



Media-ID: EM027415-00-EN
Doc.-No.: 7420 274 000 BA 01
Jun. 2017



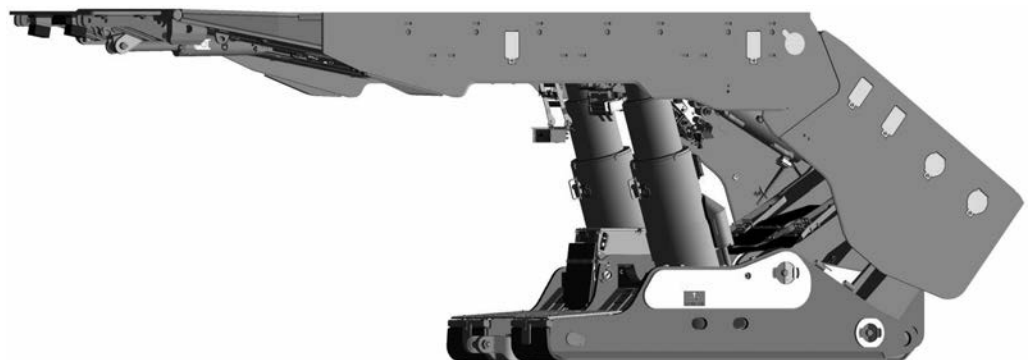
Operating and Maintenance Manual

Face-End Shield

2100/3800-2X6760-2050

Part-No.: 4844969

Serial-No.: ZZ700100 - ZZ700107



CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below



- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

Further information about this can be found in the "Operation" section of this chapter and in chapter 5 of this manual in the "Operation of the shield support" section.

Caterpillar assumes no liability for damage caused by unauthorized use.

2.5 Using the machine and working on the machine

Each time before you turn on the machine, check that all protective devices are on the machine and functional.

Keep the signaling and lighting systems in proper working order.

Clean the operating plate at regular intervals. Make sure that the operating symbols are clearly recognizable.

Never reach into or enter areas between machine components which can move.

Immediately replace damaged components relevant for safety. Shut down the relevant section immediately if component damage creates a hazard and immediate repair is not possible. If there is a safety hazard, secure this area and notify the entire face crew and responsible superiors without delay.

Secure the conveyor against being switched back on again while carrying out:

- ▶ Maintenance work
- ▶ Inspection work
- ▶ Repair work

Notify the responsible personnel of the following prior to working on the long-wall:

- ▶ your exact location,
- ▶ the work you are carrying out
- ▶ how much time you will probably need

You may only carry out work in the mining area if:

- ▶ the roof has been secured against falling rock,
- ▶ the coal face has been secured against collapsing and
- ▶ the mining equipment and conveyor have been shut down and secured against being switched back on.

Refit any protective devices removed immediately after completing work, and check that they are working properly.

emergency stop Press the EMERGENCY STOP switch immediately in the event of faults or irregularities in operation. Notify your supervisor of any peculiarity, so that necessary action can be taken immediately.

Actuate the EMERGENCY STOP SWITCH also if safety equipment.

danger of explosion Make sure to comply with the intervals specified for maintenance and inspections of the conveyor, as hot surfaces might cause an ignition of explosive atmospheres (air) and dust.

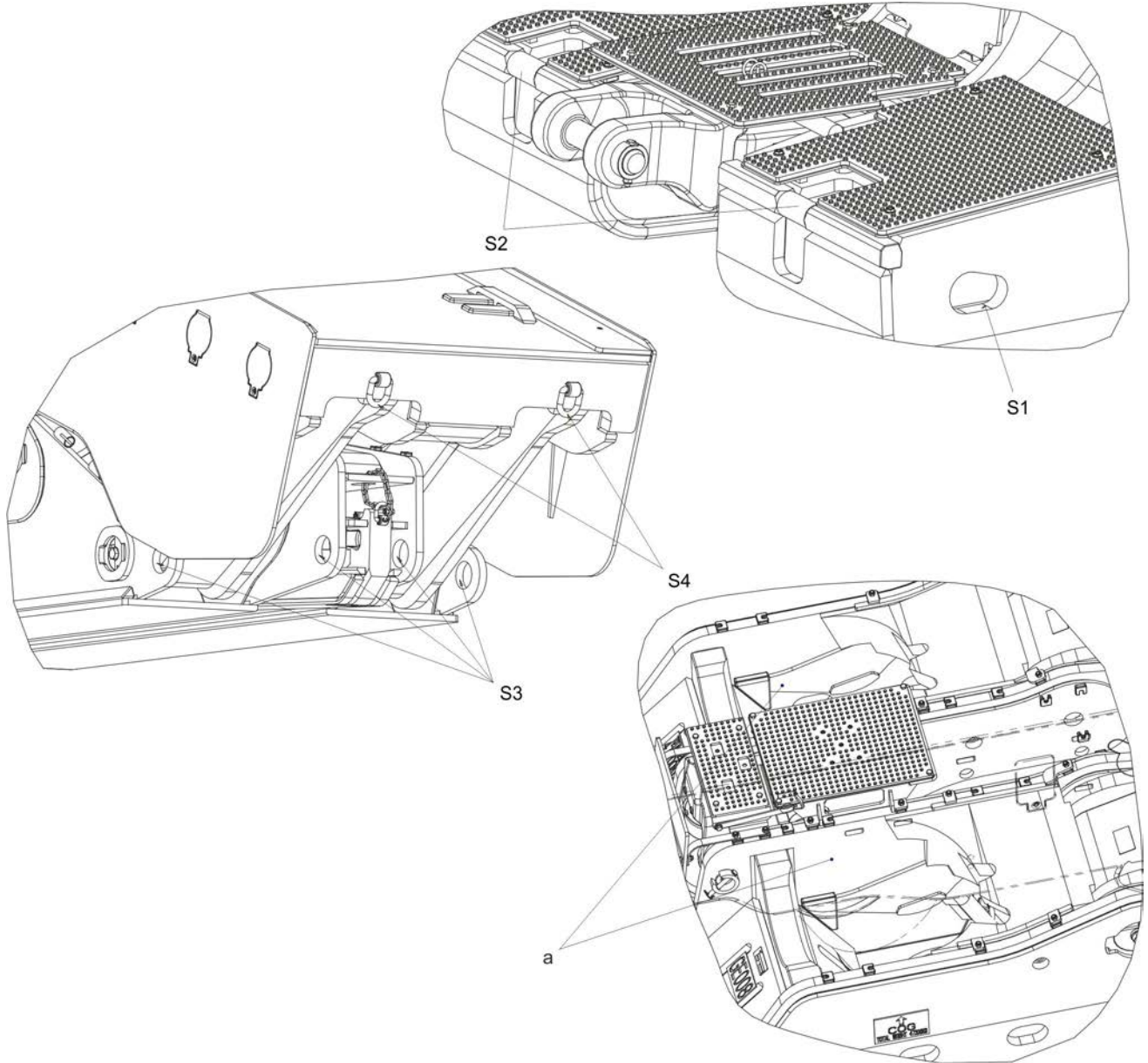
Observe the separate operating manuals for the components used.

disconnecting the conveyor Before you disconnect the support from the conveyor, release the load from the components under hydraulic pressure or mechanical stress.

Tab. 3: Transport dimensions and weights

| Device number | Length L in mm | Width W in mm | Height H in mm | Sx/Sy in mm | Weight in kg |
|--------------------|----------------|---------------|----------------|---------------|--------------|
| 7420 274 000 00 01 | 8 535 | 1 950 | 2 100 | 1 185 x 1 435 | 46 500 |

Fig. 5: Transport Face end shield



| | | | |
|----|--|----|--|
| S1 | Long slot, on the side of the base, load capacity: 25 000 kg | S2 | Long slot, 2x at the front of the base, load capacity: 30 000 kg |
| S3 | Through hole, 2x on the rear of the base, load capacity: 25 000 kg | S4 | Load ring 2x on the caving shield, gobside load capacity: 8 000 kg |
| S0 | Center of gravity | a | Filler piece not installed |



Notice on work safety

The connections of the auxiliary supply must be sealed with plugs during normal operation.

hydraulic system

The hydraulic connections to the shield units are designed as plug-type connections in accordance with DIN 20043.

The supply block for supplying the shield hydraulics is located in the middle beneath the canopy.

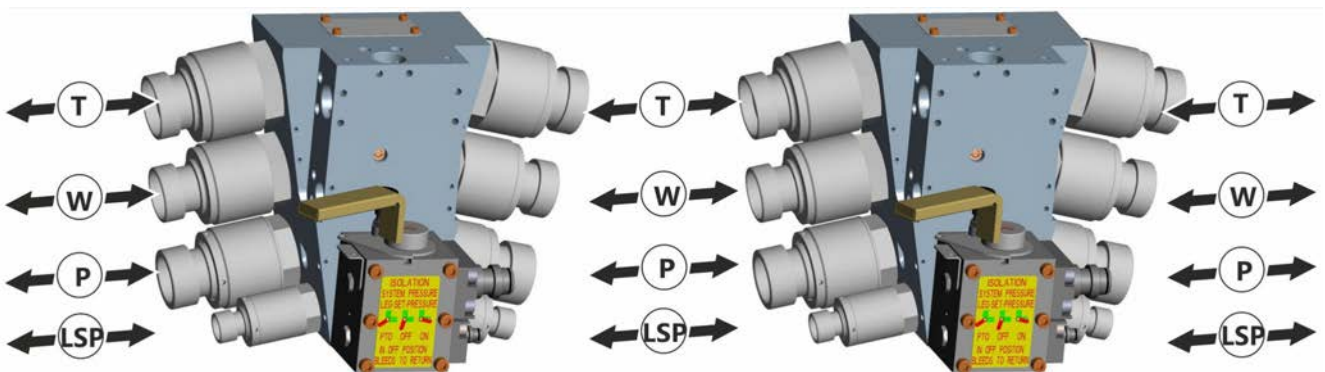
Connection to the supply block of the neighboring shield is made with the aid of four hose lines:

- ▶ one pressure line P (DN 50 SSKV-HP),
- ▶ one return line T (DN 63 SSKV-HP),
- ▶ one water line W (DN 50 SSKV-LP) and
- ▶ one LSP line (DN 25 SSKV-HP).

Proceed as follows to join the shields to one another:

1. Remove the plugs from the connections P, D, W, LSP of the shields to be connected.
2. Install the connection lines in the connections P, D, W, LSP on the supply block and connect them to the supply block of the neighboring shield.

Fig. 14: Connection lines to the neighboring shield (principle diagram)



control unit

The shield units are equipped with a type PMC®-R electronic control system. The control unit and the electrohydraulic control unit are connected via a solenoid driver module. The connection cables required for this are included in the delivery of the PMC®-R control system.

Important information

For details on how to connect the control unit, please refer to the separate operating manual for the PMC®-R control!



Important information

More information on the shield hydraulics is available in chapter 5 in the section "Operation of the shield hydraulics".



The symbol plates on the control units indicate the functions of the shield control system. They should be legible at all times and may not be removed or damaged.

Hoses must always be able to move freely. They may not be pinched or over-stretched. Make sure the hose lines are bundled properly.

Damaged hydraulic hoses and hose connections must be replaced immediately. This work may only be carried out by skilled personnel.

The shield canopy and caving shield must be mechanically secured against retracting when replacing hose lines between piloted check valves and legs or other hydraulic cylinders lying in the flow of force, such as stabilizing cylinders or adjusting cylinders. This also applies in the same way to work on the hinges of the shield unit.

Shut-off valves may not be installed in the return lines!

To make sure the return lines cannot be clamped shut, safety valves must be installed in the return line (see hydraulic layout, if prepared by Caterpillar). If the hydraulic layout was prepared by the operator, we recommend safety valves be installed at 50 m intervals in the return line. The valves should be set to 25 bar and spray into the atmosphere.

damage, replacement parts

Special incidents, especially any deficiencies and damage detected, must be reported immediately.

Machine and hydraulic parts may only be replaced with original parts.

5.5 Design of the ball valves

To open the ball valve the lever needs to be lifted to disengage from the detent. Only then the lever can be turned to the open position.



NOTICE

Operation of a ball valve

An incorrect lever position will cause damage to the ball valve over the long term.

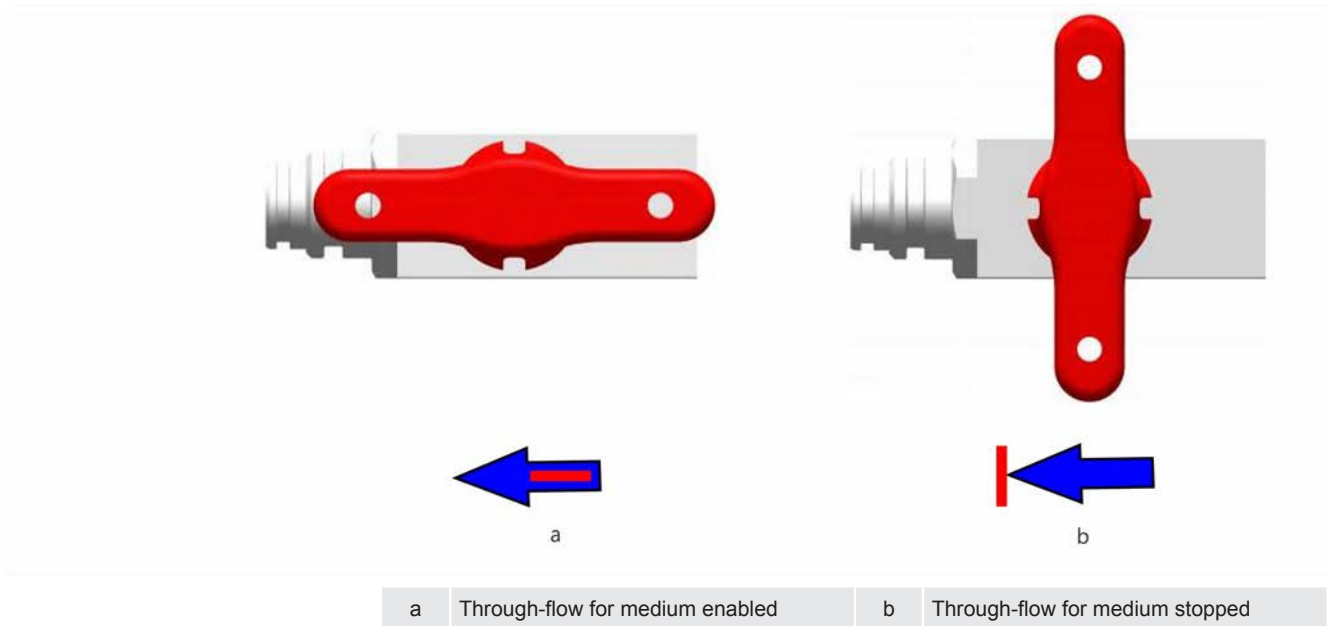
1. When operating a ball valve, always make sure that the lever is completely engaged in its respective position.

2-way ball valve

The 2-way ball valve is for shutting off the pressure supply line during maintenance work or repairs.

Blue 2-way ball valves installed are for shutting off lines conveying water, such as the water supply.

Fig. 24: 2-way ball valve, open and closed



5/3-way ball valve

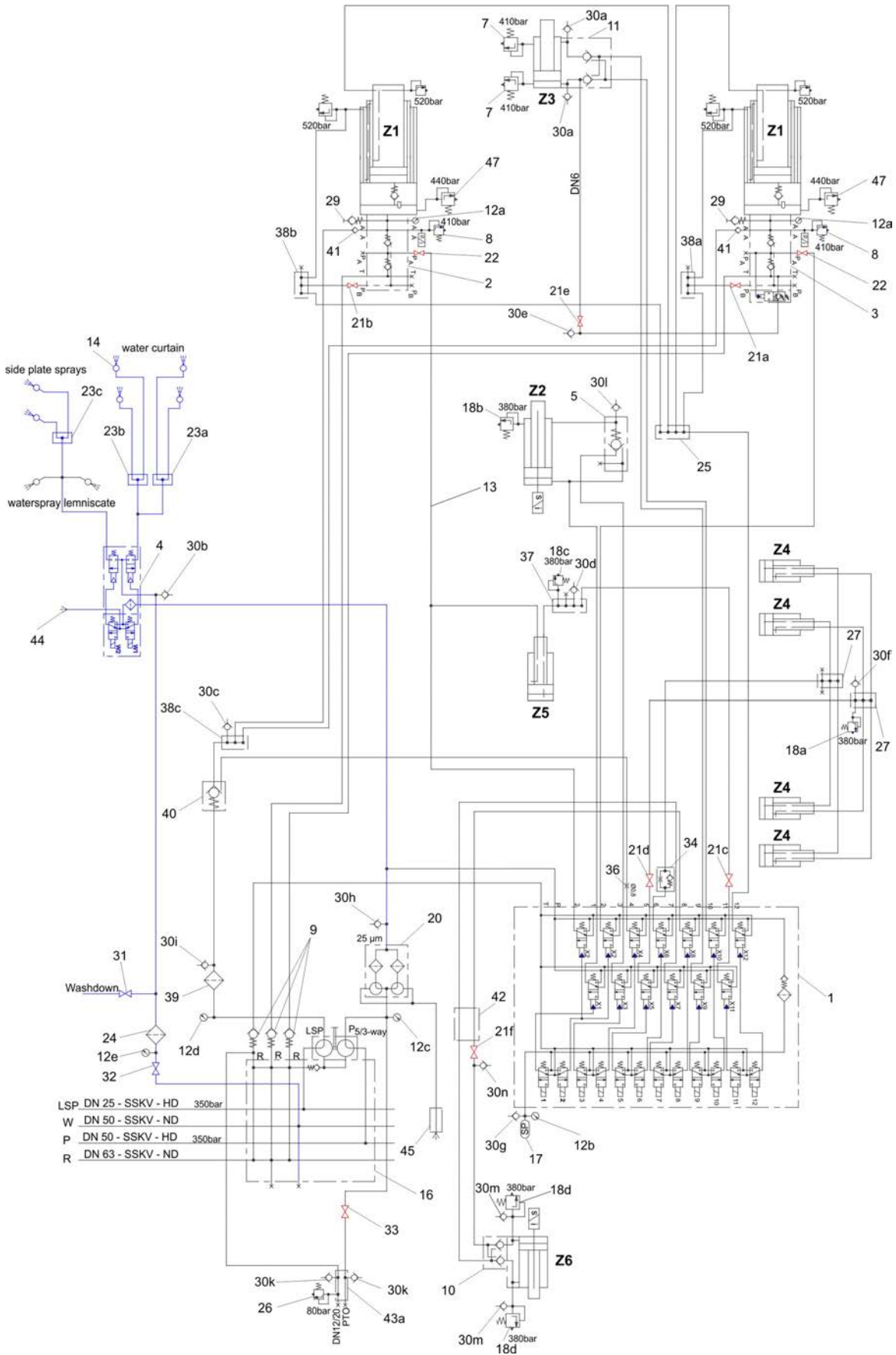
The 5/3-way ball valve has three switching or lever positions.

The 5/3-way ball valve is installed on the supply block and is used for shutting off the pressure supply line during maintenance work or repairs.

In the PTO (Power Take Off) lever position, the pressure supply line and the pressure relief are shut off.

5.6.3 Shield hydraulics

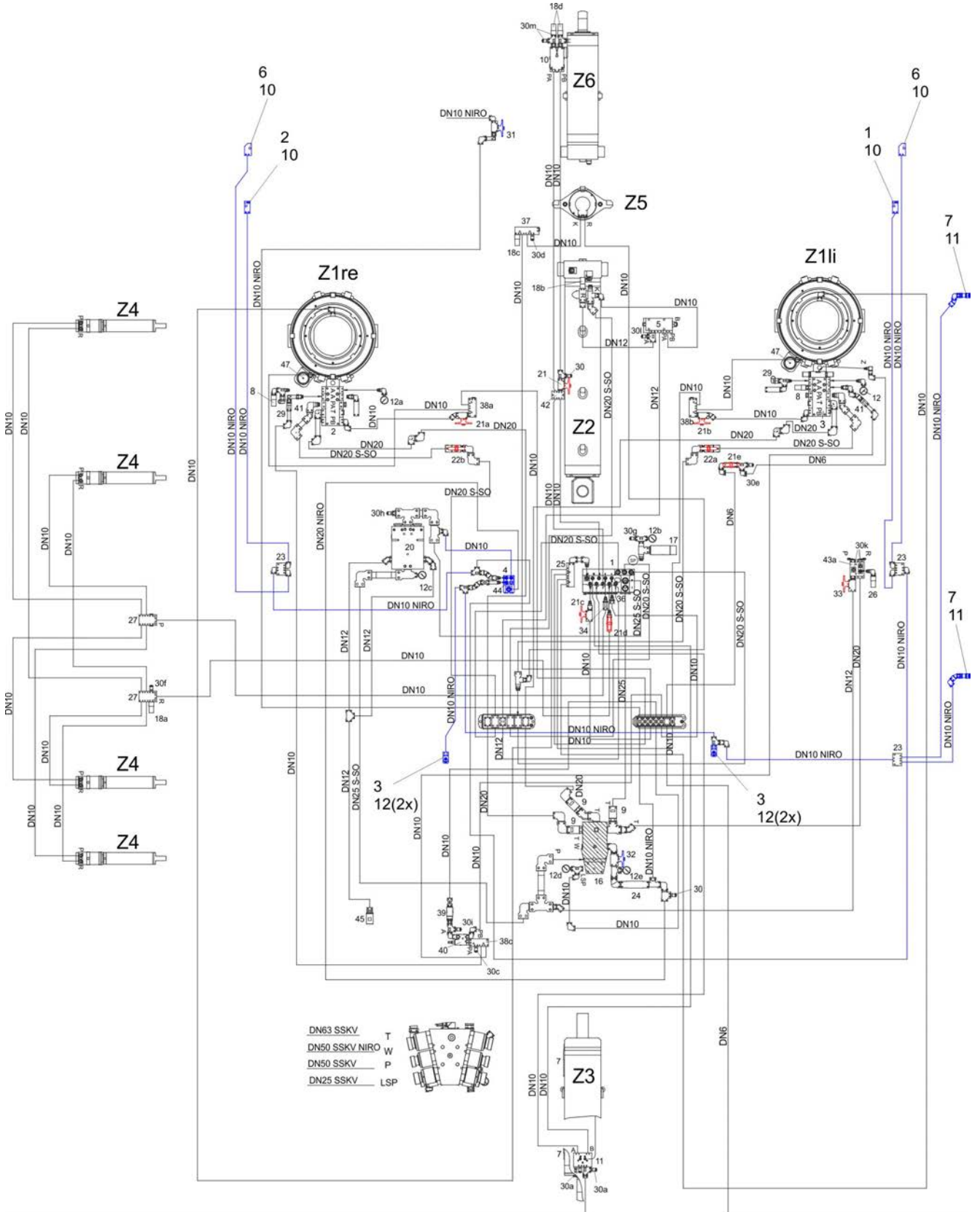
Fig. 31: Shield hydraulics Face end shield 7420 274 000 00 01



Media-ID: EM027415-00-EN / Caterpillar Global Mining Europe GmbH 2017 ©

5.6.7 Water spraying system and accessories

Fig. 35: Water spraying diagram



Media-ID: EM027415-00-EN / Caterpillar Global Mining Europe GmbH 2017 ©

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below

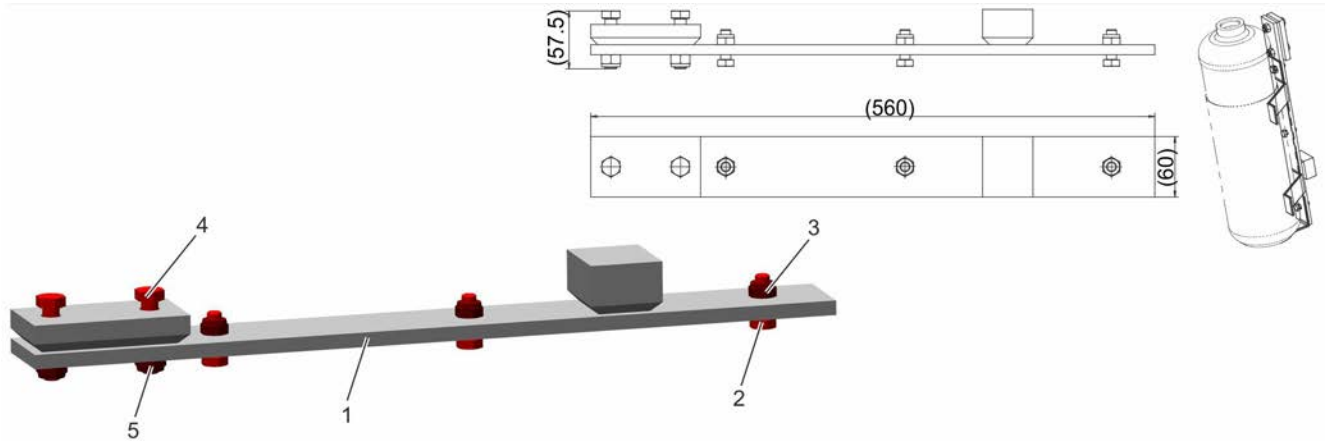


- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

Fire extinguisher holder

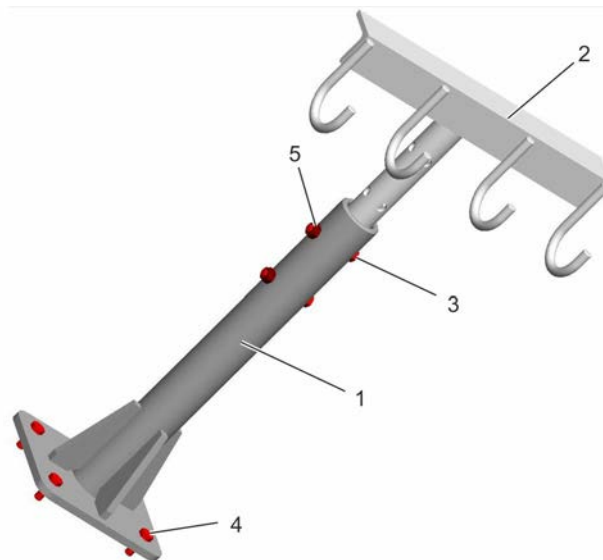
Fig. 48: Fire extinguisher holder, component positions and dimensions



| | | | |
|---|--------------------------|---|--------------------------------|
| 1 | Fire extinguisher holder | 2 | Hex. head screw M 10x30-A 2-70 |
| 3 | Hex. nut M 10-A 2-70 | 4 | Hex. head screw M 12x50-A 2-70 |
| 5 | Hex. nut M 12-1.4571 | | |

Multi-purpose holder

Fig. 49: Multi-purpose holder, component positions



| | | | |
|---|--------------------------------|---|--------------------------------|
| 1 | Multi-purpose holder | 2 | Support |
| 3 | Hex. head screw M 10x70-A 2-70 | 4 | Hex. head screw M 12x40-A 2-70 |
| 5 | Hex. nut M 10-A 2-70 | | |

PMC®-R control unit

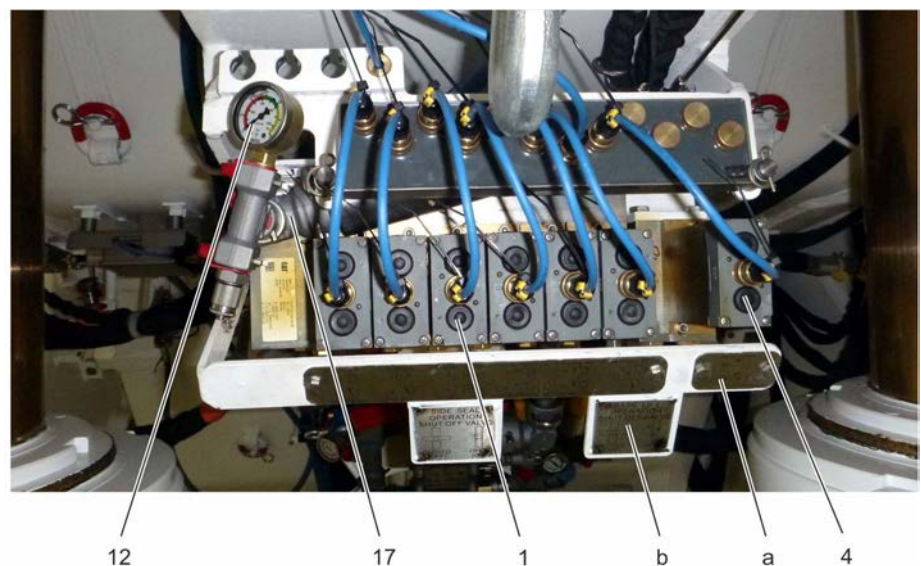
Fig. 64: PMC®-R control unit



| | | | |
|---|-------------------------|---|-----------------------|
| a | PMC®-R control unit | b | EMERGENCY STOP switch |
| c | Support lock-out switch | d | Bracket |

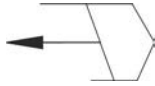
Electrohydraulic control unit and water valve

Fig. 65: Electrohydraulic control unit and Water valve unit, detail



| | | | |
|----|--|----|------------------------------|
| 1 | Electrohydraulic control unit, 12-function | 4 | Water valve unit, 2-function |
| 12 | Pressure gauge | 17 | Accumulator cartridge |
| a | Symbol plate | b | Sign |

Advance shield



Before executing this function, the side seal of the shield unit must be released and the function "Retract leg" must have been executed for both legs.

The function is executed as long as the button is pressed until there is a balance of forces or until the end position is reached.

As long as the function is activated, the piloted check valve, which hydraulically blocks the annular space of the advancing cylinder, is opened automatically.

Set the leg (compensating valve)



Before this function is actuated, the shield canopy must be correctly aligned. While this function is being executed, the baselift cylinder is actively retracted and the dust control system is activated.

The function is executed as long as the button is pressed until there is a balance of forces or until the end position is reached.

While the legs are being set, a canopy, which has too steep a setting angle, aligns itself automatically to the roof as long as the function of the compensating valve is not blocked. The canopy might then have to be realigned.

Compensating valve (KN valve)

The compensating valve and the associated shut-off valve are on the right leg when looking at the coal face. When the shut-off valve is open (lever in the direction of flow), the compensating valve is activated. When the shutoff valve is closed (lever perpendicular to direction of flow), the compensating valve has no function.

While the legs are being set, the compensating valve limits the pressure of the stabilizing cylinder to 200 bar as long as the pressure under the piston of the leg does not exceed 100 bar. This means that the stabilizing cylinder retracts if the canopy is set too steeply. The canopy only presses with the tip against the roof and aligns itself to it automatically.

Conveyor push



Before executing this function, ensure that the shield unit is completely set.

The function is executed as long as the button is pressed until there is a balance of forces or until the end position is reached.

Set leg with high pressure

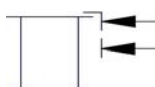


Before this function is actuated, the shield canopy must be correctly aligned.

The function is executed as long as the button is pressed until there is a balance of forces or until the end position is reached.

While the legs are being set, a canopy, which has too steep a setting angle, aligns itself automatically to the roof as long as the ball valve for the stabilizing cylinder is not blocked.

Retract seal cylinder



The seal cylinders continue to retract as long as the button is held down or until the end position is reached.

In idle state, the side seal is always pushed outwards due to the force of the compression springs.

5.14.2 3/2-way or pilot valve

The valve is jammed or a bypass has formed due to internal leakage. The latter can normally be detected on the working valves of the electrohydraulic control unit by a clearly audible hissing noise.

Pilot or control valves with a significantly lower volume flow will become noticeably warmer due to the constantly flowing medium.

The 3/2-way valve or the pilot valve may therefore be faulty.

- | | |
|--------------------------|--|
| valve sticks | <ol style="list-style-type: none"> 1. Try to solve the problem by actuating the function several times at the electrohydraulic control unit or control unit. |
| internal leakage | <ol style="list-style-type: none"> 1. Locate the faulty valve by actuating the functions individually in sequence. <p>If the noise goes away while a function is being actuated, this valve is faulty. You might have to press the button for the faulty function for several seconds before the noise goes away.</p> |
| valve replacement | <ol style="list-style-type: none"> 1. Close the main shut-off valve in the pressure feed line for the shield at the pipe distributor. 2. Then actuate the functions manually to depressurize the system. 3. Replace the 3/2-way valve or pilot valve. |

5.14.3 Piloted check valves

The formation of a bypass is indicated by a drop in pressure.

1. Try to solve the problem by actuating the function several times at the electrohydraulic control unit or control unit.

If the problem occurs again, the valve may be defective.

1. Check the valve and, if it is faulty, replace it.

5.14.4 Checking the leg check valves

To check the leg check valves please proceed as follows:

1. Set the leg until the setting pressure has been reached.
2. Remove the "set leg" hose line on the piloted check valve.

If fluid escapes from the connection of the piloted check valve, it is defective.

5.14.5 Internal bypass in legs

If you suspect an internal bypass in a leg, follow this procedure:

- ✓ Set the leg until the setting pressure has been reached.
 - ✓ Make sure that the annular space of the leg is depressurized.
 - ✓ Release the hose of the leg annular space connection at the leg.
 - ✓ Actuate the "Set leg" function at the neighboring support.
1. If there is an internal bypass in the leg, for example due to damaged piston packing, fluid will flow out of the leg's lower connection.
- ✓ Replace the leg in this case.

If fluid escapes from the detached hose lines, the piloted check valve is defective.

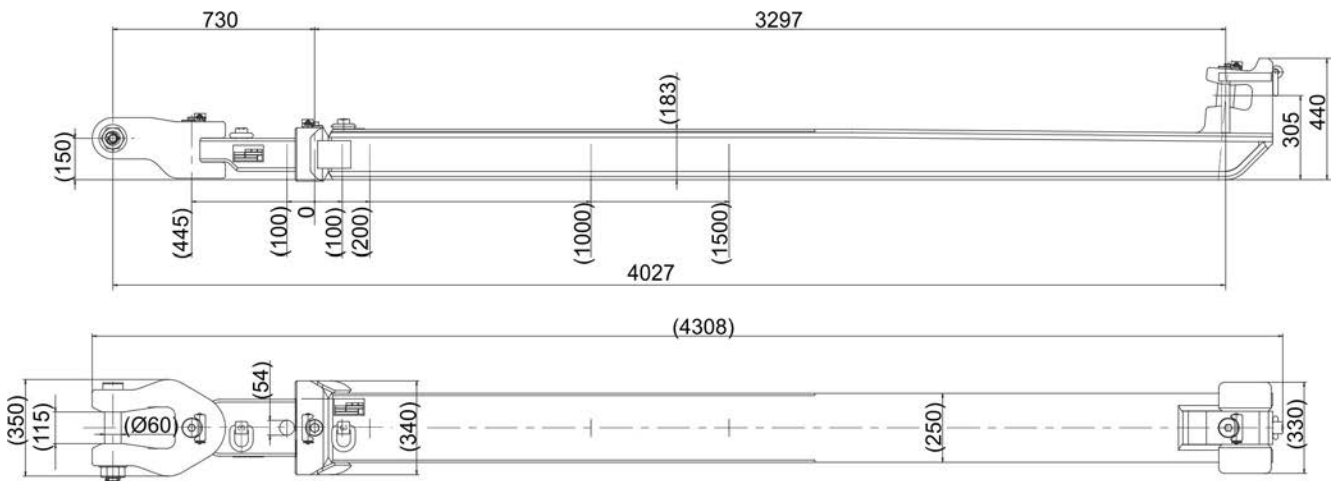
6.1.3 Relay bar assembly

The relay bar assembly is arranged in the middle of the base frame. It consists mainly of the relay bar, shifting ram, lifting cylinder and the required connecting elements. It serves to advance the conveyor and the shield.

The force of the reverse-mounted shifting ram is applied directly to the relay bar. Here, the force on the piston surface side is used to advance the shield, while the smaller force of the annular surface is used to advance the conveyor.

With the help of the base-lifting device, the base frame can be lifted from the floor during advancing. The lifting cylinder is located in the center of the base frame. The force of the lifting cylinder acts on the floor via the relay bar.

Fig. 92: Relay bar assembly, dimensions

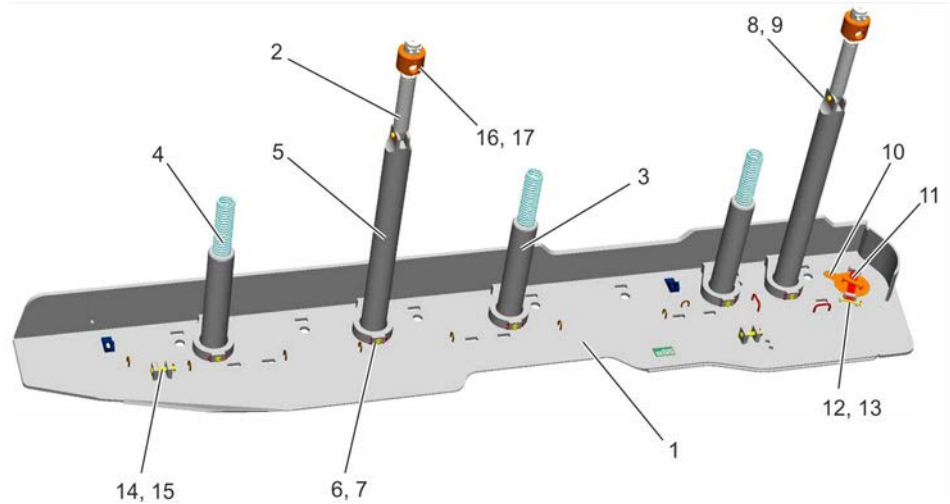


NOTICE

Installation

Apply lubricant B6 to all connecting points and slide surfaces.

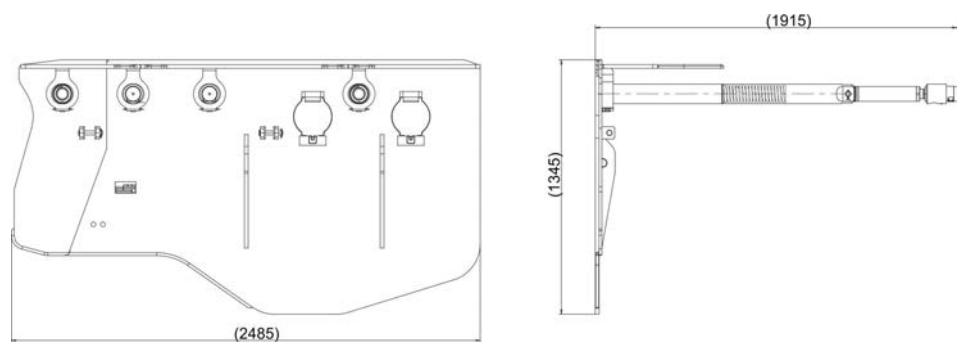
Fig. 104: Canopy side seal, component positions



| | | | |
|----|-----------------------|----|------------------------------|
| 1 | Side seal, CRH | 2 | Seal cylinder ZE-63/50-215 |
| 3 | Guiding pin Ø133x715 | 4 | Compression spring 12x79x560 |
| 5 | Guiding pin Ø133x1355 | 6 | Pin 35/28x232 |
| 7 | Staple DN 12-100 lg. | 8 | Pin Ø28x93 |
| 9 | Split pin 6.3x40-ST | 10 | Cover |
| 11 | Locking piece | 12 | Pin 15/12x120 |
| 13 | Spring clip 2.5 | 14 | Pin 30/22x120 |
| 15 | Spring clip 3.2 | 16 | Cylinder liner 133x105 |
| 17 | Screw pin M 10x12 | | |

Caving shield side seal

Fig. 105: Caving shield side seal, dimensions



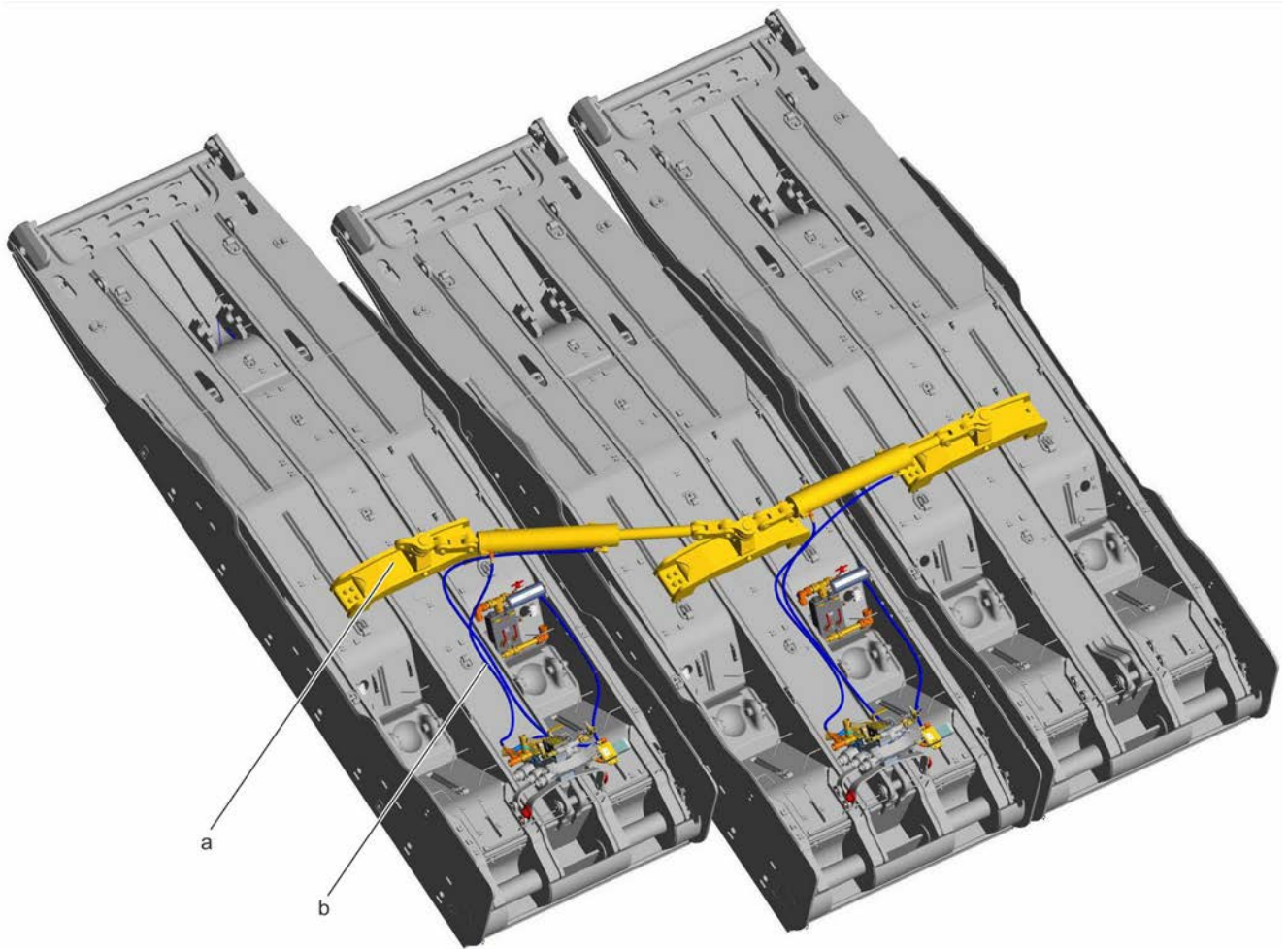
NOTICE

Installation

Apply lubricant B6 to all connecting points and slide surfaces.

| | | | |
|----|---|----|---|
| 7 | Plug-in reducing L-socket DN 25/DN10 | 8 | Plug-in reducing L-socket DN 10 |
| 9 | HP ball valve DN 10, Red | 10 | CV DN 10 |
| 15 | Hose line 2SC DN10x2100, connections galvanized | 16 | Hose line 2SC DN10x3000, connections galvanized |
| 17 | Hose line 2SC DN10x800, connections galvanized | 18 | Hose line 2SC DN10x1500, connections galvanized |
| 20 | Staple DN 10 | 21 | Staple DN 25 |
| a | Reposition existing measuring coupling | b | P-control |
| c | T-supply block | d | Connection, 2-control |
| e | glued | f | P-filter |
| g | Annular space | h | Piston space |
| i | T-control | | |

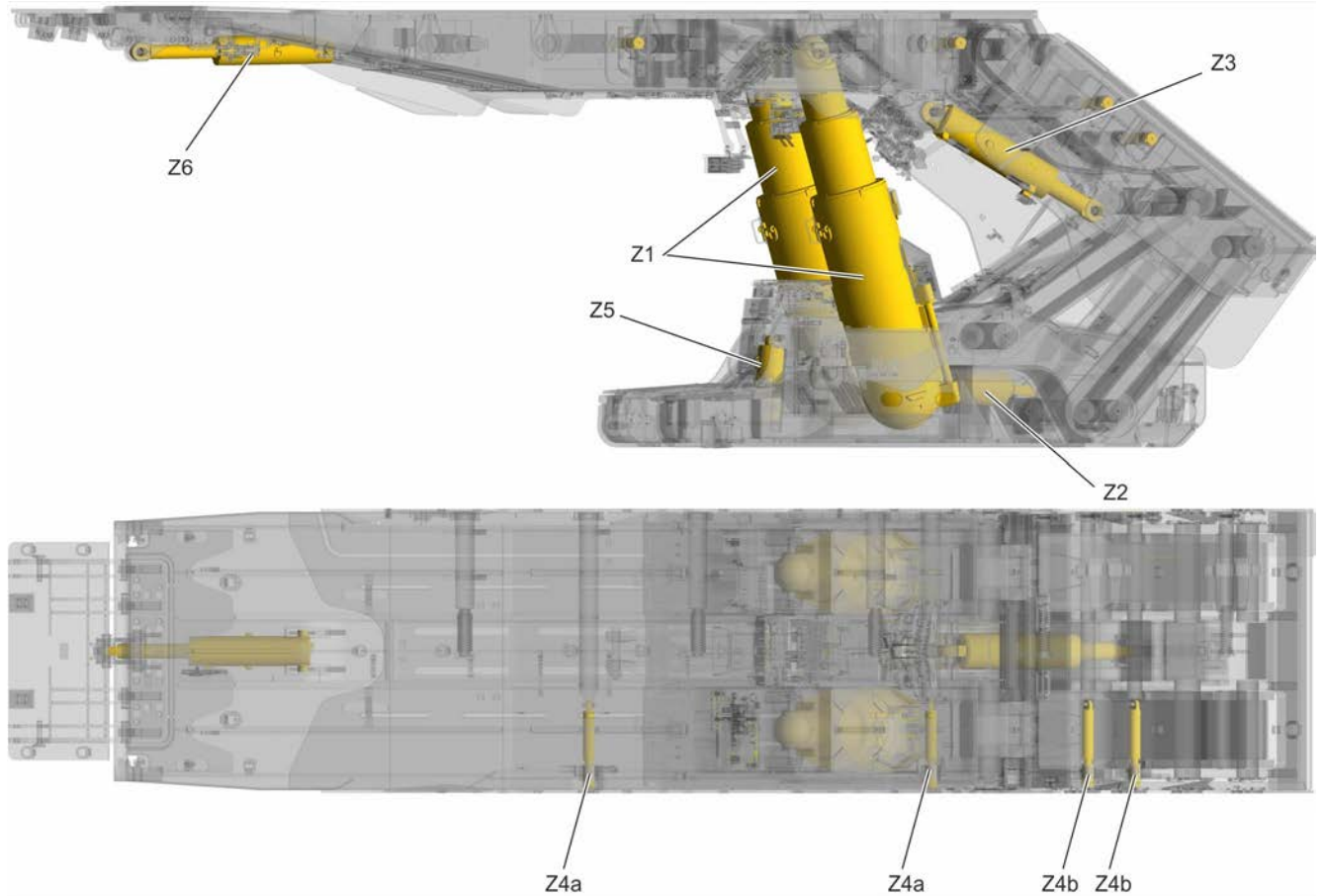
Fig. 114: Hydraulics for anti-topple device "canopy-canopy"



| | | | |
|---|------------------------------------|---|---|
| a | Anti-topple device "canopy-canopy" | 2 | Hydraulics for anti-topple device "canopy-canopy" |
|---|------------------------------------|---|---|

6.6.2 Legs and cylinders

Fig. 121: Component positions of the legs and hydraulic cylinders



Tab. 19: Component positions of the legs and hydraulic cylinders

| ID | Qty. | Name | Location | Drawing no. | Type |
|-----|------|----------------------|---------------------------|--------------------|-----------------------|
| Z1 | 2 | Leg | base frame | 8250 231 000 00 00 | SD-6500-450-1565/3175 |
| Z2 | 1 | Advancing cylinder | on the relay bar assembly | 8241 614 000 00 00 | ZE-200/125-1080 |
| Z3 | 1 | Stabilizing cylinder | caving shield canopy | 8241 615 000 00 00 | ZE-200/125-630 |
| Z4a | 2 | Seal cylinder | on the canopy | 8241 352 000 00 00 | ZE-63/50-215 |
| Z4b | 2 | Seal cylinder | on caving shield | 8241 352 000 00 00 | ZE-63/50-215 |
| Z5 | 1 | Lifting cylinders | on the base frame | 8241 616 000 00 00 | ZE-150/90-300 |
| Z6 | 1 | Flipper cylinder | Canopy-flipper connection | 8241 618 000 00 00 | ZE-165/100-555 |

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below



- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL