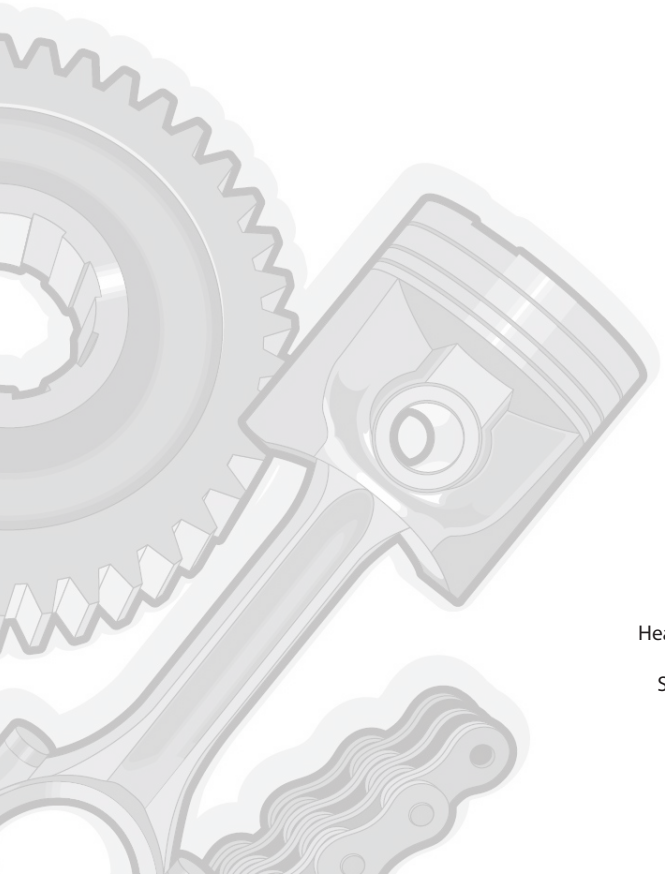
MANITOU

HANDLING YOUR WORLD

REPAIR MANUAL
MANUEL DE RÉPARATION
REPARATURANLEITUNG
MANUAL DE REPARACIÓN
MANUALE RIPARAZIONE



MANITOU BF
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FRONT AND REAR TYRES

DIMENSIONS	PRESSURE	TYRE LOAD		PRESSURE ON THE CONTACT SURFACE		AREA OF THE CONTACT SURFACE	
				HARD GROUND	LIGHT GROUND	HARD GROUND	LIGHT GROUND
440/80-24 T37 158B TUBELESS	**4,1 BAR**	FRONT UNLADEN	2000 KG	7,69 KG/CM2	2,15 KG/CM2	260 CM2	930 CM2
		FRONT LADEN	5850 KG	12,15 KG/CM2	3,36 KG/CM2	482 CM2	1743 CM2
		REAR UNLADEN	2450 KG	8,24 KG/CM2	2,29 KG/CM2	297 CM2	1070 CM2
		REAR LADEN	850 KG	5,99 KG/CM2	1,66 KG/CM2	138 CM2	500 CM2
445/70R24 IT510 151G TUBELESS	**4,1 BAR**	FRONT UNLADEN	2000 KG	8,79 KG/CM2	2,9 KG/CM2	228 CM2	690 CM2
		FRONT LADEN	5850 KG	10,3 KG/CM2	3,4 KG/CM2	568 CM2	1721 CM2
		REAR UNLADEN	2450 KG	9,07 KG/CM2	3,02 KG/CM2	270 CM2	810 CM2
		REAR LADEN	850 KG	7,24 KG/CM2	2,38 KG/CM2	115 CM2	349 CM2
15,5-25 12PR SGL DL 2A	**4,5 BAR**	FRONT UNLADEN	2000 KG	6,96 KG/CM2	3,76 KG/CM2	288 CM2	533 CM2
		FRONT LADEN	5850 KG	8,42 KG/CM2	4,55 KG/CM2	695 CM2	1286 CM2
		REAR UNLADEN	2450 KG	6,81 KG/CM2	3,71 KG/CM2	360 CM2	660 CM2
		REAR LADEN	850 KG	6,07 KG/CM2	3,27 KG/CM2	140 CM2	260 CM2
15,5/80-24 SGI 16PR TUBELESS	**4,5 BAR**	FRONT UNLADEN	2000 KG	9,09 KG/CM2	2,47 KG/CM2	220 CM2	810 CM2
		FRONT LADEN	5850 KG	13,84 KG/CM2	3,75 KG/CM2	423 CM2	1560 CM2
		REAR UNLADEN	2450 KG	10,21 KG/CM2	2,71 KG/CM2	240 CM2	903 CM2
		REAR LADEN	850 KG	7,88 KG/CM2	2,15 KG/CM2	110 CM2	402 CM2
445/70R24 XM47 TL 151G TUBELESS	**4,1 BAR**	FRONT UNLADEN	2000 KG	1,9 KG/CM2	KG/CM2	1050 CM2	CM2
		FRONT LADEN	5850 KG	3,33 KG/CM2	KG/CM2	1754 CM2	CM2
		REAR UNLADEN	2450 KG	2,16 KG/CM2	KG/CM2	1133 CM2	CM2
		REAR LADEN	850 KG	1,07 KG/CM2	KG/CM2	794 CM2	CM2
1200R24 X MINE D2	**6 BAR**	FRONT UNLADEN	2000 KG	4,15 KG/CM2	KG/CM2	482 CM2	CM2
		FRONT LADEN	5850 KG	6,69 KG/CM2	KG/CM2	874 CM2	CM2
		REAR UNLADEN	2450 KG	4,64 KG/CM2	KG/CM2	528 CM2	CM2
		REAR LADEN	850 KG	2,33 KG/CM2	KG/CM2	365 CM2	CM2
15,5R25 XHA	**4 BAR**	FRONT UNLADEN	2000 KG	2,82 KG/CM2	1,32 KG/CM2	685 CM2	1466 CM2
		FRONT LADEN	5850 KG	3,63 KG/CM2	1,64 KG/CM2	1612 CM2	3567 CM2
		REAR UNLADEN	2450 KG	3,09 KG/CM2	1,44 KG/CM2	793 CM2	1699 CM2
		REAR LADEN	850 KG	1,72 KG/CM2	0,8 KG/CM2	473 CM2	1010 CM2
445/65R22,5 XZY TL 169K TUBELESS	**4,5 BAR**	FRONT UNLADEN	2000 KG	3,43 KG/CM2	KG/CM2	583 CM2	CM2
		FRONT LADEN	5850 KG	4,84 KG/CM2	KG/CM2	1208 CM2	CM2
		REAR UNLADEN	2450 KG	3,66 KG/CM2	KG/CM2	669 CM2	CM2
		REAR LADEN	850 KG	2,59 KG/CM2	KG/CM2	326 CM2	CM2
18R19,5 XF TL TUBELESS	**6,5 BAR**	FRONT UNLADEN	2000 KG	3,39 KG/CM2	1,57 KG/CM2	579 CM2	1249 CM2
		FRONT LADEN	5850 KG	4,23 KG/CM2	1,96 KG/CM2	1381 CM2	2980 CM2
		REAR UNLADEN	2450 KG	3,51 KG/CM2	1,63 KG/CM2	674 CM2	1454 CM2
		REAR LADEN	850 KG	3,47 KG/CM2	1,61 KG/CM2	244 CM2	526 CM2
480/65R24 TL 146D SF TUBELESS	**3,8 BAR**	FRONT UNLADEN	2000 KG	3,18 KG/CM2	0,97 KG/CM2	627 CM2	2047 CM2
		FRONT LADEN	5850 KG	3,32 KG/CM2	1,99 KG/CM2	1761 CM2	2943 CM2
		REAR UNLADEN	2450 KG	3,25 KG/CM2	1,13 KG/CM2	754 CM2	2167 CM2
		REAR LADEN	850 KG	2,94 KG/CM2	0,48 KG/CM2	283 CM2	1695 CM2

HYDRAULIC CIRCUIT

- Type of pump	Variable displacement piston pump
. Capacity	63 cm3
. Flow rate at full speed	148 L/mn
. Flow rate at 2300 rpm	145 L/mn
. Flow rate at 1600 rpm	101 L/mn
- Pressure	
. Lifting, tilting, telescoping, attachment circuit	270 Bar
. Steering circuit	140 Bar
- Filtration	
. Return	10 µ
. Suction	125 µ

CHARACTERISTICS (WITH FLOATING FORK CARRIAGE)
MT 1335 HSL Turbo MONO-ULTRA NACELLE ORH Série 2-E2

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
400/80-24 156A8 PIA TUBELESS BF GOODRICH	**4,1 BAR**	FRONT UNLADEN	2650 KG	KG/CM2	KG/CM2	CM2	CM2
		FRONT LADEN	6150 KG	KG/CM2	KG/CM2	CM2	CM2
		REAR UNLADEN	2400 KG	KG/CM2	KG/CM2	CM2	CM2
		REAR LADEN	650 KG	KG/CM2	KG/CM2	CM2	CM2
440/80-24 T37 158B TUBELESS DUNLOP	**4,5 BAR**	FRONT UNLADEN	2650 KG	8,69 KG/CM2	2,40 KG/CM2	305 CM2	1105 CM2
		FRONT LADEN	6150 KG	12,75 KG/CM2	3,50 KG/CM2	483 CM2	1758 CM2
		REAR UNLADEN	2400 KG	8,42 KG/CM2	2,34 KG/CM2	285 CM2	1025 CM2
		REAR LADEN	650 KG	5,72 KG/CM2	1,59 KG/CM2	113 CM2	407 CM2
15,5-25 12PR SGL DL 2A GOODYEAR	**4,5 BAR**	FRONT UNLADEN	2650 KG	6,95 KG/CM2	3,77 KG/CM2	381 CM2	703 CM2
		FRONT LADEN	6150 KG	8,48 KG/CM2	4,59 KG/CM2	725 CM2	1339 CM2
		REAR UNLADEN	2400 KG	6,81 KG/CM2	3,71 KG/CM2	353 CM2	648 CM2
		REAR LADEN	650 KG	4,64 KG/CM2	2,50 KG/CM2	140 CM2	260 CM2
15,5/80-24 SGI 16PR TUBELESS GOODYEAR	**4,5 BAR**	FRONT UNLADEN	2650 KG	10,49 KG/CM2	2,82 KG/CM2	253 CM2	939 CM2
		FRONT LADEN	6150 KG	14,06 KG/CM2	3,80 KG/CM2	438 CM2	1618 CM2
		REAR UNLADEN	2400 KG	10,00 KG/CM2	2,69 KG/CM2	240 CM2	892 CM2
		REAR LADEN	650 KG	8,77 KG/CM2	2,35 KG/CM2	74 CM2	277 CM2
1200R24 X MINE D2 MICHELIN	**6,5 BAR**	FRONT UNLADEN	2650 KG	4,90 KG/CM2		541 CM2	
		FRONT LADEN	6150 KG	6,96 KG/CM2		884 CM2	
		REAR UNLADEN	2400 KG	4,65 KG/CM2		516 CM2	
		REAR LADEN	650 KG	1,88 KG/CM2		345 CM2	
15,5R25 XHA TUBELESS MICHELIN	**4 BAR**	FRONT UNLADEN	2650 KG	3,09 KG/CM2	1,44 KG/CM2	857 CM2	1839 CM2
		FRONT LADEN	6150 KG	3,68 KG/CM2	1,66 KG/CM2	1683 CM2	3729 CM2
		REAR UNLADEN	2400 KG	3,10 KG/CM2	1,45 KG/CM2	775 CM2	1661 CM2
		REAR LADEN	650 KG	1,53 KG/CM2	0,71 KG/CM2	436 CM2	931 CM2
18R19,5 XF TUBELESS MICHELIN	**6,5 BAR**	FRONT UNLADEN	2650 KG	3,56 KG/CM2	1,65 KG/CM2	716 CM2	1546 CM2
		FRONT LADEN	6150 KG	4,32 KG/CM2	2,00 KG/CM2	1419 CM2	3061 CM2
		REAR UNLADEN	2400 KG	3,49 KG/CM2	1,62 KG/CM2	663 CM2	1432 CM2
		REAR LADEN	650 KG	3,04 KG/CM2	1,41 KG/CM2	213 CM2	460 CM2

HYDRAULIC CIRCUIT

- Type of pump	Double gear pump with flow divider on the 2nd chamber	
	1st chamber	**2nd chamber**
. Capacity	43,8 cm3	27,8 cm3
. Max. rating capacity unladen	103 L/min	65 L/min
. Flow rate at 2300 rpm	101 L/min	64 L/min
. Flow rate at 1600 rpm	70 L/min	44 L/min
- Pressure		
. Telescoping circuit	260 Bar	160 Bar
. Lifting, tilting, stabilizer, tilting corrector, attachment circuit	260 Bar	
. Steering circuit		140 Bar
- Filtration		
. Return	10 µ	10 µ
. Suction		125 µ

CHARACTERISTICS (WITH EXTENSIBLE PLATFORM 2M25/4M)
MT 1435 HSL Turbo MONO-ULTRA NACELLE ORH Série 2-E2

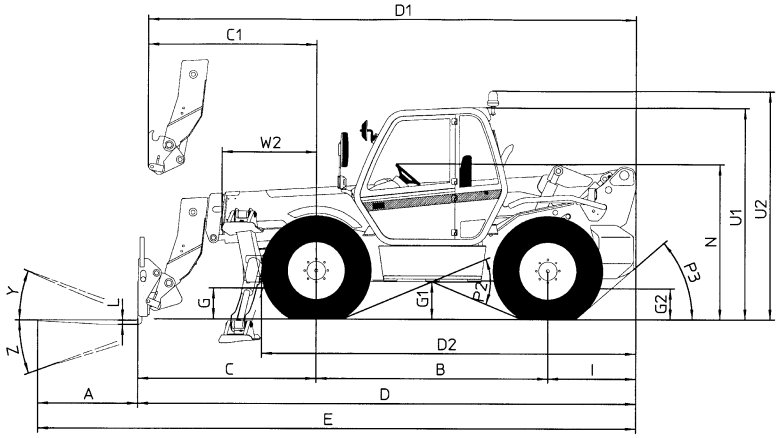
FRONT AND REAR TYRES

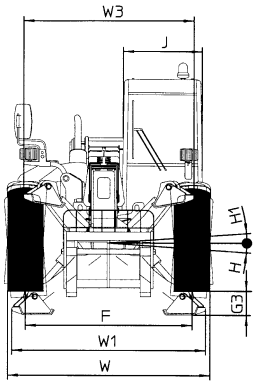
DIMENSIONS	PRESSURE	TYRE LOAD		PRESSURE ON THE CONTACT SURFACE HARD GROUND	PRESSURE ON THE CONTACT SURFACE LIGHT GROUND	AREA OF THE CONTACT SURFACE HARD GROUND	AREA OF THE CONTACT SURFACE LIGHT GROUND
440/80-24 T37 158B TUBELESS DUNLOP	**4,5 BAR**	FRONT UNLADEN	3350 KG	9,42 KG/CM2	2,60 KG/CM2	352 CM2	1275 CM2
		FRONT LADEN	3800 KG	9,96 KG/CM2	2,75 KG/CM2	374 CM2	1356 CM2
		REAR UNLADEN	2100 KG	8,03 KG/CM2	2,23 KG/CM2	261 CM2	939 CM2
		REAR LADEN	1850 KG	7,73 KG/CM2	2,14 KG/CM2	239 CM2	861 CM2
15,5/80-24 SGI 16PR TUBELESS GOODYEAR	**5,5 BAR**	FRONT UNLADEN	3350 KG	KG/CM2	KG/CM2	CM2	CM2
		FRONT LADEN	3800 KG	KG/CM2	KG/CM2	CM2	CM2
		REAR UNLADEN	2100 KG	KG/CM2	KG/CM2	CM2	CM2
		REAR LADEN	1850 KG	KG/CM2	KG/CM2	CM2	CM2
1200R24 X MINE D2 MICHELIN	**7,5 BAR**	FRONT UNLADEN	3350 KG	KG/CM2	KG/CM2	CM2	CM2
		FRONT LADEN	3800 KG	KG/CM2	KG/CM2	CM2	CM2
		REAR UNLADEN	2100 KG	KG/CM2	KG/CM2	CM2	CM2
		REAR LADEN	1850 KG	KG/CM2	KG/CM2	CM2	CM2
15,5R25 XHA TUBELESS MICHELIN	**4,75 BAR**	FRONT UNLADEN	3350 KG	KG/CM2	KG/CM2	CM2	CM2
		FRONT LADEN	3800 KG	KG/CM2	KG/CM2	CM2	CM2
		REAR UNLADEN	2100 KG	KG/CM2	KG/CM2	CM2	CM2
		REAR LADEN	1850 KG	KG/CM2	KG/CM2	CM2	CM2
18R19,5 XF TUBELESS MICHELIN	**8 BAR**	FRONT UNLADEN	3350 KG	KG/CM2	KG/CM2	CM2	CM2
		FRONT LADEN	3800 KG	KG/CM2	KG/CM2	CM2	CM2
		REAR UNLADEN	2100 KG	KG/CM2	KG/CM2	CM2	CM2
		REAR LADEN	1850 KG	KG/CM2	KG/CM2	CM2	CM2
15,5/80-24 163A8 TR-01 TUBELESS MITAS	**4,9 BAR**	FRONT UNLADEN	3350 KG	KG/CM2	KG/CM2	CM2	CM2
		FRONT LADEN	3800 KG	KG/CM2	KG/CM2	CM2	CM2
		REAR UNLADEN	2100 KG	KG/CM2	KG/CM2	CM2	CM2
		REAR LADEN	1850 KG	KG/CM2	KG/CM2	CM2	CM2

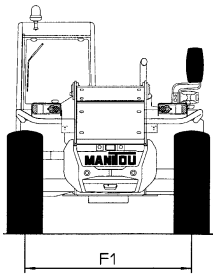
HYDRAULIC CIRCUIT

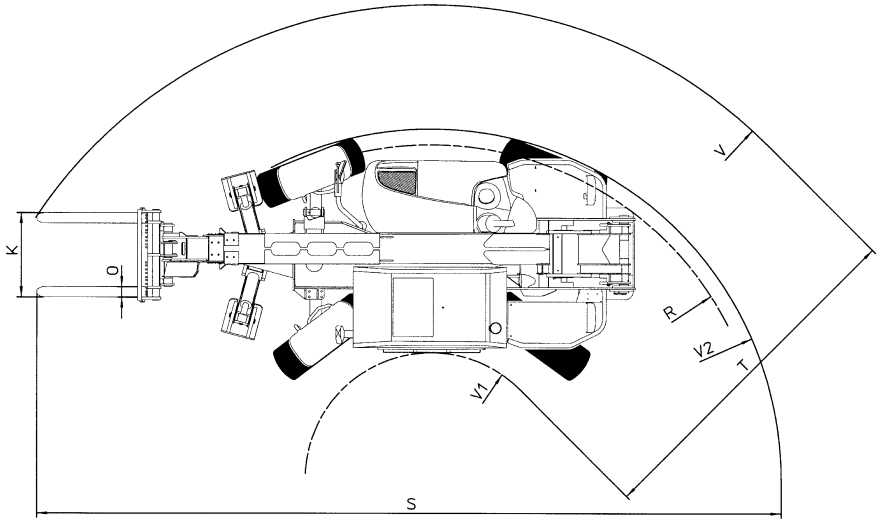
- Type of pump	Double gear pump with flow divider on the 2nd chamber	
	1st chamber	**2nd chamber**
. Capacity	43,8 cm3	27,8 cm3
. Max. rating capacity unladen	103 L/min	65 L/min
. Flow rate at 2300 rpm	101 L/min	64 L/min
. Flow rate at 1600 rpm	70 L/min	44 L/min
- Pressure		
. Telescoping circuit	260 Bar	160 Bar
. Lifting, tilting, stabilizer, tilting corrector, attachment circuit	260 Bar	
. Steering circuit		140 Bar
- Filtration		
. Return	10 µ	10 µ
. Suction		125 µ

DIMENSIONS AND LOAD CHART (WITH FLOATING FORK CARRIAGE)
MT 1335 HSL Turbo MONO-ULTRA NACELLE ORH Série 2-E2



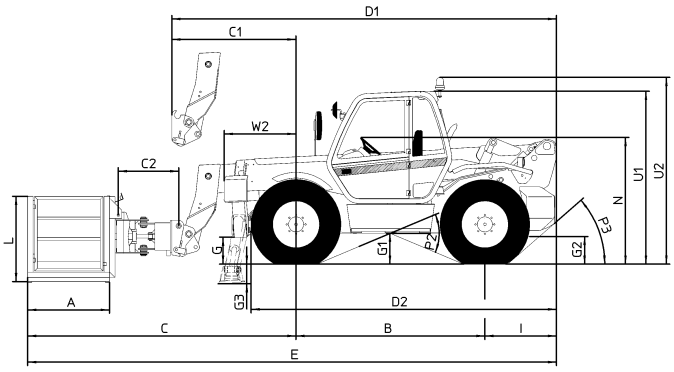


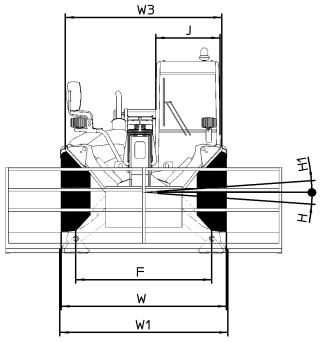


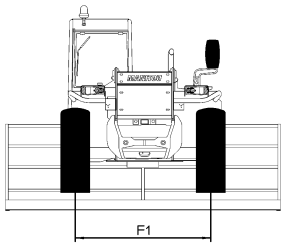


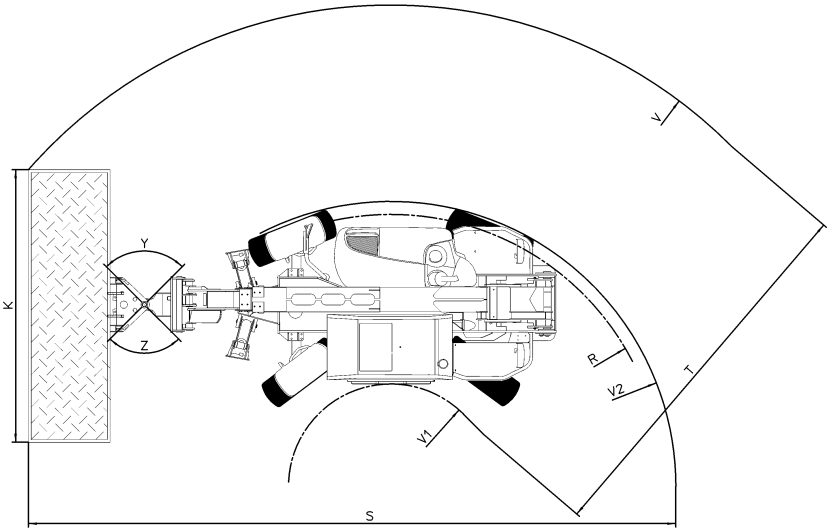
A	1200 mm
B	2770 mm
C	2119 mm
C1	2198 mm
D	5939 mm
D1	6018 mm
D2	4405 mm
E	7139 mm
F	1900 mm
F1	1900 mm
G	450 mm
G1	445 mm
G2	450 mm
G3	275 mm
H	7 °
H1	7 °
I	1050 mm
J	950 mm
K	1040 mm
L	45 mm
N	1860/1910 mm
O	125 mm
P2	43,5 °
P3	40 °
R	3905 mm
S	8817 mm
T	4205 mm
U1	2575 mm
U2	2755 mm
V	5675 mm
V1	1470 mm
V2	4113 mm
W	2315 mm
W1	2320 mm
W2	1125 mm
W3	2035 mm
Y	12 °
Z	112 °

DIMENSIONS AND LOAD CHART (WITH EXTENSIBLE PLATFORM 2M25/4M)
MT 1435 HSL Turbo MONO-ULTRA NACELLE ORH Série 2-E2









A	1200 mm
B	2770 mm
C	4270 mm
C1	2348 mm
C2	887 mm
D1	6168 mm
D2	4405 mm
E	8090 mm
F	1916 mm
F1	1916 mm
G	450 mm
G1	445 mm
G2	450 mm
G3	275 mm
H	7 °
H1	7 °
I	1050 mm
J	950 mm
K	2250/4000 mm
L	1250 mm
N	1860/1910 mm
P2	43,5 °
P3	40 °
R	3905 mm
S	9767 mm
T	5916 mm
U1	2575 mm
U2	2755 mm
V	7386 mm
V1	1470 mm
V2	4112 mm
W	2330 mm
W1	2320 mm
W2	1125 mm
W3	2035 mm
Y	90 °
Z	90 °

LUBRICANTS AND FUEL

USE THE RECOMMENDED LUBRICANTS AND FUEL:
- For topping up, oils may not be miscible.
- For oil changes, MANITOU oils are perfectly appropriate.

DIAGNOSTIC ANALYSIS OF OILS
If a service or maintenance contract has been organized with the dealer, a diagnostic analysis of engine, transmission and axle oils may be requested depending on the rate of use.

(*) FUEL CHARACTERISTICS
Use a high-quality fuel to obtain optimal performance of the I.C. engine.

CHARACTERISTICS OF RECOMMENDED FUEL:

- DERV à EN590
- BS2869 Class A2
- ASTM D975 - 91 Class 2D
- JIS K2204 (1992) Grades 1, 2, 3 and Special Grade 3.

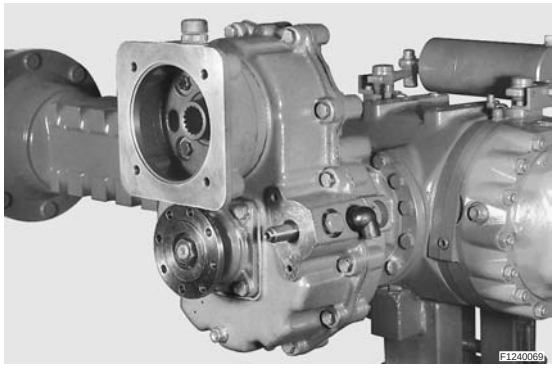
I.C. ENGINE				
ORGANS TO BE LUBRICATED	CAPACITY	RECOMMENDATION	PACKAGING	PART NUMBER
I.C. ENGINE	11 Liters	MANITOU Oil API CH4	5 L. 20 L. 55 L. 209 L.	661706 582357 582358 582359
COOLING CIRCUIT	21,5 Liters	Cooling liquid (protection - 30°)	2 L. 5 L. 20 L.	473076 470077 470078
		Cooling liquid (protection - 25°)	2 L. 5 L. 20 L.	554002 554003 554004
FUEL TANK	135 Liters	Diesel fuel (*)		

TRANSMISSION				
ORGANS TO BE LUBRICATED	CAPACITY	RECOMMENDATION	PACKAGING	PART NUMBER
GEAR BOX	2 Liters	MANITOU Oil SAE80W90 Mechanical transmission	2 L. 20 L. 55 L. 209 L.	499237 546330 546221 546220
TRANSMISSION UNIVERSAL JOINT		MANITOU Grease Multipurpose HD NLGI 2	400 g. 1 Kg. 5 Kg. 20 Kg. 50 Kg.	161589 554973 554974 499233 489670

JIB			
ORGANS TO BE LUBRICATED	RECOMMENDATION	PACKAGING	PART NUMBER
JIB PADS	MANITOU Grease Multipurpose NLGI 2	400 g. 1 Kg. 50 Kg.	545996 161590 499235
GREASING OF THE JIB	MANITOU Grease Multipurpose HD NLGI 2	400 g. 1 Kg. 5 Kg. 20 Kg. 50 Kg.	161589 554973 554974 499233 489670
OPTION GREASING THE SINGLE SIDE-SHIFT CARRIAGE	MANITOU Grease Multipurpose HD NLGI 2	400 g. 1 Kg. 5 Kg. 20 Kg. 50 Kg.	161589 554973 554974 499233 489670

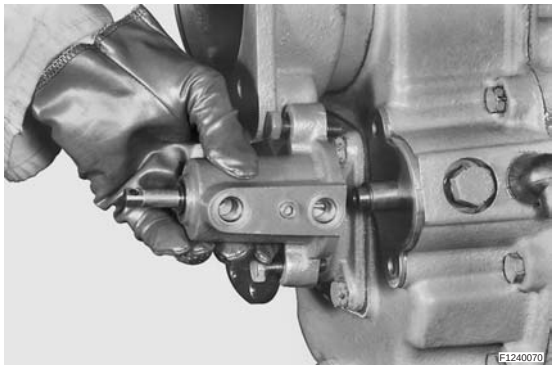
Impaginazione: TEMAS s.r.l. - Gallarate (Va)
Stampa: Gennaio 1998 (N.L. 7309)

DISASSEMBLY OF DIRECTLY FLANGED REDUCTION GEAR 357- SMONTAGGIO GRUPPO RIDUTTORE 357 AFFLANGIATO - DIREKT GEFLANSCHTER REDUZIERER 357 ZERLEGEN - DESMONTAJE GRUPO REDUCTOR 357 CON BRIDA - DEMONTAGE DU GROUPE REDUCTEUR BRIDE 357



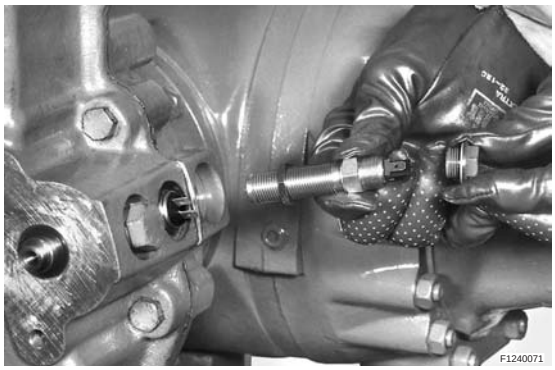
GB a

Reduction gear directly flanged on the axle with mechanic gear control.



GB b

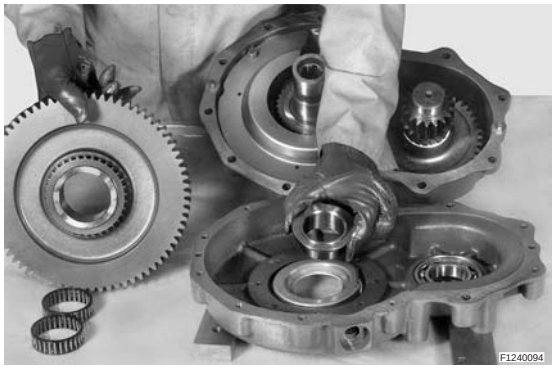
Reduction gear directly flanged on the axle with hydraulic gear control.



GB c

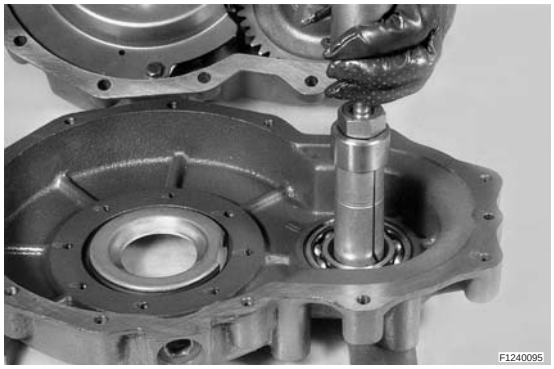
Reduction gear directly flanged on the axle with or without revolution indicator.

DISASSEMBLY OF DIRECTLY FLANGED REDUCTION GEAR 357- SMONTAGGIO GRUPPO RIDUTTORE 357 AFFLANGIATO - DIREKT GEFLANSCHTER REDUZIERER 357 ZERLEGEN - DESMONTAJE GRUPO REDUCTOR 357 CON BRIDA - DEMONTAGE DU GROUPE REDUCTEUR BRIDE 357



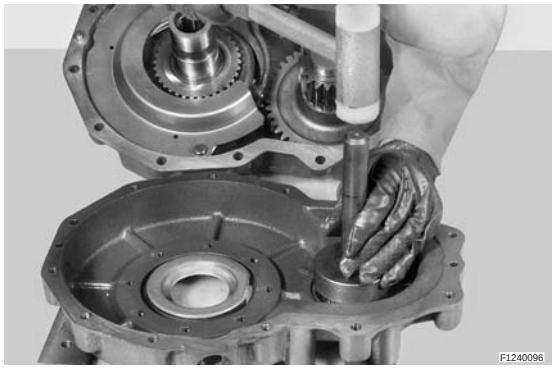
GB a

Pull out gear, needle bearings and distance piece form the box.



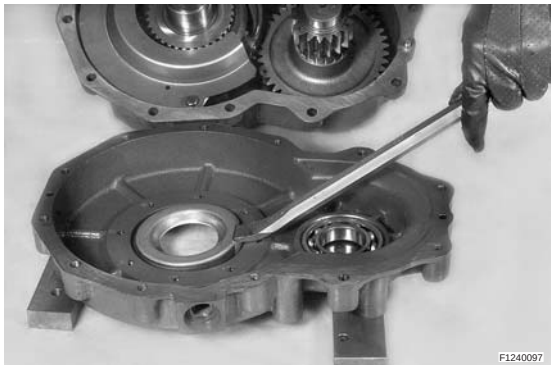
GB b

Remove the bearing if it needs replacing.



GB c

Re-introduce the bearing into the box.

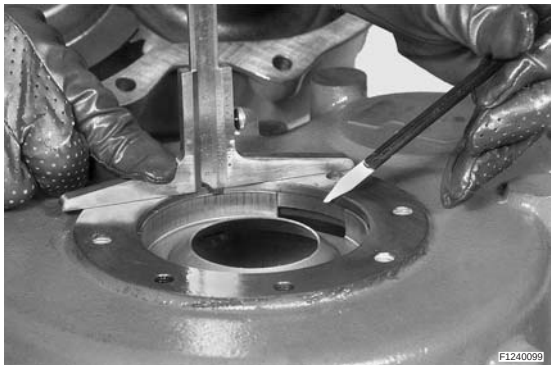


GB d

Remove the oil shield plate only if necessary.
Caution: the oil inlet must face upwards.

GB e

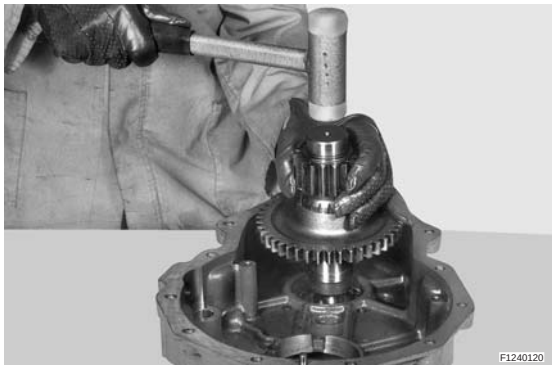
Re-introduce the oil shield plate with oil inlet facing upwards.
Apply LOCTITE 510 on the outside.



GB f

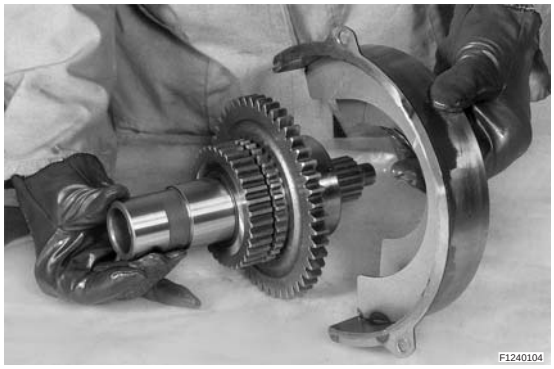
Fit the oil shield plate into position 5–5.5 mm from box plane.

ASSEMBLY OF DIRECTLY FLANGED REDUCTION GEAR 357 - ASSEMBLAGGIO GRUPPO RIDUTTORE 357 AFFLANGIATO - DIREKT GEFLANSCHTER REDUZIERER 357 MONTIEREN - MONTAJE GRUPO REDUCTOR 357 CON BRIDA - ASSEMBLAGE DU GROUPE REDUCTEUR BRIDE 357



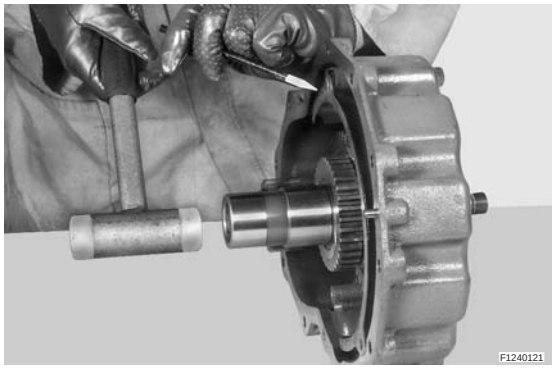
GB a

Re-assemble the motion upper shaft.



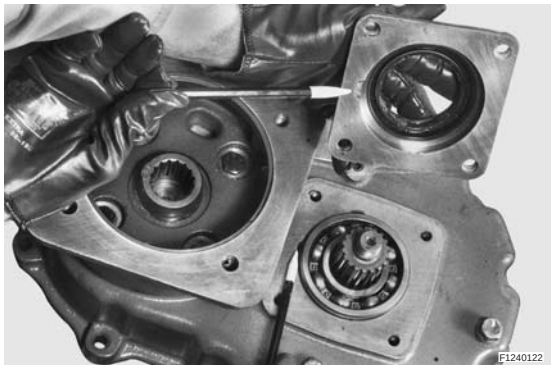
GB b

Re-assemble the full lower shaft and the flow regulator plate.



GB c

Position the shaft so that the bearing juts out approximately 5 mm from the cover of the reduction unit.

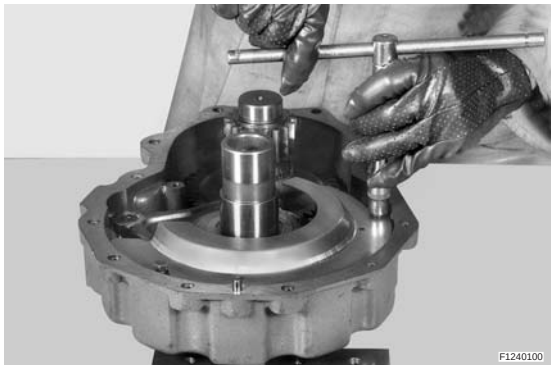


GB d

Temporarily re-assemble the cover with screws.
(Be sure that the niche faces upwards).

GB e

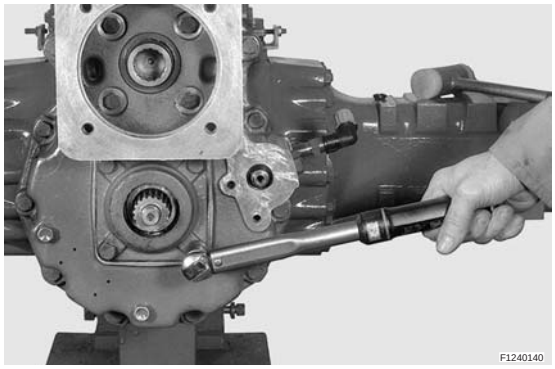
Simultaneously insert: fork and sliding blocks, coupling and flow regulator plate.



GB f

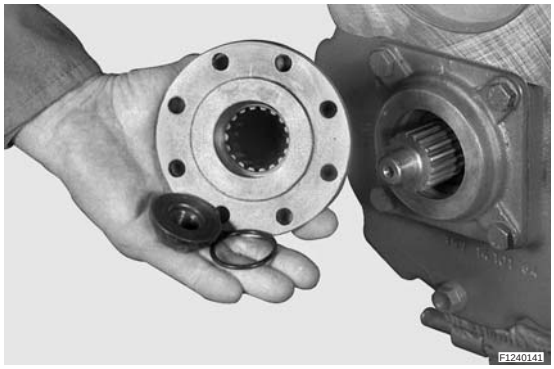
Re-insert screws and tighten.

ASSEMBLY OF DIRECTLY FLANGED REDUCTION GEAR 357 - ASSEMBLAGGIO GRUPPO RIDUTTORE 357 AFFLANGIATO - DIREKT GEFLANSCHTER REDUZIERER 357 MONTIEREN - MONTAJE GRUPO REDUCTOR 357 CON BRIDA - ASSEMBLAGE DU GROUPE REDUCTEUR BRIDE 357



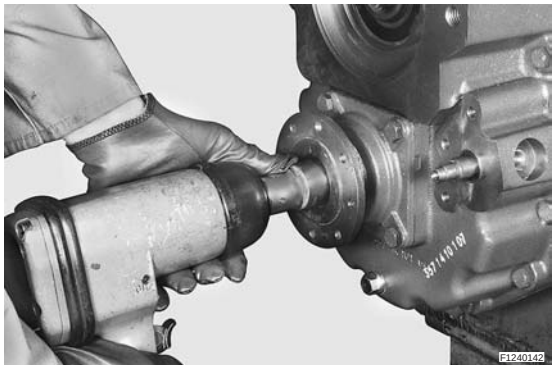
GB a

Tighten screws using a torque wrench setting of 49–51 Nm.



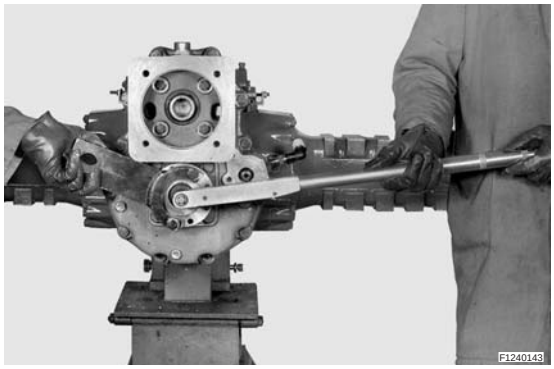
GB b

Assemble flange, O-ring and nut using LOCTITE 242.



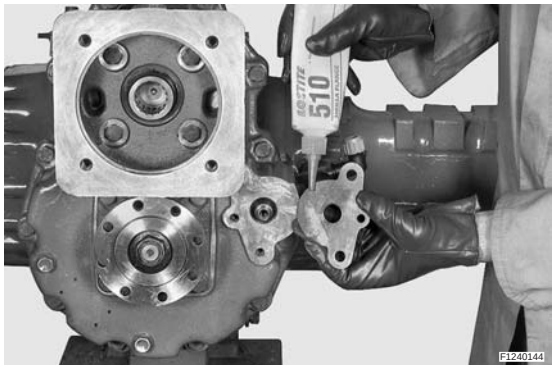
GB c

Screw down the nut of the flange.



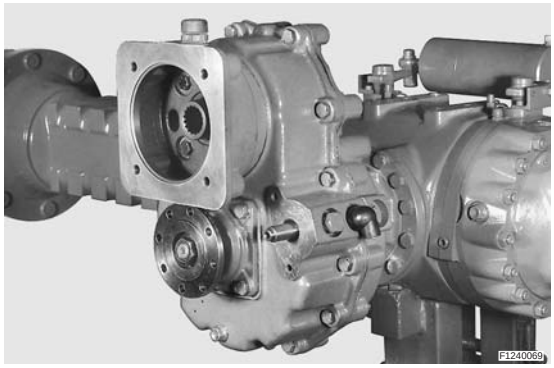
GB d

Tighten the nut using a torque wrench setting of 260–280 Nm.



GB e

Re-fix the protection plate after applying LOCTITE 510.

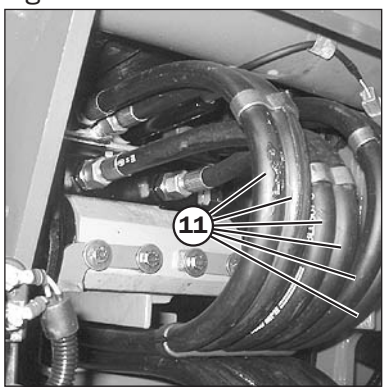


GB f

Complete flanged reduction gear 357 with mechanical gear control.

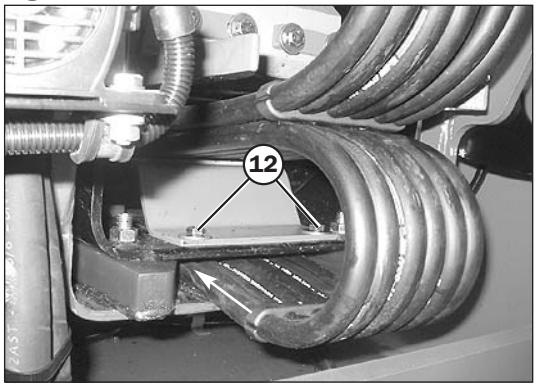
- Connect six hoses 11 (Fig. BB).

Fig. BB



- Refit two guide support mounting bolts 12 (Fig. BC).
- Insert hoses of lower layer into arm.

Fig. BC



- Check alignment of pipes under arm and replace their seal (Fig. BD).
- Reconnect connectors 13 (Fig. BE) to hoses tilting them slightly outwards.
- Refit brackets Item 14 (Fig. BE).

Fig. BD

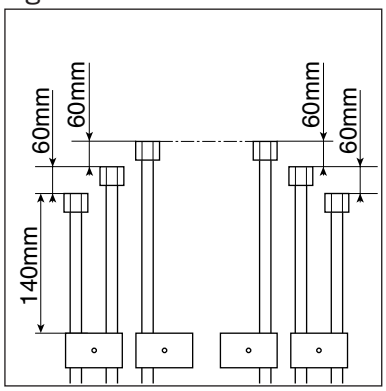
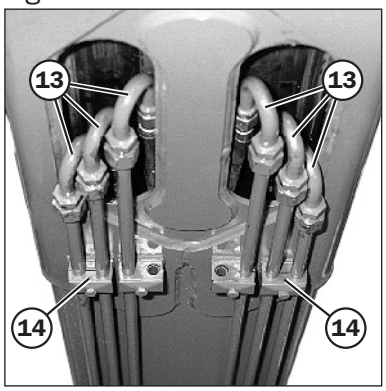


Fig. BE

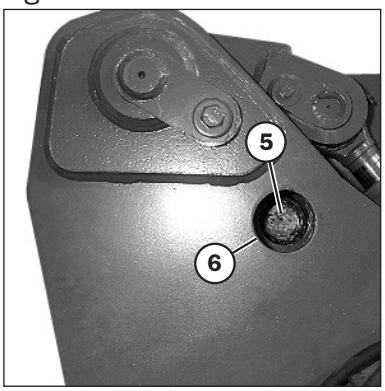


- Start fork lift truck.
- Operate all hydraulic circuits.
- Check oil level in tank and top up if necessary.
- Switch off engine.
- Decompress all hydraulic circuits.
- Restart.
- Lower stabilisers.
- Perform several complete telescope movements checking hoses unwind correctly inside arm.
- Refit housings 15 (Fig. BF) to rear of chassis.

Fig. BF

- Lower arm so that pin 5 (Fig. E) is opposite hole 6 in chassis.

Fig. E



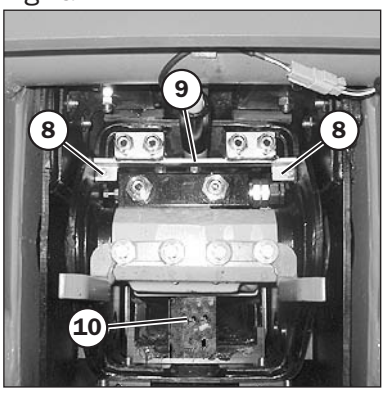
- **Remove hose guide 7 (Fig. F) see pages 6 - 7 (Fig. B - I).**

Fig. F

- Remove two mounting bolts 8 (Fig. G) from hydraulic valve block support 9.
- Position wooden block 10 (Fig. G) (approx. 100 mm tall and 300 mm long) under telescopic cylinder.

- Drive out telescopic cylinder pin 5 (Fig. E).

Fig. G



TILT CYLINDER REMOVAL

Operation requires two people

- Remove circlip 1 (Fig. A) from lower pin.

- Drive out pin 2 (Fig. B).

⚠ Warning: carriage may tilt.

Fig. A

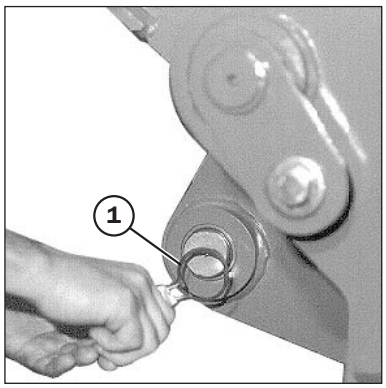
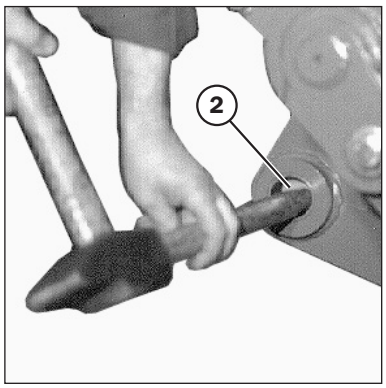


Fig. B

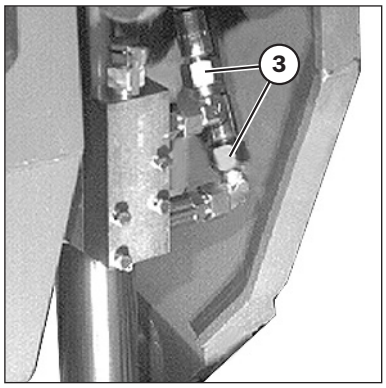


- Extend cylinder rod fully.

- Relieve pressure from hydraulic circuit by operating control valve levers.

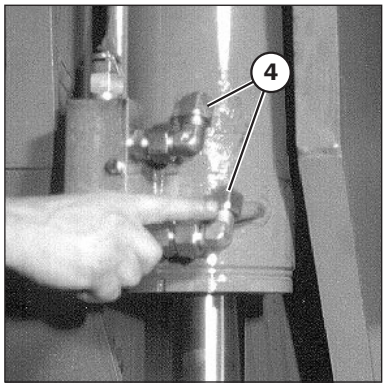
- Disconnect hoses 3 (Fig. C).

Fig. C



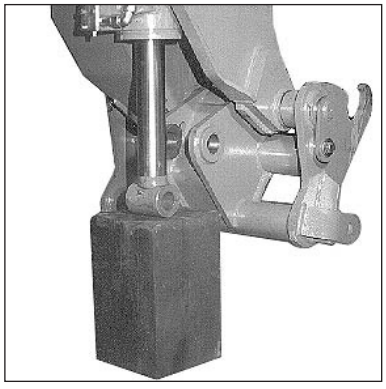
- Blank cylinder ports 4 (Fig. D).

Fig. D



- Support cylinder under rod by lowering arm (Fig. E).

Fig. E



MT 835 MU + T.
MT 845 + T. ***MT 845 T. MU***
MT 940 L + T. ***MT 940 L T. MU***

PROCEDURE

- Place the truck on a flat surface, position the jib horizontally.

NOTE : Ensure there is sufficient room to extract the telescope.

- Extract the telescope over 450 mm or so.

- Stop the engine.

- Decompress the attachment and tilt circuits.

REMOVAL OF THE LIFT BRACKET

- Procure a suitable device (Pallet stacker, chain block, etc.) to remove the lift bracket.

- Remove head pin item 1 (Fig. A) on the tilt cylinder.

- Remove pin item 2 (Fig. A) on the connecting rod (Ensuring that the articulated parts do not fall down).

- Remove slewing pin item 3 (Fig. A) on the lift bracket.

- Remove the lift bracket (Fig. B).

REMOVAL OF THE TILT CYLINDER

- Position a pan under the tilt cylinder.

- Disconnect both hoses item 1 (Fig. C) on the tilt cylinder (30 mm wrench).

NOTE : Oth elbows item 2 (Fig. C) must stay on the cylinder valve.

- Place caps on the hoses.

- Place a wedge under the tilt cylinder.

- Remove pin item 1 (Fig. D) from the base of the tilt cylinder.

- Remove the tilt cylinder.

Fig. A

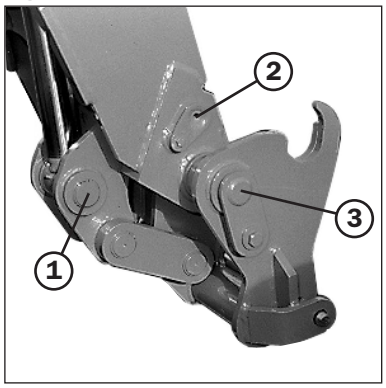


Fig. B

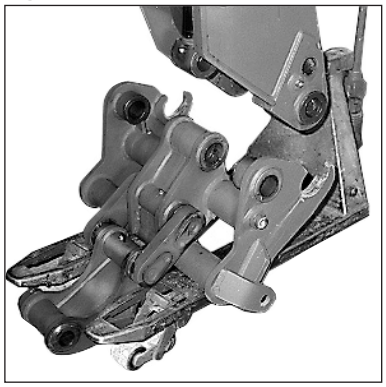


Fig. C

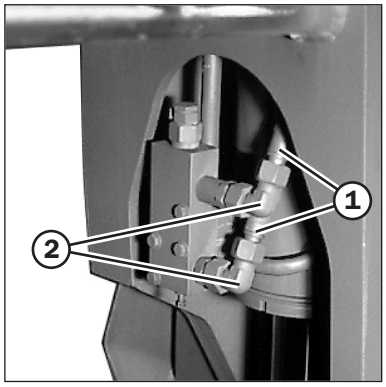
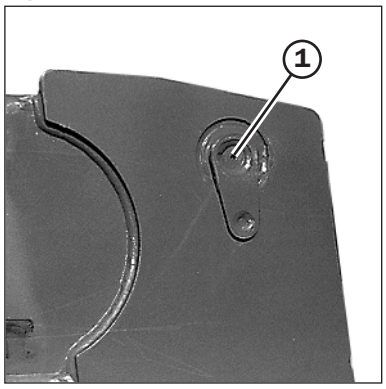


Fig. D



REPLACING HOSES OF THE ATTACHMENTS

- Hoses are positioned on the left hand side of the boom.

- Remove pressure in the hydraulic circuit using the distributor lever.

- Remove the circlips from the lower axis of the incline cylinder (Fig. 1).

- Push the axis back (Fig. 2).

- Disconnect the hoses on the end of the boom (Fig. 3), being careful to mark at least one hose, e.g. :
  - A white mark on the lower hose.

- Remove the upper nozzle (Fig. 4) in order to disconnect the lower hose.

- Cut the assembling collars (Fig. 5).

- Unscrew the hose guide (Fig. 6), then remove it (Fig. 7).

Fig. 1

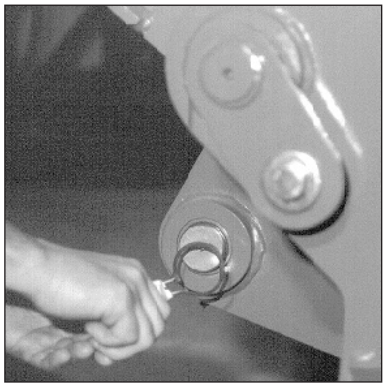


Fig. 2

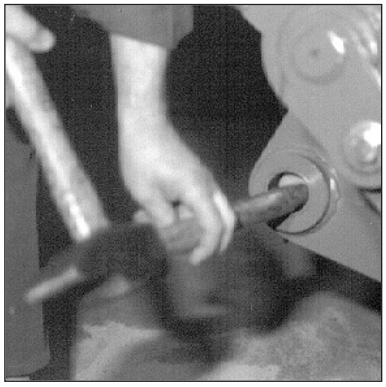


Fig. 3

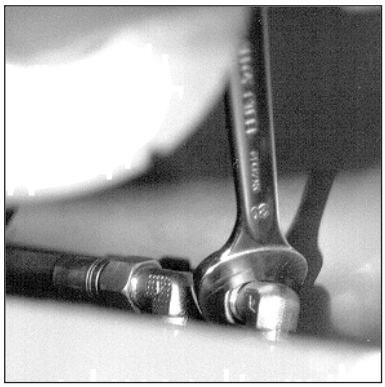


Fig. 4

Fig. 5

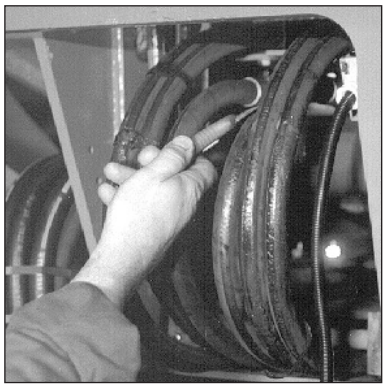


Fig. 6

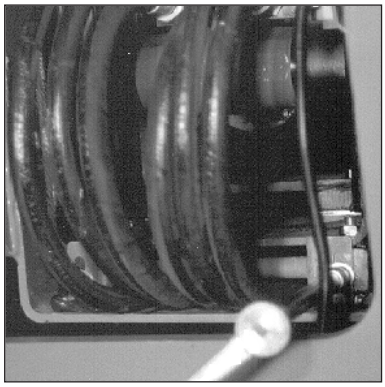
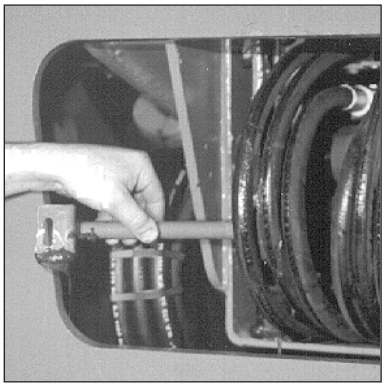


Fig. 7



REMOVAL OF THE INNER TELESCOPE

Remove the incline and attachment hoses as well as the inner telescope cylinder (See “removing the inner telescope cylinder”).

- Replace the lower runners on the inner telescope base (Fig. 1).

- Pull on the end of the boom (Fig. 2) (Pull the telescope out by about 2 m).

- Using a lifting system (Forklift truck, Maniscopic, etc) sling load the telescope at 350 mm from the inner telescope head axis (Fig. 3), if the incline cylinder remains mounted on the boom.

- If this is not the case, sling load the boom at 550 mm from the axis.

IMPORTANT : Mark all runners and shims before removing them.

- Remove the lower runners on the intermediate boom (Fig. 4 -5).

Fig. 1

Fig. 2

Fig. 3

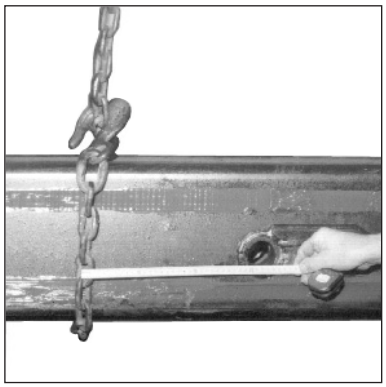


Fig. 4

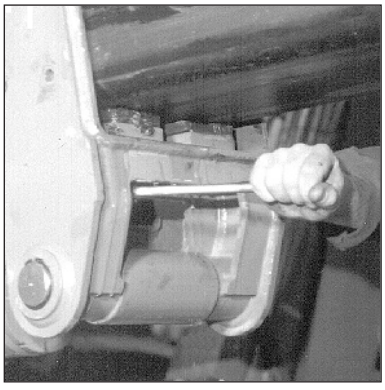


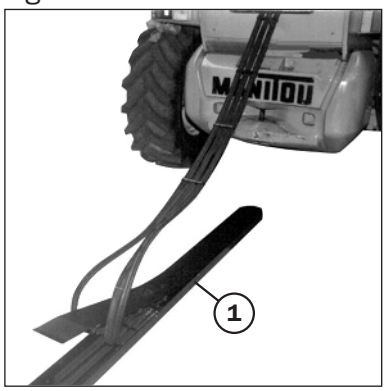
Fig. 5

REPLACEMENT OF THE INTERMEDIARY HOSES (SUPPLY, ATTACHMENT, AND TILT CYLINDER)

DISASSEMBLY

- Refer to the section "Lower hose disassembly" up to the disassembly of the hose guide (Item 1, Fig. A).

Fig. A



- Remove the cover plate (Item 1, Fig. B).

Fig. B

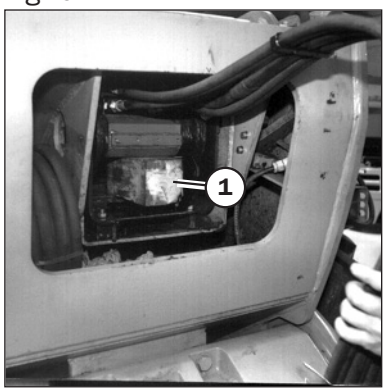
- Position a wooden block (Item 1, Fig. C) under the cylinder (av. 100 mm high and 300 mm long).

- Remove the circlip and extract the pin at the base of the inside telescope cylinder (Fig. D).

- Remove both fixing screws (Item 1, Fig. E) on the hydraulic flange bracket.

NOTE : A hydraulic supply is needed to extract the telescope cylinder from the jib. There are two options :

Fig. C



Ⓐ You have another fork lift truck and you supply the cylinder from that truck's attachment circuit.

Ⓑ Placing the hose guide along the truck, connect the two supply hoses on the inside telescope cylinder (Item 1, Fig. F) on the supply circuit of the tilt cylinder (Item 2, Fig. F).

Fig. D

Fig. E

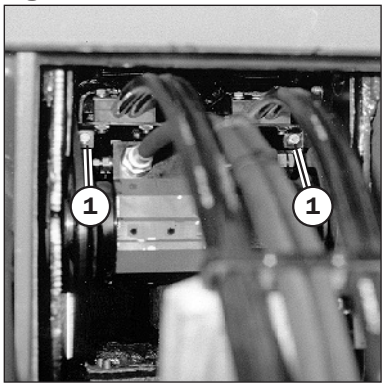
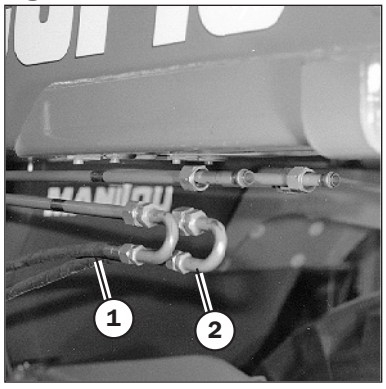


Fig. F



- Disassemble the relevant hydraulic block inside the jib (Item 1, Fig. K).

- Pull on the hydraulic block (Item 1, Fig. L) so as to be able to disconnect the attachment or tilt supply hoses.

Check that the pieces of strings follow after the hoses.

NOTE : In order to make it easier to loosen and to tighten the hoses, place a block (Item 2, Fig. L) between the hydraulic block and the hose guide, and hold the assembly with a clamp (Item 3, Fig. L).

- Mark the position of the hoses.

- Disconnect the hoses to be replaced, and remove them, checking that the piece of string does follow after the hose.

REASSEMBLY

- Prepare the new hoses.
  Transfer the markings, and pair them using new plastic collars (Item 1, Fig. M) replace the pieces of string.

- Start returning them into place.

- Thread the hoses into the sleeve (Item 1, Fig. N) in the lower telescope, making use of the strings and guiding them from the rear of the jib.

NOTE : Check that the plastic collars are not getting caught into the edge of the sleeve.

- Connect the hoses (Item 1, Fig. 0) to the hydraulic block, remove the clamp (Item 2) and the bracket (Item 3, Fig. 0).

The hoses must not get twisted while being tightened on the fittings.

Fig. K

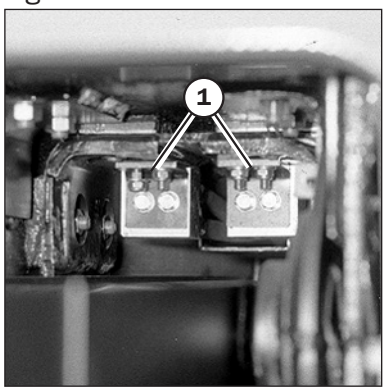


Fig. L

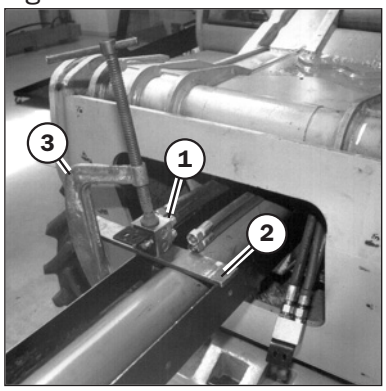


Fig. L1

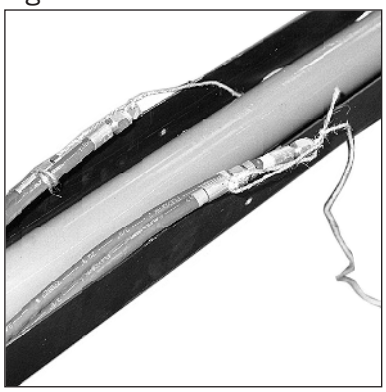


Fig. M

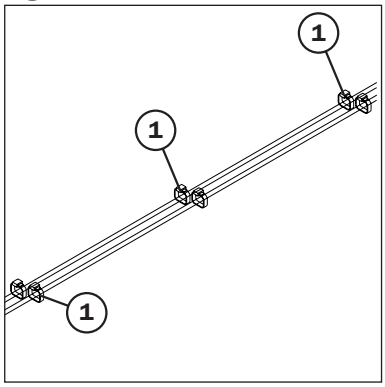


Fig. N

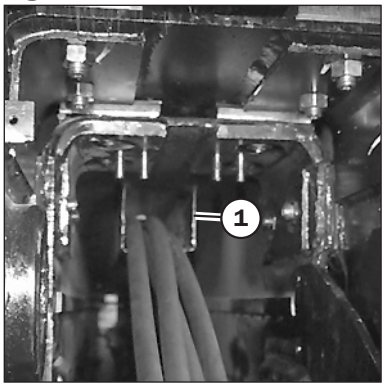
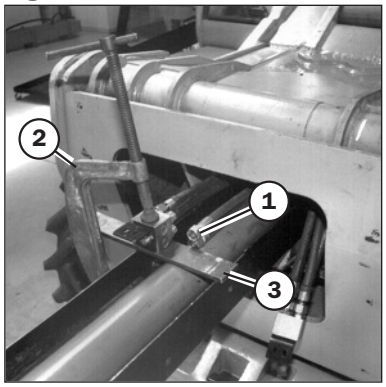


Fig. O

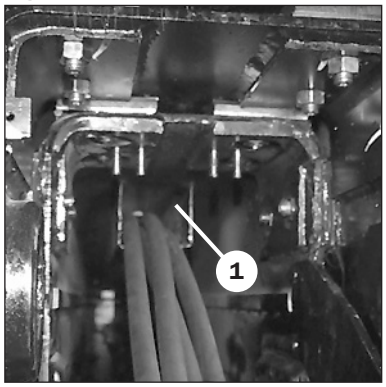


MOUNTING INSIDE THE JIB

- Present the assembly at the back of the jib.

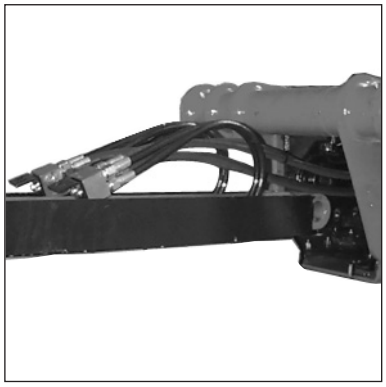
- Insert the hoses of the accessory circuit and pitch actuator circuit into duct 1 (Fig. X) of the inside telescope.

Fig. X



- Insert the telescoping actuator about 1 metre into the jib (Fig. Y).

Fig. Y



- Secure the hydraulic blocks 2 (Fig. Z) onto the pins provided for this purpose.

- Insert the telescoping actuator 3 (Fig. A1) fully.

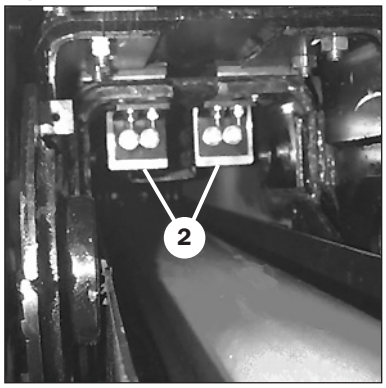
- Mount the axle of the telescoping actuator.

- Secure clamp support 4 (Fig. B1).

- Check that the six hoses 5 (Fig. C1) are in the same plane.

- If necessary, undo the 6 clamps (Fig. B1), and withdraw the twinned hoses in order to achieve correct alignment.

Fig. Z



IMPORTANT : If you have to adjust these twinned hoses, then it is essential that you adjust the four clamps 4 too (Fig. M) to the positions indicated in (Fig. L), adhering to the mounting instructions.

Fig. A1

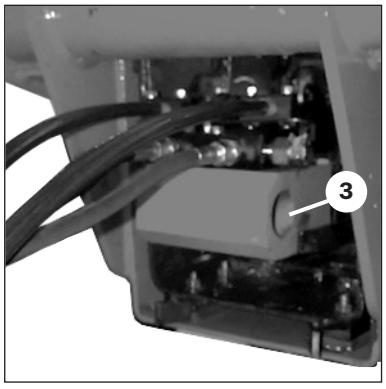


Fig. B1

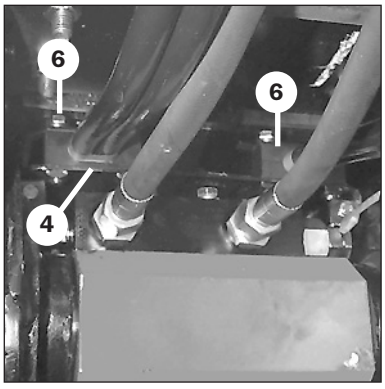
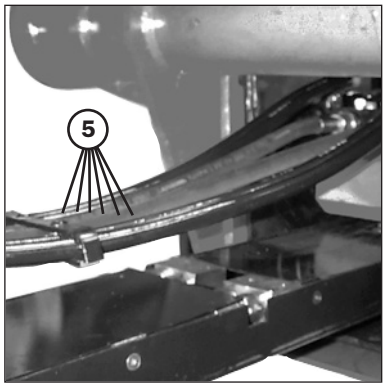


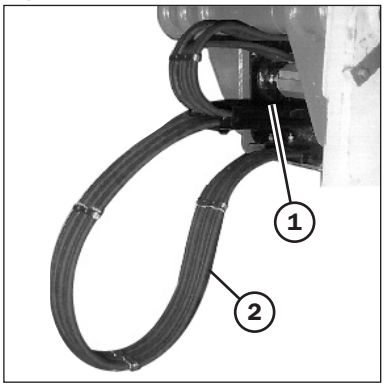
Fig. C1



- Thread hose guide 1 (Fig. F1) under the cylinder.

- Thread lower hoses 2 (Fig. F1) under the large telescope.

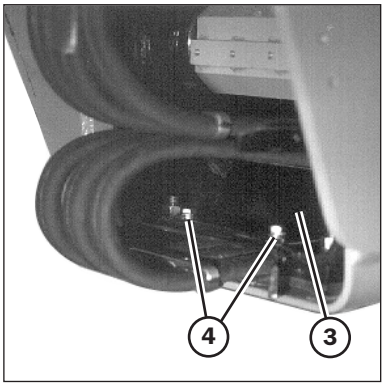
Fig. F1



- Centre guide 3 (Fig. G1) in relation to the guide block.

- Fix the guide using both screws 4 (Fig. G1) and standard thread locking product.

Fig. G1



- Fit the RH hose guide 1 (Fig. H1) and LH hose guide 2 (Fig. I1) to the rear of the telescope cylinder using fixing screws and washers. See below for the dimensions.

NOTE : The screws to be fitted with standard thread locking compound.

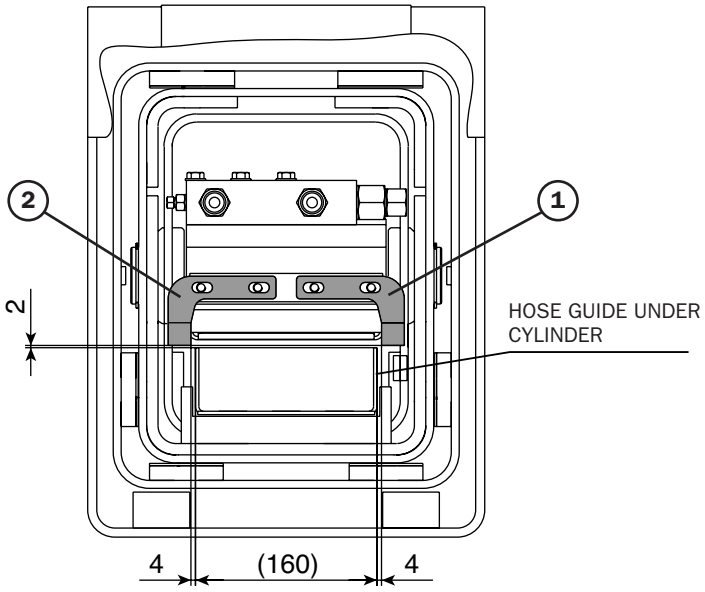


Fig. H1

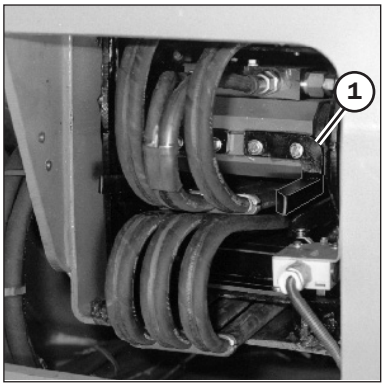
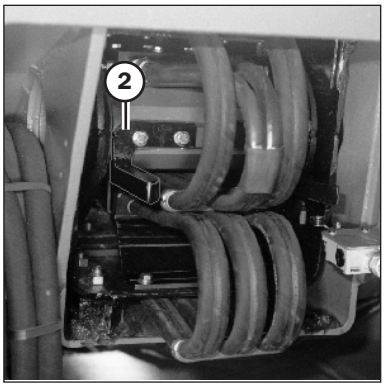


Fig. I1



DISASSEMBLY OF THE OUTSIDE TELESCOPE CYLINDER

- Stop the truck with the jib in the horizontal position.

- Decompress the supply circuit to the telescope cylinder by operating on the corresponding lever.

- Remove the balancing valve (Item 1, Fig. A) at the base of the cylinder.

Take care not to damage the seals between the valve and its bracket and to place caps on the supply openings of both the valve and the cylinder.

- Place a sling under cylinder head, using a lifting gear (Fig. B).

- Remove the circlip and extract the pin from the cylinder head (Fig. C).

- Remove the circlips (Fig. D) from the intermediary joints.

- Remove the pins (Item 1, Fig. E) using M12 screws (Item 2, Fig. E).

- Remove the driving squares (Item 1, Fig. F).

Fig. A

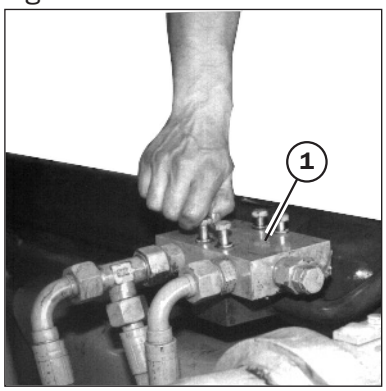


Fig. B

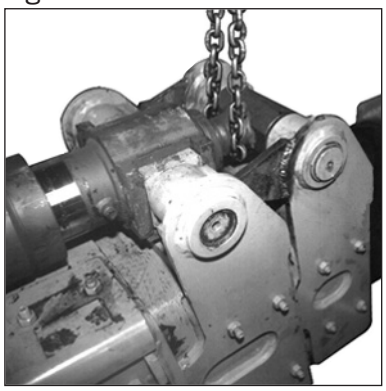


Fig. C

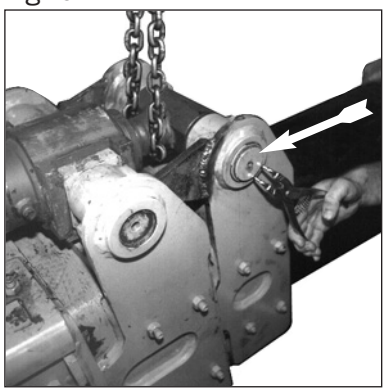


Fig. D

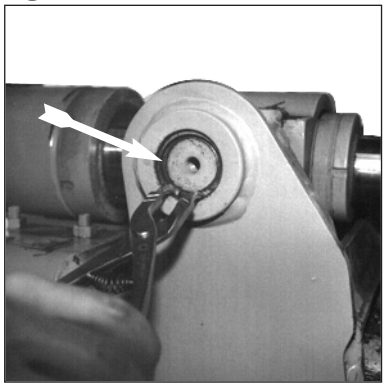


Fig. E

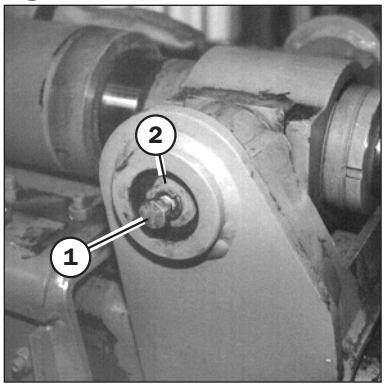
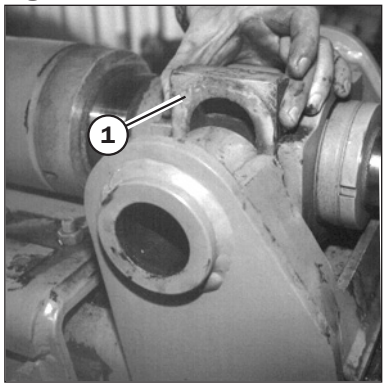
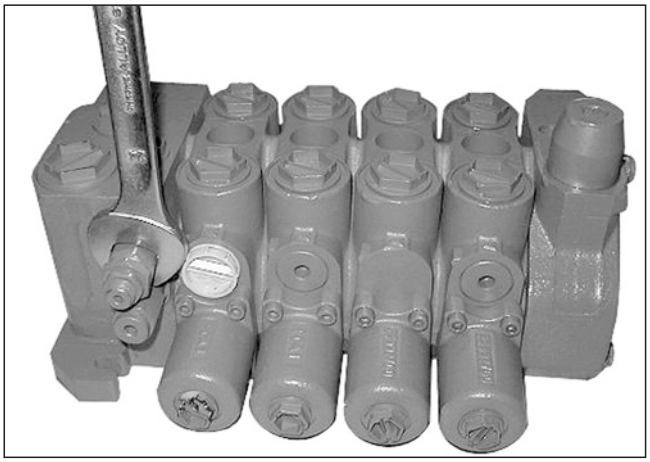


Fig. F



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.

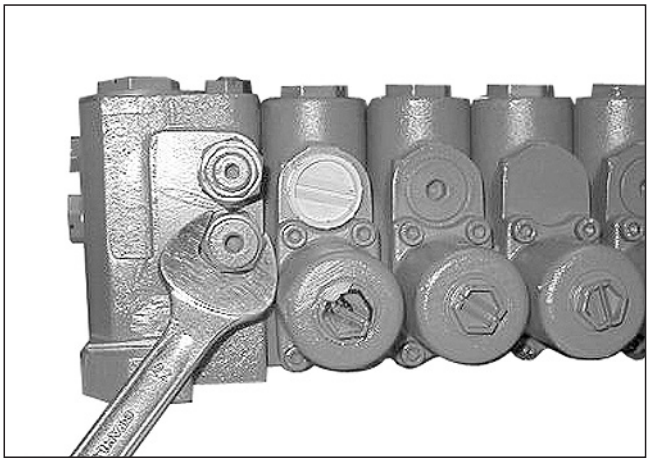
Machine switched off :
- Place all machine receivers connected to the distribution block in the idle position.
- Work the distribution slide valves to release the pressure build-up.

NB : Collect any leaking oil in an appropriate receptacle.

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

Remounting : tightening torque (cf. § 6)

5.2 CHANGING THE FLOW RATE GOVERNOR



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

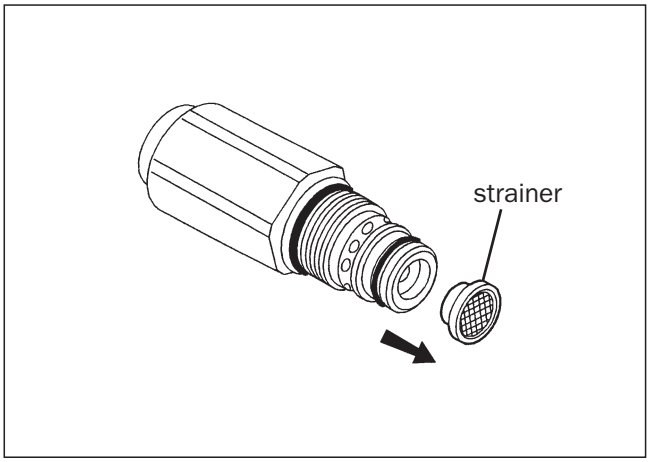
Machine switched off :
- Place all machine receivers connected to the distribution block in the idle position.
- Work the distribution slide valves to release the pressure build-up.

NB : Collect any leaking oil in an appropriate receptacle.

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

Remounting : tightening torque (cf. § 6)

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.

A

A29

Serrer le bouchon à l'aide d'une clé dynamométrique au couple de serrage de 5 (daNm)

A30

Placer la pompe verticalement avec l'arbre d'entraînement tourné vers le bas, puis serrer l'étau. Veiller à ne pas abîmer des parties usinées pendant le serrage.

Assembler en vissant l'ensemble à la main.

Le repère fait précédemment (sur le corps de pompe et le couvercle) évitera toute possibilité d'erreur au remontage.

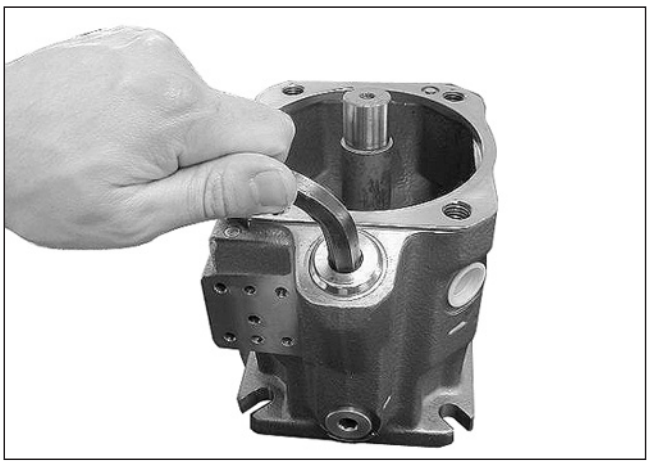
A31

Serrer les vis à l'aide d'une clé dynamométrique au couple de serrage de 7 (daNm) en faisant des déplacements diagonalement opposés.

A32

Pour contrôler le couple en rotation bouger l'arbre menant pour vérifier qu'il soit libre de tourner et qu'on n'a pas fait d'erreurs pendant le montage.

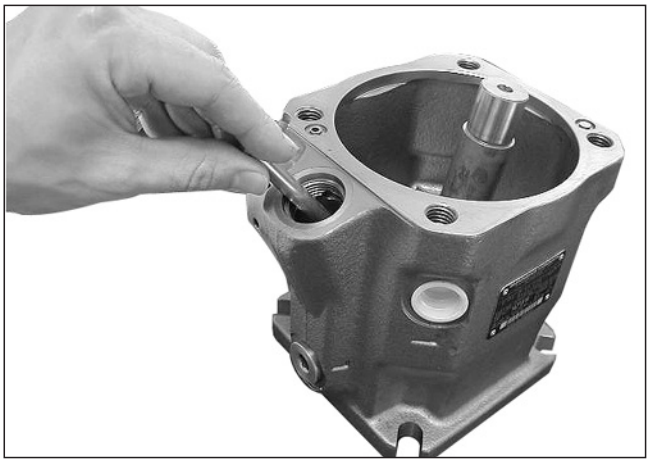
- Remove the control cylinder stop.



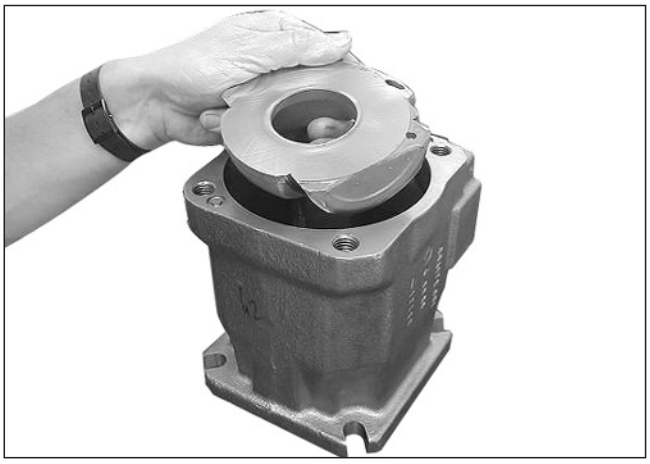
- Extract the piston from the control cylinder.
- Swivel the pump plate to release the piston more easily.

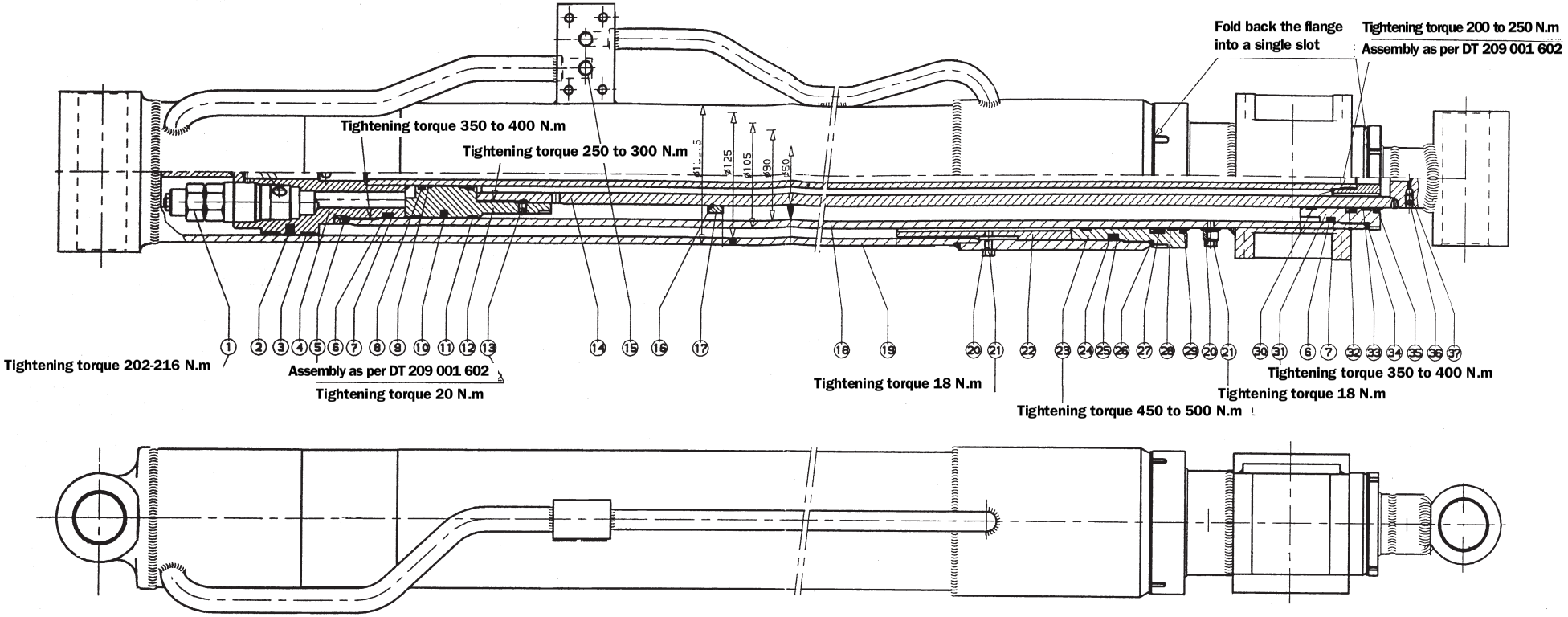
- Remove the control cylinder rod.

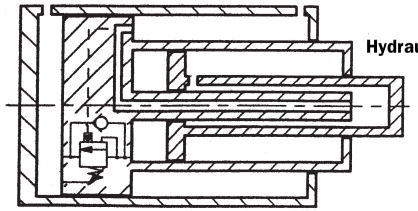
NOTE : The head of the rod has a particular shape, so you might need to move the plate in order to remove it.



- Remove the tilting plate.




Fold back the flange into a single slot
Tightening torque 200 to 250 N.m
Assembly as per DT 209 001 602
Tightening torque 350 to 400 N.m
Tightening torque 250 to 300 N.m
Tightening torque 202-216 N.m
Assembly as per DT 209 001 602
Tightening torque 20 N.m
Tightening torque 18 N.m
Tightening torque 450 to 500 N.m
Tightening torque 18 N.m
Tightening torque 350 to 400 N.m


Hydraulic diagram

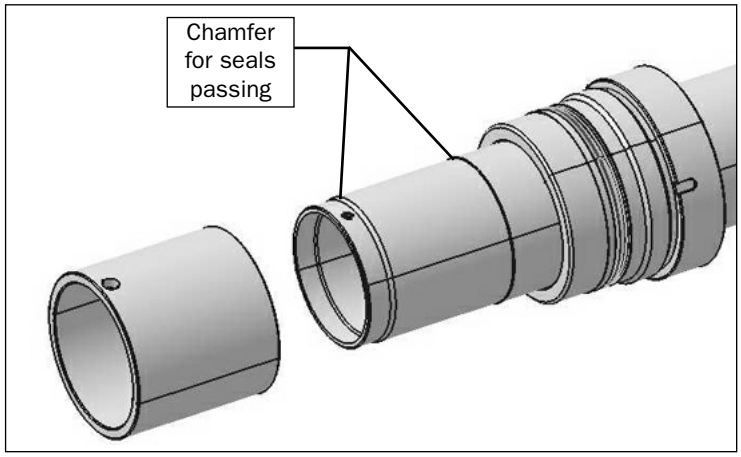
4 - Mounting of the head and the spacer on the Ø 105 element.

Check visually the cleanliness level of the element, which must not have scratches, burrs and oxydation traces.

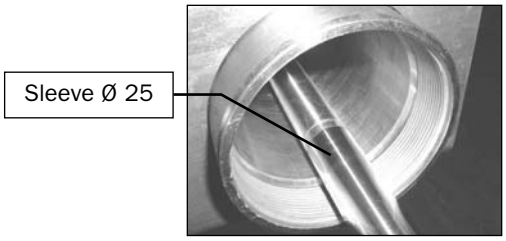
The chamfers for seals passing must be perfectly clean.

Assemble the head on the element after having correctly sprayed the head inside with vaseline oil or hydraulic oil.

Mount the spacer and place its hole facing to the element hole.



5 - Mounting of piston Ø 125 on the element Ø 105



Check visually the cleanliness level of the rod Ø 25, which must not have scratches, burrs and oxydation traces.

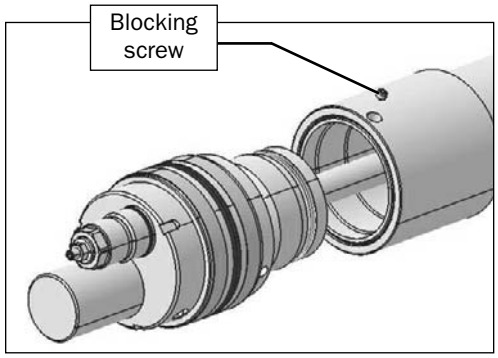
Place the element Ø 105 with its head in one or two vices equipped with smooth jaws and block the element head.

Apply some vaseline oil or hydraulic oil in the mouth of the element.

Assemble the piston Ø 125 and maintain the rod Ø 25 in the center of the element Ø 125, by means of the Ø 25 centering sleeve (Tooling code Y0004094).

Screw and block the piston with the adjustable hook-wrench.

Put some glue (Loctite 243) on the screw and tighten at a torque of 20 N.m. with the dynamometric key.



B - REMOVAL AND REASSEMBLY OF THE PISTON AND LOCKING RING

REMOVAL

- Place the stem in a vice fitted with false jaws.
- Tighten so as to stop it turning.
- Loosen nut 5 (Fig. B1) and sunscrew it completely using a box wrench. Or depending on the version, remove locking screw 6 (Fig. 1) using a hexagonal wrench.

NOTE : Locking ring 6 (Fig. B1) is fitted using Loctite, then blocked by striking it with a chisel

- Remove piston 4 (Fig. B2) by pulling it out manually or, depending on the version, by unscrewing piston 7 (Fig. B1) using a hook wrench.
- Remove locking ring 2 (Fig. B3) by sliding it along the stem.

INSPECTION

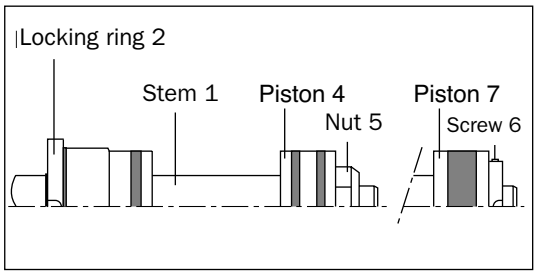
- Check that the stem is straight over its whole length, using a comparator (Fig. B4).
- Check that the stem is not scaling, corroded or scratched.

REASSEMBLY

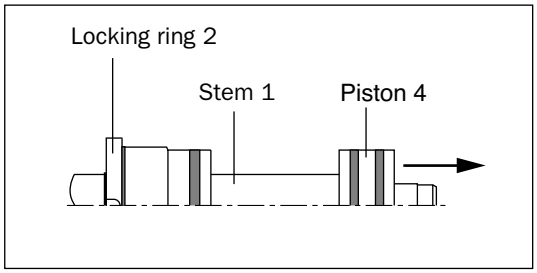
- Reassemble locking ring 2 (Fig. B5) on stem 1 (Fig. B5).
- Reassemble piston 4 (Fig. B1) on the stem.
- Screw and lock nut 5 (Fig. B1) using a box wrench and a torque wrench. See the table for the tightening torque (Fig. B6). Or, depending on the version, screw piston 7 (Fig. B1) using a spanner wrench (see tightening torque Fig. B6) and block it with locking screw 6 (Fig. B1).

NOTE :
- The locking screw should be fitted using Loctite 243, see section E.
- Tightening torque for the screw = 20 Nm.
- Strike with a chisel to drive the screw into the metal.

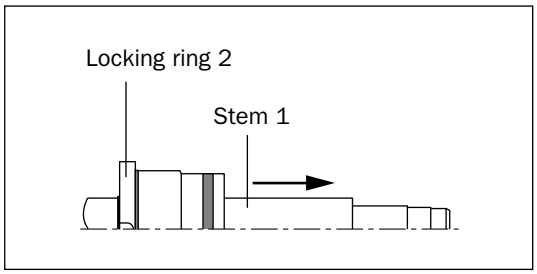
B1



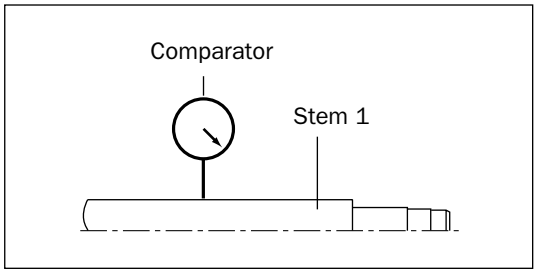
B2



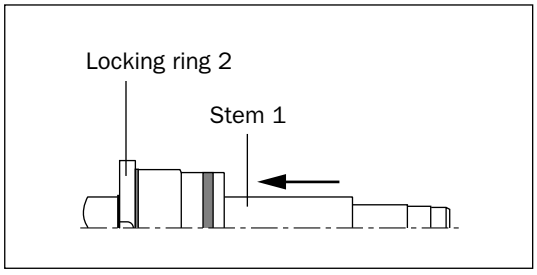
B3



B4

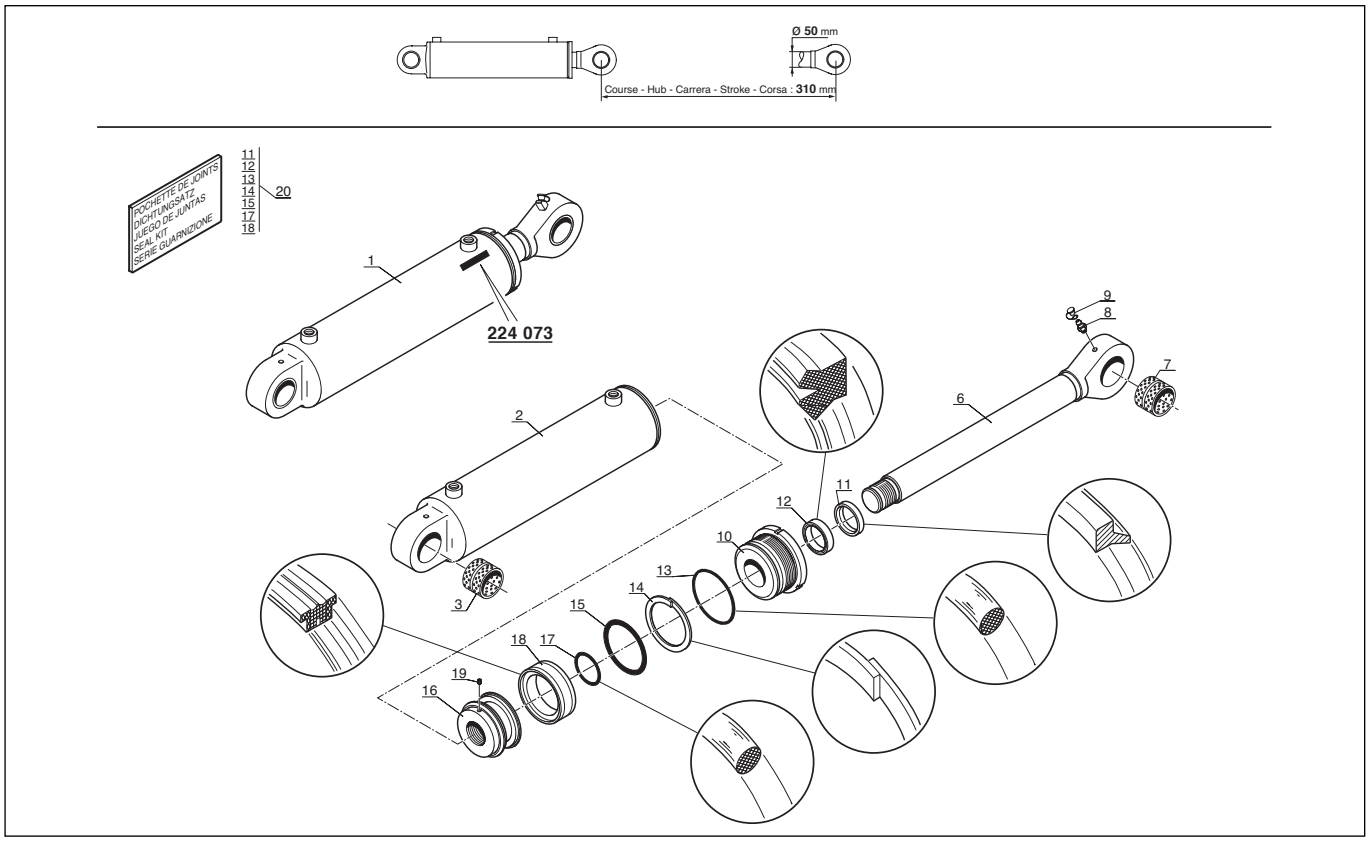


B5



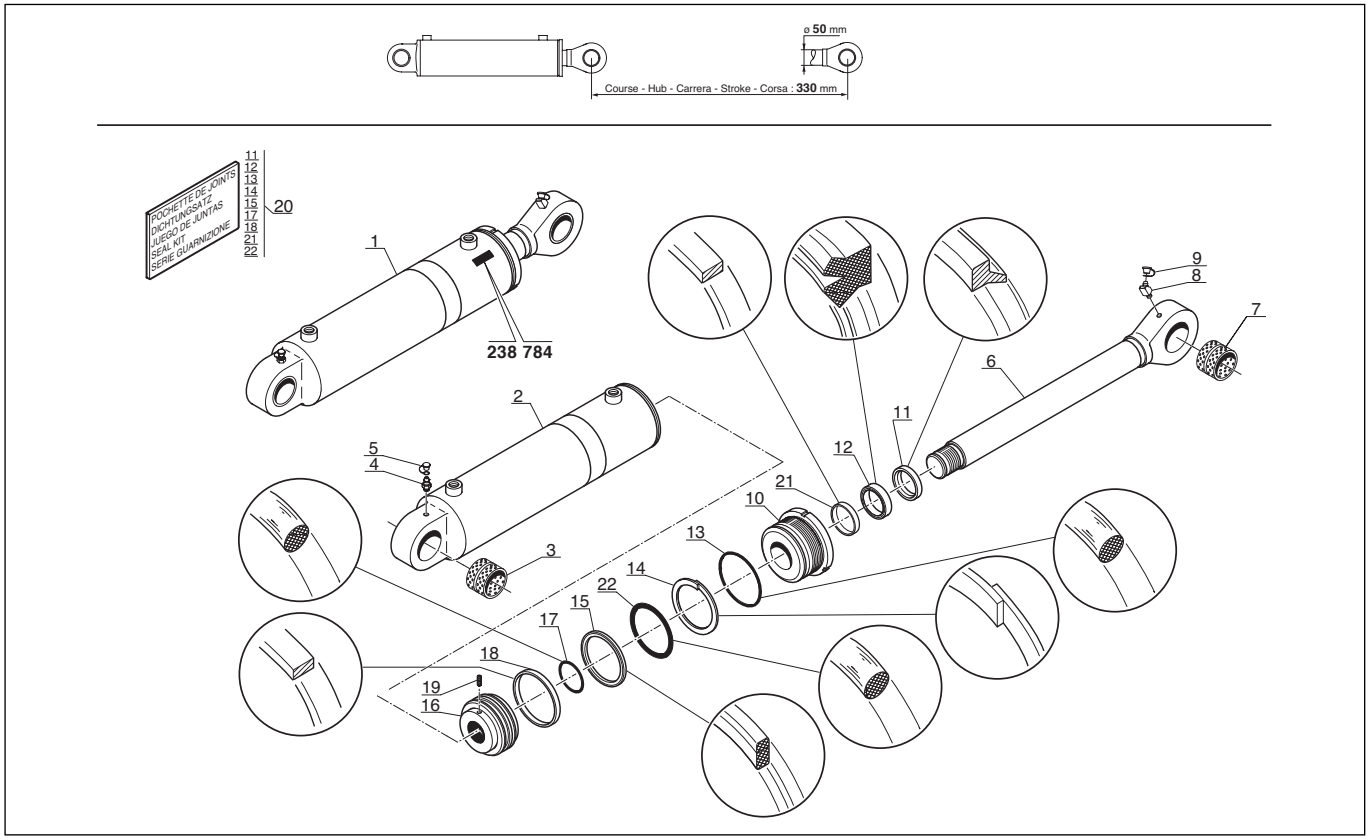
COMPENSATION CYLINDER

MT 1335 H SLT ...



COMPENSATION CYLINDER

MT 1745 H SLT Ultra ...



HYDRAULIC DIAGRAM MT 1745 HSL TURBO MONO-ULTRA
NACELLE ORH SÉRIE 2-E2

AC	Accumulator
BF	FORE block
BS3	Selector block 3 elements
BS4	Selector block 4 elements
BT	Transfer box
CA	Suction strainer
CAR	Back pressure valve
CPD	Double piloted valve
CSD	Double safety valve
CSP	Piloted safety valve
D	Valve bank (9) sections
	EA Attachment section
	ECD Levelling section
	EE1 Main inlet section
	EE2 Secondary inlet section
	EI Tilting section
	EL Lifting section
	ES Outlet section
	ESD R.H. stabilizer section
	ESG L.H. stabilizer section
	ET1 Telescope 1 section
	ET2 Telescope 2 section
	ET3 Telescope 3 section
D3	Driving valve bank 3 positions
	Position 1 : Steering short
	Position 2 : Steering front wheel
	Position 3 : Crab position
DSL	Lifting emergency control valve
DST1/2	Telescope 1/2 emergency control valve
DST3	Telescope 3 emergency control valve
ESAR	Rear axle
ESAV	Front axle
EVPV	Gear change electrovalve
EVBE	Rear axle lock electrovalve
EVR	Retracting telescope 3 electrovalve
EVS	Extending telescope 3 electrovalve
EVTF(O)	Jib head electrovalve (Option)
F	Filter
FDAV	Front disk brake
FR	Return filter
M	i.C. Engine Type 1104C-44T (TURBO)
	- Rating slow unladen 850 tr/min
	- Nominal rating load 2200 tr/min
	- Max. rating unladen 2350 tr/min
MA	Joystick
	M1 Telescope / Attachment
	M2 Lifting / Tilting
	M3 R.H. stabilizer
	M4 L.H. stabilizer
	M5 Jib head electrovalve (Option)
	M6 Levelling system
	1 Lifting
	2 Telescope 1/2 suppressed
	3 Lowering
	4 Telescope 1/2 sortie
MC	Master cylinder
MH	Hydrostatic motor
N	Level
P	Hydraulic pump
PAAV	Front attachment fitting (option)
PAAR(O)	Rear attachment fitting (Option)
PD	Steering pump
PH	Hydrostatic pump
PP	Pressure point
PRES	Pressure sensitive switch
PRF(O)	Drain-back fitting (option)
PS	Emergency pump
R	Hydraulic tank
RF	Cooler
RLF	Réservoir liquide de frein
R3V(O)	Tap 3 ways (option)
R3VD(O)	Tap double 3 ways (Option)
TH7	Joystick TH7
VAP	Control valve
VARM	Manual control valve
VBE	Blocking rear axle cylinder DE
VC	Compensation cylinder DE
VCD	Levelling cylinder DE
VDAR	Rear steering cylinder
VDAV	Front steering cylinder
VI	Tilting cylinder DE
VL	Lifting cylinder DE
VN	Cockpit orientation cylinder DE
VPV	Gear change cylinder
VSD	R.H. stabilizer cylinder DE
VSG	L.H. stabilizer cylinder DE
VT1&2	Telescope 1 & 2 cylinder DE
VT3	Telescope 3 cylinder DE
VTSDL(O)	Translation cylinder TSDL (Option)
VVT(O)	Locking carriage cylinder (option) DE

NOTA :
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.

HYDRAULIC DIAGRAM *MT 1335 HSL TURBO ULTRA*
NACELLE ORH RC SÉRIE 2-E2

AC Accumulator
AD Depressurization accumulator

BT Transfer box

CA Suction strainer
CAR Back pressure valve
CPD Double piloted valve
CSD Double safety valve
CSP Piloted safety valve

D1 Valve bank 3 sections
- EA Attachment section
- ECD Levelling section
- EE Inlet section
- ET2 Telescope 2 section

D2 Valve bank 5 sections
- EE Inlet section
- EI Tilting section
- EL Lifting section
- ESD R.H. stabilizer section
- ESG L.H. stabilizer section
- ET1 Telescope 1 section

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

ESAR Rear axle
ESAV Front axle
EVBE Rear axle lock electrovalve
EVPV Gear change electrovalve

FDAV Front disk brake
FHP High pressure filter
FR Return filter

M I.C. Engine Type 1104C-44T (TURBO)
- Rating slow unladen 850 tr/min
- Nominal rating load 2200 tr/min
- Max rating unladen 2350 tr/min

MA Joystick
- C1 Extending telescope 1 & 2
- C2 Retracting telescope 1 & 2
- C3 Extending telescope 3
- C4 Retracting telescope 3
- BP1 Tap : Stabilizer / Levelling
- BP2 Tap : Attachment
- 1 Lifting
- 2 Reverse tilt
- 3 Lowering
- 4 Forward tilt

MC Master cylinder
MH Hydrostatic motor

N Level

P Hydraulic pump

PAAV(O) Front attachment fitting (option)
PD Steering pump
PH Hydrostatic pump
PP Pressure point
PRF(O) Drain-back fitting (option)
PS Emergency pump

R Hydraulic tank
RLF Braking oil tank
RF Cooler

TH7 Joystick TH7

VBE Blocking rear axle cylinder DE
VC Compensation cylinder DE
VCD Levelling cylinder DE
VDAR Rear steering cylinder
VDAV Front steering cylinder
VI Tilting cylinder DE
VL Lifting cylinder DE
VN Cockpit orientation cylinder DE
VPV Gear change cylinder
VSD R.H. stabilizer cylinder DE
VSG L.H. stabilizer cylinder DE
VT1 Telescope 1 cylinder DE
VT2 Telescope 2 cylinder DE
VVT(O) Locking carriage cylinder (option) DE

NOTA :
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PH Hydrostatic pump
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R Hydraulic tank
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TH7 Joystick TH7

VC Compensation cylinder DE
VCD Levelling cylinder DE
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VSG L.H. stabilizer cylinder DE
VT1 Telescope 1 cylinder DE
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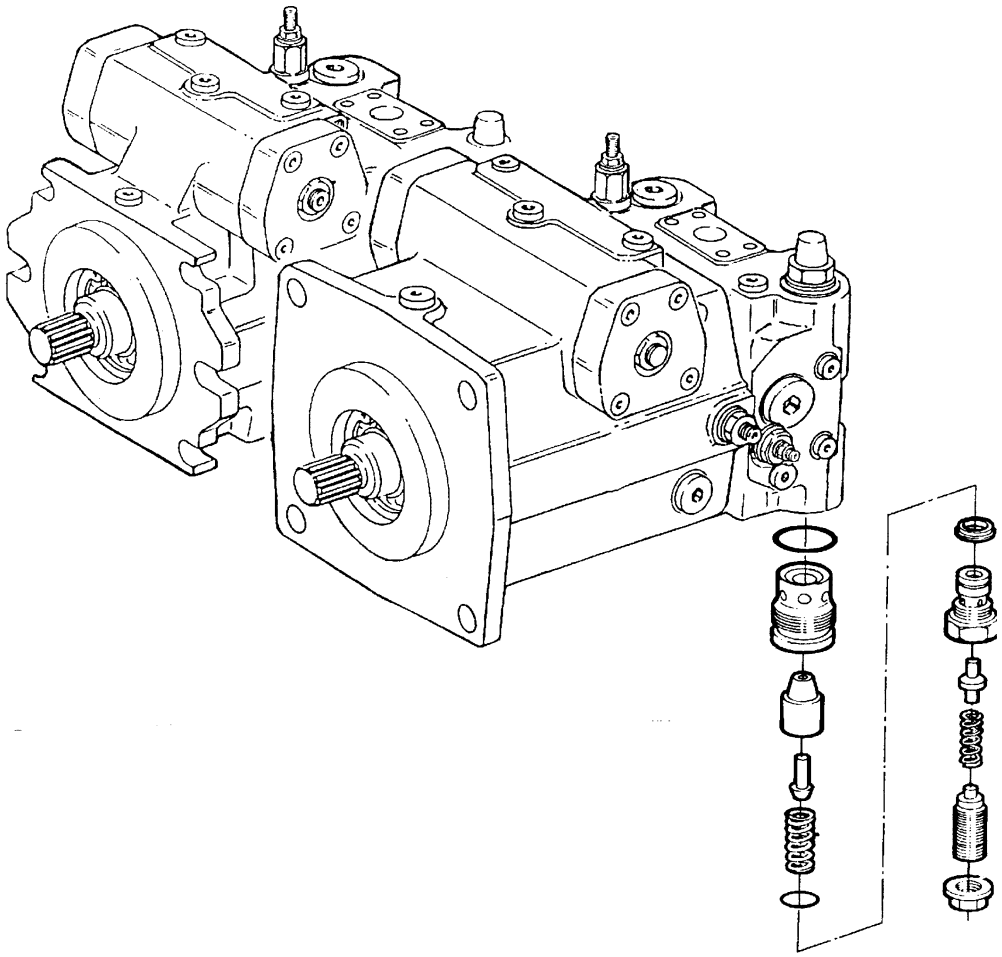
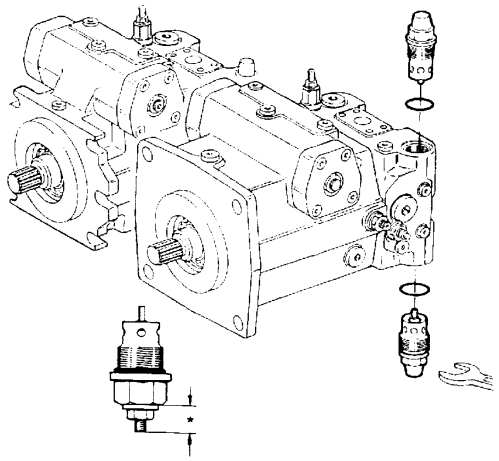
REPAIR INSTRUCTIONS

CONTENTS

- General repair instructions 5
- Seal kits and sub assembly groups 6
- Sub assemblies groups ..... 7 à 8
- Sealing of the drive shaft 9
- Sealing of the boost pump 10
- Sealing of the control piston cover 11
- Sealing of the control piston cover 12
- Sealing of the boost pressure valve 13
- Sealing of the pressure relief valve HD 14
- Sealing of the pressure cut-off valve 15
- Sealing of the control device 16
- Control device DA 18
- Sealing of the regulator valve 19
- Pump disassembly ..... 20 à 22
- Disassembly of the positioning piston ..... 23 à 24
- Dismantling of the cylinder 25
- Inspection notes ..... 26 à 27
- Positioning piston, rotary group assembly 28
- Installation of rotary group ..... 29 à 30
-Assembly of the pump ..... 31 à 33

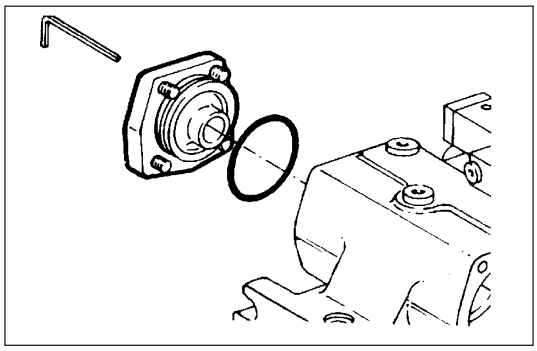
Sealing of the pressure relief valve HD



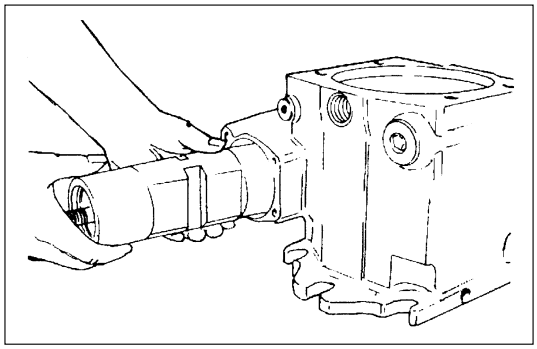


Remove valve completely.
Control : O-ring, housing.
Replacement of the tightening nut, record measure (*).
Attention !
After assembly check "valve setting".

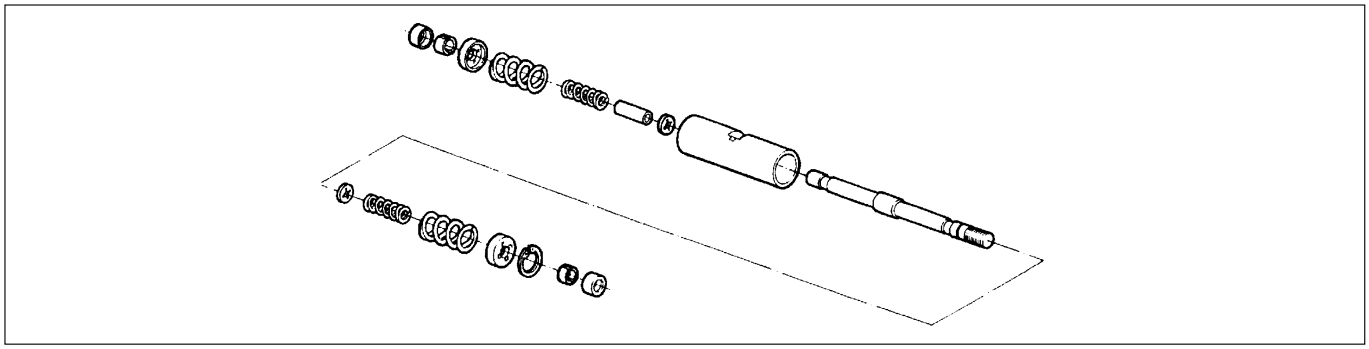
Dismantling of the control

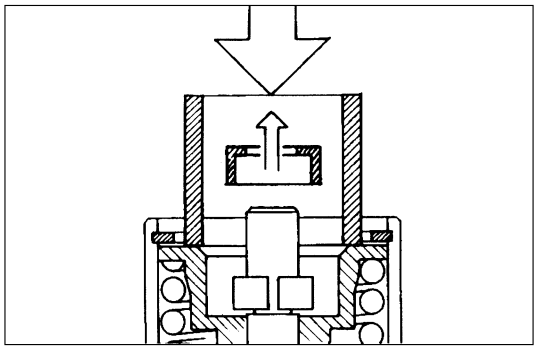


Mark position of the cover.
Loosen locking screw, remove cover.

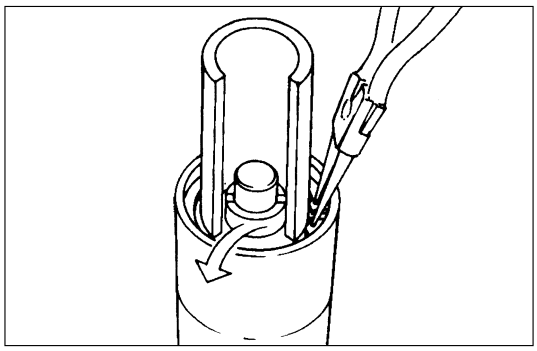


Remove positioning ring.





Fit tool device and preload spring.
Remove take-off ring.



Remove rings.
Remove safety ring.
Attention : parts are under spring load.

Tightening torques for shaft bolts (Metric ISO Standard Thread)

The values for tightening torques shown in the table are valid only for shaft bolts with metric ISO- standard threads and head support surface dimensions in accordance with DIN 912, DIN 931 and DIN 933. These values are also valid only for light or unoiled, untreated surface as well as for use only with torque-indicating wrenches and force limiting tools.

Thread size	Strength Classes 8.8	10.9	12.9
	Tightening Torque (lb.ft)		
M 3	0,8	1,2	1,4
M 4	2,1	3,0	3,6
M 5	4,4	6,3	7,4
M 6	7,4	10,3	12,5
M 8	18,4	25,8	30,2
M10	36,1	50,9	61,2
M12	63,4	88,4	106,9
M14	99,5	140,0	169,5
M16	154,8	217,4	261,6
M18	213,7	298,5	357,4
M 20	302,2	427,5	508,5
M 22	405,4	574,9	685,4
M 24	523,5	737,0	884,4
M 27	773,9	1105,5	1326,6
M 30	1068,7	1474,0	1768,8

Tightening torques for locking screws VSTI (Metric ISO fine thread)

Thread size	Designation		Tightening torques (lb.ft)
M 8 x 1	VSTI 8 x 1	-ED/SA	= 4
M 10 x 1	VSTI 10 x1	-ED	= 7
M 12 x 1,5	VSTI 12 x 1,5	-ED	= 15
M 14 x 1,5	VSTI 14 x 1,5	-ED	= 22
M 16 x 1,5	VSTI 16 x 1,5	-ED/SA	= 22
M 18 x 1,5	VSTI 18 x 1,5	-ED/SA	= 29
M 20 x 1,5	VSTI 20 x 1,5	-ED/SA	= 37
M 22 x 1,5	VSTI 22 x 1,5	-ED	= 44
M 26 x 1,5	VSTI 16 x 1,5	-ED/SA	= 51
M 27 x 2	VSTI 27 x 2	-ED	= 66
M 30 x 1 ,5	VSTI 30 x 1,5	-ED/SA	= 74
M 33 x 2	VSTI 33 x 2	-ED/SA	= 88
M 42 x 2	VSTI 42 x 2	-ED/SA	= 147
M 48 x 2	VSTI 48 x 2	-ED	= 220

Tightening torques for seal-lock nuts (Metric ISO-Standard Thread)

The values for tightening torques shown in the table are valid only for seal-lock nuts of the strength class 8.8 and with metric ISO-standard thread.

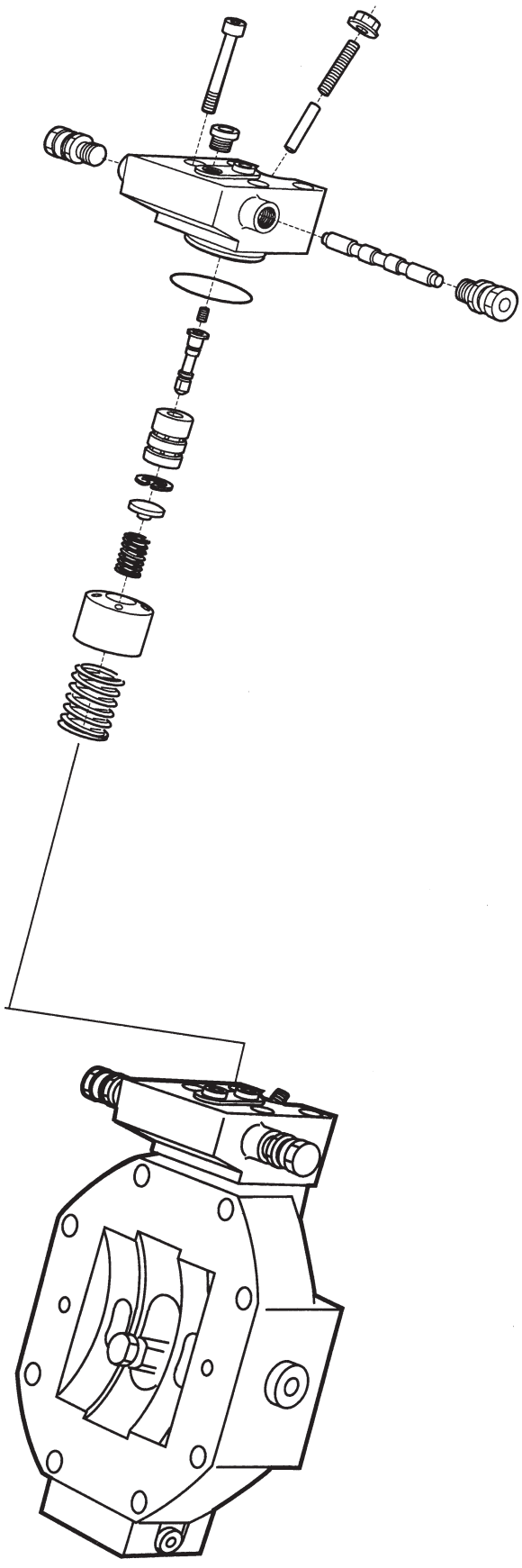
Thread size	Strength classes 8.8	10.9	12.9
	Tightening torque (lb.ft)		
M 6	7,4		
M 8	16,2		
M 10	29,5		
M 12	50,9		
M 14	81,1		
M 16	125,3		

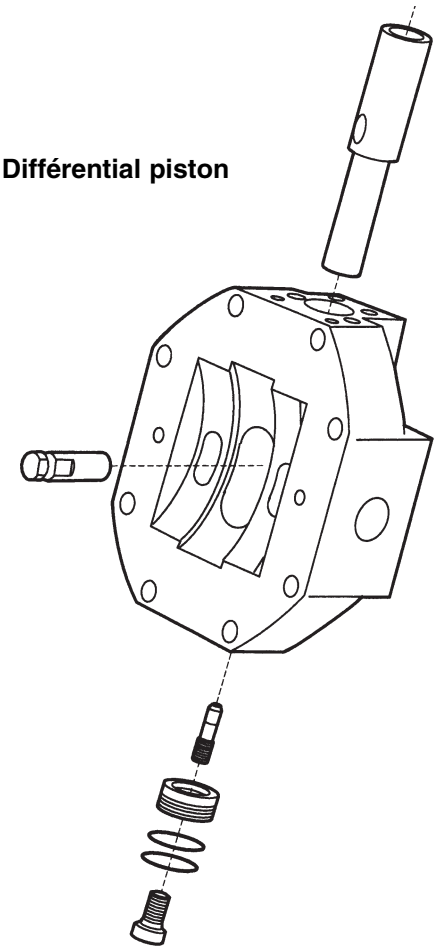
Tightening torques for cross-slotted lens head screws DIN 7985 (Metric ISO- Standard Thread)

The values for tightening torques shown in the table are valid only for cross-slotted lens head screws DIN 7985 of the strength class 8.8 and with metric ISO-standard thread.

Thread size	Strength classes 8.8	10.9	12.9
	Tightening torques (lb.ft)		
M 3	0,8		
M 4	2,1		
M 5	4,4		
M 6	7,4		
M 8	18,4		
M10	36,1		

DA





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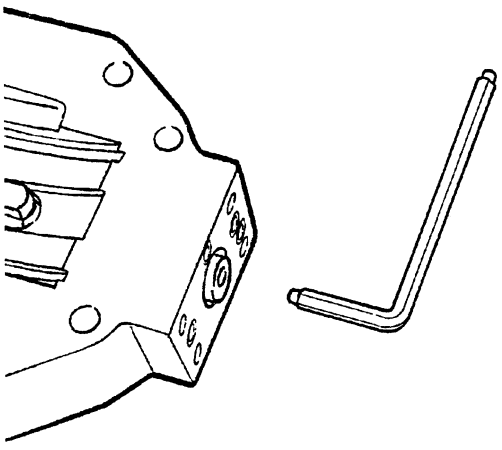
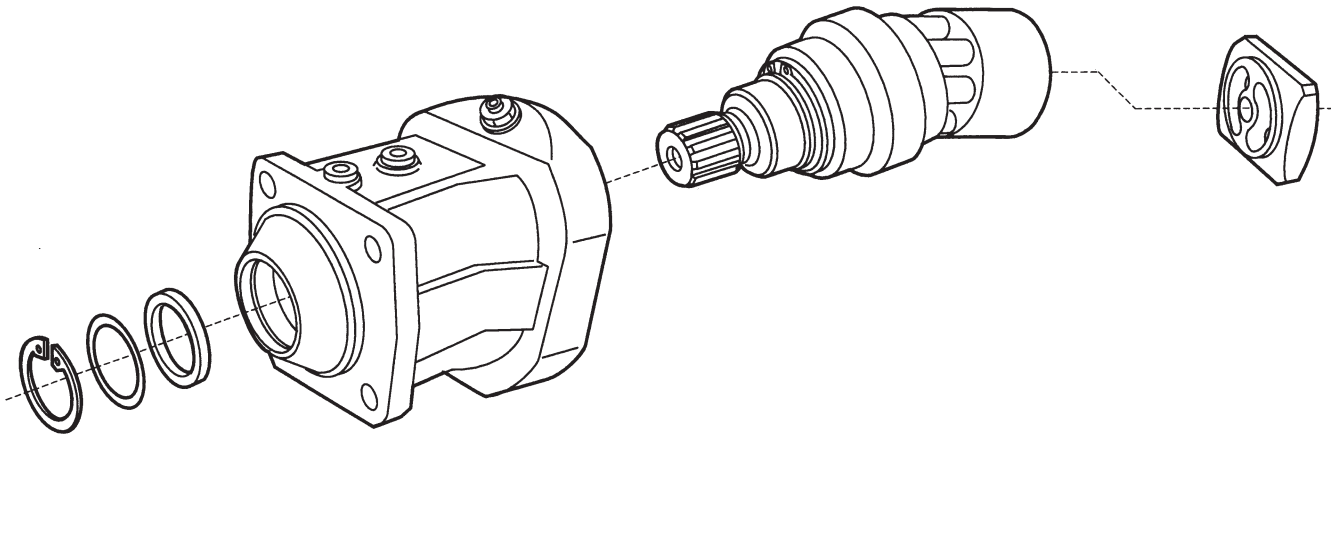
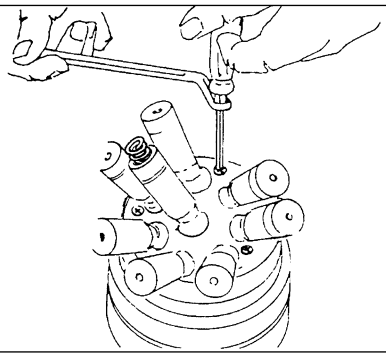


32 Loosen fixing screw.

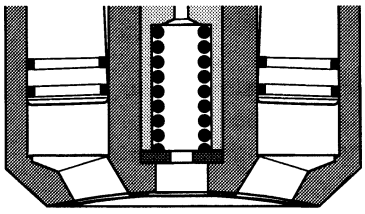
Use only socket wrench.



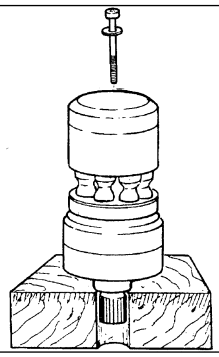
52



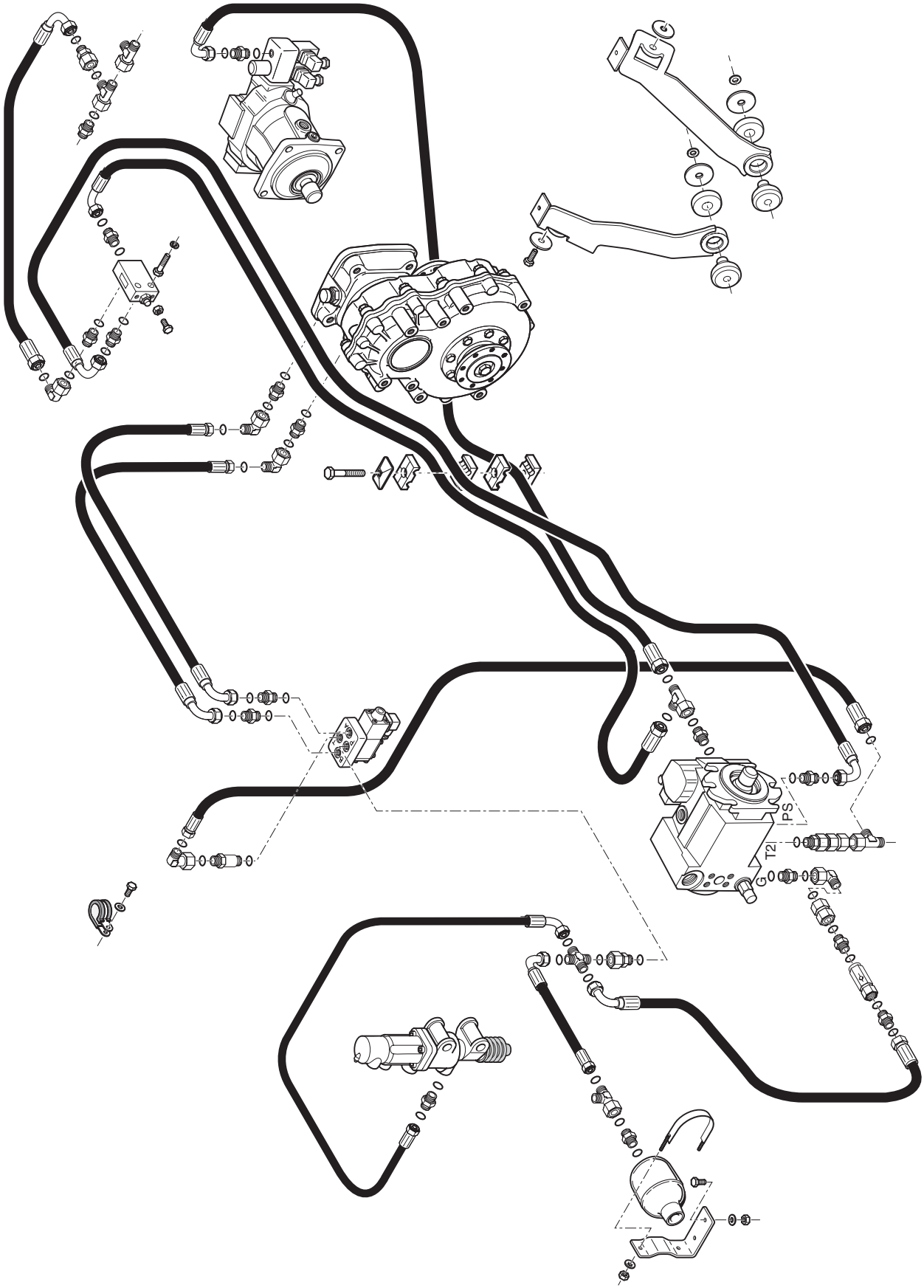
53 Insert retaining plate with pistson and center pin. Use screw with Precote-coating.



54 Make sure all parts are fitted in correctly.

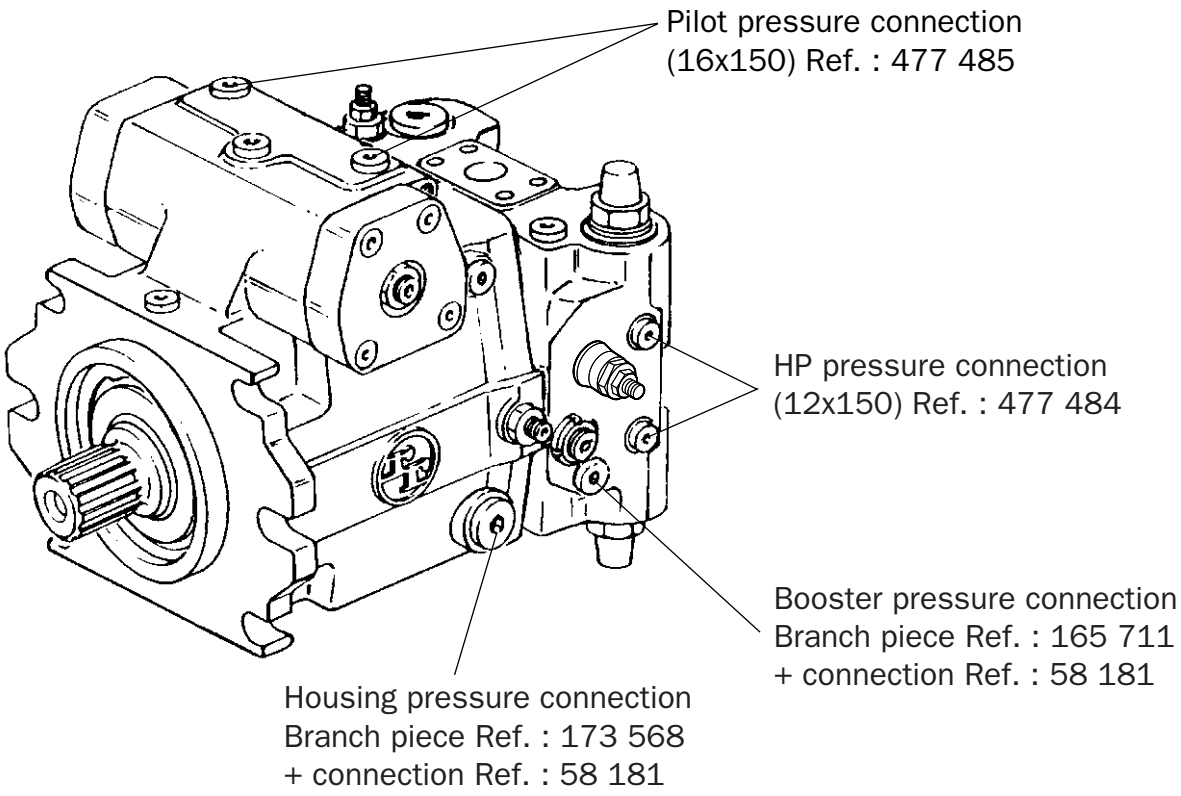


55 Swivel cylinder block to max. and fix the cylinder.


PS
T2
G

For the kits of pressure port hoses and couplings, please refer to the catalogue "pressure gauge box" Ref. 547037.

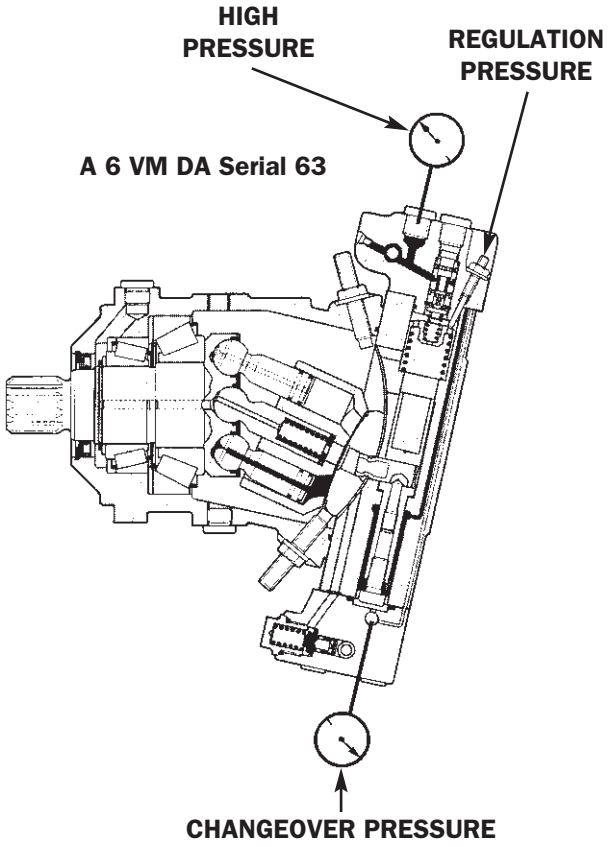
PUMP A 4 VG 71 - 90 DA



5. ADJUSTING MOTOR A 6VM DISPLACEMENT CHANGEOVER

A) CHECK MINIMUM DISPLACEMENT (MAX. SPEED) :

- The check is made driving the truck on level ground with the engine a full speed in forward drive.



- Connect two 600 bar pressure gauges as shown above. At maximum drive speed the two gauges should read the same. This signifies that both sides of the Servo piston are subject to the same pressure and the motor is at its minimum displacement.

- The actual speed can be verified (see the speed scale and technical data for the machine).

B) CHECK START OF REGULATION :

- With the wheels raised from the ground and the truck supported on blocks gradually apply the brake pedal to raise the pressure in the HP circuits (inching valve by-passed).
- Watch the two gauges. When the HP gauge shows 200/250 bar the changeover pressure will drop then the HP will continue to rise until it reaches the setting of the DR valve.
  (Changeover pressure : See specification for different trucks).
- The changeover point can be adjusted by the screw.

N°: 222099

ELECTRIC PRINCIPLE CIRCUIT

1 - Preheating
2 - Battery
3 - Starter
4 - Preheating relay
5 - Cold start
6 - Engine stop electrovalve
7 - Alternator
8 - Fuel level
9 - Machine fault sound alarm
10 - Hourmeter
11 - Load indicator
12 - Engine oil pressure
13 - Brake fluid
14 - Air filter clogging
15 - Engine water temperature
16 - Filter clogging indicator light
17 - Free
18 - Hand brake
20 - Front wheels alignment detector
21 - Front wheels alignment indicator light
22 - Rear wheels alignment detector
23 - Rear wheels alignment indicator light
24 - Sound alarm
25 - L.H. stoplight
26 - R.H. stoplight
27 - Free
30 - L.H. working head light
31 - R.H. working head light
32 - Control panel lighting
33 - R.H. rear position light
34 - R.H. front position light
35 - L.H. rear position light
36 - L.H. front position light
37 - L.H. front low beam
38 - R.H. front low beam
39 - L.H. front main beam
40 - R.H. front main beam
41 - Main beam indicator light
42 - Revolving light
43 - R.H. working tail light
44 - L.H. working tail light
45 - Free
46 - Hydraulic motor rotation electrovalve
47 - L.H. rear reverse light
48 - R.H. rear reverse light
49 - Reverse gear sound alarm
50 - Moving speed limitation electrovalve
51 - Forward electrovalve
52 - Reverse electrovalve
53 - Low speed indicator light
54 - High speed indicator light
55 - High speed electrovalve
56 - High speed control relay
57 - Low speed control relay
58 - Start safety relay
59 - Forward relay
60 - Reverse relay
61 - Rear reverse light relay
63 - Safety system
64 - Movements cut-off
67 - Front windscreen washer
68 - Front windscreen wiper
69 - Flasher unit / warning unit
70 - Flasher unit / warning unit indicator light
71 - R.H. rear indicator
72 - R.H. front indicator
73 - L.H. rear indicator
74 - L.H. front indicator
75 - Warning unit / indicator light switch
76 - Roof light
77 - Cabin rear windscreen wiper
78 - Cabin roof windscreen wiper
79 - Ventilation
80 - Free
81 - Transmission cut-off relay
82 - Lifting proportional electrovalve
83 - Tilting proportional electrovalve
84 - Telescope 1 & 2 proportional electrovalve
85 - Telescope 3 proportional electrovalve
86 - Attachment proportional electrovalve
87 - Levelling proportional electrovalve
88 - R.H. stabilizer proportional electrovalve
89 - L.H. stabilizer proportional electrovalve
90 - Movements cut-off (safety module)
91 - Stabilizers pressostat
92 - Joystick
93 - E18/S6 module
94 - Movements cut-off switch
95 - Levelling movement safety
96 - Safety : block axle/jib lifting 67°
97 - Safety : speed jib lifting 67°
98 - Reduction : speed jib lifting

COLOUR CODING

bc : White	bl : Blue	g : Grey
j : Yellow	jvt : Yellow/Green	m : Brown
n : Black	o : Orange	r : Red
ro : Pink	vt : Green	v : Purple

CONNECTOR

A - Fuse box/relay (4 pin connection + 1 pin connection)
B - Indicator light module
C - Cabin
D - Front windscreen wiepr
E - Fuse box/relay (13 pin connection)
F - Fuse box/relay (7 pin connection)
G - Fuse box/relay (11 pin connection)
H - Fuse box/relay (21 pin connection)
I - Lighting switch
J - Engine box
K - Engine harness (4 pin connection))
R - Valve bank (6 pin connection)
S - Joystick (6 pin connection)
T - Load safety module (3 pin connection)
U - Load safety module (6 pin connection)
V - Principle beam (2 pin connection)

S33 - Transmision cut-off switch to accelerator pedal
S34 - Seat switch

V1 - Fault test diode
V2 - Diode (TUV version)

Y1 - Engine stop electrovalve
Y2 - Forward electrovalve
Y3 - Reverse electrovalve
Y4 - Hydraulic engine rotation electrovalve
Y5 - Free
Y6 - High speed electrovalve
Y7 - Cold start electrovalve
Y8 - Moving speed limitation electrovalve

S33 - Transmission cut-off switch to accelerator pedal
S34 - HP filter clogging pressure switch
S35 - Seat switch

V1 - Fault test diode
V2 - Diode (TUV version)

Y1 - Engine stop electrovalve
Y2 - Forward electrovalve
Y3 - Reverse electrovalve
Y4 - Hydraulic motor rotation electrovalve
Y6 - High speed electrovalve
Y7 - Cold start electrovalve
Y8 - Moving speed limitation electrovalve

N°: 236906

ELECTRIC PRINCIPLE CIRCUIT

1 - Preheating
2 - Battery
3 - Starter
4 - Preheating relay
5 - Cold start
6 - Engine stop electrovalve
7 - Alternator
8 - Fuel level
9 - Machine fault sound alarm
10 - Hourmeter
11 - Load indicator
12 - Engine oil pressure
13 - Brake fluid
14 - Air filter clogging
15 - Engine water temperature
16 - Hydraulic return filter clogging
17 - Free
18 - Hand brake
19 - Free
20 - Front wheels alignment detector
21 - Front wheels alignment indicator light
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23 - Rear wheels alignment indicator light
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25 - R.H. stoplight
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27 - Free
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54 - High speed indicator light
55 - High speed electrovalve
56 - High speed control relay
57 - Low speed control relay
58 - Start safety relay
59 - Forwrd relay
60 - Reverse relay
61 - Rear reverse light relay
62 - Transmission cut-off relay
65 - Front windscreen washer
66 - Front windscreen wiper
67 - Blinker centre / warning
68 - Blinker centre / warning indicator light
69 - R.H. rear blinker
70 - R.H. front blinker
71 - L.H. rear blinker
72 - L.H. front blinker
73 - Warning switch / indicator light
74 - Roof light
75 - Cabin rear windscreen wiper
76 - Cabin roof windscreen wiper
79 - Ventilation
80 - Platform start relay
81 - HP filter clogging

COLOUR CODING

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CONNECTEUR

A - Fuses box / relay (4 pin connection + 1 pin connection)
B - Indicator light module
C - Cabin
D - Front windscreen wiper
E - Fuses box / relay (13 pin connection)
F - Fuses box / relay (7 pin connection)
G - Fuses box / relay (11 pin connection)
H - Fuses box / relay (21 pin connection)
I - Light switch
J - Engine box
K - Box connection ORH (11+1+1 ways)
L - Box connectionORH (4 ways)
M - Box connection (2 ways)

ELECTRIC COMPONENTS

E1 - R.H. rear blinker
E2 - R.H. front blinker
E3 - L.H. rear blinker
E4 - L.H. front blinker
E5 - L.H. stoplight
E6 - R.H. stoplight
E7 - R.H. rear position light
E8 - R.H. front position light
E9 - L.H. rear position light
E10 - L.H. front position light
E11 - L.H. front low beam
E12 - R.H. front low beam
E13 - L.H. front main beam
E14 - R.H. front main beam
E15 - R.H. working tail light
E16 - L.H. working tail light
E17 - L.H. working head light
E18 - R.H. working head light
E19 - Revolving light
E20 - L.H. rear reverse light

N°: 222098

ELECTRIC PRINCIPLE DIAGRAM

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12 - Engine oil pressure
13 - Brake fluid
14 - Air filter clogging
15 - Engine water temperature
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42 - Revolving light
43 - R.H. working tail light
44 - L.H. working tail light
45 - Free
46 - Hydraulic motor rotation electrovalve
47 - L.H. rear reverse light
48 - R.H. rear reverse light
49 - Reverse gear sound alarm
50 - Moving speed limitation electrovalve
51 - Forward electrovalve
52 - Reverse electrovalve
53 - Low speed indicator light
54 - High speed indicator light
55 - High speed electrovalve
56 - High speed control relay
57 - Low speed control relay
58 - Start safety relay
59 - Forward relay
60 - Reverse relay
61 - Rear reverse light relay
62 - Transmission cut-off relay
63 - Safety system
64 - Movements cut-off
65 - Movements cut-off suppression switch
66 - Movements cut-off electrovalve
67 - Stabilizer control switch
68 - Arm lifting angular sensor
69 - Free
70 - Arm angular safety electrovalve
71 - Free
72 - Front windscreen washer
73 - Front windscreen wiper
74 - Levelling movement safety
75 - Angular speed safety
76 - Movements safety (stabilizer)
77 - Retracted telescope safety
78 - Blinking centre / warning
79 - Blinking centre / warning indicator light
80 - R.H. rear blinker
81 - R.H. front blinker
82 - L.H. rear blinker
83 - L.H. front blinker
84 - Warning switch / indicator light
85 - Roof light
86 - Cabin rear windscreen wiper
87 - Cabin roof windscreen wiper
88 - Ventilation
89 - Free

COLOUR CODING

bc : White	bl : Blue	g : Grey
j : Yellow	jvt : Yellow/Green	m : Brown
n : Black	o : Orange	r : Red
ro : Pink	vt : Green	v : Purple

CONNECTEUR

A - Fuses box / relay (4 pin connection + 1 pin connection)
B - Indicator light module
C - Cabin
D - Front windscreen wiper
E - Fuses box / relay (13 pin connection)
F - Fuses box / relay (7 pin connection)
G - Fuses box / relay (11 pin connection)
H - Fuses box / relay (21 pin connection)
I - Light switch
J - Engine box
K - Control case (ORH)

ELECTRIC COMPONENTS

E1 - R.H. rear blinker
E2 - R.H. front blinker
E3 - L.H. rear blinker
E4 - L.H. front blinker
E5 - L.H. stoplight
E6 - R.H. stoplight
E7 - R.H. rear position light
E8 - R.H. front position light
E9 - L.H. rear position light

⊢▷ N°: 222099

ELECTRIC PRINCIPLE CIRCUIT

1 - Preheating
2 - Battery
3 - Starter
4 - Preheating relay
5 - Cold start
6 - Engine stop electrovalve
7 - Alternator
8 - Fuel level
9 - Machine fault sound alarm
10 - Hourmeter
11 - Load indicator
12 - Engine oil pressure
13 - Brake fluid
14 - Air filter clogging
15 - Engine agua temperature
16 - Hydraulic return filter clogging
17 - Free
18 - Hand brake
20 - Front wheels alignment detector
21 - Front wheels alignment indicator light
22 - Rear wheels alignment detector
23 - Rear wheels alignment indicator light
24 - Sound alarm
25 - L.H. stoplight
26 - R.H. stoplight
27 - Free
30 - L.H. working head light
31 - R.H. working head light
32 - Control panel lighting
33 - R.H. rear position light
34 - R.H. front position light
35 - L.H. rear position light
36 - L.H. front position light
37 - L.H. front low beam
38 - R.H. front low beam
39 - L.H. front main beam
40 - R.H. front main beam
41 - Main beam indicator light
42 - Revolving light
43 - R.H. working tail light
44 - L.H. working tail light
45 - Free
46 - Hydraulic motor rotation electrovalve
47 - L.H. rear reverse light
48 - R.H. rear reverse light
49 - Reverse gear sound alarm
50 - Moving speed limitation electrovalve
51 - Forward electrovalve
52 - Reverse electrovalve
53 - Low speed indicator light
54 - High speed indicator light
55 - High speed electrovalve
56 - High speed control relay
57 - Low speed control relay
58 - Start safety relay
59 - Forward relay
60 - Reverse relay
61 - Rear reverse light relay
62 - Transmission cut-off relay
63 - Safety system
64 - Movements cut-off
67 - Front windscreen washer
68 - Front windscreen wiper
69 - Blinking centre / warning
70 - Blinking centre / warning indicator light
71 - R.H. rear blinker
72 - R.H. front blinker
73 - L.H. rear blinker
74 - L.H. front blinker
75 - Warning switch / indicator light
76 - Roof light
77 - Cabin rear windscreen wiper
78 - Cabin roof windscreen wiper
79 - Ventilation
80 - Free
81 - Free
82 - Lifting proportional electrovalve
83 - Tilting proportional electrovalve
84 - Telescope 1 & 2 proportional electrovalve
86 - Attachment proportional electrovalve
87 - Levelling proportional electrovalve
88 - R.H. stabilizer proportional electrovalve
89 - L.H. stabilizer proportional electrovalve
90 - Rear axle lock electrovalve
91 - E18/S6 module
92 - Joystick
93 - Stabilizer control switch
94 - Movements safety (stabilizer)
95 - Levelling movement safety
96 - Arm lifting angular sensor
97 - Movements cut-off switch
98 - Movements cut-off (safety module)

COLOUR CODING

bc : White	bl : Blue	g : Grey
j : Yellow	jvt : Yellow/Green	m : Brown
n : Black	o : Orange	r : Red
ro : Pink	vt : Green	v : Purple

CONNECTEUR

A - Fuses box / relay (4 pin connection + 1 pin connection)
B - Indicator light module
C - Cabin
D - Front windscreen wiper
E - Fuses box / relay (13 pin connection)
F - Fuses box / relay (7 pin connection)
G - Fuses box / relay (11 pin connection)
H - Fuses box / relay (21 pin connection)
I - Light switch
J - Engine box
K - Principle beam (4 way case)
L -
M -
N -
O -
R - Valve bank (6 pin connection)
S - Joystick (6 pin connection)
T - Load safety module (3 pin connection)
U - Load safety module (6 pin connection)
V - Principle beam (2 pin connection)

BB-3 CALIBRATOR

MLT ... LSU
MLA ... LSU

Parts requiered

1 BB3 calibrator	Ref.662 070	Item	1
1 connecting lead	Ref.662 071	Item	2

Procedure

Never connect or disconnect the BB3 calibrator while the machine is switched on.

- Switch off the machine.
- Open the lid of the document holder 3 (Fig. A or B) situated behind the driver's seat.

Fig. A MLT ... LSU

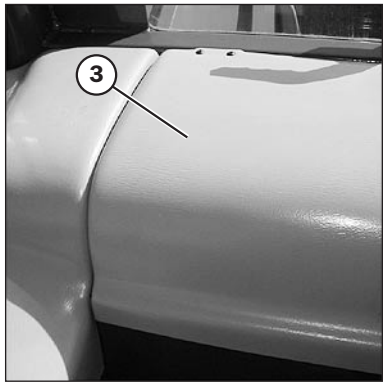
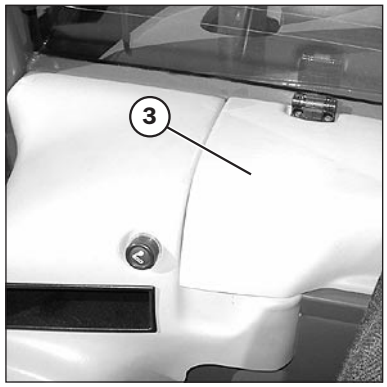


Fig. B MLA ... LSU



- Connect the BB3 calibrator to the micro-controller's diagnostic socket 4 (Fig. C or D).

Fig. C MLT ... LSU

Fig. D MLA ... LSU

N°	DESCRIPTION OF ACTION	KEY	CALIBRATOR SCREEN DISPLAY	COMMENTS
7	**Procedure to be followed if the engine stalls**			
7,1	- Press →	F1 →	1 _____GEN settings 2 _____GLR settings 3 _____Param1 GLR 4 _____Param2 GLR	
7,2	- Press →	4 →	1 _____GLR Min 2 _____measure time 3 _____ _ _ _ _ _ _ _ 4 _____ _ _ _ _ _ _ _	
7,3	- Press →	1 →	1 GLR Min 0 - 80 +/- 1 60	
7,4	- Press **twice** →	CLEAR →	1 GLR Min 0 - 80 +/- 1	To clear the parameter.
7,5	- Press → then - Press →	5 5 →	1 GLR Min 0 - 80 +/- 1 55	To enter the new parameter. Lower in steps of 5%. **NOTE : Do not go below 40%.**
7,6	- Press →	ENTER →	1 _____GLR Min 2 _____measure time 3 _____ _ _ _ _ _ _ _ 4 _____ _ _ _ _ _ _ _	To confirm the new parameter.
7,7	- Press →	MENU →	1 _____GEN settings 2 _____GLR settings 3 _____Param1 GLR 4 _____Param2 GLR	Return to the previous menu.
7,8	- Press →	MENU →	F1_____Config/Cal F2_____Diagnostic PROC _____Status TEACH ____Storage	Return to the initial menu.
7,9	- Save the parameters			See steps 4.1 to 4.5.

5 - RC2-1 MICROCONTROLLER SETTINGS : F1 MENU (Adjustment and parameter setting)

(Ref : 236673 - 246556 - 249920)

1 gen settings		2 GLR settings	
1 - poti nominal min.position / max position / Not used		1 - diesel charac adjustment range min 0 max 1 increment +/- 1 Creation of the learning curve	0
2 - poti diesel Idling speed min position upper than 0,6 Maxi speed max position lower than 4,4 Record of te potentiometer Thermal motor system	0,8 V 4,3 V Example	2 - GLR on / off value 1 GLR off value 2 GLR on Activation power regulation	GLR on
3 - I min pump adjustment range min 200 mA max 600 mA increment +/- 10 mA Minimum current proportional solenoid	0,8 V 4,3 V 400 mA	3 - R diesel adjustment range min 500 ms max 3000 ms increment +/- 22 ms Times ramp of teh reaction of teh regulation	1800 ms
4 - I max pump adjustment range min 1000 mA max 1600 mA increment +/- 10 mA Maximum current proportional solenoid	1200 mA	4 - teeth diesel adjustment range min 1 max 300 increment +/- 1 Number of flying teeth motor or coefficient reading motor system	MLT A15 MLA 17 MLT B 17
5 - dither - freq value 1 100 Hz value 2 200 Hz Frequency adjustment Dither	100 Hz	5 - fixed eng spd adjustment range min 0 rpm max 3000 rpm increment +/- 10 rpm	0 rpm
6 - supply voltage value 1 12 V value 2 24 V Supply voltage	12 V	6 - dump idle spee adjustment range min 50 rpm max 300 rpm increment +/- 5 rpm Load tolerance motor idle	50 rpm
7 - displacem swi value 1 setting poti value 2 setting BB3 Max displacement : pump controlled by potentiometer or BB3	setting BB3	7 - dump half spee adjustment range min 50 rpm max 500 rpm increment +/- 5 rpm Load tolerance motor semi-mode	200 rpm
8 - nom displacem adjustment range min 0 % max 100 % increment +/- 1 % Max displacement pumps authorised in %	100 %	8 - dump full spee adjustment range min 50 rpm max 500 rpm increment +/- 5 rpm Load tolerance motor at maximum	300 rpm

BB-3 CALIBRATOR

MLT ... LSU
MLA ... LSU

Parts requiered

1 BB3 calibrator	Ref.662 070	Item	1
1 connecting lead	Ref.662 071	Item	2

Procedure

Never connect or disconnect the BB3 calibrator while the machine is switched on.

- Switch off the machine.
- Open the lid of the document holder 3 (Fig. A or B) situated behind the driver's seat.

Fig. A MLT ... LSU

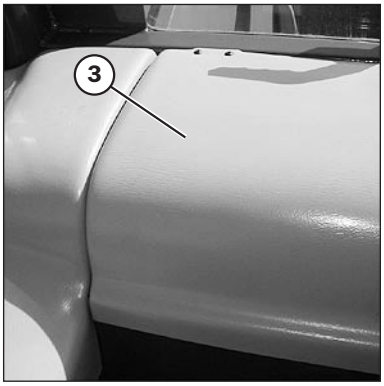
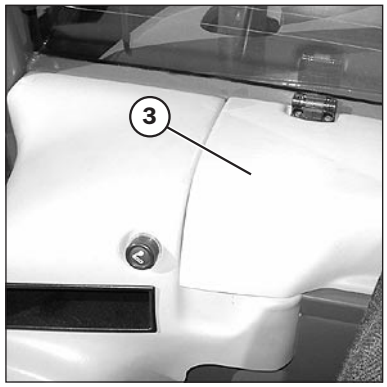


Fig. B MLA ... LSU



- Connect the BB3 calibrator to the micro-controller's diagnostic socket 4 (Fig. C or D).

Fig. C MLT ... LSU

Fig. D MLA ... LSU

N°	DESCRIPTION OF ACTION	KEY	CALIBRATOR SCREEN DISPLAY	COMMENTS
7	**Procedure to be followed if the engine stalls idling**			
7,1	- Press →	F1 →	1 _____GEN settings 2 _____GLR settings 3 _____Param1 GLR 4 _____Param2 GLR	
7,2	- Press →	4 →	1 _____GLR Min 2 _____measure time 3 _____ _ _ _ _ _ _ _ 4 _____ _ _ _ _ _ _ _	
7,3	- Press →	1 →	1 GLR Min 0 - 80 +/- 1 60	
7,4	- Press **twice** →	CLEAR →	1 GLR Min 0 - 80 +/- 1	To clear the parameter.
7,5	- Press → then - Press →	5 5 →	1 GLR Min 0 - 80 +/- 1 55	To enter the new parameter. Lower in steps of 5%. **NOTE : Do not go below 40%.**
7,6	- Press →	ENTER →	1 _____GLR Min 2 _____measure time 3 _____ _ _ _ _ _ _ _ 4 _____ _ _ _ _ _ _ _	To confirm the new parameter.
7,7	- Press →	MENU →	1 _____GEN settings 2 _____GLR settings 3 _____Param1 GLR 4 _____Param2 GLR	Return to the previous menu.
7,8	- Press →	MENU →	F1_____Config/Cal F2_____Diagnostic PROC _____Status TEACH ____Storage	Return to the initial menu.
7,9	- Save the parameters			See steps 4.1 to 4.5.

5 - RC2-2 MICROCONTROLLER SETTINGS : F1 MENU (Adjustment and parameter setting)

(Ref : 253157)

Blue: Adjustment of the theoretical engine speed sensor. Yellow: Adjustment points adaptable by the customer.

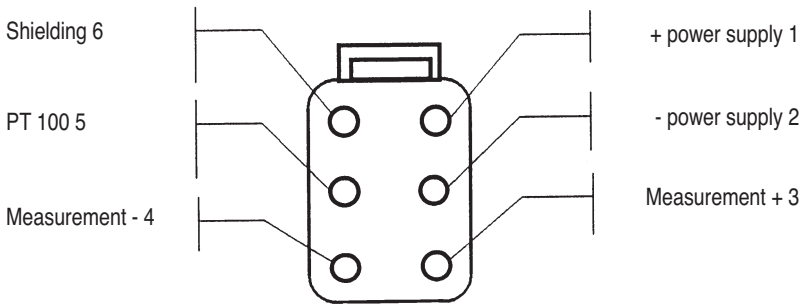
1 gen settings		2 GLR settings		3 Param 1 GLR	
1 - poti nominal min.position / max position / Not used		1 - diesel charac adjustment range min 0 max 1 increment +/- 1 Creation of the learning curve	0	1 - P1 (nA > nN) adjustment range min 1 max 2000 increment +/- 10	400
2 - poti diesel Idling speed min position upper than 0,6 Maxi speed max position lower than 4,4 Record of te potentiometer Thermal motor system	Example	2 - GLR on / off value 1 GLR off value 2 GLR on Activation power regulation	GLR on	2 - P2 (nA < nN) adjustment range min 1 max 2000 increment +/- 10	400
3 - I min pump adjustment range min 200 mA max 600 mA increment +/- 10 mA Minimum current proportional solenoid	0,8 V 4,3 V 400 mA	3 -		3 - I1 (nA > nN n' > 0) adjustment range min 0 max 1000 increment +/- 10	100
4 - I max pump adjustment range min 1000 mA max 1600 mA increment +/- 10 mA Maximum current proportional solenoid	1200 mA	4 - teeth diesel adjustment range min 1 max 300 increment +/- 1 Number of flying teeth motor or coefficient reading motor system	MLA 17 MLT B 17	4 - I2 (nA > nN n' < 0) adjustment range min 0 max 1000 increment +/- 10	100
5 - dither - freq value 1 100 Hz value 2 200 Hz Frequency adjustment Dither	100 Hz	5 - fixed eng spd adjustment range min 0 rpm max 3000 rpm increment +/- 10 rpm	0 rpm	5 - I3 (nA < nN n' < 0) adjustment range min 0 max 1000 increment +/- 10	400
6 - CAN-service value 1 on value 2 off Not used	off	6 - diesel-up adjustment range min 500 ms max 3000 ms increment +/- 22 ms Ramp inertia acceleration fuel injection pump	3000 ms	6 - I4 (nA < nN n' > 0) adjustment range min 0 max 1000 increment +/- 10	240
7 - displacem swi value 1 setting poti value 2 setting BB3 Max displacement : pump controlled by potentiometer or BB3	setting BB3	7 - diesel down adjustment range min 500 ms max 3000 ms increment +/- 22 ms Ramp inertia deceleration fuel injection pump	500 ms	7 - D factor adjustment range min 0 max 1000 increment +/- 10	50
8 - nom displacem adjustment range min 0 % max 100 % increment +/- 1 % Max displacement pumps authorised in %	100 %	8 -		8 - d call rate adjustment range min 3 max 6 increment +/- 3	3

INSPECTION PROCEDURE FOR THE LONGITUDINAL STABILITY ALARM STRAIN GAUGE

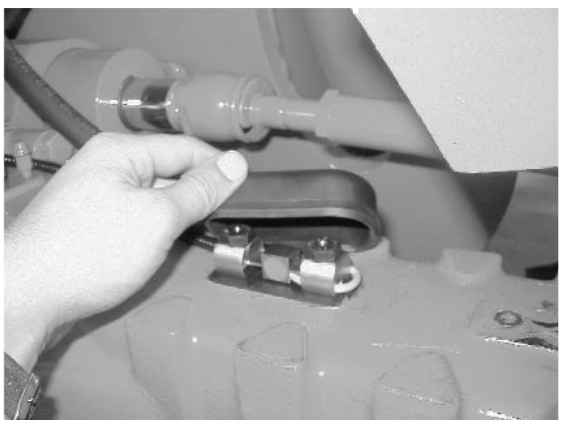
Connector engineering :

+ power supply	red wire / contact	N° 1
- power supply and PT 100	brown wire / contact	N° 2
+ measurement	yellow wire / contact	N° 3
- measurement	green wire / contact	N° 4
PT 100	blue wire / contact	N° 5
Shielding	white / contact	N° 6

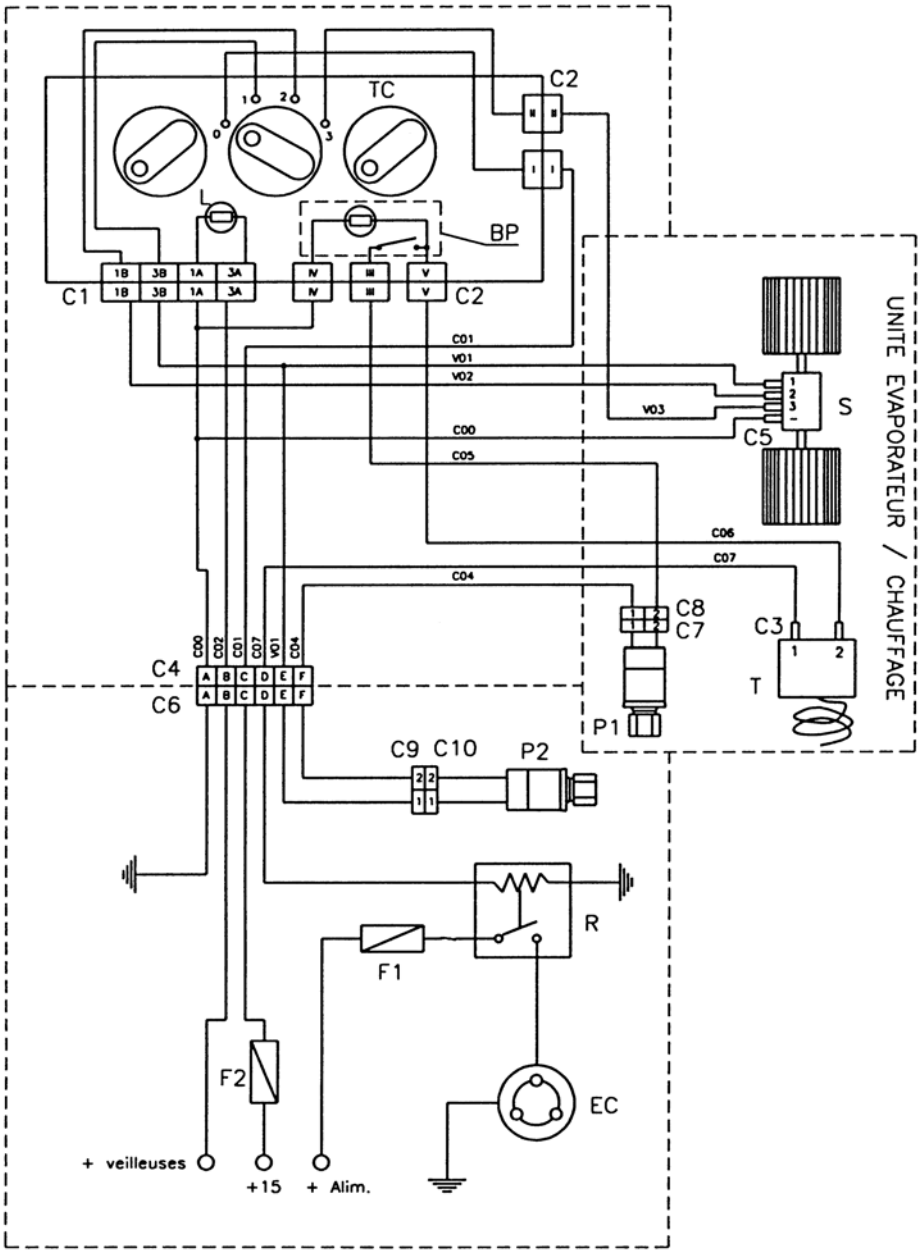
Description of the connectors of strain gauge.



Prior to any electrical inspection, carry out a visual check on the state of the gauge and its connections.



Electric skeleton diagram



TC	Control panel		**CONNECTORS**	
BP	Bouton poussoir		C1	5-way, black AMP MIC IV-TV - Ref. 144 518-2
L	Tongue		C2	6.35 x 0.8 mm female connector
S	Blower		C3	90" 6.35 x 0.8 mm female connector
T	Thermostat		C4	Deutsch Ref. HD10-6-12P
P1	Low pressure gauge		C5	1-way RKG female connector Ref. 920 510
P2	High pressure gauge		C6	Deutsch Ref. HD16-6-12S-B010
R	Relay		C7	2-way female DT - Ref. 552 459
EC	Compressor clutch		C8	2-way male DT - Ref. 552 457
F1	7.5 A fuse		C9	2-way male DT - Ref. 552 457
F2	30 A fuse		C10	2-way female DT - Ref. 552 459

2 -INSTRUCTIONS FOR STARTING UP THE MANITOU PRODUCTION UNIT

2.1- CHECK BEFORE LOADING

Tightening the coolant connections according to the torque table.

CONNECTION	MODULE	TORQUE Nm
COMPRESSOR DISCHARGE	8 _ ''	15.4 Nm
COMPRESSOR SUCTION	10 7/8 ''	24.4 Nm
CONDENSER INPUT	8 _ ''	15.4 Nm
DEHYDRATOR OUTPUT	6 5/8 ''	15.4 Nm
EVAPORATOR INPUT	6 5/8 ''	15.4 Nm
EVAPORATOR OUTPUT	10 7/8 ''	24.4 Nm

2.2- CHARACTERISTICS OF COOLANT R134a

WARNING : The MANITOU air-conditioning system uses coolant R134a only (Ref. MANITOU 4500421 – 14.5 Kg bottle) and PAG SP20 oil code : 430A08 only.

Characteristics of coolant R134a

* Trade name : Fluorocarbon 134a
* Use : Coolant
* Chemical characteristics : Tetrafluoroethane 134a
* Chemical formula : CH2FCF3
* Physical state : Liquefied gas
* Colour : Colourless
* Odour : Slightly of ether
* Boiling point (s/1bar) : -26.5 °C
* Melting point : -101°C
* Density at 25°C : 1.21kg/l
* Critical pressure : 40.56 bar
* Critical temperature : +100.6 °C
* Weight as gas : 5 times heavier than air
* 1 kg in liquid state at 1 bar : 200 l in gaseous state
* Thermal decomposition : from 110°C
* Hazardous decomposition products : hydrogen halides and traces of carbonyl halides
* Dangerous reactions : With alkaline metals and alkaline-earths of powdered metal salts : Al-Zn-Be...
* Flash point : No flash point
* Self-ignition temperature : Over 750°C
* Limit of explosivity : Below none, above none
* Ozone destruction potential : Zero (none).

5.2- PRECAUTIONS (GB)

5.2.1- Once the A/C system is slowing down, it is losing its efficiency. Contact an approved MANITOU dealer if this is the case with your air conditioner.

CAUTION : Never repair your air conditioner by yourself. An approved MANITOU dealer will have the technical know-how, all the necessary tools and the spare parts.

5.2.2- Do not open the A/C system, as it will cause loss of refrigerant.
The refrigerant in the A/C system can carry some risks. The R-134a refrigerant is colourless, odourless and denser than the air.

5.2.3- Never loosen the compressor-draining plug, as it will cause loss of the refrigerant. Always check the oil level in the compressor when the A/C system is empty