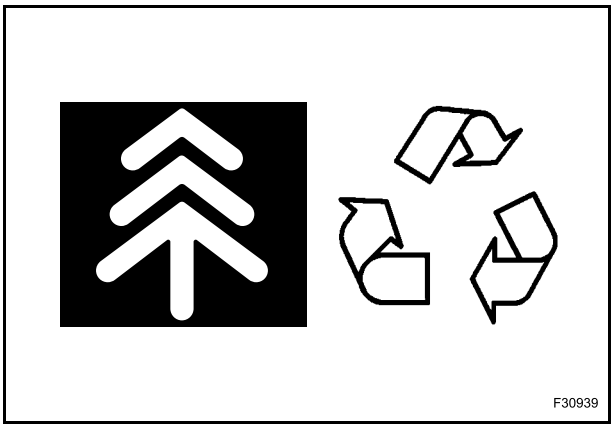
WX145
WX165
WX185

TIER 3

Service manual

Print No. 87677462A

1.9 WASTE DISPOSAL



Improperly disposing of waste can threaten the environment.

Each country has its own Regulations on this subject. It is therefore advisable to prepare suitable containers to collect and store momentarily all solid and fluid materials that must not be scattered in the environment to avoid pollution.

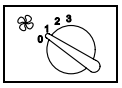
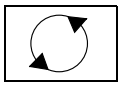
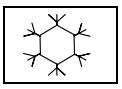
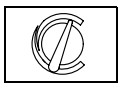
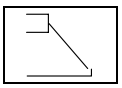
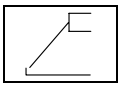
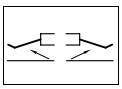
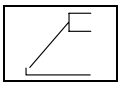
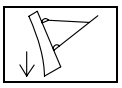
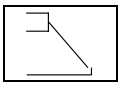
At preset intervals these products will be delivered to disposal stations legally recognized and present in this Country.

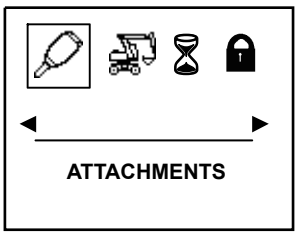
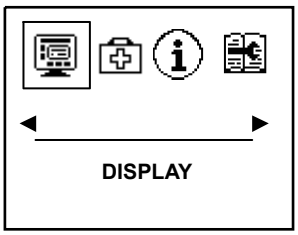
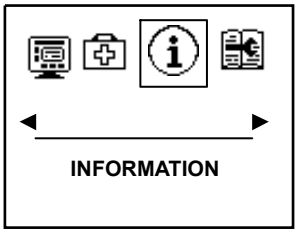
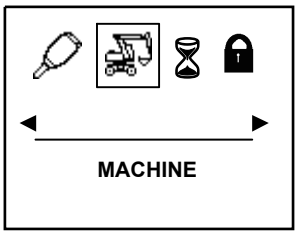
Hereunder are listed some products of the machine requiring disposal:

- lubricating oil;
- brake system oil;
- coolant mixture, condensation rests and pure antifreeze;
- fuel;
- filter elements, oil and fuel filters;
- filter elements, air filters;
- battery.

Also polluting rags, paper, sawdust and gloves must be disposed in compliance with the same procedures.

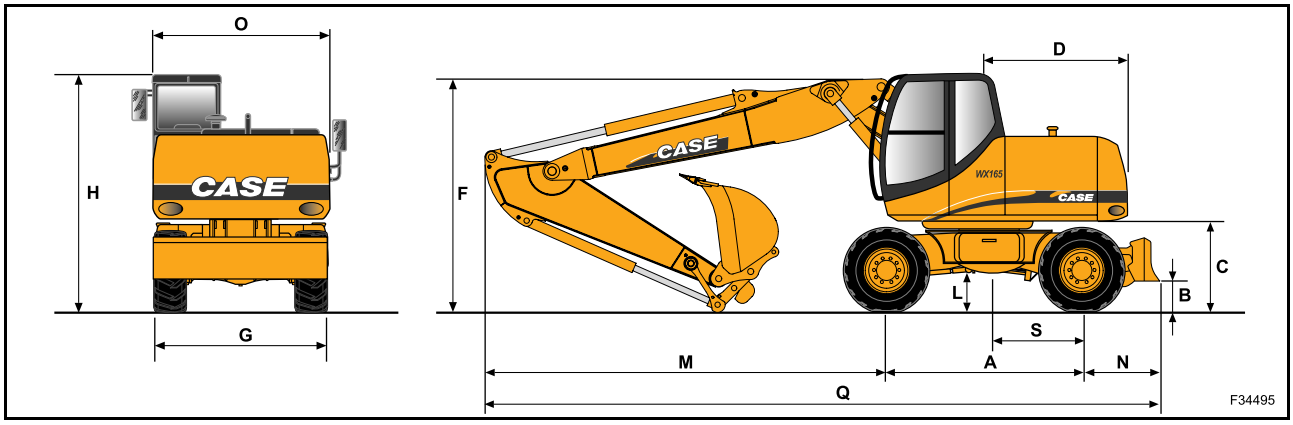
Do not use food or beverage containers that may mislead someone into drinking from them. Do not pour waste onto the ground, down a drain, or into any water source. Air conditioning refrigerants escaping into the air can damage the Earth's atmosphere. Government regulations may require a certified air conditioning service centre to recover and recycle used air conditioning refrigerants. Obtain information on the proper way to recycle or dispose of waste from your local environmental or recycling centre, or from your Dealer.

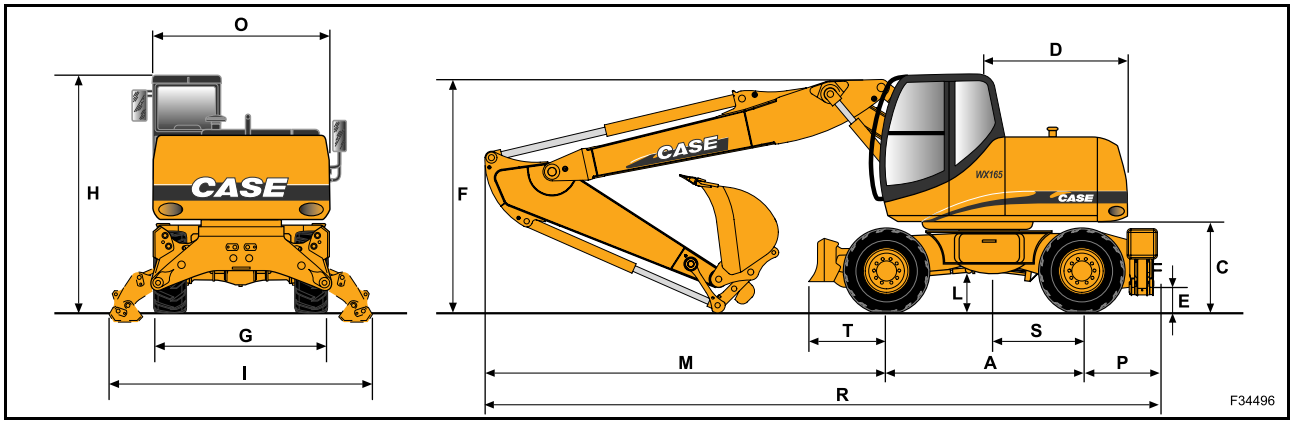
Ref.	Description		Operation	Symbol
1	Rotary knob/ selector	Blower	Activates the blower and has 3-speed stages: 1, 2, 3.	
2	White button	Air conditioner (optional)	Activates/deactivates the air recirculation.	
3	Blue button	Air conditioner (optional)	Activation/deactivation of air conditioner (ON/ OFF).	
4	Rotary knob/ selector	Heating	Sets the heating power: completely to the left - low heating power (blue); completely to the right - high heating power (red).	
5	Push-button	Stabilizer (optional)	Rear right stabilizer control.	
6	Push-button	Stabilizer (optional)	Rear left stabilizer control.	
		City Stabilizer (optional)	City stabilizer control.	
7	Push-button	Stabilizer (optional)	Front left stabilizer control.	
		Blade (optional)	Blade control.	
8	Push-button	Stabilizer (optional)	Front right stabilizer control.	

Ref.	Description		Operation	Symbol
8	Display	Attachments	Setting of hydraulic oil pressure and of volumetric flow for the following attachments: - 4 different hydraulic hammers; - 4 different rotary cutters; - 4 different hydraulic shears. Further options can be activated by the dealer for use by the operator: - degree of damping for equipment movements and travel function; - rotation power limiting; - activation of “Auto Power Boost” function; - setting of the levelling function; - basic setting; - clamshell rotation; - boom adjusting cylinder speed.	
		Display	Setting of display contrast and brightness, clock, language and measuring units.	
		Information	Displays operating data of the machine and the control system.	
		Machine	Display of all machine data.	

2.2 WX 165 MODELS

OUTFIT WITH PLACING BOOM





mm (in)

Dipper	A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q	R	S	T
2300 (90.55)	2550 (100.39)	450 (17.71)	1230 (48.42)	2000 (78.73)	320 (12.59)	2886 (113.62)	2520 (99.21)	3040 (119.68)	3900 (153.54)	365 (14.37)	4803 (189.09)	930 (36.61)	2500 (98.42)	1070 (42.12)	8283 (326.10)	8423 (331.61)	1175 (46.25)	1010 (39.76)
2600 (102.36)	2550 (100.39)	450 (17.71)	1230 (48.42)	2000 (78.73)	320 (12.59)	2950 (116.14)	2520 (99.21)	3040 (119.68)	3900 (153.54)	365 (14.37)	4814 (189.52)	930 (36.61)	2500 (98.42)	1070 (42.12)	2894 (113.93)	8434 (332.04)	1175 (46.25)	1010 (39.76)
2900 (114.17)	2550 (100.39)	450 (17.71)	1230 (48.42)	2000 (78.73)	320 (12.59)	3022 (118.97)	2520 (99.21)	3040 (119.68)	3900 (153.54)	365 (14.37)	4795 (188.77)	930 (36.61)	2500 (98.42)	1070 (42.12)	8275 (325.78)	8415 (331.29)	1175 (46.25)	1010 (39.76)

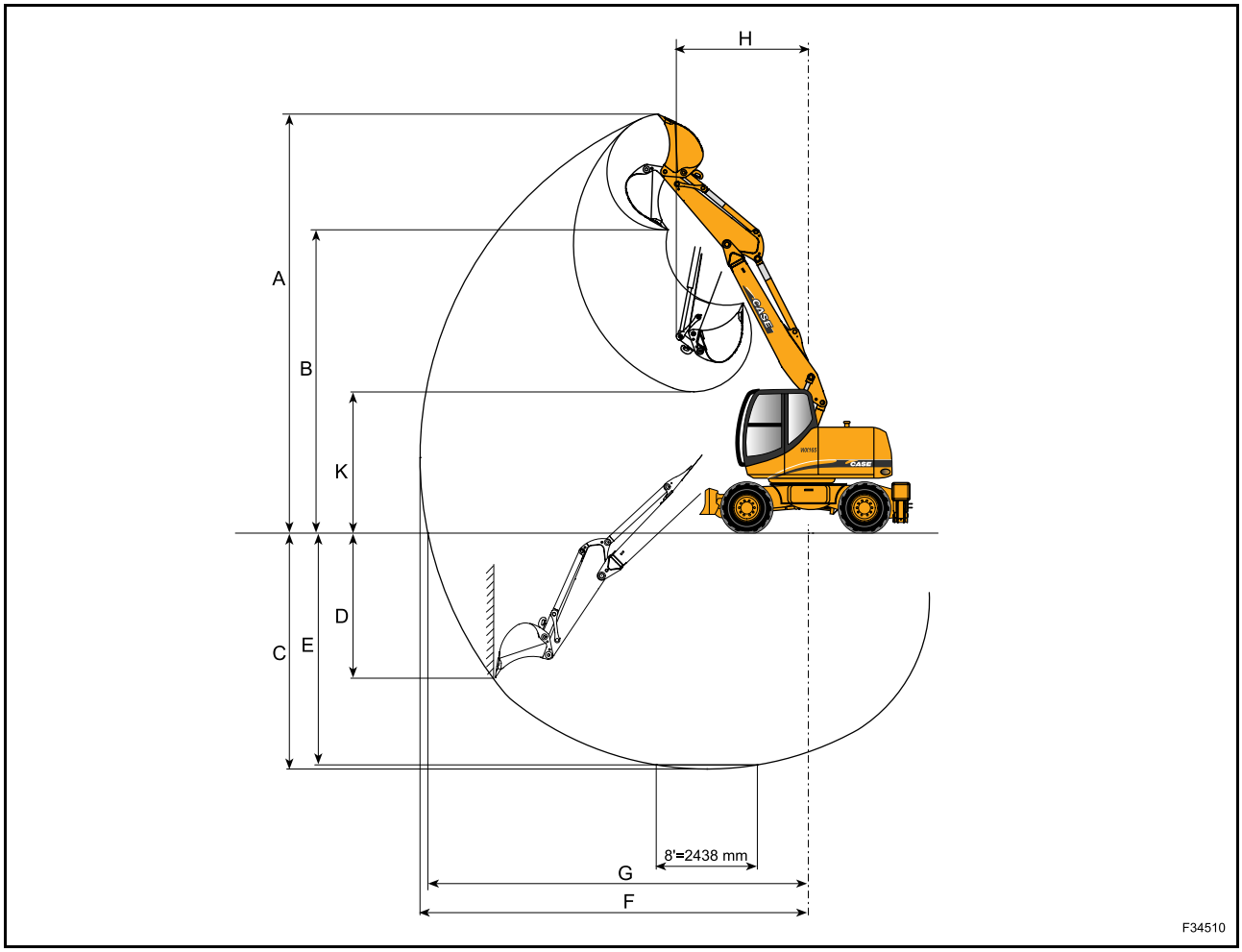
G = tyres maximum width

O = machine maximum width

Dipper (mm) (in)	Rear blade (kg) (lb)	Rear stabilizers (kg) (lb)	Front blade and rear stabilizers (kg) (lb)	Front and rear stabilizers (kg) (lb)
2300 (90.55)	16970 (37334)	17480 (38456)	17900 (39380)	18400 (40480)
2600 (102.36)	17010 (37422)	17520 (38544)	17940 (39468)	18440 (40568)
2900 (114.17)	17060 (37532)	17570 (38654)	17990 (39578)	18490 (40678)

3.2 WX 165 MODELS

OUTFIT WITH PLACING BOOM



	Dipper	mm	in	2300	90.55	2600	102.36	2900	114.17
A	Maximum digging height	mm	in	9800	385.83	10000	393.70	10300	405.51
B	Maximum loading height	mm	in	7100	279.53	7400	291.33	7600	299.21
C	Maximum digging depth	mm	in	5400	212.59	5700	224.40	6000	236.22
D	Maximum vertical wall digging depth	mm	in	3100	122.04	3400	133.85	3600	141.73
E	Maximum digging depth of cut for level bottom (L = 2438 mm (95.98 in))	mm	in	5300	208.66	5600	220.47	5900	232.28
F	Maximum digging reach	mm	in	9000	354.33	9300	366.14	9600	377.95
G	Maximum digging reach at ground	mm	in	8800	346.45	9100	358.27	9400	370.08
H	Minimum swing radius	mm	in	2700	106.29	2800	110.24	2900	114.17
K	Maximum loading height (dipper retracted)	mm	in	3100	122.05	2800	110.24	2600	102.36
F_1	Bucket tensile force (370 bar (5366 psi))	kN	lbf	112.5	25292.2	112.5	25292.2	112.5	25292.2
F_2	Dipper tensile force (370 bar (5366 psi))	kN	lbf	71.7	16119.6	66.2	14883.1	61.5	13826.4

4.1 WX 145 MODELS

OUTFIT WITH PLACING BOOM

With rear stabilizers - Allowable loads “t”

a = without stabilizers
b = with stabilizers

c = axial (front)
d = 360° (lateral)

Height		Reach with 2000 mm (78.74 in) dipper										Max reach
		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)				
		c	d	c	d	c	d	c	d	c	d	
7.5 m (24.6 ft)	a									2.7 * (8.9)	2.7 * (8.9)	4.4
	b									2.7 * (8.9)	2.7 * (8.9)	(14.4)
6.0 m (19.7 ft)	a			3.8 * (12.4)	3.5 (11.5)					2.1 * (6.9)	2.0 (6.6)	6.0
	b			3.8 * (12.4)	3.8 * (12.4)					2.1 * (6.9)	2.1 * (6.9)	(19.7)
4.5 m (14.8 ft)	a	4.0 * (13.1)	4.0 * (13.1)	4.4 * (14.4)	3.4 (11.1)	3.5 * (11.5)	2.1 (6.9)			2.0 * (6.6)	1.6 (5.2)	6.9
	b	4.0 * (13.1)	4.0 * (13.1)	4.4 * (14.4)	4.4 * (14.4)	3.8 * (12.4)	3.0 (9.8)			2.0 * (6.6)	2.0 * (6.6)	(22.6)
3.0 m (9.8 ft)	a	8.4 * (57.5)	5.9 (19.3)	5.3 (17.4)	3.3 (10.8)	3.5 (11.5)	2.1 (6.9)			2.0 * (6.6)	1.4 (4.6)	7.3
	b	8.4 * (57.5)	8.4 * (57.5)	5.8 * (19.0)	4.6 (15.1)	4.5 * (14.8)	3.0 (9.8)			2.0 * (6.6)	2.0 * (6.6)	(23.9)
1.5 m (4.9 ft)	a	9.5 * (31.2)	5.8 (19.0)	5.3 (17.4)	3.3 (10.8)	3.4 (11.1)	2.0 (6.6)			2.0 * (6.6)	1.3 (4.3)	7.4
	b	9.5 * (31.2)	8.4 (57.5)	6.9 * (22.6)	4.5 (14.8)	4.9 (16.1)	2.9 (9.5)			2.0 * (6.6)	1.9 (6.2)	(24.2)
0.0 m (ft)	a	10.1 (33.1)	5.5 (18.0)	5.3 (17.4)	3.1 (10.2)	3.3 (10.8)	1.9 (6.2)			2.3 * (7.5)	1.4 (4.6)	7.2
	b	11.3 * (37.1)	8.5 (27.9)	7.4 (24.2)	4.4 (14.4)	4.9 (16.1)	2.7 (8.9)			2.3 * (7.5)	2.0 (6.6)	(23.6)
-1.5 m (-4.9 ft)	a	10.1 (33.1)	5.2 (17.1)	5.0 (16.4)	2.8 (9.2)	3.2 (10.5)	1.8 (5.9)			2.7 (8.9)	1.5 (4.9)	6.6
	b	12.3 * (40.3)	8.1 (26.6)	7.5 * (24.6)	4.2 (13.8)	4.8 (15.7)	2.6 (8.5)			2.7 * (8.9)	2.3 (7.5)	(21.6)
-3.0 m (-9.8 ft)	a	9.8 (32.15)	5.0 (16.4)	4.9 (16.1)	2.7 (8.9)					3.7 (12.1)	2.1 (6.9)	5.4
	b	11.9 * (39.0)	7.9 (25.9)	6.5 * (21.3)	4.0 (13.1)					4.1 * (13.4)	3.1 (10.2)	(17.7)
-4.5 m (-14.8 ft)	a											
	b											

Height		Reach with 2300 mm (90.55 in) dipper										Max reach
		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)				
		c	d	c	d	c	d	c	d	c	d	
7.5 m (24.6 ft)	a			2.8 * (9.2)	2.8 * (9.2)					2.2 * (7.21)	2.2 * (7.21)	4.8
	b			2.8 * (9.2)	2.8 * (9.2)					2.2 * (7.21)	2.2 * (7.21)	(15.7)
6.0 m (19.7 ft)	a			3.4 * (11.1)	3.4 * (11.1)	2.5 * (8.20)	2.1 (6.9)			1.8 * (5.9)	1.8 * (5.9)	6.3
	b			3.4 * (11.1)	3.4 * (11.1)	2.5 * (8.20)	2.5 * (8.20)			1.8 * (5.9)	1.8 * (5.9)	(20.6)
4.5 m (14.8 ft)	a			3.8 * (12.4)	3.4 (11.1)	3.5 (11.5)	2.2 (7.21)			1.7 * (5.57)	1.5 (4.9)	7.1
	b			3.8 * (12.4)	3.8 * (12.4)	3.5 * (11.5)	3.0 (9.8)			1.7 * (5.57)	1.7 * (5.57)	(23.3)
3.0 m (9.8 ft)	a	8.5 * (27.9)	5.9 (19.3)	5.3 (17.4)	3.3 (10.8)	3.5 (11.5)	2.1 (6.9)	1.9 * (6.2)	1.3 (4.3)	1.7 * (5.57)	1.3 (4.3)	7.5
	b	8.5 * (27.9)	8.5 (27.9)	5.5 * (18.0)	4.6 (15.1)	4.3 * (14.1)	3.0 (9.8)	1.9 * (6.2)	1.9 * (6.2)	1.7 * (5.57)	1.7 * (5.57)	(24.6)
1.5 m (4.9 ft)	a	9.7 * (31.8)	5.8 (19.0)	5.2 (17.1)	3.3 (10.8)	3.4 (11.1)	2.1 (6.9)	2.3 (7.5)	1.3 (4.3)	1.8 * (5.9)	1.2 (3.93)	7.6
	b	9.7 * (31.8)	8.3 (27.2)	6.7 * (21.9)	4.5 (14.8)	4.9 (16.1)	2.9 (9.5)	2.5 * (8.20)	1.9 (6.2)	1.8 * (5.9)	1.8 * (5.9)	(24.9)
0.0 m (ft)	a	10.0 * (33.1)	5.6 (18.4)	5.3 (17.4)	3.1 (10.2)	3.3 (10.8)	1.9 (6.2)			2.0 * (6.6)	1.3 (4.3)	7.4
	b	11.0 (36.1)	8.4 (57.5)	7.3 * (23.9)	4.5 (14.8)	4.9 (16.1)	2.8 (9.2)			2.0 * (6.6)	1.9 (6.2)	(24.2)
-1.5 m (-4.9 ft)	a	10.1 (33.1)	5.2 (17.1)	5.1 (21.9)	2.8 (9.2)	3.2 (10.5)	1.8 (5.9)			2.5 * (8.20)	1.4 (4.6)	6.8
	b	12.1 * (39.7)	8.1 (26.6)	7.4 * (24.2)	4.2 (13.8)	4.7 (15.4)	2.6 (8.5)			2.5 * (8.20)	2.1 (6.9)	(22.3)
-3.0 m (-9.8 ft)	a	9.7 (31.8)	4.9 (16.1)	4.8 (15.7)	2.6 (8.5)					3.3 (10.8)	1.8 (5.9)	5.8
	b	12.3 * (40.3)	7.8 (25.6)	7.1 * (23.3)	4.0 (13.1)					3.5 * (11.5)	2.7 (8.9)	(19.0)
-4.5 m (-14.8 ft)	a											
	b											

Height		Reach with 2600 mm (102.36 in) dipper										Max reach
		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)				
		c	d	c	d	c	d	c	d	c	d	
7.5 m (24.6 ft)	a			2.8 * (9.2)	2.8 * (9.2)					1.8 * (5.9)	1.8 * (5.9)	5.3
	b			2.8 * (9.2)	2.8 * (9.2)					1.8 * (5.9)	1.8 * (5.9)	(17.4)
6.0 m (19.7 ft)	a			2.9 * (9.5)	2.9 * (9.5)	2.6 * (8.5)	2.1 (6.9)			1.5 * (4.9)	1.5 * (4.9)	6.6
	b			2.9 * (9.5)	2.9 * (9.5)	2.6 * (8.5)	2.6 * (8.5)			1.5 * (4.9)	1.5 * (4.9)	(21.6)
4.5 m (14.8 ft)	a			3.3 * (10.8)	3.3 * (10.8)	3.2 * (10.5)	2.2 (7.21)			1.5 * (4.9)	1.4 (4.6)	7.4
	b			3.3 * (10.8)	3.3 * (10.8)	3.2 * (10.5)	3.0 (9.8)			1.5 * (4.9)	1.5 * (4.9)	(24.2)
3.0 m (9.8 ft)	a	7.7 * (25.2)	6.0 (19.7)	5.2 * (17.1)	3.3 (10.8)	3.5 (11.5)	2.2 (7.21)	2.4 (7.87)	1.4 (4.6)	1.5 * (4.9)	1.2 (3.93)	7.8
	b	7.7 * (25.2)	7.7 * (25.2)	5.2 * (17.1)	4.5 (14.8)	4.0 * (13.1)	3.0 (9.8)	2.4 * (7.87)	2.0 (6.6)	1.5 * (4.9)	1.5 * (4.9)	(25.6)
1.5 m (4.9 ft)	a	9.5 * (31.2)	5.8 (19.0)	5.2 (17.1)	3.2 (10.5)	3.5 (11.5)	2.1 (6.9)	2.3 (7.5)	1.3 (4.3)	1.5 * (4.9)	1.2 (3.93)	7.9
	b	9.5 * (31.2)	8.3 (27.2)	6.5 * (21.3)	4.5 (14.8)	4.7 * (15.4)	2.9 (9.5)	3.0 * (9.8)	1.9 (6.2)	1.5 * (4.9)	1.5 * (4.9)	(25.9)
0.0 m (ft)	a	9.9 (32.5)	5.7 (18.7)	5.2 (17.1)	3.1 (10.2)	3.3 (10.8)	1.9 (6.2)	2.2 (7.21)	1.2 (3.93)	1.7 * (5.57)	1.2 (3.93)	7.7
	b	10.7 * (35.1)	8.3 (27.2)	7.2 * (23.6)	4.5 (14.8)	4.9 (16.1)	2.8 (9.2)	2.7 * (8.9)	1.9 (6.2)	1.7 * (5.57)	1.7 * (5.57)	(25.2)
-1.5 m (-4.9 ft)	a	10.1 (33.1)	5.2 (17.1)	5.1 (16.7)	2.9 (9.5)	3.2 (10.5)	1.8 (5.9)			2.1 * (6.9)	1.3 (4.3)	7.2
	b	12.0 * (39.3)	8.1 (26.6)	7.4 * (24.2)	4.2 (13.8)	4.8 (15.7)	2.6 (8.5)			2.1 * (6.9)	2.0 (6.6)	(23.6)
-3.0 m (-9.8 ft)	a	9.8 (32.1)	5.0 (16.4)	4.8 (15.7)	2.6 (8.5)	3.1 (10.2)	1.7 (5.57)			2.9 * (9.5)	1.6 (5.2)	6.2
	b	12.5 * (41.0)	7.9 (25.9)	7.4 * (24.2)	3.9 (12.8)	4.0 * (13.1)	2.5 (8.20)			2.9 * (9.5)	2.4 (7.87)	(20.3)
-4.5 m (-14.8 ft)	a											
	b											

With front blade and rear stabilizers - Allowable loads “t”

a = without stabilizers
b = with stabilizers

c = axial (front)
d = 360° (lateral)

Height		Reach with 2300 mm (90.55 in) dipper										
		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)				Max reach
		c	d	c	d	c	d	c	d	c	d	
7.5 m (24.6 ft)	a			4.4 * (14.4)	4.2 (13.8)					2.8 * (9.2)	2.8 * (9.2)	5.4 (17.7)
	b			4.4 * (14.4)	4.4 * (14.4)					2.8 * (9.2)	2.8 * (9.2)	
6.0 m (19.7 ft)	a			4.5 * (14.8)	4.2 (13.8)	4.1 (13.4)	2.6 (8.5)			2.4 * (7.87)	2.1 (6.9)	6.7 (21.9)
	b			4.5 * (14.8)	4.5 * (14.8)	4.1 * (13.4)	4.1 * (13.4)			2.4 * (7.87)	2.4 * (7.87)	
4.5 m (14.8 ft)	a			5.3 * (17.4)	4.1 (13.4)	4.1 (13.4)	2.7 (8.9)			2.3 * (7.5)	1.7 (5.57)	7.5 (24.6)
	b			5.3 * (17.4)	5.3 * (17.4)	4.7 * (15.4)	4.6 (15.1)			2.3 * (7.5)	2.3 * (7.5)	
3.0 m (9.8 ft)	a	9.5 * (31.2)	7.1 (23.3)	6.1 (20.0)	4.0 (13.1)	4.0 (13.1)	2.7 (8.9)	2.7 (8.9)	1.7 (5.57)	2.3 * (7.5)	1.5 (4.9)	7.9 (25.9)
	b	9.5 * (31.2)	9.5 * (31.2)	6.6 * (21.6)	6.6 * (21.6)	5.1 * (16.7)	4.5 (14.8)	3.8 * (12.4)	3.1 (10.2)	2.3 * (7.5)	2.3 * (7.5)	
1.5 m (4.9 ft)	a	10.4 * (34.1)	6.9 (22.6)	6.0 (19.7)	3.9 (12.8)	4.0 (13.1)	2.6 (8.5)	2.7 (8.9)	1.6 (5.2)	2.4 (7.87)	1.4 (4.6)	8.0 (26.2)
	b	10.4 * (34.1)	10.4 * (34.1)	8.1 * (26.6)	6.8 (22.3)	5.8 * (19.0)	4.5 (14.8)	4.2 (13.8)	3.1 (10.2)	2.4 * (7.87)	2.4 * (7.87)	
0.0 m (ft)	a	11.4 (37.4)	6.7 (21.9)	6.0 (19.7)	3.8 (12.4)	3.8 (12.4)	2.4 (7.87)	2.6 (8.5)	1.5 (4.9)	2.4 (7.87)	1.4 (4.6)	7.8 (25.6)
	b	12.6 * (41.3)	12.6 * (41.3)	8.8 * (28.8)	6.9 (22.6)	6.0 (19.7)	4.4 (14.4)	4.1 (13.4)	3.0 (9.8)	2.7 * (8.9)	2.7 * (8.9)	
-1.5 m (-4.9 ft)	a	11.4 (37.4)	6.3 (20.6)	5.8 (19.0)	3.5 (11.5)	3.6 (11.8)	2.2 (7.21)			2.7 (8.9)	1.6 (5.2)	7.2 (23.6)
	b	14.5 * (47.5)	13.7 (44.9)	8.9 * (29.2)	6.8 (22.3)	5.9 (19.3)	4.2 (13.8)			3.2 * (10.5)	3.1 (10.2)	
-3.0 m (-9.8 ft)	a	11.2 (36.7)	6.1 (20.0)	5.5 (18.0)	3.3 (10.8)	3.5 (11.5)	2.1 (6.9)			3.3 (10.8)	2.0 (6.6)	6.3 (20.6)
	b	15.1 * (49.5)	13.9 (45.6)	9.0 * (29.5)	6.5 (21.3)	5.1 * (16.7)	4.1 (13.4)			4.4 * (14.4)	3.8 (12.4)	
-4.5 m (-14.8 ft)	a											
	b											

Height		Reach with 2600 mm (102.36 in) dipper										
		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)				Max reach
		c	d	c	d	c	d	c	d	c	d	
7.5 m (24.6 ft)	a									2.4 * (7.87)	2.4 * (7.87)	5.8 (19.0)
	b									2.4 * (7.87)	2.4 * (7.87)	
6.0 m (19.7 ft)	a					3.8 * (12.4)	2.7 (8.9)			2.1 * (6.9)	1.9 (6.2)	7.1 (23.3)
	b					3.8 * (12.4)	3.8 * (12.4)			2.1 * (6.9)	2.1 * (6.9)	
4.5 m (14.8 ft)	a			4.5 * (14.8)	4.1 (13.4)	4.1 (13.4)	2.7 (8.9)	2.8 (9.2)	1.7 (5.57)	2.0 * (6.6)	1.6 (5.2)	7.8 (25.6)
	b			4.5 * (14.8)	4.5 * (14.8)	4.4 * (14.4)	4.4 * (14.4)	3.1 * (10.2)	3.1 * (10.2)	2.0 * (6.6)	2.0 * (6.6)	
3.0 m (9.8 ft)	a	9.7 * (31.8)	7.1 (23.3)	6.0 (19.7)	4.0 (13.1)	4.0 (13.1)	2.7 (8.9)	2.8 (9.2)	1.7 (5.57)	2.0 * (6.6)	1.4 (4.6)	8.2 (26.9)
	b	9.7 * (31.8)	9.7 * (31.8)	6.3 * (20.6)	6.3 * (20.6)	4.9 * (16.1)	4.5 (14.8)	3.9 * (12.8)	3.2 (10.5)	2.0 * (6.6)	2.0 * (6.6)	
1.5 m (4.9 ft)	a	10.5 * (34.4)	6.9 (22.6)	5.9 (19.3)	3.9 (12.8)	4.0 (13.1)	2.6 (8.5)	2.7 (8.9)	1.7 (5.57)	2.1 * (6.9)	1.3 (4.3)	8.3 (27.2)
	b	10.5 * (34.4)	10.5 * (34.4)	7.8 * (25.6)	6.8 (22.3)	5.6 * (18.4)	4.5 (14.8)	4.2 (13.8)	3.1 (10.2)	2.1 * (6.9)	2.1 * (6.9)	
0.0 m (ft)	a	11.3 (37.07)	6.8 (22.3)	5.9 (19.3)	3.8 (12.4)	3.9 (12.8)	2.5 (8.20)	2.6 (8.5)	1.6 (5.2)	2.3 (7.5)	1.3 (4.3)	8.1 (26.6)
	b	12.0 * (39.3)	12.0 * (39.3)	8.7 * (28.5)	6.8 (22.3)	5.9 (19.3)	4.4 (14.4)	4.1 (13.4)	3.0 (9.8)	2.3 * (7.5)	2.3 * (7.5)	
-1.5 m (-4.9 ft)	a	11.5 (37.7)	6.3 (20.6)	5.8 (19.0)	3.5 (11.5)	3.6 (11.8)	2.2 (7.21)	2.5 (8.20)	1.5 (4.9)	2.5 (8.20)	1.5 (4.9)	7.6 (24.9)
	b	14.2 * (46.6)	13.7 (44.9)	8.8 * (28.8)	6.8 (22.3)	5.9 (19.3)	4.2 (13.8)	3.2 * (10.5)	2.9 (9.5)	2.7 * (8.9)	2.7 * (8.9)	
-3.0 m (-9.8 ft)	a	11.2 (36.7)	6.1 (20.0)	5.5 (18.0)	3.3 (10.8)	3.5 (11.5)	2.1 (6.9)			3.0 (9.8)	1.8 (5.9)	6.6 (21.6)
	b	14.8 * (48.5)	13.9 (45.6)	9.1 * (29.8)	6.5 (21.3)	5.8 (19.0)	4.1 (13.4)			3.6 * (11.8)	3.5 (11.5)	
-4.5 m (-14.8 ft)	a	11.0 (36.1)	5.9 (19.3)							6.6 (21.6)	3.8 (12.4)	4.0 (13.1)
	b	11.8 * (38.7)	11.8 * (38.7)							7.5 * (24.6)	7.5 (24.6)	

Height		Reach with 2900 mm (114.17 in) dipper										
		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)				Max reach
		c	d	c	d	c	d	c	d	c	d	
7.5 m (24.6 ft)	a					2.7 * (8.9)	2.6 (8.5)			2.1 * (6.9)	2.1 * (6.9)	6.2 (20.3)
	b					2.7 * (8.9)	2.7 * (8.9)			2.1 * (6.9)	2.1 * (6.9)	
6.0 m (19.7 ft)	a					3.5 * (11.5)	2.7 (8.9)			1.8 * (5.9)	1.8 (5.9)	7.4 (24.2)
	b					3.5 * (11.5)	3.5 * (11.5)			1.8 * (5.9)	1.8 * (5.9)	
4.5 m (14.8 ft)	a			3.8 * (12.4)	3.8 * (12.4)	4.0 * (13.1)	2.7 (8.9)	2.8 (9.2)	1.8 (5.9)	1.8 * (5.9)	1.5 (4.9)	8.1 (26.6)
	b			3.8 * (12.4)	3.8 * (12.4)	4.0 * (13.1)	4.0 * (13.1)	3.2 * (10.5)	3.2 (10.5)	1.8 * (5.9)	1.8 * (5.9)	
3.0 m (9.8 ft)	a	9.0 * (29.5)	7.2 (23.6)	5.9 * (19.3)	4.0 (13.1)	4.0 (13.1)	2.7 (8.9)	2.8 (9.2)	1.8 (5.9)	1.8 * (5.9)	1.3 (4.3)	8.5 (27.9)
	b	9.0 * (29.5)	9.0 * (29.5)	5.9 * (19.3)	5.9 * (19.3)	4.7 * (15.4)	4.5 (14.8)	3.8 * (12.4)	3.2 (10.5)	1.8 * (5.9)	1.8 * (5.9)	
1.5 m (4.9 ft)	a	10.5 * (34.4)	6.8 * (22.3)	5.9 (19.3)	3.9 (12.8)	4.0 (13.1)	2.7 (8.9)	2.7 (8.9)	1.7 (5.57)	1.9 * (6.2)	1.2 (3.93)	8.6 (28.2)
	b	10.5 * (34.4)	10.5 * (34.4)	7.5 * (24.6)	6.7 (21.9)	5.4 * (17.7)	4.4 (14.4)	4.2 (13.8)	3.1 (10.2)	1.9 * (6.2)	1.9 * (6.2)	
0.0 m (ft)	a	11.2 (36.7)	6.8 (22.3)	5.9 (19.3)	3.8 (12.4)	3.9 (12.8)	2.5 (8.20)	2.6 (8.5)	1.6 (5.2)	2.0 * (6.6)	1.3 (4.3)	8.4 (57.5)
	b	11.5 * (37.7)	11.5 * (37.7)	8.5 * (27.9)	6.7 (21.9)	5.9 (19.3)	4.5 (14.8)	4.1 (13.4)	3.0 (9.8)	2.0 * (6.6)	2.0 * (6.6)	
-1.5 m (-4.9 ft)	a	11.4 (37.4)	6.4 (21.0)	5.9 (19.3)	3.6 (11.8)	3.7 (12.1)	2.3 (7.5)	2.5 (8.20)	1.5 (4.9)	2.3 (7.5)	1.4 (4.6)	7.9 (25.9)
	b	13.7 * (44.9)	13.5 (44.3)	8.7 * (28.5)	6.9 (22.6)	5.9 (19.3)	4.2 (13.8)	4.0 (13.1)	2.9 (9.5)	2.4 * (7.87)	2.4 * (7.87)	
-3.0 m (-9.8 ft)	a	11.2 (36.7)	6.1 (20.0)	5.6 (18.4)	3.3 (10.8)	3.5 (11.5)	2.1 (6.9)			2.8 (9.2)	1.6 (5.2)	7.0 (22.9)
	b	14.6 * (47.9)	13.9 (45.6)	9.0 * (29.5)	6.6 (21.6)	5.8 (19.0)	4.1 (13.4)			3.0 * (9.8)	3.0 * (9.8)	
-4.5 m (-14.8 ft)	a	10.9 (35.7)	5.9 (19.3)	5.4 (17.7)	3.1 (10.2)					4.5 (14.8)	2.6 (8.5)	5.1 (16.7)
	b	13.1 * (42.9)	13.1 * (42.9)	7.1 * (23.3)	6.4 (21.0)					5.3 * (17.4)	5.2 (17.1)	

WX 185 MODELS

OUTFIT WITH PLACING BOOM

With rear stabilizers - Allowable loads "t"

a = without stabilizers
b = with stabilizers

c = axial (front)
d = 360° (lateral)

Height		Reach with 2000 mm (78.74 in) dipper										Max reach
		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)				
		c	d	c	d	c	d	c	d	c	d	
7.5 m (24.6 ft)	a			5.9 * (19.3)	4.9 (16.1)					3.9 * (12.8)	3.6 (11.8)	5.3 (17.4)
	b			5.9 * (19.3)	5.9 * (19.3)					3.9 * (12.8)	3.9 * (12.8)	
6.0 m (19.7 ft)	a			5.9 * (19.3)	4.9 (16.1)	5.1 (16.7)	3.1 (10.2)			3.3 * (10.8)	2.4 (7.87)	6.7 (21.9)
	b			5.9 * (19.3)	5.9 * (19.3)	5.3 * (17.4)	4.2 (13.8)			3.3 * (10.8)	3.3 * (10.8)	
4.5 m (14.8 ft)	a	9.3 * (30.5)	8.6 (28.2)	6.8 * (22.3)	4.8 (15.7)	5.0 (16.4)	3.2 (10.5)			3.2 * (10.5)	2.0 (6.6)	7.5 (24.6)
	b	9.3 * (30.5)	9.3 * (30.5)	6.8 * (22.3)	6.4 (21.0)	5.6 * (18.4)	4.3 (14.1)			3.2 * (10.5)	2.8 (9.2)	
3.0 m (9.8 ft)	a	10.3 * (33.8)	8.2 (26.9)	7.5 (24.6)	4.6 (15.1)	4.9 (16.1)	3.1 (10.2)	3.4 (11.1)	1.9 (6.2)	3.1 * (10.2)	1.7 (5.57)	7.9 (25.9)
	b	10.3 * (33.8)	10.3 * (33.8)	8.1 * (26.6)	6.3 * (20.6)	6.1 * (20.0)	4.2 * (13.8)	4.8 * (15.7)	2.8 (9.2)	3.2 * (10.5)	2.5 (8.20)	
1.5 m (4.9 ft)	a	12.6 * (41.3)	8.1 (26.6)	7.4 (24.2)	4.6 (15.1)	5.0 (16.4)	3.0 (9.8)	3.3 (10.8)	1.9 (6.2)	2.9 (9.5)	1.6 (5.2)	8.0 (26.2)
	b	12.6 * (41.3)	11.5 (37.7)	9.7 * (31.8)	6.2 * (20.3)	6.8 * (22.3)	4.2 (13.8)	5.2 * (17.1)	2.7 (8.9)	3.4 * (11.1)	2.4 (7.87)	
0.0 m (ft)	a	14.3 (46.9)	7.7 (25.2)	7.4 (24.2)	4.4 (14.4)	4.7 (15.4)	2.8 (9.2)	3.2 (10.5)	1.8 (5.9)	3.0 (9.8)	1.7 (5.57)	7.7 (25.2)
	b	15.0 * (49.2)	11.6 (38.0)	10.1 * (33.1)	6.2 (20.3)	7.3 * (23.9)	3.9 (12.8)	5.1 * (16.7)	2.6 (8.5)	3.7 * (12.1)	2.4 (7.87)	
-1.5 m (-4.9 ft)	a	14.6 (47.9)	7.3 (23.9)	7.3 (23.9)	4.1 (13.4)	4.5 (14.8)	2.5 (8.20)			3.3 (10.8)	1.8 (5.9)	7.2 (23.6)
	b	16.8 * (55.1)	11.3 (37.1)	10.3 * (33.8)	5.9 (19.3)	7.4 * (24.2)	3.6 (11.8)			4.4 * (14.4)	2.7 (8.9)	
-3.0 m (-9.8 ft)	a	14.4 (47.2)	7.2 (23.6)	6.9 (22.6)	3.8 (12.4)	4.3 (14.1)	2.4 (7.87)			4.3 (14.1)	2.4 (7.87)	6.1 (20.0)
	b	17.4 * (57.1)	11.1 * (36.4)	10.2 * (33.4)	5.6 (18.4)	5.4 * (17.7)	3.5 (11.5)			5.2 * (17.1)	3.5 (11.5)	
-4.5 m (-14.8 ft)	a											
	b											

Height		Reach with 2400 mm (94.49 in) dipper										Max reach
		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)				
		c	d	c	d	c	d	c	d	c	d	
7.5 m (24.6 ft)	a			5.6 * (18.4)	4.9 (16.1)					3.1 * (10.2)	3.1 (10.2)	5.9 (19.3)
	b			5.6 * (18.4)	5.6 * (18.4)					3.1 * (10.2)	3.1 * (10.2)	
6.0 m (19.7 ft)	a			5.7 * (18.7)	4.9 (16.1)	5.0 * (16.4)	3.2 (10.5)			2.7 * (8.9)	2.2 (7.21)	7.1 (23.3)
	b			5.7 * (18.7)	5.7 * (18.7)	5.0 * (16.4)	4.3 (14.1)			2.7 * (8.9)	2.7 * (8.9)	
4.5 m (14.8 ft)	a			6.2 * (20.3)	4.8 (15.7)	5.0 (16.4)	3.2 (10.5)	3.4 (11.1)	2.0 (6.6)	2.6 * (8.5)	1.8 (5.9)	7.9 (25.9)
	b			6.2 * (20.3)	6.2 * (20.3)	5.2 * (17.1)	4.2 (13.8)	4.1 * (13.4)	2.8 (9.2)	2.6 * (8.5)	2.6 (8.5)	
3.0 m (9.8 ft)	a	10.8 * (35.4)	8.3 (27.2)	7.5 (24.6)	4.6 (15.1)	4.9 (16.1)	3.1 (10.2)	3.4 (11.1)	2.0 (6.6)	2.6 * (8.5)	1.6 (5.2)	8.3 (27.2)
	b	10.8 * (35.4)	10.8 * (35.4)	7.5 * (24.6)	6.3 (20.6)	5.8 * (19.0)	4.2 (13.8)	5.0 * (16.4)	2.8 (9.2)	2.6 * (8.5)	2.3 (7.5)	
1.5 m (4.9 ft)	a	12.3 * (40.3)	8.0 (26.2)	7.3 (23.9)	4.5 (14.8)	4.9 (16.1)	3.1 (10.2)	3.3 (10.8)	1.9 (6.2)	2.7 (8.9)	1.5 (4.9)	8.3 (27.2)
	b	12.3 * (40.3)	11.5 * (37.7)	9.2 * (30.2)	6.2 (20.3)	6.5 * (21.3)	4.2 (13.8)	5.4 * (17.7)	2.7 (8.9)	2.8 * (9.2)	2.2 (7.21)	
0.0 m (ft)	a	14.1 (46.2)	7.8 (25.6)	7.4 (24.2)	4.4 (14.4)	4.8 (15.7)	2.9 (9.5)	3.2 (10.5)	1.8 (5.9)	2.8 (9.2)	1.5 (4.9)	8.1 (26.6)
	b	14.4 * (47.2)	11.5 * (37.7)	10.0 * (33.1)	6.2 (20.3)	7.1 * (23.3)	4.0 (13.1)	5.4 (17.7)	2.6 (8.5)	3.0 * (9.8)	2.2 (7.21)	
-1.5 m (-4.9 ft)	a	14.5 (47.5)	7.3 (23.9)	7.3 (23.9)	4.1 (13.4)	4.5 (14.8)	2.6 (8.5)	3.1 (10.2)	1.7 (5.57)	3.0 (9.8)	1.7 (5.57)	7.6 (24.9)
	b	16.5 * (21.3)	11.3 * (37.1)	10.2 * (33.4)	5.9 (19.3)	7.3 * (23.9)	3.7 (12.1)	4.6 * (15.1)	2.5 (8.20)	3.5 * (11.5)	2.4 (7.87)	
-3.0 m (-9.8 ft)	a	14.4 (47.2)	7.2 (23.6)	6.9 (22.6)	3.8 (12.4)	4.3 (14.1)	2.4 (7.87)			3.7 (12.1)	2.0 (6.6)	6.7 (21.9)
	b	17.1 * (56.1)	11.1 * (36.4)	10.5 * (34.4)	5.6 (18.4)	6.6 * (21.6)	3.5 (11.5)			4.6 * (15.1)	3.0 (9.8)	
-4.5 m (-14.8 ft)	a	13.1 * (42.9)	6.9 (22.6)							9.3 (30.5)	4.9 (16.1)	3.7 (12.1)
	b	13.1 * (42.9)	10.8 * (35.4)							9.6 * (31.5)	7.4 (24.2)	

Height		Reach with 2800 mm (110.24 in) dipper										Max reach
		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)				
		c	d	c	d	c	d	c	d	c	d	
7.5 m (24.6 ft)	a					4.0 * (13.1)	3.1 (10.2)			2.6 * (8.5)	2.6 * (8.5)	6.5 (21.3)
	b					4.0 * (13.1)	4.0 * (13.1)			2.6 * (8.5)	2.6 * (8.5)	
6.0 m (19.7 ft)	a					4.6 * (15.1)	3.2 (10.5)	2.8 (9.2)*	2.0 (6.6)	2.3 * (7.5)	2.0 (6.6)	7.6 (24.9)
	b					4.6 * (15.1)	4.3 (14.1)	2.8 (9.2)*	2.8 (9.2)*	2.3 * (7.5)	2.3 * (7.5)	
4.5 m (14.8 ft)	a			5.5 * (18.0)	4.8 (15.7)	4.9 * (16.1)	3.2 (10.5)	3.5 (11.5)	2.1 (6.9)	2.2 * (7.21)	1.6 (5.2)	8.3 (27.2)
	b			5.5* (18.0)	5.5* (18.0)	4.9 * (16.1)	4.2 (13.8)	4.2 * (13.8)	2.9 (9.5)	2.2 * (7.21)	2.2* (7.21)	
3.0 m (9.8 ft)	a	10.7 * (35.1)	8.2 (26.9)	7.1 * (23.3)	4.6 (15.1)	4.9 (16.1)	3.1 (10.2)	3.5 (11.5)	2.1 (6.9)	2.2 * (7.21)	1.4 (4.6)	8.7 (28.5)
	b	10.7 * (35.1)	10.7 * (35.1)	7.1 * (23.3)	6.2 (20.3)	5.5 * (18.0)	4.1 (13.4)	4.8 * (15.7)	2.9 (9.5)	2.2 * (7.21)	2.1 (6.9)	
1.5 m (4.9 ft)	a	12.0 * (39.3)	8.0 (26.2)	7.3 (23.9)	4.4 (14.4)	4.8 (15.7)	3.1 (10.2)	3.4 (11.1)	2.0 (6.6)	2.3 * (7.5)	1.4 (4.6)	8.7 (28.5)
	b	12.0 * (39.3)	11.3 * (37.1)	8.7 * (28.5)	6.1 (20.0)	6.2 * (20.3)	4.1 (13.4)	5.1 * (16.7)	2.8 (9.2)	2.3 * (7.5)	2.0 (6.6)	
0.0 m (ft)	a	13.8 * (45.2)	8.0 (26.2)	7.3 (23.9)	4.5 (14.8)	4.9 (16.1)	2.9 (9.5)	3.2 (10.5)	1.8 (5.9)	2.5 * (8.20)	1.4 (4.6)	8.5 (27.9)
	b	13.8 * (45.2)	11.4 * (37.4)	9.8 * (32.1)	6.1 (20.0)	6.9* (22.6)	4.1 (13.4)	5.4 (17.7)	2.7 (8.9)	2.5 * (8.20)	2.1 (6.9)	
-1.5 m (-4.9 ft)	a	14.2 * (46.6)	7.4 (24.2)	7.3 (23.9)	4.1 (13.4)	4.6 (15.1)	2.6 (8.5)	3.1 (10.2)	1.7 (5.57)	2.8 (9.2)	1.5 (4.9)	8.1 (26.6)
	b	16.0 * (52.5)	11.3 * (37.1)	10.0 (33.1)*	5.9 (19.3)	7.2 * (23.6)	3.8 (12.4)	5.2 (17.1)	2.5 (8.20)	2.9 (9.5)*	2.2 (7.21)	
-3.0 m (-9.8 ft)	a	14.3 (46.9)	7.1 (23.3)	7.0 (22.9)	3.9 (12.8)	4.3 (14.1)	2.4 (7.87)			3.3 (10.8)	1.8 (5.9)	7.2 (23.6)
	b	16.8 * (55.1)	11.0 * (36.1)	10.3 * (33.8)	5.7 (18.7)	7.1 * (23.3)	3.5 (11.5)			3.6* (11.8)	2.6 (8.5)	
-4.5 m (-14.8 ft)	a	14.0 * (45.9)	6.9 (22.6)	6.7 (21.9)	3.6 (11.8)					5.7 (18.7)	3.1 (10.2)	5.0 (16.4)
	b	15.5 * (50.8)	10.8 * (35.4)	8.3 (27.2)	5.4 (17.7)					6.6 * (21.6)	4.6 (15.1)	

6. ROTATION

The rotation function is actuated by a closed hydraulic circuit, driving a mechanical gearbox with built-in automatic static brake, with 3 possibilities of calibration.

		WX 145	WX 165	WX 185
Rotation speed	rpm	9.5		
Rotation moment (SAE J1371)	kNm (lbs·ft)	38 (28027)	42 (30978)	53 (39091)

ROTATION GEARMOTOR

		WX 145	WX 165	WX 185
Model		S7/27/K45D		
Total ratio		23	27	
Dry weight	kg (lb)	114.5 (252)		11 (257)
Oil capacity	litres (gal)	3.5 (0.90)		
Engine		A2FM45		
Differential maximum pressure	bar (psi)	390 (5656.46)		
Output torque	kNm (lbs·ft)	7 (5163)		
Minimum / maximum service pressure	bar (psi)	14 / 80 (203.05 / 1160.30)		
Nut torque	Nm (lbf·ft)	4050 (2987.12)		
Brake		discs		
Maximum braking torque	Nm (lbf·ft)	475 (350.34)		
Number of inside discs		5		
Number of outside discs		6		
Thickness of inside discs	mm (in)	2.3 (0.09)		
Thickness of outside discs	mm (in)	1.1 (0.04)		
Maximum wear of complete discs pack	mm (in)	2.0 (0.07)		
Maximum piston stroke (wear)	mm (in)	3.1 (0.12)		
Rated stroke of brake piston	mm (in)	1.1 (0.04)		

2. SLEWING BEARING

The slewing bearing consists of an external ring integral to the upper structure, an internal ring integral to the undercarriage and a single (WX 185) or double (WX 145 - WX 165) series of balls.

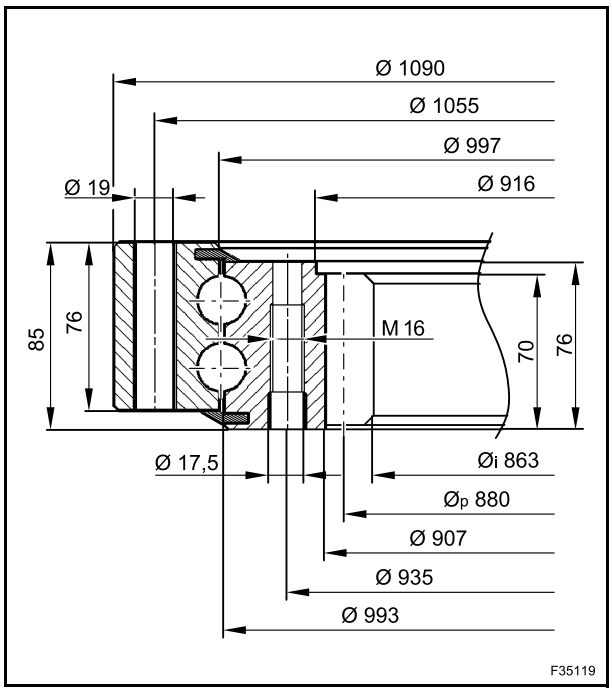
The pinion of the rotation gearbox, controlled by the rotation motor by means of the gears of the gearbox itself, rotates around its own axis and makes a revolution around the centre of the internal ring of the slewing bearing, thus enabling the upper structure to rotate independently from the undercarriage.

TECHNICAL SPECIFICATIONS

WX 145 - WX 165

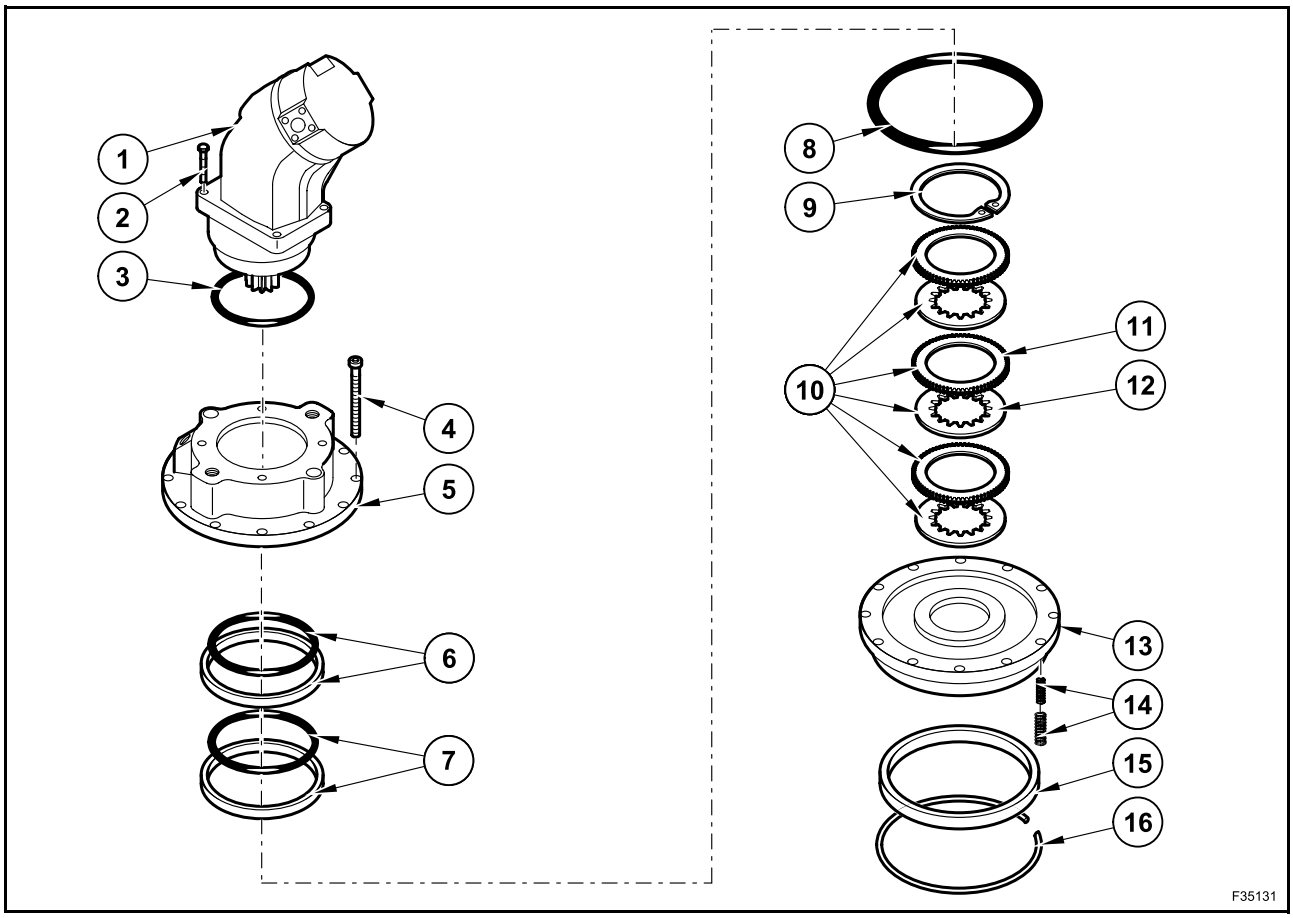
Teeth

Module 10
Number of teeth 88
Pressure angle ..... 20°



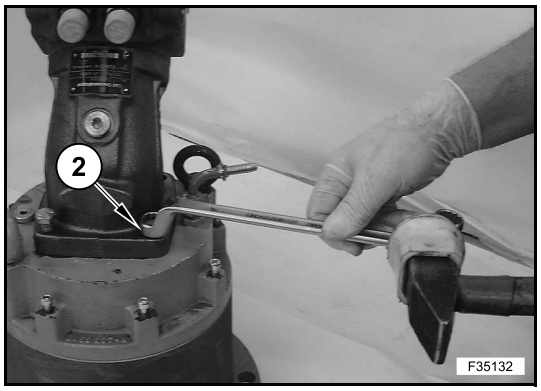
3.3 DISASSEMBLY AND ASSEMBLY

MOTOR AND BRAKE

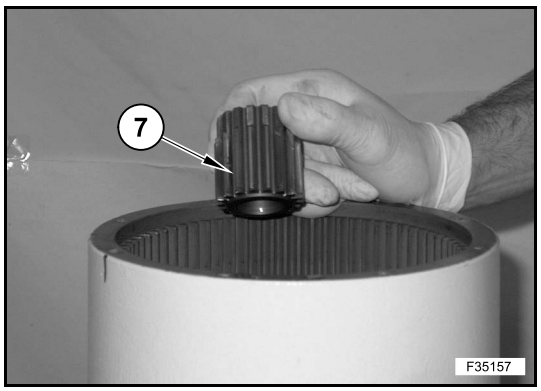


Disassembly

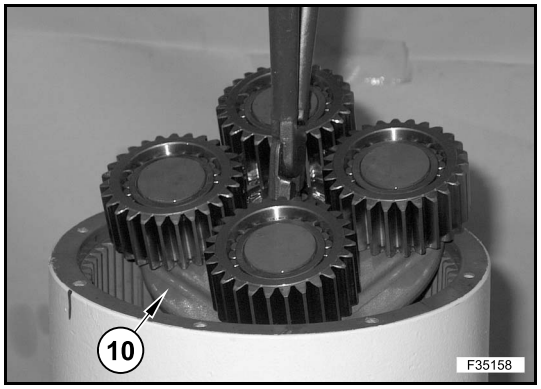
Unscrew and remove the screws (2).



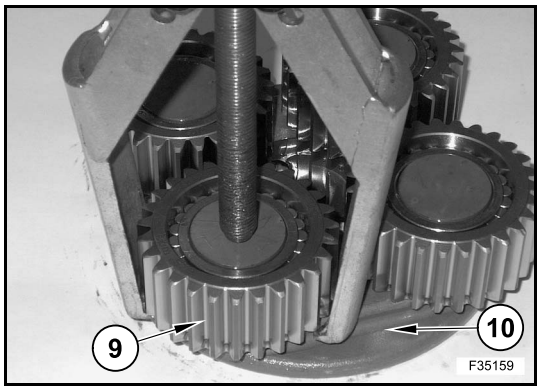
Remove the gear (7).



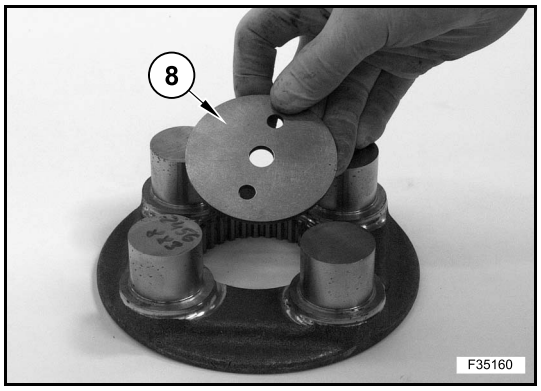
Remove the planet carrier assembly (10).



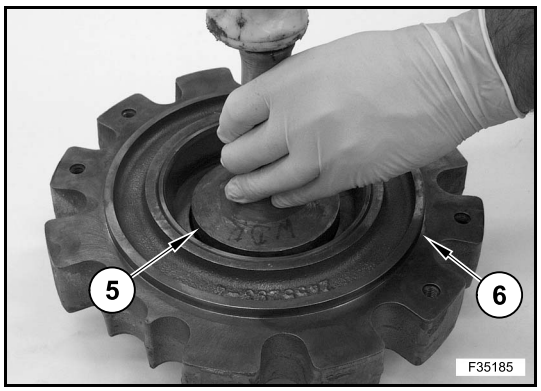
Remove the planetary gears (9) from the planet carrier (10) using a puller.



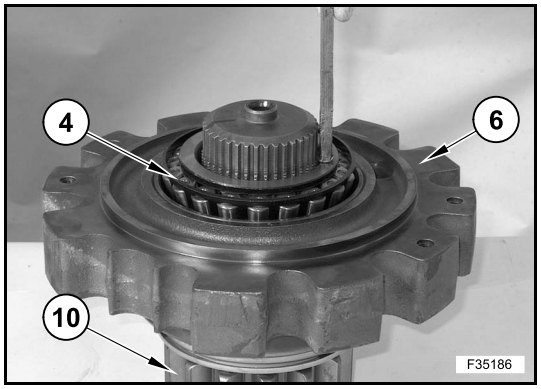
Remove the washer (8).



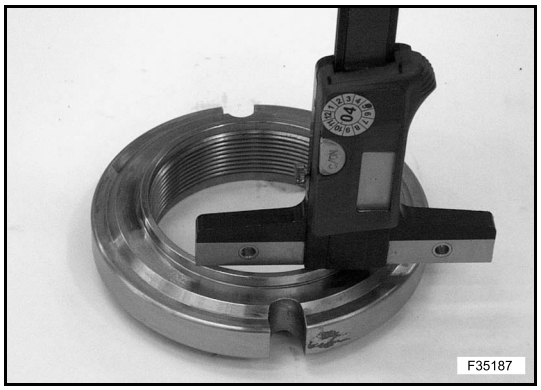
Assemble the seal ring (5) onto flange (6).



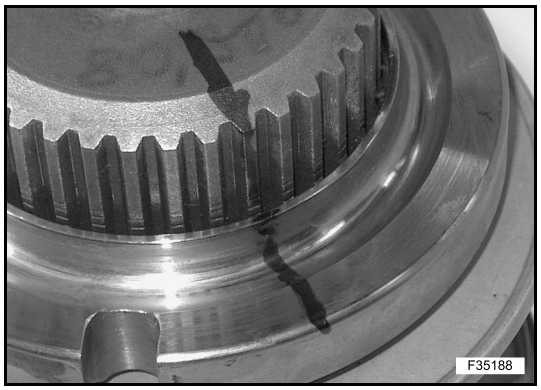
Assemble the pinion assembly (10) and the bearing (4) onto flange (6).



Verify measure (Z) on a new ring nut.

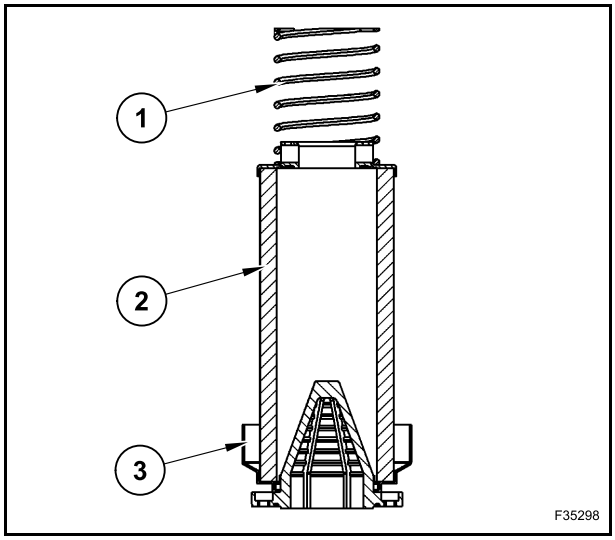


Completely screw in the new ring nut without shims and mark a reference line between the pinion and the ring nut. Unscrew the ring nut.



7.1 OIL RETURN FILTER

The filter consists of a spring (1), the filter element (2) and the by-pass valve (3). It is used to filter oil any time it runs through the hydraulic system. It holds dust and dirt particles in the oil. With the accumulation of dirt particles on the outer side of the filter, an increase occurs in the pressure difference between the inner and the outer side of the element (2) itself. A high pressure difference opens the appropriate by-pass (3), thus preventing the filter element (2) from breaking.



⚠ WARNING

Immediately replace the filter element (2) when the by-pass (3) opens; otherwise the dirt in the oil could seriously damage the hydraulic components.

TECHNICAL SPECIFICATIONS

Operating pressure (max) ..... 7 bar (101.52 psi)
Temperature..... -40 °C ÷ 120 °C (-40 °F ÷ 248 °F)
By-pass calibration..... 2 bar (29 psi)

REPLACEMENT

Beyond respecting the maintenance intervals for return filter change, replace it also:

- when the display shows the relevant error message. This means that the filter is very dirty;
- after a repair on the hydraulic system.

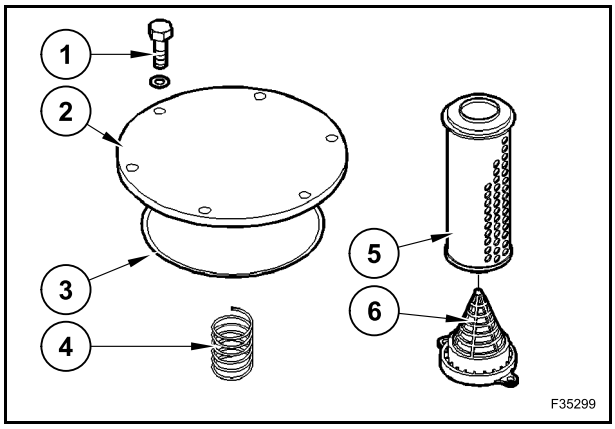
Relieve the pressure from the oil tank.

Unscrew the screws (1) and remove the cover (2) with spring (4) and gasket (3).

Take out the old return filter (5) and replace it with a new one.

Check the conditions of the spring (4) and of the by-pass (6).

Reassemble the cover (2) with a new gasket (3) and spring (4).



FUEL TOP UP AND REFUELLING

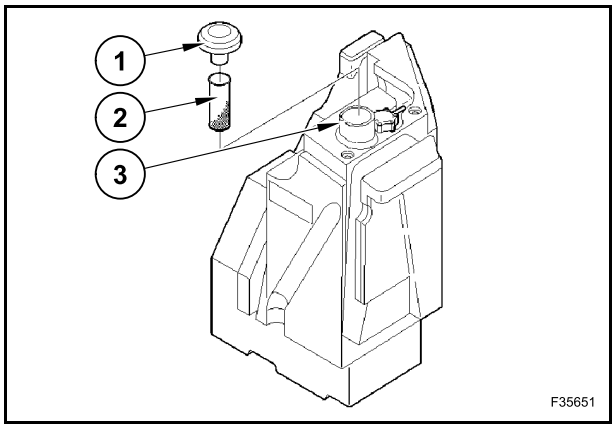
If the machine is refuelled often or regularly with fuel from cans or barrels, there is an increased risk of foreign matter and water penetrating into the fuel system.

In this case:

- always refuel through a fine mesh filter;
- user only intake hoses with a fine mesh filter;
- bleed water and sludge from the fuel tank at more frequent intervals;
- change all fuel filters at more frequent intervals.

Refuel with following operations:

- open the cover (1) of the filler neck (3);
- refuel through the filter (2) in the neck (3). Do not remove the filter.



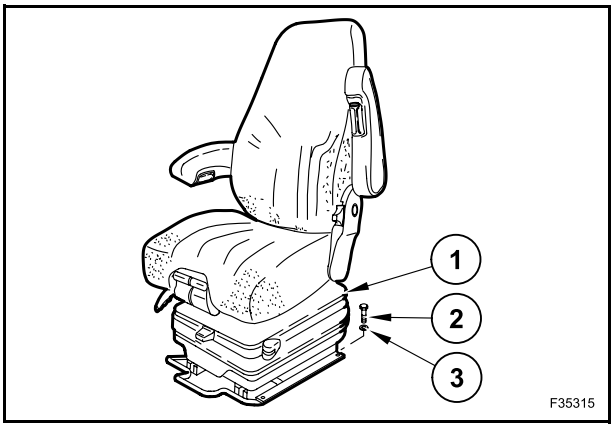
OPERATOR'S SEAT

The seat (1) is mounted on a sliding guide, which also carries the consoles of the hydraulic control levers.

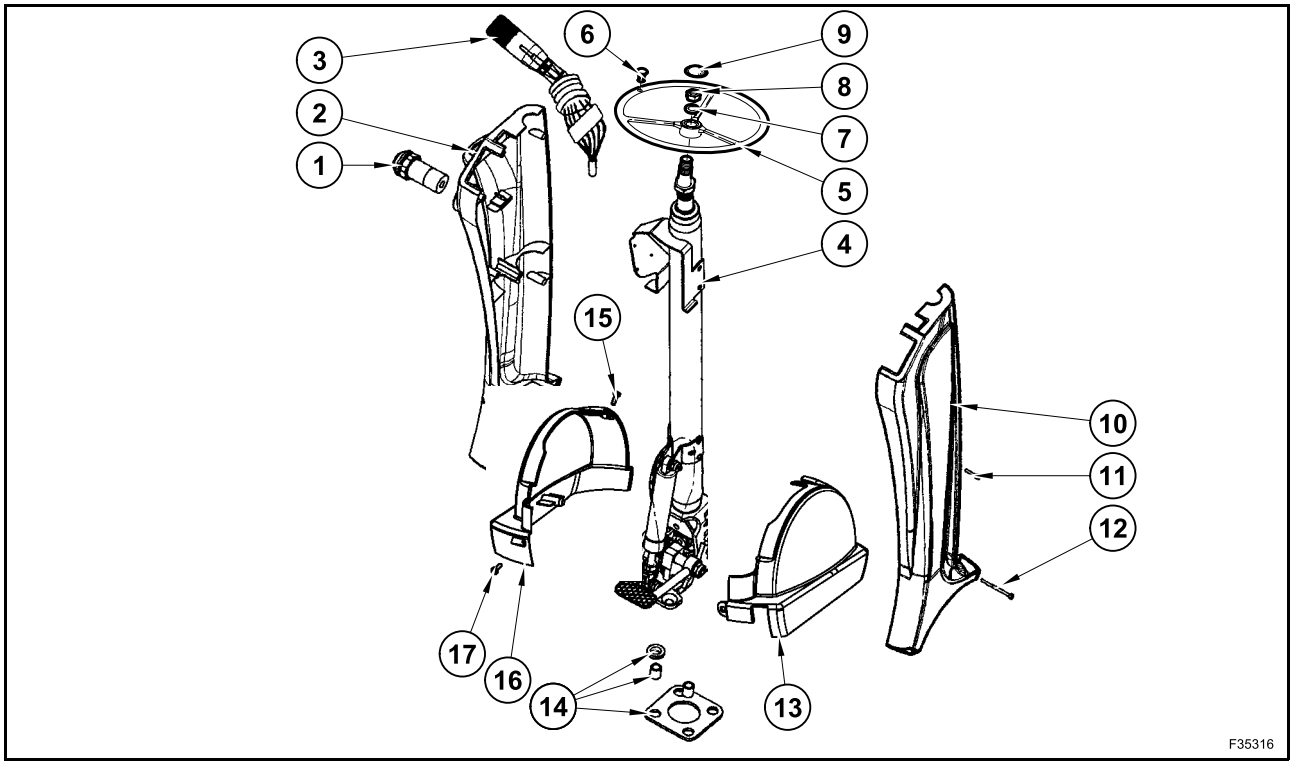
Loosen and remove the screws (2) with the washers (3).

Lift the connector for the automatic height adjustment.

Carefully remove the seat from the cab.



STEERING COLUMN



1. Ignition cylinder
2. Left panelling
3. Turn signal light/wiper lever
4. Steering column
5. Steering wheel
6. Knob
7. Washer
8. Cover
9. Nut
10. Right-hand panelling
11. Screw
12. Screw
13. Lower right-hand panelling
14. Plate
15. Screw
16. Lower left-hand panelling
17. Screw

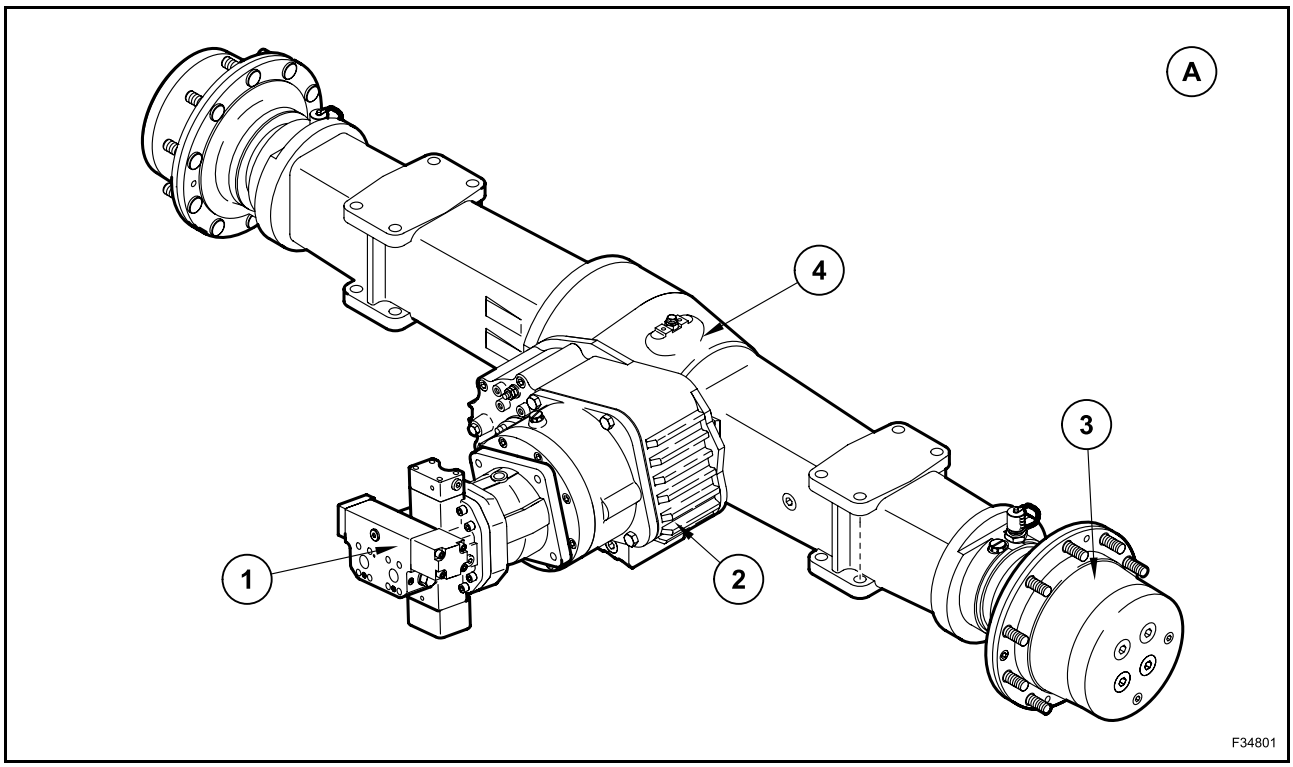
2. REAR RIGID AXLE

The rear rigid axle (A) houses the gearbox (2) and the travel motor (1).

On the wheel hubs (3) are installed planetary gearboxes complete with disc brakes.

The axle is fastened in the lower part to the undercarriage and is connected to the front axle by means of the cardan shaft.

The motion from the travel motor is conveyed to the wheel hubs through the gearbox and the central differential box (4).



1. Travel motor
2. Gearbox
3. Wheel hubs and side gearboxes
4. Differential
A. Rear rigid axle

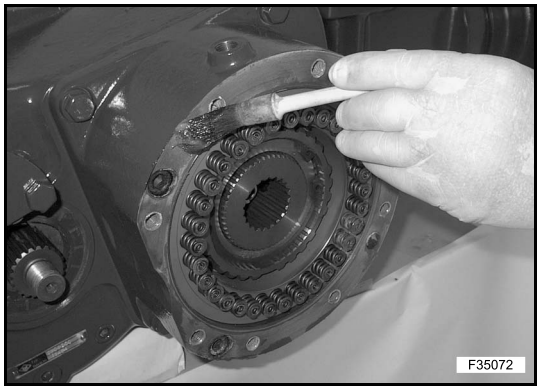
According to the speed different types of axle can be installed:

- axle for 20 km/h (12.42 mph)
- axle for 30 km/h (16.19 mph)

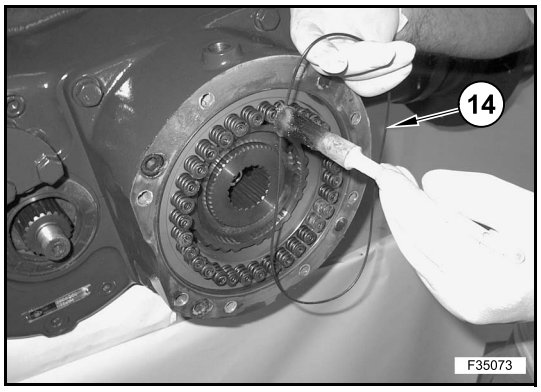
Assembly

Apply Loctite® 242 on the fastening holes of the engine flange.

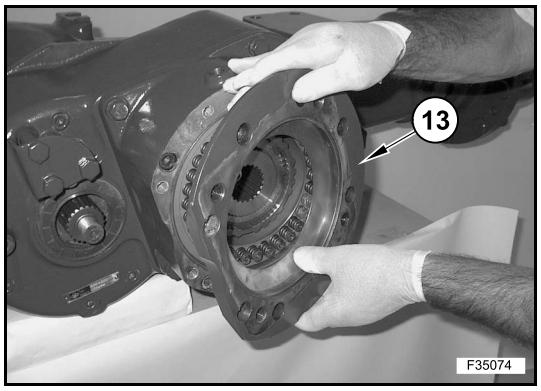
Apply a thin layer of Loctite® 510 on the housing seat of the engine flange.



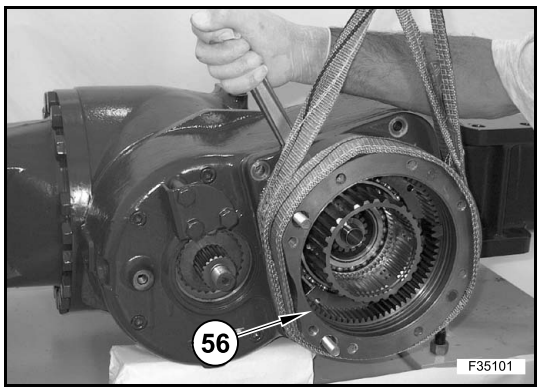
Apply a thin layer of grease and assemble the O-ring (14).



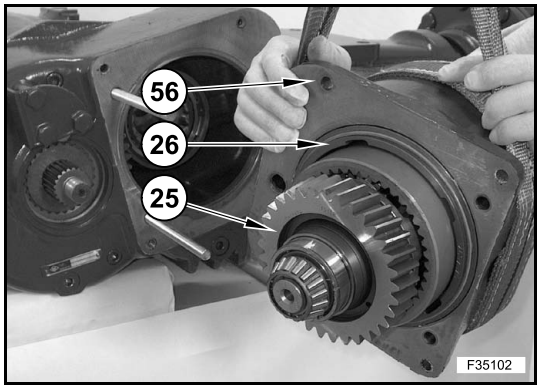
Position the engine flange (13), align the holes of the engine flange with the holes of the gearbox.



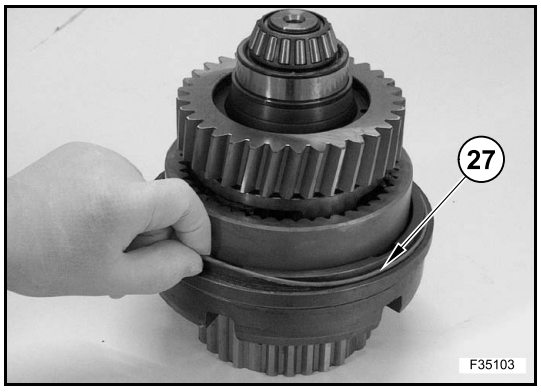
Unscrew tie rods M12 x 260 and by means of levers disassemble the gearbox (56).



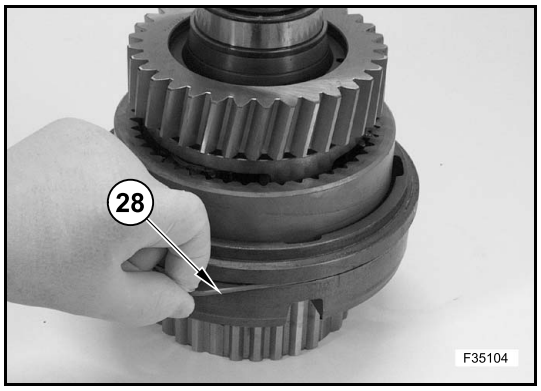
Remove the gearbox (56) with the planetary gears assy (25). Remove the O-ring (26).



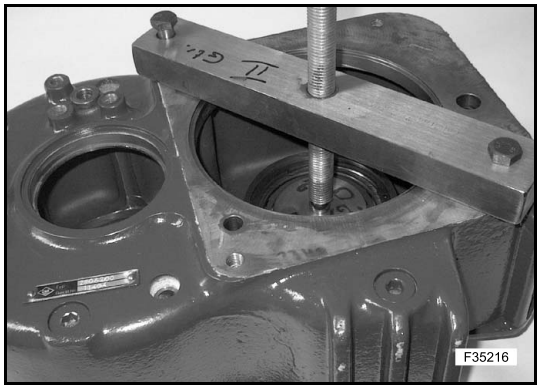
Remove the O-ring (27).



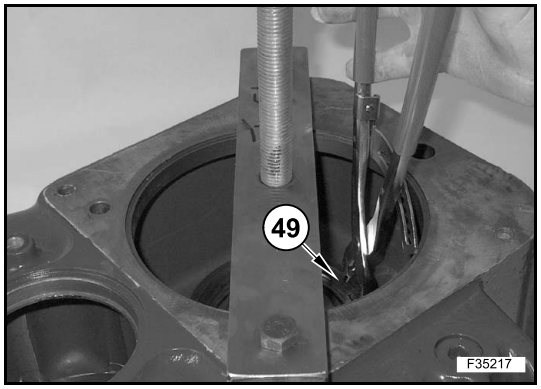
Remove the O-ring (28).



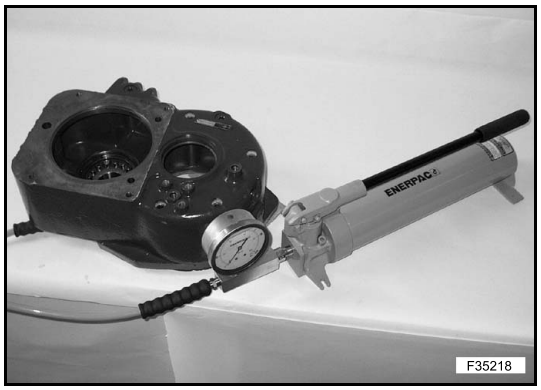
Apply pressure on the piston with tool 2897008.



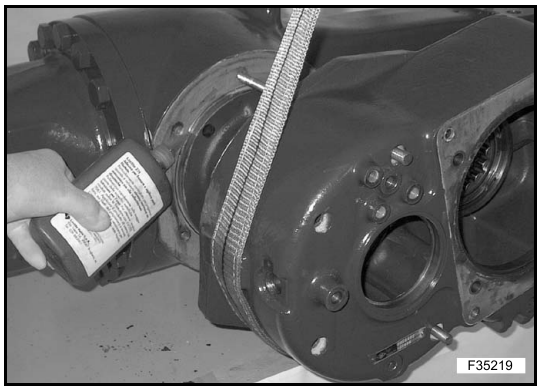
Assemble the snap ring (49).



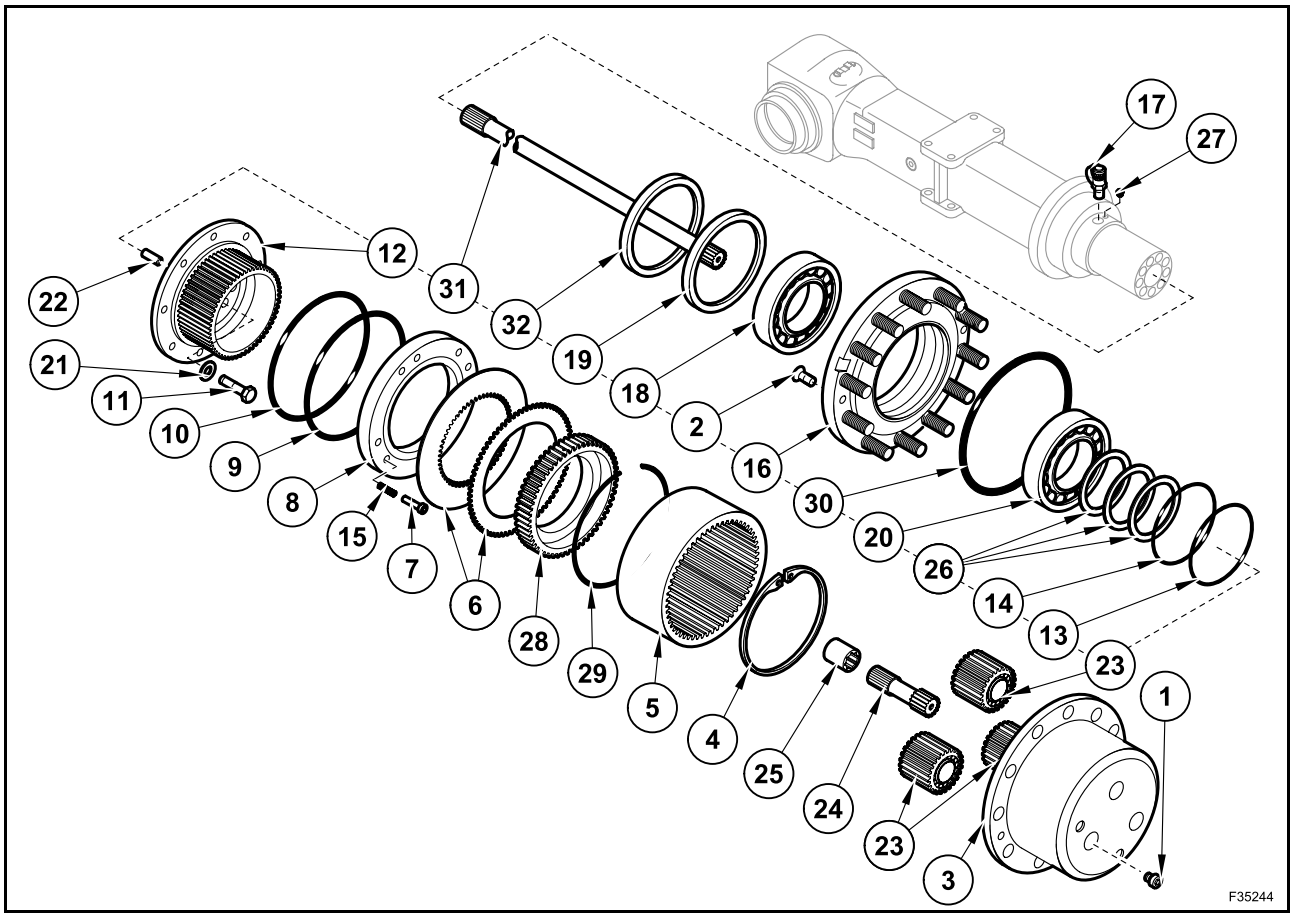
Check the tightness of the clutch.
Apply 50 ÷ 100 bar (725.18 ÷ 1450.37 psi).



Before applying Loctite® 510 remove any sealant or rust from the surface.

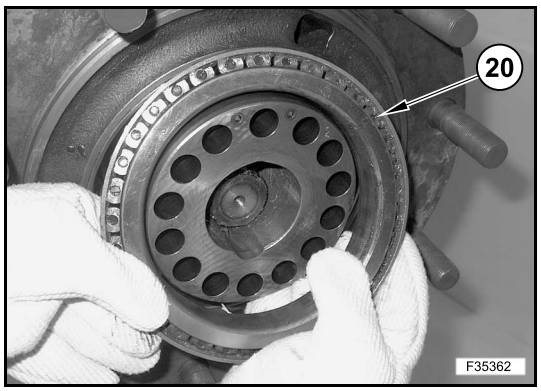


EPICYCLIC GEARBOX AND BRAKE



1. Plug
2. Fixing screw
3. Planet carrier cover
4. Snap ring
5. Ring gear
6. Brake discs
7. Screw
8. Piston
9. O-ring
10. O-ring
11. Screw
12. Brake ring gear
13. O-ring
14. O-ring
15. Spring
16. Wheel hub
17. Bleeding valve
18. Bearing
19. Seal ring
20. Bearing
21. Washer
22. Cross pin
23. Planetary gear
24. Shaft
25. Sleeve
26. Shim
27. Dowel
28. Gear
29. Snap ring
30. O-ring
31. Shaft
32. Shim

Assemble the bearing (20).

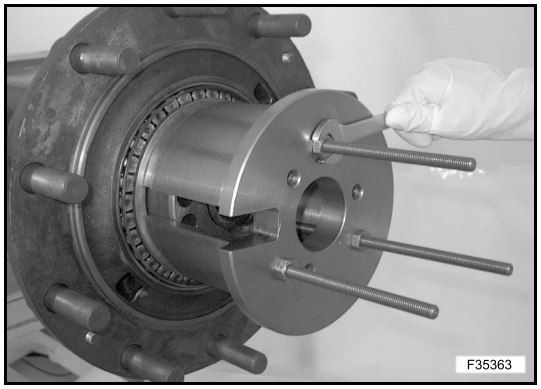


⚠ WARNING

Wear gloves to avoid burns.

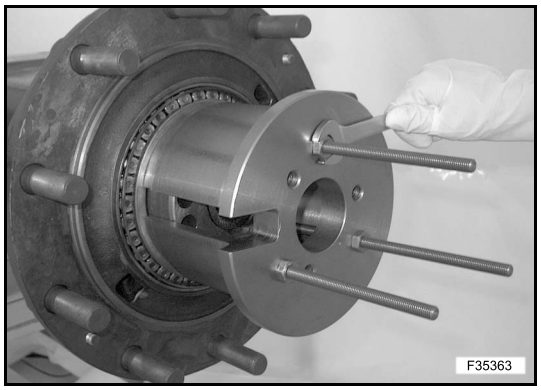
ASP100

Assemble tool 2897013, No. 3 tie rods M10 x 285 and No. 3 nuts M10.

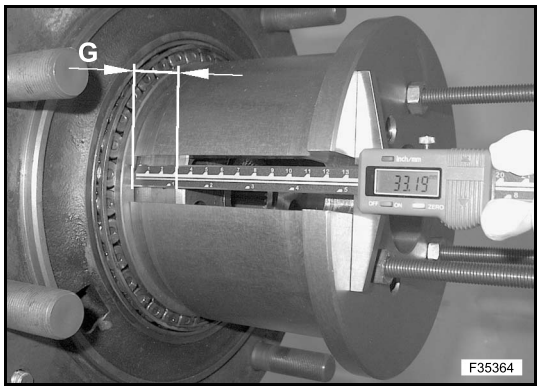


ASP125

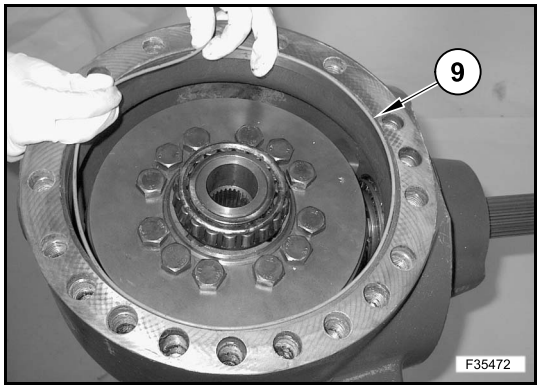
Assemble tool 2897012, No. 3 tie rods M10 x 285 and No. 3 nuts M10.



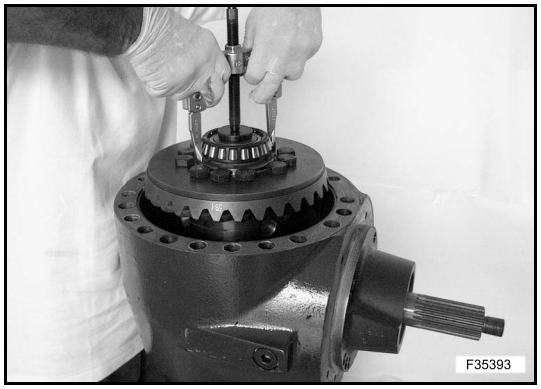
Use a depth gauge to measure the value (G) of the wheel hub.



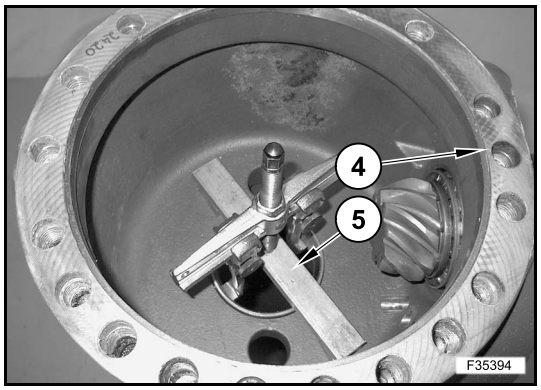
Remove the O-ring (9).



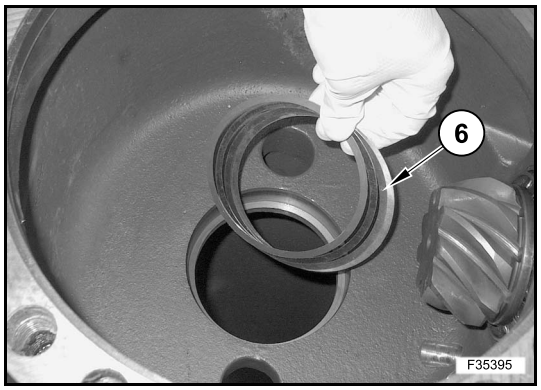
Disassemble the whole differential assy.



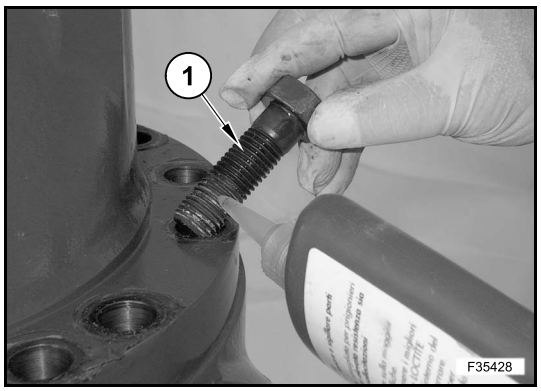
By means of a puller, remove the bearing cup (5) from the body (4).



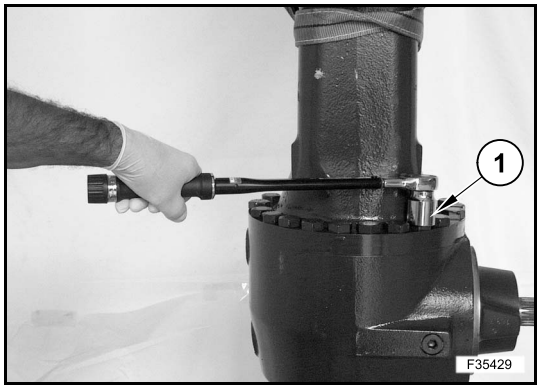
Remove the shims (6).



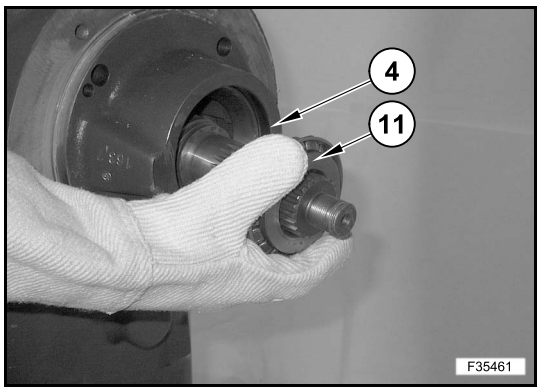
Apply Loctite® 242 on the screws (1).



Tighten the screws (1) to the prescribed torque 285 Nm (210.2 lbf·ft) (ASP100) - 560 Nm (413 lbf·ft) (ASP125).



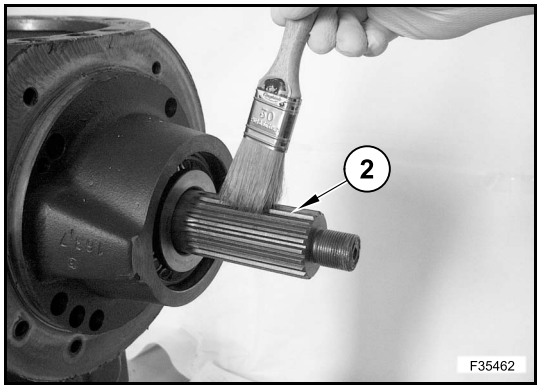
Assemble the bearing (11) into its relevant seat on body (4).



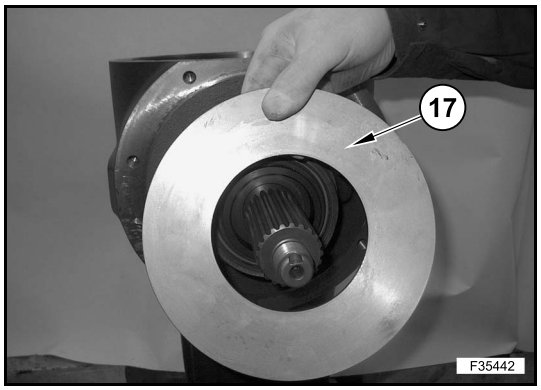
⚠ WARNING

Use a suitable glove so as not to get scorched.

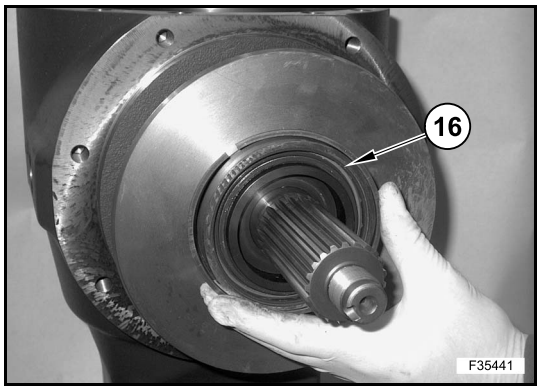
Grease the pinion (2).



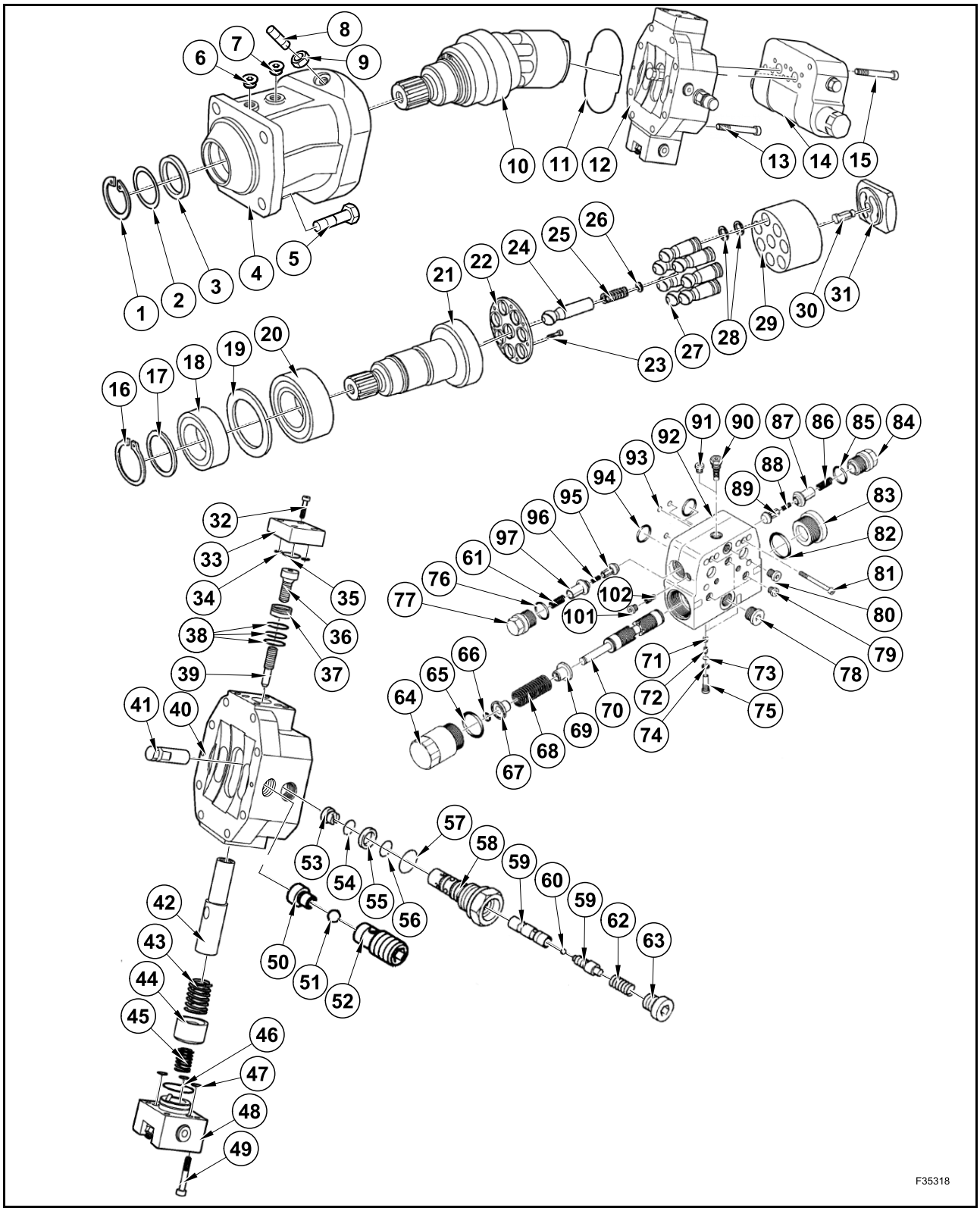
Assemble the disc (17).



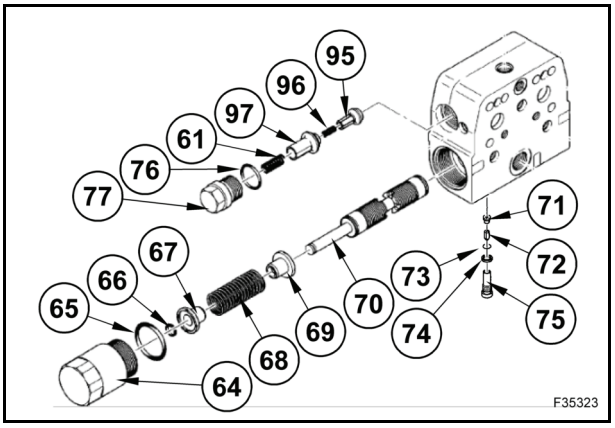
Assemble the snap ring (16).



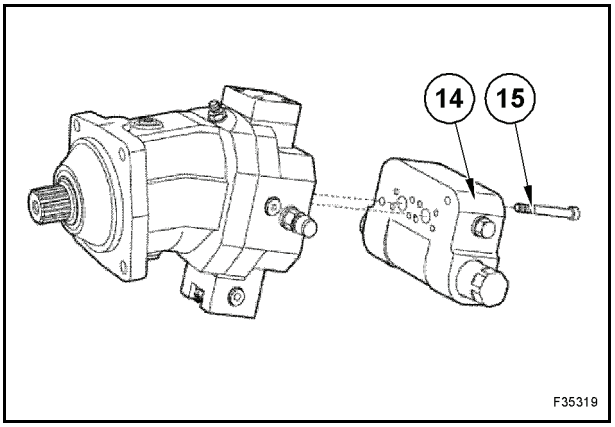
3.3 DISASSEMBLY AND ASSEMBLY



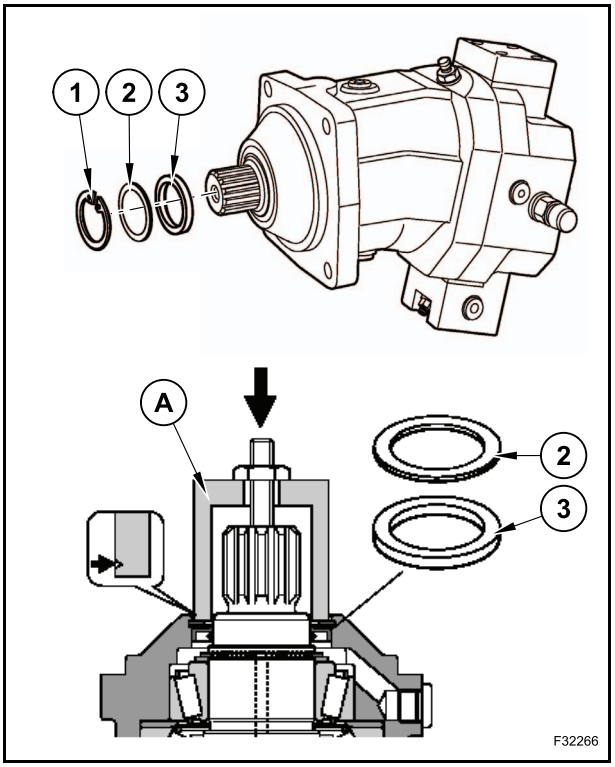
Reassemble (if fitted) the regulator assy.



Assemble the brake assy (14) by tightening the screws (15).

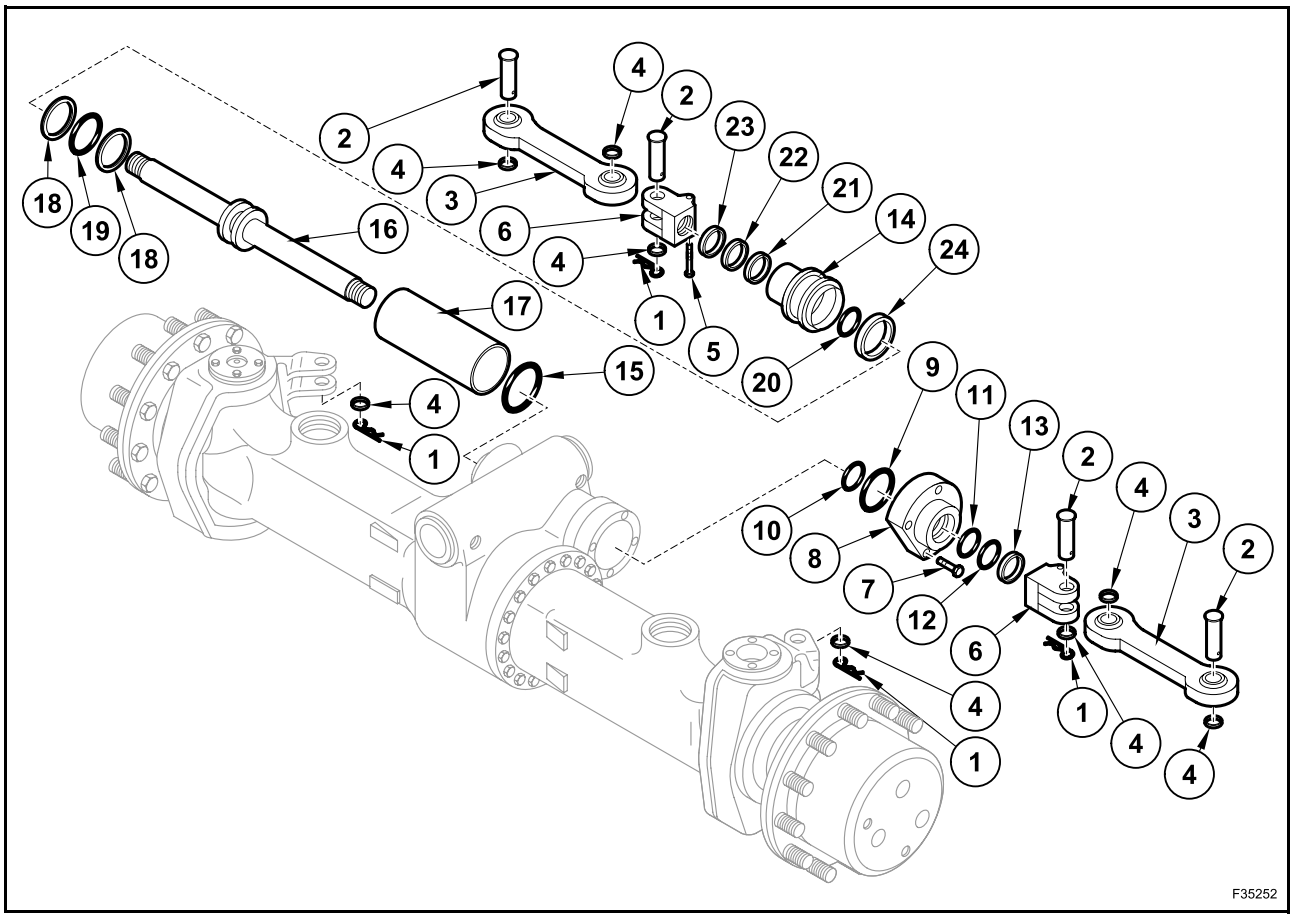


Assemble the seal ring (3). By means of sleeve (A) fit seal ring by inserting the sleeve up to the mark applied before disassembly. Assemble the shim (2) and the snap ring (1).



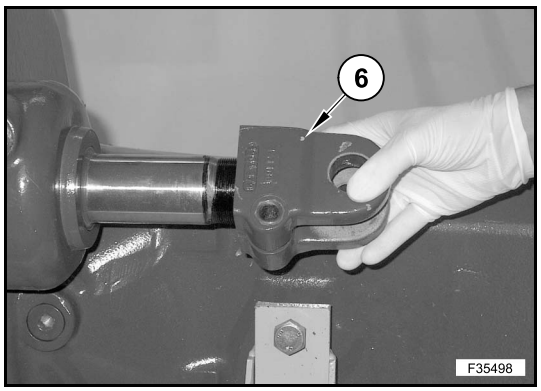
5.3 DISASSEMBLY AND ASSEMBLY

STEERING CYLINDER

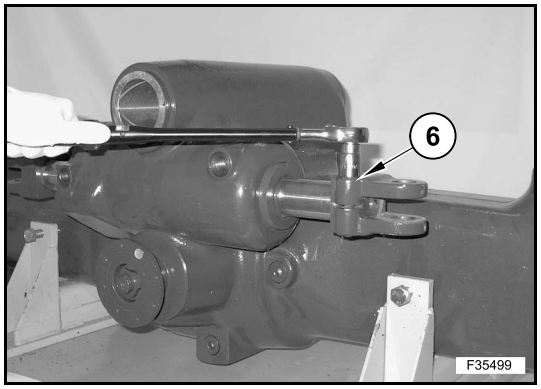


1. Split pin
2. Pin
3. Rod
4. Shim
5. Screw
6. Fork
7. Screw
8. Cylinder head
9. O-ring
10. O-ring
11. Gasket
12. Gasket
13. Seal ring
14. Piston
15. O-ring
16. Rod
17. Cylinder liner
18. Gaskets
19. O-ring
20. O-ring
21. Gasket
22. Gasket
23. Wiper ring
24. Shims

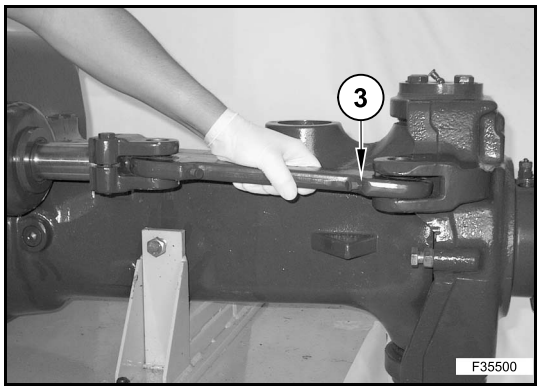
Screw in the forks (6).



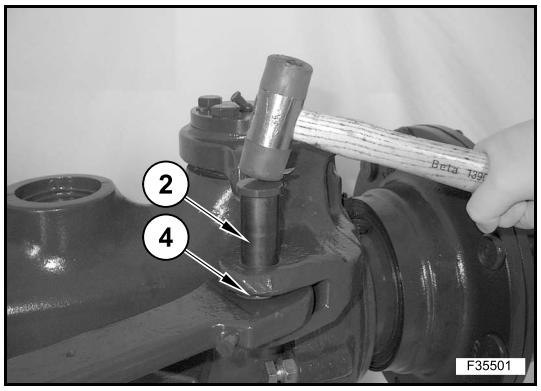
Assemble the screws (5) and tighten them to the prescribed torque of 117 Nm (86.29 lbf·ft).



Assemble the rods (3).

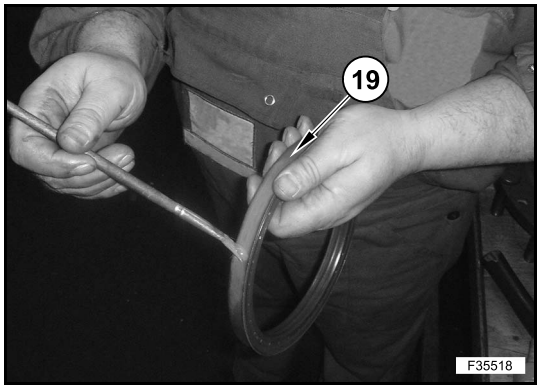


Assemble the pins (2) and the shims (4).

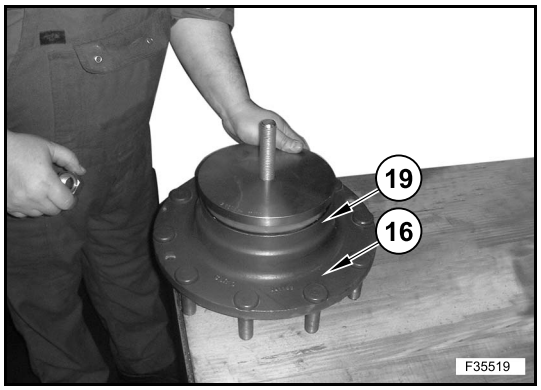


Assemble the shim (31).

Apply Loctite® 510 to seal ring (19).



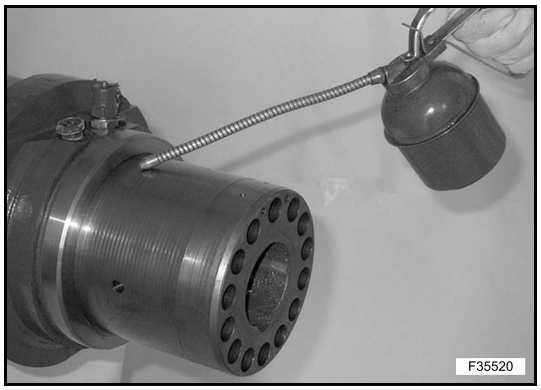
Assemble the seal ring (19) onto wheel hub (16) by means of tool 2897003.



Lubricate the axle beam for wheel hub assembly.

⚠ WARNING

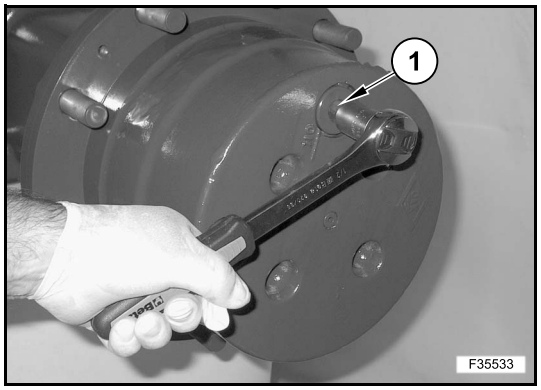
Lubricate the hub and the oil inlet holes.



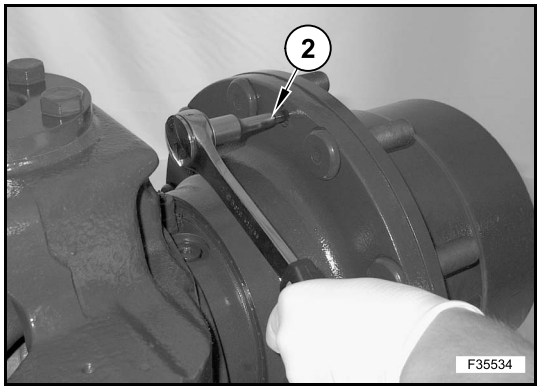
Disassembly

Before draining the oil, place the wheel hub with the plug (1) in the highest position and unscrew it of a few turns in order to relieve a possible internal pressure, then completely remove it. Rotate the hub until the hole reaches the lowest position.

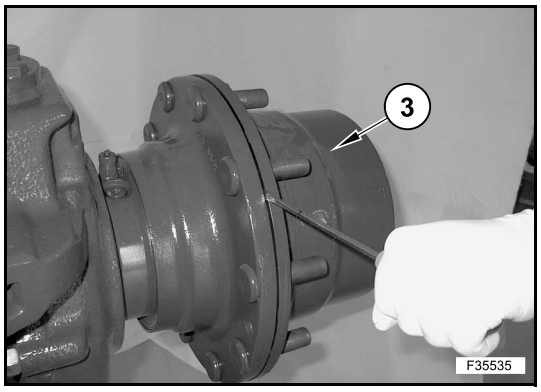
Drain the oil completely.



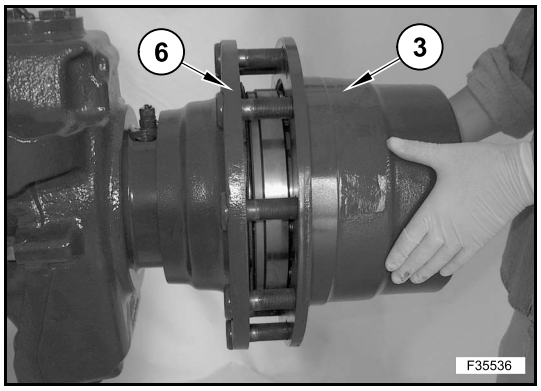
Remove the screws (2) from the planet carrier cover.



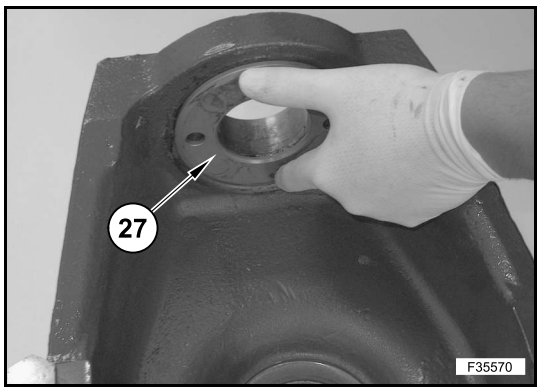
By means of levers inserted in the provided slots, remove the planet carrier cover (3).



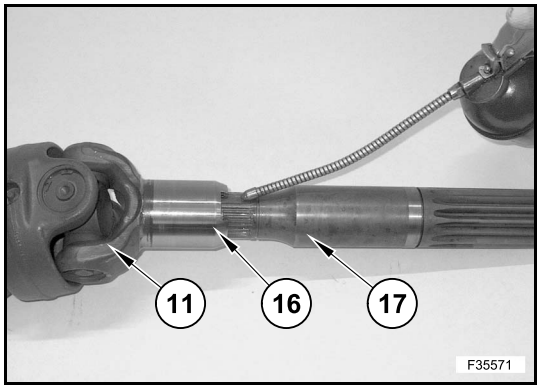
Remove the planet carrier cover (3) and the O-ring (6).



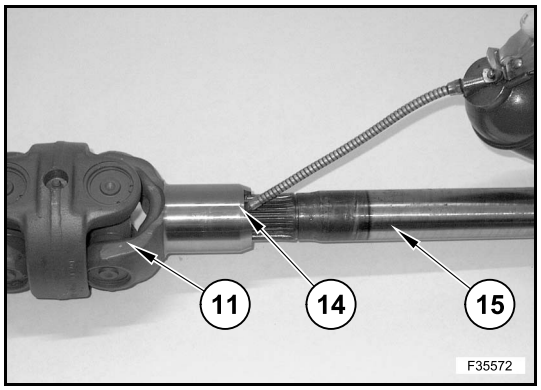
Grease and assemble the disc (27).



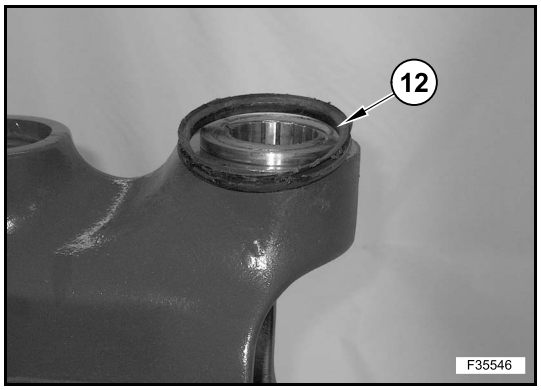
Lubricate the shaft (17), assemble the snap ring (16) and assemble onto cardan shaft (11).



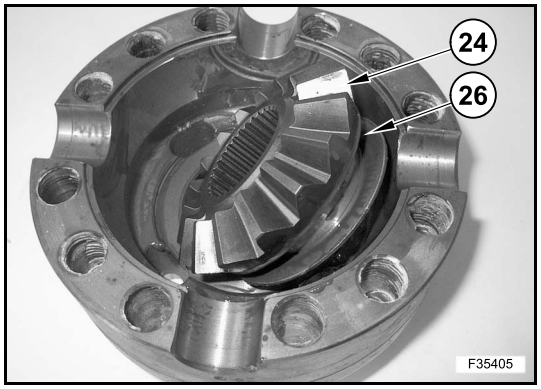
Lubricate the shaft (15), assemble the snap ring (14) and assemble onto cardan shaft (11).



Assemble the gasket (12). Pay attention to the assembly direction.

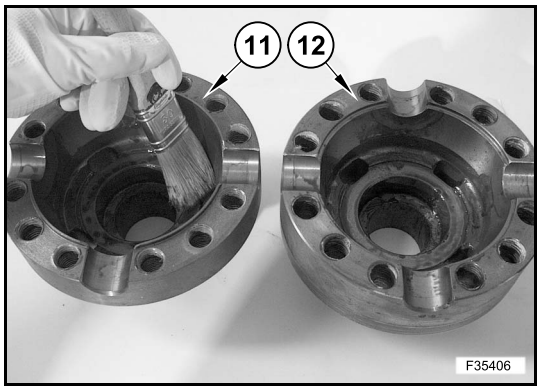


Remove the gear (24) and the shim (26).



Assembly

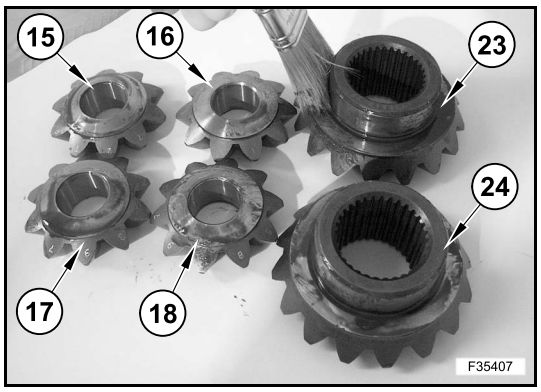
Apply a thin layer of Molicote G-n plus on the differential half boxes (11) and (12).



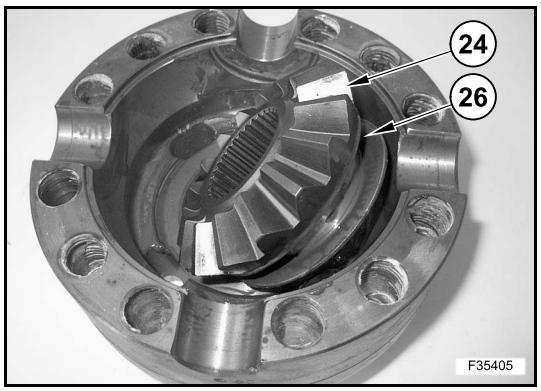
⚠ WARNING

Remove the rests of sealant.

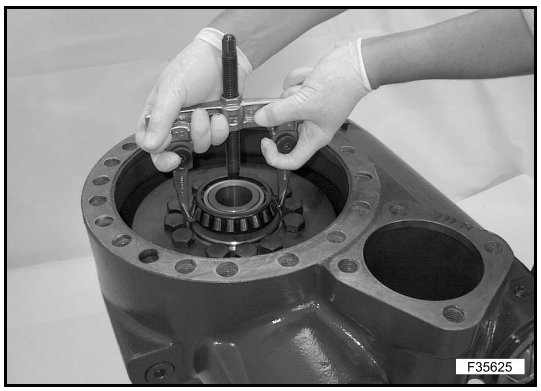
Apply a thin layer of Molicote G-n plus on the planetary gears (15), (16), (17), and (18) and on the gears (23) and (24).



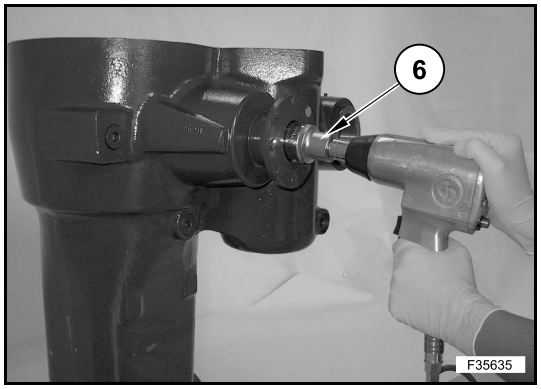
Assemble the planetary gear (24) and the shim (26).



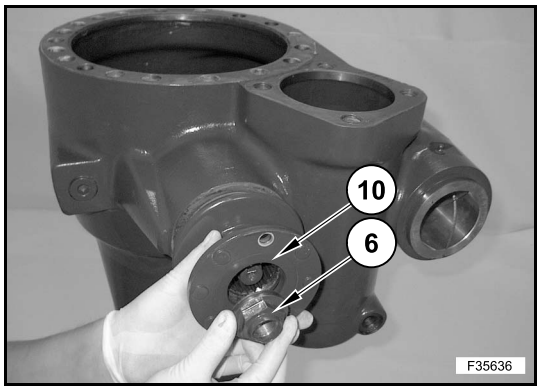
Extract the differential assy.



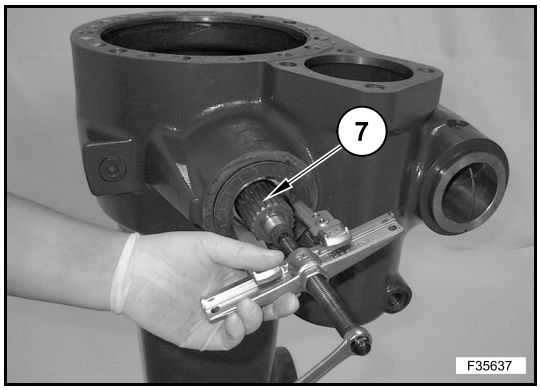
Loosen the nut (6).



Remove the nut (6) and the flange (10).



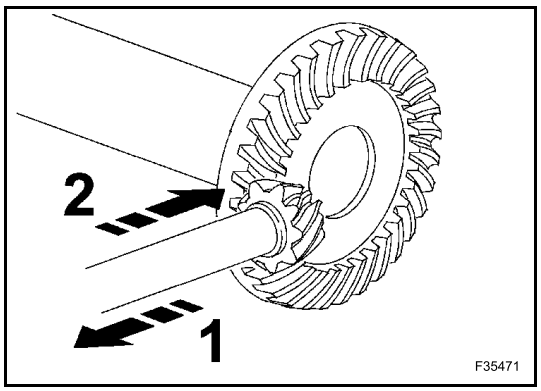
Remove the seal ring (7) with a puller.



Contact adjustment.

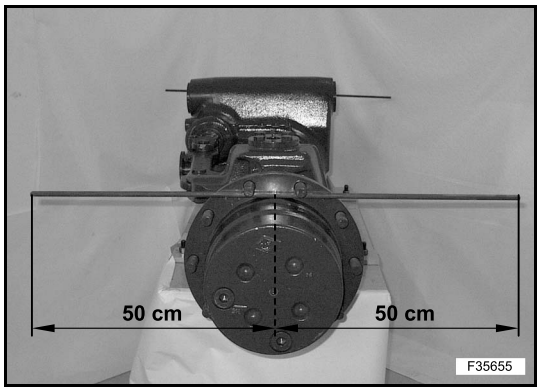
1 - move the pinion for type X contact adjustment.

2 - move the pinion for type Z contact adjustment.



TOE-IN ADJUSTMENT

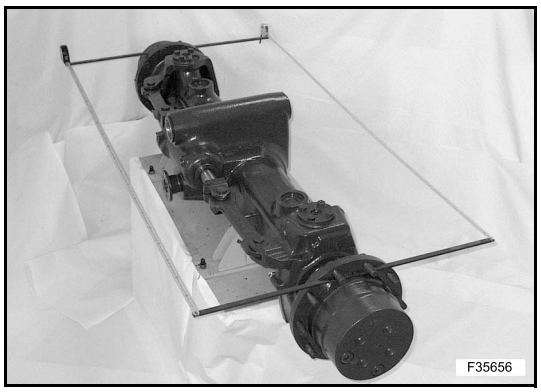
Assemble 2 identical linear bars, each 1 m (3.28 ft) long, on the wheels' sides, blocking them with two nuts, on the wheel hub stud bolts.



⚠ WARNING

The two bars must be locked in their centerline, so that they are perfectly perpendicular to the supporting surface and parallel to the pinion axis. Align the two bars.

Using a tape measure (M), measure the distance (mm) from the bar ends.



NOTE: select the minimum value by rotating the measurement points.

7. BLADE

The levelling blade has the function of improving the excavator's stability during all digging movements and may also be used for levelling the ground.

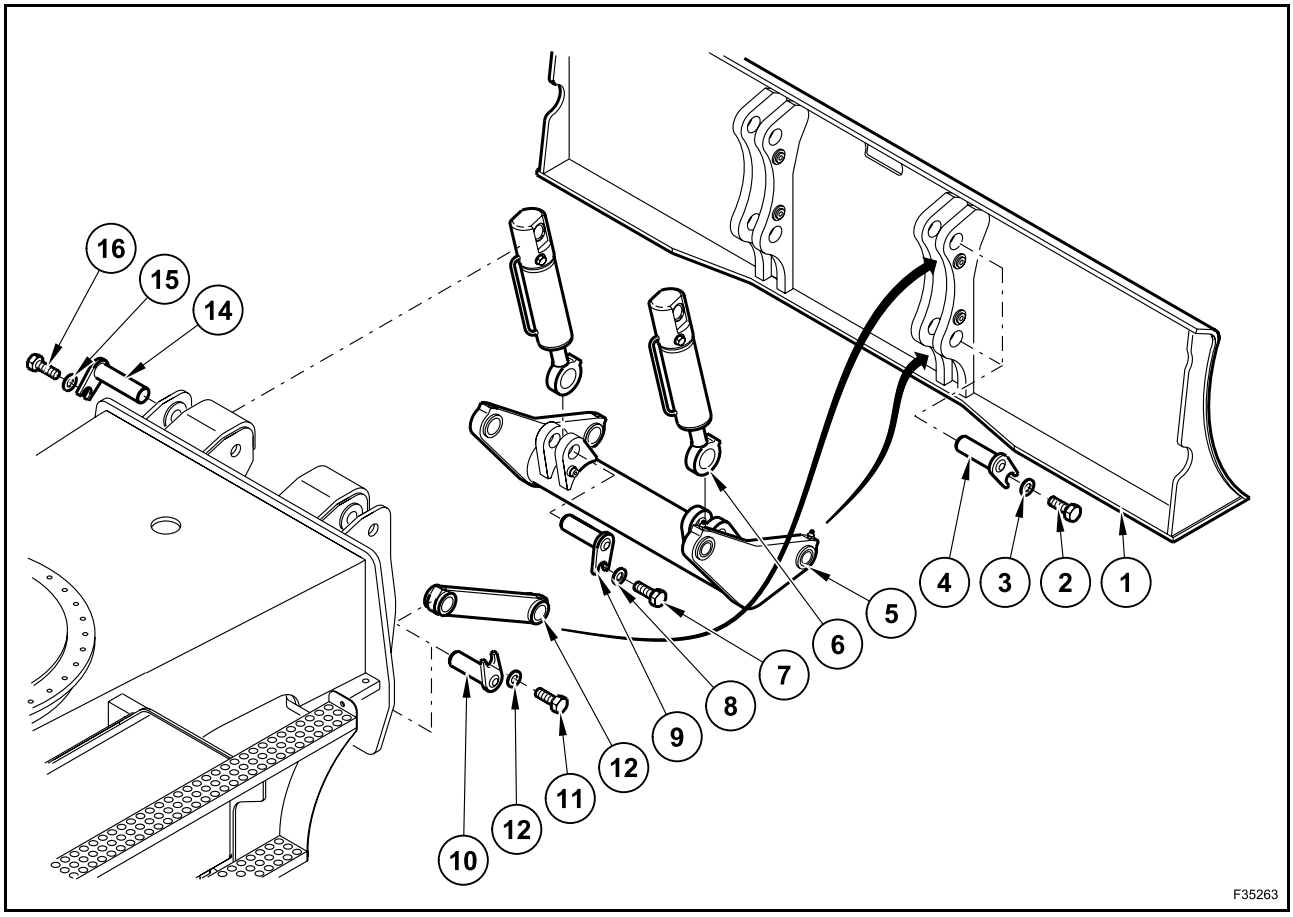
The blade is available in two outfits:

• front blade;

• rear blade.

The levelling blade kinematics is calculated in order to obtain a parallel vertical movement to the undercarriage frame on the entire movement arc of the hydraulic cylinders.

DISASSEMBLY



1. Levelling blade
2. Screw
3. Washer
4. Pin
5. Connecting rod
6. Blade cylinders
7. Screw
8. Washer
9. Pin
10. Screw
11. Washer
12. Pin
13. Rod
14. Pin
15. Washer
16. Screw

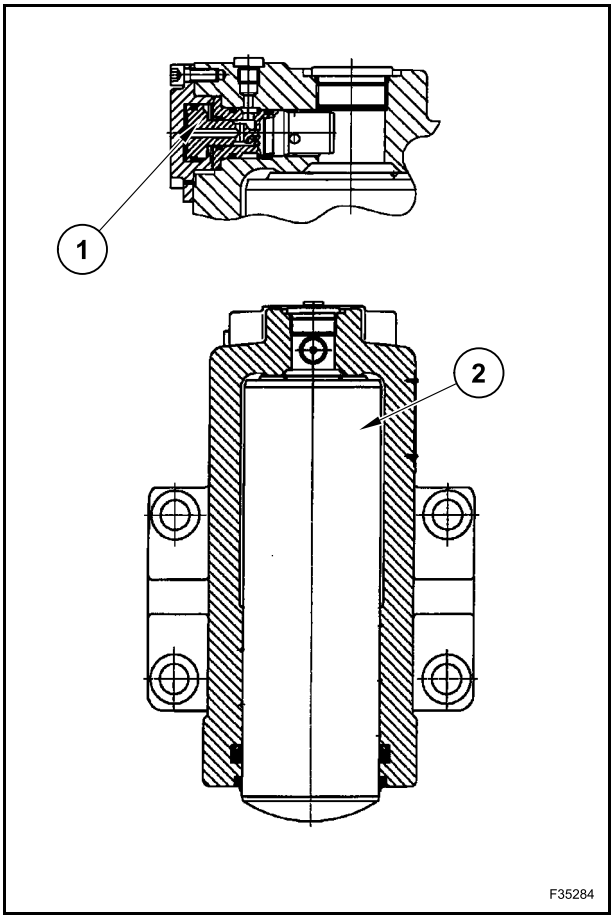
8. AXLE FLOATING LOCKING CYLINDERS

The axle floating locking cylinders are single-acting cylinders with built-in blocking valves (1) connected by means of a hose. This hose is connected to a supply hose, which is also a control hose.

The cylinder pistons (2) rest on the thrust blocks of the floating axle. The fittings of the two cylinders are equipped with restrictor valves and check valves. They stop the oil coming out of the cylinder and enable the inlet oil to fill the cylinder chambers through the check valve without being stopped.

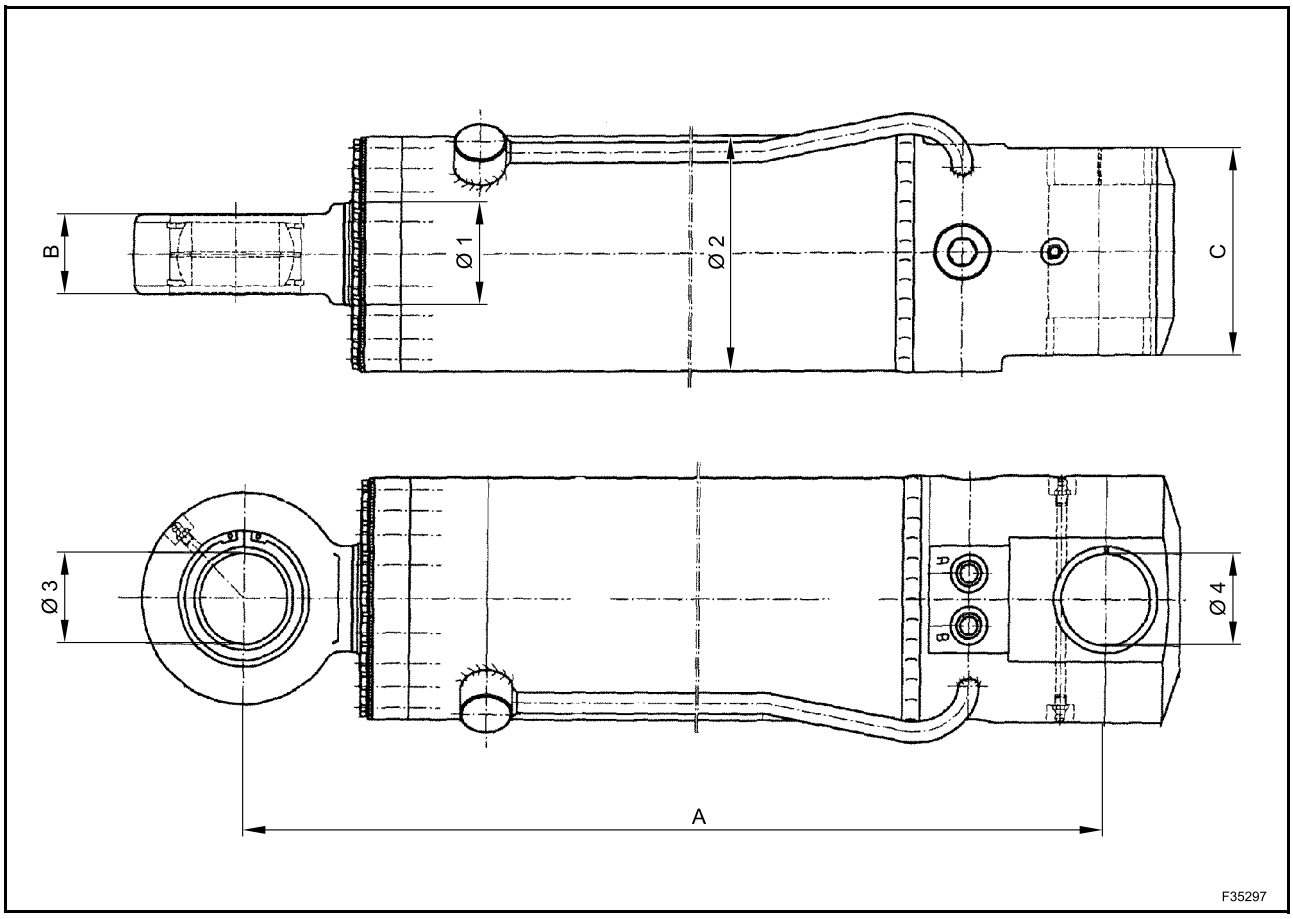
During off-road travel with the blocking valves (1) opened, the axle floats according to the ground profile. The movement of the axle pushes a a piston inside a cylinder, while the oil thus conveyed enters the opposite cylinder, pushing out its piston. With the blocking valves (1) closed, the oil remains blocked inside the cylinders, and therefore the axle remains blocked too.

Without opening pressure, the blocking valve is closed, retracted by the force of the spring and possibly supported by the internal pressure of the cylinder. When opening the floating axle blocking, the pilot control pressure, as opening pressure, reaches, through the solenoid valve, the blocking valves, which are opened. By means of the open valves, the pilot control pressure acts as preload pressure on the pistons, which, in turn, are pushed against the thrust blocks of the axle.



9.1 STABILIZER CYLINDERS

TECHNICAL SPECIFICATIONS



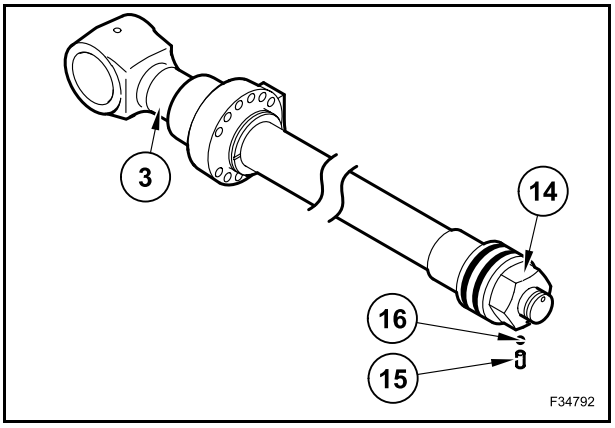
$Ø_1$ Rod	mm (in)	70 (2.75)
$Ø_2$ Liner	mm (in)	125 (4.92)
$Ø_3$ Rod connection	mm (in)	60 (2.36)
$Ø_4$ Bottom connection	mm (in)	60 (2.36)
A Completely retracted	mm (in)	890 (35)
B Rod connection	mm (in)	55 (2.16)
C Bottom connection	mm (in)	140 (5.51)
Stroke	mm (in)	520 (20.47)
Service pressure	bar (psi)	370 (5366.39)

FAULT	POSSIBLE CAUSE	ACTION
Cylinder extends without control.	Non-return valves of cylinders defective operation.	Consult your Dealer.
	Cylinders internal leaks.	Consult your Dealer.
Stabilizer cylinders retract without control.	Non-return valves of cylinders defective operation.	Consult your Dealer.
	Cylinders internal leaks.	Consult your Dealer.
Blade cylinders extend or retract without control.	Non-return valves of cylinders defective operation.	Consult your Dealer.
	Cylinders internal leaks.	Consult your Dealer.
The blade lays only one side.	Non-return valves of cylinders defective operation.	Consult your Dealer.
	Cylinders internal leaks.	Consult your Dealer.
Stabilizer legs lay only on one side.	Non-return valves of cylinders defective operation.	Consult your Dealer.
	Cylinders internal leaks.	Consult your Dealer.

Secure the rod (3) onto workbench.

Put matching reference marks on rod (3) and nut (14).

Remove dowel (15) and ball (16).

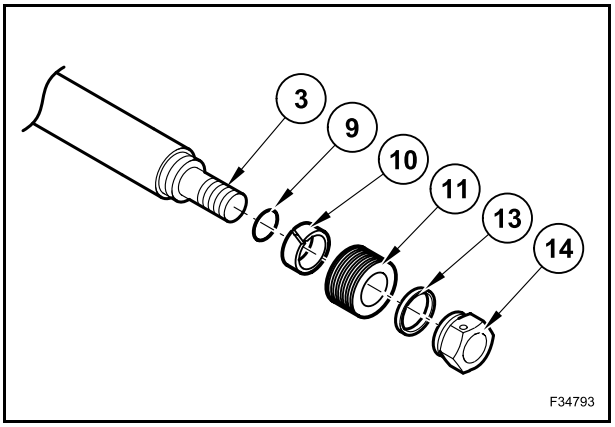


Unscrew the nut (14) by means of tools 380000812 and 000000000.

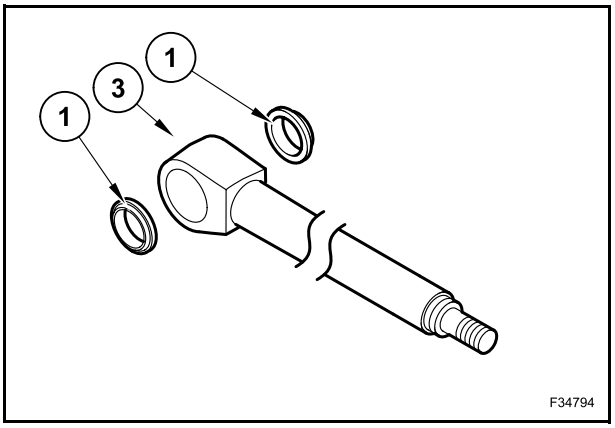
Remove the shim (13).

Extract the piston (11) and the brake bushing (10).

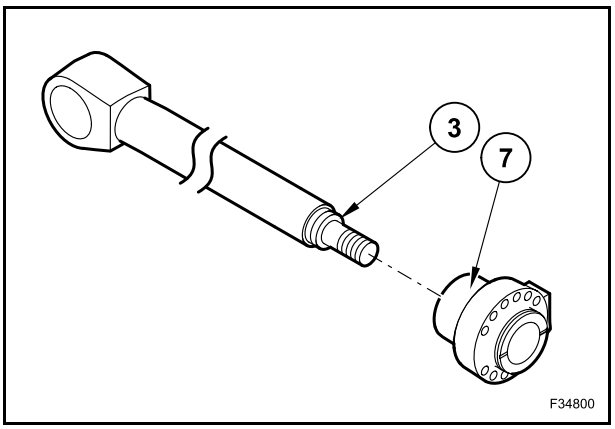
Remove O-ring (9) from rod (3).



Remove the wiper rings (1) from the rod (3).



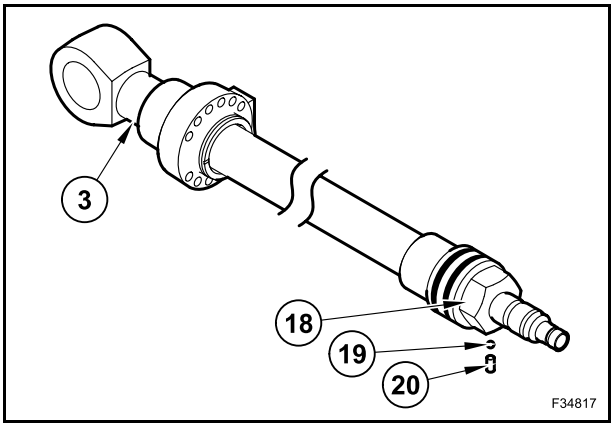
Extract the head (7) from the rod (3).



Secure the rod (3) onto workbench.

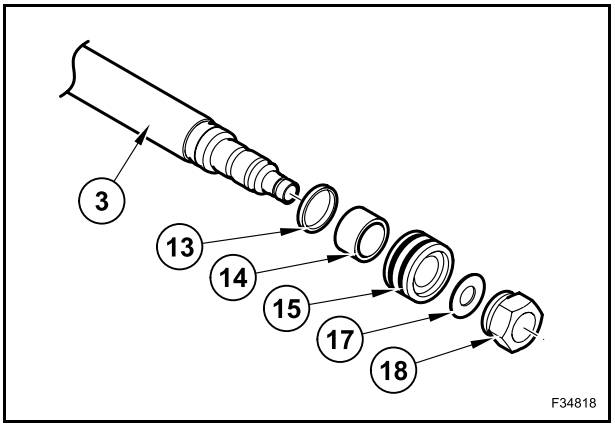
Put matching reference marks on rod (3) and nut (18).

Remove dowel (20) and ball (19).

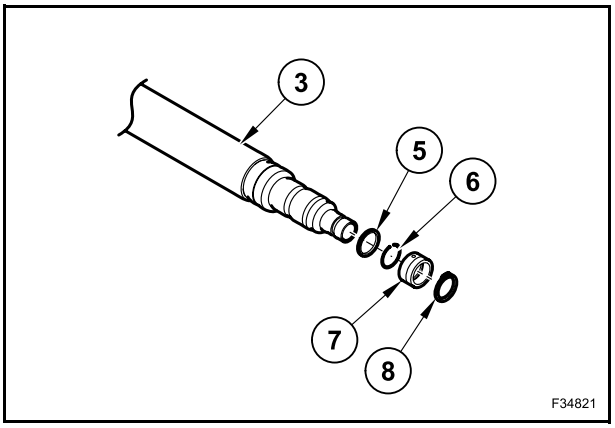


Unscrew the nut (18) by means of tools 380000812 and 000000000.

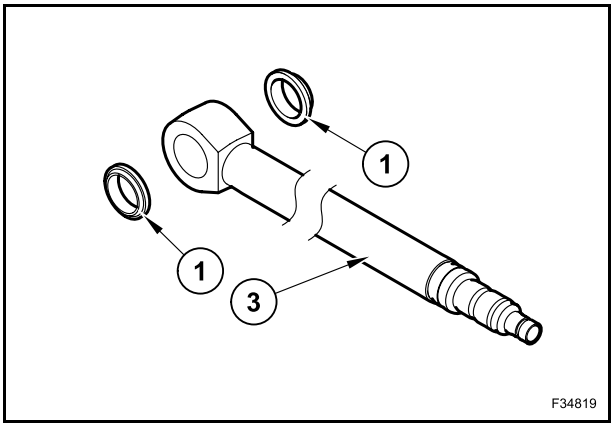
Remove the shim (17), the piston (15), the front brake bushing (14) and the ring (13) from the rod (3).



Remove the snap ring (8), the rear brake bushing (7), the gasket (6) and the stopper (5) from the rod (3).



Remove the wiper rings (1) from the rod (3).

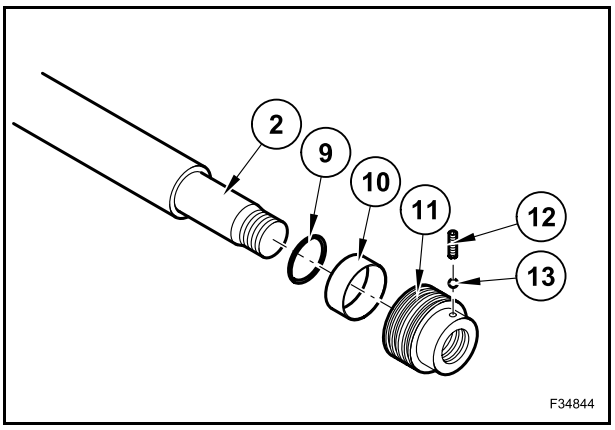


Secure the rod (3) onto workbench.

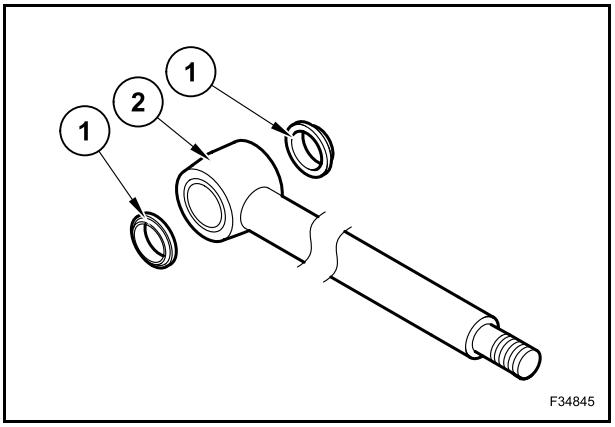
Remove dowel (12) and ball (13) from piston (11).

Unscrew and remove the piston (11).

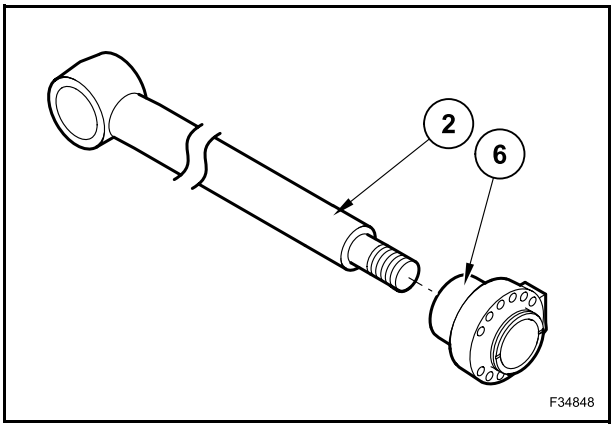
Remove the brake bushing (10) and the O-ring (9).



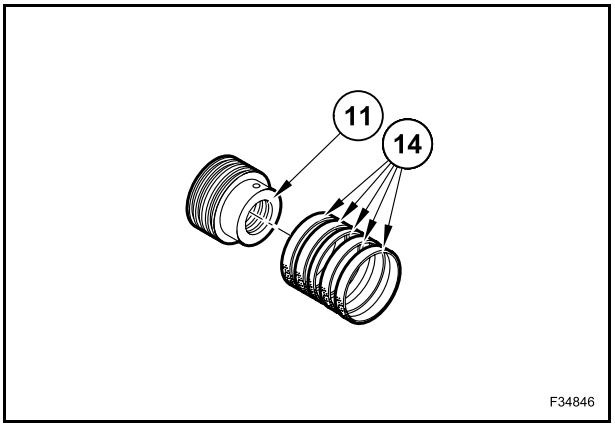
Remove the wiper rings (1) from the rod (2).



Extract the head (6) from the rod (2).



Remove piston gaskets (14) from piston (11).

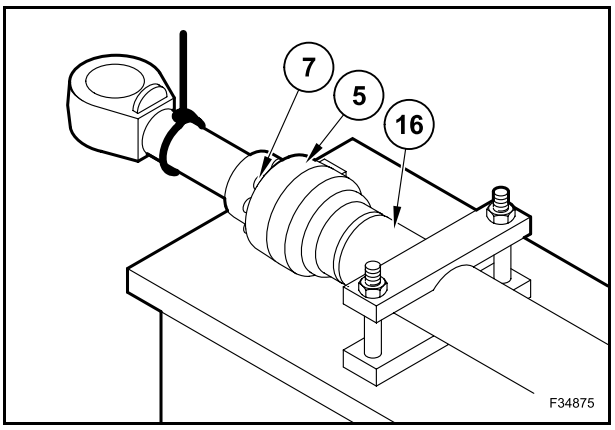


Fasten the head (5) onto cylinder liner (16) by tightening the screws (7).

Tighten the screws (5) to the following tightening torques:

WX 165: 171 Nm (126.12 lbf·ft)

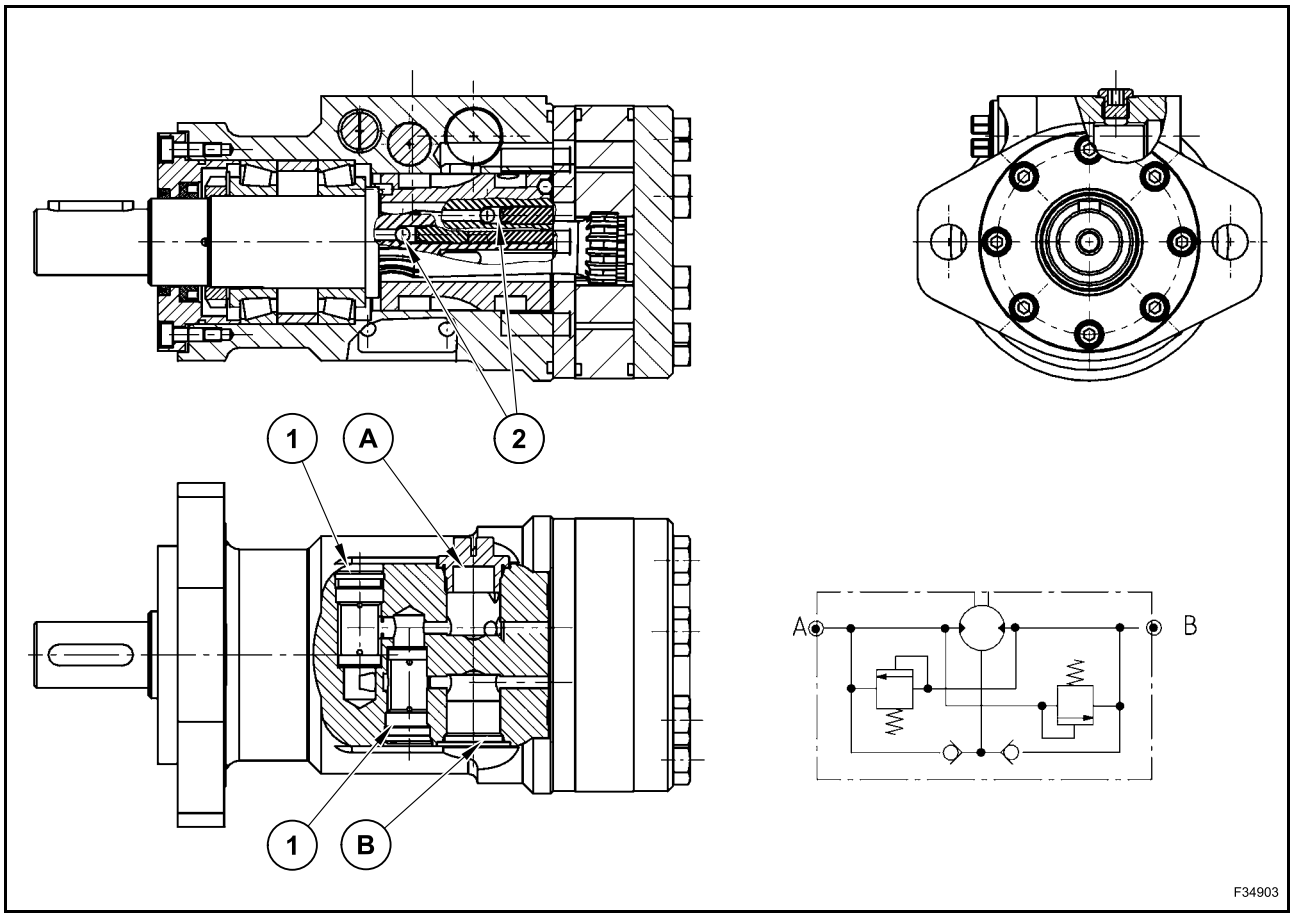
WX 185: 171 Nm (126.12 lbf·ft)



2.5 SPECIAL TOOLS

CODE	CYLINDER	USE
380000812	All	Unlocking and tightening the piston nut.
	Boom	Unlocking and tightening the piston nut.
	Dipper	Unlocking and tightening the piston nut.
	Bucket (WX 165 - WX 185)	Unlocking and tightening the piston nut.
380001035	Boom	Assembling the piston gaskets.
2488399	Dipper (WX 165 - WX 185)	Assembling the piston gaskets.
380001091	Dipper (WX 145)	Assembling the piston gaskets.
380001760	Bucket (WX 145)	Assembling the piston gaskets.
380001090	Bucket (WX 165 - WX 185)	Assembling the piston gaskets.
380001229	Boom adjusting	Assembling the piston gaskets.

ROTATION MOTOR



A. Working connection
B. Working connection
1. Direct-control secondary valves
2. Replenishing valves

The clamshell rotation motor is a slow-rotation hydraulic motor, operating according to the Gerotor principle.

It rotates the clamshell and its clams, so that taking and releasing the material may be performed in a targeted manner. By means of its shaft, the motor actuates a pinion which engages in a ring gear.

The forces externally acting on the rotation motor are reduced on both sides by means of secondary valves (1). A possible not allowable high pressure opens one of the valves and the pressure peak is relieved to the low-pressure side. Possible lack of oil is compensated through replenishing valves (2), located on both sides.

By means of the auxiliary power takeoff, the diesel engine (1) actuates the gear pump (2). It supplies the double-circuit system of the brakes, the steering system as well as the multi-cooler's fan motor.

During operation, the gear pump (2) delivers the oil first of all to the pedal brake valve (4). Beyond the double-circuit pedal valve, also the accumulator charger (5) is mounted on the brake valve.

Once the accumulator's charge (9) is completed, the accumulator charging valve switches, so that oil delivery moves to the priority valve (3).

On the priority valve (3), delivery is distributed between power steering (8) and fan motor (7); anyway, power steering has priority.

With the power steering (8) in neutral position, its LS hose has no pressure; therefore, the priority valve (3) delivers the entire oil flow to the fan motor (7).

With the power steering (8) not in neutral position, oil under pressure is delivered to the steering cylinder (10) on the front axle (9).

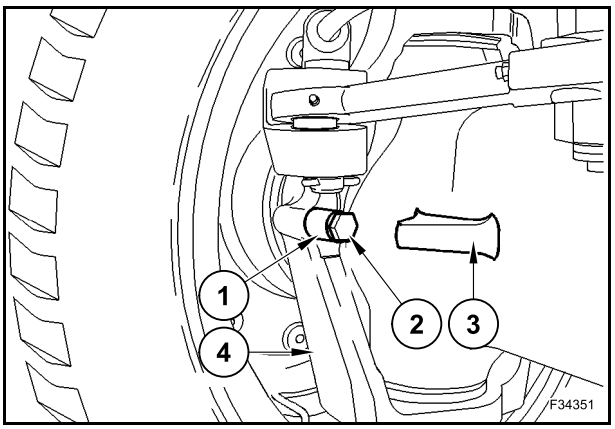
According to which of the two rods of the steering cylinder (10) is retracted (the opposed rod is extended), the machine steers to one side or to the opposite side.

STEERING ADJUSTMENT

In order to guarantee a correct travel and steering operation, the steering stopper has to be adjusted according to the axle and to the tyre type.

At each axle or tyre change, correctly adjust the steering stopper and constantly keep it under control.

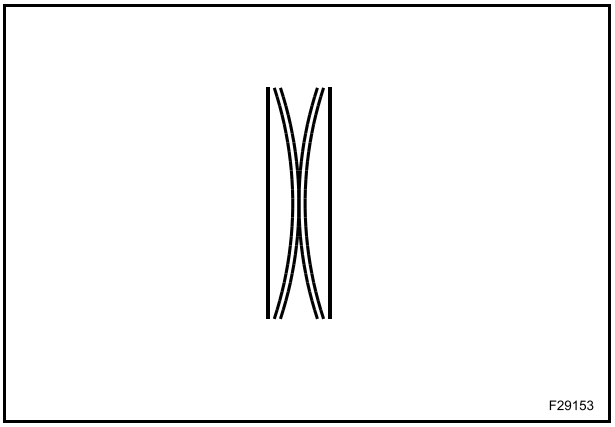
Through the axle joint rotation (4), the steering forces are transferred to the wheel, which is steered. The steering stopper is limited by a spacer (1), fastened to the joint by means of a screw (2) and a thrust stopper (3), placed on the axle body. In this way the steering wheels can turn safely without coming in touch with other elements, even when they are completely steered and the axle is fully inclined.



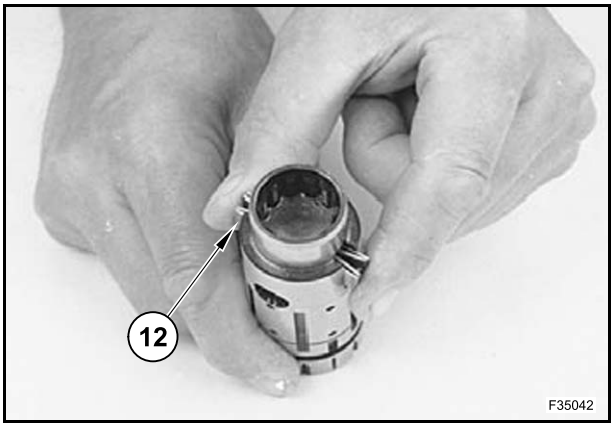
ASSEMBLY

NOTE: great care should be taken during re-assembly.

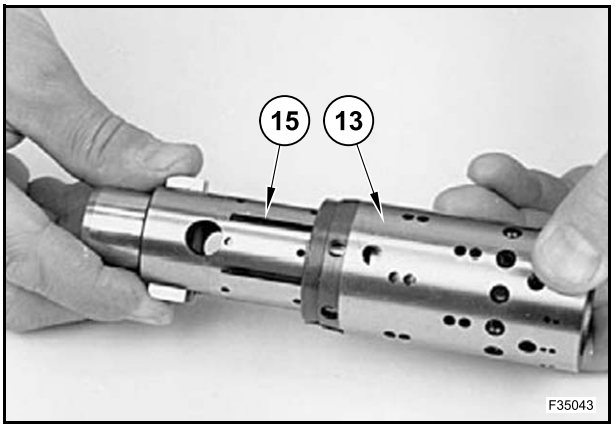
Place the two flat neutral position springs in the slot. Place the curved springs between the flat ones and press them into place.



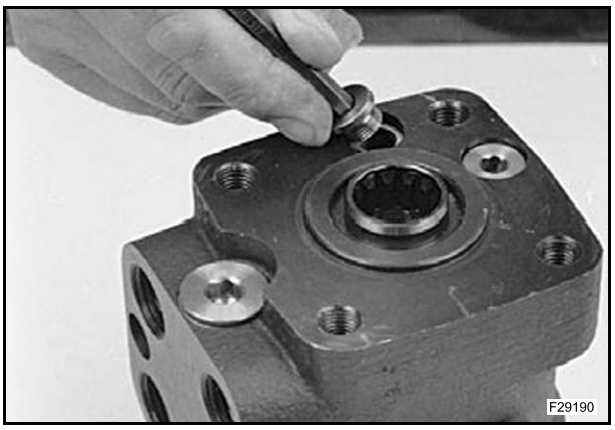
Line up the spring set (12).



Fit the spool (15) into the sleeve (13). Make sure that spool and sleeve are placed correctly in relation to each other.

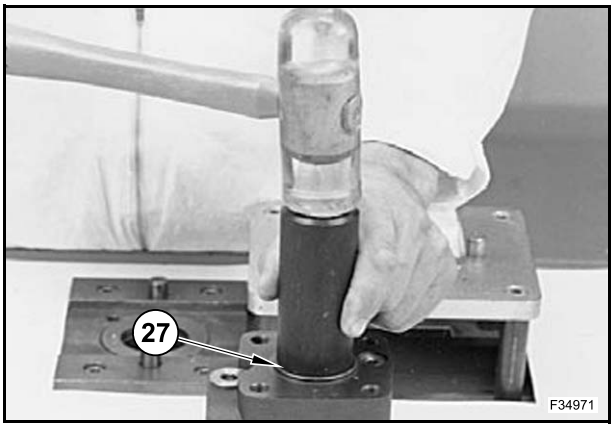


Screw in the two safety valves' plug with the seal ring and tighten to the prescribed torque of 30 ± 10 Nm (22.12 ± 7.37 lbf·ft).



Place the dust seal ring (27) in the housing.

Fit the dust seal ring (27) into the housing using a buffer and a plastic hammer.



AIR BLEEDING

The brake system of this machine consists of two braking circuits. One circuit is designed for the pair of wheels of the steering axle, while the other circuit is designed for the pair of wheels of the rigid axle.

If operations have been performed on the braking system, causing the penetration of air inside the system, for instance during hose replacement, once these works have been completed, bleed air from the concerned circuit.

Secure the machine so that it cannot move accidentally.

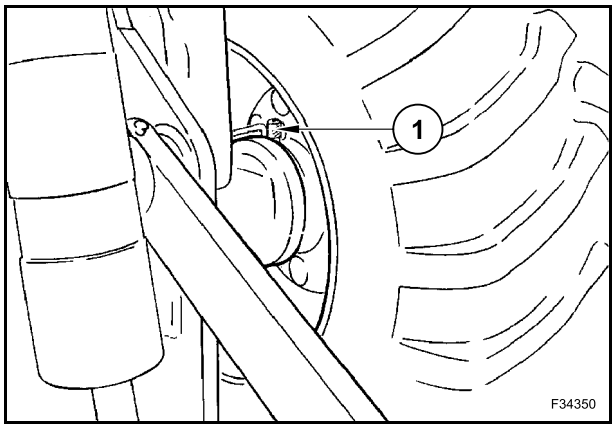
Link a hose to the connection (1) of a disc brake.

Connect the other end of the hose with a container, previously filled with hydraulic oil.

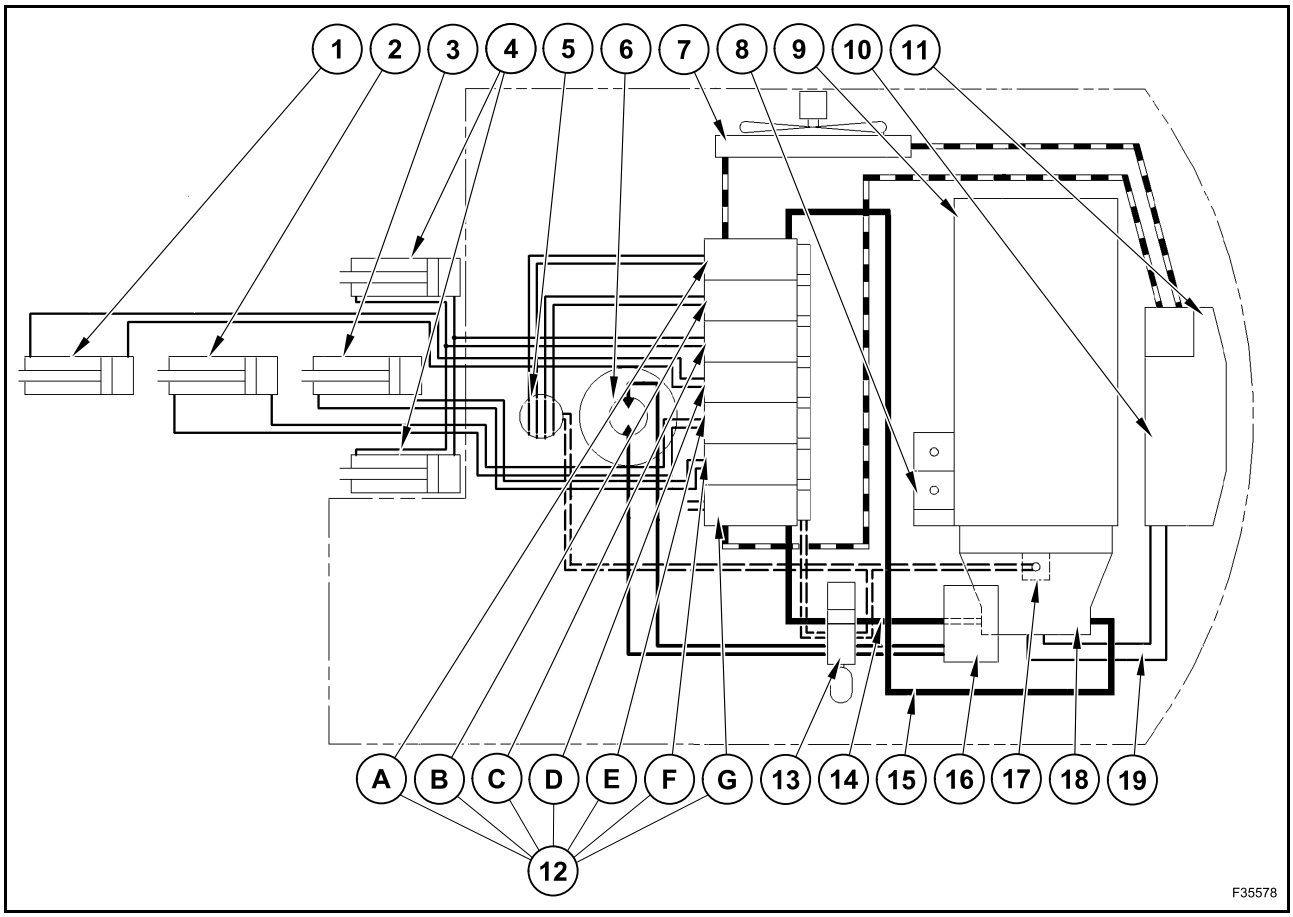
Start the engine.

Depress the pedal and hold, until hydraulic oil, flows out from the hose without air bubbles.

Repeat this operation also with the other brake of the same axle. In this way, air is bled from one braking circuit.



UPPER STRUCTURE HYDRAULIC SYSTEM



1. Bucket cylinder
2. Dipper cylinder
3. Boom adjusting cylinder
4. Boom cylinders
5. Rotary control valve
6. Rotation gearmotor
7. Multi-cooler
8. Gear pump
9. Diesel engine
10. Hydraulic oil tank
11. Oil Filter
12. Control valve
12A. Control valve: travel control
12B. Control valve: stabilizer control
12C. Control valve: boom control
12D. Control valve: bucket control
12E. Control valve: dipper control
12F. Control valve: boom adjusting cylinder control
12G. Control valve: hammer and shear control
13. Pilot control assy
14. Pump delivery hose
15. Additional pump delivery hose
16. Rotation pump
17. Pilot control pump
18. Variable-displacement twin pump
19. Suction hose

1. Diesel engine
2. Pump assy
3. Variable-displacement twin pump
4. Rotation pump
5. Gear pump for brake, steering and fan systems
6. Multi-cooler
7. Check valve (only on 25 km/h (15.53 mph) or 30 km/h (18.64 mph) axles)
8. Pressure switch
9. Rotation gearmotor
10. Speed sensor
11. Hydraulic oil tank
12. Return filter
13. Breather filter
14. Pressure switch
15. Hydraulic oil temperature sensor
16. Power steering
17. Pedal brake valve
18. Accumulator
19. Steering priority valve and fan motor
20. Steering shut-off pressure switch
21. Brake shut-off pressure switch
22. Brake valve
23. Shut-off pressure switch for automatic floating axle lock
24. Hammer
25. Switching sensor for hammer and shears
26. Control valve
27. Pressure sensor for pump 2
28. Pressure sensor for pump 1
29. Pressure sensor for automatic gearshift
30. Pressure sensor
31. Hammer by-pass pilot control valve
32. Hammer and shear valve
33. Pilot control assy
34. Pilot control assy filter
35. Pressure relief check valve
36. Pilot control assy pressure relief valve
37. Accumulator
38. Load-limit adjusting proportional valve
39. Sensor for pressure activation and deactivation
40. Pressure control sensor
41. Sensor
42. Accumulator
43. Boom cylinder pressure sensor
44. Dipper cylinder
45. Bucket cylinder
46. Check valve on bucket cylinder rod side
47. Switching valve for standard bucket cylinder and clamshell cylinder on cylinder rod side
48. Switching valve for standard bucket cylinder and clamshell cylinder on cylinder bottom side
49. Pipe break protection valve on dipper cylinder rod side
50. Off-set boom cylinder
51. Frequency change valve
52. Pressure relief solenoid valve for clamshell rotation
53. Clamshell rotation motor
54. Clamshell cylinder
55. Rotary control valve
56. Boom cylinders
57. Pipe break protection valves on boom adjusting cylinder bottom
58. Sensor
59. Sensor
60. Rotation pump pressure switch

1. Diesel engine
2. Pump assy
3. Variable-displacement twin pump
4. Rotation pump
5. Gear pump for brake, steering and fan systems
6. Multi-cooler
7. Check valve (only on 25 km/h (15.53 mph) or 30 km/h (18.64 mph) axles)
8. Pressure switch
9. Rotation gearmotor
10. Speed sensor
11. Hydraulic oil tank
12. Return filter
13. Breather filter
14. Pressure switch
15. Hydraulic oil temperature sensor
16. Power steering
17. Pedal brake valve
18. Accumulator
19. Steering priority valve and fan motor
20. Steering shut-off pressure switch
21. Brake shut-off pressure switch
22. Brake valve
23. Shut-off pressure switch for automatic floating axle lock
24. Hammer
25. Switching sensor for hammer and shears
26. Control valve
27. Pressure sensor for pump 2
28. Pressure sensor for pump 1
29. Pressure sensor for automatic gearshift
30. Pressure sensor
31. Hammer by-pass pilot control valve
32. Hammer and shear valve
33. Pilot control assy
34. Pilot control assy filter
35. Pressure relief check valve
36. Pilot control assy pressure relief valve
37. Accumulator
38. Load-limit adjusting proportional valve
39. Sensor for pressure activation and deactivation
40. Pressure control sensor
41. Sensor
42. Accumulator
43. Boom cylinder pressure sensor
44. Dipper cylinder
45. Bucket cylinder
46. Check valve on bucket cylinder rod side
47. Switching valve for standard bucket cylinder and clamshell cylinder on cylinder rod side
48. Switching valve for standard bucket cylinder and clamshell cylinder on cylinder bottom side
49. Pipe break protection valve on dipper cylinder rod side
50. Off-set boom cylinder
51. Frequency change valve
52. Pressure relief solenoid valve for clamshell rotation
53. Clamshell rotation motor
54. Clamshell cylinder
55. Rotary control valve
56. Boom cylinders
57. Pipe break protection valve on boom adjusting cylinder bottom
58. Sensor
59. Sensor
60. Rotation pump pressure switch

1. Hydraulic rotary control valve
2. Electric rotor
3. Rear rigid axle
4. Gearbox
5. Hydraulic travel engine
6. Accumulator
7. Control valve
7A. Control valve: creep speed control
7B. Control valve: floating axle lock control
7C. Control valve: gear engagement control
7D. Control valve: parking brake control
8. Parking brake pressure switch
9. Front steering axle
10. Axle floating locking cylinders

The variable-displacement twin pump consists of pump 1 and pump 2.
Each pump is equipped with own output regulator, able to adjust the pumps independently one from another.

Being conditioned by a tilted shaft, the piston stroke is generated when the pump starts turning. At one end the axial pistons suck the oil by moving backward inside the cylinder (2), at the other end the axial pistons push the sucked oil by moving forward inside the cylinder (2).

The cylinder is driven by a central pin (3). At one end the central pin seats in the circular seat, at the other a preload is actuated/exerted on the control plate (5), by a pack of springs (4). The preload of the spring pack amplifies the centering effect of the drum against the control plate. The tightness of the rotation cylinder is therefore improved, according to the control plate stationary, in the circular surface area. This occurs mainly in the low pressure range, where still low hydraulic compression power operates. The control plate (5) is mechanically connected to the positioning piston (8) by means of a drive pin (7). In this way the motion of the positioning piston (8) is transferred to the control plate (5). During this operation, the control plate is lead into a sliding race (6), while the cylinder (2) is driven, with following adjustment of its tilting according to the drive shaft. As the tilting adjustment a is modified, also the piston stroke inside the cylinder changes and consequently the oil delivery to the pump.

ROTATION PUMP VALVES

Pressure relief and top-up valve

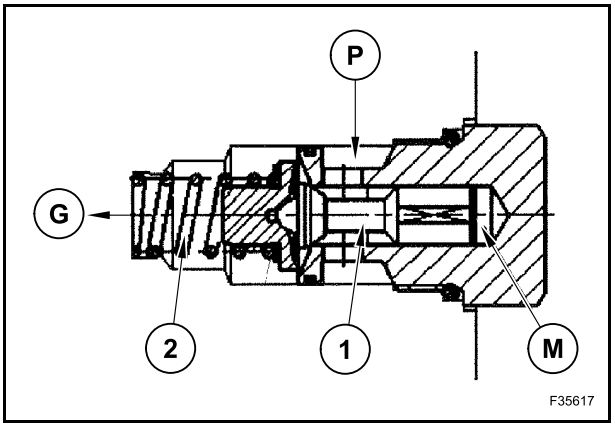
The supply pressure valve limits the pressure of the built-in auxiliary pump. It is a pressure relief valve at direct control with damping.

The supply pressure (P) available, acts on the measure surface (M) through the flat section of the valve piston (1).

Here the hydraulic power reacting against the spring force (2) builds up.

During operation, the supply pump fills the relevant system.

The exceeding oil, flowing in front of the open piston (1) of the valve, reaches the casing and returns to the tank pipes (G). The supply pressure, building up during this operation remains constant.



Secondary pressure-limiting valve

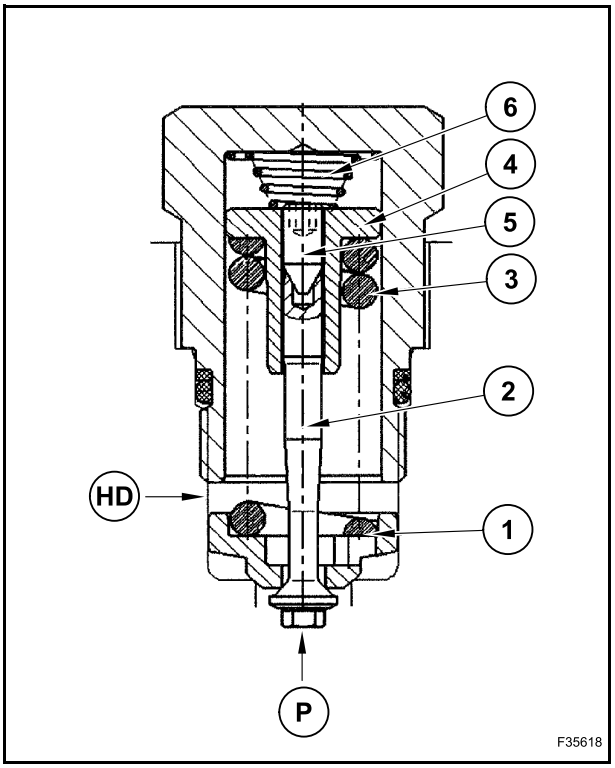
The safety valve has two tasks inside the closed system. It protects the system against pressure peaks and ensures the system filling.

To each rotation direction corresponds a relief valve. The filling of the system, also called supply, is always performed from the side not controlled by the pressure. The supply pressure force (P) pushes spring (1) against spring (6) so that oil can be supplied on the high-pressure side (HD).

The high pressure reaches the spring chamber in the plate (1) centre and, by means of a slot, also the supply spring chamber (6). Here builds up the hydraulic pressure oriented downwards and reacting against the high pressure spring (3) force.

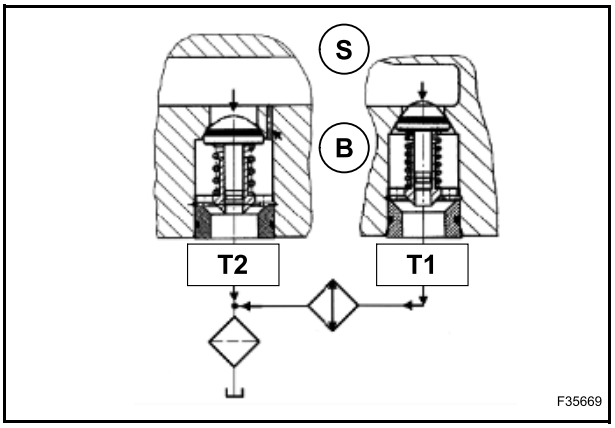
A high pressure peak, not allowable, pushes the plate (4) and the spool (2) downward against the spring (3). The cone, positioned on the spool (2) lifts from the sealing edge. The pressure peak relieves against the supply pressure through the secondary valve on the low-pressure side.

The setscrew (5) has the task to adjust the plate (4) position.



CHECK VALVES

The return oil from the control valve, must return to the tank flowing though le check valves, parallel connected to port T1 and port T2. To perform this operation, the valves poppets must be pushed backwards against the spring forces. To the force present at port T1 of the valve, also the cooler delivery resistance must be added. Because of this resistance the preloading pressure generates in the tank channel. The amount of preloading pressure is also determined by the return-oil volume.



A large volume of oil requires a bigger draining section. The valve poppet opens further, so that the spring under the poppet is compressed strongly.

This preloading pressure ensures the oil supply to cylinders and travel motor by means of the check valves and top-up valves.

The check valve at T1 is equipped with a 2-bar (29-psi) spring. While the valve in T2 is equipped with a 5-bar (72.51-psi) spring.

The amount of return oil flowing through the valve in T1, must overcome the force of the 2-bar (29-psi) spring, and the resistance to cooler delivery, according to viscosity. When oil is cold, the total resistance is higher, therefore and part of the oil volume flows through the 5-bar (72.51-psi) valve in T2. In this way, the cooling oil volume is regulated, according to viscosity, by the differential resistances in T1 and in T2.

In addition, the 5-bar (72.51-psi) valve in T2 protects the cooler against inadmissibly high pressures.

The by-pass bore (B), parallel to the valve in T2, relieves the pressure into the tank channel (S) after the engine stop.

The pilot control assy (1) consists of a control valve on which are installed some solenoid valves.

The valves communicate by means of oil through port P.

On the pilot control assy is installed a filter (2) at input, protecting the downhill elements from possible dirt.

The check valve (4), installed downstream of filter (2) opens and let the oil delivery flow through to the pressure relief valve (3), by means of which the pilot control system is secured. Excess oil returns, with no pressure, to the hydraulic tank through port T.

The pilot control pressure thus released by the pressure-holding valve reaches the accumulator (14) at port A to supply the undercarriage control and the solenoid valve (6). Besides, the pilot control pressure is available on proportional valve (5), on solenoid valve (7), on pressure measuring point M, on solenoid valve (8) and on the flanged valves (9), as well as on the proportional valves (10) and (11).

The accumulator (13) is under nitrogen preload. During operation, it is loaded by the pilot control pressure. The force of the accumulated pressure, after the engine stop, is available for solenoid valves (6) and for the undercarriage control. When the solenoid valve (6) is powered, by means of accumulator pressure, the pressure can be relieved from all cylinders functions. In this way the working attachment can be lowered in case of emergency.

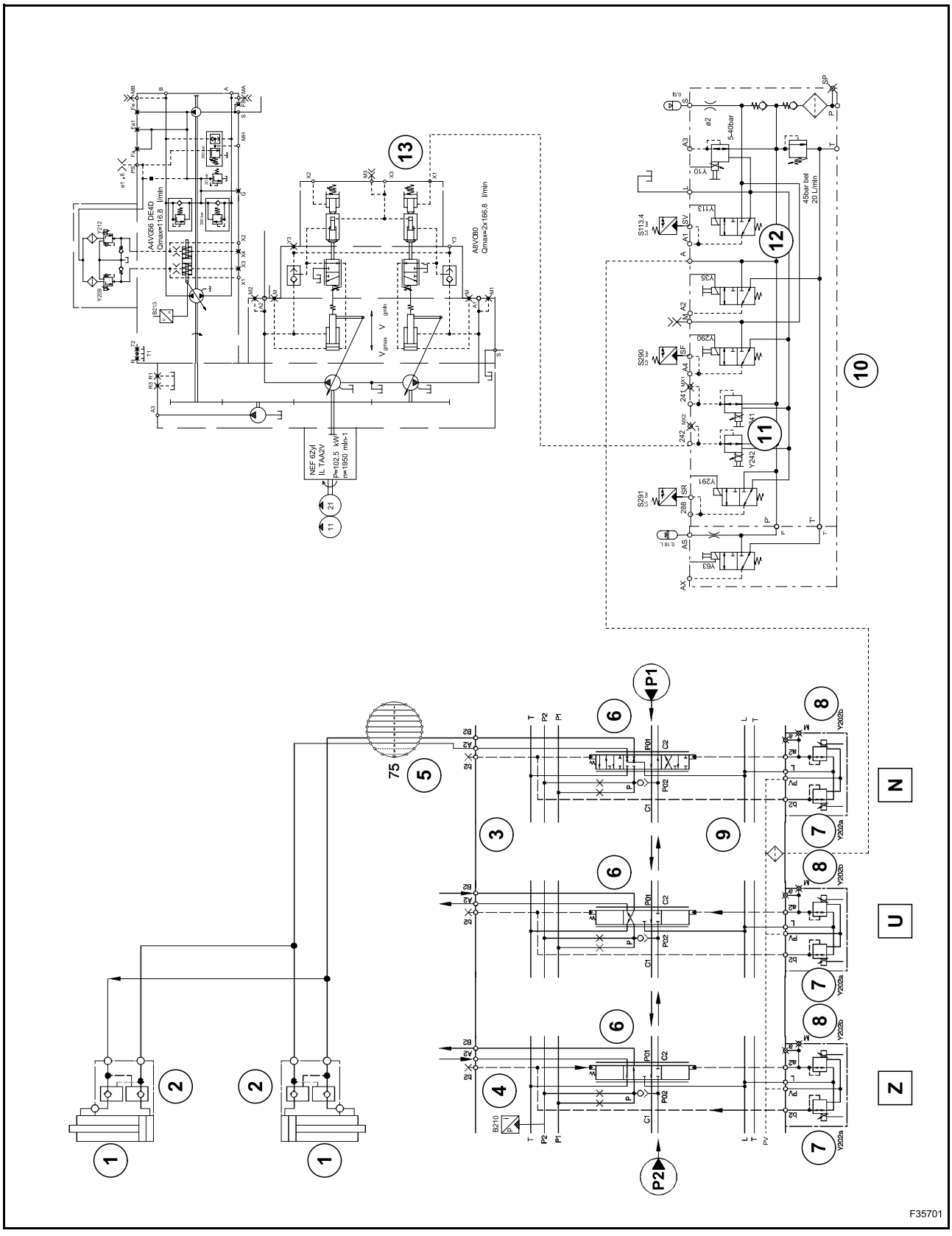
The pressure-holding valve under the accumulator (14) ensures, after the engine stop, that the accumulator pressure is held and not conveyed to the pilot control pump.

Through port A of the basic group, the pilot control pressure, reaches the undercarriage control valve, after its flowing through the hydraulic control valve.

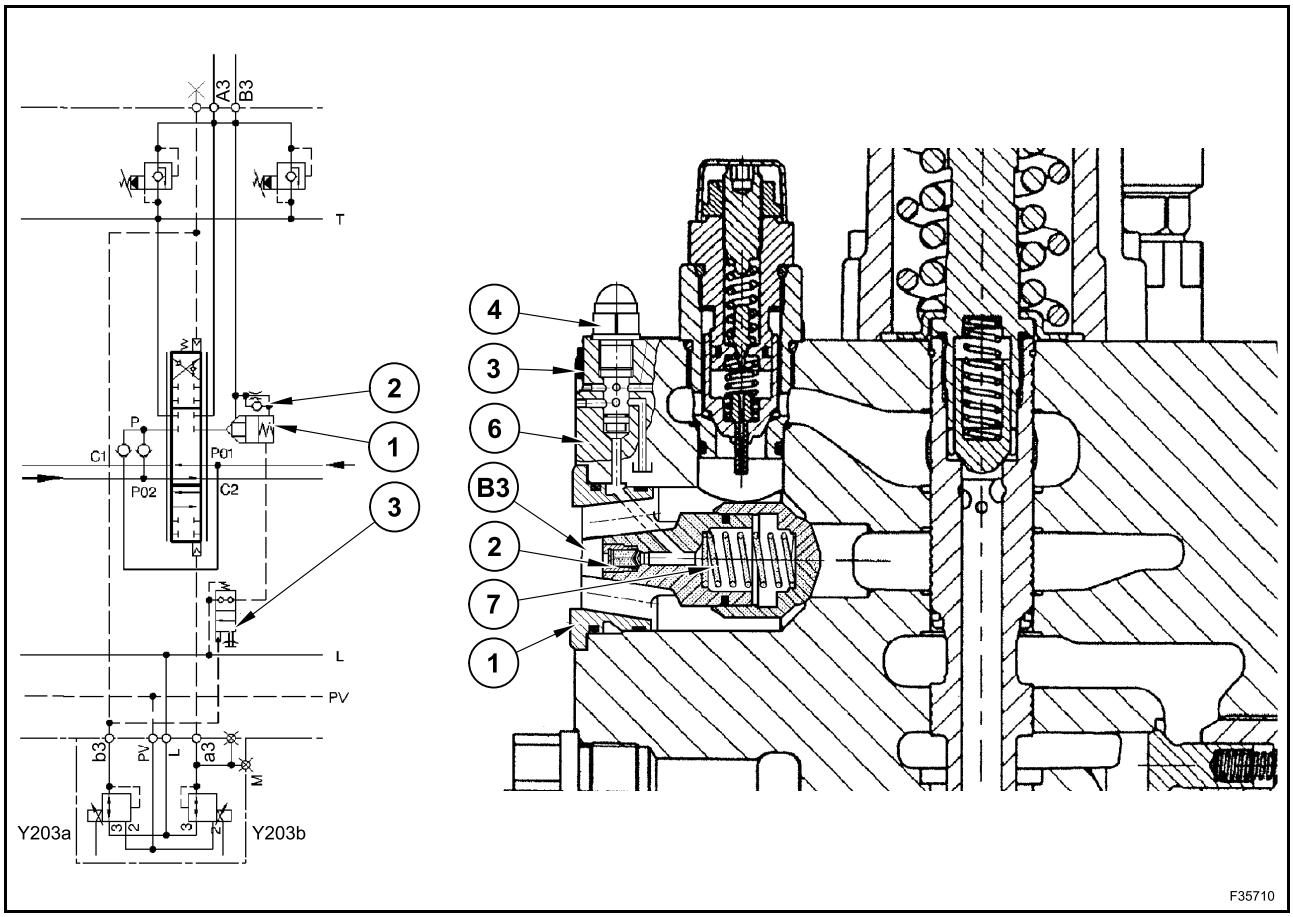
Both pressure switches (14) and (15) detect, if the solenoid valves (6) and (8) when powered, convey the pilot control pressure and, if when they are unpowered, they release the pressure again.

1. Front steering axle
2. Axle floating locking cylinders
3. Undercarriage control valve
3A. Control valve: creep speed control
3B. Control valve: axle floating locking control
3C. Control valve: parking brake control
3D. Control valve: gear engagement control
4. Accumulators
5. Pressure switch
6. Travel motor
7. Gearbox
8. Rear rigid axle
9. Feed pressure valve
10. Hydraulic rotary control valve
11. Electric rotor
12. Upper structure control valve
13. Pressure sensor for pump 2
14. Pressure sensor for automatic gearshift
15. Travel rod
16. Load-holding valve
17. Travel proportional valve
18. Travel proportional valve
19. Filter
20. Check valve
21. Travel pilot control solenoid valve
22. Pilot control assy
N. Neutral
F. Forward
R. Reverse

9. STABILIZATION HYDRAULIC SYSTEM



LOCKING VALVE WITH EMERGENCY ACTIVATION



1. Locking valve
2. Restrictor check valve
3. Unlocking valve
4. Screw
5. Pilot control pressure
6. Leakage channel
7. Spring

The locking valve (1) is used to block the loading pressure on the bottom side of the boom cylinders, without causing leaks.

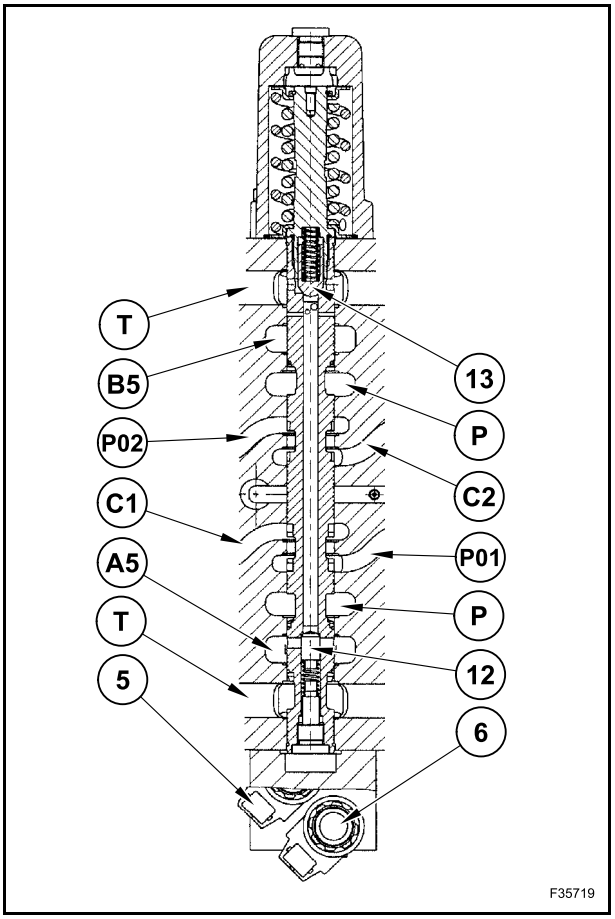
The loading pressure, present in the cylinders when the attachment is raised, acts, by means of connection B3, on the rod side of the locking valve, on which an opening force acts. At the same time, by means of the restriction in the check valve (2), the loading pressure reaches the spring chamber (7). The loading pressure, assisted by the spring force, closes the locking valve (1).

When lowering the boom, the pilot control pressure (5) opens the unlocking valve (3), through which the closing pressure in the spring chamber (7) discharges into the leakage oil channel (6). When lifting the attachment, the pump pressure opens the locking valve, while oil is ejected out of the spring chamber through the check valve (2).

Emergency activation

In emergency situations (the boom remains raised), the unlocking valve (3) may be activated by means of a screw (4). By tightening the screw (4), the valve (3) opens the passage towards the leakage oil channel (6) of the control valve. The opening section on the unlocking valve (3) determines the lowering speed of the attachment.

1. Dipper cylinder
2. Control valve
3. Dipper rod
4. Filter
5. Proportional valve
6. Proportional valve
7. Pilot control pressure disengaging solenoid valve
8. Solenoid valve for pump 1 control pressure
9. Solenoid valve for pump 2 control pressure
10. Pilot control assy
11. Pump regulator
12. Check valve
13. Preloading pressure
N. Neutral
R. Dipper cylinder retraction
E. Dipper extension
P01. Delivery channel of pump 1
C1. Connection channel for pump 1
P02. Delivery channel of pump 2
C2. Connection channel for pump 2
P. Channel P (bridging channel)
A5. Dipper cylinder - bottom side
B5. Dipper cylinder - rod side
T. Tank channel



The dipper cylinder system is supplied both by pump 1 and by pump 2.
The sum of the two oil flows, the double delivery, acts in both cylinder directions.

If another cylinder is contemporarily operated, the dipper cylinder receives oil from one pump only.

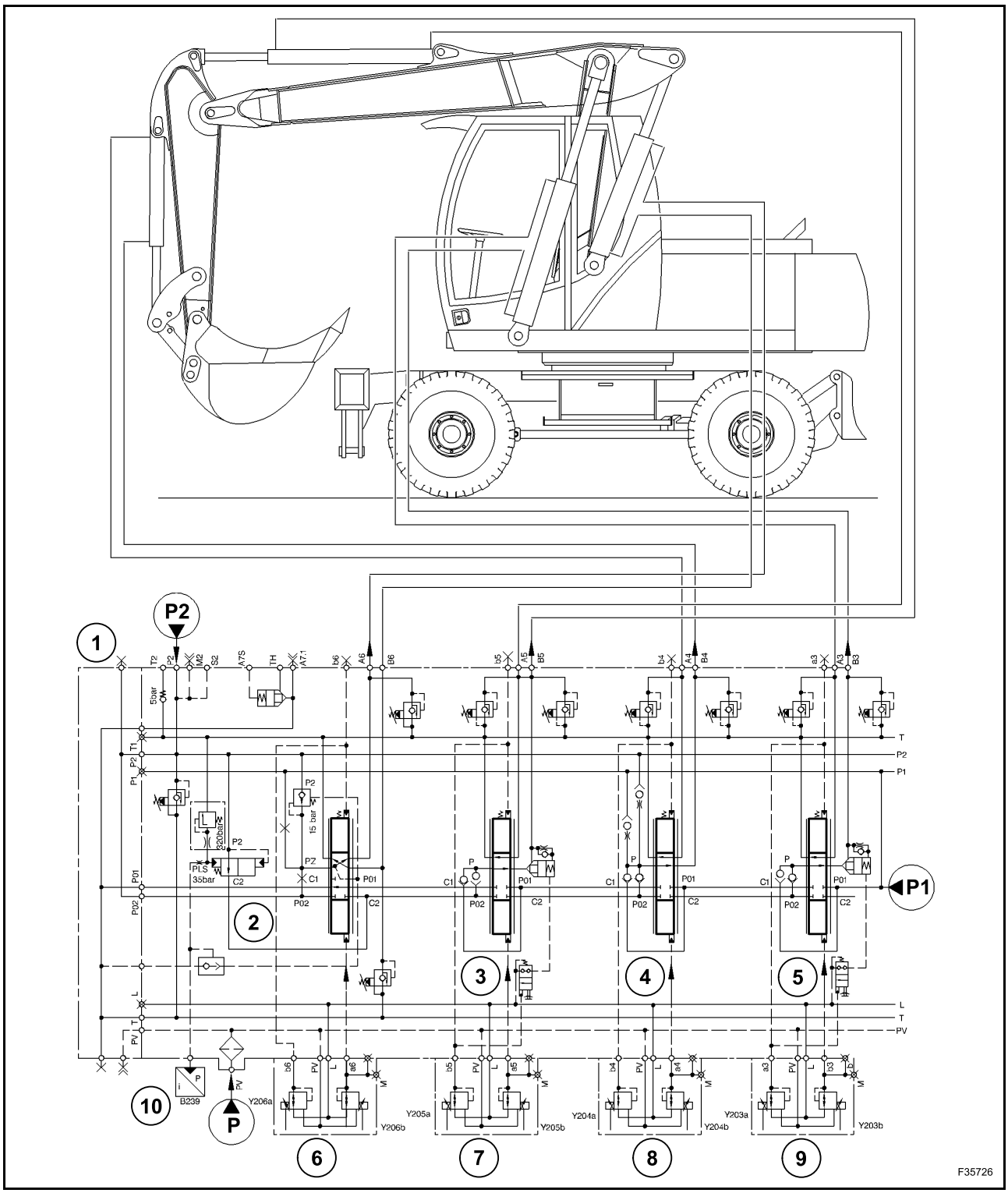
Neutral

With the control valve rod (3) in neutral position, the cooling oil of both pumps, passing in front of the control valve rod (2), moves to channels C1 and C2, passes in front of the other rods and finally drains into the tank channel. The circulation pressure opens both pressure-holding valves, so as to enable the deliveries of both pumps to meet in channel P.

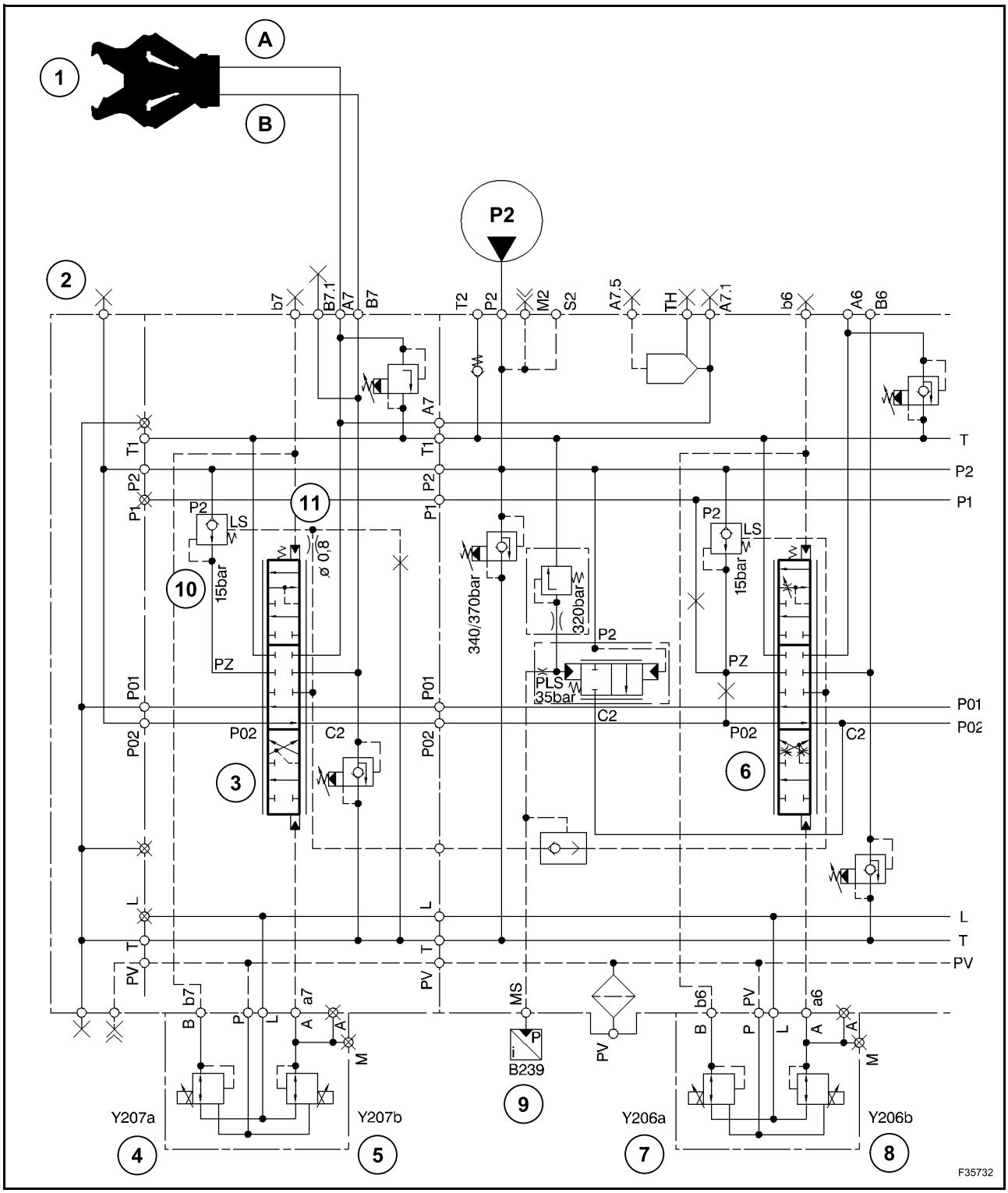
The secondary valves protect both the cylinder and the line sides against pressure peaks.

The preloading pressure in the tank channel remains available on both cylinder sides, in order to prevent cavitation by means of check and top-up valves.

14. HYDRAULIC SYSTEM WITH COMBINATION OF DIFFERENT FUNCTIONS (BOOM, PLACING BOOM, DIPPER AND BUCKET)



17. HYDRAULIC SYSTEM OF SHEARS (WITH PLACING BOOM)



HAMMER BY-PASS VALVE

The by-pass valve (1) of the hammer is controlled by the solenoid valve (6) by means of the connection A7.5.

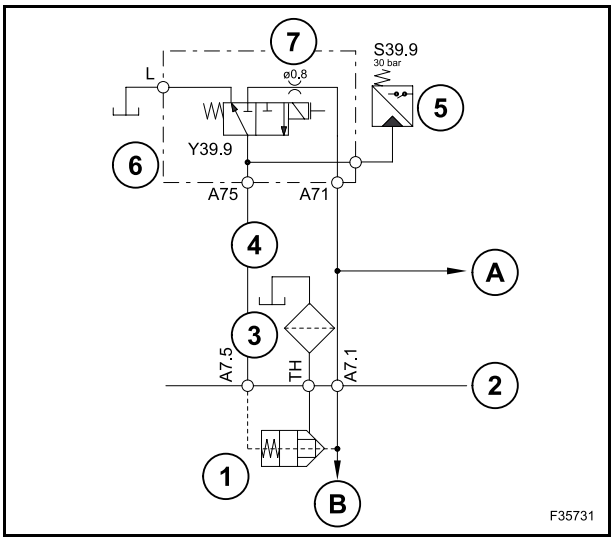
The solenoid valve (6) engages the by-pass valve (1) of the hammer into connection TH.

By engaging the hammer through the switch in the cab, the solenoid valve (6) remains unpowered and the by-pass valve (1) of the hammer remains open.

The return oil coming from the hammer moves to connection A7.1 in the control valve (2), opens the by-pass valve (1) of the hammer and, through connection TH, it drains into the tank (4).

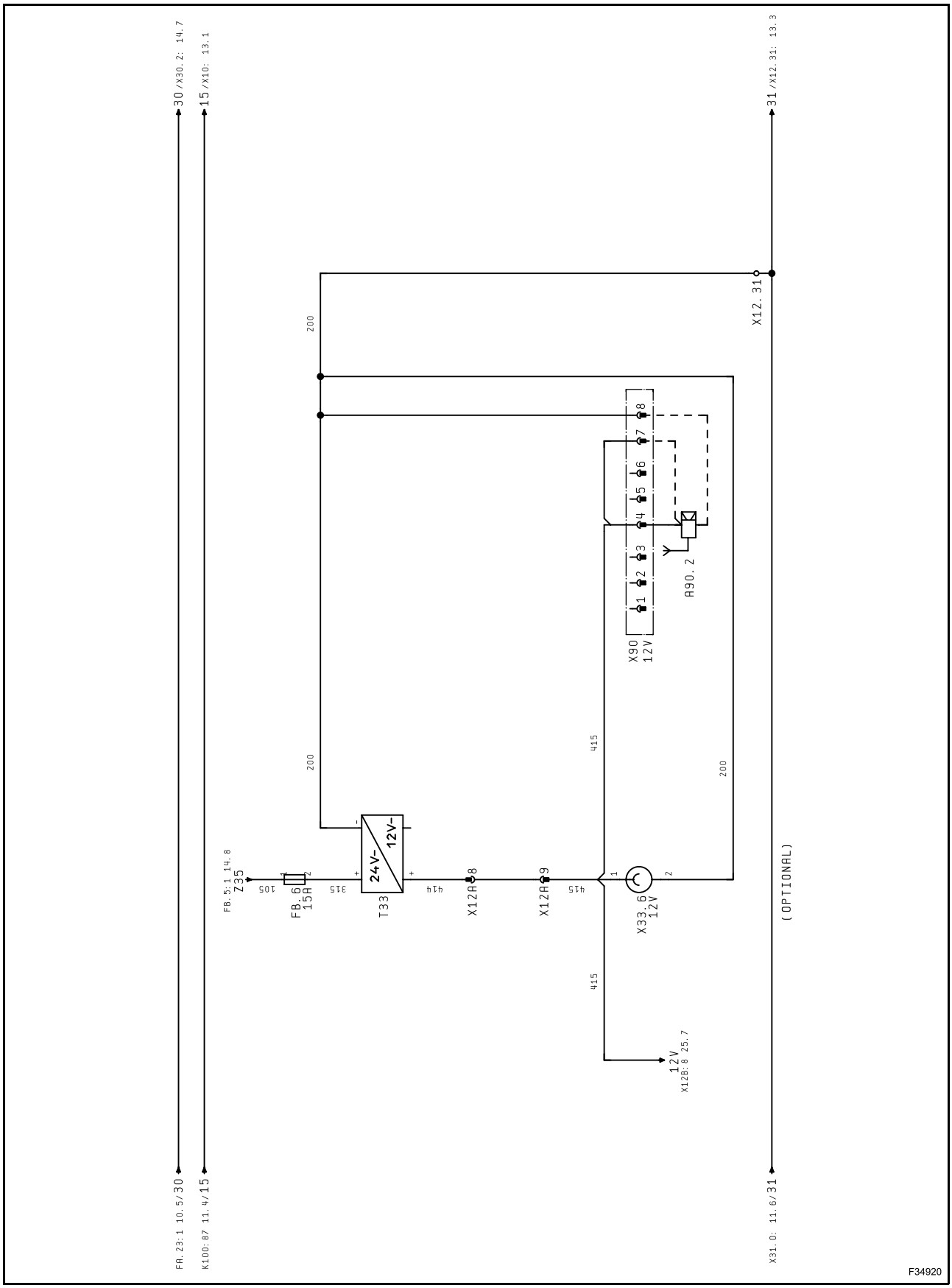
With the shears engaged, voltage is supplied to the solenoid valve (6). The high pressure for shear opening moves to the connection A7.1 out of the control valve and finally reaches the shears. The high pressure also supplies the solenoid valve.

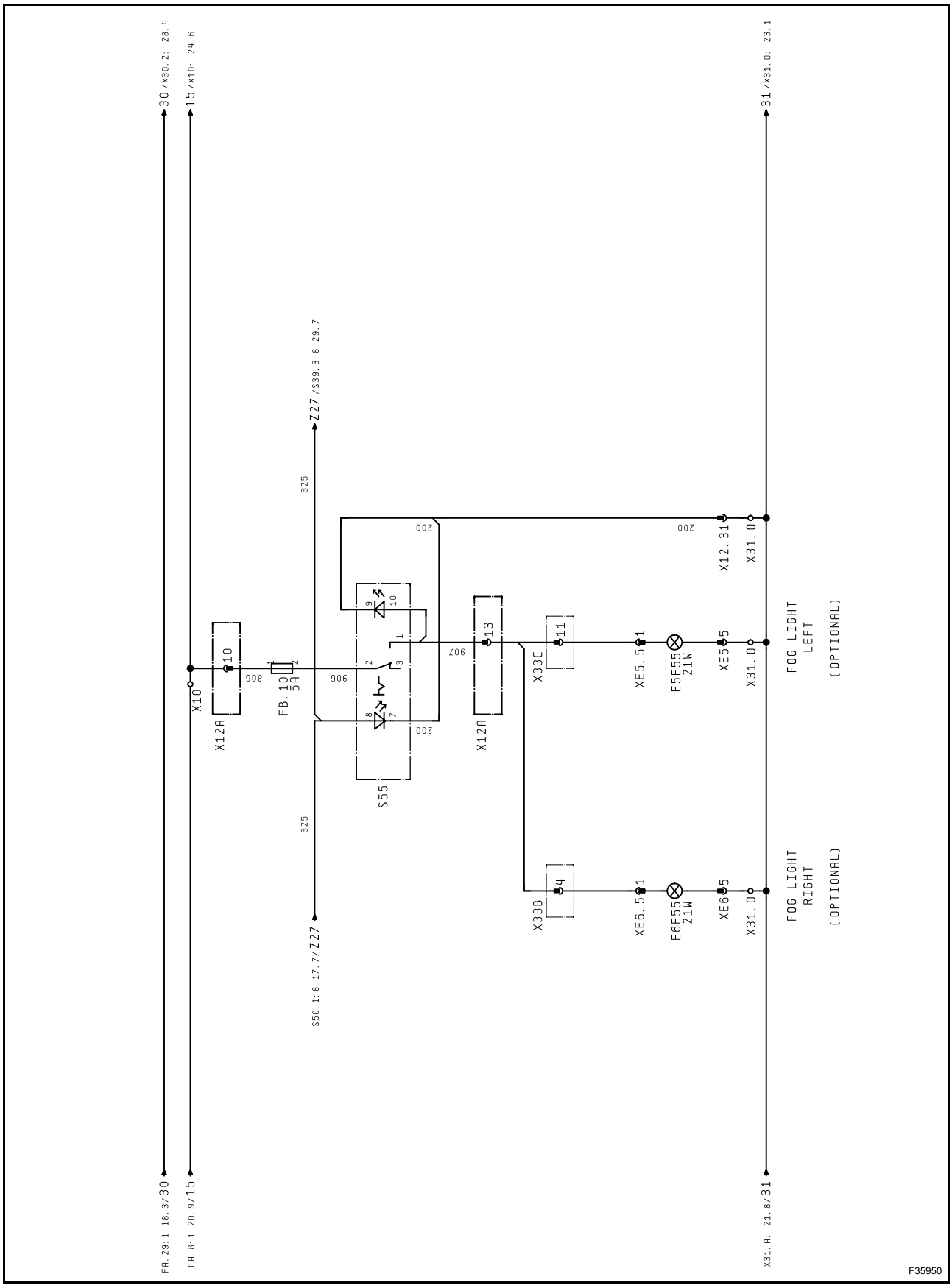
Through connection A7.1, by passing through nozzle Ø 0.8 (0.03) (7) and the solenoid valve piston, high pressure also acts, through connection A7.5, in the chamber of the hammer by-pass valve spring. The check valve closes, blocking the return to the tank. The pressure switch (5) is supplied with high pressure too. As long as the sensor remains open, the hammer operation cannot be activated.



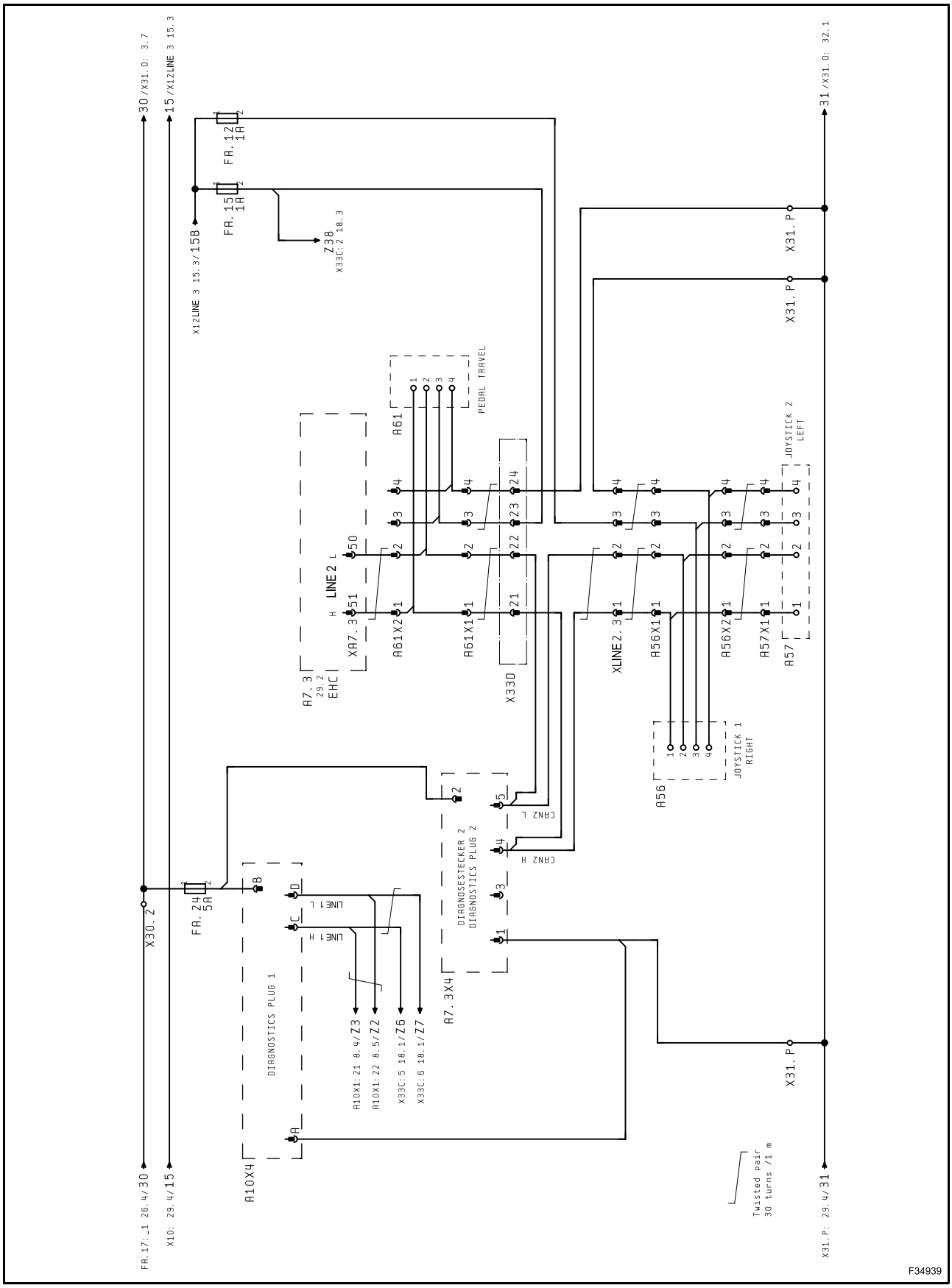
1. By-pass valve
2. Control valve
3. Filter
4. Oil tank
5. Pressure sensor
6. Solenoid valve
7. Nozzle
A. Hammer and shears
B. Hammer and shear rod

CAB

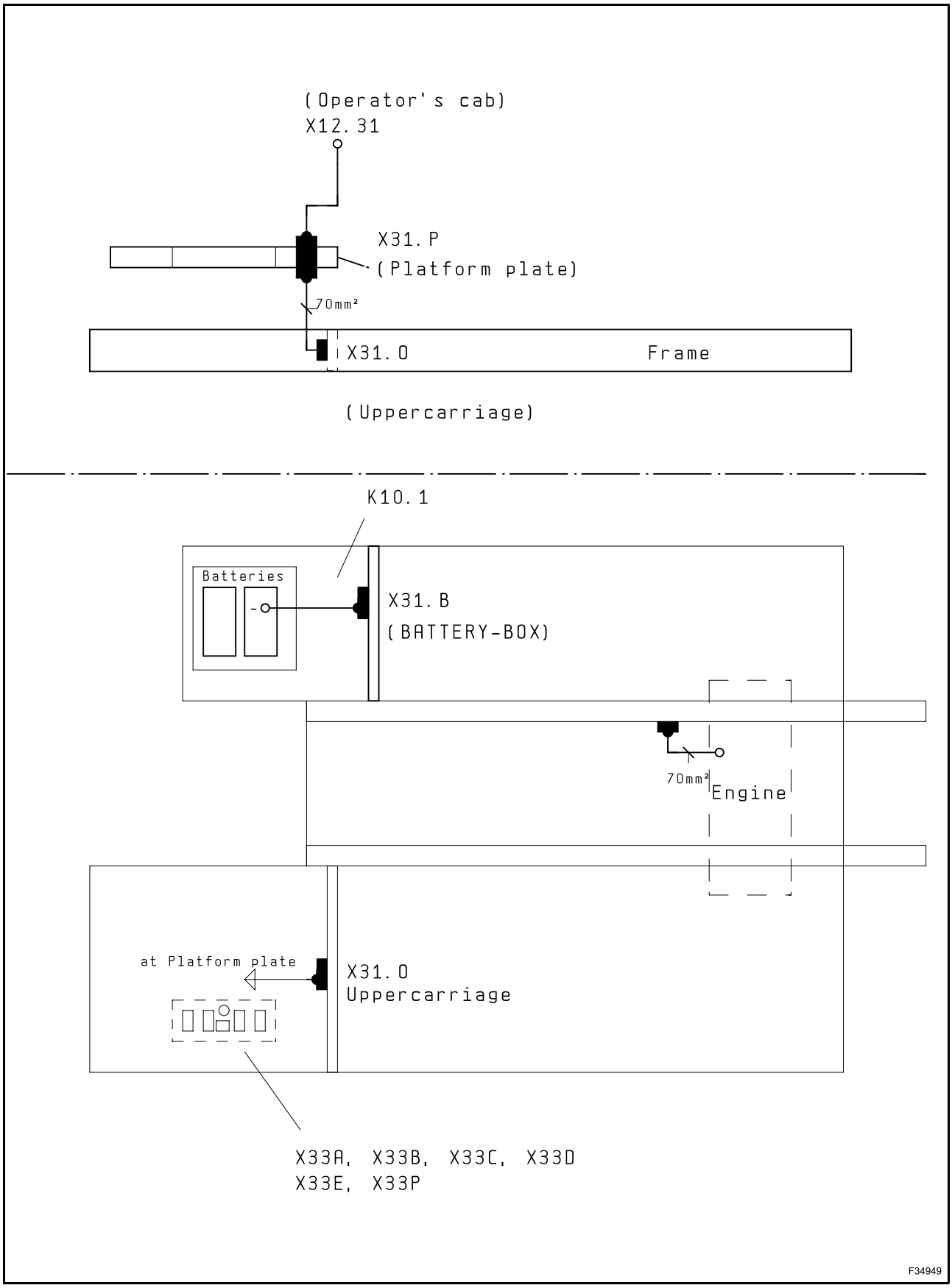

30 /X30.2: 14.7
15 /X10: 13.1
31 /X12.31: 13.3
X12.31
200
X90
12V
A90.2
415
200
FB.5:1 14.8
Z35
105
FB.6
15A
315
T33
24V-
12V-
414
X12A8
X12A9
415
X33.6
12V
(OPTIONAL)
12V
X12B:8 25.7
FR.23:1 10.5/30
K100:87 11.4/15
X31.0: 11.6/31
F34920


30 /X30.2: 28.4
15 /X10: 24.6
31 /X31.0: 23.1
Z27 /S39.3:8 29.7
325
200
907
906
X10
X12A
FB.10
5A
S55
X33C
X33B
XE5.5 1
XE6.5 1
E5E55
21W
E6E55
21W
X12.31
X31.0
FOG LIGHT
LEFT
(OPTIONAL)
FOG LIGHT
RIGHT
(OPTIONAL)
S50.1:8 17.7/Z27
FA.29:1 18.3/30
FA.8:1 20.9/15
X31.R: 21.8/31
F35950

LINE 2


30 /X31.0: 3.7
15 /X12LINE 3 15.3
31 /X31.0: 32.1
FA. 12 1A
FA. 15 1A
X12LINE 3 15.3/15B
Z38
X33C:2 18.3
X31.P
A61
PEDAL TRAVEL
JOYSTICK 2 LEFT
A7.3 29.2 EHC
XA7.3
LINE2
A61X2
A61X1
X33D
XLINE2.3
A56X1
A56X2
A57X1
A57
A56
JOYSTICK 1 RIGHT
CAN2 L
CAN2 H
DIAGNOSESTECKER 2
DIAGNOSTICS PLUG 2
A7.3X4
FA. 24 5A
X30.2
LINE 1
DIAGNOSTICS PLUG 1
A10X4
A10X1: 21 8.4/Z3
A10X1: 22 8.5/Z2
X33C:5 18.1/Z6
X33C:6 18.1/Z7
Twisted pair
30 turns /1 m
FA.17:_1 26.4/30
X10: 29.4/15
X31.P: 29.4/31
F34939

MASS: POINTS ON MACHINE



4. BULBS

Burnt bulbs have to be replaced with bulbs of same power.

Before installing a new bulb, remove all traces of corrosion from the holder and the electrical contacts.

This helps avoid contact problems and high contact resistances.

Never touch new bulbs with bare fingers. Finger marks and dirt will burn in when the bulb is hot and may reduce the service life of the bulb.

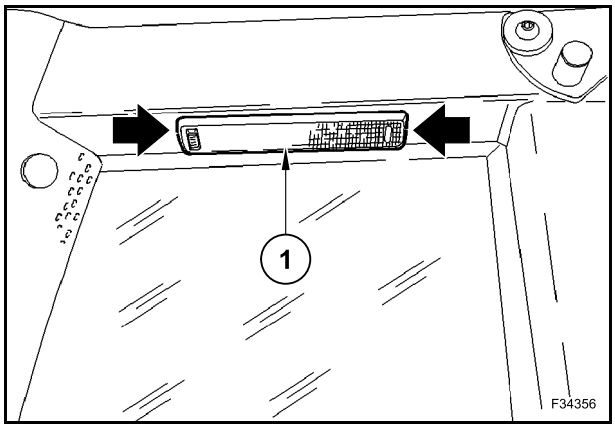
Because of this, wrap a clean rag or a piece of the packing around the bulb and fit the same into the bulb holder.

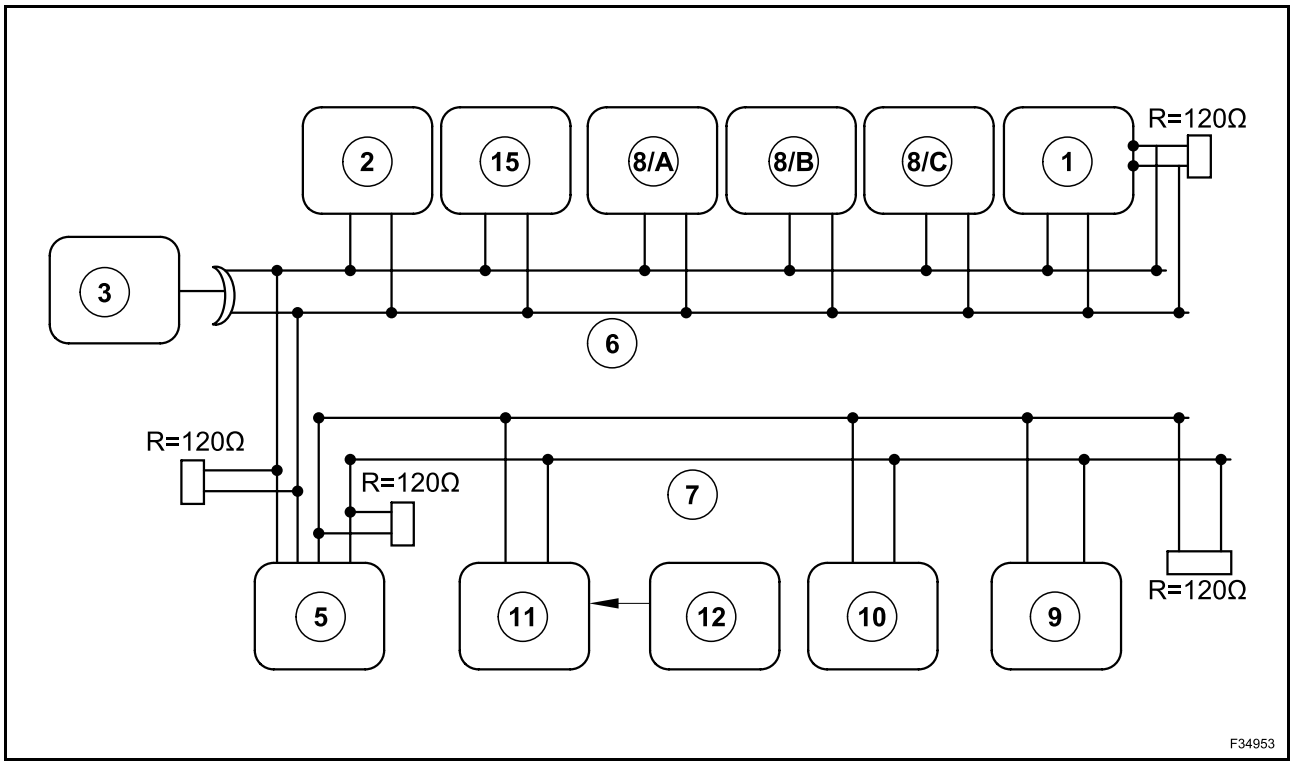
4.1 CAB LIGHT

Unlock and remove the light cover (1).

Now the bulbs are accessible and can be replaced.

Refit the cover (1) and lock it.





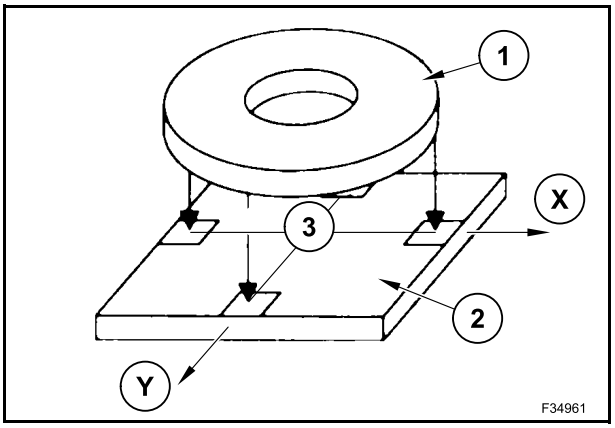
The wheel excavators are equipped with two lines: line 1 and line 2.
In this way it is ensured that the components connected to network through line 1, as the Central Unit, the display, the key-pad modules as well as the pump control system can operate independently from the components of the electro-hydraulic pilot control, connected to network through line 2.

Both lines ends are equipped with terminal resistors.

The terminal resistors of the line 1 are located in the display and in the electro-hydraulic controller.

The terminal resistors of line 2 are located inside the electro-hydraulic controller and inside the left hydraulic control lever.

HYDRAULIC CONTROL LEVERS OPERATION



The hydraulic control levers convert a manual motion into an electrical signal that allows to control the various equipment. The shifting movements are detected by sensors and put out via the interfaces as digital signals.

The position of the movement axes is detected contact-free by means of sensors.

These sensors requires a stable voltage between 4.5 and 5.5V. They deliver at the output a proportional signal and nearly always from 0 to supply voltage. The linearity decreases slightly within 0.5 V from the supply limits but this is not limiting for normal practice.

The sensitivity and the shifting time can be checked by adjusting the distance between the sensor and the magnet surface (1), the larger is the distance, the smaller will be the sensitivity, but the linear detection range will be greater.

To ensure the hydraulic control lever correct operation, two Hall sensors (3) are used to detect the motion directions (X) and (Y), they are installed on the support plate (2). The plausibility control of the signals is based on redundant signal evaluation. This means that based on a value detected by the Hall sensor, the inner microcontroller computes from the measured value of a sensor the probable value of the other sensor and then compares the computed with the measured value. If the difference between both values exceeds a defined tolerances range, a troubleshooting routine comes into force.

During this process, all hydraulic control levers functions are disabled, therefore it becomes necessary to restart the machine.

The position of the hydraulic control lever knob, or the angular deflection in one or more directions, is registered in the same way for all hydraulic control levers. Four Hall sensors (two for direction (X) and two for direction (Y) are mounted on a fixed board in the hydraulic control lever housing. An annular magnet is attached to the articulated joint at the top of which the hydraulic control lever is located. While shifting the knob of the hydraulic control lever in one direction, the distance between the annular magnet and the sensors located in movement direction is reduced or increased. The output voltage changes of the Hall sensors resulting, are converted by the controller into a digital value and can thus be further processed.

Through the conversion, the strengthening and the calibration, the final output signal is produced as a digital value (digit = Bit; Binary dit).

Neutral

If no hydraulic function is activated, the power input of the main pumps is minimized by a high control current of the load-limit regulator to the proportional valve.

The resulting control pressure is about 40 bars (580.15 psi).

The seven possible power stages would be noticeable only as engine speed stages.

During travel, only pump 1 is loaded.
The mechanical output setting of pump 1 corresponds approximately to the engine maximum power.

Road travel

Power stages 6 to 1 are given the engine speed and pump output of the next higher power stage.

Power stage 7 is given a 5% higher pump output, which corresponds to the mechanical power setting of a pump.

Travel (with no road travel mode)

Power stages 7 to 1 are available for the travel function.

If further working functions are activated while the machine is travelling, the load limit of the diesel engine is reached immediately, with the result that the control pressure rises. This causes the reduction of the main pumps output. This power reduction continues until the power balance between the engine output and the hydraulic input is restored.

Working phase

When working with the working hydraulics, the speed signal of the diesel engine is evaluated, and the loading state of the engine is thus recognized, at each power stage. This means that any change in diesel engine speed to above or below the reference speed entails a control current adapted to the output of the diesel engine. This control current is the output signal of the load-limit regulator. The proportional valve converts this control current proportionately into control pressure, causing the power regulator of the main pumps at connection to be activated. If the full hydraulic output is not utilized, the diesel engine speed rises to above the reference speed on account of the lower total load. The result is that the load-limit regulator counter-controls and increases the power intake of the main pumps. It puts out a lower control current to the proportional valve in order to load the main pumps with a lower control pressure.

The result is that the regulating pressure of the main pumps, which is within the normal range in this situation, is raised. This causes the power input to increase and the volumetric flow as well.

If the main pumps are in the pressure range below the start of regulation, the load-limit regulator signal cannot influence the power input of the main pumps.

The electronic load limit regulation attained in this way in conjunction with individually output controlled main pumps ensures optimum utilization of the available diesel engine output.

3.3 MAIN VALVE CALIBRATION (CONTROL VALVE)