

TM 09135C-01

**TEREX**LIFT

## SHOP MANUAL

*Document 57.4400.8200 Edition 09/2005*

### *Light Capability Rough Terrain Forklift (LCRTF)*

# TX 51-19MD

CONTRACT NO. SP050001D0044D.O.0024



PCN 500 091352 00

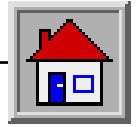
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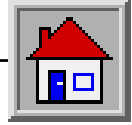
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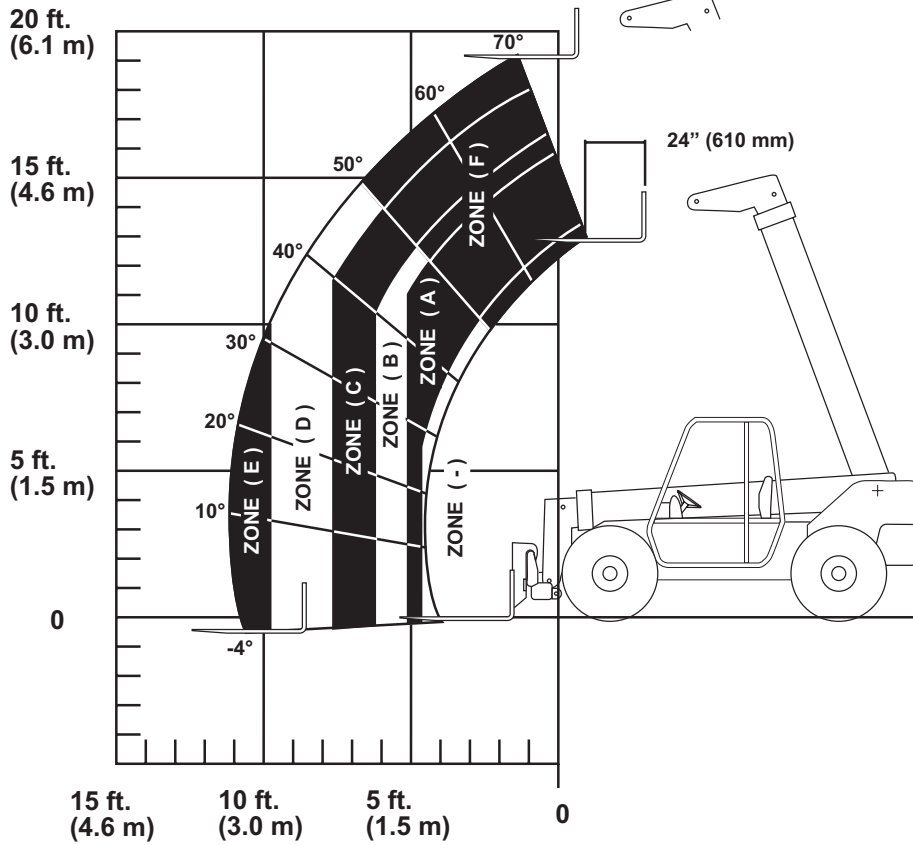


## **SECTION 2**

# **SAFETY RULES**



# TEREXLIFT TX51-19MD



**RATED LIFT CAPACITIES ARE WITH:**  
MACHINE ON A FIRM LEVEL SURFACE WITH UNDAMAGED,  
PROPERLY INFLATED TIRES.

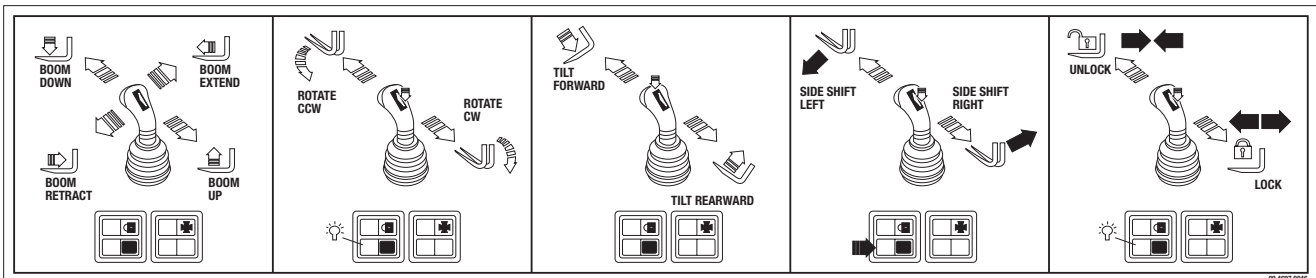
TIRE SIZE: 375 / 75 R20  
TIRE PRESSURE: 54 psi  
TIRE PRESSURE - SOFT GROUND: 26 psi

**S/N**

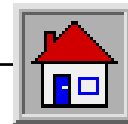
**LOAD LIMITS / HORIZONTAL BOOM  
LAST FULLY VISIBLE LETTER**

(-)	RETRACTED = 5070 LBS (2300 Kg)
(A)	LETTER VISIBLE = 4410 LBS (2000 Kg)
(B)	LETTER VISIBLE = 3305 LBS (1500 Kg)
(C)	LETTER VISIBLE = 2755 LBS (1250 Kg)
(D)	LETTER VISIBLE = 2205 LBS (1000 Kg)
(E)	LETTER VISIBLE = 1765 LBS ( 800 Kg)
(F)	BOOM ANGLE +50° = 500 LBS ( 225 Kg)

09.4697.0076



09-4697-0046



**DIESEL ENGINE**

- Make
- Model / Type
- Features:
  
- Cylinders
- Bore x Stroke in (mm)
- Total Displacement Cu. In. (cc)
- Power At 2500 Rpm (ISO 3046 IFN) Hp (kW)

**Turbo**  
 DEUTZ  
 BFM 2011  
 Diesel  
 4 Stroke  
 Direct Injection  
 2-3-4 Cylinders In Line  
 3.7 x 4.4 (94 x 112)  
 189.65 (3108)  
 81.6 (60)

**ELECTRIC SYSTEM**

- Voltage V
- Self – Regulated Alternator (On Diesel Engine) V
- Battery Ah

24  
 24  
 2x120

**MACHINE NOISE LEVELS**

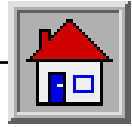
- Drive By @25 feet dBa
- Static @25 feet dBa

68  
 61

**PRESSURE SETTING**

- Main Distributor Valve psi
- Propel Pump Valve psi
- Counterbalance Valve psi

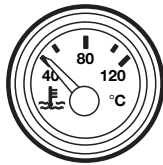
4100  
 6000  
 5100



- i. **Turn signal Indicator** – Green indicator signaling when turn signals are ON.



- 3. **Engine Coolant Temperature** –Indicates the engine coolant temperature.



## ATTENTION

Engine cannot be started if the parking brake is not engaged, operator completely sitting in seat and Forward/Neutral/Reverse lever in Neutral.

- 4. **Ignition Switch** - This switch is used to energize the electrical system of the machine and start the machine.



## WARNING

Before using the machine, make sure that the first green LED of the overload warning system is ON.

The overload warning system must not be used to check the load to be lifted. During work if, several indicators light up, operate the levers more smoothly.

## ATTENTION

This machine is equipped with overload warning system. When machine is out of balance and / or over capacity the overload warning system will shut down the Boom Down and Telescope Out functions. However Boom Up and Telescope In functions are still available to reposition load to a more stable area.

- 5. **Overload Warning System** – A LED warning display. The LED's switch on in sequence from the right to the left and indicate the gradual variation of the machine stability as follow:



**Green LED**

- 0-89% of capacity
- normal operation

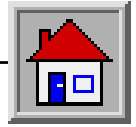
**Yellow LED**

- 90-100% capacity

**Red LED**

- hazardous overload; boom down, extend cut and allows only for the load return within safety limits.

At the machine starting, the overload warning system carries out a diagnostics of all LED's then sets to the first green LED signaling the proper functioning of the instrument.

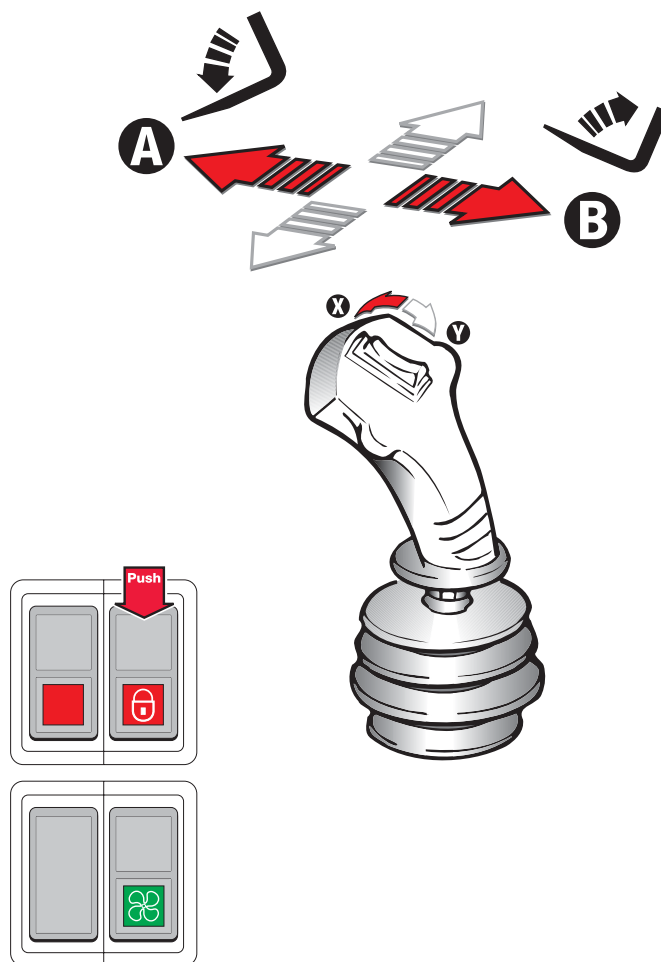


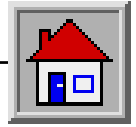
#### 4.9 TILTING THE FORKS FORWARD AND REARWARD



Before operating the boom, make sure that nobody is within the working range of the machine.

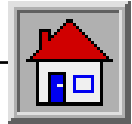
- Depress the rocker switch forward to tilt position (X).
- Shift the lever forward to tilt the forks forward (A).
- Shift the lever rearward to tilt the forks rearward (B).





## **SECTION 6**

# **LUBRICATION**



**7.2 'A' MAINTENANCE CHECKS – 50 HOURS OR WEEKLY SERVICES**

Company Name \_\_\_\_\_

Company Address \_\_\_\_\_

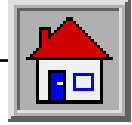
\_\_\_\_\_

Maintenance Person \_\_\_\_\_

Date Performed \_\_\_\_\_

Model Number \_\_\_\_\_ Serial Number \_\_\_\_\_

MAINTENANCE POINT		PERFORMED BY
	Check Engine Oil Level	
	Drain Fuel Filter	
	Check Hydraulic Oil Level	
	Check Brake Reservoir	
	Lube Boom Pads	
	Lube Drive Shaft	
	Lube Axle King Pins	
	Lube Rear Axle Pivot	
	Lube Cylinder	
	Lube Fork Attachment	
	Lube Boom Pivot	
	Check Tire Inflation	
	Check Wheel Lug Nuts Torque	
	Check Drive Shaft Bolt Torque	



**8.6 LUBE DRIVE SHAFT**

ATTENTION

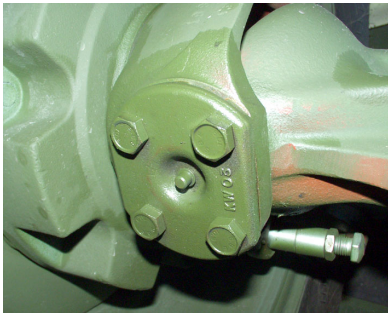
Clean all fitting before applying lubrication.

Lubricate the drive shaft by applying recommended lubrication to the grease fitting points.

**8.7 LUBE AXLE KING PINS**

Apply recommended lubrication to all eight king pins, located on top, bottom and each end of the axle.

Bottom King Pin

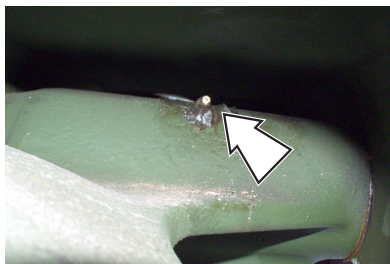


Top King Pin



**8.8 LUBE REAR AXLE PIVOT PIN**

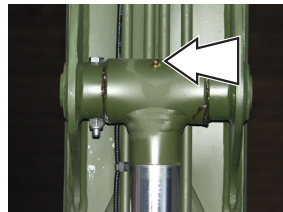
Apply recommended lubrication to the rear pivot pin, which is located top of rear axle.



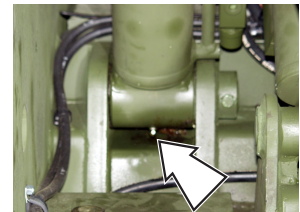
**8.9 LUBE CYLINDERS**

Raise the boom and clean all the grease fittings before applying EP2 lubrication. Lube all eight bearing, located on each end of cylinder.

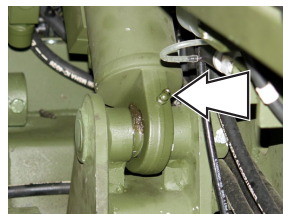
Top Boom Cylinder



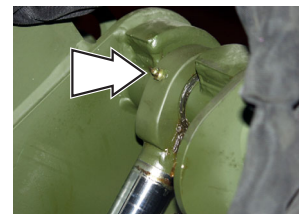
Bottom Boom Cylinder



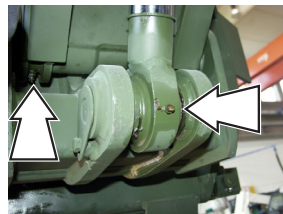
Top Slave Cylinder



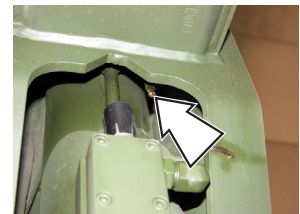
Bottom Slave Cylinder



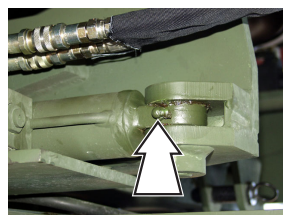
LH Fork Carrier  
 Bottom Tilt Cylinder



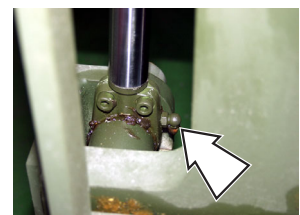
Top Tilt Cylinder

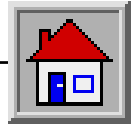


RH Fork Carrier  
 Cylinder

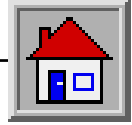


Bottom Rotation Cylinder





**SECTION 10**  
**500 HOURS OR**  
**QUARTERLY MAINTENANCE**



**11.0 1000 HOURS OR SEMI ANNUAL MAINTENANCE**

**GENERAL**

The lubrication charts in **Section 6** provide general locations of the individual service points and list the type lubricant, which should be used for each component. Before proceeding with 1000 hours or semiannual maintenance checks, refer back to the pre-operation checklist and the 50, 250 and 500 hours Maintenance.

**11.1 CHECK ENGINE VALVE TIP CLEARANCE**



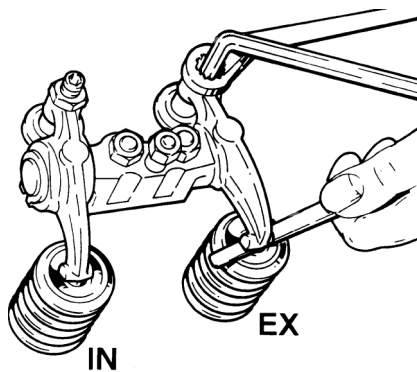
If the cap nut is over tightened the stud and plate assembly for the rocker pedestal may be damaged.

The valve tip clearance (8 places) is checked with a feeler gauge between the top of the valve stem and the rocker lever, with the engine cold. The correct clearance for both the inlet and the exhaust valves is:

**Inlet:** 0.3 mm (0.012 in)

**Exhaust:** 0.5 mm (0.02 in).

Refer to DEUTZ manual for procedures for setting valve tip clearances.

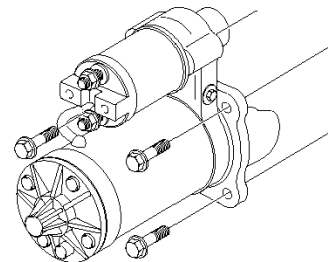


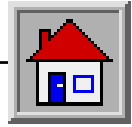
**11.2 CHECK ELECTRICAL ALTERNATOR**

With the engine off, check for side ply in the pulley. Start the engine. Make sure all accessories are off. Rev up the motor to a fast idle. Using a voltmeter set to the DC scale. Measure the voltage across the battery terminals - Red lead of the voltmeter on the positive terminal, black on the negative. The voltage should read around 26 volts. IF it reads less than 24 volts you may have a failed alternator. Turn on the defroster heater, headlights, work light, dome light and fan to draw power. Rev up the engine and watch the voltmeter. It should still be reading around 26 volts. If it reads lower than 25 volts the chances are the alternator is starting to fail. Check the field voltage at the alternator. Place ignition switch in the on position. Do not start engine. The brown / black wire on the alternator is the one that supplies the field. Check with a voltmeter to see if there is 24 volts at the field.

**11.3 CHECK ELECTRICAL STARTER**

Test the starter motor on the engine. Ensure that the battery is fully charged. Turn on the lights and operate the starter switch. Connect a voltmeter across the battery terminals and operate the starter switch. If the starter does not operate but the lights keep their power or there is no voltage drop across the battery, check the switch and all the connections and wires. Slow action of the starter can be caused by faulty wire connections. Failure to engage smoothly between the starter and the flywheel can be caused, on some types of starter motor, by dirt on the helical grooves of the starter motor drive, which can prevent free pinion movement. Clean the shaft thoroughly with cleaning fluid made especially for the purpose, and apply a small quantity of aero shell 6B or its equal. The starter is a specialist repair only.



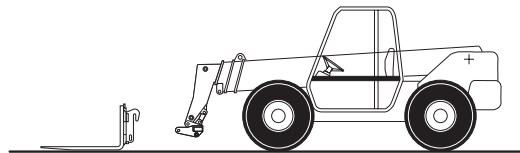


**13.0 ROUTINE MAINTENANCE**

**GENERAL**

This section provides routine maintenance procedures. A thorough and regular maintenance keeps the machine in a safe and efficient working condition. For this reason, it is advisable to wash, grease and service the machine properly. Always ensure all machine components are in good condition. Check for oil leaks and loosening guards, and make sure that the safety devices are efficient. In case of defects, find and rectify them before using the machine. For purchases components always refer to the vendor manuals. Not-respecting the ordinary maintenance schedule of this manual automatically voids Terexlift warranty. The relief valves are factory preset. Adjusting the valve in the field will void machine warranty. Valves must be set only by trained personnel.

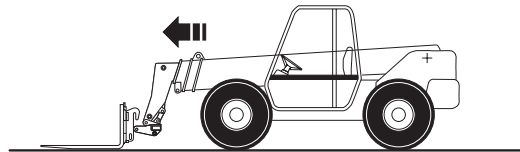
5. Tilt the holding frame forward and retract the boom to release the attachment upper lock.
6. Move back with the machine (or with the boom) and drive to the new attachment going to be coupled.
7. Hold the frame tilted forward and hook the upper pins of the new attachment.
8. Retract and raise the attachment a few inches. Attachment will center automatically on the quick coupling frame.
9. Operate the joystick function to lock the attachment.
10. Couple the connectors of the attachment, to the quick couplings of the frame.



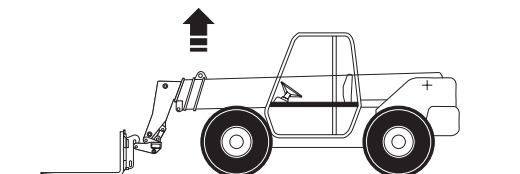
**13.1 REPLACING THE ATTACHMENTS**



Use only attachments directly designed and manufactured by Terex for its handlers.

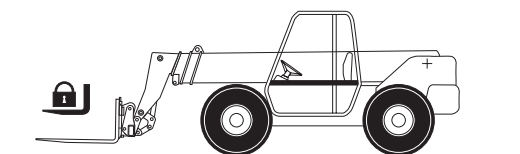
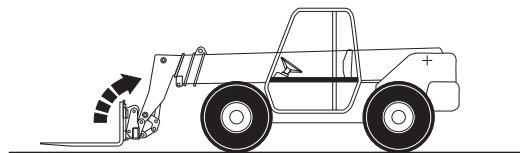


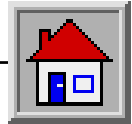
After substitution, visually check the attachment is correctly coupled to the boom, before operating the machine. A wrongly coupled attachment may cause injury to personnel or damage equipment.



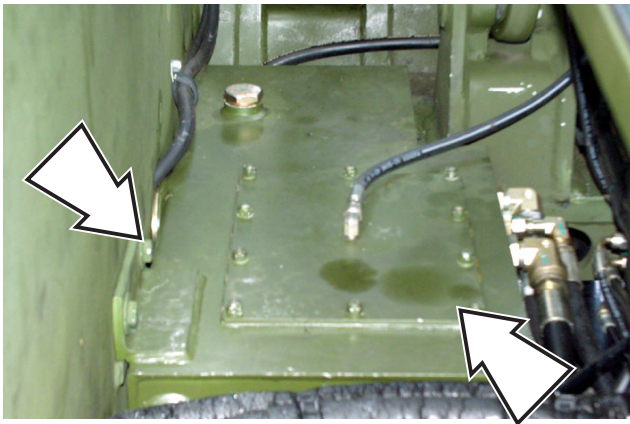
To change attachments, operator as follows:

1. Disconnect the quick connectors from the fork rotate cylinder and connect them to the attachment lock / unlock cylinder. Then disconnect the quick connectors from the side shift cylinder.
2. Disconnecting the quick connectors of the attachment, and connect the hydraulic locking pipes of the attachment to couplings.
3. Operator the Joystick function to unlock attachment pins.
4. Rest the attachment flat on the ground.





12. Remove the screws securing the tank on the machine by using a 17 mm and 19 mm wrench.

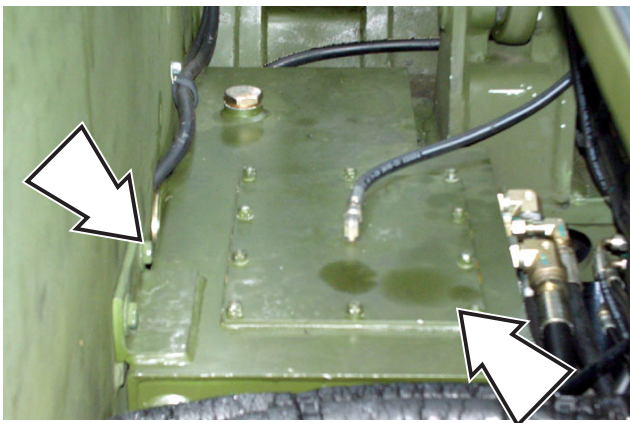


13. Lower and remove the tank from the machine.

**ASSEMBLY**

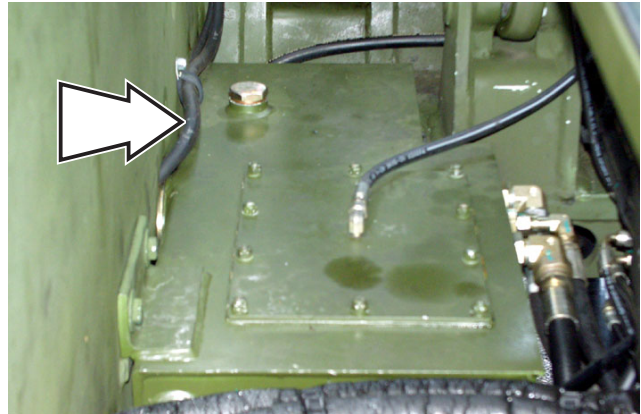
Follow the procedures listed below to install the oil tank:

1. Install the oil tank by using a 17 mm and 19 mm wrench to secure the four screws that attach the oil tank to the machine.



- 2. Connect the tank vent lines.
- 3. Using a 10 mm wrench connect the hose clamp of the filler extension.
- 4. Connect the flexible hoses under the valve by using a 38 mm and 50 mm wrench.

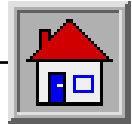
- 5. Connect the electrical wire to the sending unit.
- 6. Connect the three side flexible hoses by using a 22 mm – 27 mm and 32 mm wrench.



7. Using a 32 mm and 367 mm wrench connect the valve.



- 8. Fill the oil tank with oil and open the valves of the intake line before starting the machine.
- 9. Start the machine, after a few minutes, check the oil level and if necessary, add new oil.
- 10. Check for leaks.



7. Remove the holding valve.



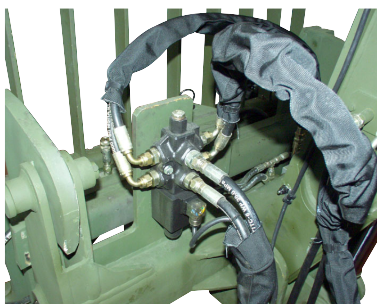
8. Using adequate lifting device lift new cylinder into place and reinsert pin.
9. Replace the holding valve.
10. Bring tool coupling in position on heads of boom.
11. Reinsert the pin holding coupling to boom mask and the pin attaching the tilt cylinder.
12. Connect hydraulic hoses. Start engine and check for leaks.

**14.3 BOOM DISASSEMBLY**

1. Position the machine on a hard level surface.
2. Position the boom assembly on suitable support device near a strong anchor point. Support boom with blocking to prevent damage to tubing.



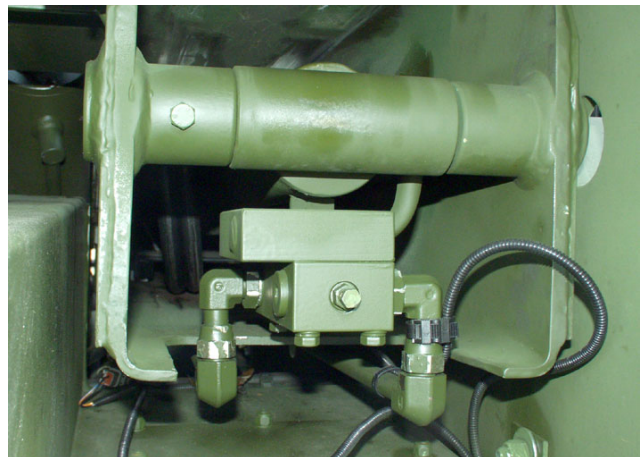
3. To remove tool coupling, disconnect hydraulic hoses.



4. Remove the pin holding coupling to boom mask and the pin attaching the tilt cylinder.



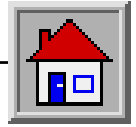
5. Use adequate lifting device to remove coupling from machine.
6. Remove the tilt cylinder.
7. Remove flow valve at back of boom.



8. Remove pin holding telescope cylinder at back of boom.



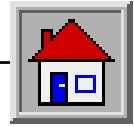
**DO NOT DISASSEMBLE ANY COMPONENT (S) DURING WARRENTY PERIOD WITHOUT CONTACTING TEREXLIFT.**



## **SECTION 15**

### **CARRARO AXLES**

**DO NOT DISASSEMBLE ANY COMPONENT (S) DURING WARRENTY PERIOD WITHOUT CONTACTING TEREXLIFT.**



## **A GENERAL INFORMATION**

### **A.1 Manual use**

#### **End users**

- Installer
- User
- Maintenance operator

#### **Maintenance**

CONSULT THIS MANUAL THOROUGHLY, as proper functioning and good efficiency of mechanical organs depends mostly on constant and correct routine maintenance ensuring product integrity and expected life duration.

In case of any damages or anomalies, quick intervention of specialized personnel can avoid future impairment and lengthen the working life.

#### **Repair**

The disassembly/assembly procedures have been outlined for a total product overhauling. They have also been described in sequence through photographs with relevant explanation for specific interventions, thus obtaining a complete and safe guide for each and every phase of an operation.

Operation description presumes that the unit has already been removed from the vehicle. The manual supplied by the vehicle manufacturer should be consulted in case of a overhauling or maintenance intervention requiring the removal of the machine.

Moreover, the attentive product inspection leads to a correct repair work estimation that could merely require dismounting only few components, and thus operating partially on the group.

### **A.2 Information property**

This manual should be considered as CARRARO S.p.A. confidential information. All rights reserved.

No part of this manual may be reproduced, in any form or by any means, without prior written permission of CARRARO S.p.A. Only the customer, whom the manual, together with the product, has been issued to, is allowed to use this document, and only in order to use, maintain and repair the unit.

CARRARO S.p.A. declares that the subject of this manual consists with the technical and safety specifications of the machine that the manual is referred to. The manufacturer shall not be held liable for direct or indirect damages to persons, things or animals due to an improper use of this document or of the machine or to a different use of them, which does not comply with what is provided for in this manual.

### **Carraro Spa**

Via Olmo, 37

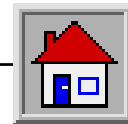
35011 Campodarsego (Pd) Italia

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Fax +39 049 9289111

[www.carraro.com](http://www.carraro.com)

**DO NOT DISASSEMBLE ANY COMPONENT (S) DURING WARRENTY PERIOD WITHOUT CONTACTING TEREXLIFT.**



#### C.4 Technical Features

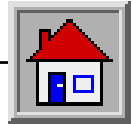
MACHINE	<b>Front Axle</b>
CODE	<b>CA144609</b>
MODEL	<b>26.11+TB172</b>

DIFFERENTIAL TYPE	
Open	○
Limited Slip	●
Limited Slip "Ball Type"	○
100% Mechanical lock, hydraulically controlled (positive or negative)	○
With multidisc clutch in oil bath hydraulically controlled	○
100% Mechanical, electromagnetically controlled	○
"No spin"	○

DESCRIPTION	VALUES
Bevel gear ratio	2.46 / 1
Epicyclic reduction gear ratio	6.00 / 1
Transfer Box ratio	1.85 / 1
Total ratio	27.33 / 1
Dry weight	341 Kg
Input rotation CLOCK WISE (C.W.) COUNTER CLOCK WISE (C.C.W.)	○ ●
Steering angle	36° <sup>0</sup> <sub>-0.2</sub>
Toe-in	A <sup>0</sup> <sub>-0.2</sub>
Bevel gear set backlash	0.16÷0.22 mm
Pinion bearings preloading (measured D=30.5 mm without seal)	P= 10.5÷15.7 daN
Pinion-ring gear bearing total preloading (measured D=30.5 mm without seal)	T= (P+3.9)÷(P+5.9) daN
Nominal differential disc thickness	1.6 mm
Nominal differential counterdisc thickness	1.5-2.8 mm
Maximum differential disc wearing	0.15 mm
Maximum differential counterdisc wearing	0.10 mm
Type of brake	Wet discs brake
Number of brake discs (each side)	2
Number of brake counterdiscs (each side)	3
Nominal brake disc thickness	4.75 ÷ 4.90 mm

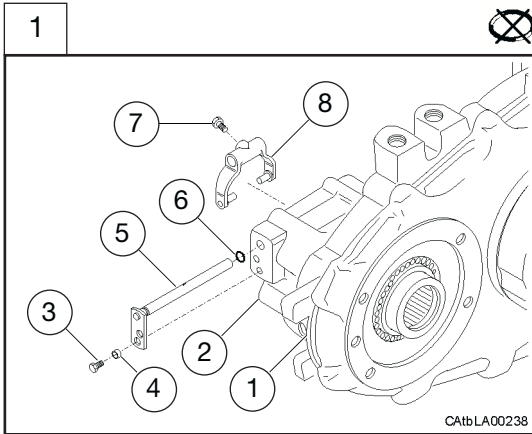
DESCRIPTION	VALUES
Nominal brake counterdisc thickness	9.5/3/8 mm
Maximum brake disc wearing (each side)	0.25 mm
Maximum brake piston stroke	0.8 mm
Maximum operating pressure	68.9 bar
Max. wheels braking torque	11360 Nm
Oil specification IN PRESENCE OF DIFFERENTIAL LIMITED SLIP, USE RECOMMENDED OIL ENRICHED IN ADDITIVES Note: DO NOT USE SYNTHETIC OR VEGETABLE OIL WITHOUT CONSENT OF THE AXLE MANUFACTURER	SAE 80W to comply API GL4 respectively MIL-L-2105
Differential oil capacity	6 Liter
Epicyclic reduction gear oil capacity each side	1.6 Liter
Oil specification for brake actuation	MINERAL OIL
Oil displacement for brakes actuation	10 cc
Grease specification	TECNOLUBE SEAL POLYMER 400/L DIN = KHER1R ISO-I-XMR-XM2
Differential input flange	DIN1310
Hydraulic motor flange	DIN5480

**DO NOT DISASSEMBLE ANY COMPONENT (S) DURING WARRENTY PERIOD WITHOUT CONTACTING TEREXLIFT.**

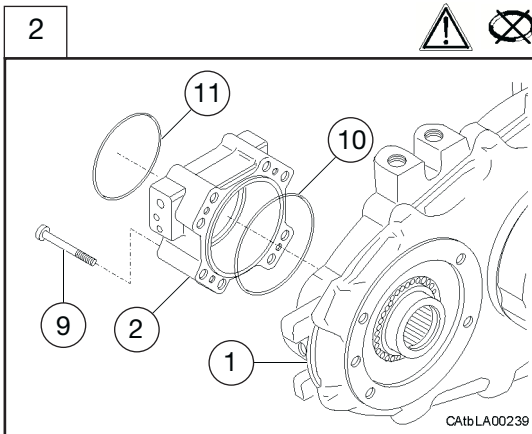


**D.2 Transmission box disassembly**

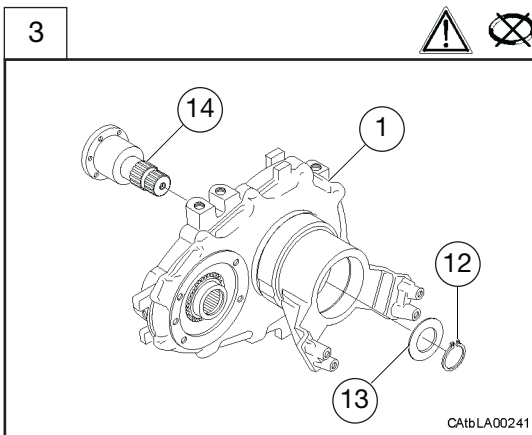
Some of the following pictures may not show exactly your axle, but the process is the same.



Position the transmission box (1) on a suitable workbench. Remove the screw (3) and the bush (4) from the motor flange (2).  
 Loosen the locking fork screw (7).  
 Extract the fork control shaft (5) from the motor flange (2) and collect the fork (8).

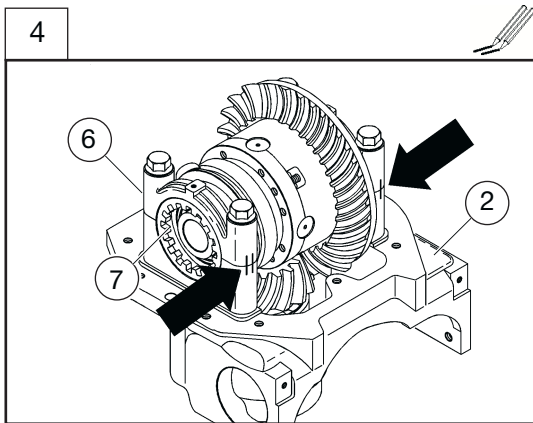
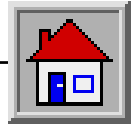


Unscrew fastening screws (9) and remove the motor flange (2).  
 Remove O-Rings (10) and (11) from motor flange (2)

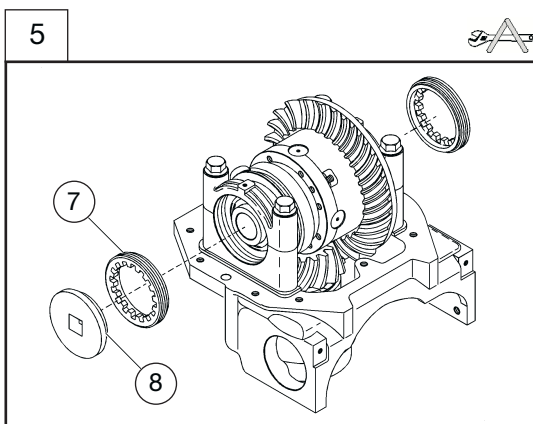


Remove the lock ring (12) and the washer (13) from the shaft (14).  
 Extract the shaft (14) from the transmission box (1).

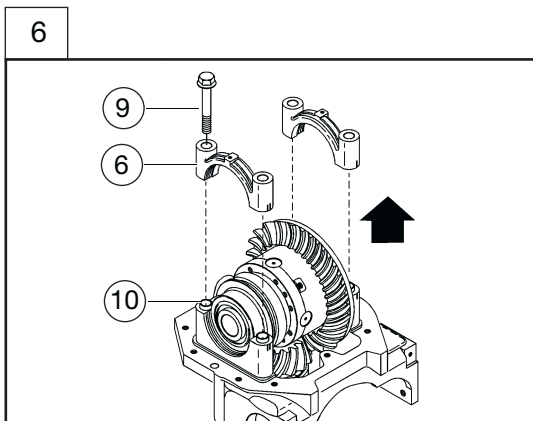
**DO NOT DISASSEMBLE ANY COMPONENT (S) DURING WARRENTY PERIOD WITHOUT CONTACTING TEREXLIFT.**



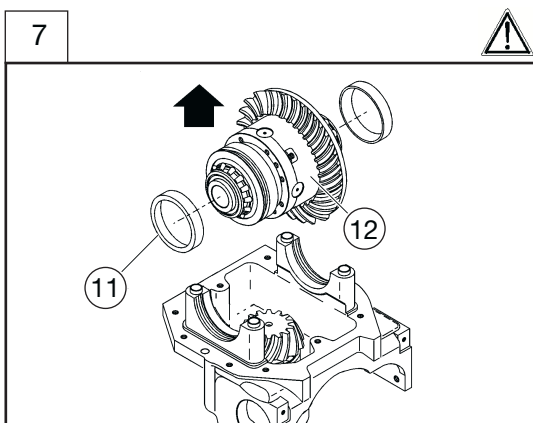
Before removing the bolts (6), mark both half-collars and the differential support with permanent reference marks to avoid inverting them during re-assembly. Mark the area between the ring nuts (7) and the differential support (2) as well.



Unscrew the adjuster ring nuts (7) using tools CA119030 (8) and a wrench.

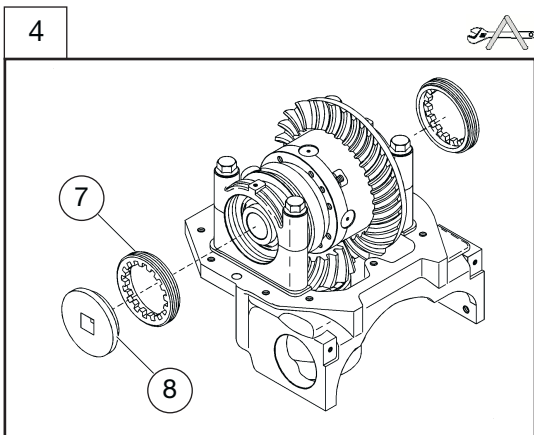
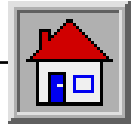


Remove the 4 screws (9) and remove both half-collars (6). **Note:** check that the bushes (10) remains in their housings.



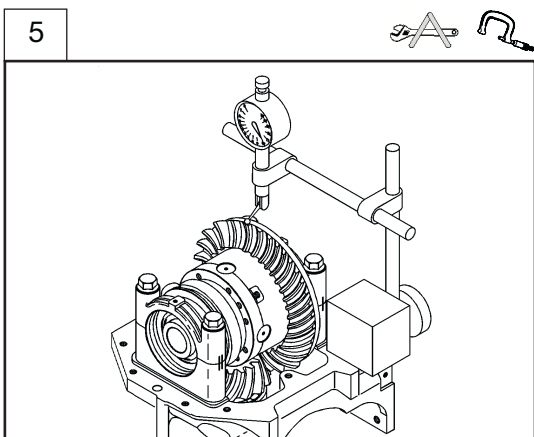
Take out the differential case (12). Collect from ring gear side the cup bearings (11). **Warning:** don't mismatch the cup bearings if they are not to be replaced.

**DO NOT DISASSEMBLE ANY COMPONENT (S) DURING WARRENTY PERIOD WITHOUT CONTACTING TEREXLIFT.**

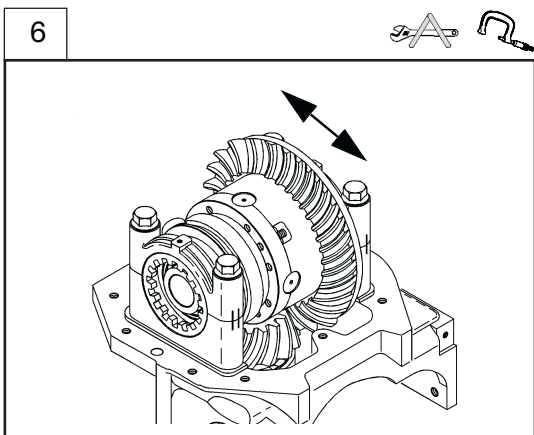


Assemble and tighten both adjustment ring nuts (7) in the differential support with special tools CA119030 (8), till the backlash is eliminated and the differential bearings are slightly preloaded.

Check that the differential bearings are well settled; if necessary, knock slightly with a soft hammer, in order to properly set the bearings in position.



Position a magnetic-base dial gauge on the differential support, so that the feeler stylus touches the surface of one tooth of the crown gear with a 90° angle.



Lock the pinion and move the crown gear alternatively and note the pinion-ring gear backlash, measured with the comparator.

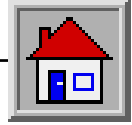
Repeat the operation on 2 or more points (teeth), rotating the crown gear, so that to obtain an average value.

Check if the measured backlash value is within the requested range:

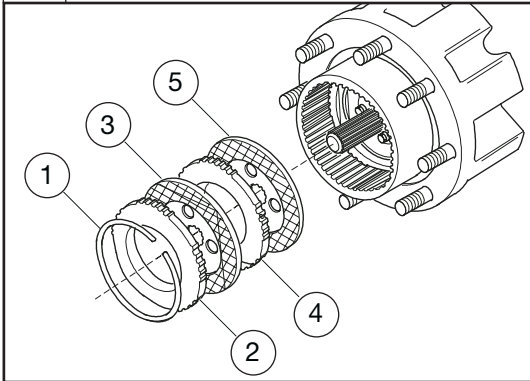
**0.16÷0.22 mm**

Carry out the adjustment by operating on the 2 ring nuts with the appropriate tools CA119030.

**DO NOT DISASSEMBLE ANY COMPONENT (S) DURING WARRENTY PERIOD WITHOUT CONTACTING TEREXLIFT.**



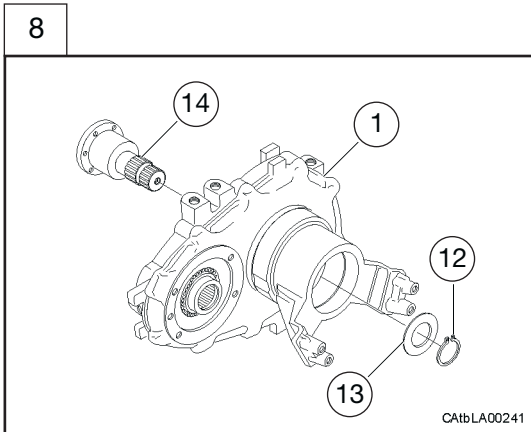
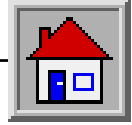
15



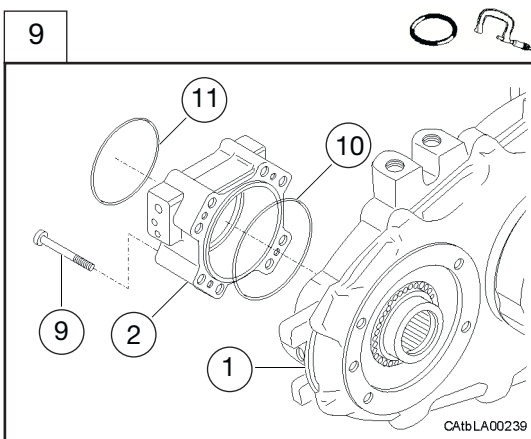
Insert separator disks (2, 4) and brake disks (3, 5), as in figure.

Lock the disks with the lock ring (1).

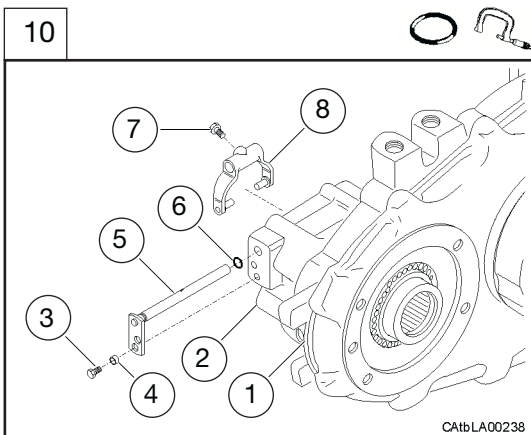
**DO NOT DISASSEMBLE ANY COMPONENT (S) DURING WARRENTY PERIOD WITHOUT CONTACTING TEREXLIFT.**



Insert the shaft (14) on the transmission box.  
 Assemble the lock ring (12) and the washer (13) on the shaft (14).



Insert new well lubricated O-Rings (10, 11) in the motor flange (2).  
 Assemble the motor flange (2) with the fastening screws (9) to the requested torque (Sec.C.7)

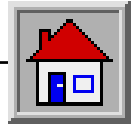


Assemble a new well lubricated O-Ring (6).  
 Position the fork (8) in the motor flange (2).  
 Insert the fork control shaft (5) in the motor flange (2) and in the fork (8).

**Note:** do not tighten the screw (7) before inserting the sleeve coupling.

Assemble the screw (3) and the bush (4) in the motor flange (2).

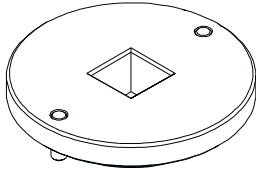
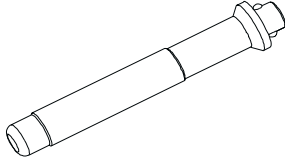
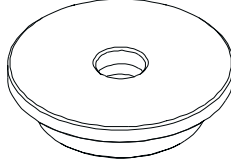


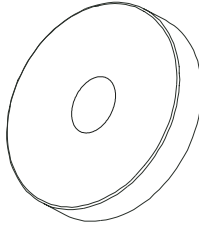
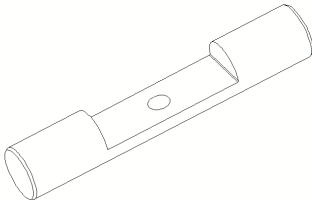
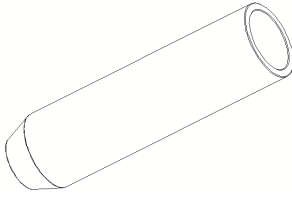
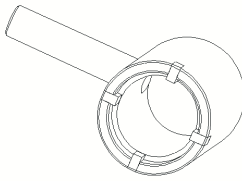
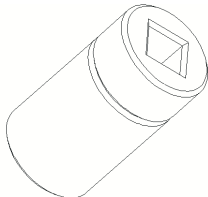
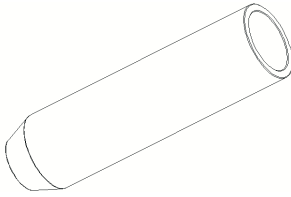

**DO NOT DISASSEMBLE ANY COMPONENT (S) DURING WARRENTY PERIOD WITHOUT CONTACTING TEREXLIFT.**



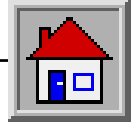
**G SPECIAL TOOLS**

**G.1 Special tools**

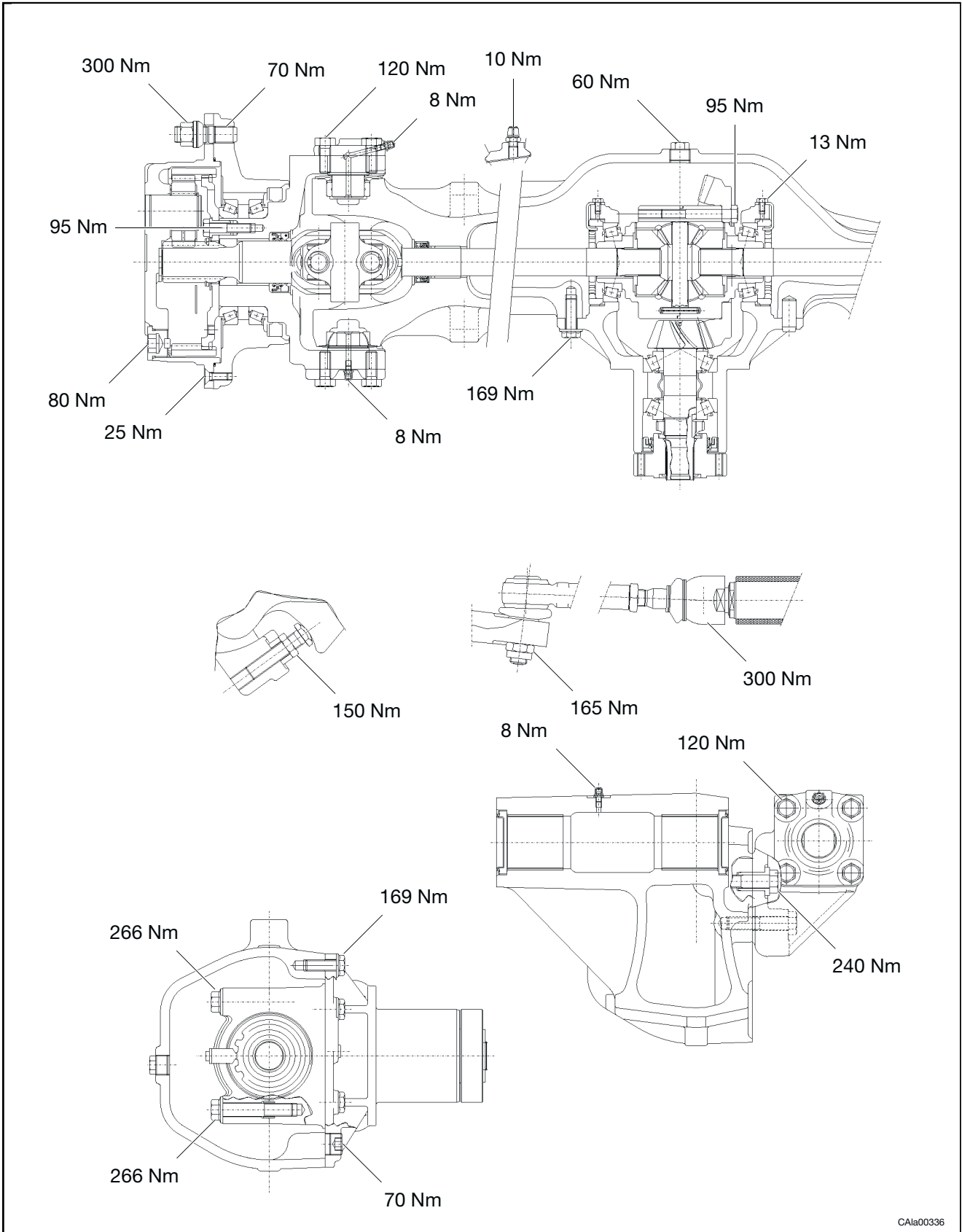
The special drifts/pad used to assembly the seals, bearings and bushes should always be used with the interchangeable handle CA119033; its use is recommended together with a suitable safety handle in order to protect the hands.

<p><b>CA119030</b> Wrench</p> 	<p><b>CA119033</b> Handle</p> 	<p><b>CA119068</b> Driver</p> 
<p><b>CA119097</b> Driver</p> 	<p><b>CA119102</b> Driver</p> 	<p><b>CA119205</b> False differential box</p> 
<p><b>CA119206</b> False differential box</p> 	<p><b>CA119220</b> Driver</p> 	<p><b>CA715080</b> Wrench</p> 
<p><b>CA715081</b> Wrench</p> 	<p><b>CA715082</b> Driver</p> 	<p><b>CA715083</b> Driver</p> 

**DO NOT DISASSEMBLE ANY COMPONENT (S) DURING WARRENTY PERIOD WITHOUT CONTACTING TEREXLIFT.**



**C.7 Tightening torques**



CAla00336

**DO NOT DISASSEMBLE ANY COMPONENT (S) DURING WARRENTY PERIOD WITHOUT CONTACTING TEREXLIFT.**

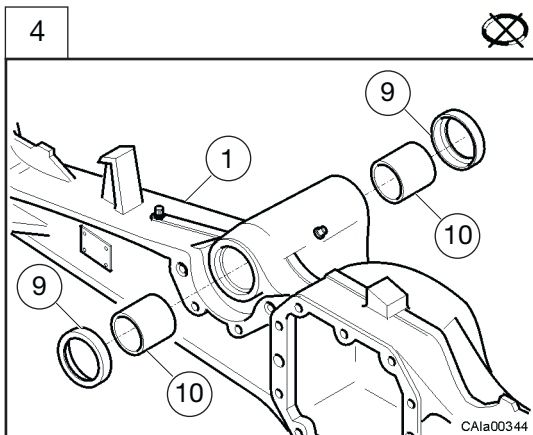
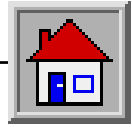
CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

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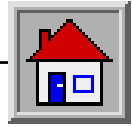
Take the seal rings (9) out of the axle beam (1) with a lever.

**Note:** this is a destructive operation for the seal rings.

Remove the bush (10) from the beam with a suitable extractor.

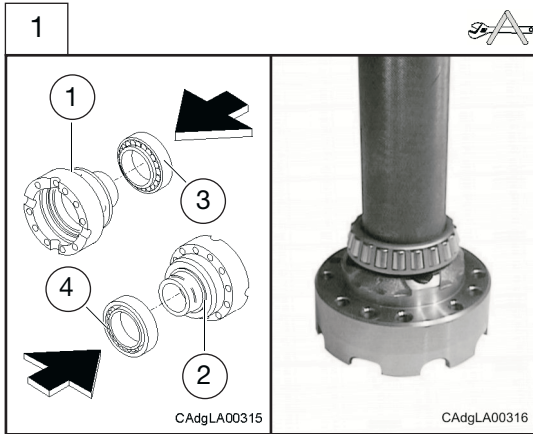
**Note:** examine the bushes before the removal and replace only if the wear conditions require this.

**DO NOT DISASSEMBLE ANY COMPONENT (S) DURING WARRENTY PERIOD WITHOUT CONTACTING TEREXLIFT.**

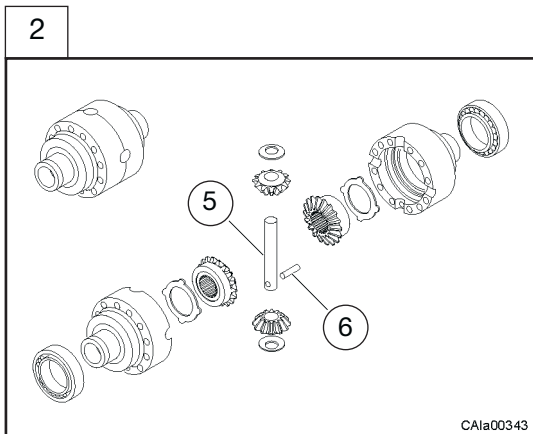


**E.2 Differential group assembly**

Some of the following pictures may not show exactly your axle, but the procedure is the same.

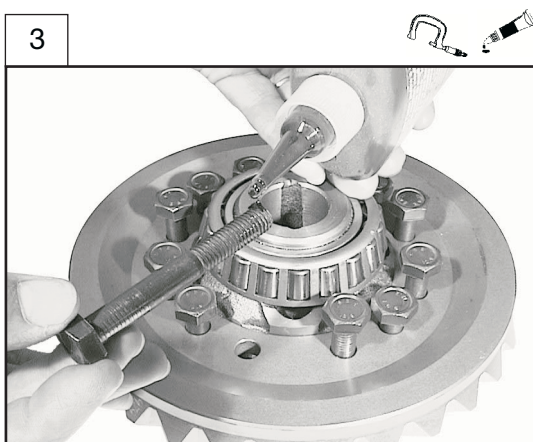


Assemble the cones of the new taper roller bearings (3, 4) on the half boxes (1, 2), using the special tool CA715093 and a hammer.



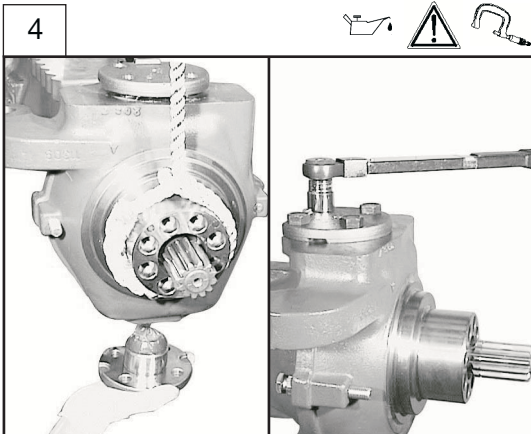
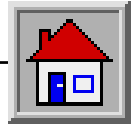
Position a half box on a workbench and assemble all inner components (thrust washers, sun gears, planetary gears, locking differential counterdisks, central pin), as shown in figure.

Fix the pin (5) with the lock pin (6).  
 Join the two half boxes, aligning the reference marks made upon them.



Position the bevel crown gear on the differential box.  
 Apply Loctite® 270 on screws thread.  
 Fix the whole tightening the screws to the requested torque (Sec. C.7).

**DO NOT DISASSEMBLE ANY COMPONENT (S) DURING WARRENTY PERIOD WITHOUT CONTACTING TEREXLIFT.**



**Danger:** secure the swivel housing group with a rope.

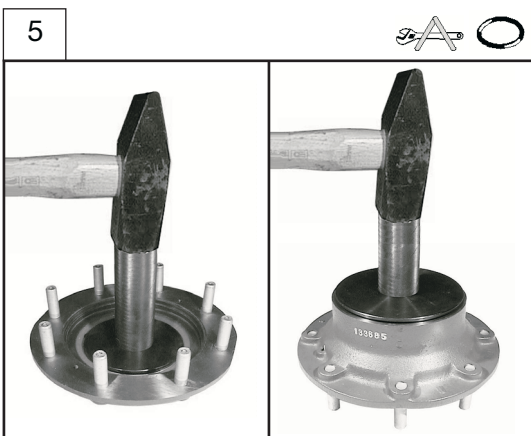
Lubricate the seal ring lip and protect the splined end of the axle shaft by winding it with thin adhesive tape to avoid damage to the seal ring.

After assembly, remove completely the adhesive tape.

Assemble the swivel housing on the axle beam.

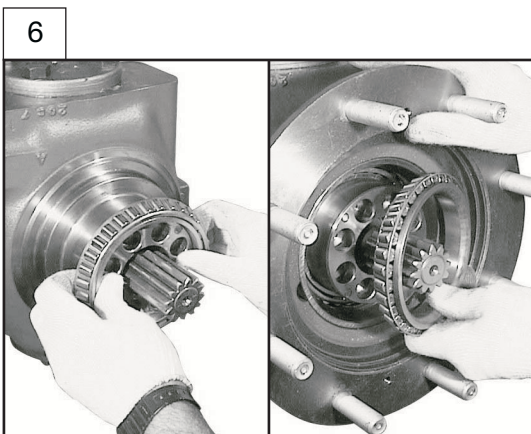
Assemble the two king pins, the upper and the lower, and tighten the retaining screws with dynamometric wrench to the requested torque (Sec.C.7).

**Note:** make sure that the Belleville washers remain in their position.



Position the wheel hub on a workbench and force both cups of the taper roller bearings in position with the special tool CA715085 under a press or with a hammer.

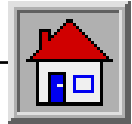
Insert the seal ring into the wheel hub with the special tool CA715099 and a hammer.



Assemble the cone of the taper roller bearing on the swivel housing end.

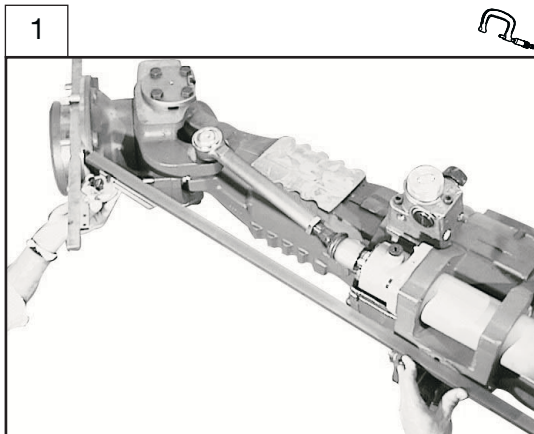
Assemble the wheel hub on the swivel housing and fit the other cone of the taper roller bearing in position.

**DO NOT DISASSEMBLE ANY COMPONENT (S) DURING WARRENTY PERIOD WITHOUT CONTACTING TEREXLIFT.**

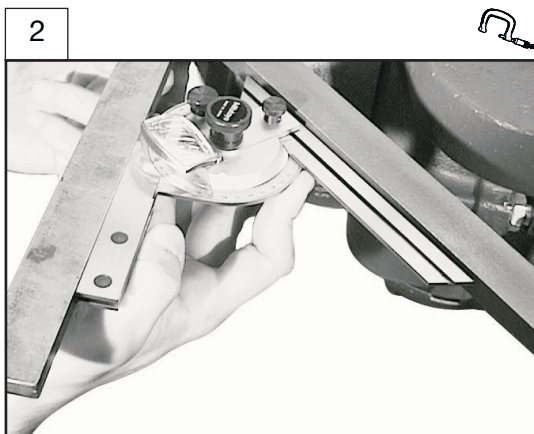


### E.9 Steering angle adjustment

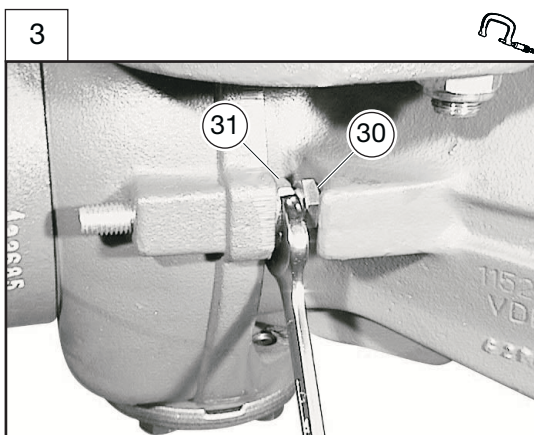
Some of the following pictures may not show exactly your axle, but the procedure is the same.



Use the same bars assembled for the toe-in adjustment and a long bar perfectly leaned over the machined part of the central body (pinion side), so that the two bars form an acute angle at the maximum steering.

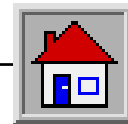


Adjust a goniometer to the requested angle (Sec. C.4) and position it on the long bar. Move a wheel side till it forms, with the two bars, the angle fixed by the goniometer.



Adjust the steering mechanical retainer, screwing in or out the special screws (30), locking them with a locknut (31) to the requested tightening torque (Sec.C.7). Steer completely towards the other side and repeat the same operations.

**DO NOT DISASSEMBLE ANY COMPONENT (S) DURING WARRENTY PERIOD WITHOUT CONTACTING TEREXLIFT.**

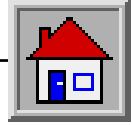


## 16.0 TROUBLESHOOTING GUIDE

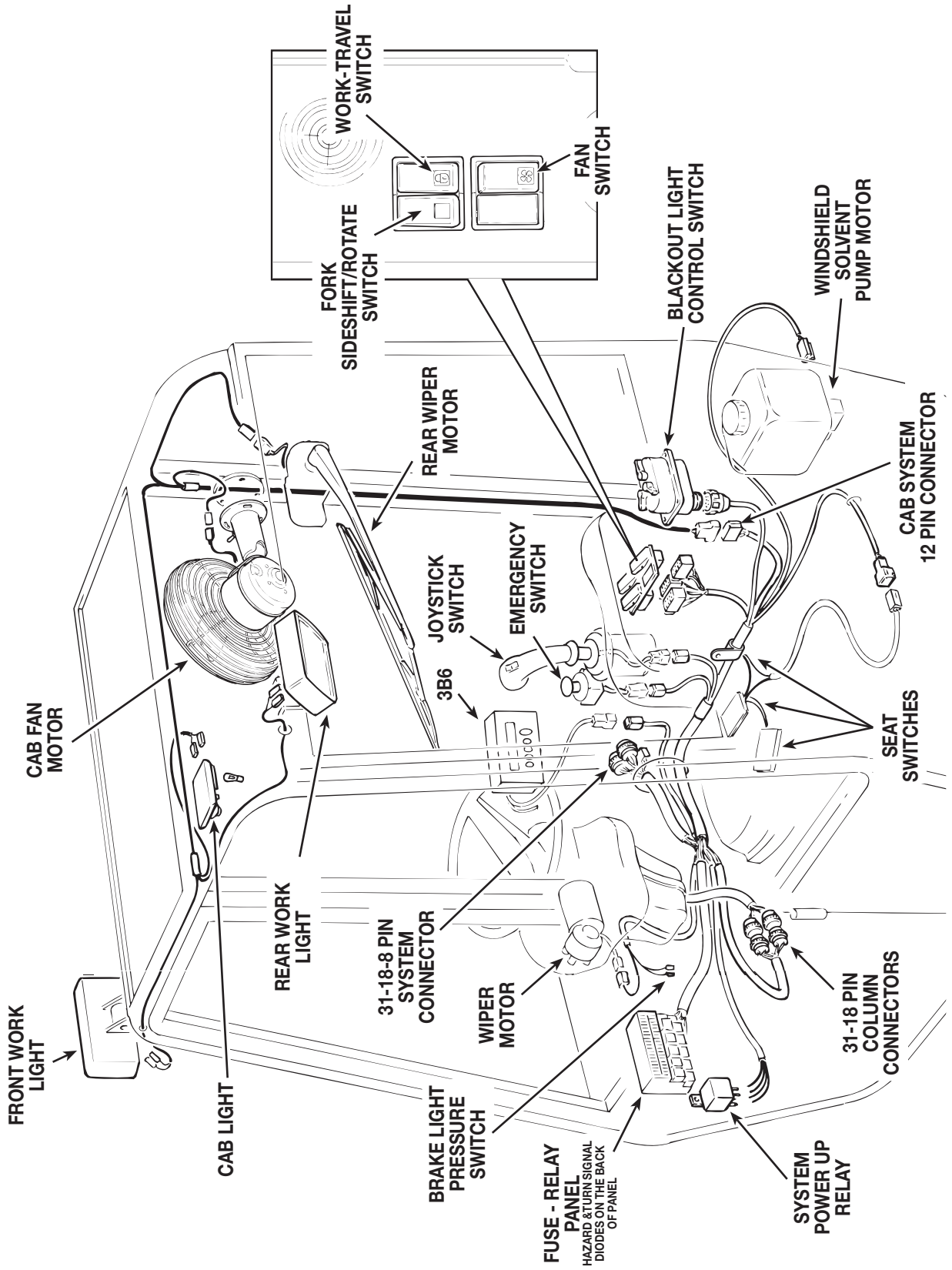
This section provides troubleshooting and schematic for the electrical and hydraulic system. There are three troubleshooting charts one for General, Electrical and Hydraulic. These charts are of general nature, but should provide an intuitive feeling for a specific system. Knowing the system is the greatest aid to troubleshooting. Every component has a purpose in the system. The construction and operating characteristics of each one should be understood. Know the capabilities of the system. Each component in the system has a maximum rated speed, torque or pressure. Loading the system beyond the specification increases the possibility of failure. Know the correct operating pressures. Always set and check pressures with a gauge that is know to be accurate.

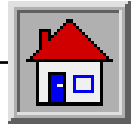
### 16.1 GENERAL TROUBLESHOOTING

FAULT	CAUSE	SOLUTION
The hydraulic oil Thermometer does not function	This is normal, when the outside temperature is low and / or the machine is used for short periods, since the hydraulic oil cannot warm up over 40-50°C  The oil temperature bulb is damaged.	Check and replace the bulb
High temperature of the Engine coolant	Water level in the overflow tank  The temperature bulb is defective  The dashboard manometer is defective	Check and, if necessary, refill  Change bulb  Change
Low hydraulic oil level	Oil Leaks	Refill
High hydraulic oil temperature	The radiator grill is dirty	Clean the grill regularly
Low engine performance	The air filter is dirty	Clean the air filter regularly
The steering column Response is slow or noisy	Joints are damaged  The spiders of the driving shaft are damaged	Change the joints  Change the spiders
The differential is noisy and its body temperature is high	No Oil  Bearing are damaged	Check and refill  Change the bearings as per HURTH instructions.
Oil leaks from axles and/or gearbox	Seals are worn	Change as per HURTH instructions



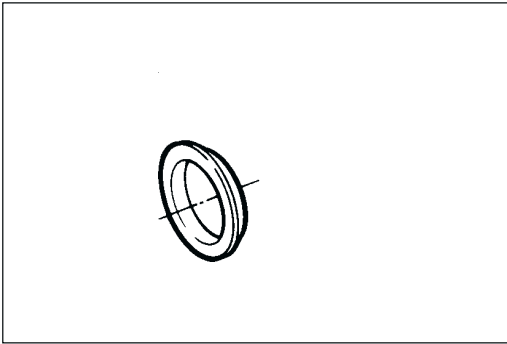
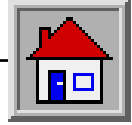
# CAB WIRING



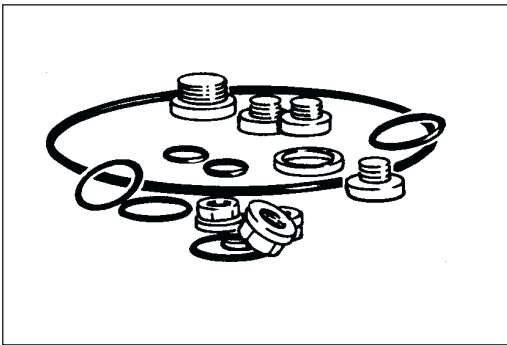


## **SECTION 17**

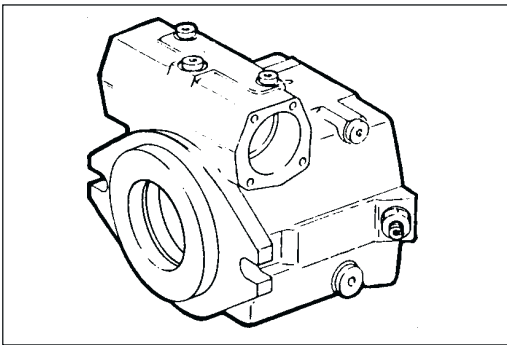
# **HYDRAULIC SYSTEM**



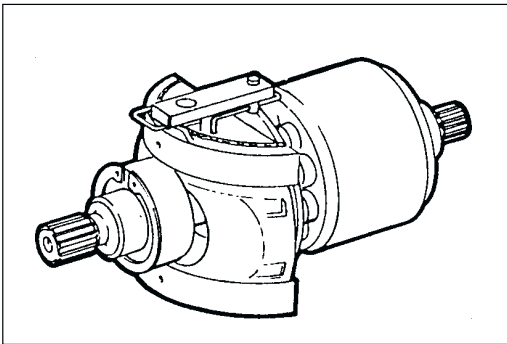
1 Seal kit for drive shaft.



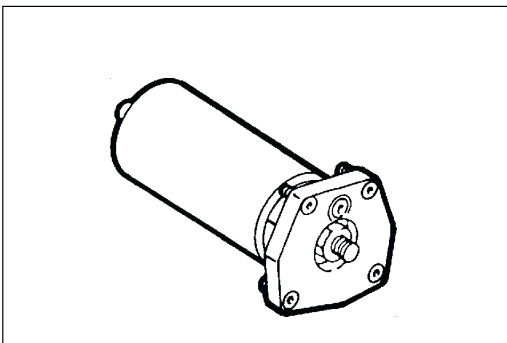
2 External seal kit.



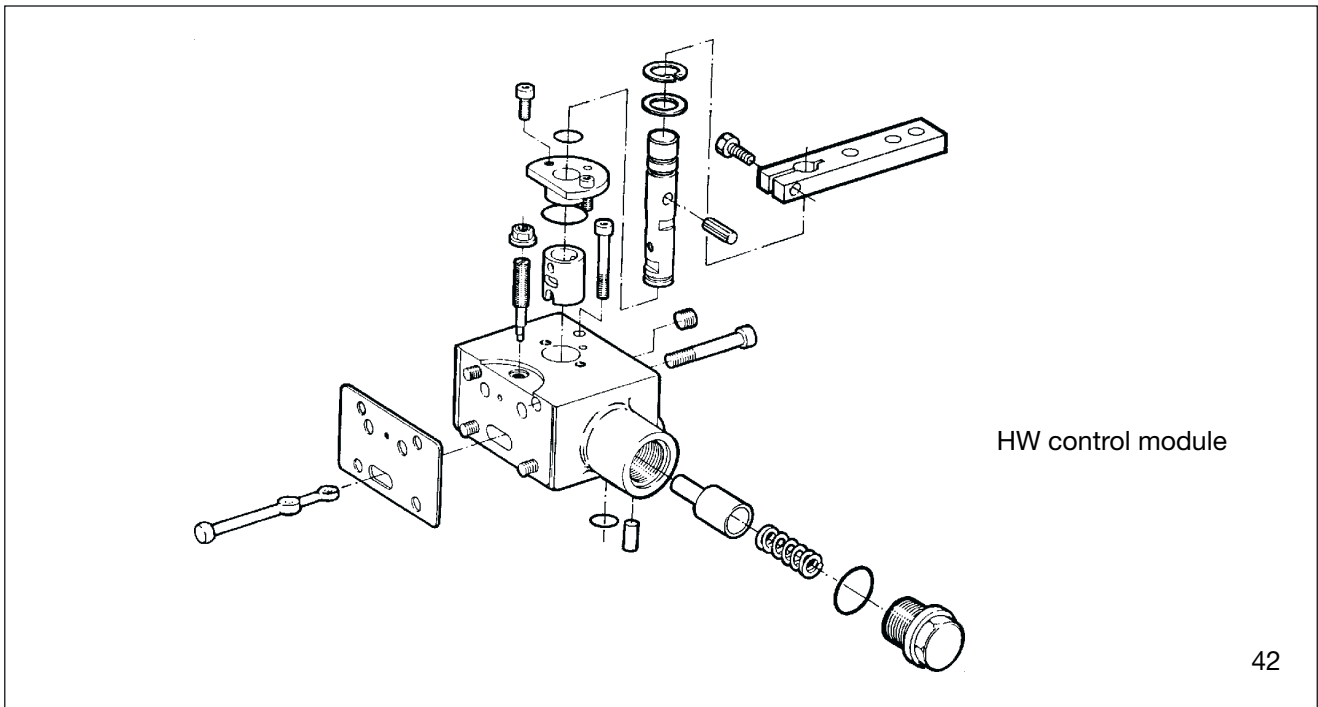
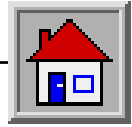
3 Housing.



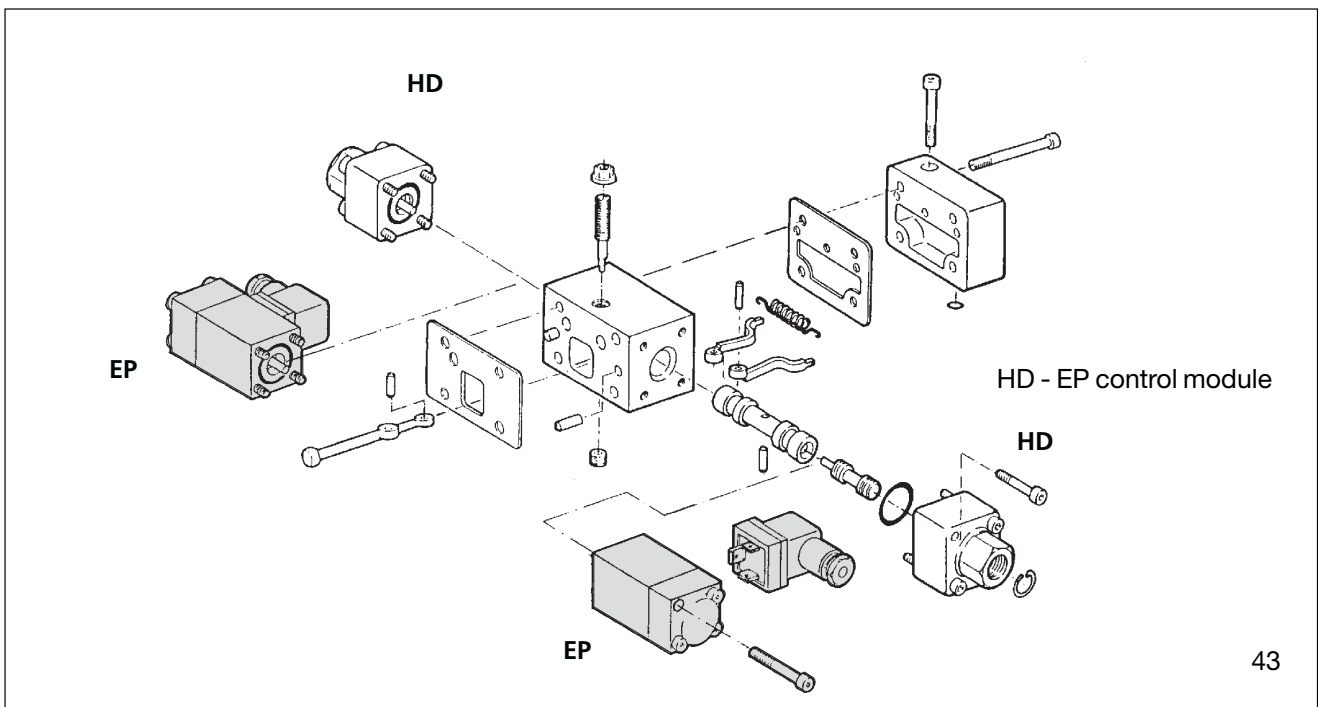
4 Complete rotary group.



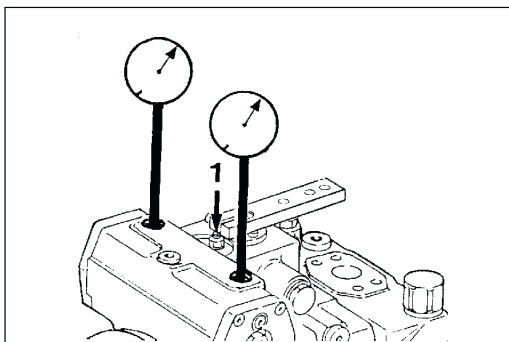
5 Positioning piston.



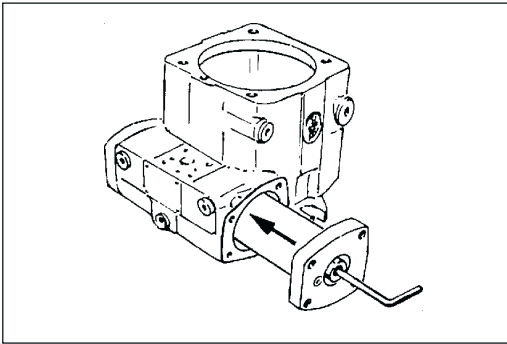
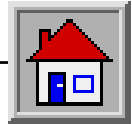
42



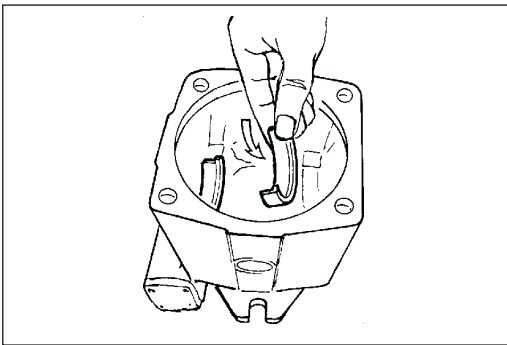
43



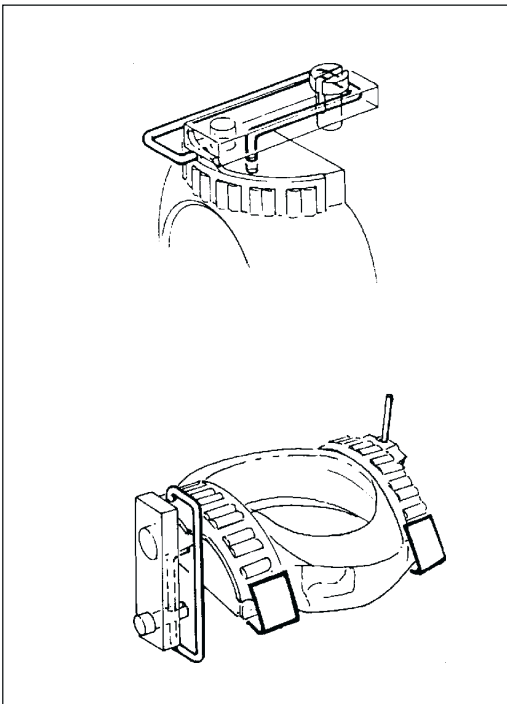
44 Reset hydraulic zero position (1).  
Both gauges must indicate the same pressure.



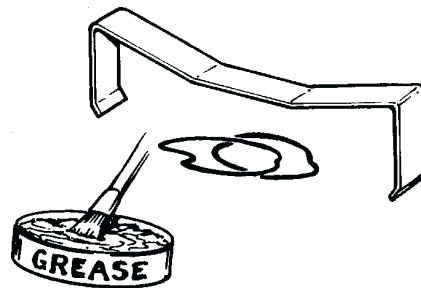
75 Insert positioning piston into the housing.  
 Instruction:  
 Oil positioning piston before assembly.



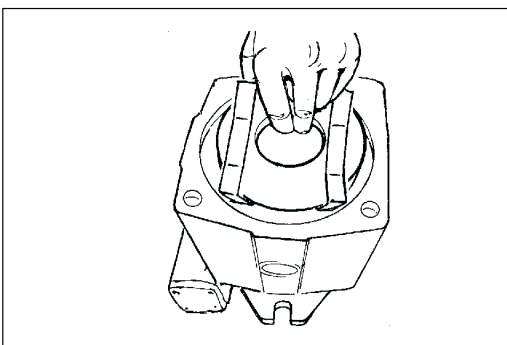
76 Insert bearing cup set.




Assemble bearing, wire, gliding stone and articulating pin.  
 Assistance: Devices e.g. - Clamp / rubber rings / grease

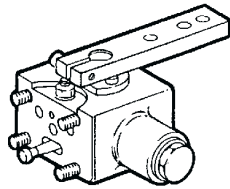
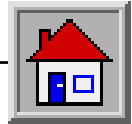


77

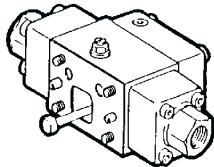


78 Insert completely swivel cradle into the housing.  
 Pay attention for correct seat of the swivel cradle in the housing.

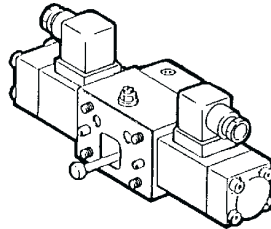
 Remove auxiliary device.



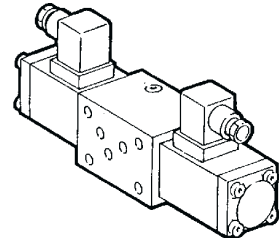
HW



HD

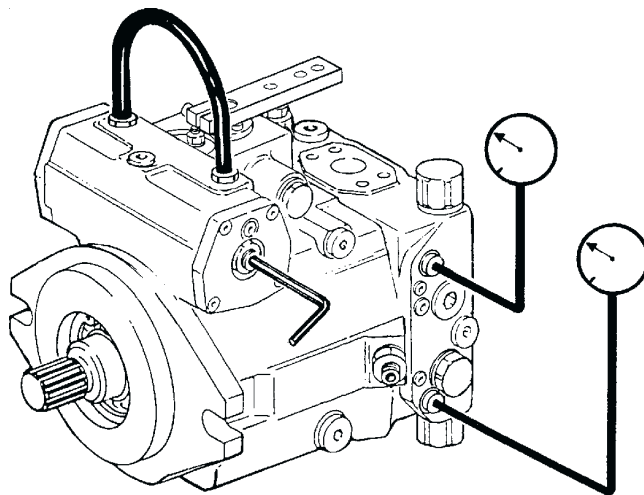


EP



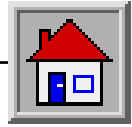
DA

101



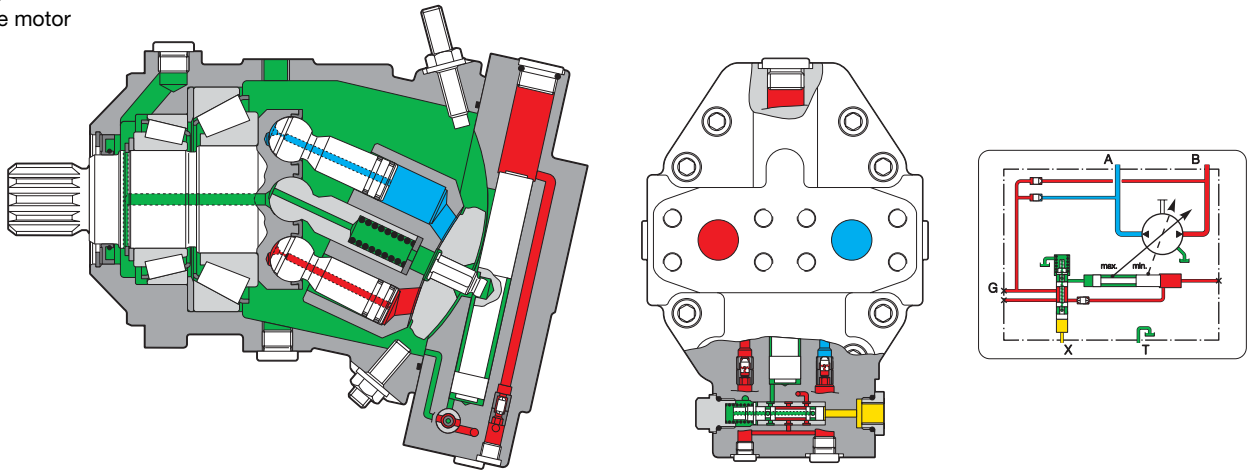
**Attention!**  
 Observe safety regulations!  
 Connect both control chambers with hose NW6.  
 Avoidance of rest signal from hydraulic zero position.  
 Connect manometer to  $M_A$  and  $M_B$ .  
 Adjust zero position so that at blocked drive both manometer indicate the same pressure valve.  
**Note:**  
 Adjust death line of zero position.

102



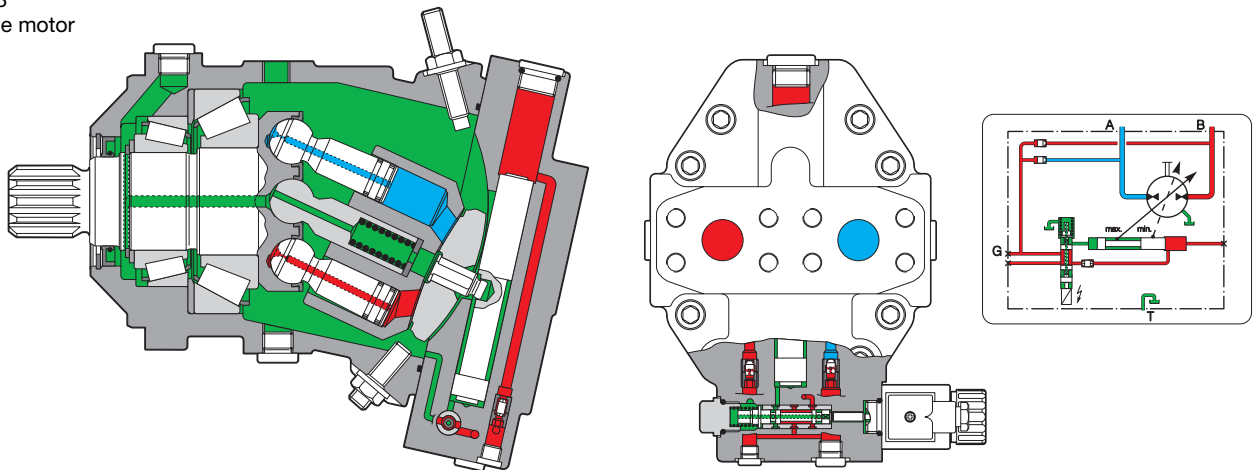
**A6VM 55-107 HZ3/6**

Index 3  
Variable motor



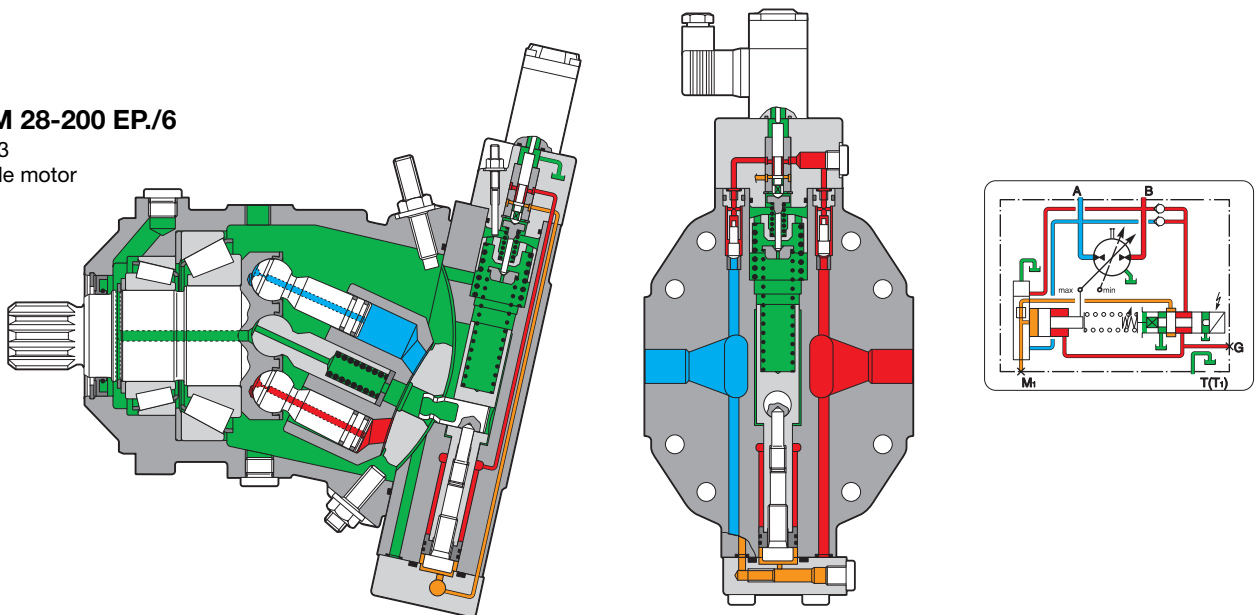
**A6VM 55-107 EZ3/6**

Index 3  
Variable motor

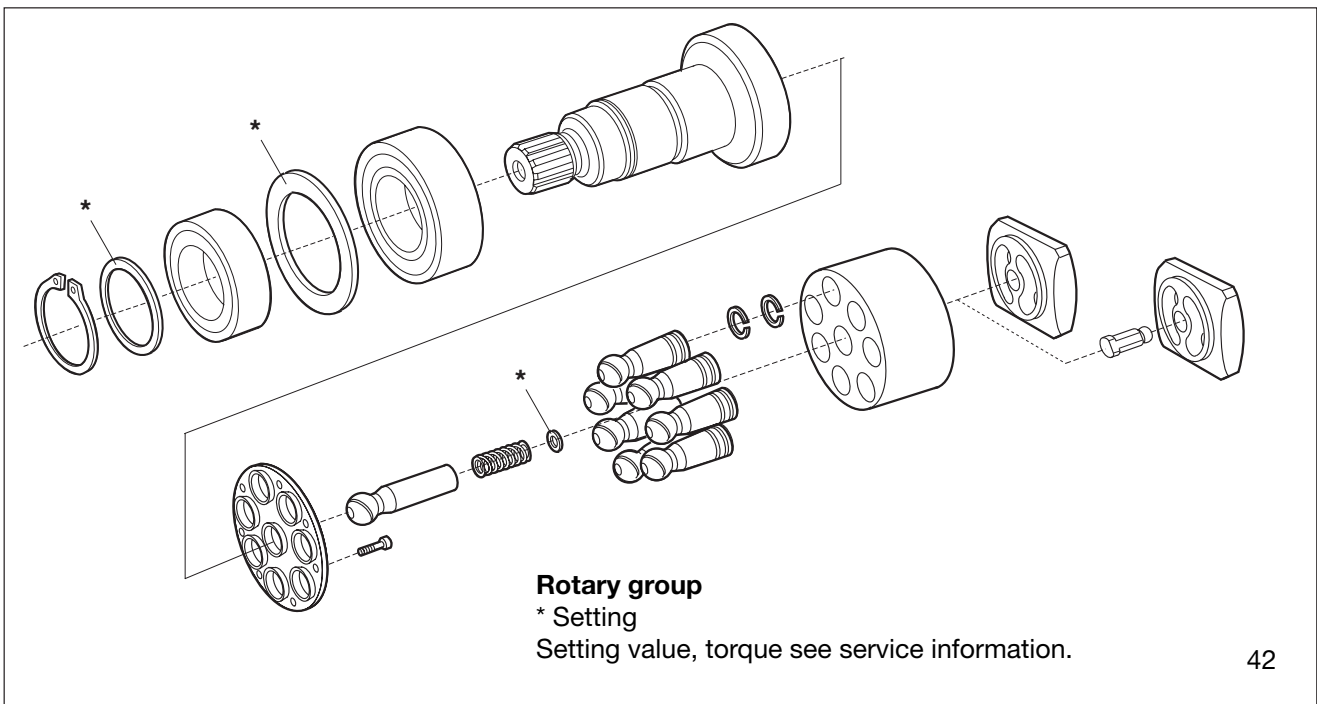
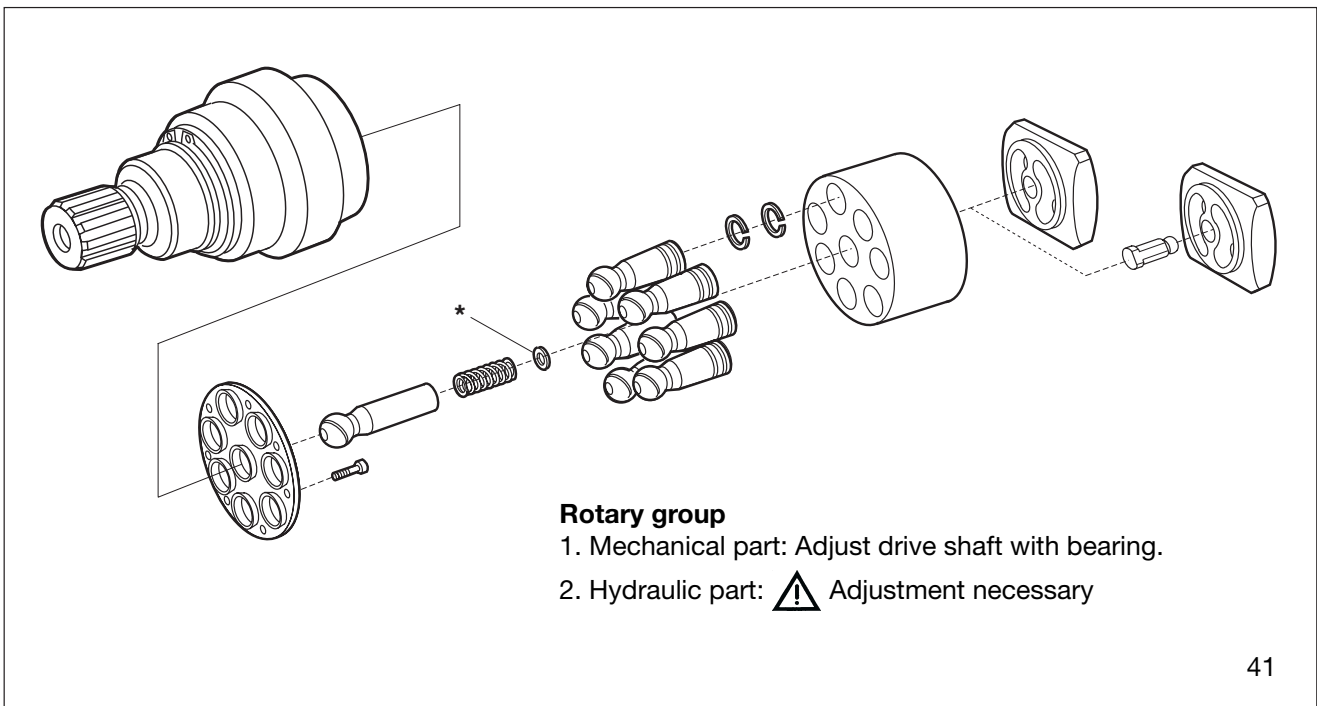
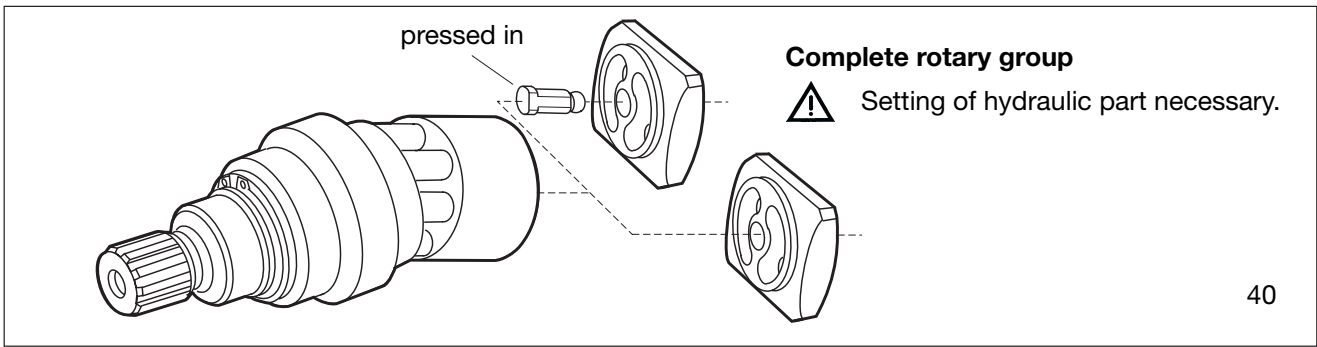
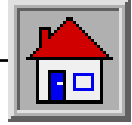


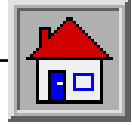
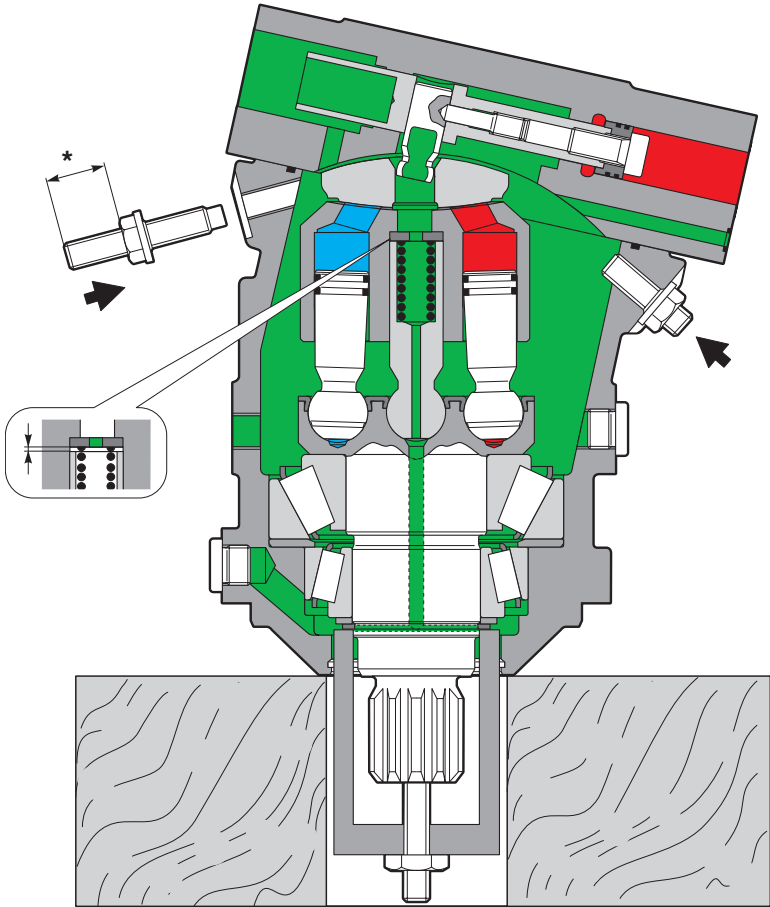
**A6VM 28-200 EP./6**

Index 3  
Variable motor









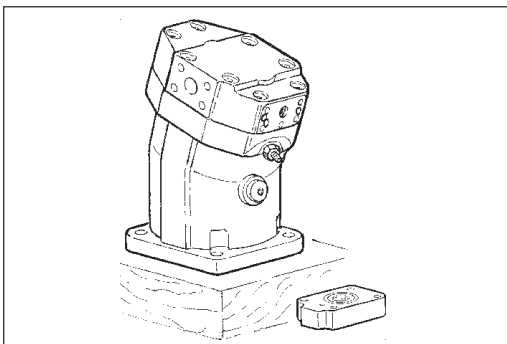



1. Assemble port plate with differential piston.

-  Take care of assembly design!
-  Tighten fixing screws with torque.

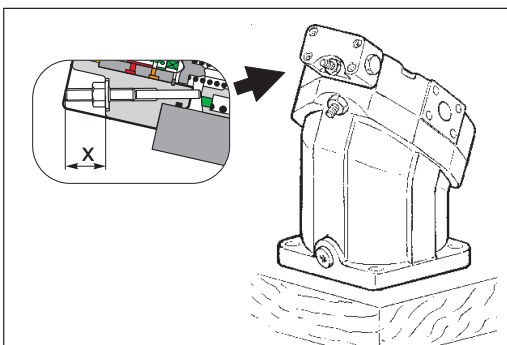
2. Swivel rotary group to "starting position".
3. Set  $Q_{min}$ -screw to dimension\*.
4. Assemble plug.
5. Remove assembly sleeve.

61



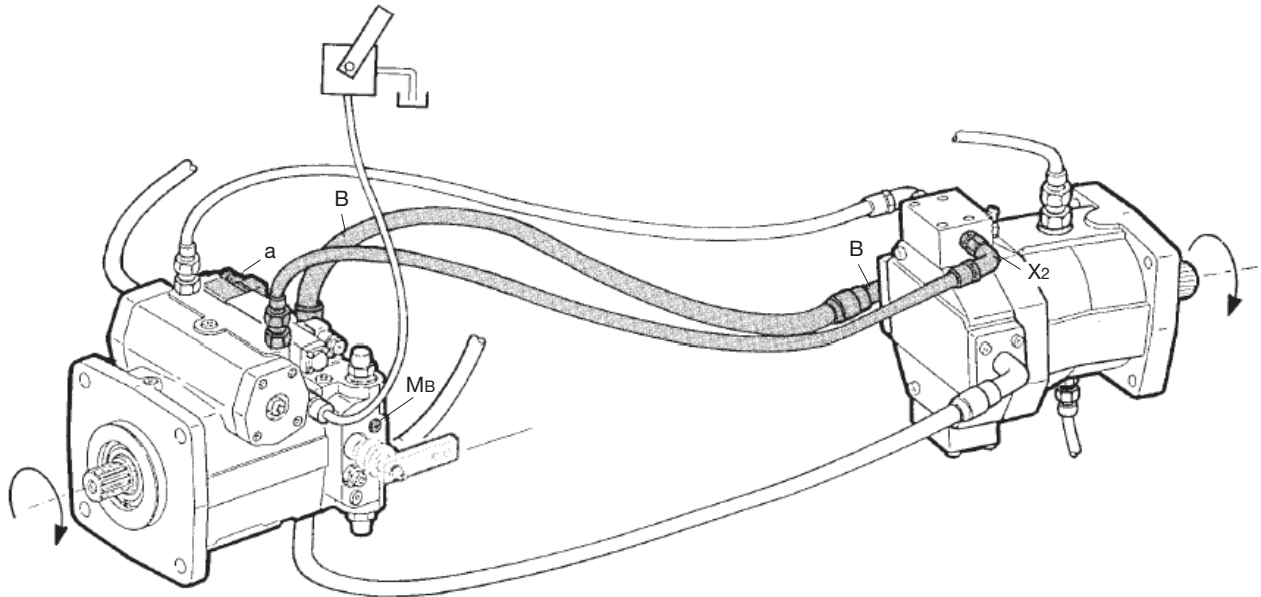
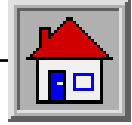
62

Assemble cover.



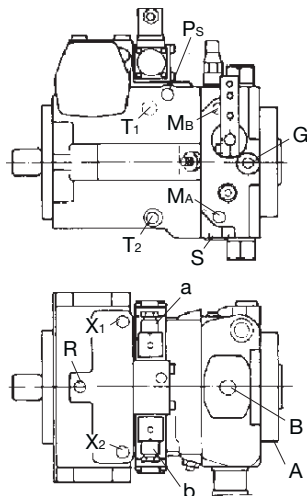
63

Assemble control components.



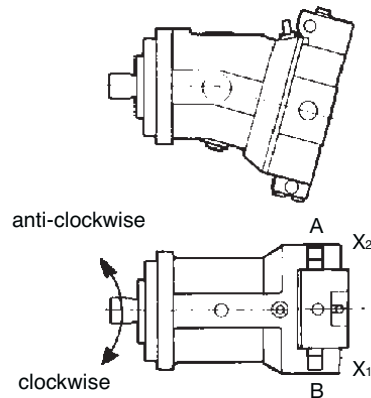
**A4V/DA**

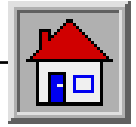
Direction of rotation	Clockwise		Anti-clockwise	
Solenoid operation	a	b	a	b
Control pressure in	X <sub>2</sub>	X <sub>1</sub>	X <sub>2</sub>	X <sub>1</sub>
Direction of through flow	A-B	B-A	B-A	A-B
Service pressure	M <sub>B</sub>	M <sub>A</sub>	M <sub>A</sub>	M <sub>B</sub>

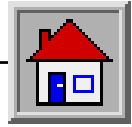


**A6VM/DA**

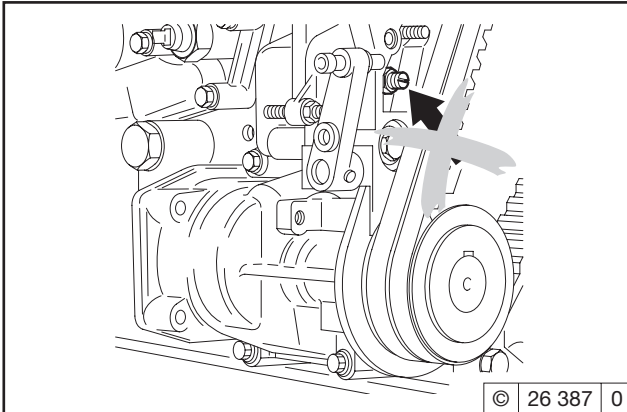
Clockwise	Anti-clockwise
X <sub>1</sub>	X <sub>2</sub>
A - B	B - A







### 2.1.5 Fuel Delivery Lock



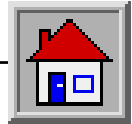
The manufacturer shall not be held liable for damages resulting from adjustments made to the regulator by the operator.

The lock screws are protected in order to prevent this:

1. with locking paint on model: with torque balancer
2. with plastic protective cap on model: without torque balancer.



Adjustments to the regulator are to be carried out only by authorised DEUTZ SERVICE specialists.



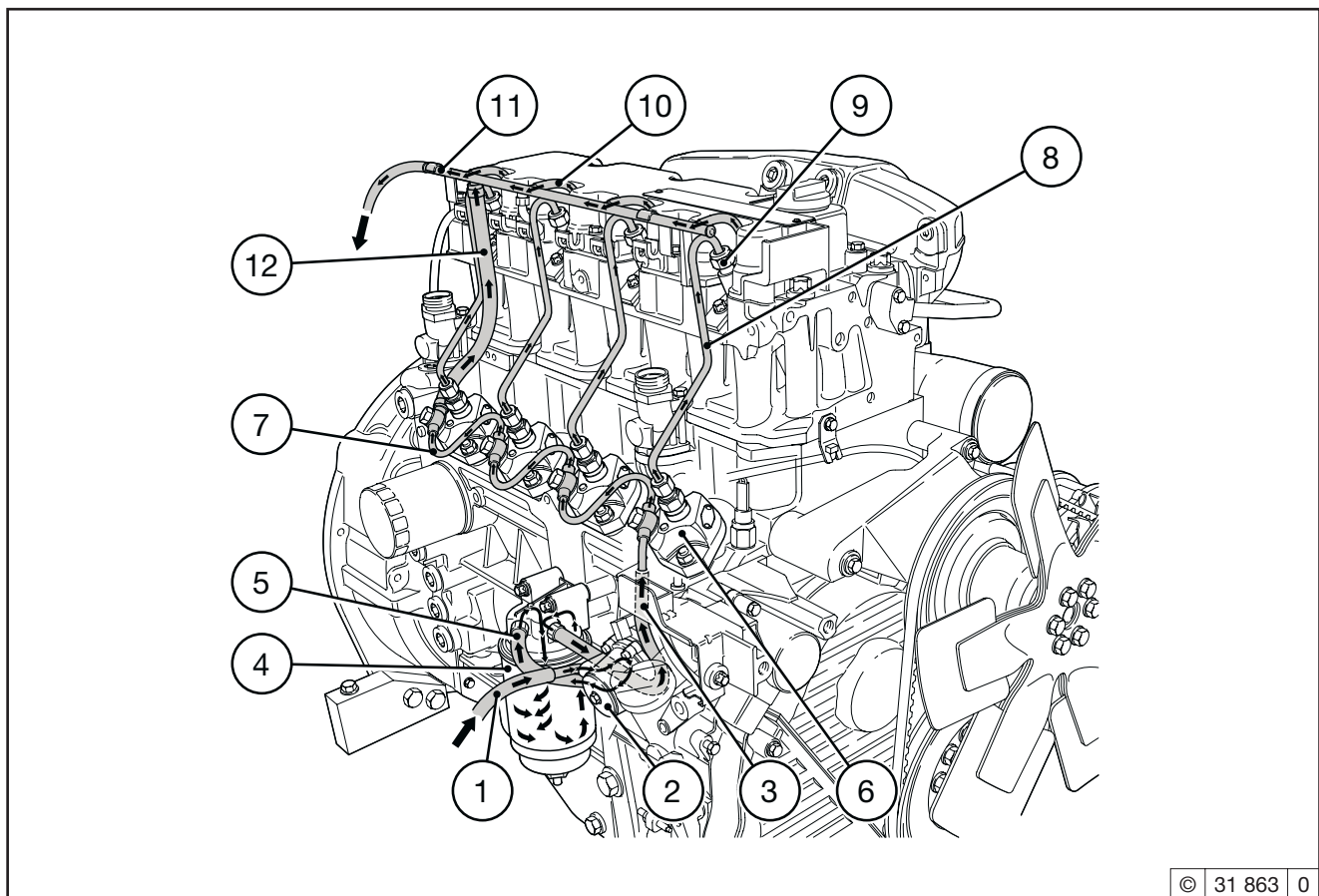
## 2.4 Fuel System Schematic

### 2.4.1 Fuel System

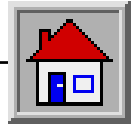
- 1 Fuel line from tank to fuel pump
- 2 Fuel pump
- 3 Fuel line from fuel pump to easy-change fuel filter
- 4 Easy-change fuel filter
- 5 Fuel line from filter to injection pump
- 6 Injection pump
- 7 Fuel distributor line
- 8 Injection line
- 9 Injection valves
- 10 Fuel leakage line
- 11 Fuel overflow pipe
- 12 Fuel return line to tank



The installation of a fuel pre-filter/hand pump between the fuel tank and the engine is prescribed to protect the engines against dirt in the fuel.



© 31 863 0



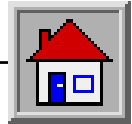
<b>Deutz maintenance and service schedule = E</b> <b>check = ●</b> <b>adjust = ○</b> <b>clean = ▲</b> <b>replace = ■</b>										<b>Additions and modifications for engines with EPA approval</b> The specified engine maintenance intervals are permissible recommended maximums. Depending on usage, reduced maintenance intervals may be necessary (comply with the unit manufacturer's operating instructions). # Maintenance must only be carried out by authorised service personnel	
↓ prior to or during 1st trial run, check 2x daily during the breaking-in phase or when commissioning new and overhauled engines											
↓ every 10 operating hours or daily											
↓ in operating hours (OH) every											
<b>E10</b>	<b>E20</b>	<b>E25</b> 250	<b>E30</b> 500	<b>E40</b> 1000	<b>E50</b> 3000	<b>E60</b> 6000	<b>E70</b> 12000	<b>Years</b>		<b>Operation</b>	<b>Section</b>
								1	2		
●	●		■							FL 2011 lube oil, see TC 0199-99-3002	6.1.1/ 6.1.2
		■								BFL 2011 lube oil, see TC 0199-99-3002	6.1.1/ 6.1.2
				●		■				Injection valve	#
				●					●	Crankcase pressure vent valve	#

Page 2 of 2

Timing belt change intervals Guideline values in OH	Engine application Example:	Engine/ application/operating parameters Example:
6000 or max. 5 years	Generating sets 1500/1800 rpm; pump units, low speed; platform lifts; refrigeration units etc.	low speed; moderate ambient temperature; low dust exposure
5000 or max. 5 years	compressors; rollers; forklift trucks; welding units; small dumpers; ski-steer loaders etc.	wheel loaders; medium to high variable speed; high ambient temperature; moderate dust exposure
3000 or max. 5 years	agricultural machinery; ski-steer loaders; wheel loaders; drilling equipment; trench-cutting machines; joint cutters; bulldozers etc.	high speed; impact loads; extreme ambient temperature; high dust exposure

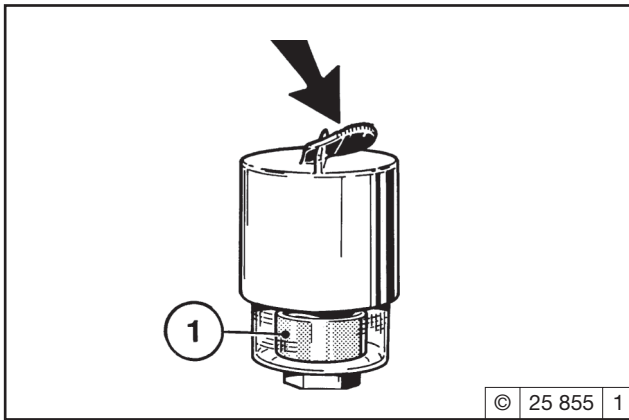
### 5.2.1 Scheduled Maintenance Plan

Intervals at/after	Deutz maintenance and service schedule	Operation	Carried out by:
50 OH	E 10	After commissioning and E 50-E 70	Authorised specialists
Daily	E 20	Daily check	Operator
250 OH	E 25	Inspection	Authorised specialists
500 OH	E 30	Extended inspection	Authorised specialists
1000 OH	E 40	Interim overhaul	Authorised specialists
3000 OH	E 50	Extended interim overhaul	Authorised specialists
6 000 OH	E 60	Partial overhaul	Authorised specialists
12 000 OH	E 70	Basic overhaul	Authorised specialists



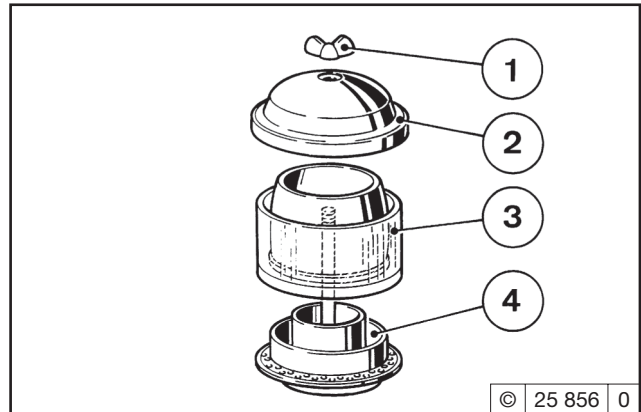
**6.4 Combustion Air Filter**

**6.4.1 Cleaning Intervals**



- Amount of dirt in air cleaner depends on amount of dust in air and size of air cleaner used. If high level of dust is anticipated, cyclone-type pre-cleaner can be fitted to air cleaner.
- Cleaning intervals will have to be determined from case to case.
- If dry type air filters are used, cleaning should only be carried out according to service indicator or service switch.
- Air cleaner servicing is needed when:
  - **Service indicator**  
red signal 1 is fully visible when engine is off.
  - **Service switch**  
yellow pilot light comes on when engine is running.
- pressing button on service indicator. Service indicator is now ready for operation again.

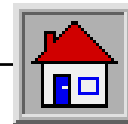
**6.4.2 Emptying Cyclone-Type Precleaner**



- Undo wing nut 1 and remove cover 2.
- Remove collector bowl 3 from lower section 4 and empty. Clean leaves, straw and other foreign matter from lower section of pre-cleaner.
- Reposition collector bowl 3 onto lower section 4, fasten cover 2 in place by tightening wing nut 1.

---

Never fill collector bowl with oil. Replace collector bowl if damaged.



## 9. Technical Specification

### 9.1 Engine Specifications and Settings

#### 9.2 Torque Wrench Settings

#### 9.3 Tools

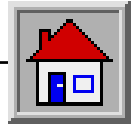
### 9.1 Engine Specifications and Settings

Model	F2L 2011	F3L 2011	F4L 2011
Number of cylinders	2	3	4
Cylinder arrangement	vertical in line		
Bore	[mm] 94		
Stroke	[mm] 112		
Total displacement	[cm <sup>3</sup> ] 1554	2331	3108
Compression ratio	[ε] 19		
Working cycle	4-stroke diesel engine		
Combustion system	Naturally aspirated engine with direct injection		
Direction of rotation	On left when looking at flywheel		
Weight incl. integral cooling system to DIN 70020-A (without starter, with alternator)	approx. [kg] 175	217	256
Engine output	[kW (hp)] 1)		
Speed	[rpm] 1)		
Lubrication	Pressure lubrication		
SAE oil	20 W 20		
Maximum oil temperature in oil pan	[°C] 130		
Min. oil pressure in warm condition, oil temperature 110°C at: 900 rpm (low idling speed)	[bar] 1.4 <sup>3)</sup>		
1800 rpm	[bar] 2.2 <sup>3)</sup>		
max. 2800 rpm	[bar] 3 <sup>3)</sup>		
Oil change quantity (oil pan) approx.	[l] 6 <sup>2)</sup>	5.5 <sup>2)</sup>	10 <sup>2)</sup>
Oil change quantity with filter (standard 0.5 l)	approx. (l) 6.5 <sup>2)</sup>	6 <sup>2)</sup>	10.5 <sup>2)</sup>
Valve clearance with cold engine (Engine cooling time at least 30 min.: oil temperature should be below 80°C	[mm] Inlet 0.3 <sup>+0.1</sup> / Exhaust 0.5 <sup>+0.1</sup>		
Start of feed	[°crankshaft BTDC] 1)		
Injector opening pressure: vehicle/unit	[bar] 210 <sup>+8</sup>		
Firing order of engine	1 - 2	1 - 2 - 3	1 - 3 - 4 - 2
V-belt tension: pretension / retension (after engine has been running under load for 15 mins)	[N] 450 / 350 ±20		

<sup>1)</sup> Engine power, speed, start of delivery are stamped on engine rating plate, see also 2.1.

<sup>2)</sup> Approx. values can vary depending on sump and/or cooler design (external cooling system). **Upper oil dipstick mark is always authoritative.**

<sup>3)</sup> Values for engines without engine oil heating.

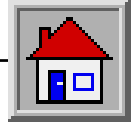


## 19.1 PRESSURE SETTING

### Transmission

Min. 725 PSI - 1100 RPM  
Max. 6230 PSI - 2500 RPM

Distributor Valve  
3500 PSI

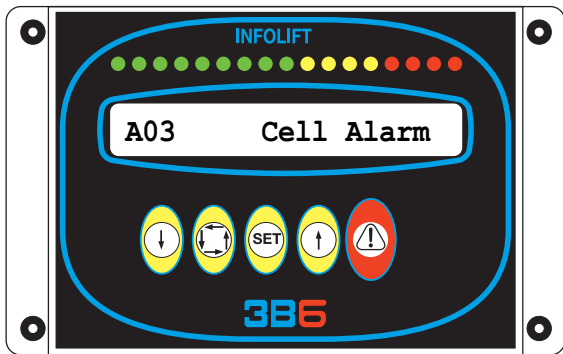
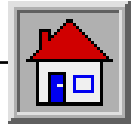


# 3B6 LOAD MOMENT INDICATOR (LMI) TX 51-19MD USMC TELEHANDLER

## USER AND ACCURACY VERIFICATION MANUAL



Complies to the MACHINES DIRECTIVE Standards: EN60204-1, EN954, EN12077-2  
EMC according to the " Heavy Industrial Environment" category: EN50081-2, EN50082-2

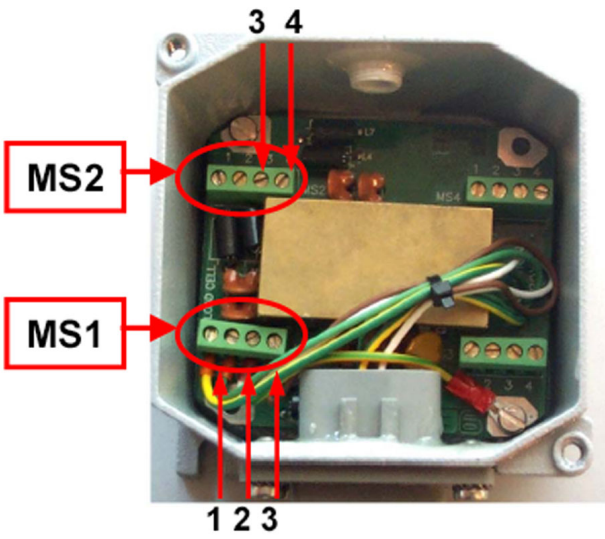


A03 Cell Alarm message is shown when

the value read from the load cell is greater than the maximum allowed.

**Shut-Off Output is OFF.**

(to override shut-off, refer to [page 479](#))



**ACTION:**

- Check the cables integrity between INFOLIFT / Amplifier and Amplifier/ Load Cell
- Check the proper supply voltage on Amplifier board (MS1 Terminal) between 3 (+VB = BATTERY +) and 2 (GND)
- Check Load Cell supply voltage on Amplifier board (MS2 Terminal) between 3 (+V=8Vdc) and 4 (0Vdc)
- Check the load signal on amplifier board (MS1 Terminal) between 1(signal) and 2 (0V); signal must stay in the range of 0,5Vdc (no load) and 4,5Vdc(Max load).

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