SMPC30006224

Shop Manual

PC3000-6

HYDRAULIC MINING SHOVEL

SERIAL NUMBERS PC3000-6 6224

July 2006

III. SPECIFICATIONS

III.IV EXPLANATION OF ABBREVATIONS

ABB.	Definition
A	Ampere
AC	Alternating Current
API	American Petroleum Institute
BHA	Back Hoe Attachment
°C	Degree Celsius
CLS	Central Lubrication System
CO	Cut off function (main pump)
DC	Direct Current
FSA	Front Shovel Attachment
HP	High Pressure
HT	High Tension
LED	Light Emitting Diode
MRV	Main Relieve Valve
PIV	Pressure Increasing Valve
PTO	Power Take-Off (Pump Distributor Gear)
Qmax	Maximum pump delivery = maximum swash plate angle
Qmin	Minimum pump delivery = minimum swash plate angle
1/2 Qmax	1/2 pump delivery
SLS	Swing circle pinion Lubrication System
SRV	Secondary relieve valve
V	Volt
1/min	Revolutions Per Minute (RPM)

Legend for illustration (Z 24012):

A	View from machine center
B	View from pump compartment
C	Top view

1	Main hydraulic oil reservoir
2	Location temperature sensors
3	Location level sensors
4	Oil level sight gauge
5	Breather filter
6	Return oil filter (three)
7	Auxiliary return oil connections
8	Back pressure valve
9	Leakage oil line connections
10	Leakage oil filter (one)
11	Mounting brackets
12	Oil reservoir outlet (suction pipe)
13	Main gate valve
14	Compensator
15	Access cover
16	Level switch for service arm indicator light
17	Refill plug

Legend for illustration (Z 23080a):

A **Left View of Operator's Cab**

B **Top View of Operator's Cab**

1 Control switch for hydraulically operated access ladder

3 Access door to the air filter of the operator's cab

5 Portable fire extinguisher. Make sure the fire extinguisher is always charged and ready for use.

6 Handle of the sliding window

REMARK

The sliding window serves as emergency exit and should always be closed when working with the shovel to prevent dust from getting into the cab.

7 Operator's console.

8 Safety lock lever.

⚠ WARNING

Before leaving the operator's cab set the safety lock lever to LOCK position (L). If the controls are not locked, and they are touched inadvertently, this may lead to a serious accident.

9 Air conditioner condenser unit

14 Co-driver's seat.

15 Operator's seat,

16 Left control lever

17 Right control lever

18 Control pedals for opening and closing of the bottom dump bucket (Face shovel only)

19 Travel control pedals

20 Swing brake pedal

21 Door opener push button, from inside the cab door.

22 Outside mirrors with integrated heaters.

23 Adapter for warning beacon

24 Aerial (Radio antenna)

26 Main wiper Motor

27 Main windshield wiper

28 Auxiliary windshield wiper

Prime Drive Assembly

Legend for illustration Z 22176

1	Diesel Engine
2	Torsion type coupling (diesel drive)
3	Pump distributor gear (PTO)
4	Adapter flange
5	Torsion type coupling (electric drive)
6	Electric motor

General

The PC 3000 diesel is driven by a Komatsu diesel engine:

Model:	SSA 12 V 159
Type:	4-cycle, water-cooled, direct injection
Aspiration:	Turbocharged and after cooled
Number of cylinders	12
Rated power	940 kW (1269 HP) @ 1800 rpm
Governor	All-speed, electronic

The engine is controlled by two signal lines for the main fuel valve and the RPM control. Engine monitoring sensors direct connected to relays and modules in the cab base. Visual monitoring by text display and gauges at the dash board.

Legend for illustration Z25219

1	Main pump
2	Gear box connecting flange
3	Pilot pump
4	Level plug
5	Breather pipe
6	Drain plug
7	Gear oil for spline shaft lubrication
8	Spline shaft of the pump
9	Shaft seal between gear box and gear shaft
10	Gear shaft of main pump
11	Gear shaft of pilot pump
12	Adapter coupling to pilot pump

Description

The spline shaft housing is a independent separate oil chamber between the pump and the gear box. It prevent a contamination of hydraulic oil in to the gear box oil in case of defect pump shaft seals. All spline shaft housings are filled with the same gear oil as the gear box (PTO).

There are two reasons for this separate oil chamber.

- To lubricate the multi spline connections between gear box drive shaft and the pump to prevent wear and corrosion.
- To monitor the shaft seal of the pump and gear box drive shaft

If oil comes out of the breather pipe it indicates a problem with the shaft seal of the pump.

If the level drops lower as the level plug it may indicates a problem of the shaft seal between gear shaft and gear box

Legend:Z 22396b(

1	Wing nut
2	Washer
3	Seal ring
4	Main filter element
5	Cotter pin
6	Wing nut with service indicator
7	Safety filter element
8	Maintenance switch
9	Flap for pre-separator
10	Air intake to the pre-separator tubes

Description:

The air is filtered by a dry-air filter with pre-separator for coarse impurities.

The air filter includes 2 filters. One for each engine cylinder bank. Each one consists of a main filter element (4) and a safety element (7).

The main filter element condition is controlled by the maintenance switches (8). The switch actuates a fault message at the text display in the cab as soon as the restriction is too high. The safety filter element incorporates service indicator inside of the wing nut of the safety filter mounting.

- A green indication inside of the window means the filter is O.K.
- A red indication inside of the window means the safety element (2) needs to be changed.

To reset the indicator after filter change suck at the indicator window, the indicator should move to the green position.

NOTICE

- **For service intervals and procedure refer to the Operation and Maintenance Manual of the corresponding machine**

NOTICE

- **The switch point of the pressure switch for the leak oil filter has been chosen so low with best intention to protect first of all the radial seal rings of the hydraulic motors.**
- **For maintenance refer to the Maintenance Manual**

Description			Value
Filter monitoring	Return oil chamber	B26	2 bar
	Leak oil chamber	B25	0,5 bar
	Breather filter	B24	0,080 bar
Filter size	Return oil		10 micron
	Leak oil		3 micron
	Safety filter (by pass filter)		200 micron

Legend for illustration Z 25230

1	Collector tube
2	Connection to cooler
3	Connection to back pressure valve
4	Back pressure valve
5	Connection to return oil chamber (not cooled)
6	Pulsation damper
7	Distribution to each cooler (two or four)
8	Resistor close to inlet of the cooler
9	Cooler outlet
10	Cooled return oil to the reservoir
11	Connection to return oil chamber (cooled oil)
12	Screen filter (cooler protection)
13	Filter monitoring difference pressure switch
14	Oil cooler
15	Return oil filter chamber
16	Hydraulic oil reservoir
17	Distributor pipe

Function:

The return oil from the hydraulic system flows via hoses into the collector tube (1). To prevent damage of the oil cooler and pipes there is on the end of the tube a pulsation damper (6) installed. One pair of hoses (3) connects the tube (1) with the back pressure valve (4) at the return oil chamber of the hydraulic oil reservoire. Another pipe connects the collector tube (1) via a screen filter (12) to a distributor pipe and pulsation damper (6). A differential pressure switch (13) monitors the screen filter condition. Another two or four hoses (7) (depends on the number of cooler elements) connects the distributor pipe (17) to the oil cooler (14).

The back pressure valve (5) limits the return oil pressure which is created by the oil flow through the restriction (8) in front of the cooler (14).

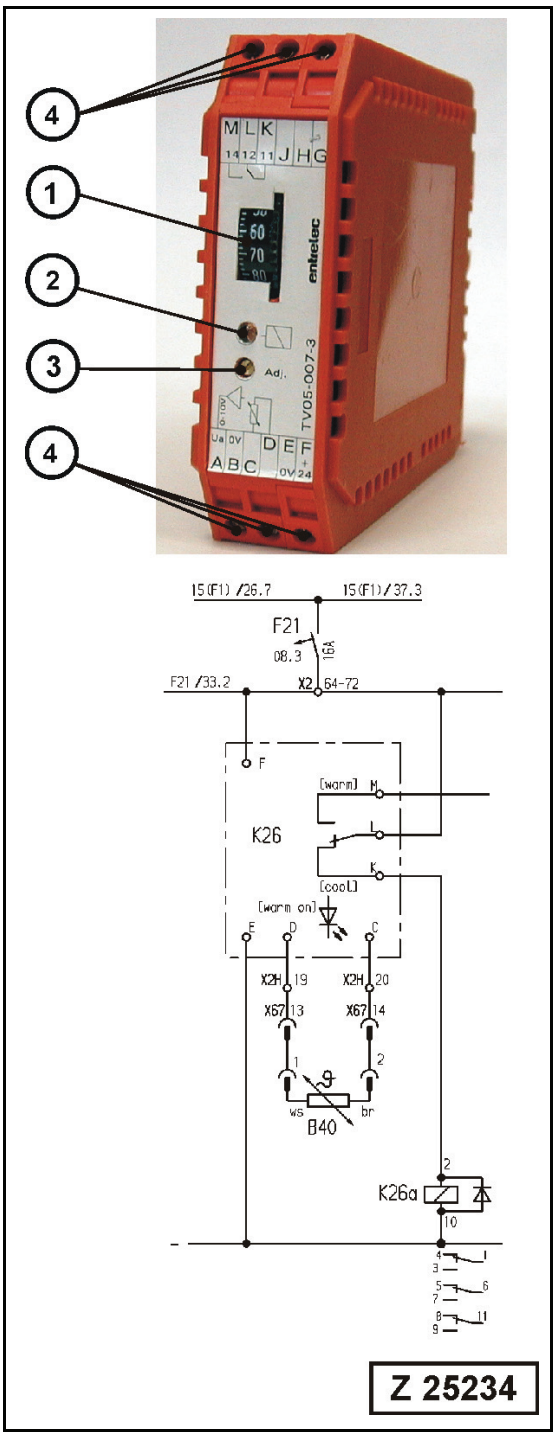
On the flow to the cooler (14) the hydraulic oil pass the restriction (8) gets cooled in the cooler (14) and flows than through the lines (10) into the filter chamber (15) of the hydraulic oil reservoir (16).

The restriction (8) and the connected (6) pulsation damper are acting as shock absorbers to prevent cooler cracks created from pressure peaks.

4.4.3 Temperature relay

Legend for illustration Z 25234

1	Adjustment drum (switch point adjustment)
2	LED, relay active = LED lights
3	Adjustment screw for line resistance compensation
4	Connecting terminals



General:

In combination with a PT100 sensor the temperature relay monitors the temperature limits. When the set temperature limit is exceeded the corresponding relay immediately change the condition and the LED (2) lights up. Correspond to the connected relay contacts the output opened or closed.

Function check for RPM-Control:

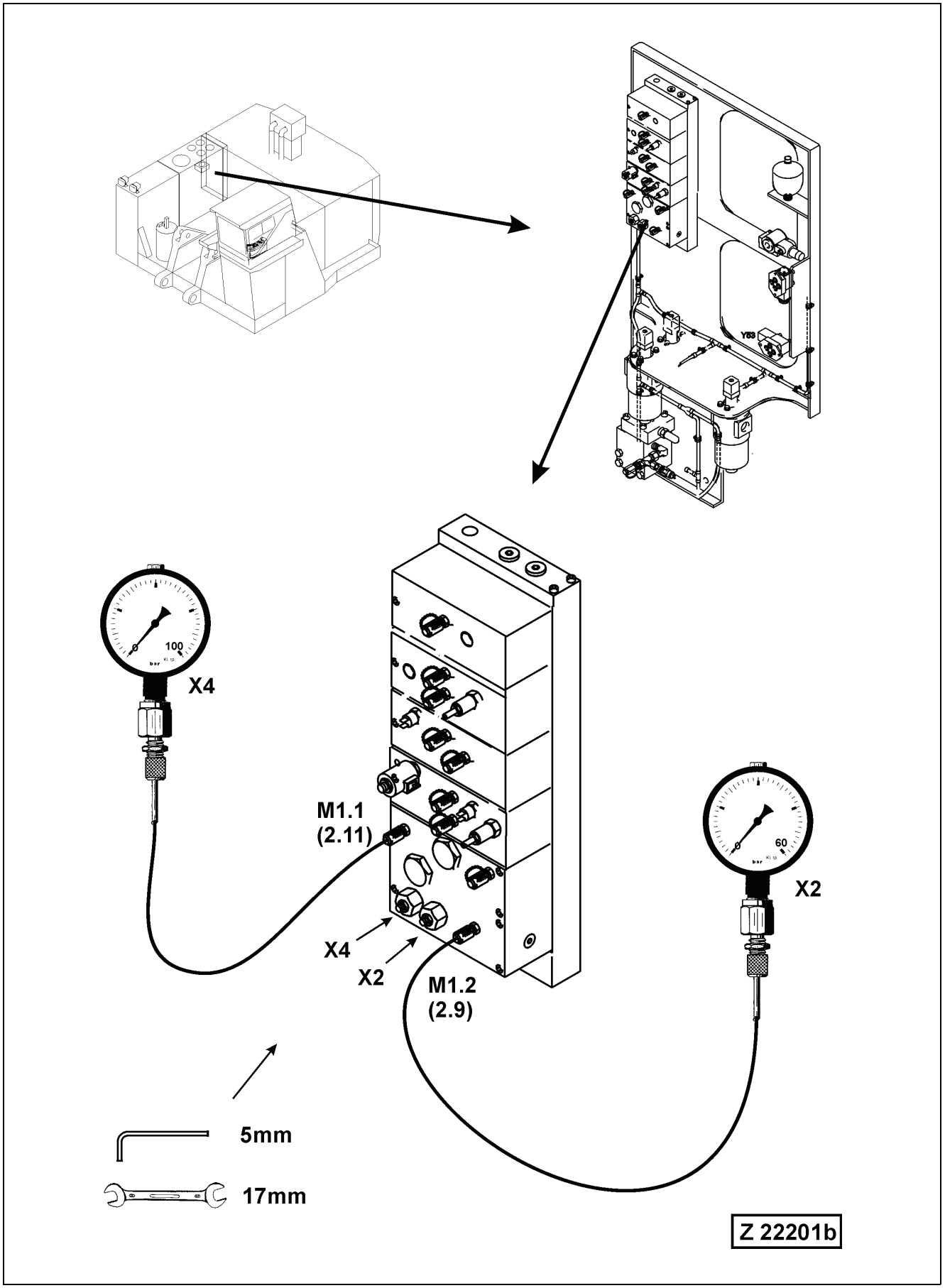
1. Adjust at the switching unit K26 a temperature below the actual hydraulic oil temperature.
2. Start motor (diesel engine run with max. rpm).
3. The cooler fan must run now with 1300 rpm.*
4. Adjust at the switching unit K26 a temperature above the actual hydraulic oil temperature.
5. The cooler fan must run now with low rpm.*
6. Adjust at the switching unit K26 the value according to the chart in the hydraulic diagram select the value for the filled in oil viscosity.

Adjustment of the line resistance compensation:

1. Unplug the temperature sensor and measure the electrical resistance between the two open ends of the sensor with a multi meter. Use the conversion table "Basic Values in Ohm according to DIN 43 76" in section Specification to get the corresponding temperature, it is the real temperature. Plug in the sensor back to the cable harness.
2. Adjust the scale drum (1) of the temperature module to a higher value as the temperature measured before at item 1.), the LED (2) should be off. Now turn the scale drum (1) slowly to a lower value until the LED (2) switch on. The value at the scale should be the same as the measured. If not correct with potentiometer (3), use a small screw driver.

NOTICE
Always check the switch point by adjusting of the scale drum from a high value to a lower value to eliminate an influence of the hysteresis which is about 3 to 5 °C.

5.1.2 Pilot pressure adjustment



Procedure to check the control logic

⚠ WARNING

- **Check must be done with running engine and moving attachment.**
- **Make sure that the machine can move hazard free all functions. All function must be activated carefully.**
- **The travel parking brake and swing parking brake must be in a good and safe working condition.**

1. Connect pressure gauges to the check points of all pilot control cabs Required number of pilot pressure gauges
   FSA = 25 (0-60 bar)
   BHA = 22 (0-60 bar)
2. Connect pressure gauges to the main high pressure circuits at the high pressure filters. Required number of high pressure gauges: 3 (0-400 bar)
3. Mark each pilot cab with spool number and cab side for easy and faultless reading during check.
4. Disconnect the connector to solenoid valve Y16 at the filter and valve frame in the pump housing. It activates the travel parking brakes and blocks the travel function.
5. Start engine and let engine run in high idle. Ladder, service arm and seat contact must be in operation condition.
6. Operate on after the next item of the control logic test sheet Check for each item the gauge readings and compare it with the test sheet condition.

   If there is a abnormality check electrical and hydraulically pilot control circuit.
7. Move attachment into a safe position. Stop engine.
8. Reconnect connector to solenoid valve Y16.

Check sheet BHA Page 10

PC3000/6_Frontshovel **Ser. No.:** **Date:**

40 Check Operating Situations

41 Boom down, Stick in, Bucket empty, Clam close, Swing right

Y132b	Y132b	Y132c
O	O	O

III	- O -	b
P	O - -	a

b	a
-	-
-	-
-	O
O	-
P	I

b	a
-	-
-	-
O	-
-	-
P	II

42 Boom down, Stick out, Bucket fill

Y132b	Y132b	Y132c
-	-	O

III	- - -	b
P	- O O	a

b	a
-	-
O	-
-	-
O	-
P	I

b	a
-	-
-	O
-	O
-	-
P	II

43 Boom down, Stick out, Bucket empty

Y132b	Y132b	Y132c
-	-	O

III	- O -	b
P	- - O	a

b	a
-	-
O	-
-	-
O	-
P	I

b	a
-	-
-	O
O	-
-	-
P	II

44 Boom down, Stick in, Bucket fill

Y132b	Y132b	Y132c
O	O	O

III	- - -	b
P	- O -	a

b	a
-	-
-	O
-	-
O	-
P	I

b	a
-	-
-	-
-	O
-	-
P	II

Check sheet FSA Page 7

34 Boom up, Stick out, Bucket fill, Swing left

III	O	O	-	b
P	-	-	O	a

b	a
-	-
-	O
-	-
-	O
P	I

b	a
-	-
-	O
-	-
-	O
P	II

35 Boom up, Stick out, Bucket empty

III	-	O	-	b
P	-	-	O	a

b	a
-	-
O	-
-	-
-	O
P	I

b	a
-	-
-	O
O	-
-	O
P	II

36 Boom up, Stick out, Bucket empty, Swing right

III	-	O	-	b
P	O	-	O	a

b	a
-	-
O	-
-	-
-	O
P	I

b	a
-	-
-	O
O	-
-	O
P	II

37a Check Automatic Priority

38 Boom up, Bucket fill

III	-	O	-	b
P	-	-	-	a

b	a
-	-
-	O
-	-
-	O
P	I

b	a
-	-
-	-
-	O
-	O
P	II

39 Boom up, Stick out

III	-	O	-	b
P	-	-	O	a

b	a
-	-
-	-
-	-
-	O
P	I

b	a
-	-
-	O
-	-
-	O
P	II

Legend for illustration Z 25279

Numbers in brackets are component numbers for the hydraulic diagraml

Control block III

6	SRV (66.1), bucket cylinder rod side
7	SRV (66.2), stick cylinder rod side
8	ACV (68.5), stick cylinder piston side
21	MRV block III

Floating system

17	solenoid valve Y132c, boom
18	solenoid valve Y 132b, stick

Legend for illustration Z 21834

The illustration shows the valve block up side down

1	Throttle adjustment pin
2	Back up ring
3	O-ring
4	Retainer
5	Back up ring
6	O-ring
7	Spring
8	Spring cup
9	Throttle valve sleeve
9.1	Adjustable throttle holes
9.2	Permanent throttle holes (safety channel)
10	O-ring
11	Housing
12	Return line port, T
13	Pressure relief valve
14	Bolt
15	Clip ring
16	Lock nut
A	Line ports from the control valve
B	Line port to the cylinder
M	Pressure check point
Y	Control oil drain port

Function:

Setting of the maximum permissible cylinder speed (flow B to A) is carried out by pin (1). Depending on the pin (1) setting the radial holes (9.1) in the valve sleeve (9)will be partially opened to achieve the required throttling of the oil flow. The safety holes (9.2) prevents the valve from becoming completely closed.

For the lifting operation (flow A to B) the valve sleeve which is guided by the spindle (1) is pressed against spring (7) so that the valve will be completely open.

SRV (13) limits the maximum system pressure from the cylinder and relieves oil to the tank line T when the pressure reach the valve setting.

Function:

Main control valve Type MO:

Illustration Z 22217

Upper picture

Spool centering springs (1) keeps the spool (3) in neutral center position if there is no pilot pressure at pilot port a or b.

Precise control grooves (2) provide for sensitive controlling because a motion is started always while the pressure oil and the return oil fist passes this fine control grooves before spool is inter connecting the entire groove to the service line port.

In neutral position of the spool (3) the pump oil flows back via port PU to outlet T and from there via pipes back in the oil reservoir.

Lower picture

The spool is pushed to the left position by pilot pressure at pilot port a. Port PU is closed and the connection through the check valve P1 to the service port A is open. Also the connection form the other service port B (return line) is connected to the port T (return line to reservoir).

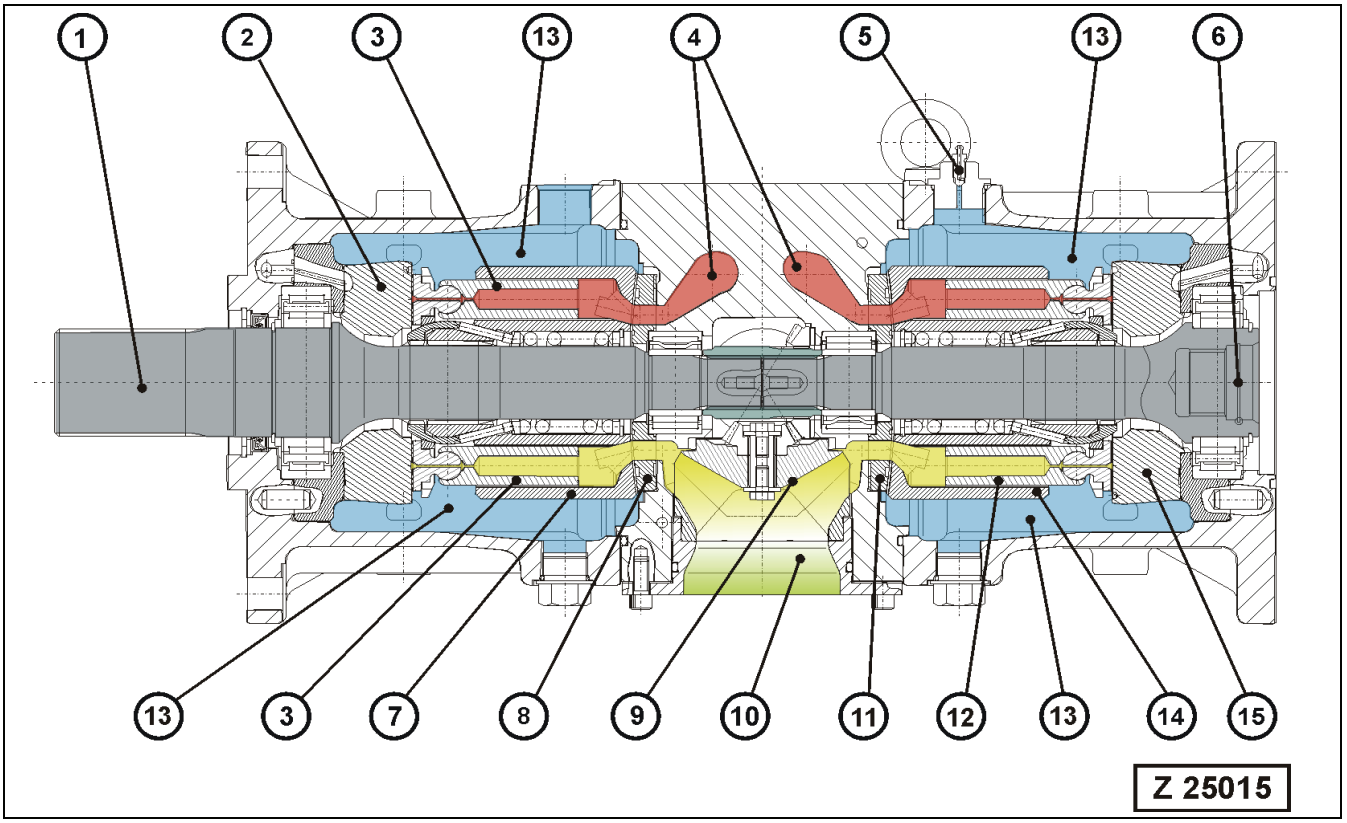
Legend for illustration Z 25285

Numbers in brackets are port numbers and component numbers stamped in the control blocks and written in the hydraulic diagram.

1	Support plate with distribution lines
2	X4 control pressure, constant 60 bar
3	X2 control pressure, constant 35 bar
33	Return line to oil reservoir pressure less
4	Control oil block (252)
5	Pressure relieve valve X4 pressure (252.2)
6	Pressure regulator valve X2 pressure (252.1)
7	Check point M1.2, X2 pressure (2.9)
8	Check point M1.1, X4 pressure (2.11)
9	Check point M30, X4 pressure (2.5)
10	Control block travel brake and truck tensioning (257)
11	Pressure relieve valve travel brake pressure (257.1)
12	Check point M12, (11.2)
13	Solenoid valve Y16, travel brake control (257.2)
14	Pressure switch B48, travel brake monitoring (8.4)
15	Control block slew brake (256)
16	Check point M2, X2 pilot control pressure (7.4)
17	Check point M10, slew parking brake pressure (7.6)
18	Check point M39, slew service brake pressure (7.5)
19	Solenoid valve Y5, slew parking brake control (256.2), diagram no. (35.10)
20	Solenoid valve Y120, slew service brake emergency control (256.1), diagram no. (35.9)
21	Pressure switch B16 slew parking brake monitoring (7.7)

7. MAIN HYDRAULIC PUMPS AND PUMP REGULATION

7.2.1 Main pump function

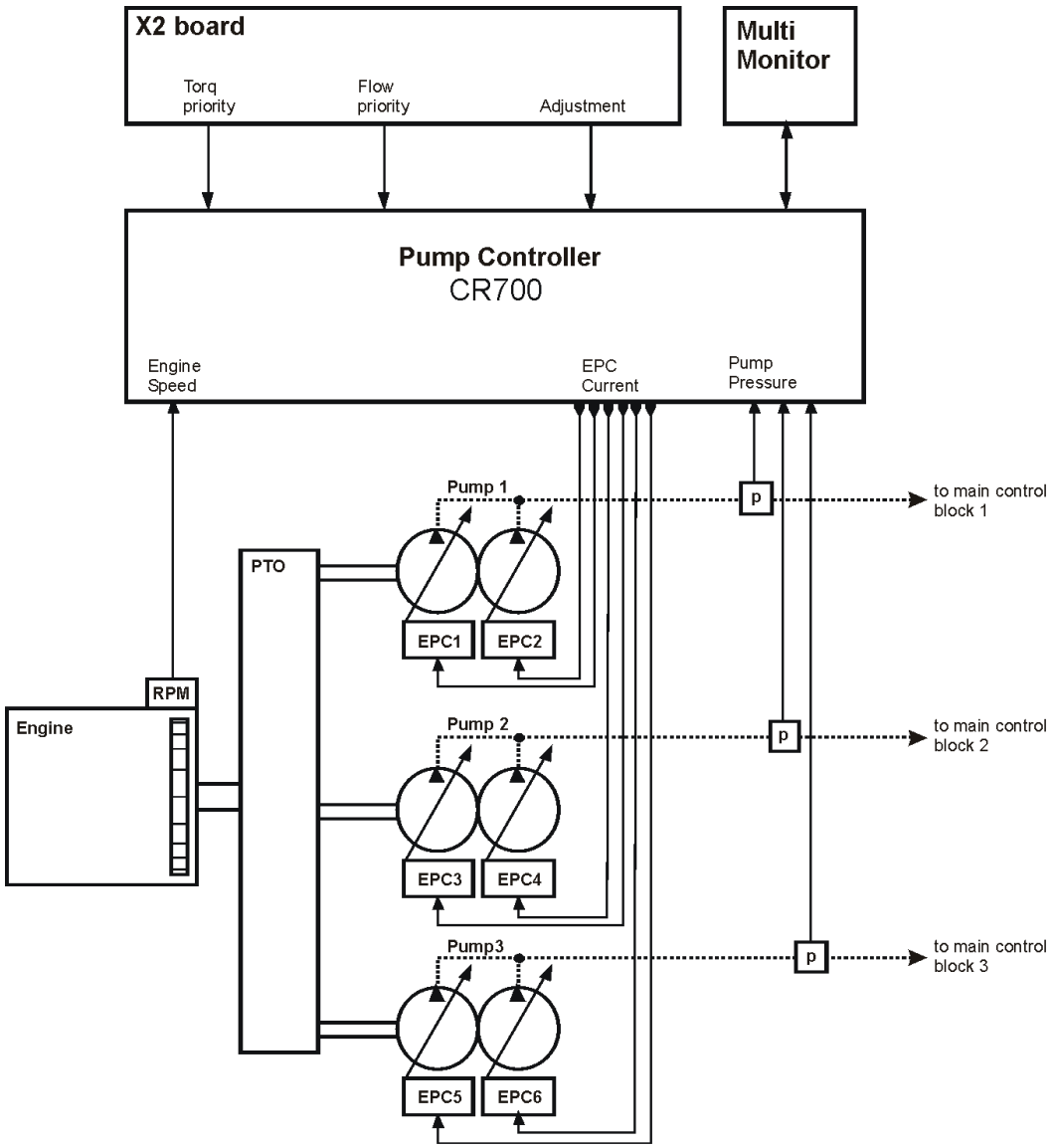


Legend for illustration Z 25015

1	Main spline shaft
2	Swash plate 1st pump
3	Pump piston 1st pump
4	Pump outlet, high pressure
5	Bleeding nipple
6	Drive shaft coupling for auxiliary pump
7	Pump cylinder 1st pump
8	Pump valve plate 1st pump
9	Centrifugal pump
10	Pump intake, suction port (low pressure Pump valve plate
11	Pump valve plate 2nd pump
12	Pump piston 2nd pump
13	Case oil filling
14	Pump cylinder 2nd pump
15	Swash plate 2nd pump

7.4 Electronic pump regulation

General



Pump controller CR700

Multi Monitor

Z 25111

Adjustment (menu item 04)

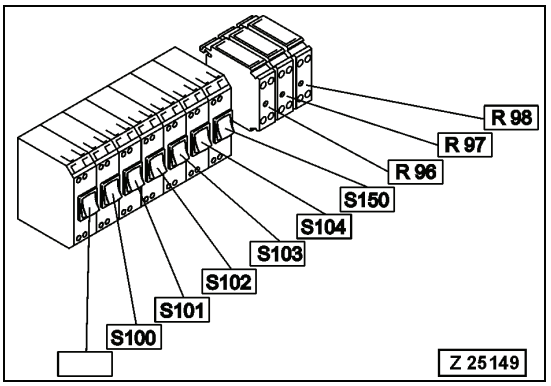
All electronically controlled pump parameters (EPC system) like regulation values, Qmin, Qmax and cut off pressure can be selected, checked and adjusted at this menu.

REMARK

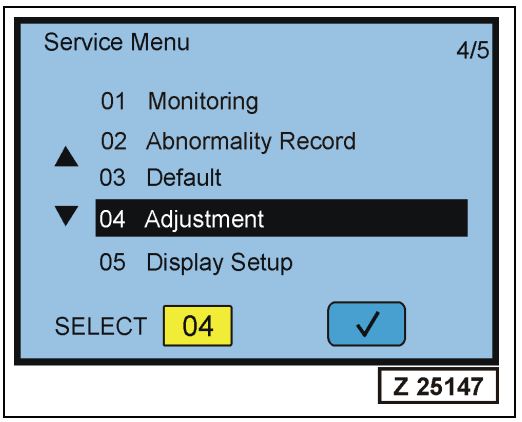
The ex works adjustment of the EPC system should not be altered. If special applications require an adjustment contact KMG Service department for further information.

To select and adjust the EPC system parameter there are momentary switches (S100-S104) and potentiometers (R96, R97, R98) at the X2 board. Z 25149

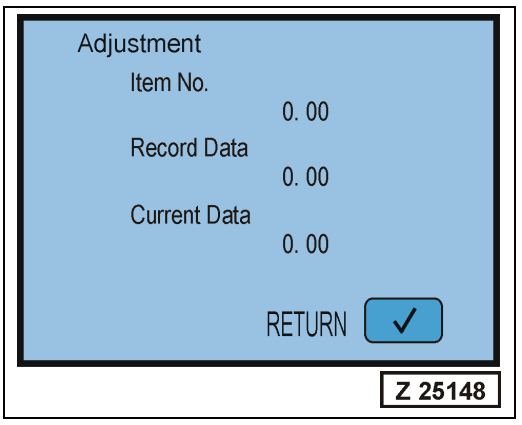
Switch in X2 box	Function
S 100	Memory record except Primary P-Factor
S 101	Down
S 102	Up
S 103	Test mode (all main pumps Qmax)
S 104	Memory record only Primary P-Factor
S 150	Test mode (all main pumps = Qmin)
R 96	Adjustment data except Primary P-Factor
R 97	Adjustment demand power (only E. drive)
R 98	Adjustment only Primary P-Factor



Select item 04 "Adjustment" at the Service Menu with the up ▲ , down ▼ key or write " 0 4 " with the number keys and confirm with the enter key ✓ , Z 25147.



The menu item "Adjustment" appears Z 25148. There are three items with values:



Controller Adjustment table

Item No.	Contents	PC3000-6		unit	Effective range	Default Value
		Diesel	Electric			
0	No select					
1	Primary P-factor	X	X	%	60...120	100
2	P_tm	X	X		1…5000	225
3	I_tm	X	X		1…3000	1172
4	D_tm	X	X		1…2000	1
5	n'_{set}	X		rpm	1…2100	1800
6	T_match	X		%	1…20000	5830
7	Sol_ofs_P1	X	X	%	80…120	100
8	Sol_ofs_P2	X	X	%	80...120	100
9	Sol_ofs_P3	X	X	%	80...120	100
10	Sol_ofs_P4	X	X	%	80...120	100
11	Sol_ofs_P5	X	X	%	80...120	100
12	Sol_ofs_P6	X	X	%	80...120	100
13	Sol_ofs_P7			%	80...120	100
14	Sol_ofs_P8			%	80...120	100
15	Sol_ofs_P9			%	80...120	100
16	Sol_ofs_P10			%	80...120	100
17	Sol_ofs_P11			%	80...120	100
18	Sol_ofs_P12			%	80...120	100
19	Sol_adj_min_P1	X	X	mA	1…1000	250
20	Sol_adj_min_P2	X	X	mA	1…1000	250
21	Sol_adj_min_P3	X	X	mA	1…1000	250
22	Sol_adj_min_P4	X	X	mA	1…1000	250
23	Sol_adj_min_P5	X	X	mA	1…1000	250
24	Sol_adj_min_P6	X	X	mA	1…1000	250
25	Sol_adj_min_P7			mA	1…1000	250
26	Sol_adj_min_P8			mA	1…1000	250
27	Sol_adj_min_P9			mA	1…1000	250
28	Sol_adj_min_P10			mA	1…1000	250
29	Sol_adj_min_P11			mA	1…1000	250
30	Sol_adj_min_P12			mA	1…1000	250

Legend for illustration Z 22251

1	Main control blocks
3	Rotary joint
4	Travel motors
5	Attachment cylinder
6	Swing motor
7	Distributor manifold

All other numbers are component numbers from the hydraulic diagram.

Function:

From the control blocks (I, II, III) the oil returns via return oil pipes and the return oil collector manifold (15) into the tank whenever the spools of the control blocks are in neutral position. On its way to tank the oil must pass the back pressure valve (25) and the return oil filters (50.2, 50.2, 50.3).

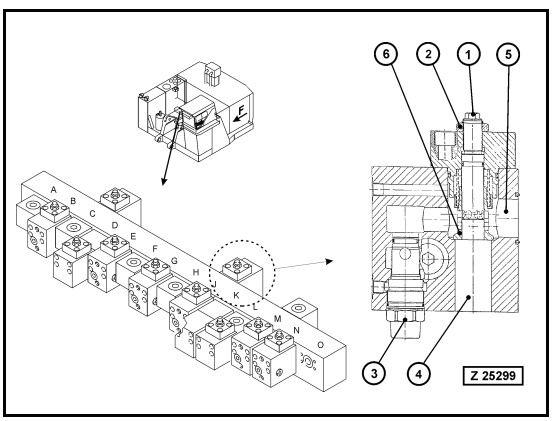
The function of the back pressure valve (25) ensures:

- enough oil supply for all anti-cavitation valves
- enough oil flow through the oil coolers

If the operator starts a movement the relevant spool in the control block allows the flow from the pump to the chosen attachment cylinder either piston or rod end or to the travel or swing motor. From the opposite side of the cylinder or motor the oil returns to the control block and from there via the return oil pipes through the filters back to the tank.

Each circuit is provided with one MRV and at least one SRV (3) and ACV.

To limit the lowering speed of the attachment there are throttle check valves in the relevant service line see illustration Z 25299. The throttle valves are only in circuits where the gravity can move the cylinder. To limit the gravity supported cylinder moving the throttle valve restrict the return oil flow. flow from (5) to (4). In the opposite direction from (4) to (5) which is only pump pressure supported a internal check valve opens so that there is no flow restriction. The speed must be limited to prevent cavitation in the cylinder supply line and to limits the return oil flow through the valve blocks to prevent erosion and cavitation in the blocks.



SRV adjustment exemplary for service line circuits of the attachment:

1. Select the SRV's for the function have to be adjust. Mark the SRV position to prevent mistakes.

2. Start engine and let it run in high idle.

3. Stall hydraulic system e.g. bucket fill against final stop.

4. Increase the respective MRV's until there is no reaction at the gauge pointer (should be 350 bar) and turn a quarter further cw in. So that the setting of the MRV is estimated 10 -20 bar higher as the required SRV pressure. For valve adjustment refer to "How to adjust a MRV or SRV" auf Seite 255

5. Stall the function how to adjust against the final stop and keep the control fully activated. The gauges show now the pressure of the lowest SRV setting.

6. Increase the involved SRV's a 1/2 turn further in. For valve adjustment refer to "How to adjust a MRV or SRV" auf Seite 255. Read the value of the gauge connected to the concerned valve block. If there are more as one SRV is in the service line only the last SRV of the sequence shows a gauge reaction.

7. Reduce the pressure setting from the SRV to the required pressure. If there are more SRV's in the line choice any.

8. If there are more SRV's in the line reduce the next SRV slightly lower as the pressure when the gauge pointer shows the first lowering reaction. Increase now the pressure just to the point when the gauge pointer stops increasing. It should be the required pressure which was adjusted at the SRV before.

9. Repeat Item 8 until all SRV's of the corresponding service line are adjusted.

10. Reset the MRV back to the original initial value.

NOTICE
All main relieve valve (MRV) adjustments must be verified and fine tuned with the Multi Monitor values. The display value is in a small range inconstant that is normal, use the average value.

To select the SRV's of the different attachment functions use the "SRV location chart FSA" auf Seite 261 for the FSA and "Check and Adjustment for SRV's of BHA attachment" for the BHA.

To adjust the SRV for the travel and swing function refer to XXX

Swing circuit General

Study together with the valid hydraulic and electric circuit diagram for the respective machine.

The slew motor (60) gets oil from main pump III (3). The oil flows from the pump via the filter (12.3) in to the main control block III. When operating the control lever for slew the first control spool of main control block III opens the service line to the slew motor so that pump oil start moving the slew motor and via the planetary slew gear box the slew pinion.

Between the slew motor and the gear box is a spring loaded multi disc parking brake installed. This break is only a parking brake to lock the superstructure to the under carriage.

A hydraulically working service brake is direct flanged to the slew motor head. This brake creates a back pressure to the motor return line which create a brake torque. This back pressure is via the foot pedal or counter acting of the lever adjustable between 150-330 bar so that the break torque is variable.

During acceleration this brake valve (pressure increasing valve) must be adjusted to the higher setting because the basic setting of this valve (150 bar) is lower as the main relieve valve setting (310 bar). To increase the pressure setting pilot pressure is feed to the x port of the pressure increasing valve.

Legend for illustration Z 21934 Siebenhaar brake

1	Circlip
2	Thrust washer
3	Outer discs
4	Inner discs
5	Piston
6	Quad ring with back up ring
7	Quad ring with back up ring
8	Springs
9	Piston back up ring and seal retainer
10	O ring
11	Circlip
12	Oil pressure port
22	
23	

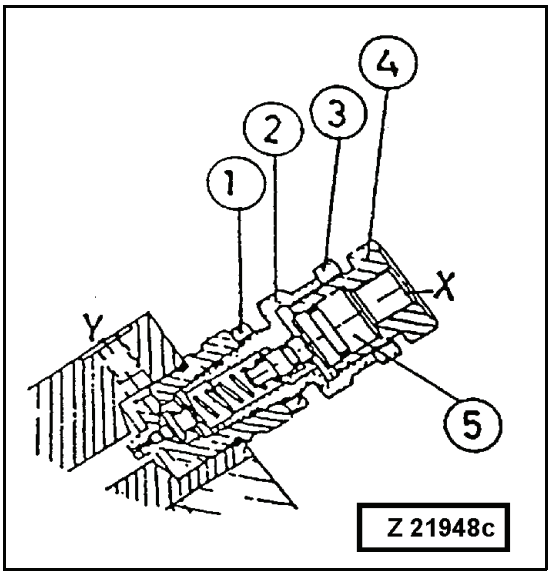
Legend for illustration Z22439 L&S break

1	Disc housing
2	Thrust washer
3	Inner discs
4	Outer discs
5	Sinus spacer ring
6	Piston
7	Quad ring with back up ring
8	Quad ring with back up ring
9	Springs
10	Thrust washer
11	Circlip
12	Drive shaft
13	Oil pressure port

General:

Both brakes from the same brake principal. The spring loaded multi disc brake is a safety parking brake applied by spring force and released by pilot oil pressure.

Low pressure check / adjustment, illustration Z 21948c, d



11. Loosen lock nut (3) and adjust the low pressure of 150 bar by turning out set screw (4) ccw. Tight lock nut (3).
12. Stop engine and release pilot pressure by moving the controls several times.
13. Remove plug P from the plugged pilot hose and reconnect the pilot hose to port X of the PIV.
14. Remove gauges.

NOTICE
All main relieve valve (MRV) adjustments must be verified and fine tuned with the Multi Monitor values. The display value is in a small range inconstant that is normal, use the average value.

Slew service brake pilot pressure check

1. Connect a gauge(0 - 60 bar) to check point M28.3
2. Start engine and let it run in high idle
3. The gauge should show 0 bar.
4. Activate the slew service brake pedal fully.
5. The gauge should show 19 bar. The brake pedal pressure is fix factory adjusted and can not changed at the machine.
6. Activate the slew parking brake and activate the slew function fully into one direction. The pilot pressure should show 35 bar.
7. Stop engine and remove gauges.

Crosscheck of the PIV setting

1. Connect gauges (0 - 400 bar) to check point M28.1, M28.2 at the slew brake valve block on top of the slew motor
2. Start engine and let it run in high idle.
3. Relies the slew parking brake and activate carefully the slew function in one direction.
4. Relies the slew control lever rapidly to neutral after full slew speed. Don’t activate the slew service brake pedal. Check during the slow down path the pressure gauges. One gauge pointer should increase for a short time to the minimum service brake pressure of 150 bar.
5. Activate the slew function in one direction.
6. Push during slewing the service brake pedal full down and after full slew speed release the slew control lever rapidly to neutral keep pedal fully activated. Check during the slow down path the pressure gauges. One gauge pointer should increase for a short time to the maximum service brake pressure of 330 bar.

Legend for illustration Z 22273

1	Brake housing with direct flange to hydraulic motor
2	Control pressure port to release the brake
3	Clip ring
4	Inner disc carrier
5	Disc package, inner and outer disc one by one
6	Clip ring
7	Input drive shaft
8	Piston seal ring
9	Drive shaft seal
10	Clip ring
11	Springs, 36 main springs and 18 adjustment springs
12	Disc support ring
13	Spring carrier and force release piston
14	Oil drain plug, disc lubrication oil

Function

Brake applied:

The outer discs engaged to the housing (1) by serration and the inner discs in serration connection with the carrier (4) are pressed together by the springs (11). This results in a fixed connection between housing (1) and carrier (4).

Brake released:

Oil pressure via port (2) reaches the bottom of the piston (13) and forces the piston against the springs (11). This function eliminates the spring force onto the discs thus the brake is released.

The minimum release pressure is 18-20 bar

Function:

NOTICE
All shut off valves are in the drawn normal operating position. 89.1 closed and 89.2, 89.3, 111 open.

The pilot pressure (St) from the rotary joint is connected to shut off valve (111) of the track tensioning valve block and to the pilot port of the pressure increasing valve (87). Behind the lever (111) is a orifice to reduce the flow volume in to the track tensioning cylinder which should stabilize the pilot pressure supply to the travel parking brake. The pilot pressure is behind the orifice via the check valve 91.1 and 91.2 connected to the side frames and in the side frame to the track tensioning cylinder. The resulting force moves the guide wheels toward the front until the correct track tension is obtained. Simultaneously the system is via the none return valves 92.1 and 92.2 connected to the pressure increasing valve (87) (pressure relieve valve).

External force acting upon the guide wheels are absorbed by the pressure accumulators (93.1 + 93.2) and (100.1 + 100.2). By the pressure relief valve (87) the system is protected against high pressure peaks.

Purpose of the pressure increasing valve PIV (87)

Controlled system pressure:

- Engine stop:
  Relieve pressure with out pilot pressure = 35 bar

- Engine running:
  Relieve pressure with 35 bar pilot pressure = 315 bar

With stopped engine the solenoid valve Y16 is de-energized so the pilot pressure to the track tensioning is released to the tank. and so there is no pressure to the pilot port of the PIV valve. The low pressure adjustment of 35 bar remains in the track tensioning system, supported from the low pressure accumulators (100.1 and 100.2). In normal operating condition the tensioning pressure can be higher. This function is to prevent high pressure and stress in the track system when the machine is stopped. The remaining pressure is high enough to keep the track tight for the next motor start and operation.

As soon the engine is started the pilot pressure acts on the PIV pilot port so the pressure setting increase to 315 bar. Now the pressure can rise to 315bar created from external force.

A relieve valve (257.1) protects together with the check valve (257.3) the pilot pressure system against pressure peaks from truck tensioning system in case of defect check valves (91.1) or (31.2) or from defect seal of the rotary joint. In case of return pressure relieve valve (257.1) relieve oil to the reservoir until the pressure increase to 50 bar.

Functional test after adjustment:

1. Bleed all air from the system. Connect pressure check hoses to check point M29.1, 29.2, 29.3, 29.4 at all tensioning cylinder.
2. Make sure that the shut off valves (87), (89.1), (89.2) and (89.3) are in operating position.
3. Connect a pressure (0 -400 bar) gauge to one of the check points M29.x
4. Start engine and let it run in high idle.
5. The gauge pointer should increase slowly up to 35 bar.
6. Travel the machine in one direction. Watch the gauge. The gauge pointer should show pressure peaks with more as 35 bar.
7. Unplug solenoid valve Y16 at the valve and filter frame.The pressure should decrease back to 35 bar to the low pressure setting of the PIV.
8. Stop engine
9. Remove gauges. Reconnect plug of solenoid valve Y16.

NOTICE
The pressure may drop to a lower pressure as 35 bar after a while because of internal leaks and decreasing temperature.

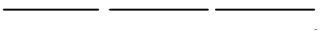
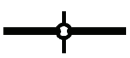
11. CENTRAL REFILLING SYSTEM

NOTICE

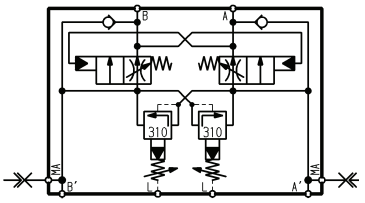
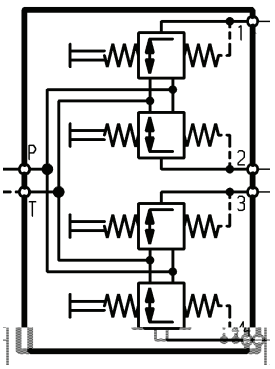
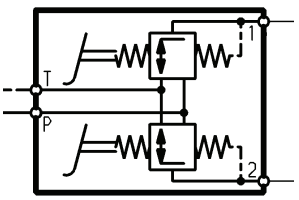
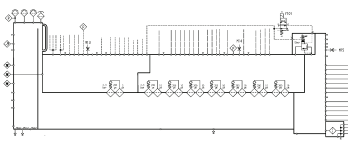
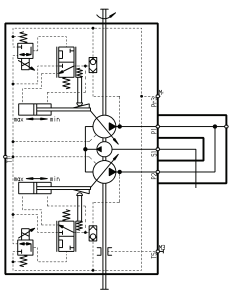
- **The illustration are used for exemplary explanations only**
- **Use original circuit diagram for detailed reading.**
- There are more symbols on the following pages shown as in the diagrams drawn. May be symbols of the diagrams not shown in the following pages.

Legend for illustration Z 22987

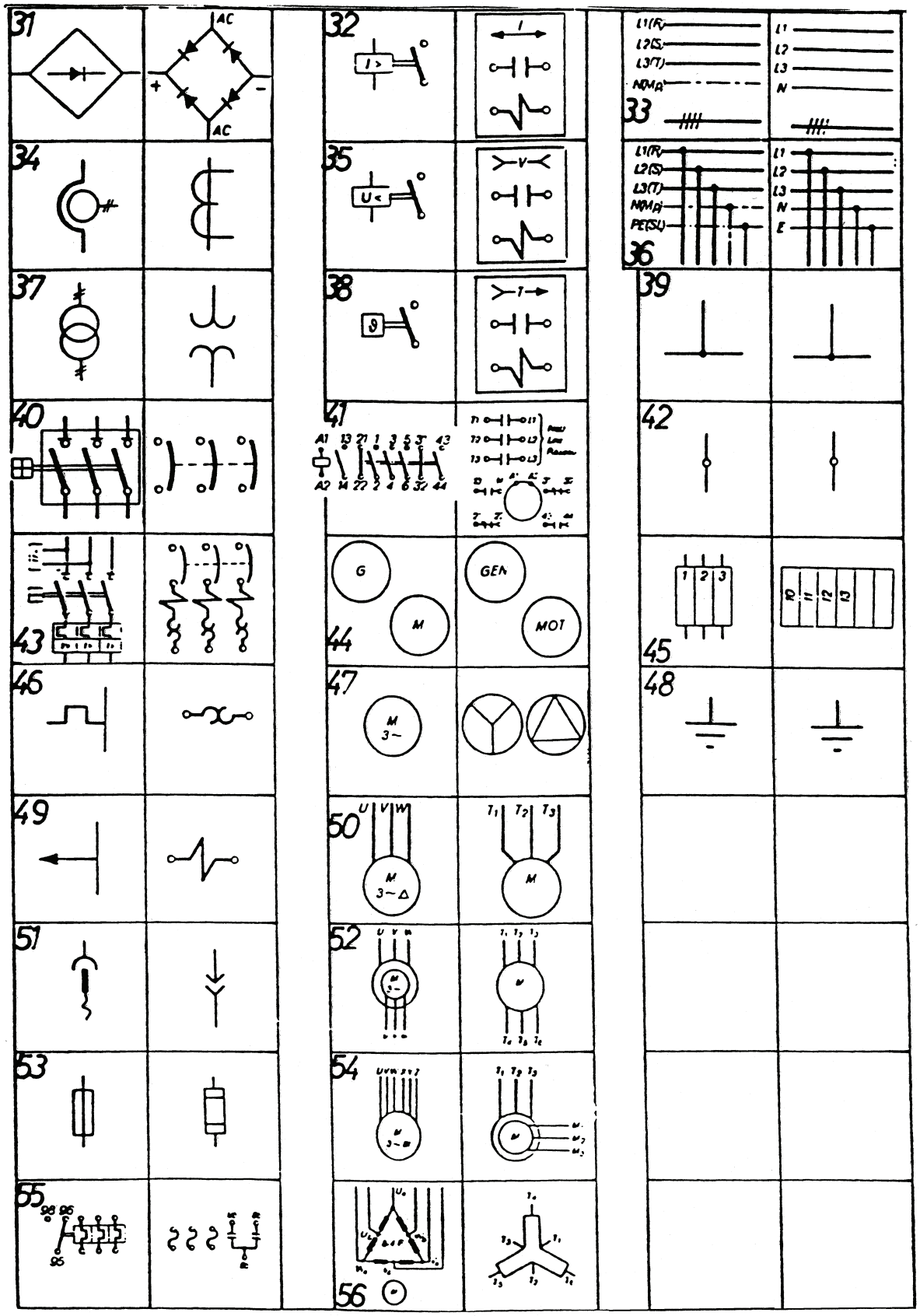
12.2.1 Lines, unions

Item	Symbol	Description	Used as / at / on
1.		Oil supply line can be a hose or a pipe	Suction line or pressurized line of main hydraulic circuit or pilot pressure circuit or auxiliary circuits
2.		Return oil line can be a hose or a pipe	Return lines, connected to the return oil filter chamber of the main oil reservoir
3.		Case drain line (leak oil) can be a hose or a pipe	Return line, connected to the case drain oil filter chamber of the main oil reservoir
4.		Control oil line can be a hose or a pipe	Pilot controlling, pump regulation line parking brake control line
5.		Crossed line	Pipes or hoses not connected
6.		Connection point is a connection of hydraulic lines without definite position	Connection between several lines
7.		Component connection point is a connection with a definite position at a component	Connection to components like valve blocks, tanks, pumps,

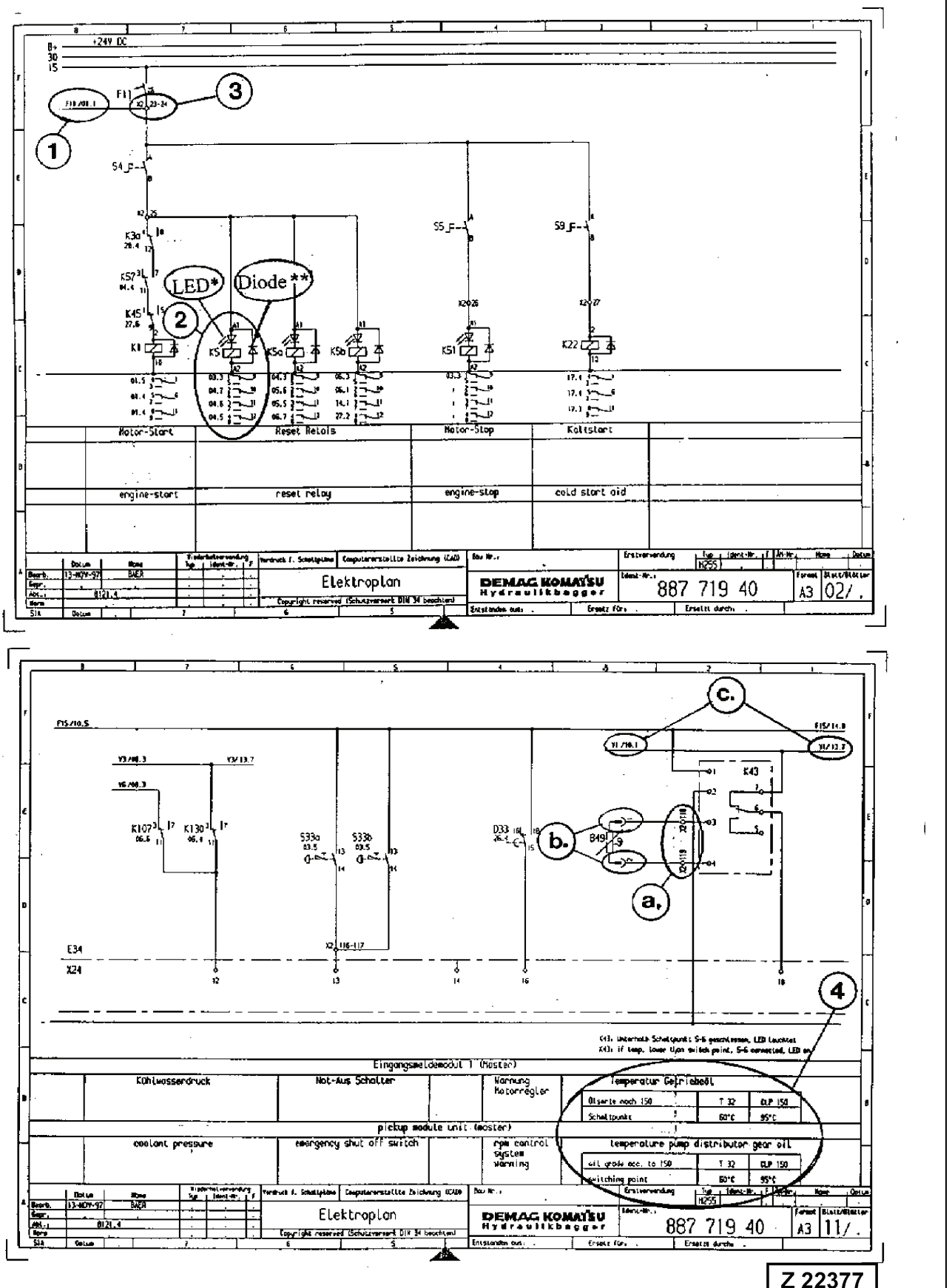
12.2.5 Pump, motor, cylinder

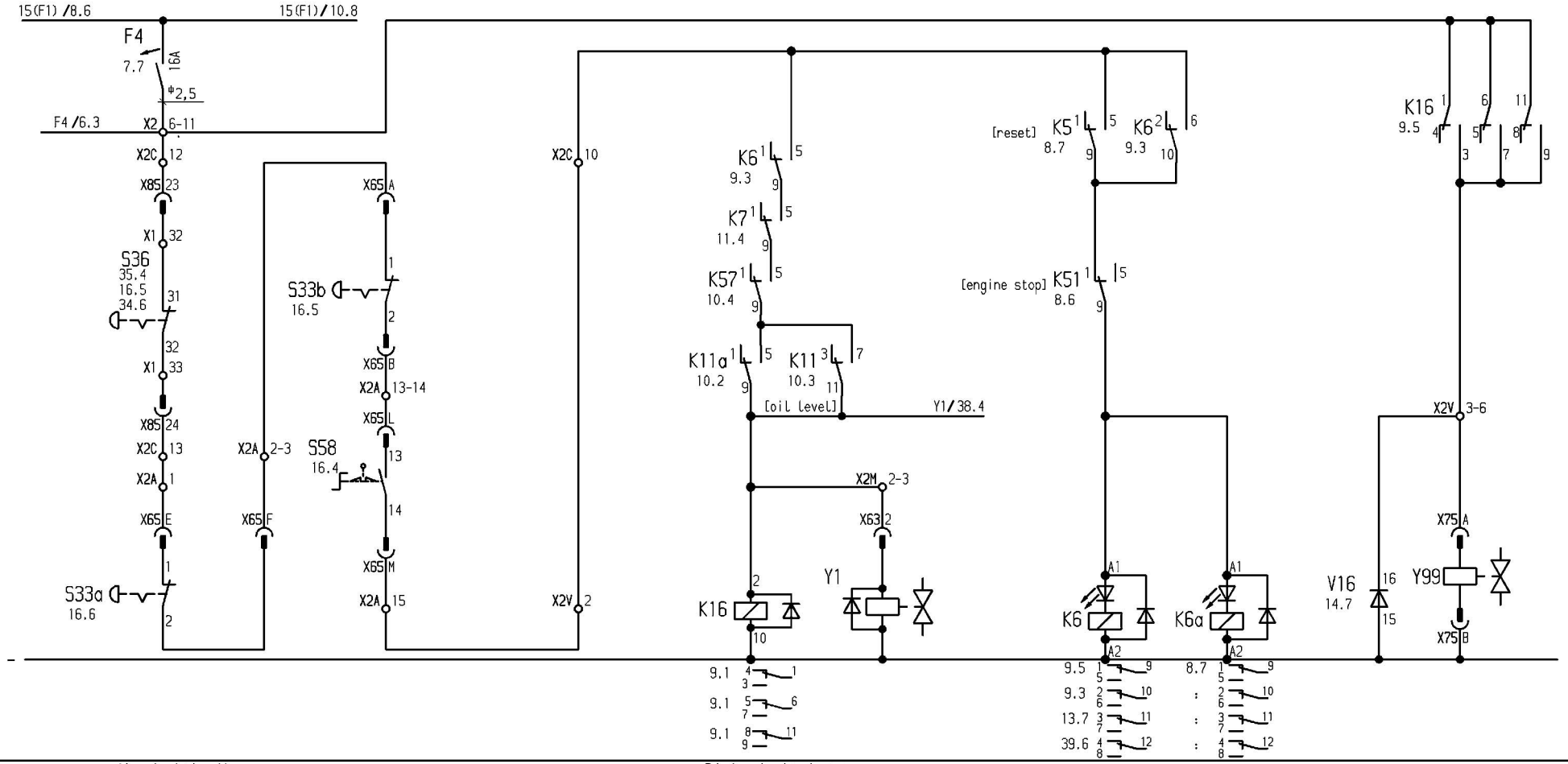
Item	Symbol	Description	Used as / at / on
65.		Travel brake valve block with secondary pressure relieve valve in the line to the travel motors. The return oil flow is restricted according to the pressure inlet.	Mounted in the supply line to the travel motors
66.		Remote control lever to control the main control blocks	Control lever in the operators cabin of machines with hydraulic remote control
67.		Remote control pedal to control the main control blocks	Control lever in the operators cabin of machines with hydraulic remote control
68.		Hydraulic oil reservoir with leak and return oil filter, back pressure valve and sensors	Main hydraulic reservoir
69.		Double main pump with charge pump, variable displacement individual for each pump, controlled via proportional solenoid valve	Main pump

13.3 Symbols


31
AC
AC
+
-
32
I>
I
33
L1(R)
L2(S)
L3(T)
NOM(N)
L1
L2
L3
N
34
35
U<
V
36
L1(R)
L2(S)
L3(T)
NOM(N)
PE(SL)
L1
L2
L3
N
E
37
38
9
T
39
40
41
A1
13
21
1
3
5
A2
14
22
2
4
6
42
43
44
G
M
GEN
MOT
45
1
2
3
46
47
M
3~
48
49
50
U
V
W
M
3~Δ
T1
T2
T3
M
51
52
53
54
55
56
Z 21817

Reading of the circuit diagram





Abschaltbedingungen

S36 : Not-Aus Kabine
S33a: Not-Aus Maschinenhaus
S33b: Not-Aus Maschinenhaus
S58: Sicherheitsschalter

Sicherheitskette

Y1: Kraftstoffabsperrventil

Motor läuft (Freigabe)

K6 erregt: Motor soll laufen

Kraftstoffventil

Y99 : Absperrventil Kraftstoffleitung (Tank)

conditions for the shut down

S36 : emergency shut down in cab
S33a: emergency shut down in machinery house
S33b: emergency shut down in machinery house
S58: safety switch

shut down system

Y1: fuel shut off valve

engine run (enable)

K6 active: engine should run

fuel valve

Y99 : shut off valve in fuel supply line (tank)

	Datum	Name
Bearb.	31.01.06	Wydra
Gepr.	_	_
Abt.:	8125	
Norm	.	

Wiederholverwendung: Typ . | Ident-Nr. . | F .

Vordruck F. Schaltpläne | Computererstellte Zeichnung (CAD)

E-Plan

Bau Nr.: 06224

KOMATSU MINING GERMANY

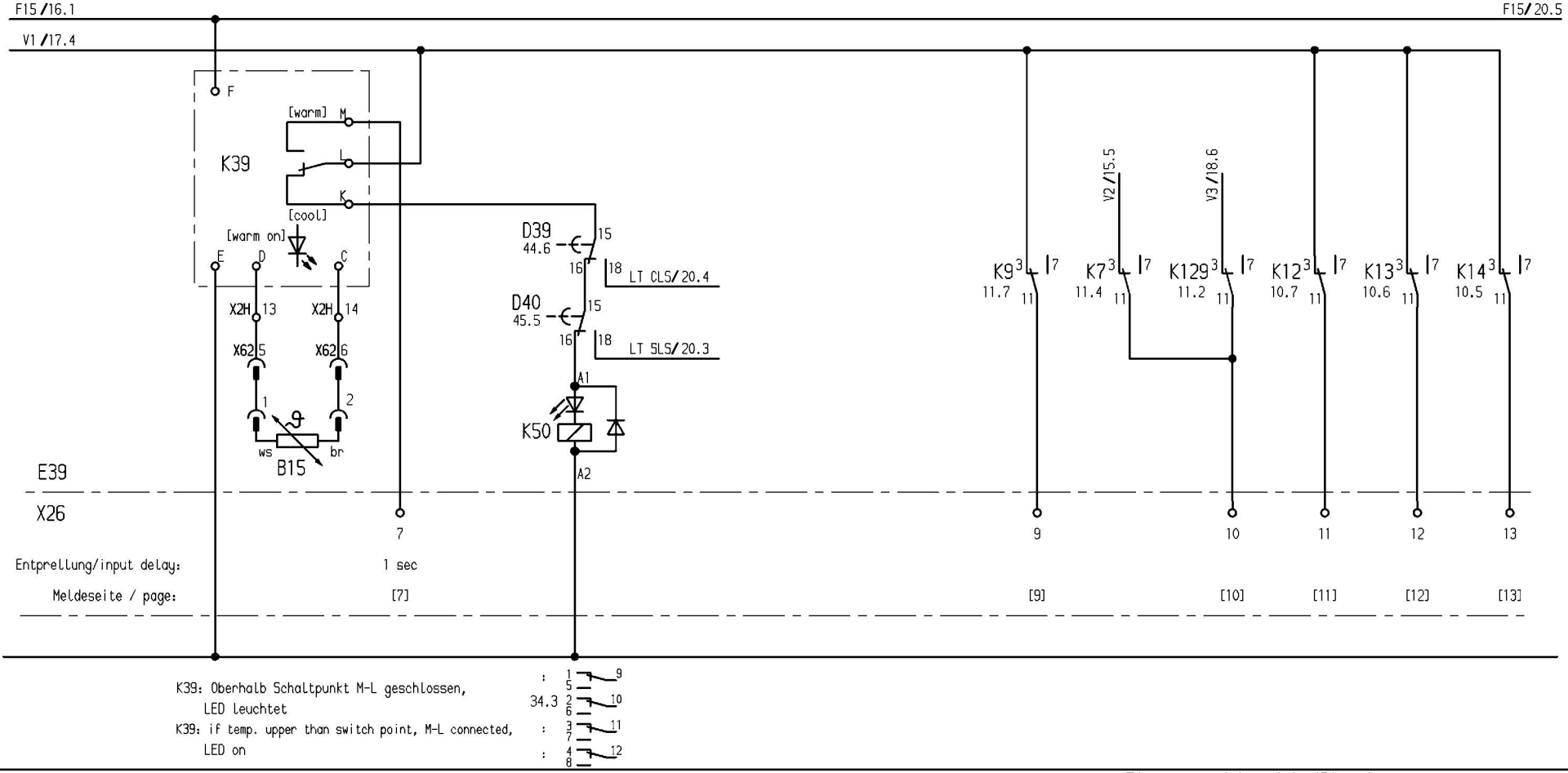
Entstanden aus: . | Ersatz für: . | Ersetzt durch: .

Erstverwendung	Typ	Ident-Nr.	F	ÄM-Nr.	Name	Datum
	PC3000-6	.	.	E7652	.	.

Ident-Nr.: 938 368 40 _

Format: A3

Blatt/Blätter: 9 /54



Eingangsmeldemodul (Slave)

Temperatur Hydr. Öl						
Ölsorte nach ISO	VG22	VG32	VG46	VG68	VG100	
Schaltpunkt	58°C	69°C	79°C	85°C	85°C	

Schaufelabschaltung
K50 ein: Freigabe

Kühlwasser Temperatur	Motor Öldruck	Hochdruckfilter		
		Pumpe I	Pumpe II	Pumpe III

pickup module unit (slave)

hydr. oil temperature						
oil grade acc. to ISO	VG22	VG32	VG46	VG68	VG100	
switching point	58°C	69°C	79°C	85°C	85°C	

bucket cut off
K50 on: enable

coolannt temperature	engine lube oil pressure	high pressure filter		
		pump I	pump II	pump III

	Datum	Name	Wiederholverwendung Typ	Ident-Nr.	F
Bearb.	31.01.06	Wydra	.	.	.
Gepr.	_	_	.	.	.
Abt.:	8125		.	.	.
Norm	.		.	.	.

Vordruck F. Schaltpläne | Computererstellte Zeichnung (CAD)

E-Plan

Bau Nr.: 06224

KOMATSU MINING GERMANY

Erstverwendung	Typ	Ident-Nr.	F	ÄM-Nr.	Name	Datum
	PC3000-6	.	.	E7652	.	.

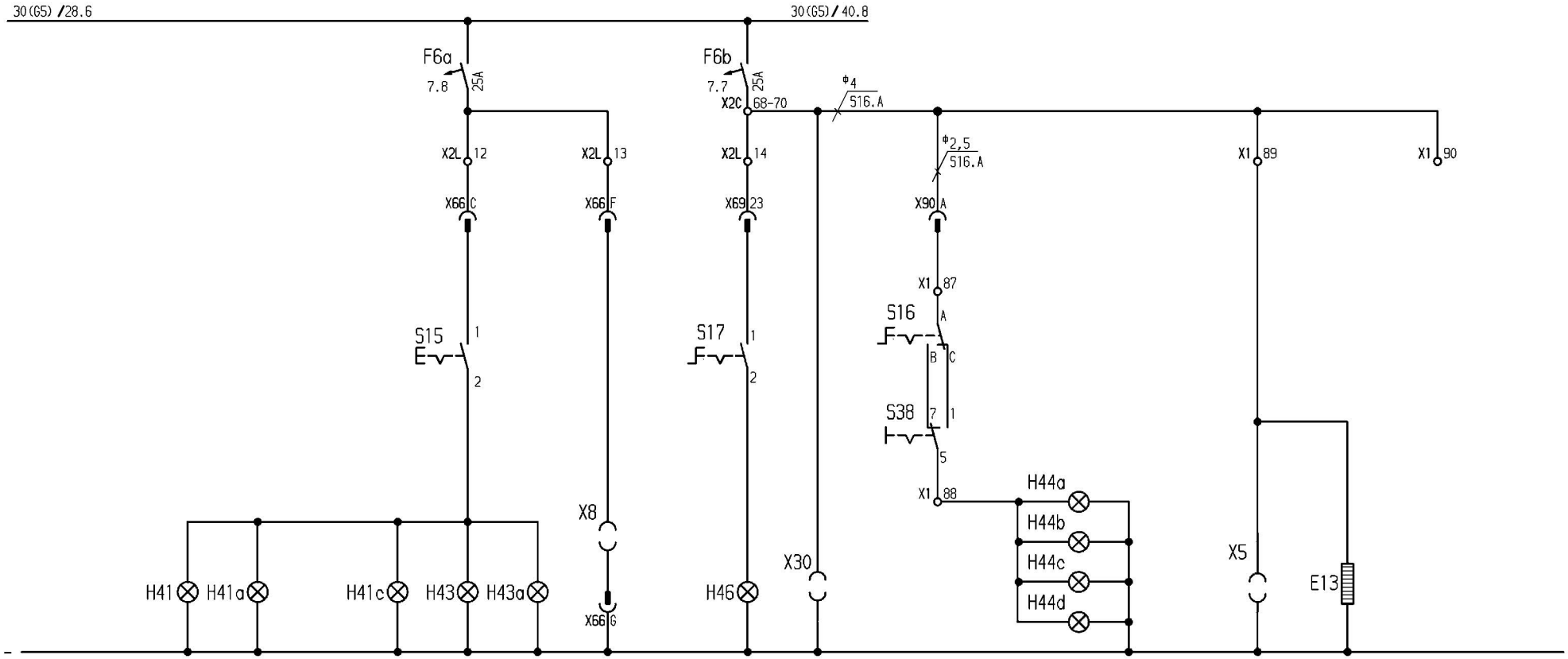
Ident-Nr.: 938 368 40 _

Format: A3

Blatt/Blätter: 19/54

Entstanden aus: . | Ersatz für: . | Ersetzt durch: .

SIA | Datum . | 8 | 7 | 6 | 5



Beleuchtung: Innenbeleuchtung

Pumpenraum	Motorraum	Kabinenuntersatz	Kabine Innenbeleuchtung	Kabine
H41...: Beleuchtung (je 70W)	H43...: Beleuchtung (je 70W) X8 : Steckdose 24V	H46: Beleuchtung (je 70W) X30: Steckdose 24V	S38: Schalter Kabinentür S16: Schalter Steuerpult H44...: Deckenbeleuchtung (je 20W)	X5: Steckdose 24V E13: Zigarettenanzünder

light: inside lights

pump chamber	engine chamber	cab support room	cab light inside	cab
H41...: light (each 70W)	H43...: light (each 70W) X8 : socket 24V	H46: light (each 70W) X30: socket 24V	S38: switch cab door S16: switch dashboard H44...: light (each 20W)	X5: socket 24V E13: cigarette lighter

	Datum	Name	Wiederholverwendung Typ	Ident-Nr.	F
Bearb.	31.01.06	Wydra	.	.	.
Gepr.	_	_	.	.	.
Abt.:	8125		.	.	.
Norm	.		.	.	.

Vordruck F. Schaltpläne | Computererstellte Zeichnung (CAD)

E-Plan

Bau Nr.: 06224

KOMATSU MINING GERMANY

Erstverw.	Typ	Ident-Nr.	F	ÄM-Nr.	Name	Datum
	PC3000-6	.	.	E7652	.	.

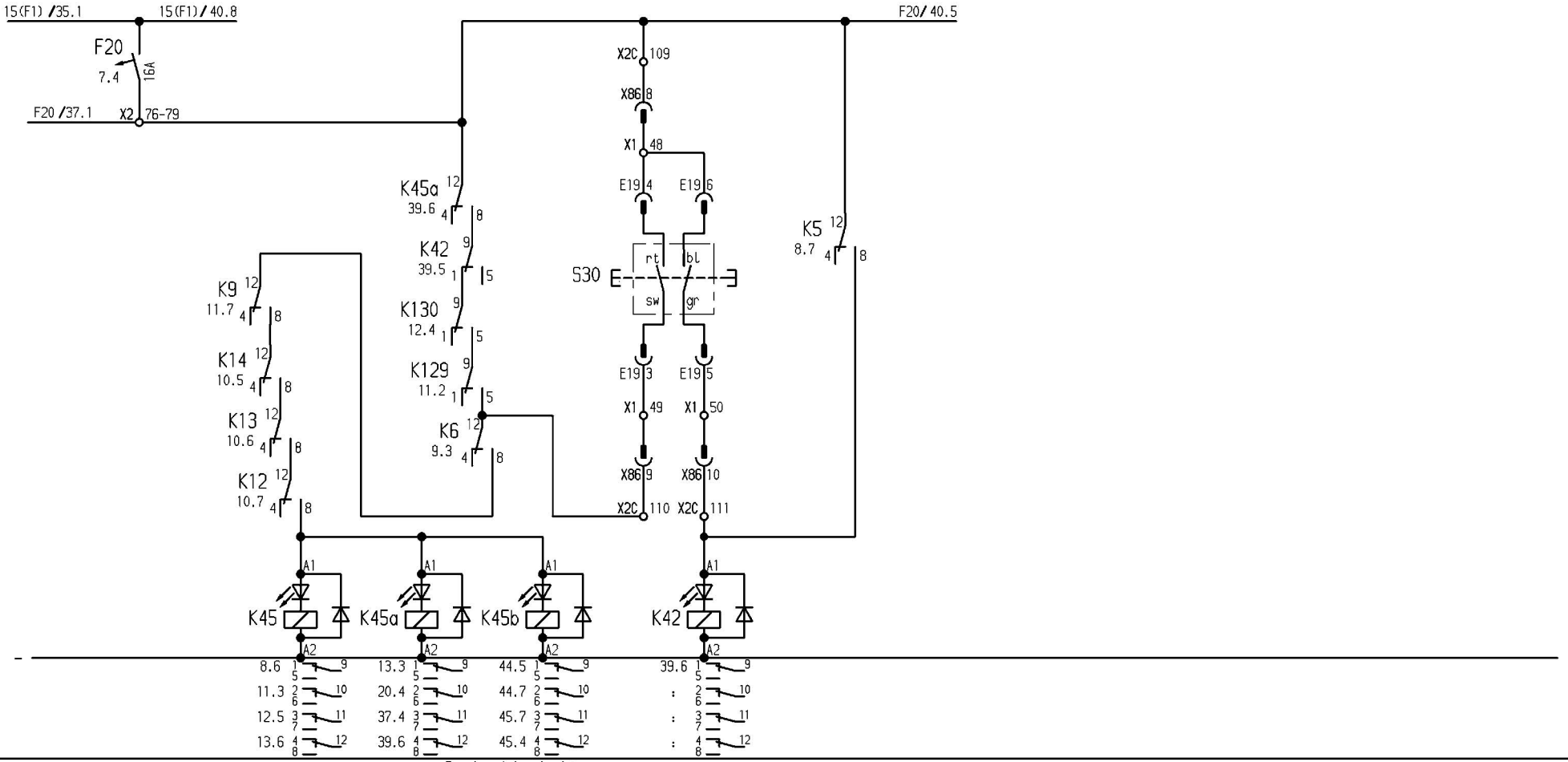
Ident-Nr.: 938 368 40 _

Format: A3

Blatt/Blätter: 29/54

Entstanden aus: . | Ersatz für: . | Ersetzt durch: .

SIA | Datum . | 8 | 7 | 6 | 5



Drehzahlschaltung

K45: angezogen im hohen Leerlauf

S30: Taster im rechten Handhebel
sw: Hoher Leerlauf
gr: Niedriger Leerlauf

switching off engine rpm

K45: activated at high idle

S30: tip switch in right lever
black: high idle
gray: low idle

	Datum	Name
Bearb.	31.01.06	Wydra
Gepr.	_	_
Abt.:	8125	
Norm	.	

Wiederholverwendung: Typ . | Ident-Nr. . | F .

Vordruck F. Schaltpläne | Computererstellte Zeichnung (CAD)

E-Plan

Bau Nr.: 06224

KOMATSU MINING GERMANY

Erstverwendung	Typ	Ident-Nr.	F
	PC3000-6	.	.

ÄM-Nr.	Name	Datum
E7652	.	.

Ident-Nr.: 938 368 40 _

Format: A3

Blatt/Blätter: 39/54

Entstanden aus: .

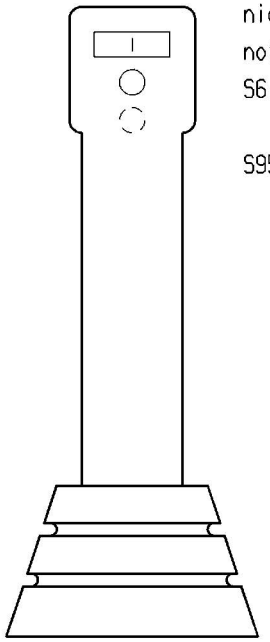
Ersatz für: .

Ersetzt durch: .

SIA | Datum . | 7 | 6 | 5

Schalterbelegung der Handhebelgeber

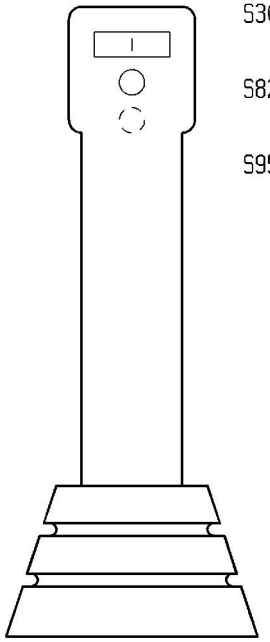
arrangement of switches in the control levers



nicht belegt
not demanded
S6: Hupe
horn
S95: Schwimmstellung Stiel
float position stick

linker Handhebel
left lever

E 20



S30: Drehzahlumschaltung
low / high idle
S82: Dumper zähler
SKW counter
S95a: Schwimmstellung Ausleger
float position boom

rechter Handhebel
right lever

E 19

	Datum	Name	Wiederholverwendung Typ	Ident-Nr.	F
Bearb.	31.01.06	Wydra	.	.	.
Gepr.	_	_	.	.	.
Abt.:	8125		.	.	.
Norm	.		.	.	.

Vordruck F. Schaltpläne | Computererstellte Zeichnung (CAD)

E-Plan

Bau Nr.: 06224

KOMATSU MINING GERMANY

Erstverw.	Typ	Ident-Nr.	F
	PC3000-6	.	.

ÄM-Nr.	Name	Datum
E7652	.	.

Ident-Nr.: 938 368 40 _

Format A3

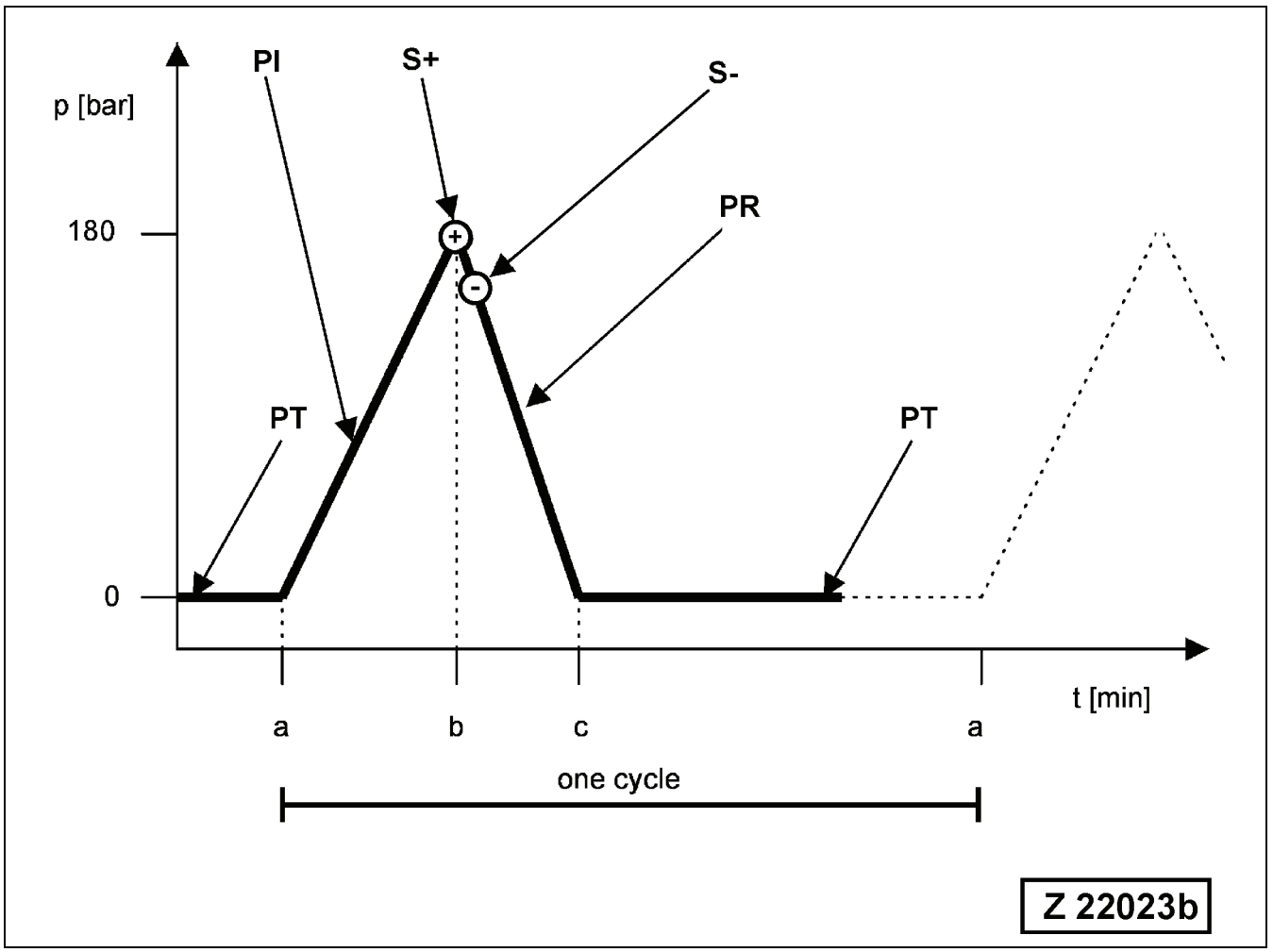
Blatt/Blätter 49/54

Entstanden aus: .

Ersatz für: .

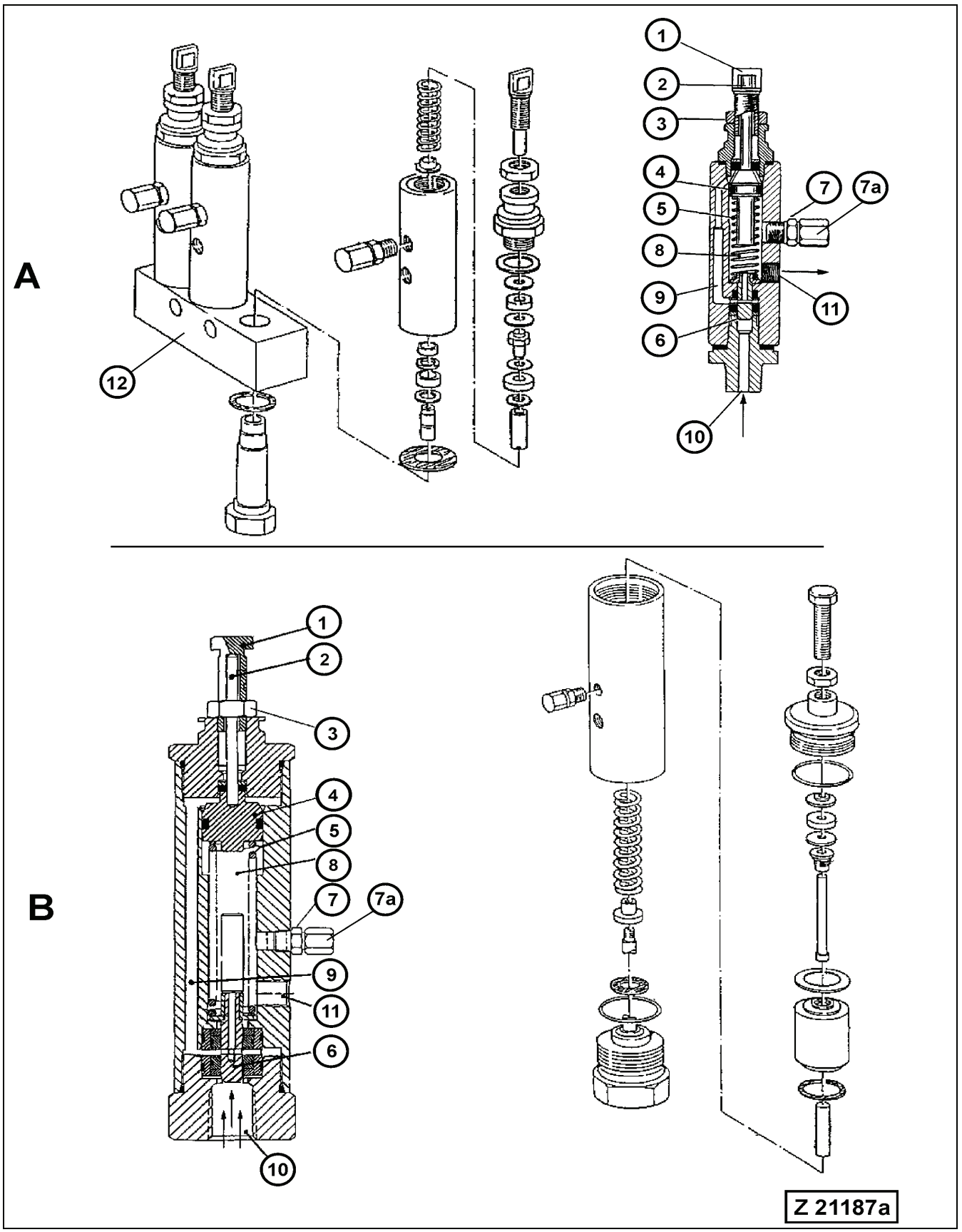
Ersetzt durch: .

Function of a lubrication cycle

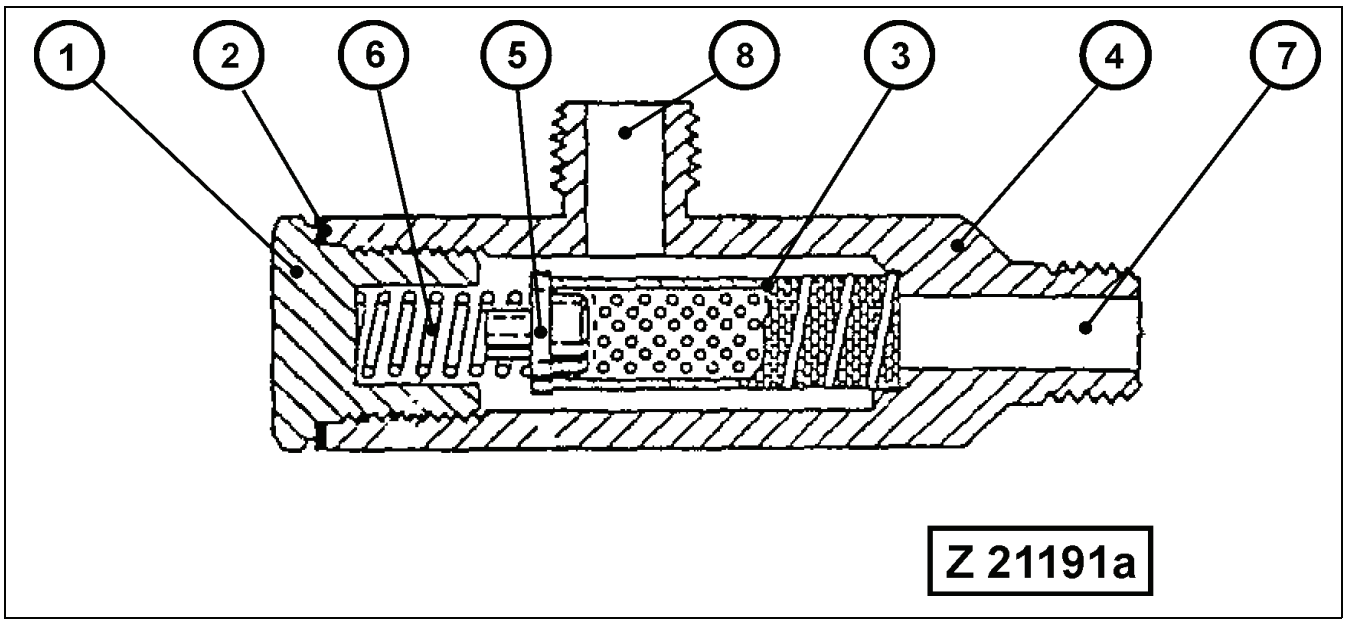


X-axis	Time
Y-axis	Lubricant supply line pressure
P	**P**ressure **I**ncreasing
S+	**S**witch point **ON** of the end of line pressure switch
S-	**S**witch point **OFF** of the end of line pressure switch
PR	**P**ressure **R**elieve
PT	**P**ause **T**ime

15.5 Lubricant Injector (metering valve)



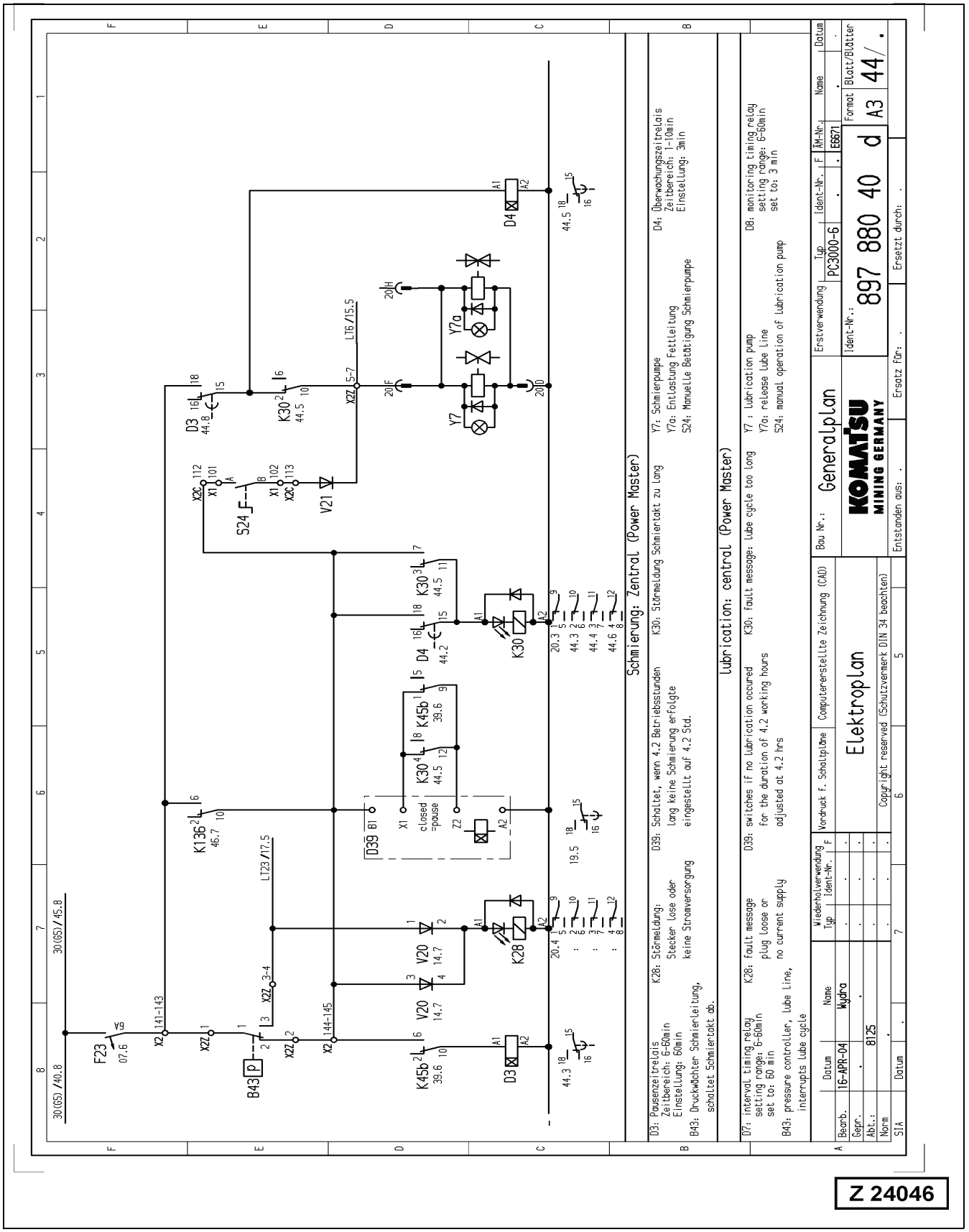
15.7 Lubricant in line filter



Legend for illustration Z 21190

1	Plug screw
2	Plug screw gasket
3	Screen filter element
4	Filter housing
5	Spring guide
6	Spring
7	Inlet
8	Outlet

Central Lubrication System (CLS) function and controlling with ETM system (PC 3000)



15.11 Trouble shooting lubricating system