove the ring gear use a hammer and a chisel to break the ring. Ensure that the flywheel is not damaged during this operation.

To fit

The ring gear is heated onto the flywheel. When a new gear is to be fitted, ensure that it is not heated to more than 250 °C (480 °F). Ensure that the chamfer on the teeth of the gear is in the correct direction.

Starting aid

General description

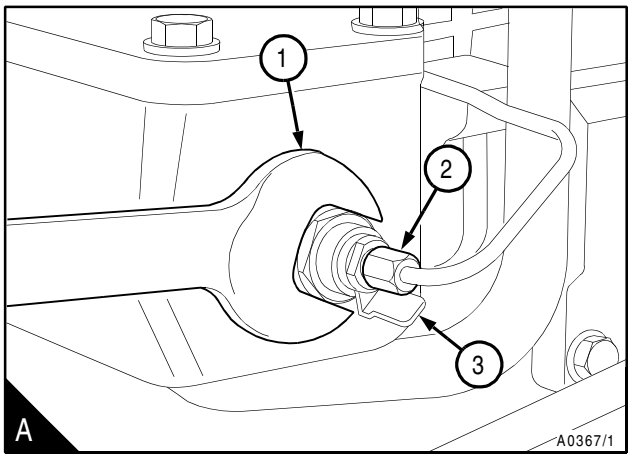
There are two types of electrical starting aid in use: The fuelled starting aid and the port heater.

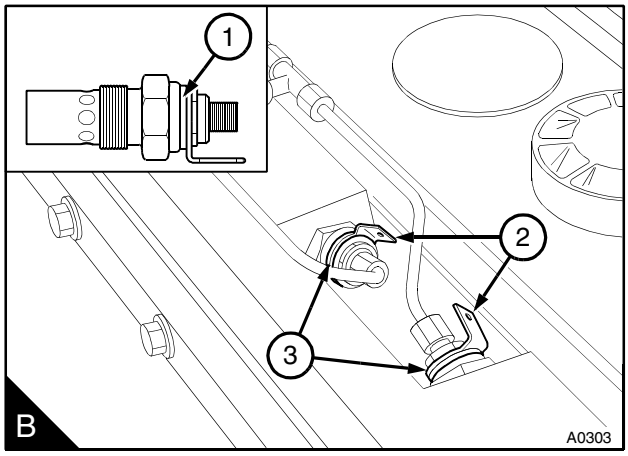
The fuelled starting aid (B1) is a device which is operated electrically and ignites a controlled amount of diesel fuel in the induction manifold to heat the induction air. A heater coil in the body expands a valve holder to allow fuel to flow into the device. The fuel is ignited by the hot coil and heats the air which passes through the induction manifold when the starter motor is operated.

The port heater has an electrically heated coil that heats the air as it enters the induction manifold. Port heaters are used in a group of two or three.

Starting aid

To remove and to fit a fuelled starting aid 23-9





To remove

1 Disconnect the fuel pipe (A2) and the electrical connection (A3).

2 Turn the spanner (A1) counter-clockwise and remove the starting aid.

To fit

1 Ensure that the contact faces of the manifold and the starting aid are clean. Put the sealing washer into position and fit the starting aid. Tighten the starting aid to 31 Nm (23 lbf ft) 3,2 kgf m.

2 Check the fuel pipe and, if it is still full of fuel, connect it to the starting aid. If the fuel has drained from the pipe, eliminate the air from the pipe as shown in paragraph 3 of operation 20-9.

3 Connect the electrical connection (A2).

Some engines which have water-to-air intercoolers are fitted with twin fuelled starting aids (B3). These starting aids are in a recess on top of the induction manifold. In this situation, access to the electrical terminals (B2) can be restricted if the starting aids are not fitted correctly, see page 272.

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Perkins

Service Bulletin

New 1000 Series **97 issue 1**

Removal of coolant pump impeller **July 2000**

This service bulletin explains the new procedure to remove the coolant pump impeller from the coolant pump.

To remove the impeller.

Special tool

Basic puller, part number 21825565

1 Drain the coolant from the engine.

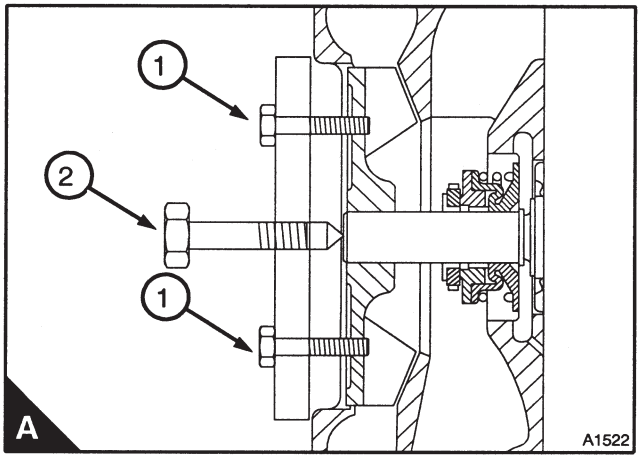
2 Remove coolant pump from the engine in accordance with the workshop manual, TPD1350 issue 3.

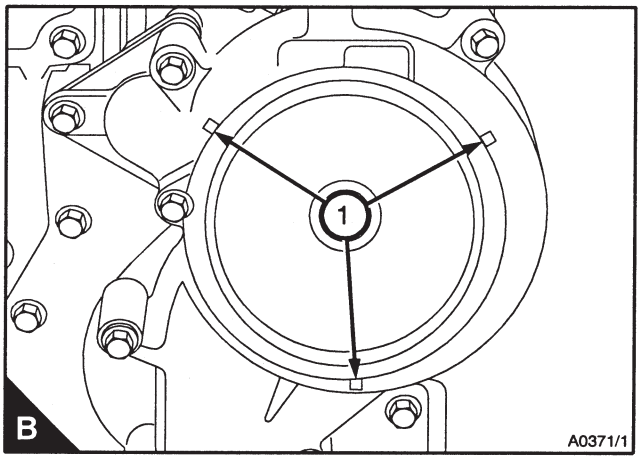
3 Use a lever under the edge of the pressed steel cover and remove the cover, there are three recesses (B1) around the edge of the pump body to give access for a lever. Discard the pump cover after removal.

4 The basic puller should be used as shown in (A), Fit two M8 x 1,25mm x 60mm setscrews (A1) to the impeller to secure the puller.

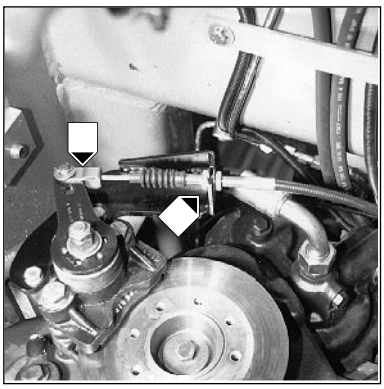
5 Tighten the centre setscrew (A2) of the puller untill the impeller is removed. Discard the impeller.

6 A new impeller is fitted in accordance with the workshop manual, TPD1350 issue 3.



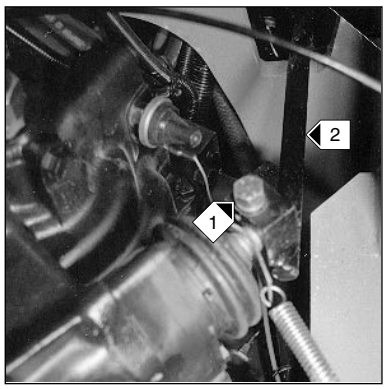


End



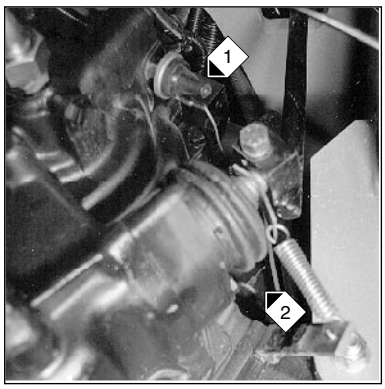
6

- Remove the parking brake cable and pull it clear on the lift truck side.



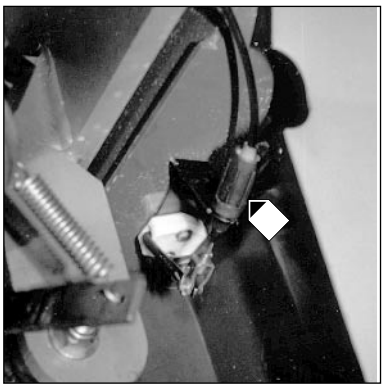
7

- Unscrew the mounting screw 1 then remove the gear lever 2.



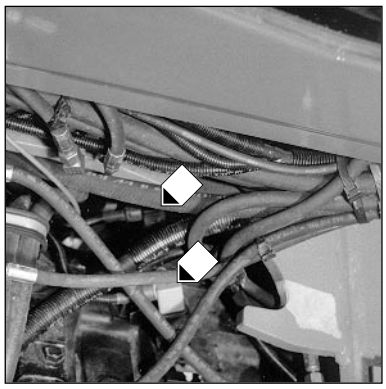
8

- Disconnect the transmission oil pressure switch 1 and oil temperature sender 2.



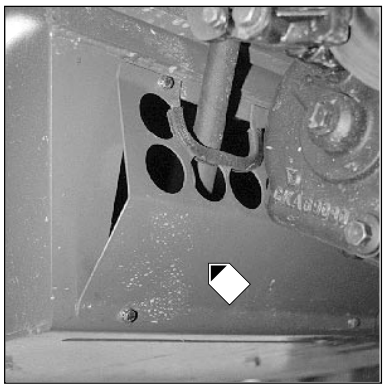
9

- Remove the accelerator cable on the pedal side and pull it clear towards the engine.



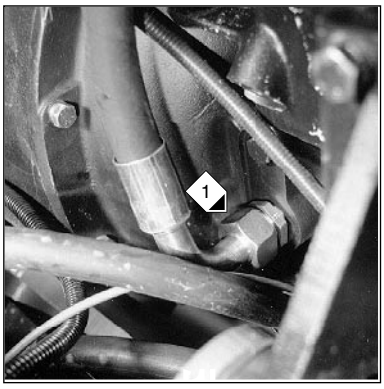
10

- Disconnect the two connectors on the gearbox control electro-valve.



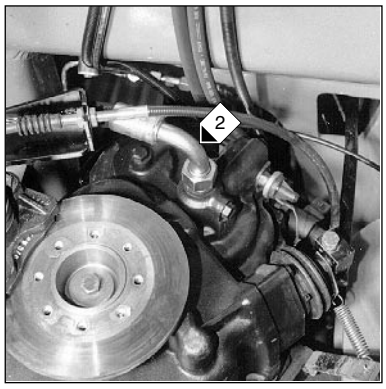
11

- Disassemble the engine box cover plate.



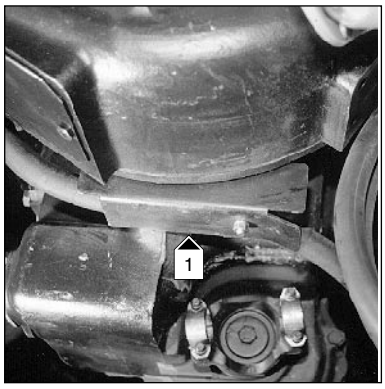
12

- Place a tray under the gearbox and loosen the lower oil cooler hose 1 on the box.



13

- Disconnect the upper oil cooler hose 2.
- Seal the hose and gearbox inlet openings.



14

- Disassemble the hose support plate 1 under the box.
- Slide the two oil cooler hoses into the engine box under the radiator.

GEAR BOX (Details)

1 – Transmission housing
2 – Transmission rear case
3 – Plug
4 – "O" ring
5 – Screw
6 – Stud-bolt
7 – Screw
8 – "O" ring
9 – Plug
10 – Seal
11 – Brake assy
12 – Plug
13 – "O" ring
14 – Drain plug
15 – "O" ring
16 – Air breather
17 – Transmission oil pressure switch
18 – Complete electrical control valve
19 – Screw
20 – Plug
21 – Filtrer housing
22 – Gasket
23 – Connection
24 – Oil filter
25 – Screw
26 – Ball
27 – Spring
28 – "O" ring
29 – Plug
30 – Plug
31 – Plug
32 – Complete pump
33 – Seal
34 – "O" ring
35 – Screw
36 – Washer
37 – Oil temperature sensor
38 – "O" ring
39 – Suction trainer
40 – Washer
41 – "O" ring
42 – Cover
43 – Screw
44 – Valve (Pressure regulation)
45 – Seal kit
46 – Over pressure valve
47 – Seal kit
48 – Upper seat
49 – Gear lever foot
50 – Pin
51 – Clamp
52 – Dust cover
53 – Clamp
54 – Screw
55 – Washer
56 – "O" ring
57 – Plate
58 – Screw
59 – Oil level
60 – "O" ring
61 – Connection
62 – "O" ring

SHAFT AND GEAR END FLOAT TOLERANCES

SHAFT END FLOATS.

All shaft end floats should be 0,0254 à 0,0762 mm.

GEAR END FLOATS.

Input shaft forward and reverse primary gears : 0,061 à 0,41 mm.

Output shaft gears :

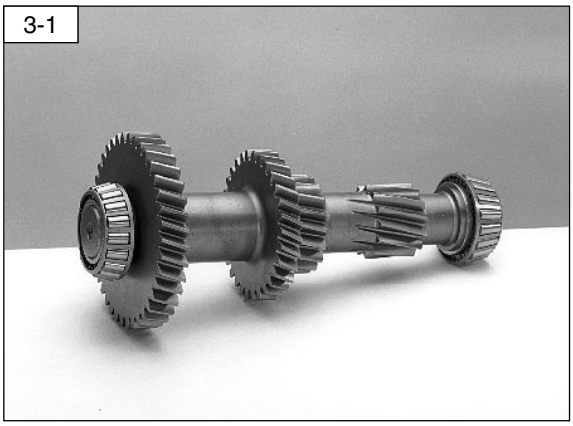
4th Gear : 0,20 à 0,56 mm.
3rd Gear : 0,38 à 0,84 mm.
2nd Gear : 0,36 à 0,56 mm.
1st Gear : 0,33 à 0,51 mm.

4 wheel drive : 0,051 à 0,28 mm.

3 - DIS-ASSEMBLY AND RE-ASSEMBLY OF THE COUNTERSHAFT

4 - DIS-ASSEMBLY AND RE-ASSEMBLY OF THE REVERSE IDLER SHAFT

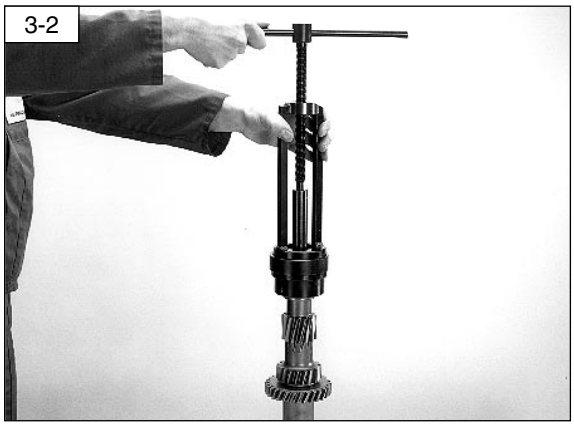
3-1



The countershaft assembly.

DIS-ASSEMBLY

3-2



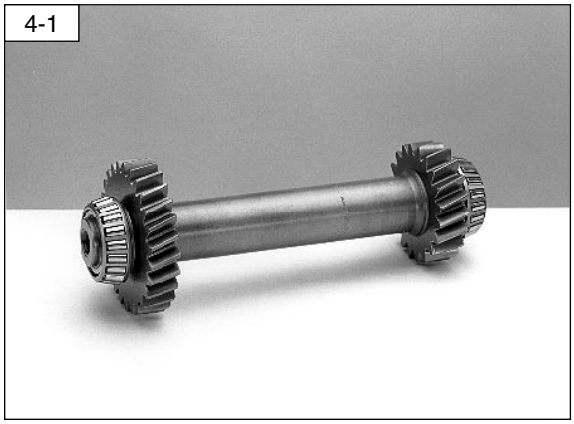
Using the appropriate bearing puller remove the countershaft front and rear bearings.

RE-ASSEMBLY

3-3

Using an appropriately sized tube replace the countershaft front and rear bearings.

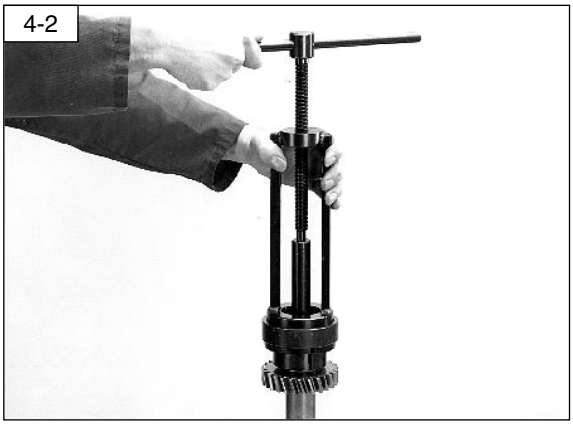
4-1



The reverse idler assembly.

DIS-ASSEMBLY

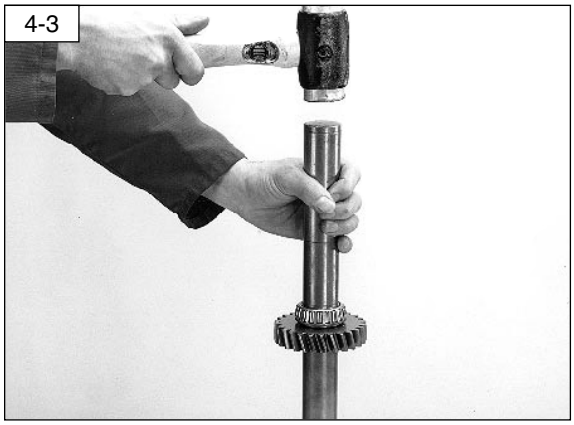
4-2



Using the appropriate bearing puller remove the front and rear bearings.

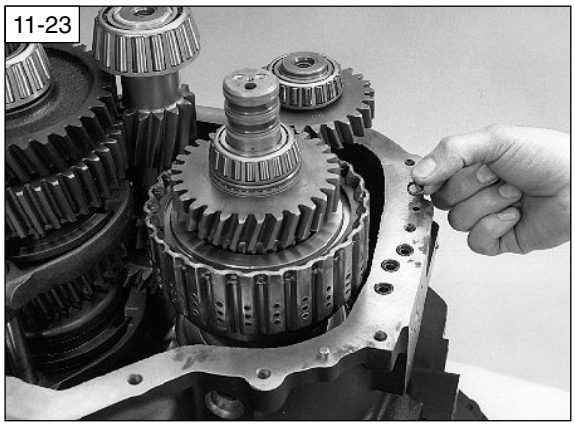
RE-ASSEMBLY

4-3



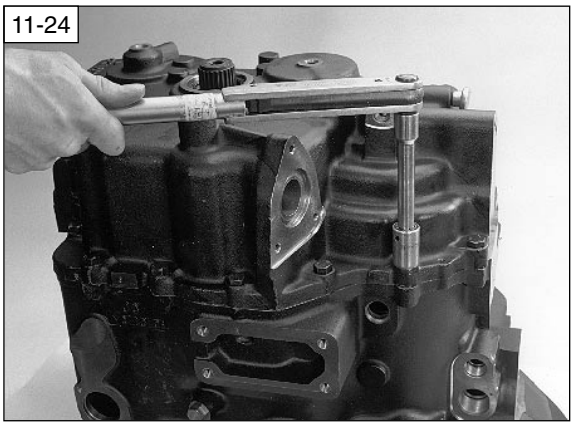
Using an appropriately sized tube replace the front and rear bearings.

11-23



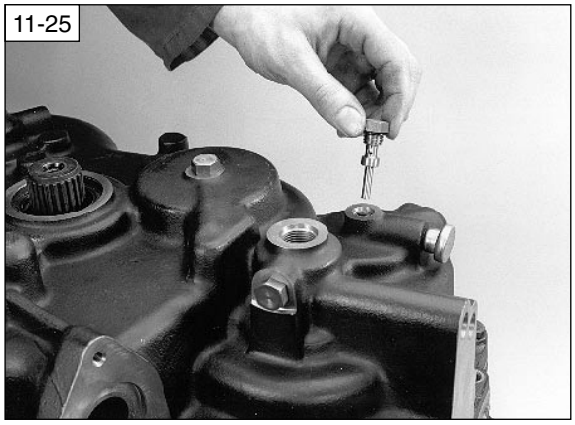
Replace the 4 "O"rings in the front case. (There are only 3 fitted on the 2 wheel drive model).

11-24



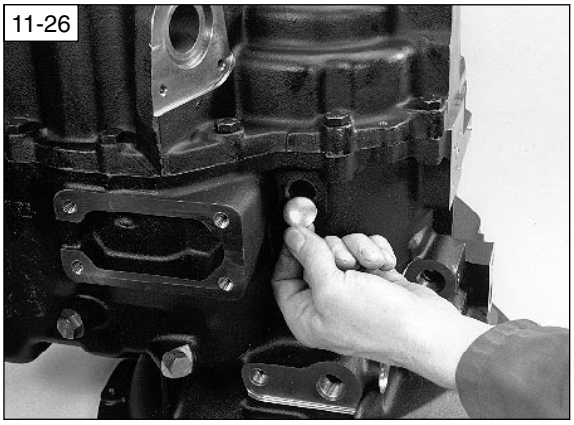
Re-fit the rear case using an approved liquid gasket Taking care not to damage the input shaft sealing rings. Tighten the 17 bolts to a torque of 33 to 47 lbs / ft.

11-25



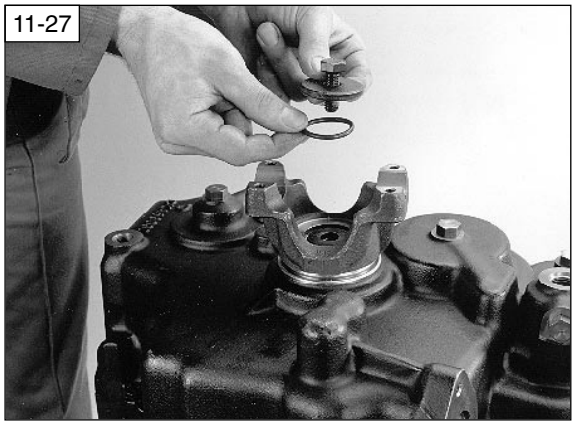
Replace the shaft end plug and "O"ring assemblies. Note the special breather plug es fitted in the reverse idler position. Tighten to a torque of 30 to 40 lbs / ft.

11-26



Fit a new expansion plug to the shimming access hole using an approved sealant. Stop threaded product (P / N° 562227).

11-27

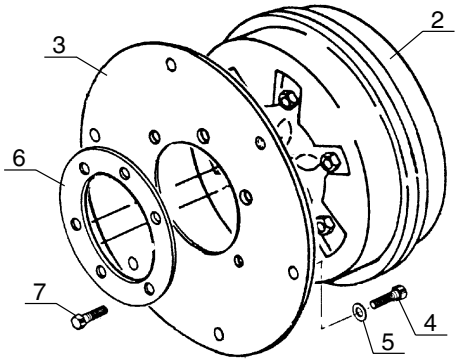


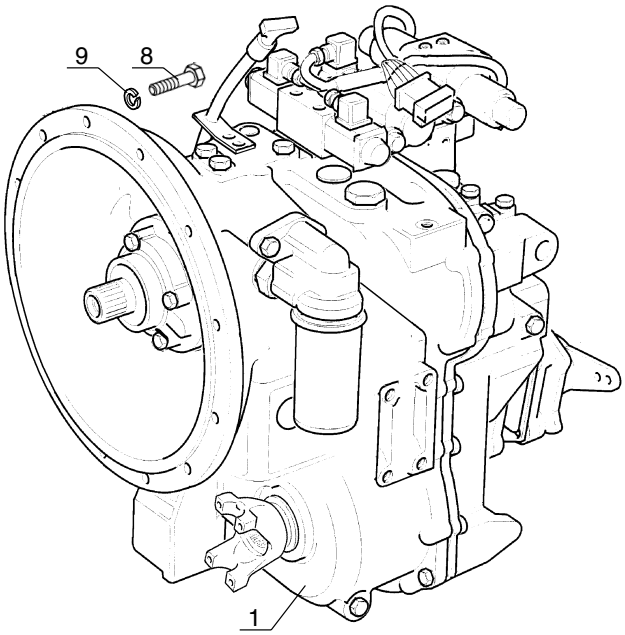
Replace the output yoke, "O"ring, washer and bolt. Then tighten to a torque of 50 to 65 lbs / ft.

11-28

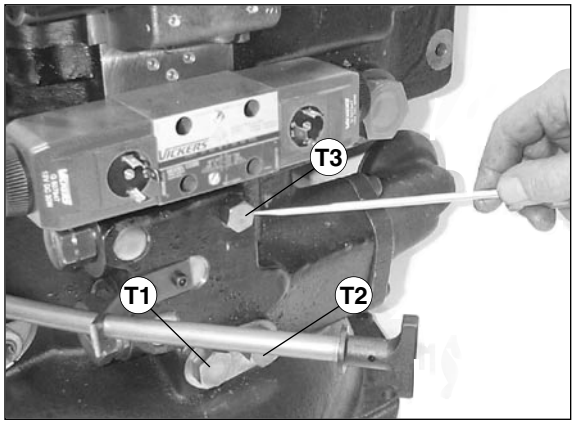
4WD VERSION : Replace the spacer, 4WD yoke, "O"ring, washer and bolt. Then tighten to a torque of 50 to 65 lbs / ft.

GEAR BOX AND CONVERTER

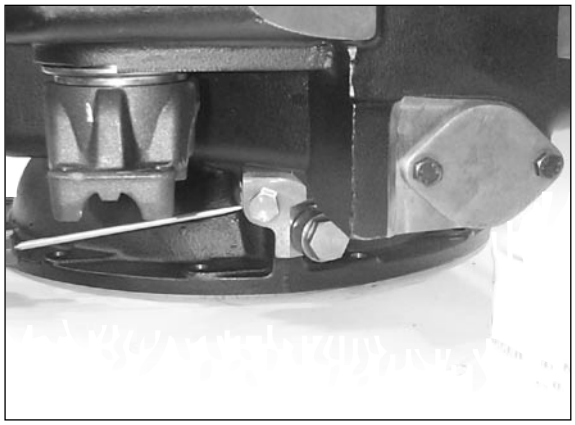




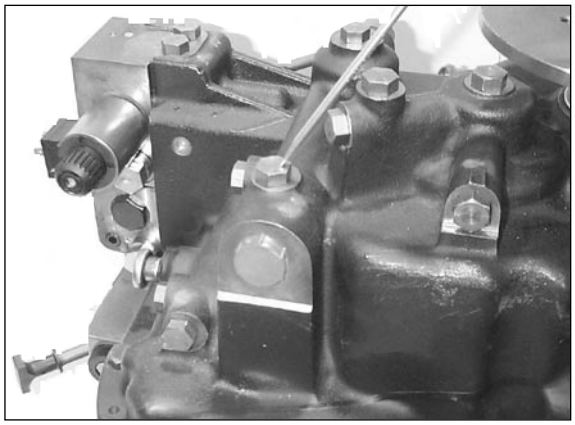
1 – Complete gear box
2 – Converter
3 – Intermediate plate
4 – Screw
5 – Washer
6 – Converter reinforcement plate
7 – Screw
8 – Screw
9 – Washer



CONVERTER PRESSURE (T1)
PUMP OUTLET PRESSURE (T2)
PUMP PRESSURE AFTER FILTER (T3)



CLUTCH 3rd GEAR PRESSURE (T4)

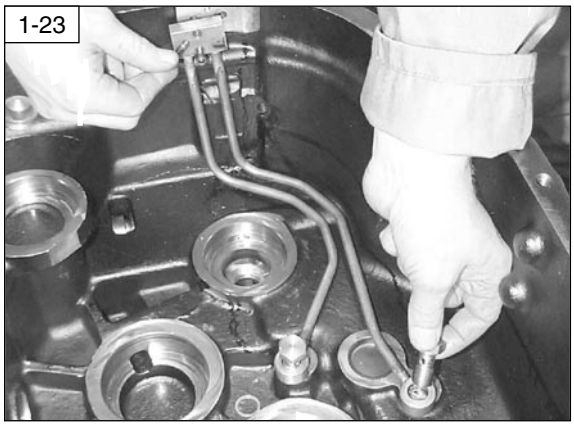


LUBRICATION PRESSURE (T5)

1-22

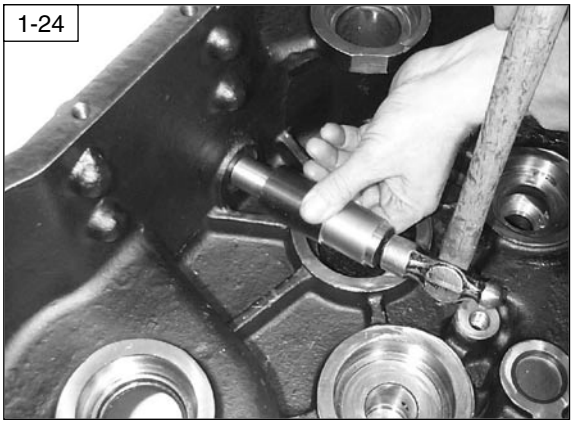
Remove the bearing shells from the front case.

1-23



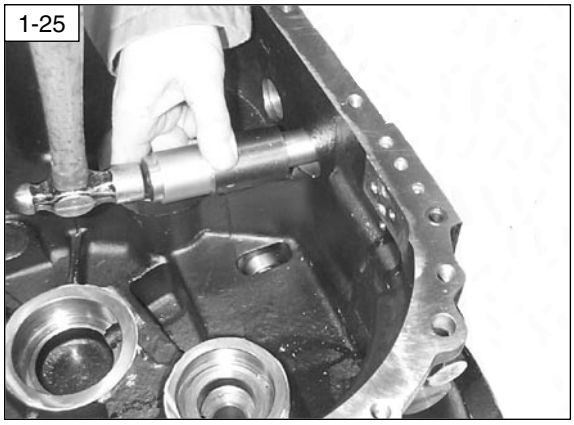
Remove the 2 capscrews and 2 banjo bolts and withdraw internal hydraulic pipe.

1-24



Remove and discard the expansion plug from the left side shimming access hole.

1-25

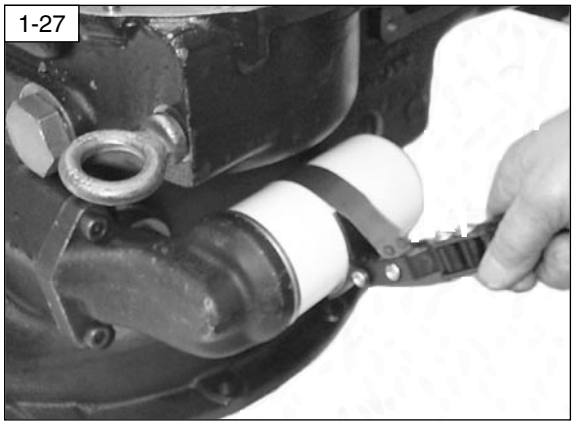


Remove and discard the expansion plug from the upper shimming access hole.

1-26

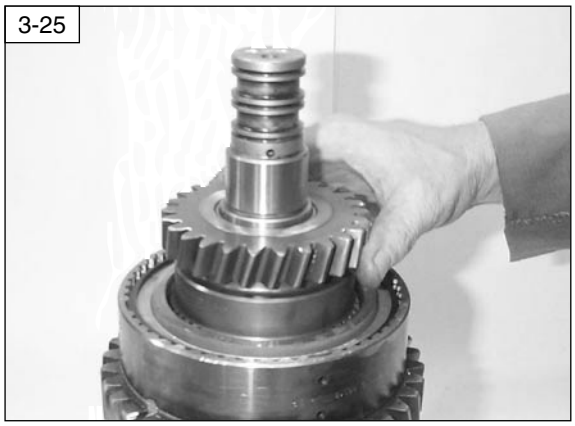
Remove 2 screws and withdraw the strainer cover, O ring, spacer and strainer.

1-27



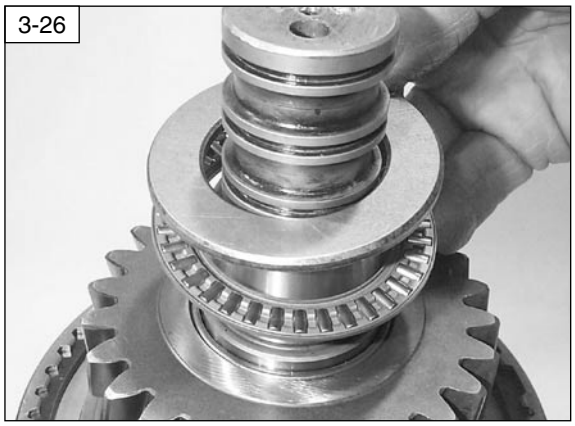
Using a strap wrench remove and discard the oil filter.

3-25



Line up the clutch plate splines and replace the primary gear (see tips).

3-26



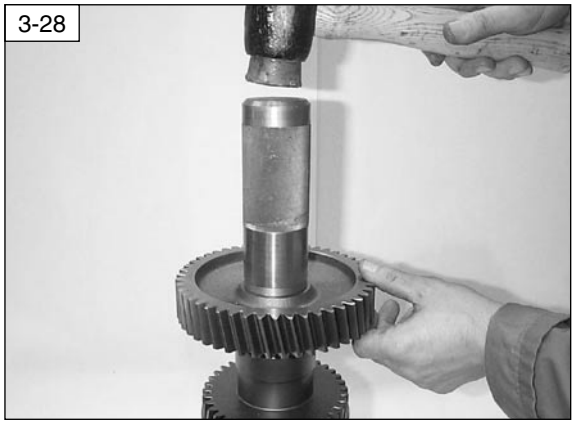
Replace the needle bearing and thrust washer as shown. Check gear end float.

NOTE : The needle bearing should be fitted with the closed side of its cage against the gear.

3-27

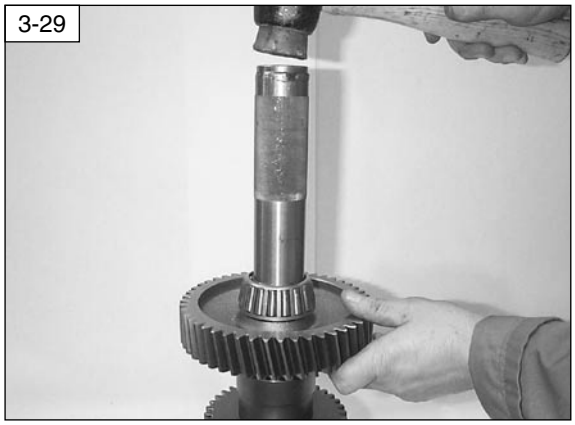
Using an appropriately sized tube replace the bearing as shown.

3-28



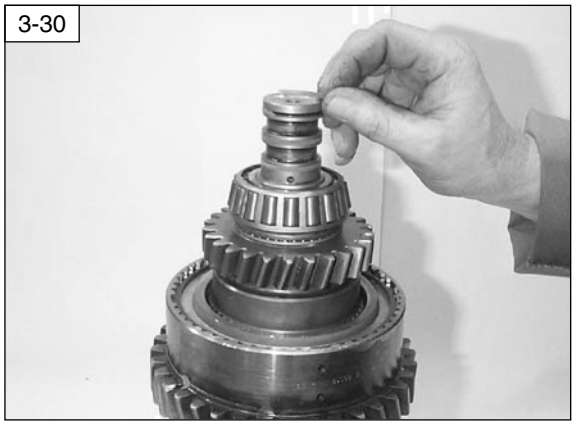
Invert the shaft and repeat steps 3:16 to 3:26. Then refit the drive gear using Loctite 638, or equivalent on the shaft splines.

3-29



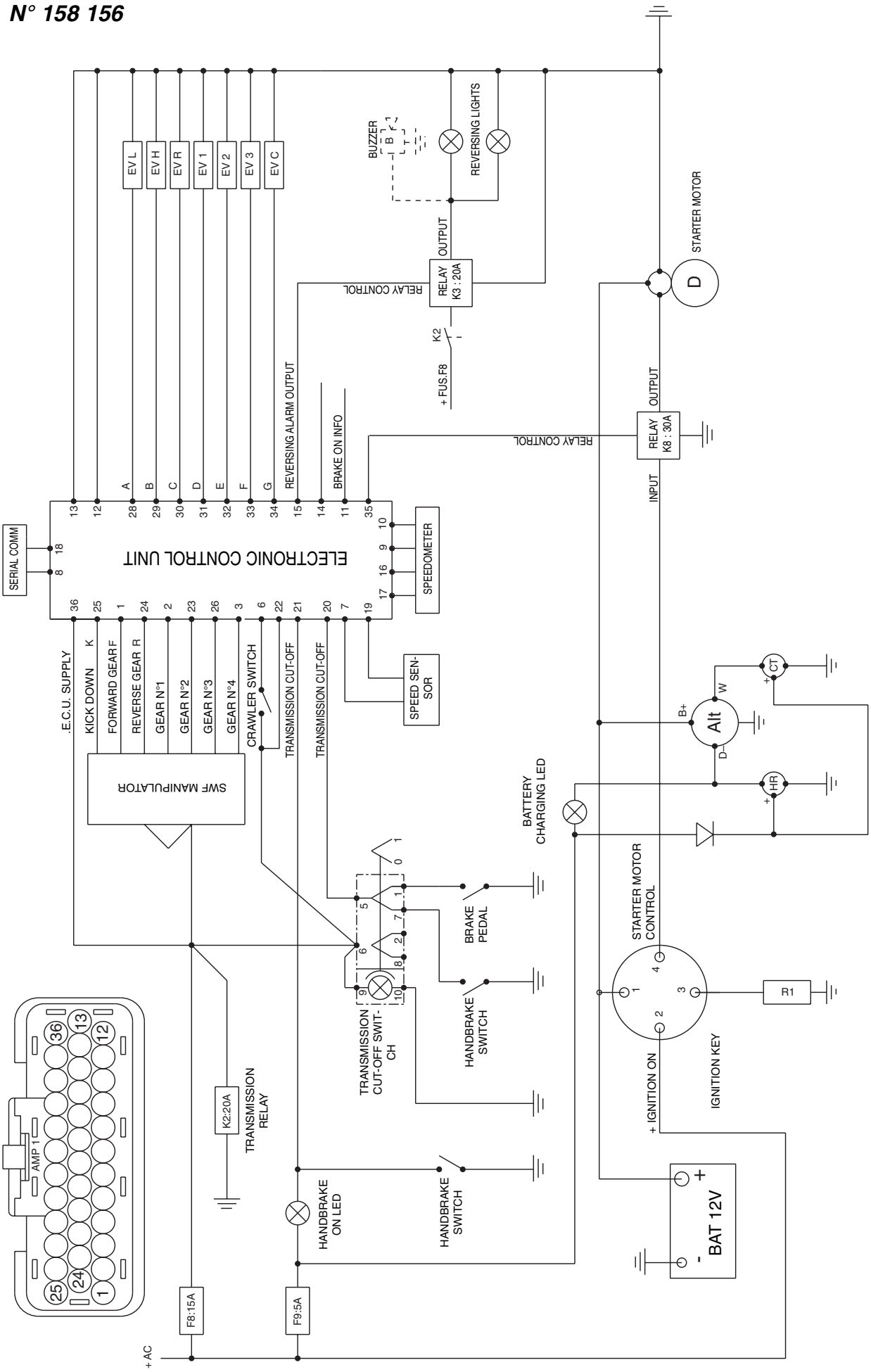
Using an appropriately sized tube replace the rear bearing as shown.

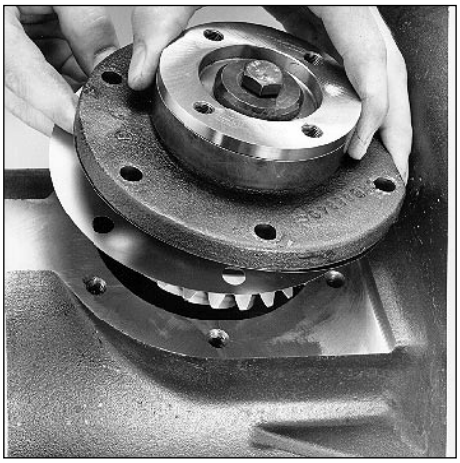
3-30



Finally fit 3 new sealing rings to the front of the shaft as shown.

B - Wiring diagram from machine N° 143 612 to machine N° 158 156





- 5 -

- Remove the input shaft housing and shims.

- 6 -

- Remove the 6 bolts retaining the output shaft housing. (17 mm socket).

- 7 -

- Remove the output shaft housing and shims.

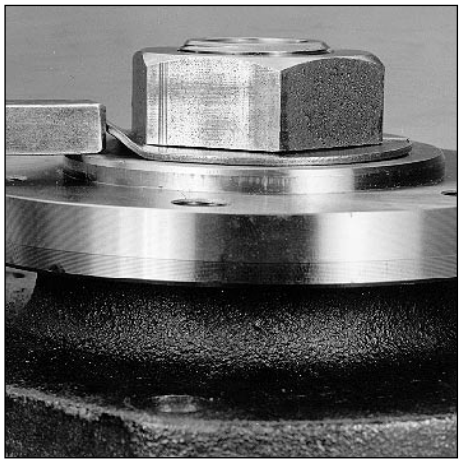
- 8 -

- Using a suitable lever, remove the input shaft oil seal from the case.

- 56 -

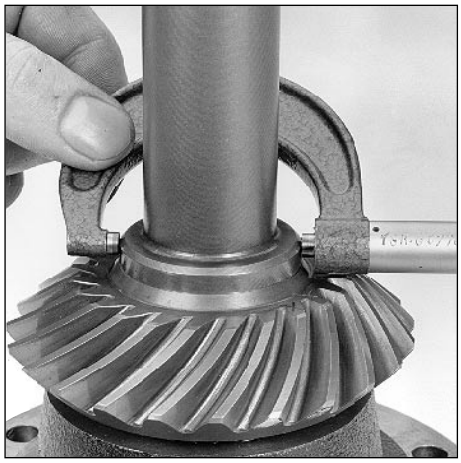
- Rebuild as previously described.

- On final assembly fit the o-ring under the tab washer.



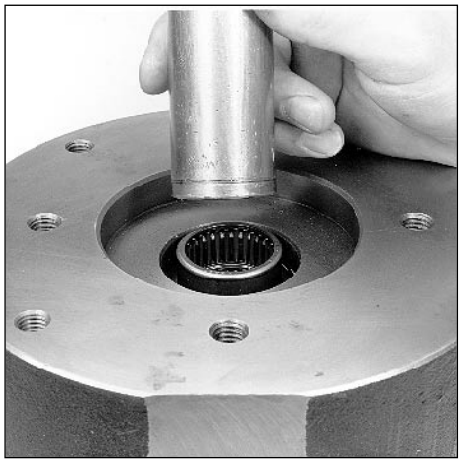
- 57 -

- Retorque the flange retaining nut and bend the tab washer using a suitable tool.



- 58 -

- Measure and note the diameter of the output shaft.
  Measurement D :

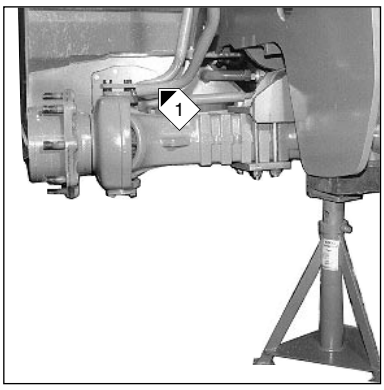


- 59 -

MAIN HOUSING REASSEMBLY

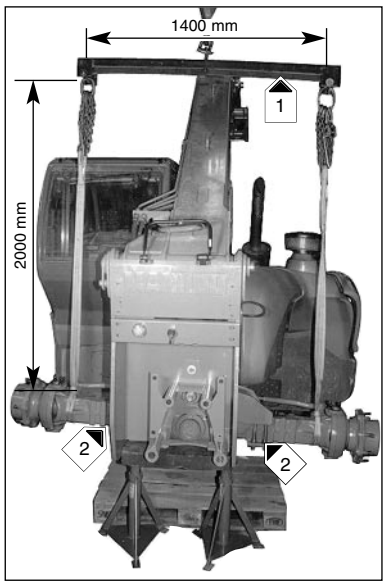
- Using a suitable tool refit the output shaft needle bearing.

- Into the case to a depth of 1.5 mm below the housing face.



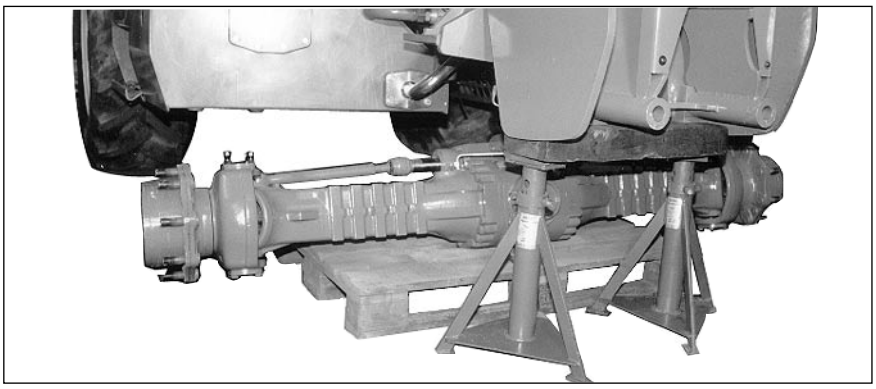
7

- Remove the two rear wheels.
- Disassemble the two mud-guard brackets 1.



8

- Set up a lifting beam 1 over the lift truck.
- Fix the slings on either side of the axle assembly.
- Remove the mounting screws 2 on either side of the rear axle assembly.



9

- Lower the axle assembly onto a pallet.
- Pull the assembly clear with a lift truck or pallet jack.

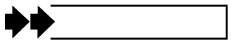
REASSEMBLY OF THE REAR AXLE ASSEMBLY

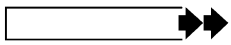
- Reassemble by carrying out in reverse order the operations described in the chapter " REMOVAL OF THE REAR AXLE ASSEMBLY".
- Comply with screw tightening torques - see "TIGHTENING TORQUE" chapter.

When the axle assembly is raised, fit the strain gauge, tightening torque (see page 13) and adjust the safety system (See chapter : 80-8-80-M29 in group : 80 - ELECTRICITY).

der Montage müssen die Ränder der Dichtringe geschmiert werden. Wenn beim Kegelradpaar ein Zahnrad ausgewechselt werden muß, muß auch das andere Zahnrad ausgewechselt werden. Bei der Montage müssen die vorgeschriebenen Spiele, Vorspannungen und Drehmomente strengstens eingehalten werden.

GÜLTIGKEIT: Das Handbuch gibt an zu welchen Kennummern die Einheiten gehören. Der Einfachheit halber sind die Angehörigkeiten folgendermaßen aufgeführt:

 = bis Kennummer

 = ab Kennummer

Wenn keine Angehörigkeit angegeben ist, verstehen sich die Arbeiten zur Zerlegung und Montage für alle Ausführungen gültig.

SPEZIFISCHE WERKZEUGE UND ERSATZTEILE: die Zeichnungen der für Wartungsarbeiten erforderlichen spezifischen Werkzeuge, sind am Ende des Handbuchs aufgeführt; Ersatzteile können beim Fahrzeughersteller oder direkt bei der Kundendienststelle oder bei einem zugelassenen Händler der SPICER CLARK-HURTH bezogen werden.

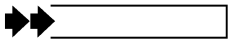
ESP

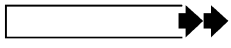
El rendimiento y la duración de los órganos mecánicos depende, además que del constante y correcto mantenimiento, también de la intervención inmediata en caso de averías o anomalías.
Al proponer este manual, ha sido considerada la suposición de una revisión general del grupo, pero es el mecánico quien tiene que valorar la necesidad de montar cada uno de los componentes en caso de reparación. El manual es una guía rápida y segura que permite intervenciones precisas por medio de fotografías y de planos que muestran las distintas fases de las operaciones. A continuación figuran todas las informaciones y advertencias necesarias para ejecutar un montaje correcto, para las comprobaciones y el montaje de cada uno de los componentes. Para remover el puente diferencial del vehículo hay que consultar los manuales de los fabricantes del vehículo. En la descripción de las operaciones siguientes se supone que el puente ya ha sido sacado del vahículo.

IMPORTANTE: Para facilitar el trabajo salvaguardando al mismo tiempo las superficies mecanizadas y la seguridad de los operadores, se aconseja que se usen equipos y herramientas adecuados como caballetes y bancos de soporte, martillos de plástico o de cobre, palancas adecuadas, extractores y llaves específicas.
Antes de desmontar las partes y descargar el aceite, es conveniente que se haga una limpieza minuciosa del puente sacando las incrustaciones y acumulaciones de grasa.

INTRODUCCION: Todos los órganos mecánicos desmontados tienen que ser limpiados minuciosamente con productos adecuados y restaurados o sustituidos en el caso de que presenten daños, desgaste, rajaduras, agarrotamientos, etc. En particular, comprobar la integridad de todas las partes en movimiento (cojinetes, engranajes, par cónico, ejes) y de estanqueidad (anillos OR, detenedor de aceite) sujetas a mayores solicitaciones y desgaste.
Se aconseja, de todas formas, que se sustituyan los órganos de estanqueidad cada vez que se ejecute la revisión o reparación de los componentes.
Al volver a montar, los segmentos de compresión tienen que estar lubricados en los bordes de estanqueidad. En el caso del par cónico, la sustitución de uno de sus engranajes comporta también la sustitución del otro. Al montar hay que tener en cuenta escrupulosamente los juegos, las precargas y los pares descriptos.

VALIDEZ: El manual suministra la validez de los grupos en forma de matrícula. Para poder tener una interpretación correcta, la validez está indicada:

 = hasta la matrícula

 = desde la matrícula en adelante

Si no ha sido indicada validez, las operación de desmontaje y montaje son comunes a todas las versiones.

HERRAMIENTAS ESPECIFICAS Y RECAMBIOS: Los planos de las herramientas especificas necesarias para la ejecución de las intervenciones de mantenimiento figuran al final del manual; los recambios se pueden pedir al fabricante de la máquina o directamente al Service Center o a Distribuidores autorizados de SPICER CLARK-HURTH.

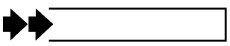
F

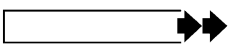
Le rendement et la continuité des organes mécaniques dépendent, non seulement d'une maintenance correcte et constante, mais également de la rapidité d'intervention en cas de pannes ou d'anomalies. En vous proposant ce manuel, on envisage l'hypothèse d'une révision générale du groupe, mais c'est au mécanicien d'évaluer la nécessité de monter ou non chacun des composants en cas de réparation. Le manuel est un guide rapide et sûr consentant des interventions précises, au travers de photographies et de dessins prospectifs qui illustrent les différentes phases des opérations. Ensuite, sont reportées toutes les informations et précautions nécessaires pour un démontage correct et les vérifications et assemblage de chaque composant. En ce qui concerne le déplacement du pont d'étai du véhicule, il est nécessaire consulter les manuels fournis par le constructeur du véhicule. En décrivant les opérations suivantes, on présume que le pont ait déjà été enlevé du véhicule.

IMPORTANT: Pour faciliter le travail en sauvegardant en même temps les surfaces usinées et la sécurité des opérateurs, il est préconisé d'utiliser des installations appropriées telles que des étais ou banc de support, maillets en plastique ou cuivre, leviers appropriés, extracteurs et clés spécifiques.
Avant de procéder au démontage des parties et vidanger l'huile, il vaut mieux nettoyer soigneusement le pont, en enlevant incrustations et blocs de gras.

PRELIMINAIRE: Tous les organes mécaniques démontés doivent être soigneusement nettoyés à l'aide de produits appropriés et réparés ou remplacés dans le cas où ils seraient abîmés, usés, fêlés, grippés, etc. Vérifier, l'intégrité, en particulier, de toutes les parties en mouvement (paliers, engrenages, couple conique, arbres) et l'étanchéité des bagues (bagues OR, parahuile), qui sont sujettes à plus de sollicitations et à l'usure. Il est préconisé, de toute façon, de substituer les organes d'étanchéité, chaque fois que l'on effectue une révision ou une réparation des composants. Au moment du montage, les bagues d'étanchéité doivent être lubrifiées sur les bords étanches. Dans le cas du couple conique, la substitution de l'un de ses engrenages comporte également la substitution de l'autre. En phase de montage, il faut respecter scrupuleusement les jeux, les précharges et les couples prescrits.

VALIDITE: Le manuel fournit la validité des groupes sous forme de matricule. Pour une meilleure interprétation, les validités sont indiquées comme:

 = jusqu'à l'immatriculation

 = à partir de l'immatriculation et après

Si les validités ne sont pas indiquées, les opérations de démontage et d'assemblage sont pareilles dans toutes les versions.

INSTALLATIONS SPECIFIQUES ET PIECES DETACHEES: Les dessins des installations spécifiques nécessaires pour effectuer des interventions d'entretien sont reportées à la fin du manuel, les pièces détachées peuvent être commandées au constructeur de la machine ou directement aux Centres de Services, ou Distributeurs agréés de la Société SPICER CLARK-HURTH.

a

ITA Rimuovere i dischi di frenatura (7) annotando l'ordine di montaggio.
NOTA. 1 - Se i dischi non vanno sostituiti, evitare lo scambio di posizione.
2 - Estrarre il doppio giunto cardanico (18).

D Bremsscheiben (7) abnehmen und auf die Reihenfolge der Montage achten.
BEMERKUNG. 1 - Sollen die Scheiben nicht ausgewechselt werden, diese in der richtigen Reihenfolge zur Seite legen.
2 - Doppelgelenkwelle (18) abnehmen.

ESP Remover los discos de frenado (7) anotando el orden de montaje.
NOTA. 1 - Si los discos no tienen que ser sustituidos, evitar el intercambio de posición.
2 - Extraer el semieje (18).

F Enlever les disques de freinage (7) en prenant note de l'ordre de montage.
NOTE. 1 - Si les disques ne sont pas à remplacer, éviter le changement de position.
2 - Extraire le joint de cardan double (18).

b

ITA Rimuovere le molle (8) di rientro del pistone (9).
NOTA. Se le molle (8) risultano snervate o deformate, devono essere sostituite.

D Rückzugsfedern (8) des Kolbens (9) abnehmen.
BEMERKUNG. Wenn die Federn (8) nachgesetzt oder verformt sind, diese auswechseln.

ESP Remover los muelles (8) de vuelta del pistón (9).
NOTA. Si los muelles (8) están desnervados o deformados, hay que sustituirlos.

F Enlever les ressorts (8) de rentrée du piston (9).
NOTE. Si les ressorts (8) sont énervés ou déformés, il faut les remplacer.

c

ITA Rimuovere le viti a perno (10) di guida del pistone (9).
ATTENZIONE! Se le viti devono essere sostituite, annotare la colorazione distintiva per i giochi freno (Vedere «ASSEMBLAGGIO GRUPPI DI FRENATURA»).

D Die Stiftschraube (10) zur Kolbenführung (9) entfernen.
ACHTUNG! Sollen die Schrauben ausgewechselt werden, auf die farbige Kennzeichnung für das Bremsenspiel achten (Siehe «ZUSAMMENBAU DER BREMSAGGREGATE»).

ESP Remover los pernos roscados (10) de guía del pistón (9).
CUIDADO! Si hay que sustituir los pernos, anotar el color distintivo para los juegos del freno (Véase «MONTAJE DE LOS GRUPOS DE FRENADO»).

F Enlever les vis goujon (10) de guidage du piston (9).
ATTENTION! Si les vis doivent être remplacées, prendre note de la couleur de distinction des jeux de frein (Voir «ASSEMBLAGE DU GROUPE DE FREINAGE»).

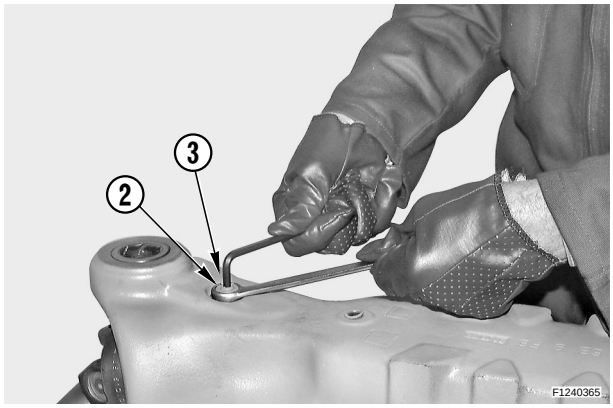
d

ITA Immettere lentamente aria compressa attraverso l'attacco del circuito frenante per estrarre il pistone completo.
ATTENZIONE! Trattenere il pistone che può essere espulso velocemente ed essere danneggiato.

D Langsam Druckluft in den Bremskreislauf blasen, um den kompletten Kolben herauszuziehen.
ACHTUNG! Den Kolben mit der Hand halten, um zu vermeiden daß er zu schnell herausgestoßen und beschädigt wird.

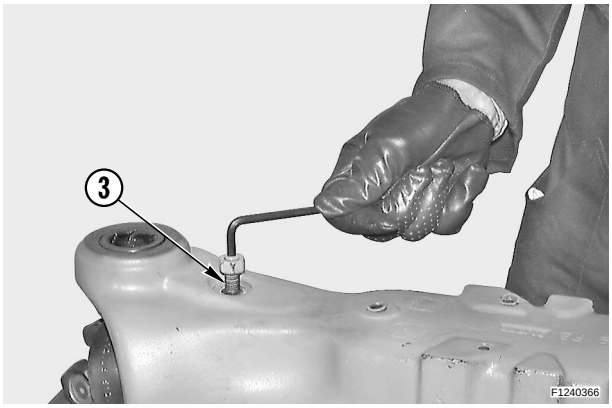
ESP Introducir lentamente aire comprimido a través de la unión del circuito frenante para extraer el pistón completo.
CUIDADO! Retener el pistón porque puede ser expulsado rápidamente y quedar dañado.

F Injecter tout doucement de l'air comprimé à travers le raccord du circuit freinant pour extraire le piston complet.
ATTENTION! Retenir le piston qui pourrait être éjecté fortement et s'abîmer.



GB a

Unloose and remove the top and bottom check nuts (2) from the dowels (3).



GB b

Remove top and bottom check dowels (3) from the flange (5) or bush (13).

a

ITA Utilizzando un mazzuolo in materiale plastico, sfilare parzialmente il mozzo portaruota (7).
NOTA. Battere alternativamente in più punti equidistanti.

D Mit einem Gummihammer, die Radhalternabe (7) etwas heraus schieben.
BEMERKUNG. Abwechselnd an verschiedenen, gleich entfernten Stellen schlagen.

ESP Utilizando un martillo de material plástico, extraer parcialmente el cubo portarruedas (7).
NOTA. Golpear alternativamente en varios puntos equidistantes.

F A l'aide d'un maillet en matière plastique, extraire partiellement le moyeu porte-roue (7).
NOTE. Frapper sur plusieurs points à la même distance.

b

ITA Asportare il cuscinetto esterno (8).

D Äußeres (8) Lager abnehmen.

ESP Sacar el cojinete exterior (8).

F Enlever le palier externe (8).

c

ITA Sfilare il mozzo portaruota (7).

D Radhalternabe (7) herausziehen.

ESP Extraer el cubo portarruedas (7).

F Extraire le moyeu porte-roue (7).

d

ITA Asportare i perni e rimuovere la scatola snodo (3).
Per i dettagli di rimozione dei perni, vedere «RIMOZIONE SCATOLA SNODO COMPLETA».

D Stifte und Gelenkgehäuse (3) entfernen.
Siehe «KOMPLETTES GELENKGEHÄUSE ABMONTIEREN».

ESP Sacar los pernos y remover la caja de la rótula (3).
Para los detalles de remoción de los pernos, véase «REMOCION CAJA DE ROTULA COMPLETA».

F Enlever les tourillons, enlever le boîtier articulation (3).
Pour de plus amples détails, voir «DEPOSE DU BOITIER ARTICULATION COMPLET».

e

ITA Asportare gli anelli elastici (9).

D Die Kolbenringe (9) entfernen.

ESP Sacar los anillos elásticos (9).

F Enlever les anneaux élastiques (9).

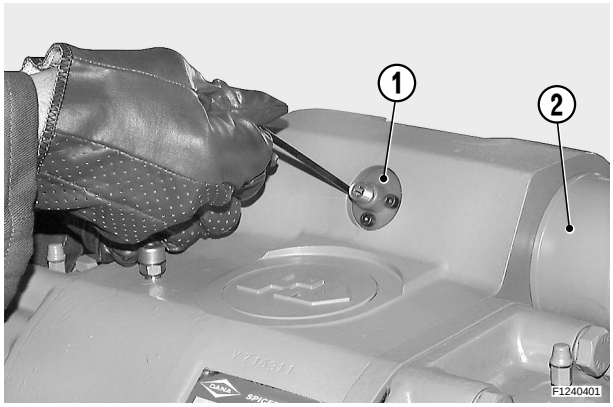
f

ITA Utilizzando un estrattore, asportare gli ingranaggi satelliti (10).
NOTA. Annotare il senso di montaggio dei satelliti.

D Mit einem Abzieher, die Planetenräder (10) heraus nehmen.
BEMERKUNG. Montagerichtung der Planetenräder beachten.

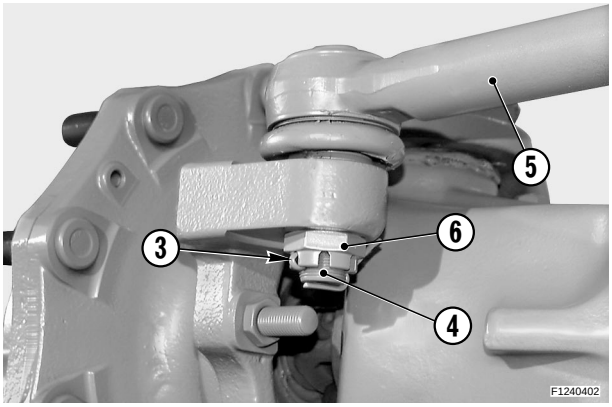
ESP Utilizando un extractor, sacar los engranajes satélites (10).
NOTA. Anotar el sentido de montaje de los satélites.

F A l'aide d'un extracteur, extraire les engrenages satellites (10).
NOTE. Prendre note du sens de montage des satellites.



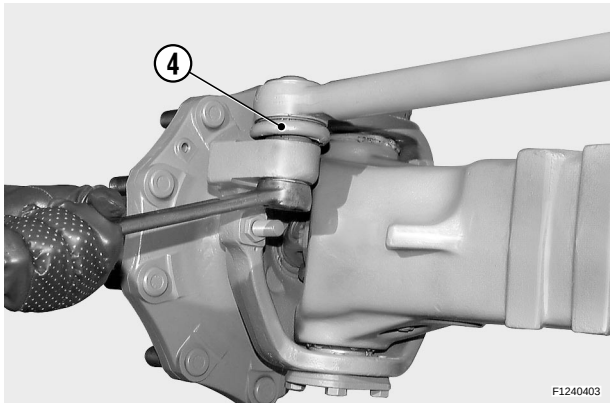
GB a

Remove the centring sensor (1) of the steering piston (2), if supplied.



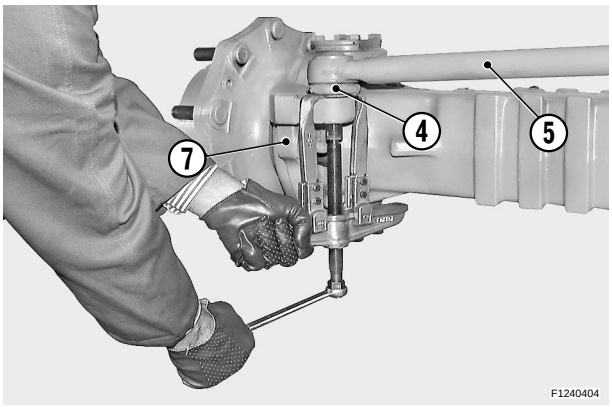
GB b

Remove the safety cotter pins (3) from the articulation pins (4) of the steering bars (5).
CAUTION! Dispose of used cotter pins.



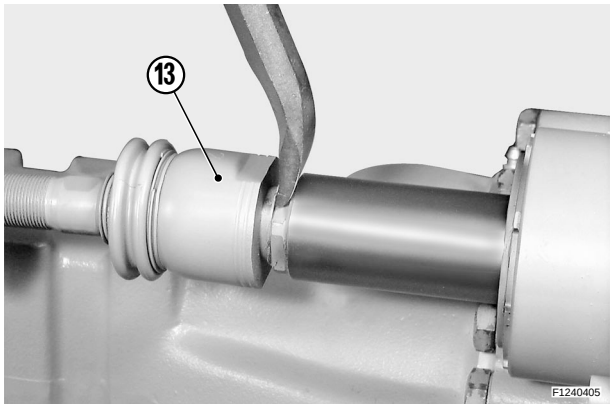
GB c

Remove the castellated nuts (6) that lock the articulation pins (4).



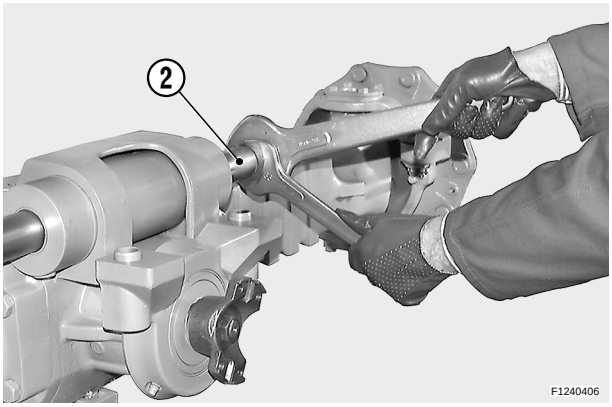
GB d

Disconnect the tapered pins of the articulation (4) from the steering case (7) by means of a puller.



GB e

If the connection of the steering bars includes a safety collar (13), raise the border.



GB f

Disconnect left and right steering bars (5) from the piston (2).

a

ITA Rimuovere l'anello elastico (1) di ritegno della testata (2).

D Kolbenring (1) vom Kopf (2) abnehmen.

ESP Remover el anillo elástico (1) de retención de la culata (2).

F Enlever l'anneau élastique (1) de retenue de la culasse (2).

b

ITA Con leggeri colpi di un mazzuolo in materiale plastico, spingere la testata (2) verso l'interno del cilindro (3).
NOTA. Inserire la testata fino a filo del cilindro.

D Mit einem Gummihammer den Kopf (2) leicht zum Zylinder (3) hin schlagen.
BEMERKUNG. Den Kopf bis an den Zylinderrand hinein schlagen.

ESP Con ligeros golpes de martillo de material plástico, empujar la culata (2) dentro del cilindro (3).
NOTA. Introducir la culata hasta que quede a ras del cilindro.

F Avec de légers coups de maillet en matière plastique, pousser la culasse (2) à l'intérieur du cylindre (3).
NOTE. Introduire la culasse jusqu'au bord du cylindre.

c

ITA Utilizzando un punteruolo, forzare l'anello di arresto (4) interno al cilindro (3) ed estrarlo utilizzando un cacciavite.

D Mit einem Dübel den Sprengring (4) in den Zylinder (3) ausdrücken und mit einem Schraubenzieher herausnehmen.

ESP Utilizando un punzón, forzar el anillo de tope (4) dentro del cilindro (3) y extraerlo utilizando un destornillador.

F A l'aide d'un pointeau forcer l'anneau de butée (4) à l'intérieur du cylindre (3), extraire ce dernier à l'aide d'un tournevis.

d

ITA Con un mazzuolo in materiale plastico, mandare in battuta il pistone (5) a ridosso della testata (2).
Proseguire fino all'espulsione della testata (2) dal cilindro (3).

D Mit einem Gummihammer den Kolben (5) bis zum Anschlag des Kopfes (2) bringen.
Weiter schlagen, bis der Kopf (2) aus dem Zylinder (3) geschlagen worden ist.

ESP Con un martillo de material plástico, mandar a tope el pistón (5) detrás de la culata (2).
Continuar hasta la expulsión de la culata (2) del cilindro (3).

F A l'aide d'un maillet en matière plastique, envoyer en butée le piston (5) à l'abri de la culasse (2).
Continuer jusqu'à l'éjection de la culasse (2) hors du cylindre (3).

e

ITA Scomporre il gruppo cilindro (3) estraendo nell'ordine la testata (2) ed il pistone (5).
ATTENZIONE! Annotare il senso di montaggio del pistone che ha la parte smussata "**A**" orientata verso la testata (2).

D Das Zylinderaggregat (3) zerlegen; dazu der Reihenfolge nach den Kopf (2) und den Kolben (5) abnehmen.
ACHTUNG! Montagerichtung des Kolbens beachten: das abgerundete Teil "**A**" muß zum Kopf (2) gerichtet sein.

ESP Descomponer el grupo cilindro (3) extrayendo en su orden la culata (2) y el pistón 5.
ATENCION! Anotar el sentido de montaje del piston que tiena la parte descantillada "**A**" orientada hacia culata (2).

F Décomposer le groupe cylindre (3) en extrayant dans l'ordre d'abord la culasse (2), puis le piston (5).
ATTENTION! Prendre note du sens de montage du piston, la partie arrondie "**A**" tournée vers la culasse (2).

f

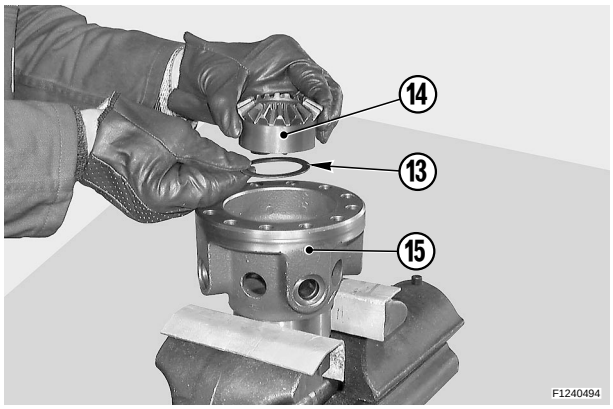
ITA Rimuovere dalla testata (2), dal cilindro (3) e dal pistone (5) tutte le guarnizioni, gli anelli antiestrusione e gli anelli raschiatori.
NOTA. 1 - Tutte le tenute devono essere sostituite ad ogni smontaggio. 2 - Prestare molta attenzione per non rovinare le sedi delle guarnizioni e dello scorrimento del pistone.

D Vom Kopf (2), vom Zylinder (3) und vom Kolben (5) alle Dichtungen, Halteringe und Abschaber wegnehmen.
BEMERKUNG. 1 - Alle Dichtungen müssen jedesmal gewechselt werden, wenn der Zylinder zerlegt wird. 2 - Sehr vorsichtig vorgehen, um die Dichtungs- und Kolbensitze nicht zu beschädigen.

ESP Remover de la culata (2) del cilindro (3) y del pistón (5) todas las juntas, los anillos antiextrusión y los anillos raspadores.
NOTA. 1 - Todas las estanqueidades tienen que ser sustituidas a cada desmontaje. 2 - Tener mucho cuidado a fin de no dañar los alojamientos de las juntas y del deslizamiento del pistón.

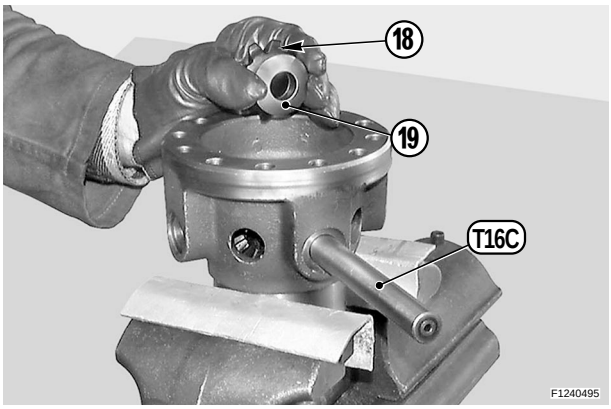
F Enlever de la culasse (2), du cylindre (3) et du piston (5), toutes les garnitures, anneaux anti-extrusion et les anneaux racleurs.
NOTE. 1 - Toutes les étanchéités doivent être remplacées à chaque démontage. 2 - Faire très attention à ne pas abîmer les logements des garnitures et de coulissement du piston.

ASSEMBLING - ASSEMBLAGGIO - MONTIEREN - MONTAJE - MONTAGE



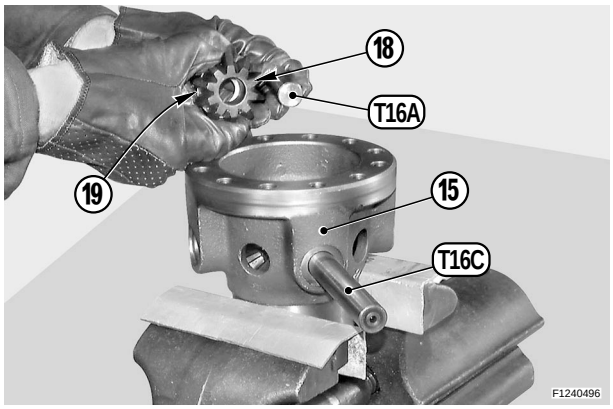
GB a

Insert the shim washer (13) and the planetary gear (14) in the differential carrier (15).



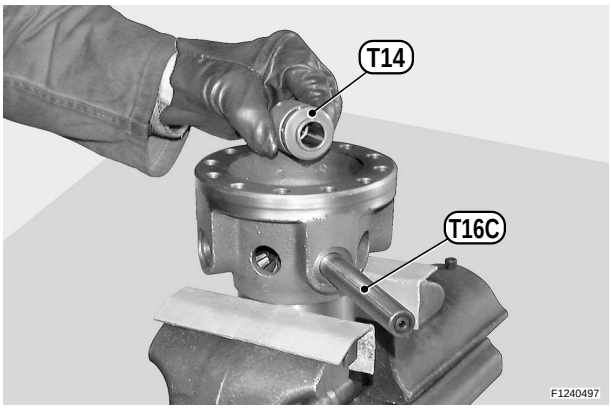
GB b

Position the shim washer (19) and the first planet wheel gear (18). Hold them in position using bar **T16C**.



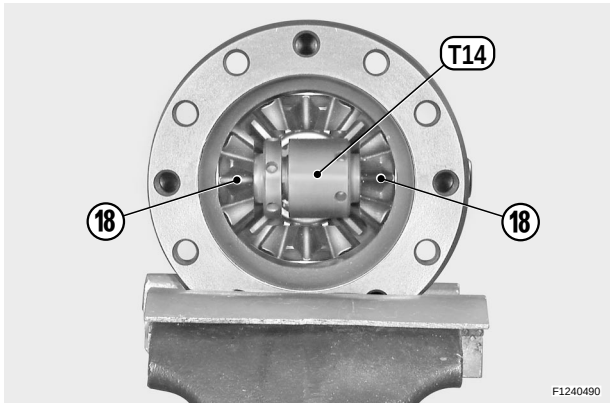
GB c

With the help of gudgeon **T16A**, position the second planet wheel gear (18) and the relative shim washer (19).



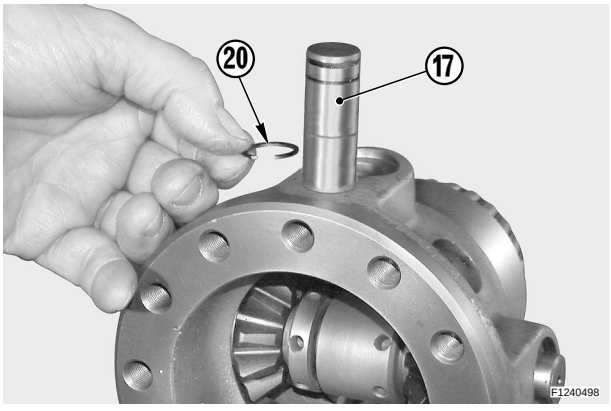
GB d

Insert tool **T14** between the two planetary gears (18). Line up the entire unit by pushing bar **T16C** all the way down until gudgeon **T16A** is ejected.



GB e

Lock tool **T14** behind the planet wheel gears (18).
After locking, remove bar **T16C**.



GB f

Fit the snap rings (20) onto the pins (17).

a

ITA Impegnare la chiave speciale **T22** sulla ghiera (7) ed applicare sul pignone (8) il codolo **T21**.
Fermare la chiave **T22** e ruotare il pignone per allentare ed asportare la ghiera (7).
NOTA. Se lo smontaggio risulta faticoso, scaldare la ghiera a circa 80 °C.

D Den speziellen Schlüssel **T22** in die Nutmutter (7) setzen und am Rad (8) den Schaft **T21** anbringen.
Schlüssel **T22** festhalten und das Rad drehen, um die Nutmutter (7) zu lockern und abzunehmen.
BEMERKUNG. Falls die Nutmutter zu fest sitzt, diese auf ca. 80°C erhitzen.

ESP Bloquear la llave especial **T22** en la virola (7) y aplicar en el piñón (8) el mango **T21**.
Bloquear la llave **T22** y girar el piñón para aflojar y extraer la virola (7).
NOTA. Si el desmontaje resulta difícil, calentar la virola a unos 80°C.

F Engager la clé spéciale **T22** sur le collier de serrage (7) et appliquer sur le pignon (8) le cône **T21**.
Bloquer la clé **T22**, tourner le pignon pour relâcher et enlever le collier de serrage (7).
NOTE. Si le désassemblage est rendu difficile, chauffer la bague à une chaleur de 80°C.

b

ITA Applicare i blocchi **T23** e con un estrattore, estrarre il pignone (8) completo del cuscinetto interno (9), del distanziale (10) e degli spessori (11).
NOTA. Le ralle dei cuscinetti rimangono nel corpo centrale (12).

D Die Blöcke **T23** anbringen und mit einem Abzieher das Rad (8) samt dem inneren Lager (9), Distanzstück (10) und der Scheiben (11) herausziehen.
BEMERKUNG. Die Lagerscheiben bleiben im zentralen Körper (12) sitzen.

ESP Aplicar los bloqueos **T23** y con un extractor, extraer el piñón (8) con su cojinete interior (9) del separador (10) y de los posibles espesores (11).
NOTA. Las ranguas de los cojinetes quedan en el cuerpo central (12).

F Appliquer les blocs **T23** et à l'aide d'un extracteur, extraire le pignon (8) complet du palier interne (9), du différentiel (10) et des éventuelles cales (11).
NOTE. Les crapaudines des paliers demeurent dans le corps central (12).

c

ITA Asportare il pignone (8), gli spessori (11) ed il distanziale (10).

D Rad (8), Unterlegscheibe (11) und Distanzstück (10) abnehmen.

ESP Sacar el piñón (8), los espesores (11) y el separador (10).

F Enlever le pignon (8), les cales (11) et l'entretoise (10).

d

ITA Utilizzando un estrattore ed una pressa, rimuovere dal pignone (8) il cuscinetto interno (9).

D Mit einem Abzieher und einer Presse, vom Rad (8) das innere Lager (9) abnehmen.

ESP Utilizando un extractor y una prensa, remover del piñón (8) el cojinete interior (9).

F A l'aide de l'extracteur et d'une presse, ôter du pignon (8) le palier interne (9).

e

ITA Rimuovere la ralla del cuscinetto esterno (13).

D Scheibe vom äußeren Lager (13) abnehmen.

ESP Remover la rangua del cojinete exterior (13).

F Enlever la crapaudine du palier externe (13).

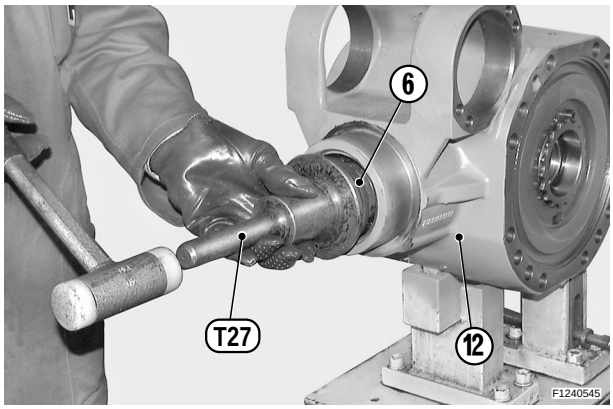
f

ITA Con un punzone inserito nelle cave predisposte, rimuovere la ralla del cuscinetto interno (9) e gli spessori di rasamento (14).

D Einen Dübel in die vorgesehenen Nuten stecken und die Scheibe des inneren Lagers (9) und die Zwischenlegscheiben (14) entfernen.

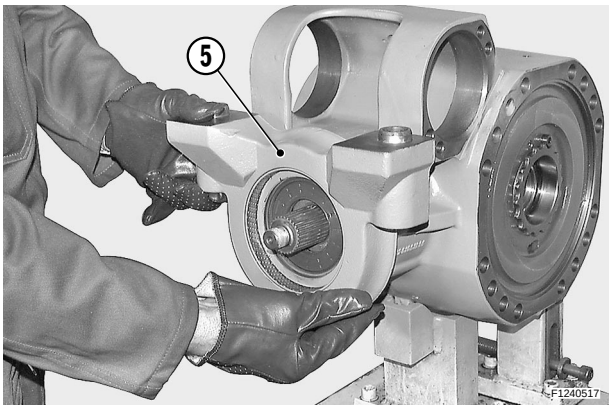
ESP Utilizando un punzón introducido en las ranuras predispuestas, remover la rangua del cojinete interior (9) y los espesores (14).

F A l'aide d'un poussoir introduit dans le creux prédisposé, enlever la crapaudine du palier interne (9) et les cales de rasage (14).



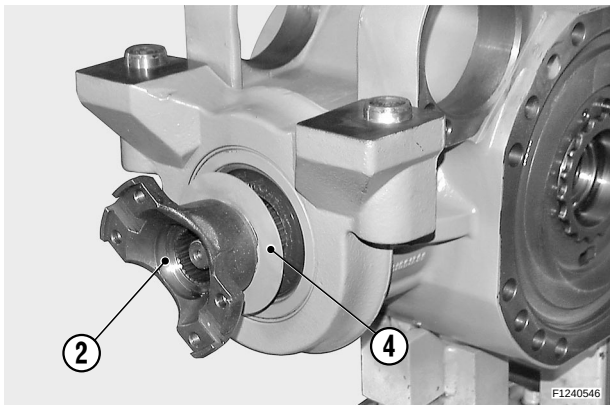
GB a

Lubricate the outer surface of the new sealing ring (6) and fit it onto the central body (12) using tool **T27**.



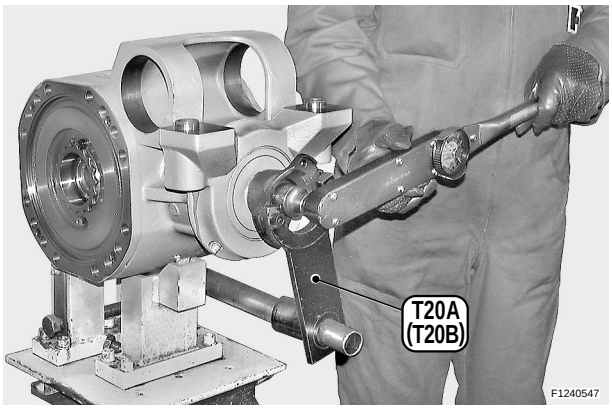
GB b

Install the swinging support (5).
NOTE. Check that it is properly oriented.



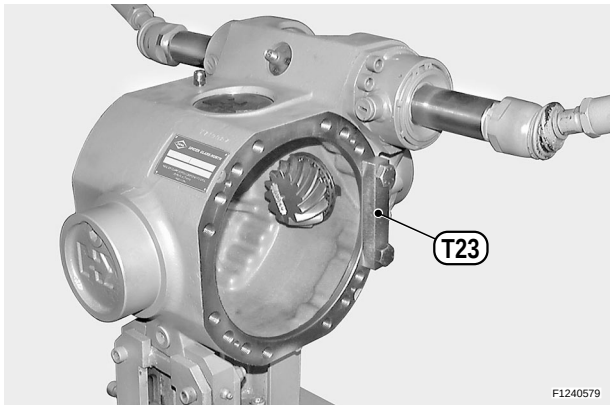
GB c

Fit the flange (2) complete with the guard (4) and fasten it.
For keying the flange (2), use a plastic hammer if necessary.
NOTE. Make sure that the guard (4) is securely fastened onto the flange and that it is not deformed.



GB d

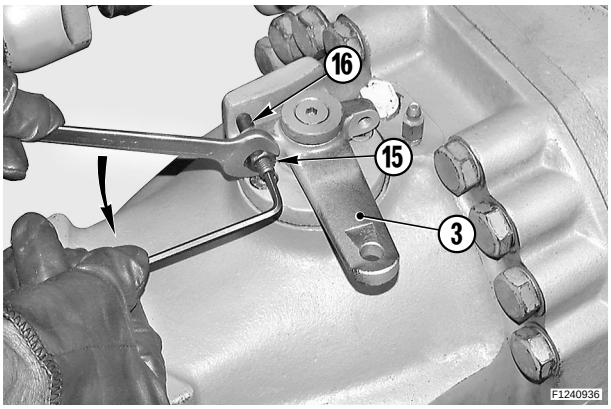
Apply Loctite 242 to the threaded part of the pinion (8).
Position tool **T20A** (or **T20B**) and fasten it in order to avoid rotation.
Insert O-ring (3) the nut (1) and tighten it using a dynamometric wrench.
Torque wrench setting: 280–310 Nm



GB e

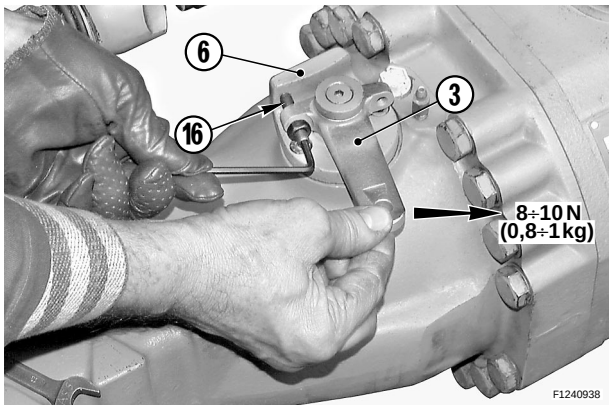
Remove blocks **T23** (used for extracting the pinion) and re-install the arms.
For details, see «CHECKING WEAR AND REPLACING THE BRAKING DISKS».

PROBLEM - PROBLEMA - PROBLEM - PROBLEMA - PROBLEME	CAUSE - CAUSE - URSACHE - CAUSAS - CAUSE	CORRECTION - RIMEDI - ABHILFE - REMEDIOS - REMEDE
Diff-lock inoperative *Il blocco differenziale non funziona* Differentialsperre ohne Wirkung *El bloque del diferencial no funciona* Mauvais fonctionnement du blocage du différentiel	17. If manual control, loose or misadjusted linkage *17. Se il comando è manuale: comando scollegato o registrato male* 17. Bei mechanisch betätigter Sperre, loser oder schlecht eingestellter Hebel *17. Si el mando es manual: mando desconectado o mal ajustado* 17. Si la commande est manuel: commande déconnectée ou mal réglée	Inspect and correct linkage and readjust as indicated in vehicle's service manual. *Controllare, riparare e registrare il comando indicato nel manuale del veicolo.* Hebel überprüfen und gemäß Anweisungen im Handbuch des Fahrzeuges einstellen. *Controlar, reparar y ajustar el mando indicado en el manual del vehículo.* Inspecter, réparer er régler la commande selon le manuel du véhicule.
	18. If hydraulic control, problems in the hydraulic or electrical circuits of the vehicle *18. Se il comando è idraulico: problemi nel circuito elettrico del veicolo* 18. Bei hydraulisch betätigter Sperre, Probleme in der hydraulischen oder elektrischen Anlage des Fahrzeuges *18. Si el mando es hidráulico: problemas en el circuito eléctrico del vehículo* 18. Si la commande est hydraulique: problème dans le circuit électrique dans le véhicule	Refer to the service manual for the vehicle. *Fare riferimento alle istruzioni nel manuale del veicolo.* Siehe Anweisungen im Handbuch des Fahrzeuges. *Consultar las instrucciones del manual del vehículo.* Voir instructions dans manuel du véhicule.
	19. If hydraulic control: problems in actuating cylinder (noteable through loss of hydraulic oil or increase of the oillevel in axle) *19. Se il comando è idraulico: problemi nell'attuatore (caratterizzati da perdite del fluido idraulico o da aumento del livello d'olio nel ponte)* 19. Bei hydraulisch betätigter Sperre, Ölverlust im Betätigungszylinder (erkentlich durch Verlust von hydraulisch Fluessigkeit oder Anstieg des Oelniveaus in der Achse) *19. Si el mando es hidráulico: problemas en el actuador (caracterizados por pérdidas del fluido hidráulico o por un aumento del nivel del aceite en el puente)* 19. Si la commande est hydraulique: problèmes dans le vérin (caracterisés par des fuites de fluide hydraulique ou augmentation du niveau d'huile dans le pont)	Rebuilt cylinder. *Controllare e riparare il cilindro.* Überprüfen und Zylinder reparieren. *Controlar y reparar el cilindro.* Inspecter et reparer le cylindre.
	20. If with lim. slip differential, worn discs *20. Se il differenziale è del tipo autobloccante, dischi usurati* 20. Wenn mit Selbstsperrdifferential, Scheiben verschlissen *20. Si el diferencial es del tipo autobloqueante: discos gastados* 20. Si avec différentiel à glissement limité, usure sur les disques	Replace discs. *Sostituire i dischi.* Scheiben ersetzen. *Sustituir los discos.* Remplacer les disques.



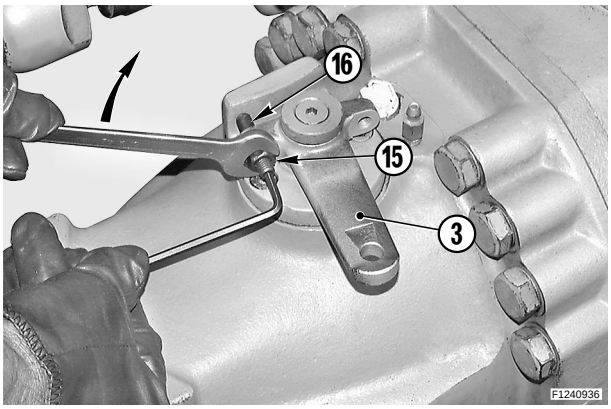
GB a

Connect the braking circuit and apply maximum working pressure to set the disks.
Release the pressure, loosen nut (15) and unscrew dowel (16) by a few turns.



GB b

Apply a force of 8 – 10 N (0.8 – 1 kg) to lever (3). Direct the force towards the braking direction in order to eliminate the idle stroke. While the force is being applied, tighten dowel (16) until it is caused to rest onto bush (6).



GB c

Lock dowel (16) in this position with nut (15).
Torque wrench setting: 20 – 25 Nm.
CAUTION! The idle stroke should be eliminated without preloading thrust levers (12) and (13).

GB d

CAUTION! After connecting the control cable, check that when brakes are released both dowels (16) do lean against bush (6).

a

ITA Controllare che i satelliti abbiano un leggero gioco rispetto il primo ingranaggio planetario.
Posizionare il secondo ingranaggio planetario (6) ed il secondo gruppo di frizione (7) nel corpo differenziale (9).

D Kontrollieren, ob die Planetengetriebe etwas Spiel im Verhältnis zum ersten Planetengetriebe haben.
Das zweite Planetengetriebe (6) und das zweite Kupplungsaggregat (7) in den Differentialkörper (9) einsetzen.

ESP Controlar que los satelites tengan un ligero juego respecto al primero engranaje planetario.
Colocar el segundo engranaje planetario (6) y el segundo grupo de friciòn (7) en el cuerpo diferencial (9).

F Contrôler que les satellites aient un peu de jeu par rapport au premier engrenage planétaire.
Mettre le deuxième engrenage planétaire (6) en place ainsi que le second groupe de friction (7) du corps différentiel (9).

b

ITA Allineare i fori di lubrificazione della corona (4) con le cave della scatola differenziale sulle sporgenze del gruppo di frenatura. Posizionare la corona (4) sul corpo differenziale (9) e bloccarla con le viti (3) spalmate con Loctite 242.
Coppia di serraggio viti: 128÷142 Nm
NOTA. Serrare le viti con il metodo del serraggio incrociato.

D Die Schmierlöcher des Kranzes (4) der Differentialschachtel mit den Vorsprüngen des Bremsaggregats ausrichten. Den Kranz (4) auf den Differentialkörper (9) positionieren und mit den Schrauben (3), die zuvor mit Loctite 242 geschmiert wurden, blockieren. Anzugsmoment der Schrauben: 128÷142 Nm.
BEMERKUNG. Sie Schrauben im Kreuz fest schrauben.

ESP Alinear los agujeros de lubrificar de la corona con los nichos de la caja diferencial (4) sobre las partes salientes del grupo de frenadura.
Colocar la corona (4) sobre el cuerpo diferencial (9) y bloquearla con los tornilloss: 128÷142 Nm.
NOTA. Apretar los tornillos de manera cruzada.

F Aligner les trous de lubrification de la couronne (4) avec les creux du carter différentiel sur les saillies du groupe de freinage. Placer la couronne (4) sur le corps différentiel (9) et bloquer celle-ci avec les vis (3) enduites de Loctite 242.
Couple de serrage des vis: 128÷142 Nm.
NOTE. Serrer les vis avec la méthode de serrage croisée.

c

ITA Se sono stati rimossi, montare i cuscinetti (5) e (8) utilizzando l'attrezzo **T17**.

D Falls sie abmontiert wurden, die Lager (5) und (8) mit dem Werkzeug **T17** montieren.

ESP Si han sido removidos, montar los cojinetes (5) y (8) utilizando la herramienta **T17**.

F S'ils ont été enlevés, remonter les paliers (5) et (8) à l'aide de l'outil **T17**.

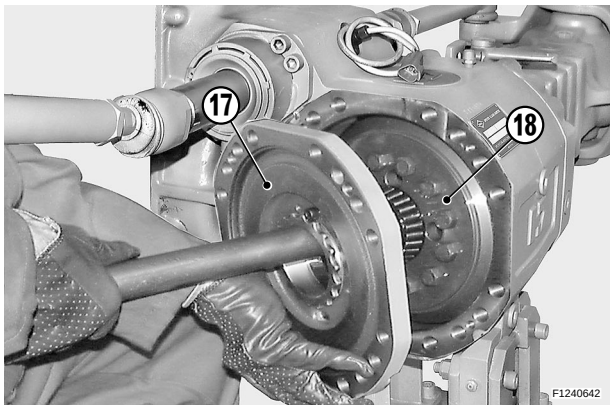
d

ITA Installare nel corpo centrale (1) il gruppo differenziale (2) completo.
Per i dettagli, vedere «INSTALLAZIONE GRUPPO DIFFERENZIALE».

D In den zentralen Körper (1) das vollständige Differentialaggregat (2) installieren.
Für weitere Einzelheiten, siehe «INSTALLATION DES DIFFERENTIALAGGREGATS».

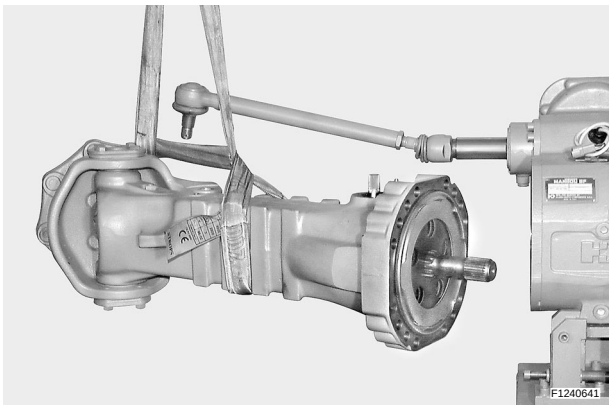
ESP Introducir en el cuerpo central (1) el grupo diferencial (2) completo.
Para los detalles, vease «INSTALACION GRUPO DIFERENCIAL»

F Installer dans le corps central (1) le groupe différentiel (2) complet.
Pour tout détail, voir «INSTALLATION DU GROUPE DIFFERENTIEL».



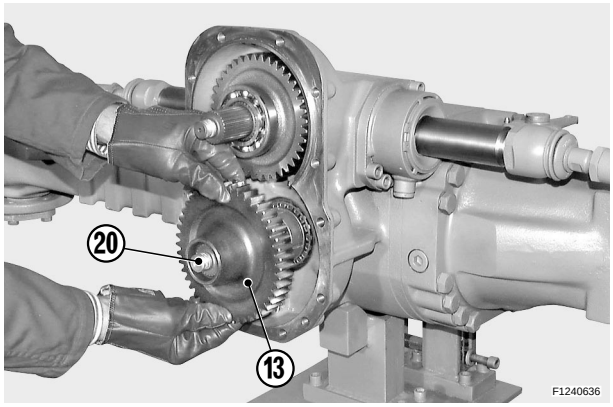
GB a

Re-install the differential unit (18) and the intermediate cover (17).
CAUTION! If the crown has been replaced, reinstate clearances.
For details, see «HOW TO ASSEMBLE AND ADJUST THE DIFFERENTIAL UNIT».



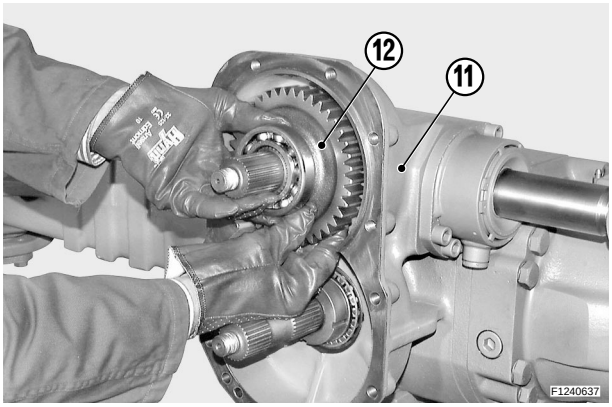
GB b

Re-install the complete arm checking flatness and blocking the arm by keeping to the appropriate procedures illustrated in section «HOW TO ASSEMBLE THE BRAKING UNITS».
Also connect the steering bar.



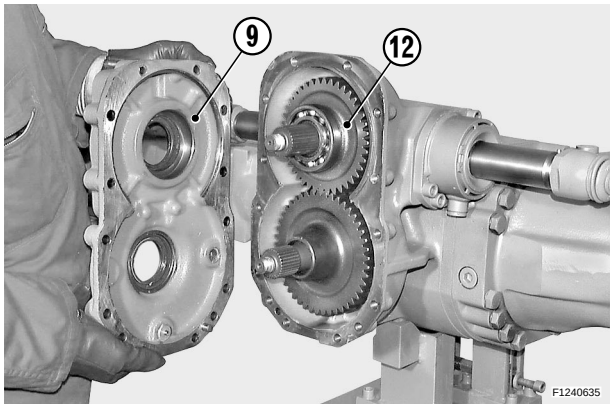
GB c

Fit the lower gear (13) onto the pinion (20).



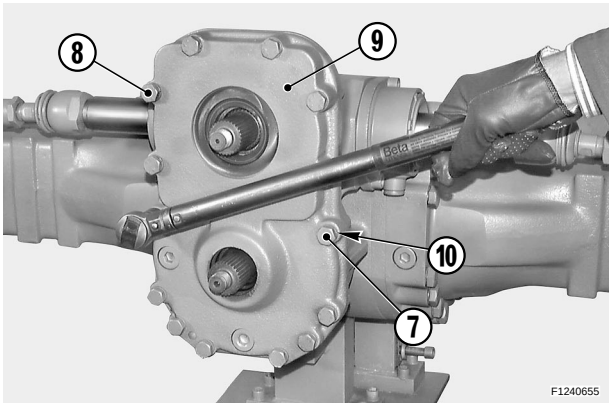
GB d

Insert the upper gear unit (12) into the body of the reduction gear (11).



GB e

Apply Loctite 510 to the locking surface of the body of the reduction gear (11).
Lubricate snap rings (6) and (15); fit cover (9) and set cover (if necessary) by lightly tapping with a plastic hammer.

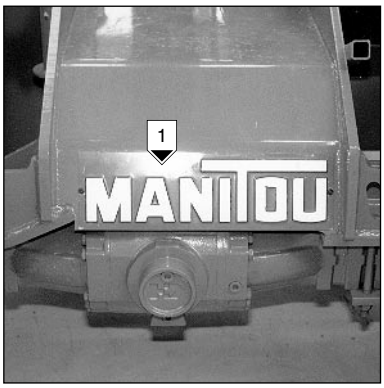


GB f

Block cover (9) with screws (7) and (8) and relative washers (10). Tighten using the criss-cross method.
Torque wrench setting: 82 – 91 Nm

BLEEDING THE BRAKE CIRCUIT

TOOLING REQUIRED : 1 bleeder (pressure 1 to 1.2 bar) ref 554 019

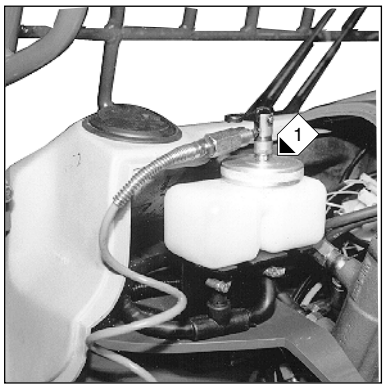


1

- Raise the jib
- Disassemble the front cover 1.

2

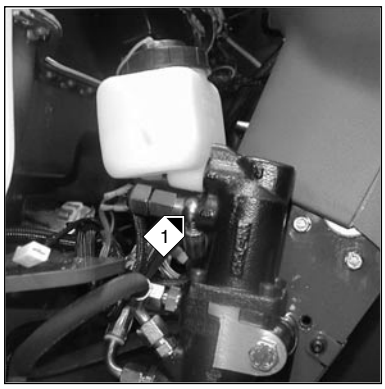
- Disassemble the lower left hand instrument panel casing.



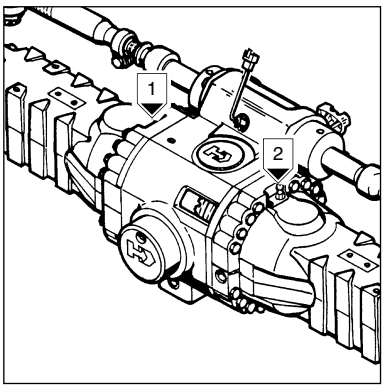
3

- Remove the brake fluid tank cap and mount the bleeder adapter 1.

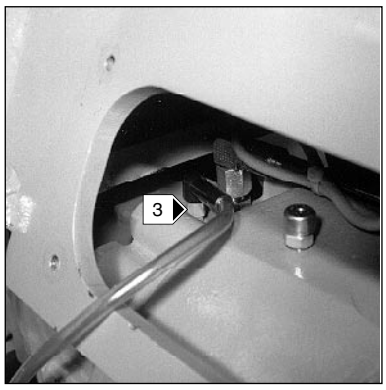
- Set the bleeder in operation.
- Bleed the master cylinder (MLT series A) by undoing screw 1 (Fig. 3a).



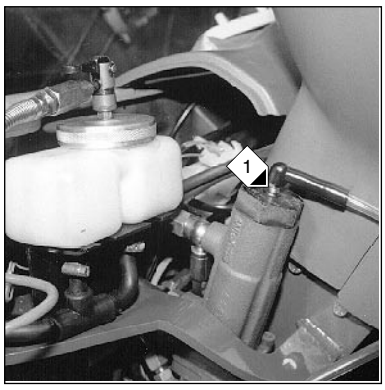
3a



4



5



6

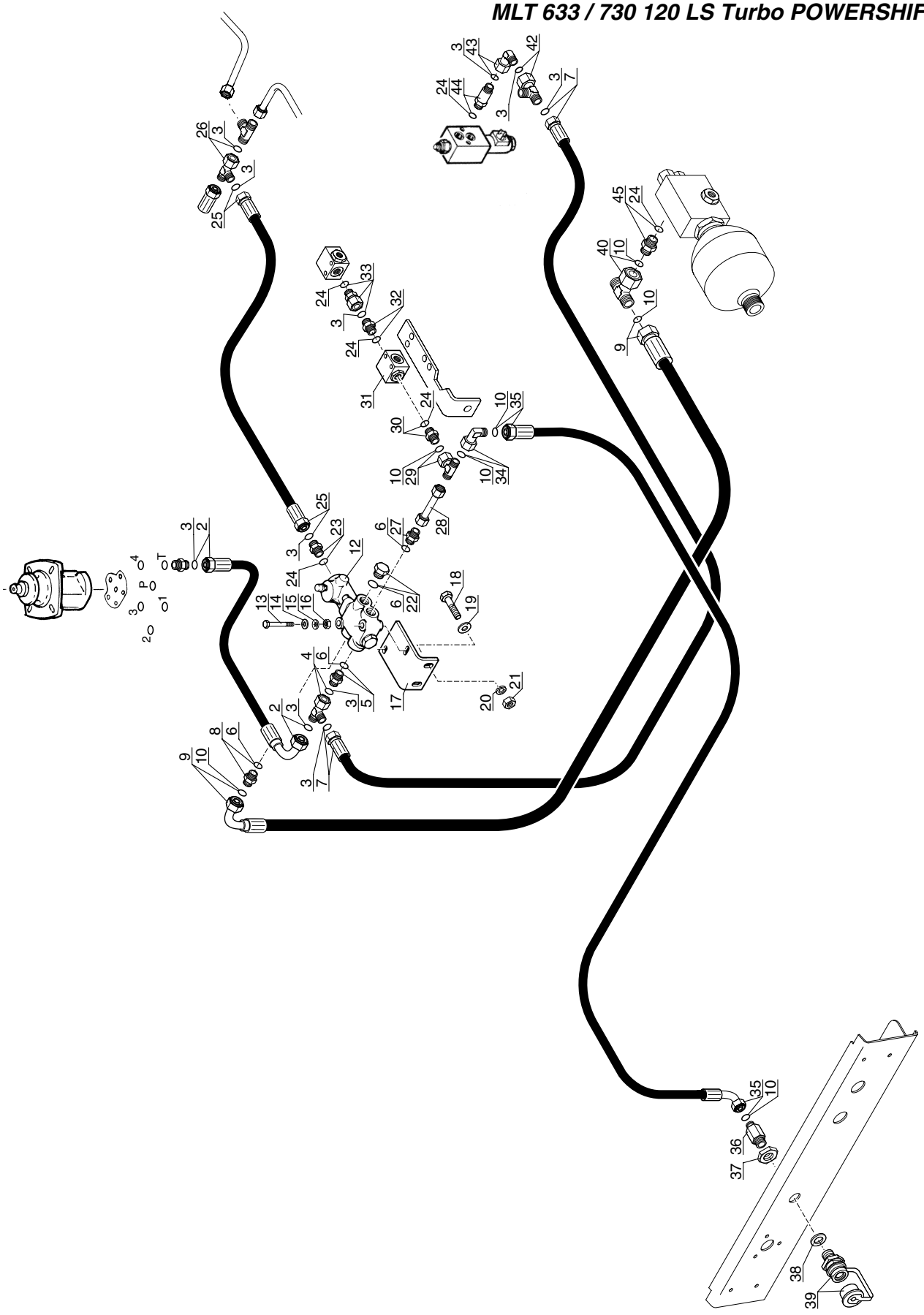
- Fit a transparent collector tube onto the rear axle left hand bleeder screw 1 (Fig. 4).
- Loosen the drain screw, then when the brake fluid begins to flow with no air bubbles, tighten up the bleeder valve.
- Follow the same procedure with the rear axle right hand bleeder screw 2 (Fig. 4), on the front axle right hand bleeder screw 3 (Fig. 5), on the front axle left hand bleeder screw and bleed the master cylinder (MT and MLT Series 1), bleed screw 1 (Fig. 6).

- Top up the brake fluid tank.

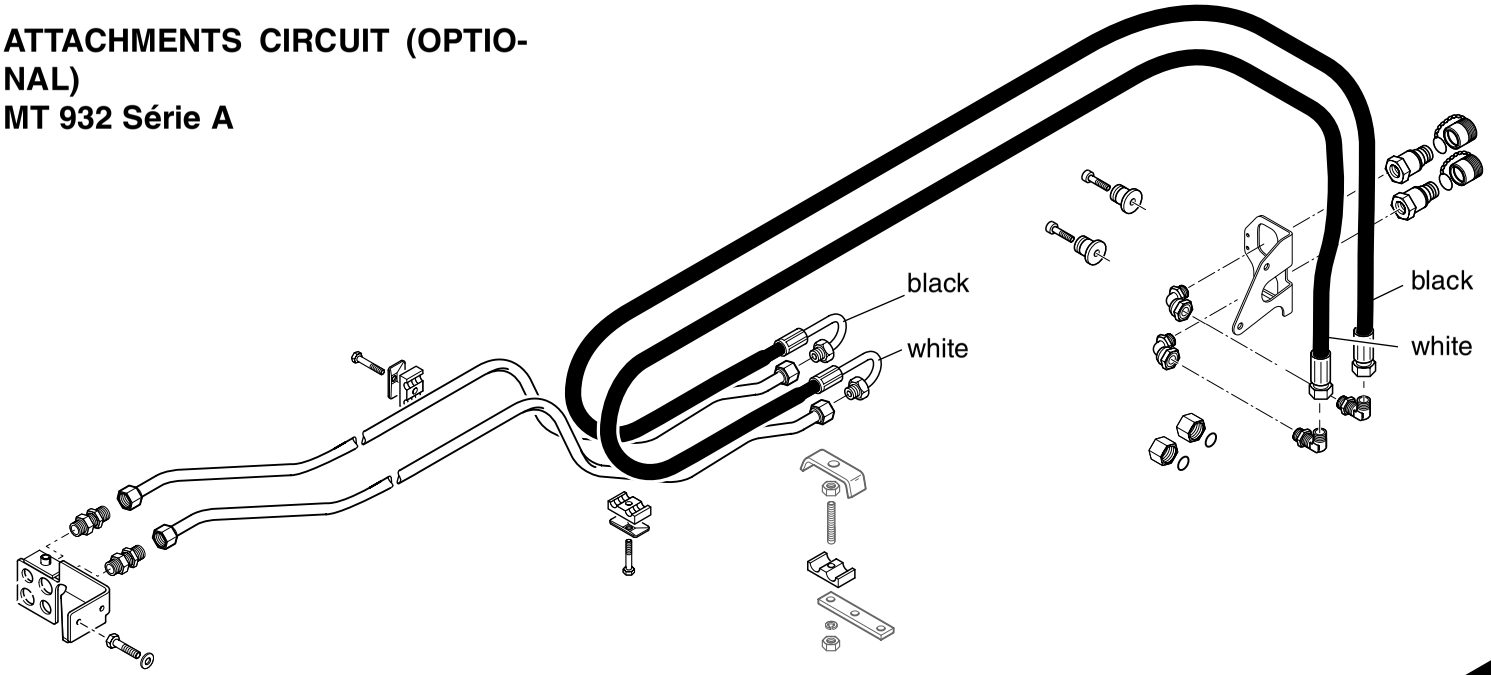
Oil to use : See "CHARACTERISTICS" in chapter " O - GENERAL"

HYDRAULIC TRAILER BRAKE CIRCUIT (OPTION)
- UP TO MACHINE N° 142 537

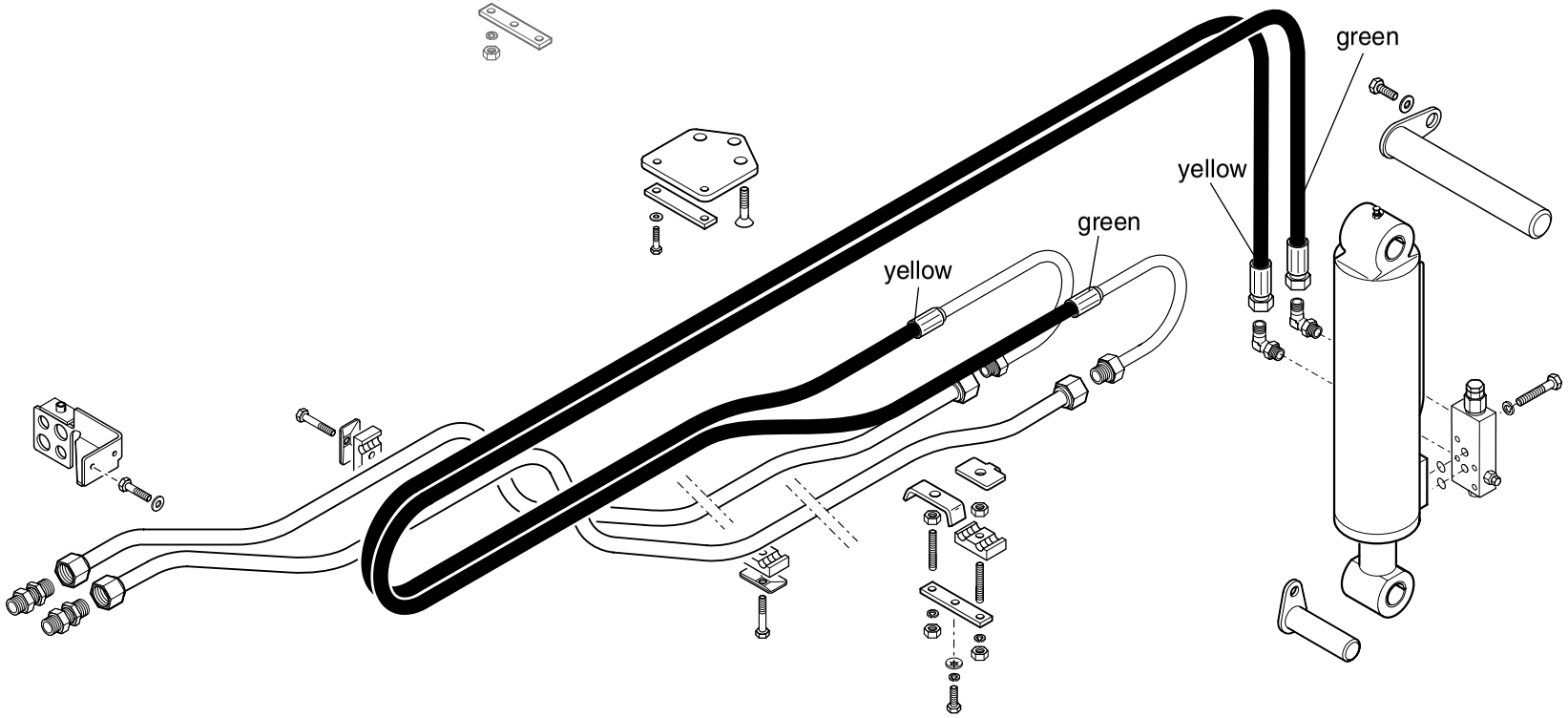
MLT 633 / 730 LS Turbo
MLT 633 / 730 120 LS Turbo
MLT 633 / 730 120 LS Turbo POWERSHIFT



ATTACHMENTS CIRCUIT (OPTIONAL)
MT 932 Série A

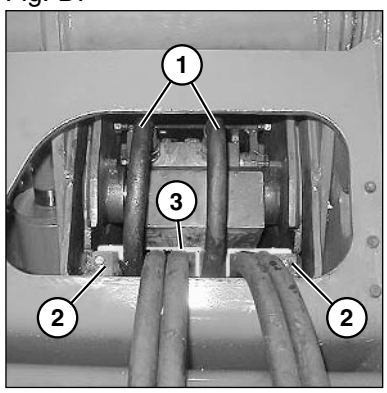


TILT CIRCUIT
MT 932 Série A



- Disconnect and blank the two cylinder supply hoses 1 (Fig. DI).
- Blank the two cylinder valve connectors.
- Remove the two pads 2 (Fig. DI).
- Remove the hose guide 3 (Fig. DI).

Fig. DI

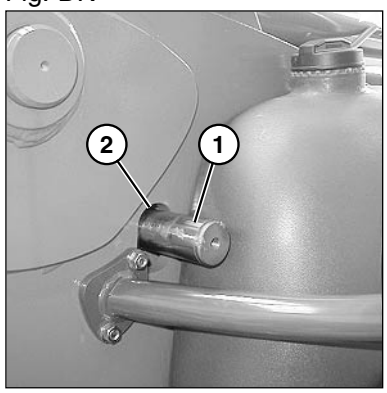


- Remove the rear LH light bracket 1 (Fig. DJ).

Fig. DJ

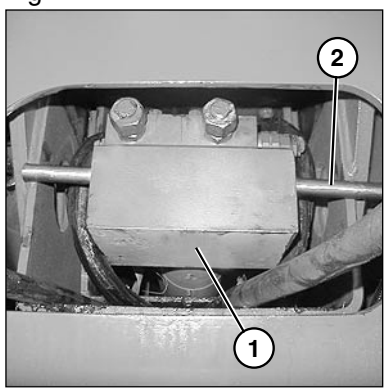
- Drive out the pin 1 from the bottom of the cylinder from the left hand side to remove it through the hole in the chassis 2 (Fig. DK).
- Remove the pin 1 (Fig. DK).

Fig. DK



- Raise the jib slightly (max 5°).
- Using a lever, pull the telescopic cylinder 1 (Fig. DL) backwards.
- Wedge the cylinder using a bar 2 (Fig. DL) at the back of the bottom of the jib (to prevent the cylinder from moving into the jib when you remove the intermediate telescope).

Fig. DL



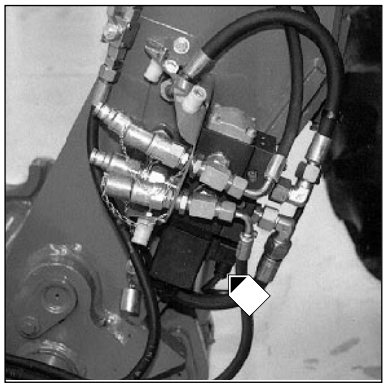
INDEX

- ADJUSTMENT AND IMMOBILIZATION OF THE JIB WEAR PADS 4
- REMOVAL OF THE PAIRED HOSES IN THE JIB 6
- REMOVAL OF THE TILTING CYLINDER 10
- REMOVAL OF THE CARRIAGE 12
- REMOVAL OF THE TELESCOPING CYLINDER 14
- REMOVAL OF THE TELESCOPE 16

REMOVAL OF THE INNER BOOM

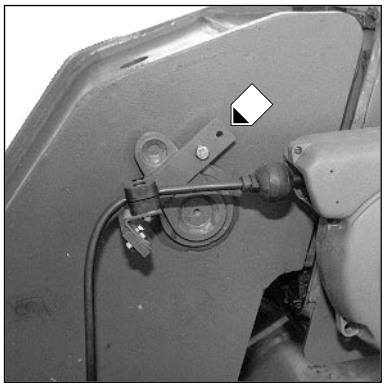
REMOVAL OF THE INNER BOOM

- Remove the following items before removing the inner boom.
  - Remove the paired hoses in the jib.
  - Remove the tilting cylinder.
  - Remove the carriage.
  - Remove the telescoping cylinder.



1

- Disconnect the electrical bundle from the reel at the level of the jib head electrovalve and pull it clear (Option).

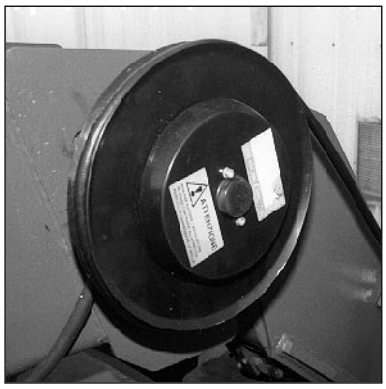


2

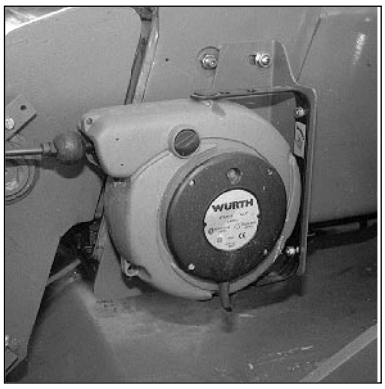
- Disassemble the harness mounting (Option).

3

- Hold the leak return hose, disassemble it and guide it onto the reel (Option).



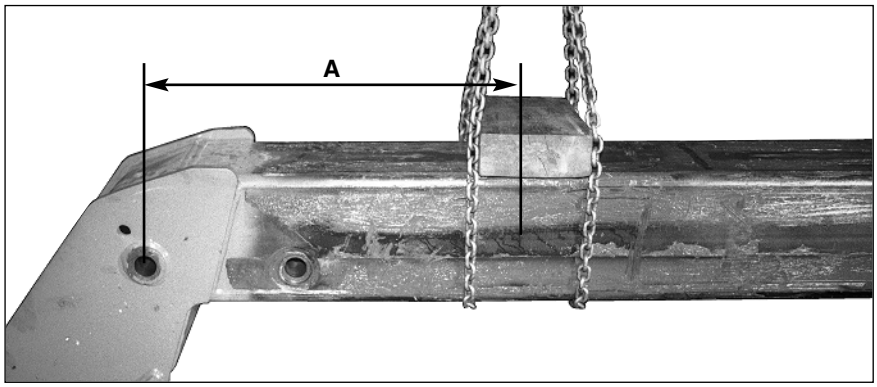
4



5

- Pass a bar into the telescoping cylinder head opening for example, and draw the inner boom until the rear wear pads almost butt against the front wear pads.

- Remove the electrical and hydraulic reel (Option).



6

- Sling the inner boom at the point at distance A depending on the options fitted to the lift truck.

6 M JIB
- Bare inner boom
  A = mm
- Inner boom with electrovalve at jib head
  A = 780 mm

7 M JIB
- Bare inner boom
  A = mm
- Inner boom with electrovalve at jib head
  A = mm

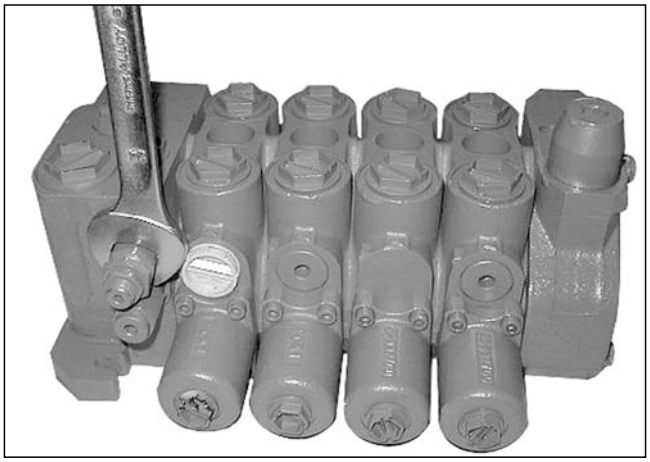
DISTRIBUTOR DISASSEMBLY

70-2-54-M33 EN

M29	MT 732 *Série 1 et A* MT 732 Turbo *Série 1 et A* MT 932 *Série 1 et A* MT 932 Turbo *Série 1 et A*	MLT 629 *Série 1 et A* MLT 629 Turbo *Série 1 et A* MLT 629 120 LS *Série A* MLT 633 Turbo LS *Série 1 et A* MLT 633 Turbo POWERSHIFT *Série 1* MLT 633 120 LS *Série 1 et A* MLT 633 120 LS POWERSHIFT *Série 1 et A*	MLT 730 *Série 1 et A* MLT 730 Turbo *Série 1 et A* MLT 730 Turbo LS *Série 1 et A* MLT 730 Turbo POWERSHIFT *Série 1 et A* MLT 730 120 LS *Série 1 et A* MLT 730 120 LS POWERSHIFT *Série 1 et A*
M30	MT 732 *Série 1 et A* MT 732 Turbo *Série 1 et A* MT 932 *Série 1 et A* MT 932 Turbo *Série 1 et A*		
M31		MLT 629 *Série 1 et A* MLT 629 Turbo *Série 1 et A* MLT 629 120 LS *Série A* MLT 633 Turbo LS *Série 1 et A* MLT 633 Turbo POWERSHIFT *Série 1* MLT 633 120 LS *Série 1 et A* MLT 633 120 LS POWERSHIFT *Série 1 et A*	MLT 730 *Série 1 et A* MLT 730 Turbo *Série 1 et A* MLT 730 Turbo LS *Série 1 et A* MLT 730 Turbo POWERSHIFT *Série 1 et A* MLT 730 120 LS *Série 1 et A* MLT 730 120 LS POWERSHIFT *Série 1 et A*
M32	MT 732 *Série 1 et A* MT 732 Turbo *Série 1 et A* MT 932 *Série 1 et A* MT 932 Turbo *Série 1 et A*	MLT 629 *Série 1 et A* MLT 629 Turbo *Série 1 et A* MLT 633 Turbo POWERSHIFT *Série 1*	MLT 730 *Série 1 et A* MLT 730 Turbo *Série 1 et A* MLT 730 Turbo POWERSHIFT *Série 1 et A*
M33		MLT 629 120 LS *Série A* MLT 633 Turbo LS *Série 1 et A* MLT 633 120 LS *Série 1 et A* MLT 633 120 LS POWERSHIFT *Série 1*	MLT 730 Turbo LS *Série 1 et A* MLT 730 120 LS *Série 1 et A* MLT 730 120 LS POWERSHIFT *Série 1 et A*
M34	MT 732 *Série 1 et A* MT 732 Turbo *Série 1 et A* MT 932 *Série 1 et A* MT 932 Turbo *Série 1 et A*	MLT 629 *Série 1 et A* MLT 629 Turbo *Série 1 et A* MLT 629 120 LS *Série A* MLT 633 Turbo LS *Série 1 et A* MLT 633 120 LS *Série 1 et A*	MLT 730 *Série 1 et A* MLT 730 Turbo *Série 1 et A* MLT 730 Turbo LS *Série 1 et A* MLT 730 120 LS *Série 1 et A*
M35		MLT 633 Turbo POWERSHIFT *Série 1 et A* MLT 633 120 LS POWERSHIFT *Série 1*	MLT 730 Turbo POWERSHIFT *Série 1 et A* MLT 730 120 LS POWERSHIFT *Série 1 et A*
M36	MT 732 *Série 1 et A* MT 732 Turbo *Série 1 et A* MT 932 *Série 1 et A* MT 932 Turbo *Série 1 et A*	MLT 629 *Série 1 et A* MLT 629 Turbo *Série 1 et A* MLT 633 Turbo LS *Série 1 et A* MLT 633 Turbo POWERSHIFT *Série 1*	MLT 730 *Série 1 et A* MLT 730 Turbo *Série 1 et A* MLT 730 Turbo LS *Série 1 et A* MLT 730 Turbo POWERSHIFT *Série 1 et A*
M37		MLT 629 120 LS *Série A* MLT 633 120 LS *Série 1 et A* MLT 633 120 LS POWERSHIFT *Série 1*	MLT 730 120 LS *Série 1 et A* MLT 730 120 LS POWERSHIFT *Série 1 et A*

5 - SX 14 BLOCK REPAIR PROCEDURES

5.1 CHANGING THE LS LIMITER



NB : This operation does not require removal of the distribution block from the machine.

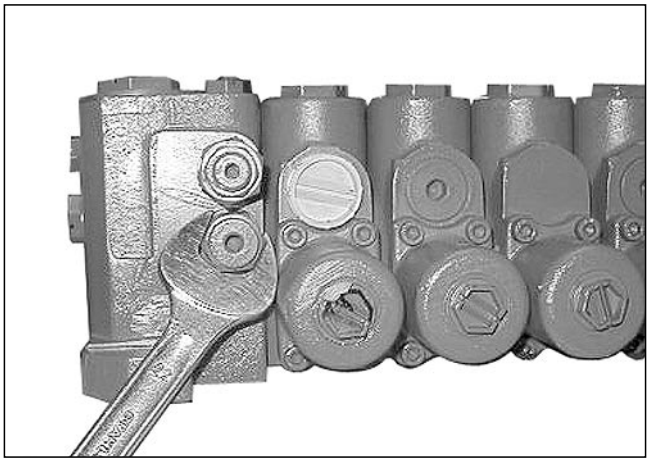
Machine switched off :
- Place all machine receivers connected to the distribution block in the idle position.
- Work the distribution slide valves to release the pressure build-up.

NB : Collect any leaking oil in an appropriate receptacle.

- On the inlet member, unscrew the LS limiter (17 mm wrench).

Remounting : tightening torque 25 ± 2 N.m.

5.2 CHANGING THE FLOW RATE GOVERNOR



NB : This operation does not require removal of the distribution block from the machine.

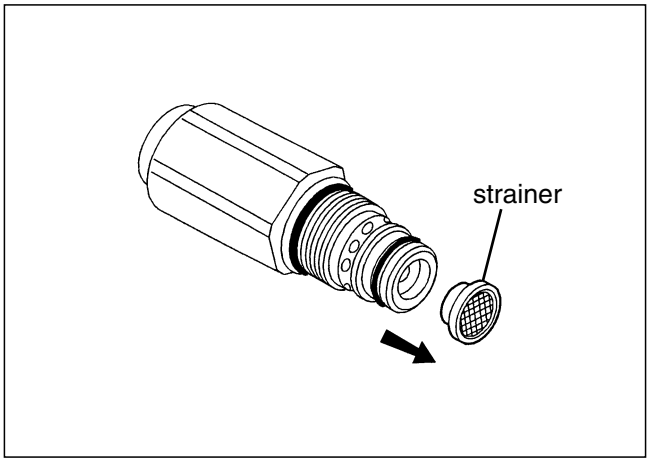
Machine switched off :
- Place all machine receivers connected to the distribution block in the idle position.
- Work the distribution slide valves to release the pressure build-up.

NB : Collect any leaking oil in an appropriate receptacle.

- On the inlet member, unscrew the flow rate governor (22 mm wrench)

Remounting : tightening torque 20 ± 2 N.m.

REMOVING AND REPLACING THE STRAINER



- Using flat nose pliers, extract the strainer from the governor.

Warning: do not damage the O-ring on the end of the governor.

A9

Release the bearing.

A10

Remove the input and output shafts.

A11

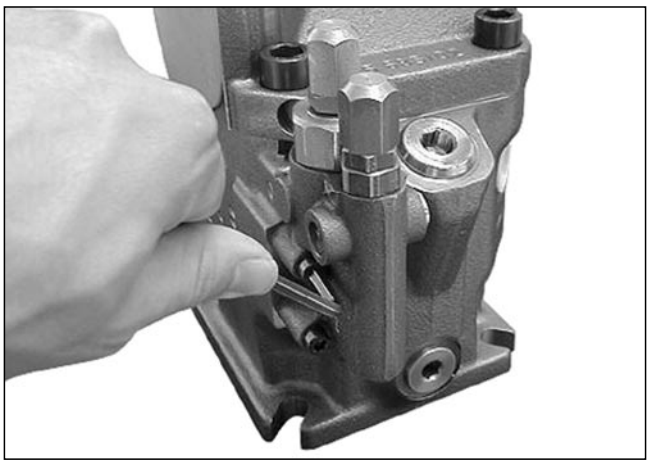
Release the lower bearing and draw a mark on the bearing and the body to ensure correct reassembly.

A12

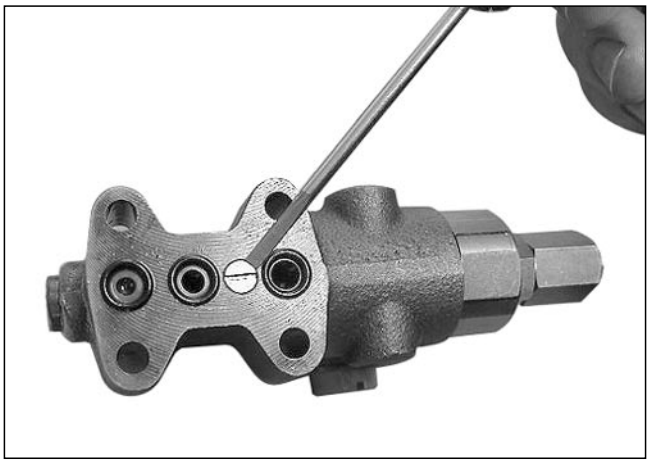
Remove the ring seal

1 - DISMANTLING

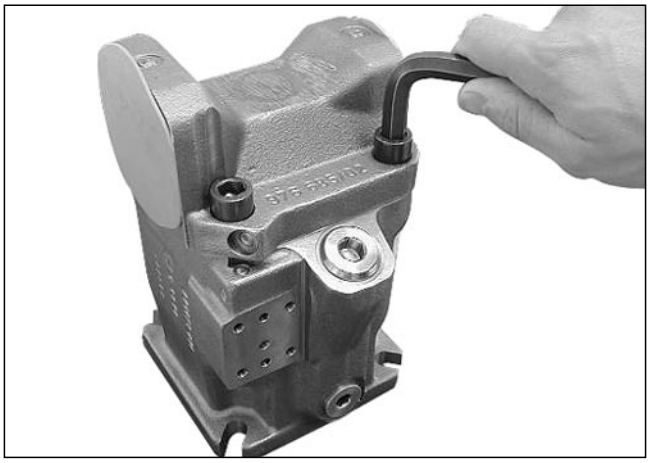
- Remove the governing unit



On refitting, make sure the pivoting choke in the governing unit is properly positioned (Slot in line with the oil circulation holes).



- Position the pump vertically.
- Note the position and remove the cylinder head.



- Remove the cylinder head, holding the slide-face in position.

REASSEMBLY

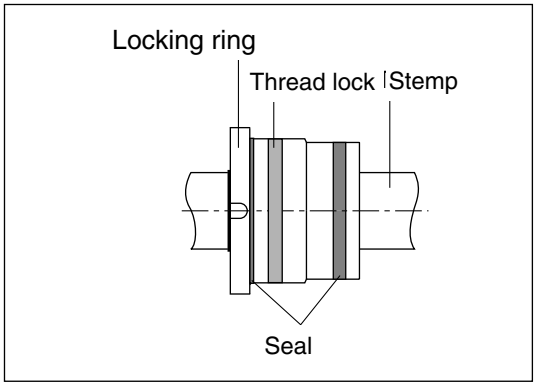
- Apply hydraulic oil on the piston seals and ring, using a brush.
- Reassemble the complete stem inside the cylinder body 3 (Fig. A1).
- Ensure that the seals are not damaged while passing through the inside thread in the cylinder body.

NOTA : The locking ring is tightened in different ways depending on whether the cylinder body has a collar or not (Fig. A4). Follow the instructions below.

CYLINDER WITHOUT COLLAR

- Apply hydraulic oil to the outer seals of the locking ring.
- Apply Loctite 222 thread lock (see section E) to the locking ring (Fig. A3).
- Tighten the ring.
- Lock using a pin wrench and a torque wrench. Refer to the tightening torque (Fig. A4) or use the angular tightening procedure (Fig. A4).
- Rotate the stemp through one turn to ensure the seals are correctly positioned.

A3



CYLINDER WITH COLLAR

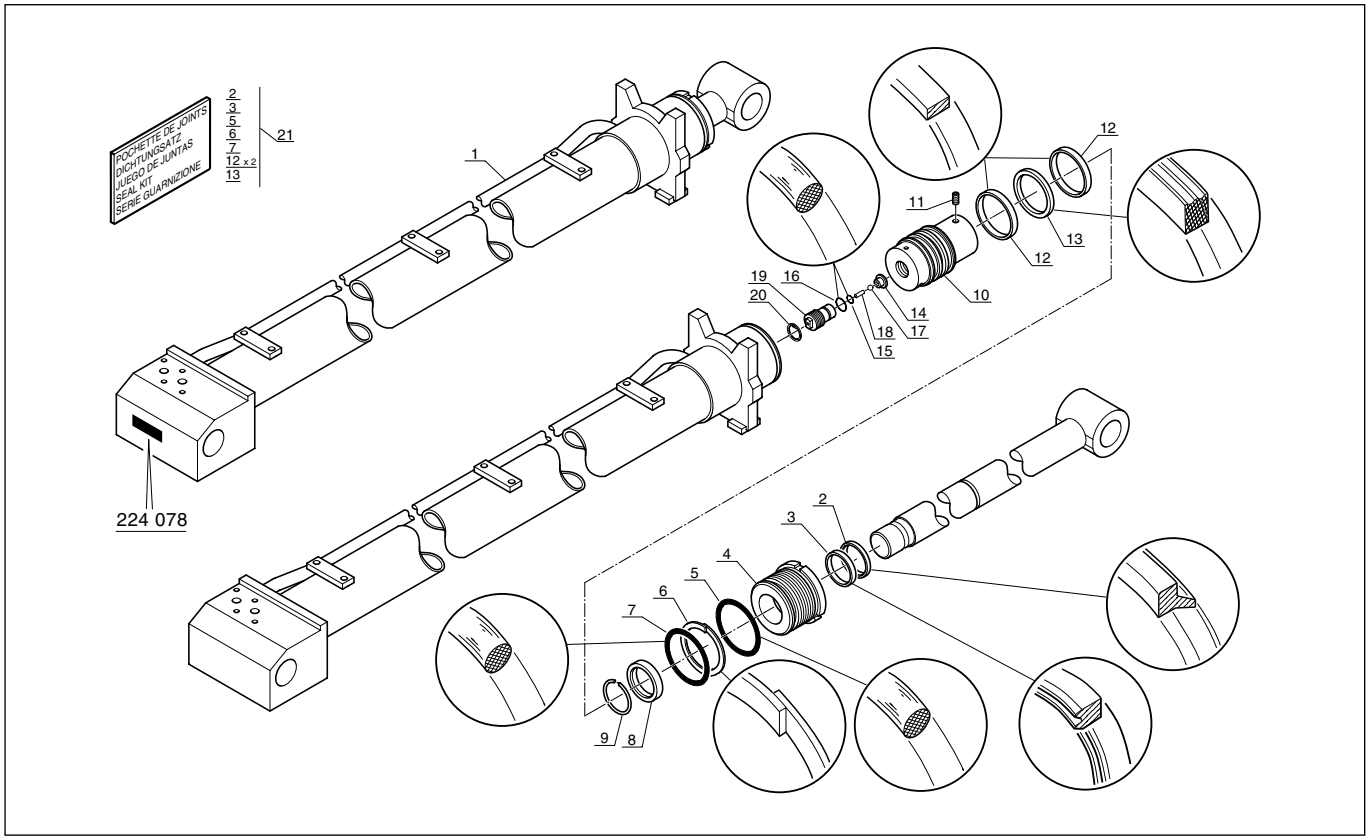
- Apply hydraulic oil to the seals and thread of the locking ring.
- Tighten the ring.
- Lock using a pin wrench and a torque wrench. Refer to the tightening torque (Fig. A4) or use the angular tightening procedure (Fig. A4).
- Rotate the stemp through one turn to ensure the seals are correctly positioned.

NOTE

- It is recommended that the cylinder is tested hydraulically before reassembly on the machine.
- Extend and retract the stemp several times.

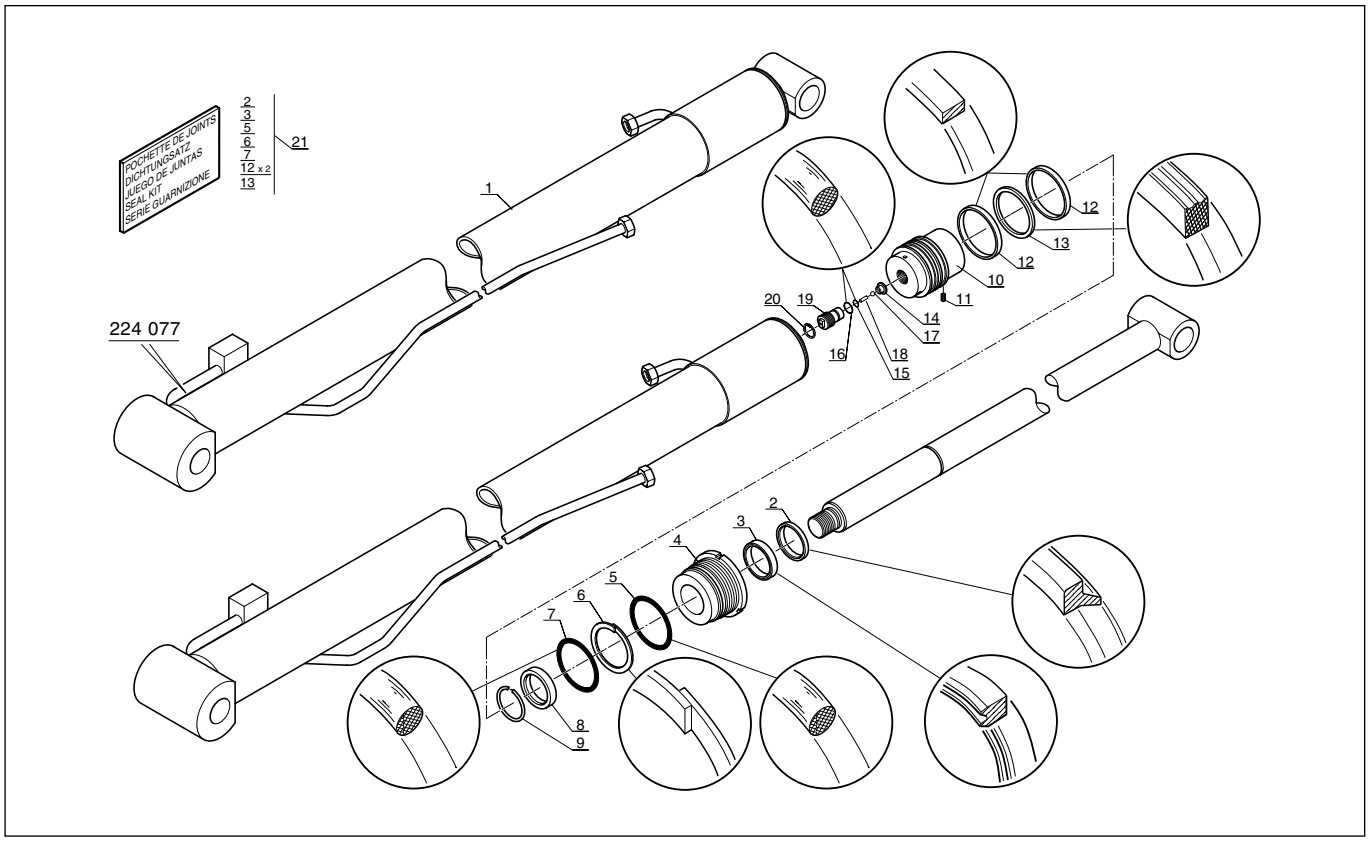
INNER TELESCOPING CYLINDER

MT 932 Série 1 et A



OUTER TELESCOPING CYLINDER

MT 932 Série 1 et A



TROUBLESHOOTING

Faults noted by abnormal machine operation

SYMPTOMS	PROBABLE CAUSES A10V0 PUMP	PROBABLE CAUSES SX14 CONTROL VALVE	ADDITIONAL CHECKS	SOLUTIONS
Lack of force on all receivers	1 - Low oil level		Check oil level in oil tank	
	2 - Suction strainer clogged		Remove and clean strainer	
	3 - FR regulator unadjusted			Adjust FR regulator (see section 1.1)
	4 - FR regulator faulty or seized			Remove and change DFR regulation block (see unit 70-3-47)
	5 - DR limiter unadjusted			Adjust DR limiter (see section 1.4)
	6 - DR limiter faulty			Remove and change DFR regulation block (see unit 70-3-47)
	7 - FR regulator control incorrect		Check LS limiter of control valve	Change flow regulator or clean strainer (see unit 70-3-54 M33 section 5.2)
		1 - LS limiter faulty	Measure pressure (see unit 70-5-M33)	Change LS limiter (see unit 70-3-54 M33 section 5.1)
		2 - LS limiter unadjusted		Adjust setting (see section 1.5)
Lack of force on all receivers at maximum engine speed	1 - Anti-stalling device unadjusted		Check adjustment setting of anti-stalling limiter	Check and adjust pressure (see section 1.2)
	2 - Anti-stalling device faulty		Check operation of anti-stalling module	Check anti-stalling module (see section 1.3)
Lack of force on one receiver		1 - Overpressure or anti-shock secondary limiter unadjusted		Reset to original pressure (see section 1.4)
		2 - Secondary limiter valve stuck "open" (return to tank)		Change secondary limiter (see unit 70-3-54 M33 section 5.5)

BA Power unit + Accumulator

CA Suction strainer
CR(O) Towing hook (Option)
CSP Piloted safety valve

D Valve bank 4 or 5 sections
- EA Attachment section
- EA(O) Attachment section (Option)
- EE Inlet section
- EI Tilting section
- EL Lifting section
- EF Outlet section
- ET Telescope section

D3 Driving valve bank 3 positions
- Position 1 : Steering short
- Position 2 : Steering front wheel
- Position 3 : Crab position

EVTF(O) Jib head electrovalve (Option)

FDAV Front disk brake
FDAR Rear disk brake
FR Return filter

M I. C. Engine
MA Joystick
- M1 Attachment
- M2 Extending telescope
- M3 Attachment
- M4 Retracting telescope

MC Master cylinder

N Level

P Hydraulic pump
PAAV Front attachment fitting
PAAV(O) Front attachment fitting (Option)
PAAR(O) Rear attachment fitting (Option)
PD Steering pump
PFR(O) Trailer braking fitting (Option)
PP Pressure point
PRF(O) Drain-back fitting (Option)

R Hydraulic tank
RLF Braking oil tank

SC Circuit selector
SCFR(O) Trailer braking circuit selector (Option)
S2F Selector 2 functions

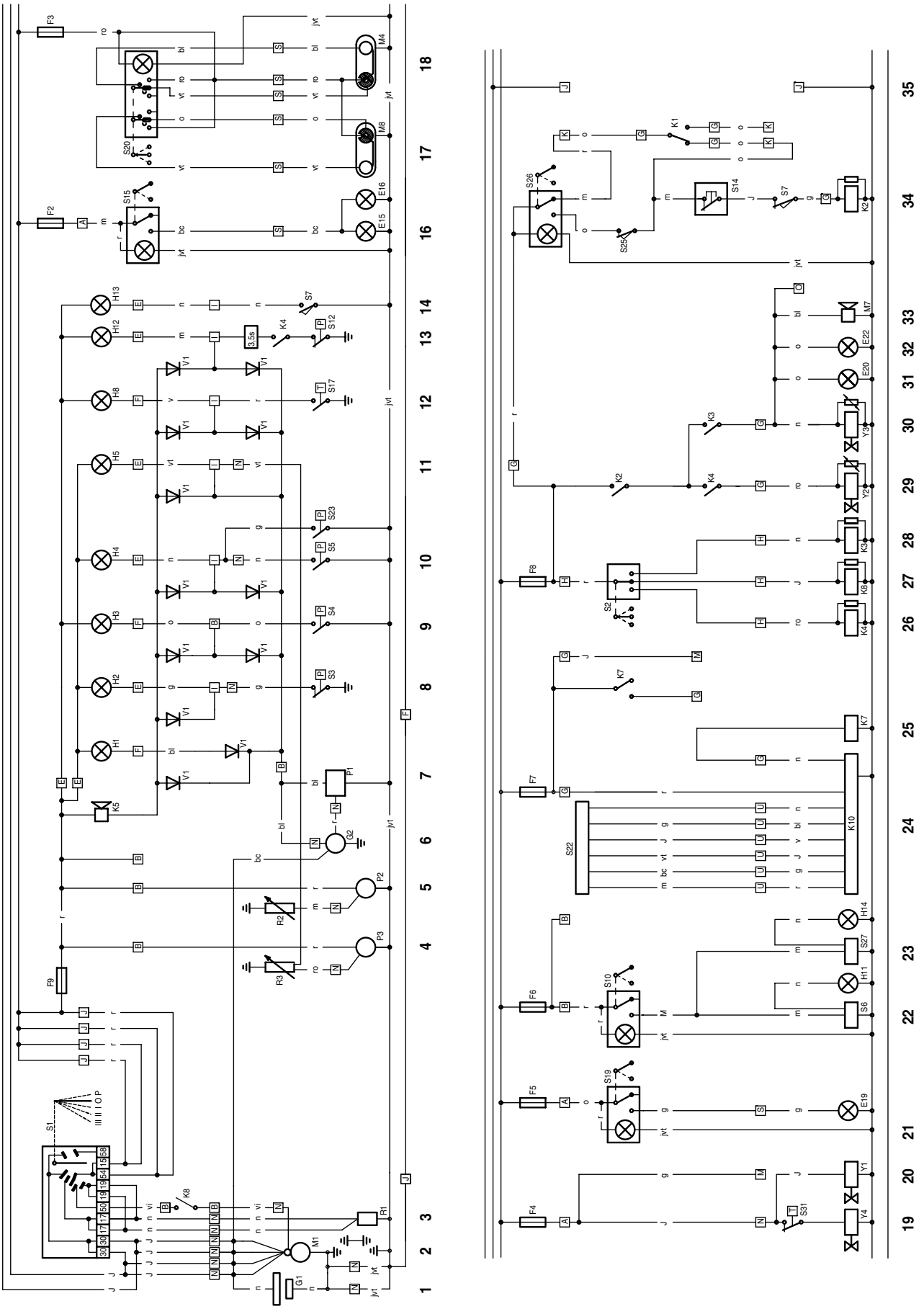
VACM(O) Movements cut-off valve (Option)
VAI Insulation valve
VAFR(O) Trailer braking valve (Option)
VC Compensation cylinder DE 100x50 C310
VDAR Rear steering cylinder DE 90x45 C80x2
VDAV Front steering cylinder DE 90x45 C80x2
VI Tilting cylinder DE 120x60 C445 (MLT 6)
DE 130x65 C380 (MLT 7)
VL Lifting cylinder DE 130x70 C720 (MLT 6)
DE 140x70 C720 (MLT 7)
VT Telescoping cylinder DE 70x50 C2100 (MLT 6)
DE 70x50 C2750 (MLT 7)
VVT(O) Locking carriage cylinder DE 60x45 C183 (Option)

NOTE : 1 - The main relief valve's pressure, on inlet sections are given at engine's maximum rating.
2 - The secundary valve's pressure, are given at 1000 rpm of the engine.
3 - Pressure relief valve's control must be done at an oil temperature of 50°C.

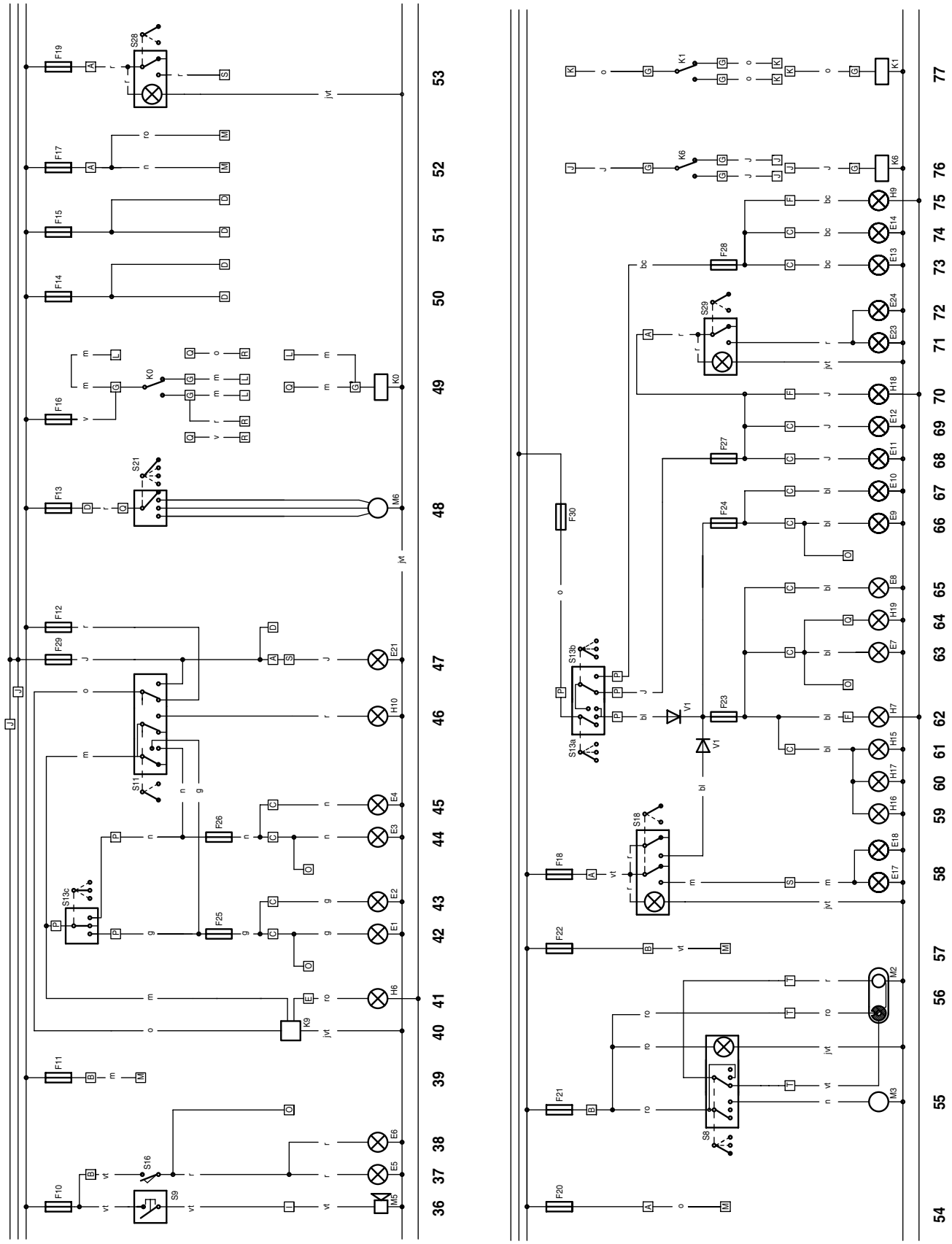
GROUP 80

ELECTRICITY

ELECTRIC DIAGRAM MLT 629 / 730 Turbo Série 1



ELECTRIC DIAGRAM MLT 629 / 730 Série A



F5 - Revolving light
F6 - Wheels alignment
F7 - Load status indicator device
Hydraulics movements cut-off (Option)
F8 - Gear reverser
Transmission cut-off
F9 - Control instruments panel
F10 - Sound alarm
Stop switch
F11 - Jib head light (Option)
F12 - Indicator power supply
F13 - Heating
F14 - Option
F15 - Fuel reheating (Option)
F16 - Air conditioning (Option)
F17 - Electrovalve on jib head (Option)
Electrovalve on jib head + Locking of hydraulic attachment (Option)
Electrical jib provision (Option)
Anti-theft device provision (Option)
Rear hydraulic provision (Option)
Double-acting hydraulic towing hook (Option)
F18 - Front working headlight (Option)
F19 - Rear defrosting (Option)
F20 - Pneumatic seat (Option)
F21 - Front windscreen wiper and windscreen washer
F22 - Option
F23 - Right sidelights + sidelights indicator light + control panel lighting
Service plate lighting (Option)
F24 - L.H. sidelights
F25 - R.H. indicators
F26 - L.H. indicators
F27 - Low beam + low beam indicator light + rear fog light
F28 - Main beam + main beam indicator light
F29 - Warning unit + roof light
(+) permanent (Option)
F30 - Lighting switch, horn and indicators
F31 - Engine preheating

G1 - Battery
G2 - Alternator

H1 - Battery load indicator light
H2 - Engine oil pressure indicator light
H3 - Brake fluid indicator light
H4 - Air filter / hydraulic return filter clogging indicator light
H5 - Engine water temperature indicator light
H6 - Flashing lights / warning unit indicator light
H7 - Sidelights indicator light
H8 - Transmission oil temperature indicator light
H9 - Main beam indicator light
H10 - Warning unit indicator light
H11 - Front wheels alignment indicator light
H12 - Transmission oil pressure indicator light
H13 - Brake indicator light
H14 - Rear wheels alignment indicator light
H15 - Hourmeter module indicator light/rev counter
H16 - Engine water temperature module indicator light
H17 - Fuel level module indicator light
H18 - Low beam indicator light
H19 - Ventilation indicator light

K0 - Air conditioning relay (Option)
K1 - Transmission cut-off relay to hydraulic controls lever
K2 - Transmission cut-off relay
K3 - Reverse relay
K4 - Forward relay
K5 - Buzzer
K6 - Electrovalve on jib head (Option)
Electrovalve on jib head + Locking of hydraulic attachment (Option)
Electrical pre-fitting / jib head (Option)
K7 - Hydraulics movements cut-off (Option)
K8 - Starting safety relay
K9 - Flasher unit / warning unit
K10 - Overload safety module
K13 - Driving housing of progressiveness
K14 - Control module of valve bank flow

M1 - Starter
M2 - Front windscreen wiper
M3 - Windscreen washer
M4 - Roof windscreen wiper (Option)
M5 - Sound alarm
M6 - Ventilation
M7 - Reverse gear sound alarm (Option)
M8 - Rear windscreen wiper

P1 - Hourmeter module/rev counter
P2 - Fuel level module
P3 - Engine water temperature module

R1 - Preheating resistor
R2 - Fuel sensor
R3 - Engine water temperature sensor

S1 - Key switch
S2 - Gear reverser
S3 - Engine oil pressure switch
S4 - Brake fluid
S5 - Air filter clogging
S6 - Front wheels alignment switch
S7 - Brake switch
S8 - Windscreen wiper / front windscreen washer switch
S9 - Sound alarm control
S10 - Wheels alignment switch
S11 - Warning unit switch
S12 - Transmission oil pressure
S13a - Sidelight lighting switch
S13b - Low beam / main beam lighting switch
S13c - Indicators lighting switch
S14 - Transmission cut-off switch to gear lever
S15 - Rear working headlight switch (Option)
S16 - Stop switch
S17 - Transmission oil temperature
S18 - Front working headlight switch (Option)
S19 - Revolving light switch
S20 - Rear windscreen wiper / roof switch
S21 - Ventilation switch
S22 - Overload strain gauge
S23 - Hydraulic return filter clogging
S24 - Transmission cut-off switch to hydraulic controls lever
S25 - Transmission cut-off switch to brake pedal
S26 - Transmission cut-off switch
S27 - Rear wheels alignment switch
S28 - Rear defrosting switch (Option)
S29 - Rear fog light switch
S31 - Attachment switch
S32 - Attachment switch
S33 - Extended telescope switch
S34 - Retracted telescope switch
S36 - Cold start-up switch

V1 - Fault test diode

Y1 - Engine stop electrovalve
Y2 - Forward electrovalve
Y3 - Reverse electrovalve
Y4 - Cold start-up electrovalve
Y5 - Attachment electrovalve
Y6 - Attachment electrovalve
Y7 - Extended telescope electrovalve
Y8 - Retracted telescope electrovalve
Y9 - Hydraulic flow control electrovalve
Y15 - Electrovalve of progressiveness

NORMAL DIFFERENTIAL UNIT 125
EXPLODED VIEW 125
DISASSEMBLY 126
ASSEMBLY 128
SPECIAL TOOLS 131
T1 131
T2 131
T3 132
T4 132
LIMITED SLIP DIFFERENTIAL UNIT (25% AND 45%) 133
EXPLODED VIEW 133
DISASSEMBLY 134
ASSEMBLY 137
SPECIAL TOOLS 140
T1 140
T2 140
T3 141
T4 141
HYDRAULIC DIFFERENTIAL LOCK 143
EXPLODED VIEW 143
DISASSEMBLY 144
ASSEMBLY 147
SPECIAL TOOLS 149
T1 149
T2 149
HYDRAULIC NEGATIVE BRAKE 151
EXPLODED VIEW 151
DISASSEMBLY 152
ASSEMBLY 155
INCORPORATED REDUCTION GEAR AND PINION 602 161
EXPLODED VIEW 161
DISASSEMBLY 162
ASSEMBLY 166
SPECIAL TOOLS 169
T1 169
T2 170
T3 171
T4 172
T5 173
T6 174

ASSEMBLY

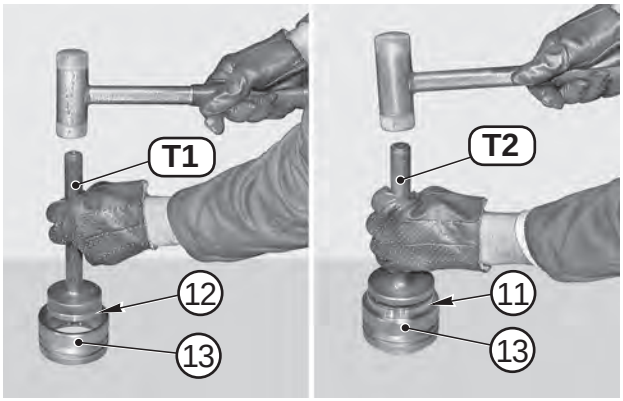


FIGURE 6: Using tools T1 (See drawing T1 p. 33) and T2 (See drawing T2 p. 33), insert the sealing ring (12) and the bearing (11) in the bushing (13).

NOTE:

Carefully check the assembly side of the seal (12).

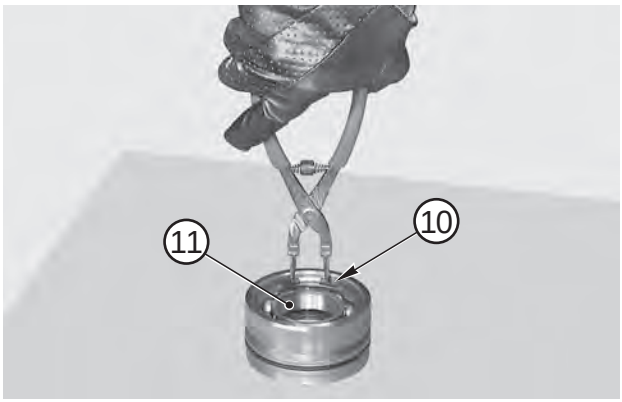


FIGURE 7: Fit the snap ring (10) on the bearing (11).

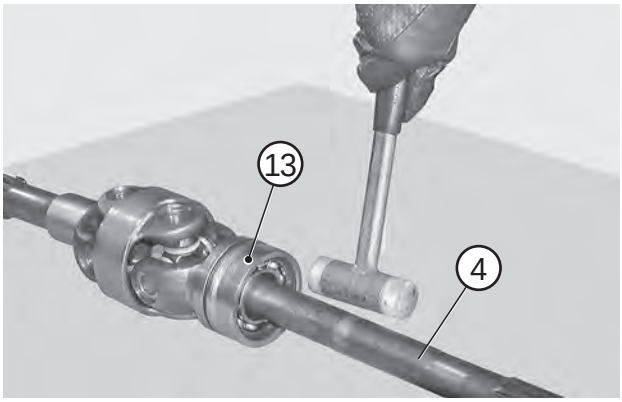


FIGURE 8: Heat the bearing in oil at an approximate temperature of 100°C and fit the entire bushing (13) on the u-joint (4).

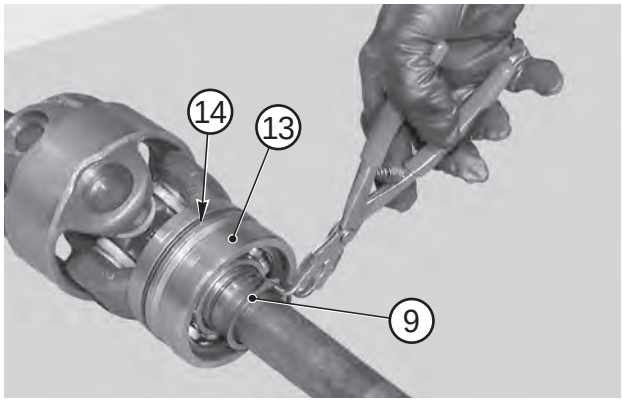


FIGURE 9: Fit the check ring (9) on the bushing unit (13); also put the o-ring (14) into position.

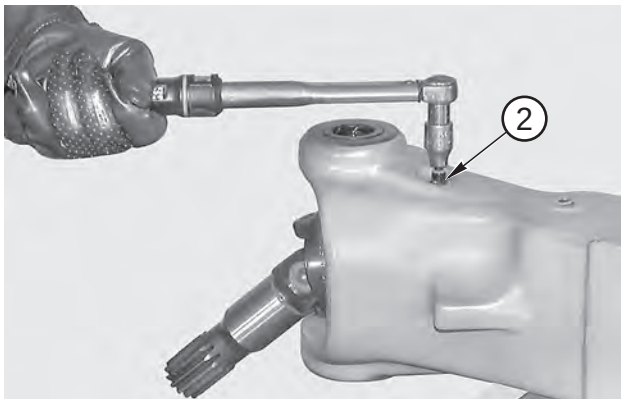


FIGURE 10: Insert the u-joint and tighten the top and bottom studs (2).
Torque wrench setting: maximum 15 N·m.

NOTE:

For u-joint coming with a bushing, center the point of the check studs in the slot.

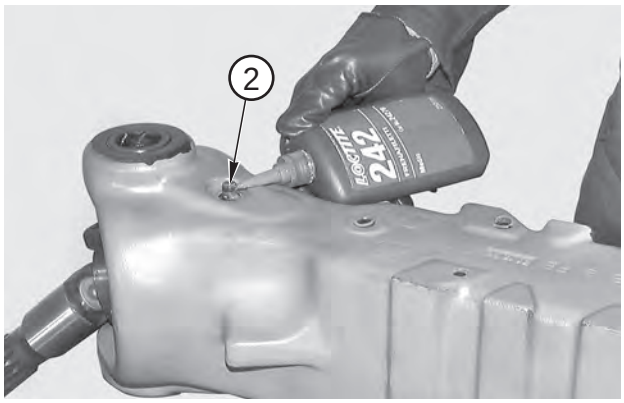
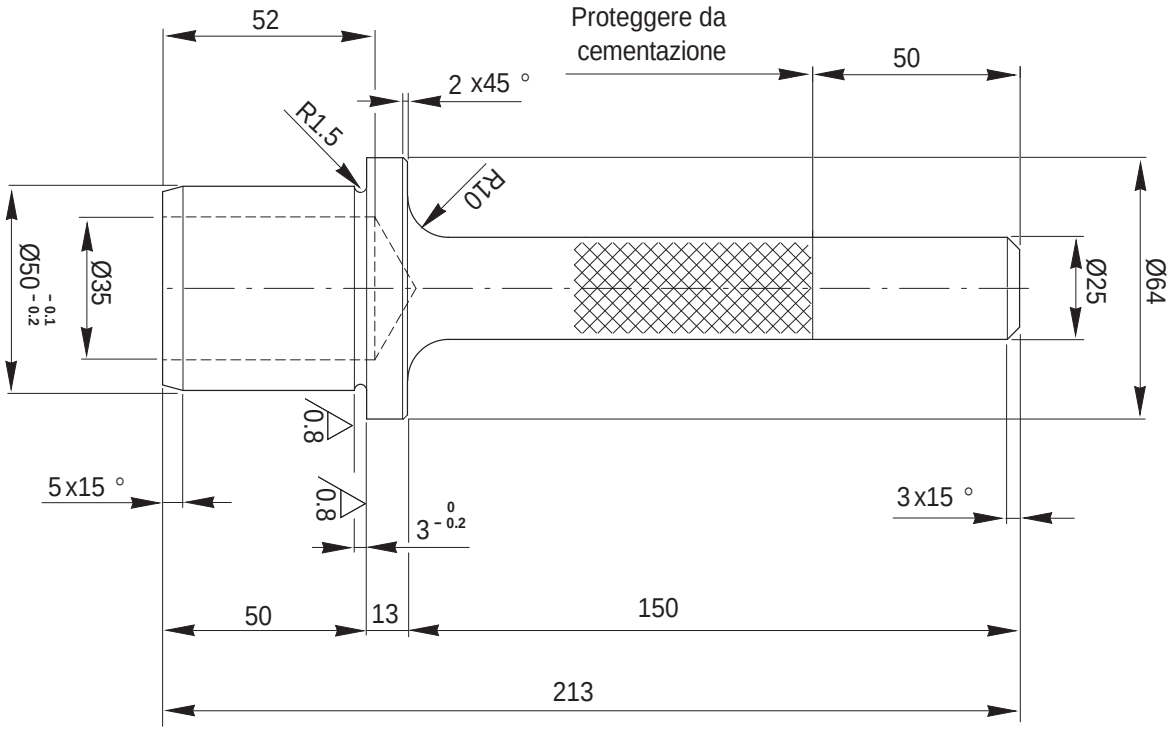


FIGURE 11: Apply Loctite 242 to the jutting parts of the studs (2).

SPECIAL TOOLS

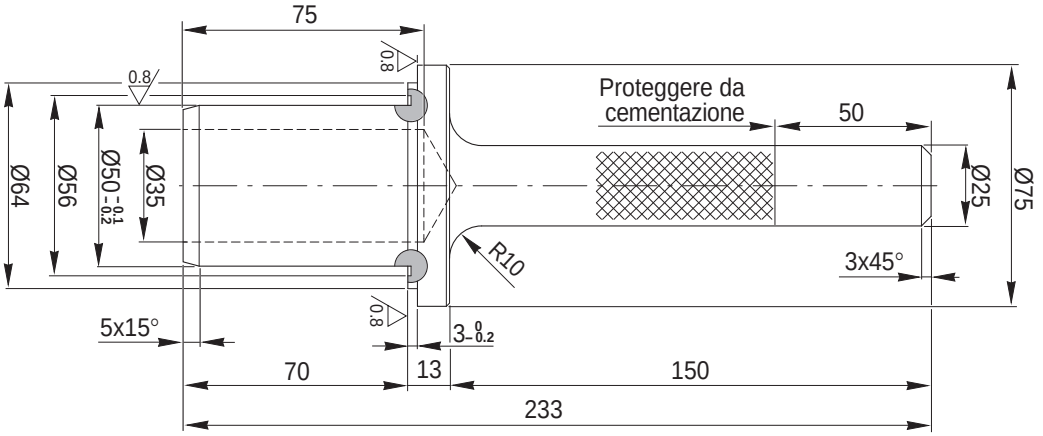
T1

P/N: 2303



T2

P/N: 3363



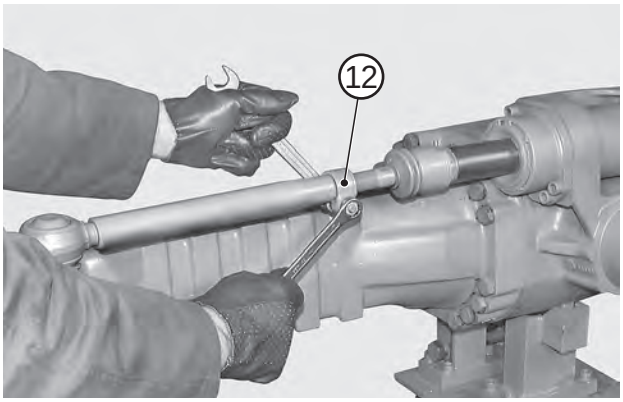


FIGURE 41: CONVERGENCY ADJUSTMENT ON UNITS WITH COLLAR
Loosen the nuts on the collars (12).

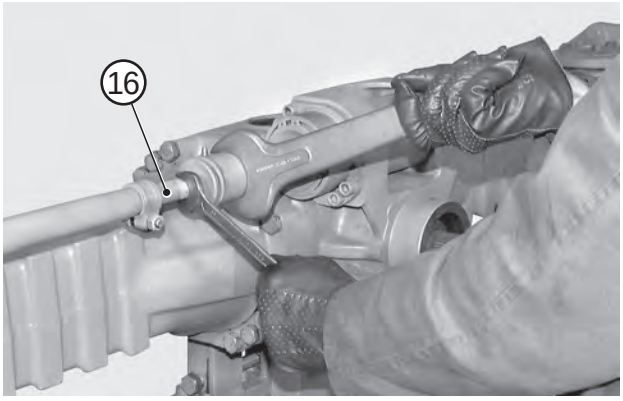


FIGURE 42: Rotate the ball-and-socket joints (16) until convergency has been obtained.
Check that articulations move easily and lock the collars (12).
Torque wrench setting for nuts: 42 - 52 N·m

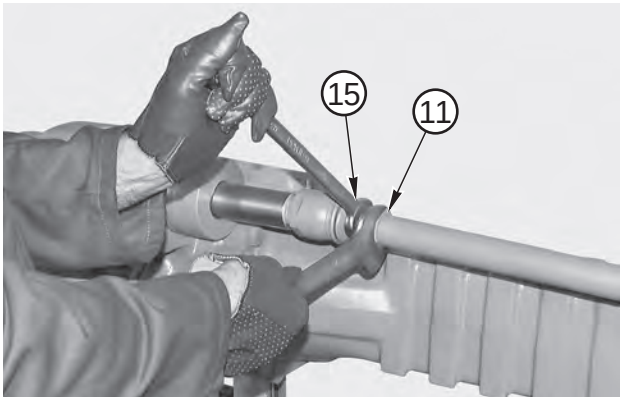


FIGURE 43: CONVERGENCY ADJUSTMENT ON ALTERNATIVE VERSIONS
Loosen the nuts (11) and screw them onto the ball-and-socket joints (15).

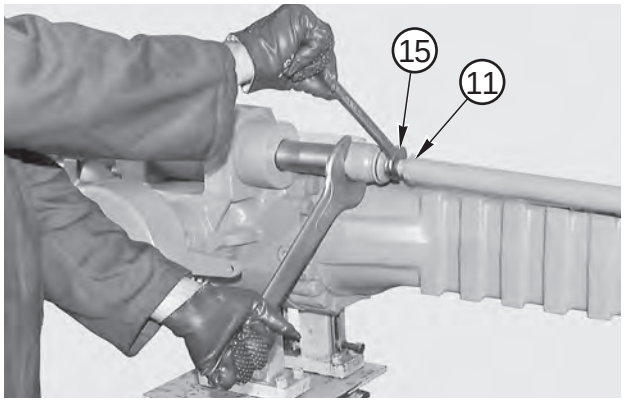


FIGURE 44: Hold the articulations still and rotate the ball-and-socket joints (15).
Once the convergency has been adjusted, lock the nuts (11).
Torque wrench setting for nuts: 298 - 328 N·m

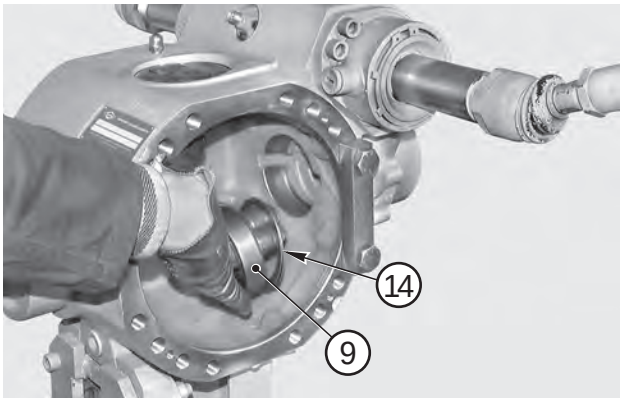
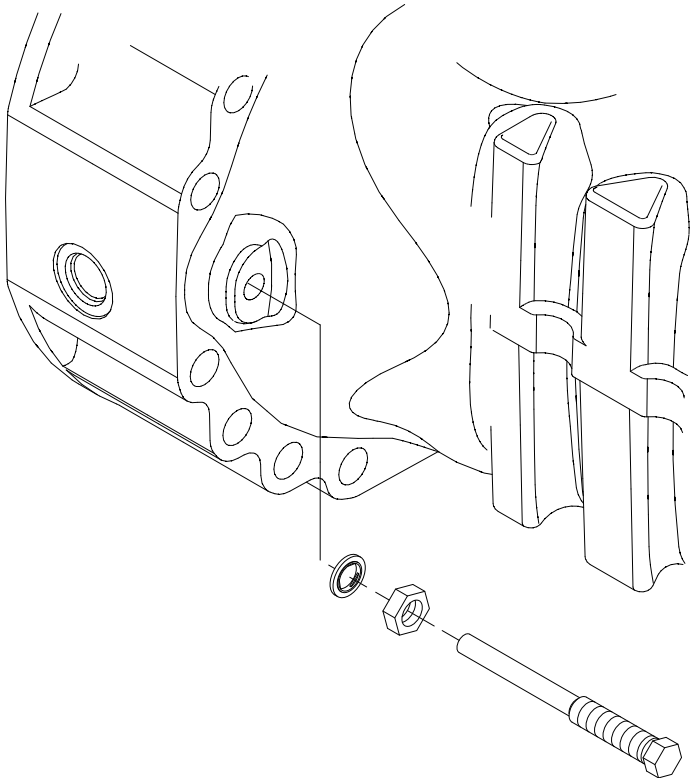


FIGURE 12: Insert a drift in the appropriate holes and remove the thrust block of the internal bearing (9) as well as the shim washers (14).

MANUAL EMERGENCY RELASE

EXPLODED VIEW



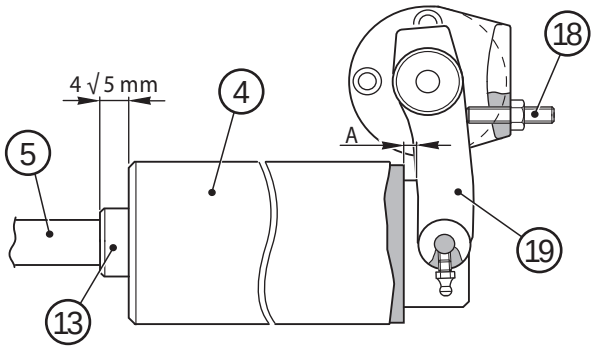
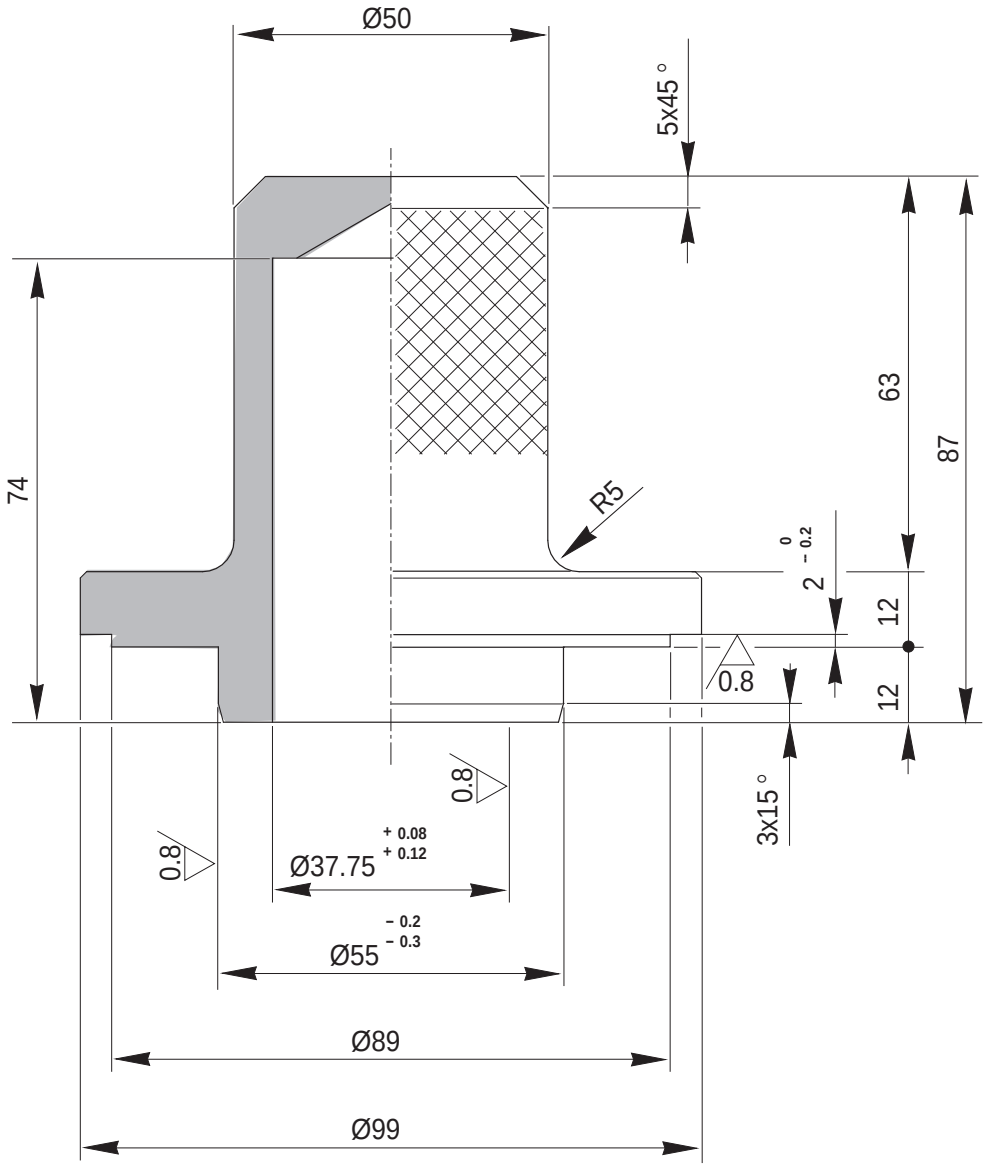


FIGURE 12: Check that, when the brakes are released (pressure inserted), levers (19) lean against the screws (18) without pre-stressing them and make sure that a clearance "A" is left between cylinder (4) and lever (19).
Also check that when pressure is released, piston (13) projects out by 4 - 5 mm.

T2

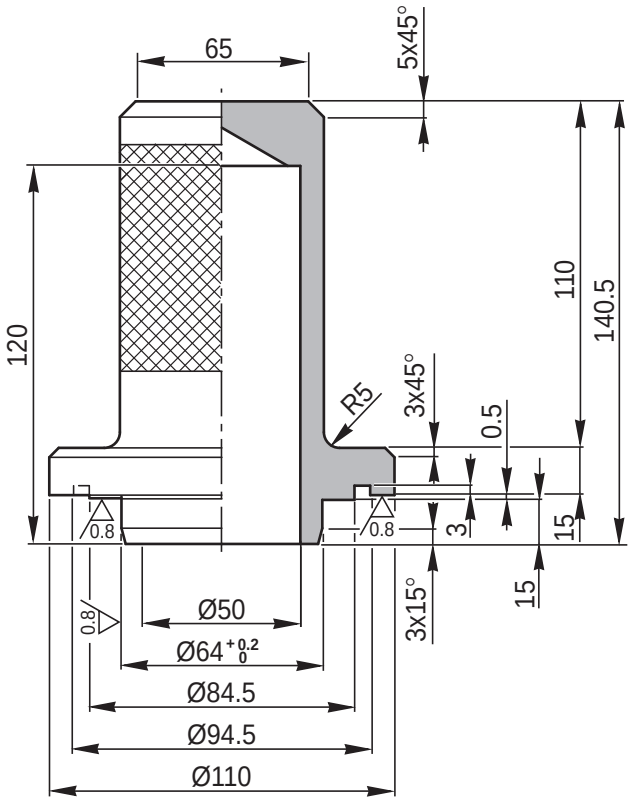
P/N: 3327


Ø50
5x45 °
74
63
87
R5
2 0 -0.2
12
12
0.8
3x15 °
0.8
0.8
Ø37.75 +0.08 +0.12
Ø55 -0.2 -0.3
Ø89
Ø99

SPECIAL TOOLS

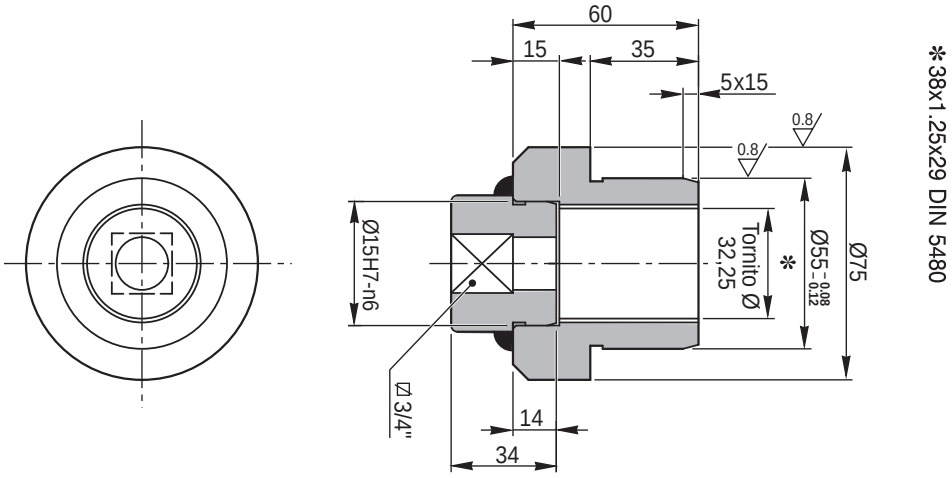
T1

P/N: 3739



T2

P/N: 3317/3



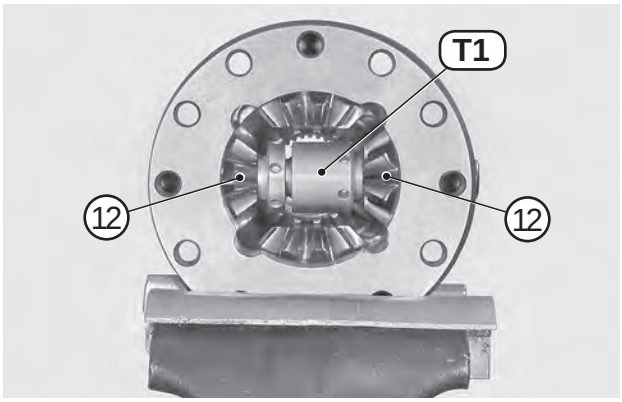


FIGURE 7: Introduce tool T1 (See drawing T1 p. 140) in-between the planetary gears (12).

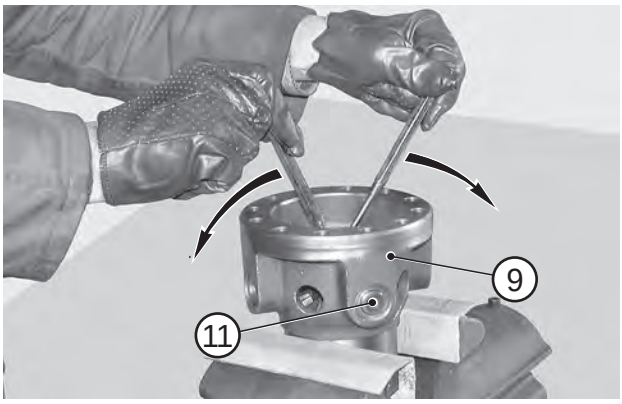


FIGURE 8: Using two pin-drivers, engage tool T1 (See drawing T1 p. 140) in between the planetary gears (12).

⚠CAUTION

Carefully check that tool T1 (See drawing T1 p. 140) keeps in an aligned position with the pins (11) when locked.

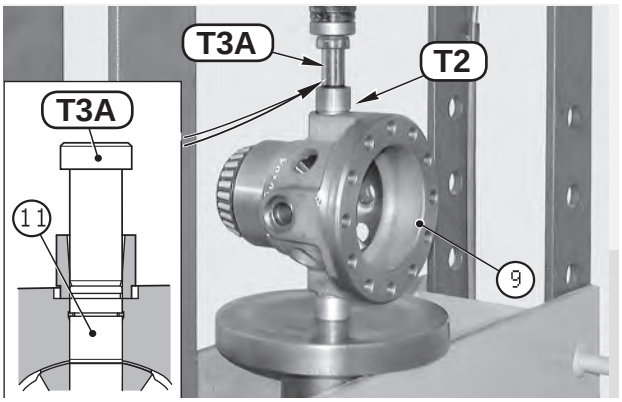


FIGURE 9: Place the differential unit (9) under a press, position guide bushing T2 (See drawing T2 p. 140) and insert press tool T3A (See drawing T3 p. 141). Press press tool T3A (See drawing T3 p. 141) to end of stroke.

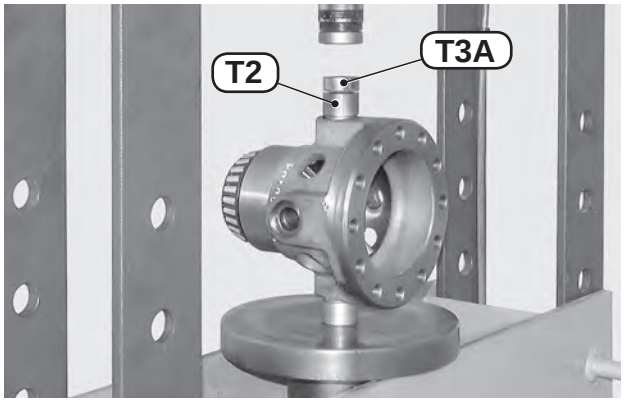


FIGURE 10: Remove press tool T3A (See drawing T3 p. 141) and bushing T2 (See drawing T2 p. 140).

NOTE:

In this state, the pin (11) is contained within tool T1 (See drawing T1 p. 140).

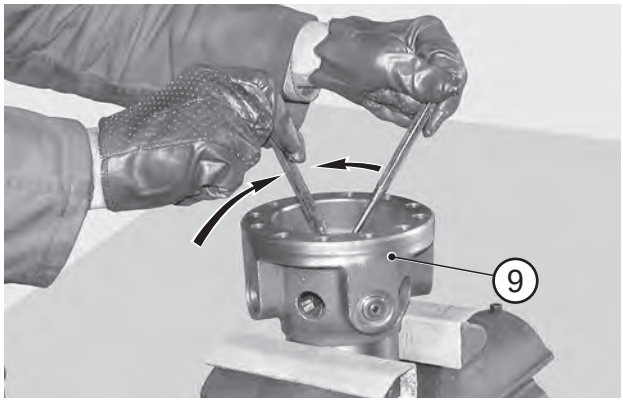


FIGURE 11: Remove tool T1 (See drawing T1 p. 140) and planetary pin (11) with it.

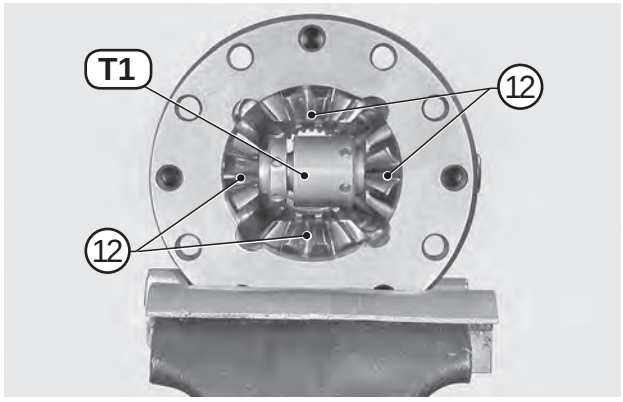


FIGURE 12: Leaving the released planetary in its position, lock again tool T1 (See drawing T1 p. 140).
Repeat pin extraction operation on the second planetary pin (11).
Repeat the same operations on the remaining pins.

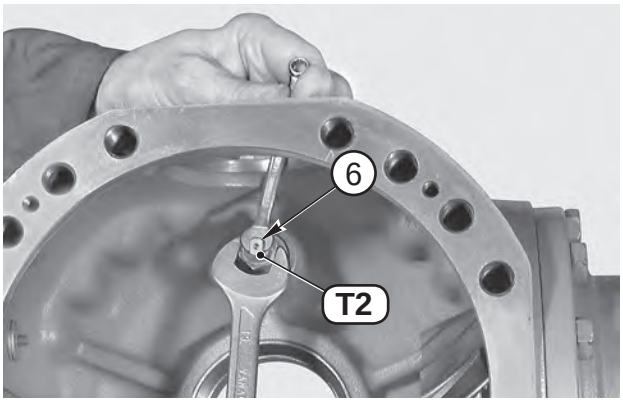


FIGURE 21: Screw tool T2 (See drawing T2 p. 149) on the thread of the piston (6) to compress the spring (7) and vacate the seat for installing the snap ring (12).

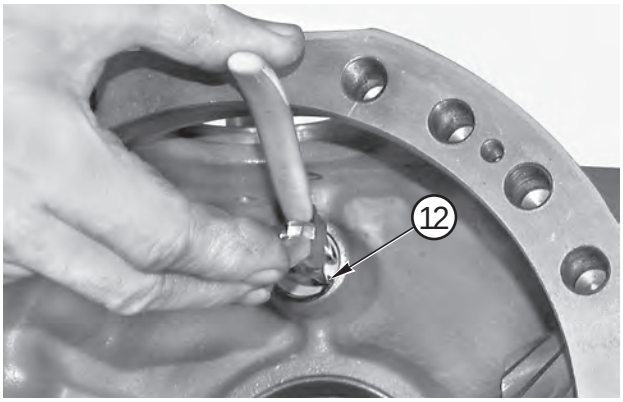


FIGURE 22: Install the snap ring (12).
Remove tool T2 (See drawing T2 p. 149) and fit the snap ring (9) of spring (7).

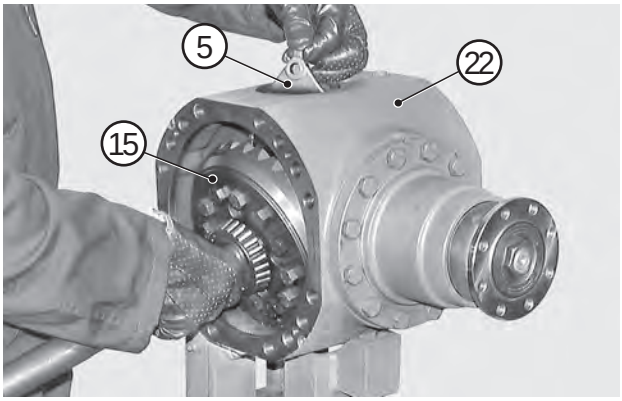


FIGURE 23: Insert the selector fork (5) and the differential unit (15) into the central unit (22).
Engage the selector fork (5) in the coupling (19) and on the piston (6).

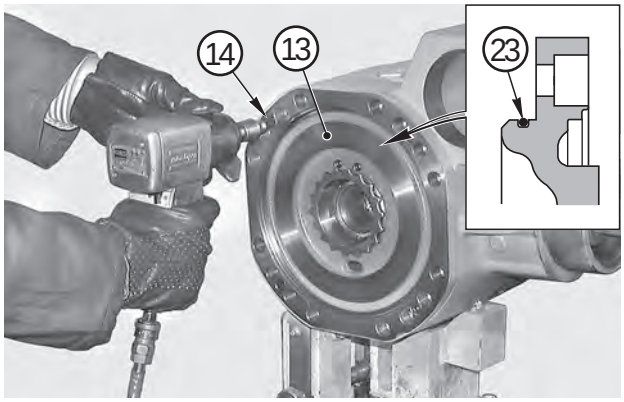


FIGURE 24: Install the intermediate cover (13) and lock it with screws (14). Tighten screws using a torque wrench setting of 23.8 - 26.2 N·m.

NOTE:

Carefully check the state of the o-ring (23).

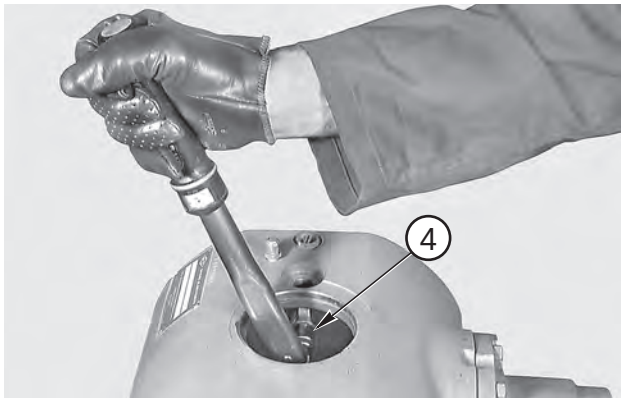


FIGURE 25: Install the lock nut (4) of the selector fork (5) and lock it with a torque wrench set to a torque of 70 - 75 N·m.

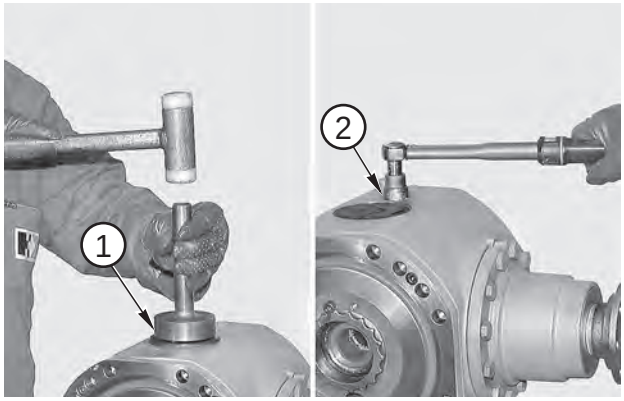
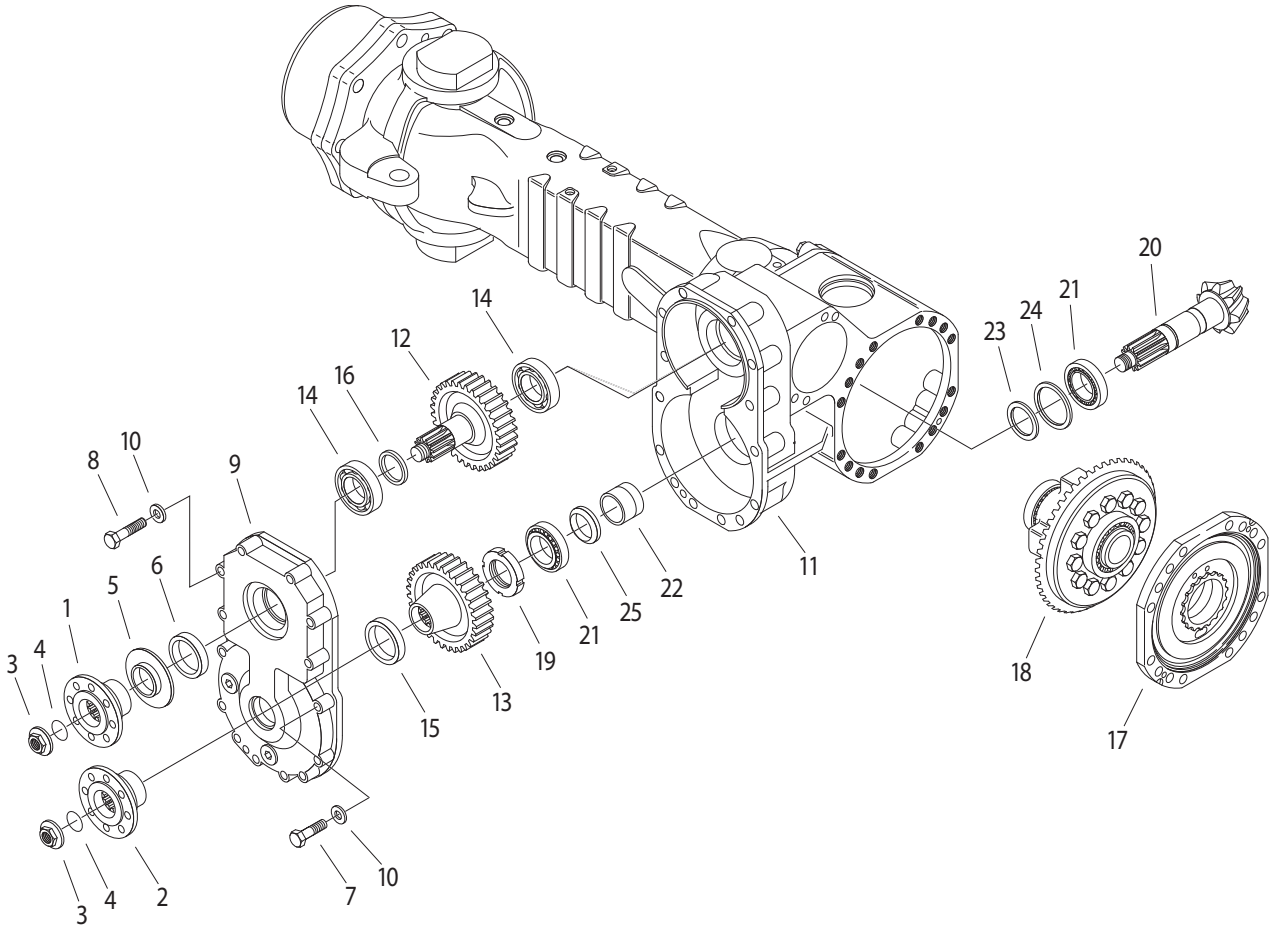


FIGURE 26: Install the security switch (2) complete with o-ring; torque wrench setting: maximum 30 N·m.
If necessary, adjust differential unit clearances. (see DIFFERENTIAL UNIT p. 61).
Install the top cap (1) and the arms. (For details, see CHECKING WEAR AND REPLACING THE BRAKING DISCS p. 19).

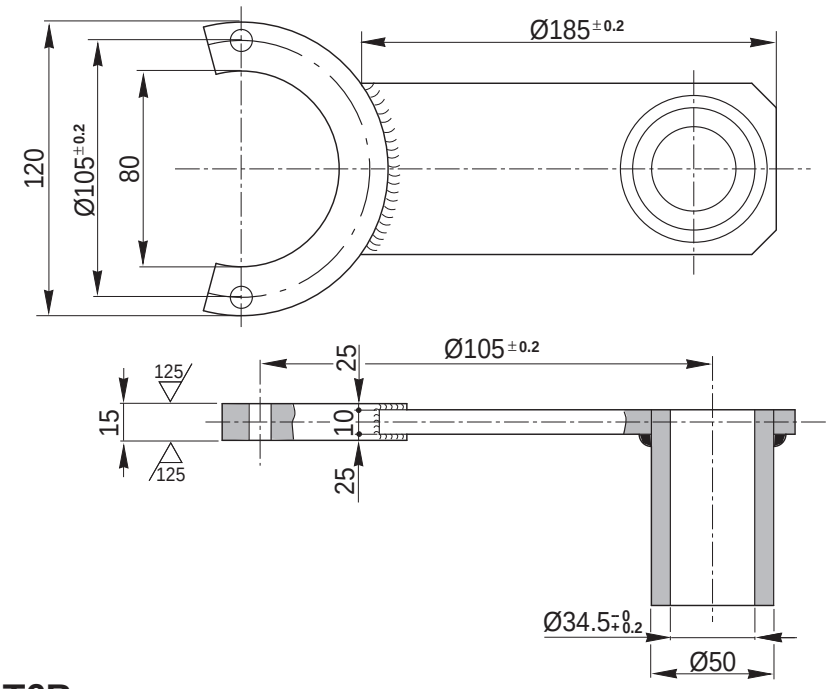
INCORPORATED REDUCTION GEAR AND PINION 602

EXPLODED VIEW

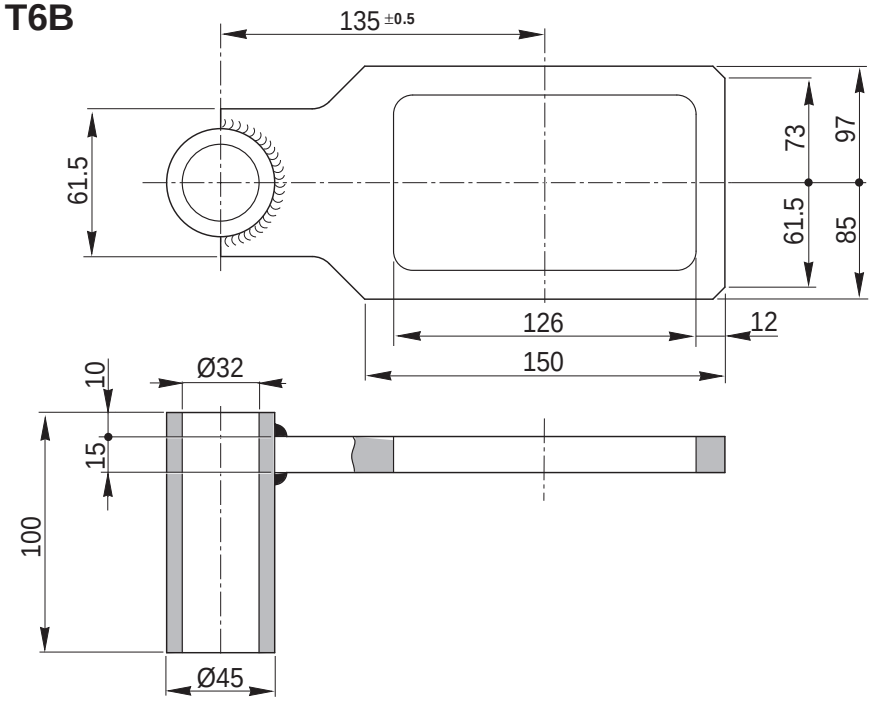


T6

T6A


Ø185 ±0.2
120
Ø105 ±0.2
80
125
25
Ø105 ±0.2
15
10
125
25
Ø34.5 +0 -0.2
Ø50

T6B


135 ±0.5
61.5
73
97
61.5
85
126
12
150
10
Ø32
15
100
Ø45