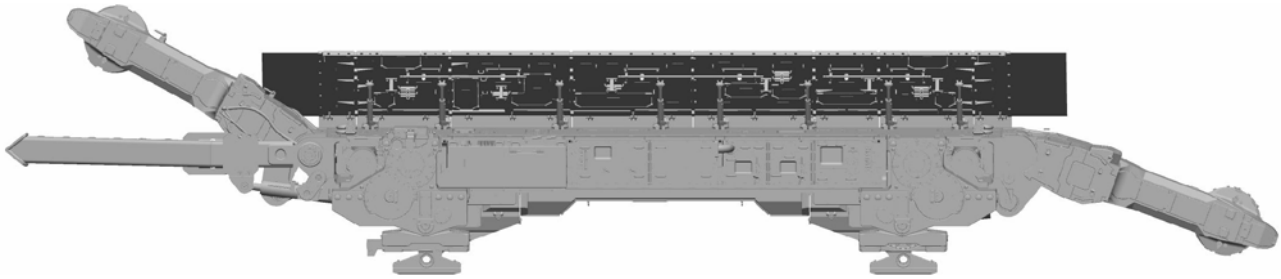
Operating Manual

Shearer EL3000

Doc. no.: SHEL3000-131 BA 00



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2 Your safety

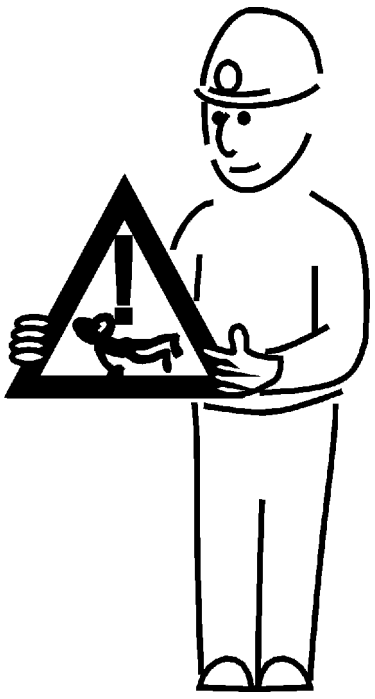
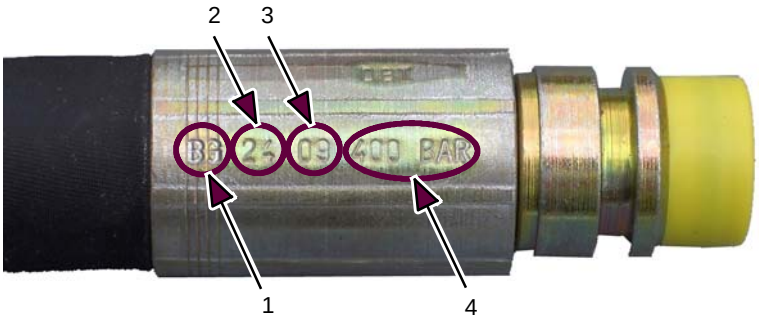


Fig. 1: Example: hydraulic hose, identification



1 manufacturer
2 calendar week
3 year
4 max. working pressure

Never attempt to hold a hydraulic hose that is thrashing about. Immediately depressurize the section in question.

Never attempt to repair damaged hydraulic hoses.

Replace hydraulic hoses at the first suspicion of damage.

Observe the following recommendations for use, storage and assembly of hydraulic hoses and assembled hoses:

Storage of hoses

A hose should not be stored for more than four years before assembly.

Storage of assembled hose

An assembled hose should not be stored for more than 2 years (after assembly).

Observe the following storage conditions to minimize wear of hydraulic hoses and assembled hoses:

- The storage temperature should be between +15°C and +25°C with a max. humidity of 65%.
- Avoid storage temperatures of below 10°C!
- Store horizontally in a dry and low-dust environment.
- Avoid direct sunlight or UV rays.
- Protect from sources of heat.
- Do not store near ozone emitting lighting equipment or electrical appliances that might generate sparks.
- Avoid contact with acids, bases or solvents.
- When stored radially, observe the manufacturer´s bend radius.

Period of use assembled hoses

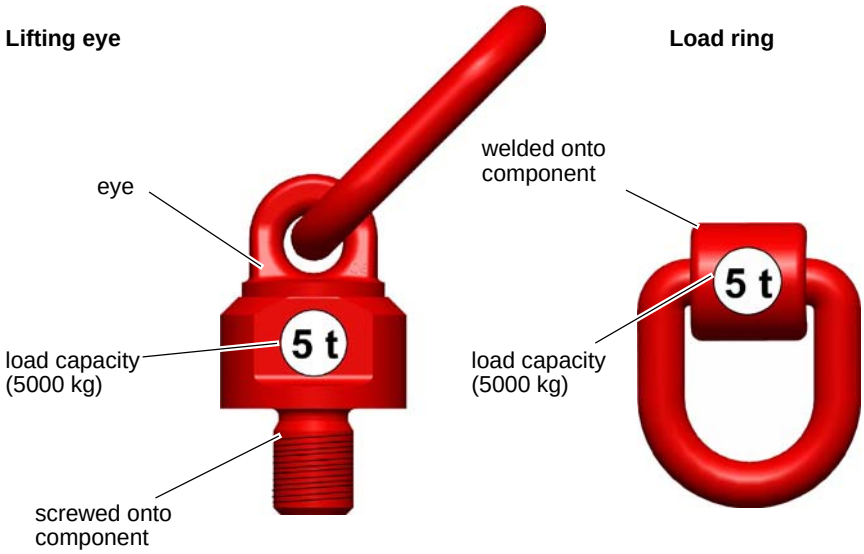
The period of use of assembled hoses should not exceed a maximum of 2 years.

Tab. 1: Period of use

Hydraulic hose Period of storage	**Assembled hose** Period of use	
Age	Storage	Use
max. 4 years	**max. 2 years**	**max. 2 years**

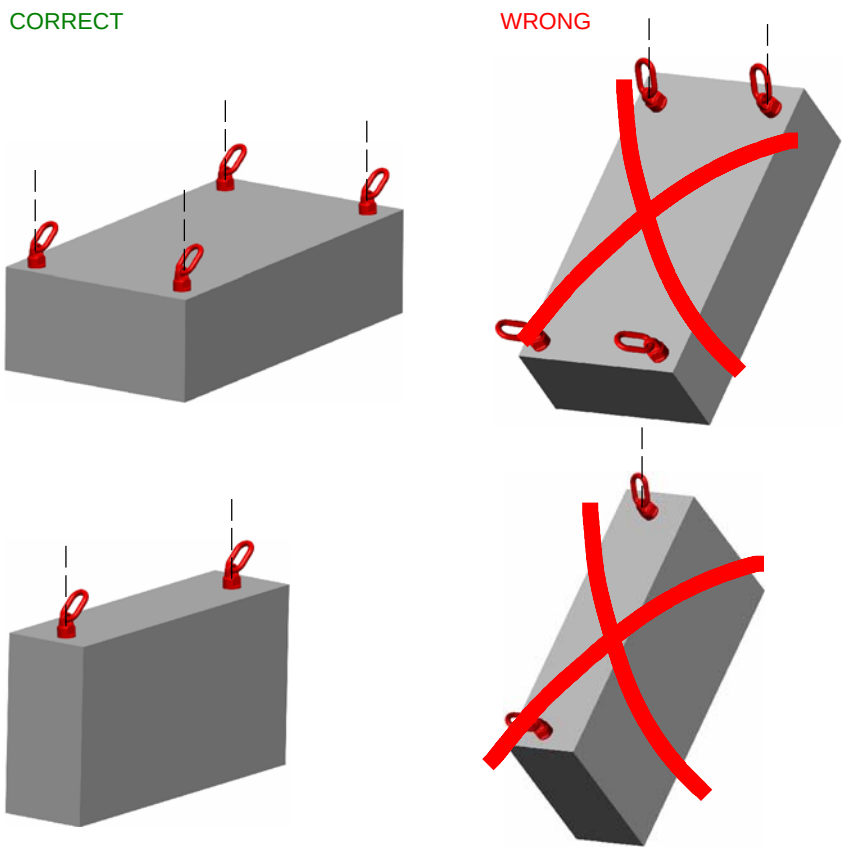
Important!
Due to the cold flow (crawling expansion) of the hose after assembly, assembled hoses should only be stored for a short time.

Fig. 7: Lifting eye and load ring example



Danger!
To transport loads, always use all lifting points provided. Components may come loose due to incorrectly or insufficiently attached loads. Falling components can cause serious injury or even death.

Fig. 8: Correct transport of machine parts



Installation

What you need to observe prior to installation

Who is allowed to perform the installation?

Installation work may only be carried out by persons who have been adequately trained for these specific requirements.

Work on:

- safety components (pressure relief valves, extinguishers etc.),
- the electrical system (controls, signaling devices, etc.),
- the hydraulic system (cylinders, directional control valves, hoses etc.)

may only be carried out by service engineers from Caterpillar or by specially trained personnel.

Which tools are required for installation?

tool box

You need a number of tools in order to be able to install the shearer properly.
We recommend that you use the tool box and special tools supplied.

Furthermore, various items of auxiliary equipment and machines are required at the installation points. These include:

- lifting equipment with sufficient load capacity
- means of attachment with sufficient load capacity
- impact wrenches incl. accessories

Notes on installation

Caution!
Serious damage can be caused to the shearer as a result of incorrect installation.
The shearer should therefore only be installed under the instructions of specialists from Caterpillar.

Caution!
Please take care to observe the corresponding separate operating manuals (e.g. for motors, superbolts, etc.).

installation plan

The operator must compile a risk assessment with respect to the environment in which the shearer is to be installed. The sequence of operations during installation must be adapted to the individual conditions on site. Before starting the work, a detailed list of all steps to be taken with respect to transport and installation should be compiled as well as a corresponding installation plan.

tightening torques

For tightening torques not listed in the installation instructions for the components, please refer to the list in chapter 6. Please also observe the tightening torques specified in the spare parts lists provided.

instructions for handling - connection points

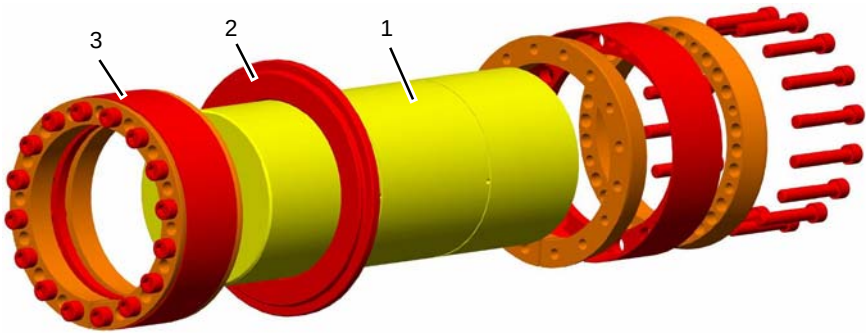
Pins, holes, screws and securing elements must be lubricated with grease.

Fit ranging arm to mainframe

Each ranging arm is being fitted to the mainframe using 2 hinge pins and 4 clamping sets that are inserted into the bores of the hinge brackets of the mainframe and the ranging arm.

Important!
Carefully read the separate mounting instructions of the clamping sets before you start the installation and make sure you are familiar with the mounting steps.

Fig. 26: Hinge pin with clamping set and thrust washer



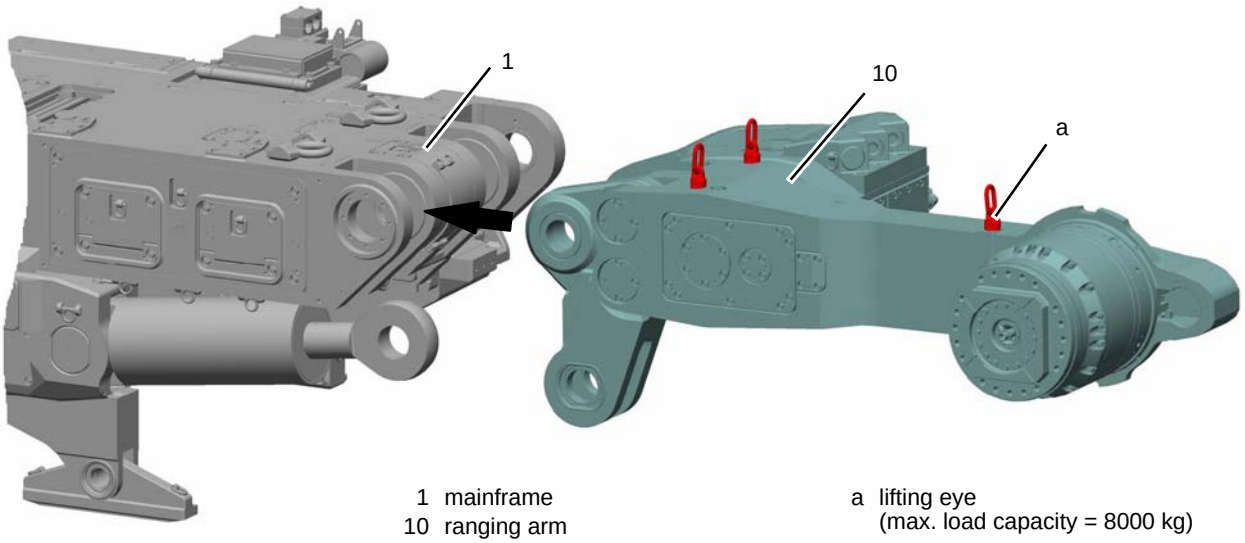
1 hinge pin
2 thrust washer
3 clamping set KTR 401

To fit the ranging arm to the mainframe, proceed as follows:

☞ Use appropriate lifting equipment or a special vehicle to position the ranging arm at the mainframe.

☞ Make sure the ranging arm is level.

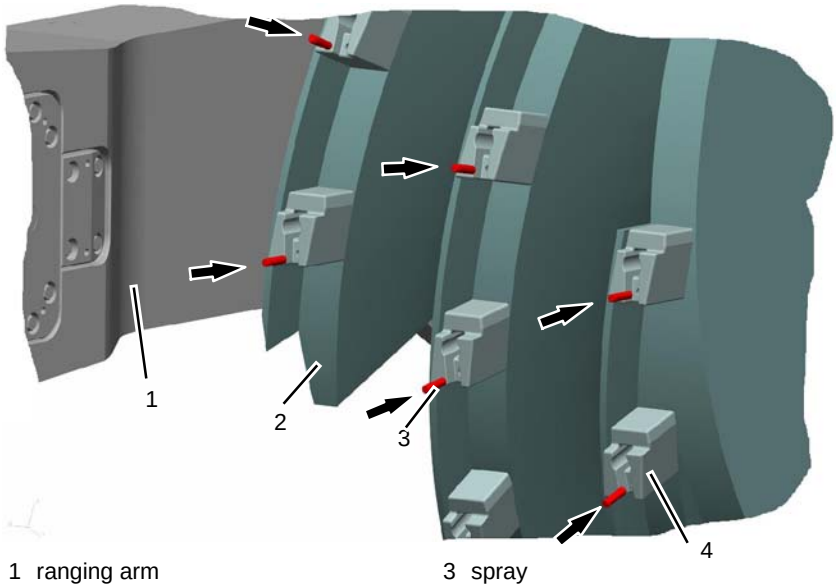
Fig. 27: Position and align ranging arm



1 mainframe
10 ranging arm
a lifting eye
(max. load capacity = 8000 kg)

☞ Fit the sprays and secure the sprays with the staples. Test all sprays are operational.

Fig. 42: Fitting sprays

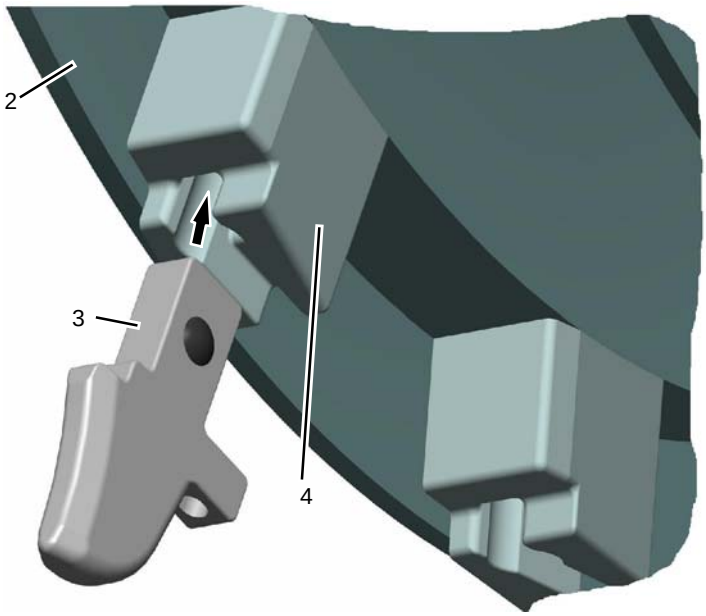


1 ranging arm
2 cutting drum
3 spray
4 pick retainer

☞ Fit the picks. Make sure not to strike the Tungsten tip.

☞ Fit cover plate if supplied.

Fig. 43: Fitting picks



1 ranging arm
2 cutting drum
3 pick
4 pick retainer

Operation

This chapter contains important information on the operation and maintenance of the shearer. It also includes instructions on the replacement of wear parts, etc.
Please read this chapter carefully and thoroughly. Make sure you observe the safety instructions in chapter 2, “Your safety”.

Who is allowed to operate the shearer?

The shearer may only be operated by persons with sufficient knowledge of the shearer and the entire conveyor system.
This includes knowledge of:

- what safety equipment is installed on the system,
- where this safety equipment is located,
- how this safety equipment is to be operated.

When is coal cutting allowed to be started?

Coal cutting may not be started until the perfect condition and proper function of the shearer and the entire conveyor system has been checked and the daily maintenance operations have been performed.

Danger!
When you start up the shearer ensure that nobody is present in the shearer's hazardous area.

What you have to observe before starting the shearer

Carefully observe the procedures for daily maintenance stated in the maintenance tables when you start the shift. This will ensure a better reliability and performance of the shearer:

☞ Clean the shearer from any debris that might obstruct the operation of the shearer.

☞ Check the shearer for any visible defects, eg. cracks, leakages, broken or missing parts or wear. That includes:

- wear of the picks on the cutting drums
- wear of the skid shoes (face side)
- wear of the insert in the trapping shoes (goaf side)
- hoses and cables

For further information concerning the wear measurement please refer to “How to replace wear parts” in this chapter.

☞ Check oil and hydaulic fluid levels. Fill up if necessary. Grease the grease nipples as stated in the maintenance tables. Further information can be obtained in the section “Maintenance”.

☞ Check if the cutting drums can rotate freely.

☞ Check all flameproof covers, cable inlets, safety equipment, controls and inspection covers for damage.

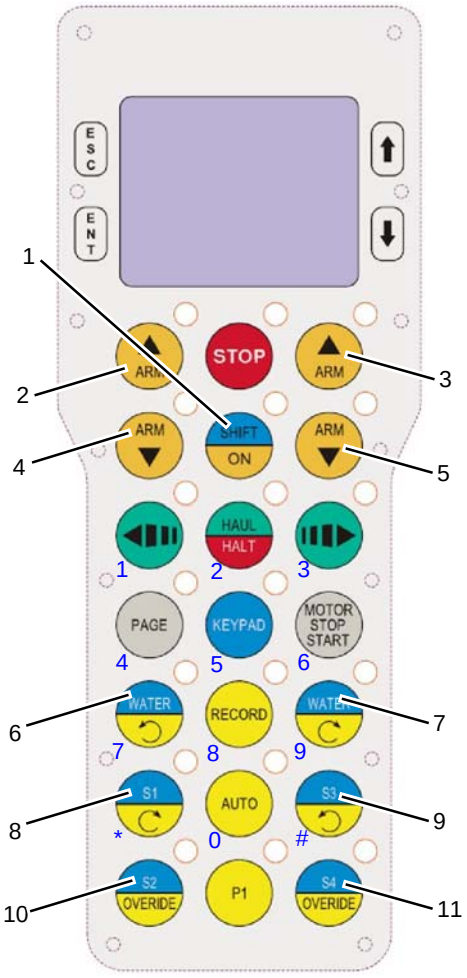
☞ Check that the water supply is correct to all parts of the shearer.

No.	Function
14	Program on/off
15	Right cowl clockwise
16	Left cowl counter clockwise
17	Auto mode on/off
18	Right cowl counter clockwise
19	Left arm: change from auto mode to manual operation
20	Cooling water on/off (programmable in MMC, Setup mode)
21	Right arm: change from auto mode to manual operation

Shift buttons

The following image shows the buttons that can be activated after pressing and holding the SHIFT button.

Fig. 58: Transmitter: Shift buttons



No.	Function
1	Shift button (keep pressed)
2	Left arm raise fast
3	Right arm raise fast
4	Left arm lower fast
5	Right arm lower fast

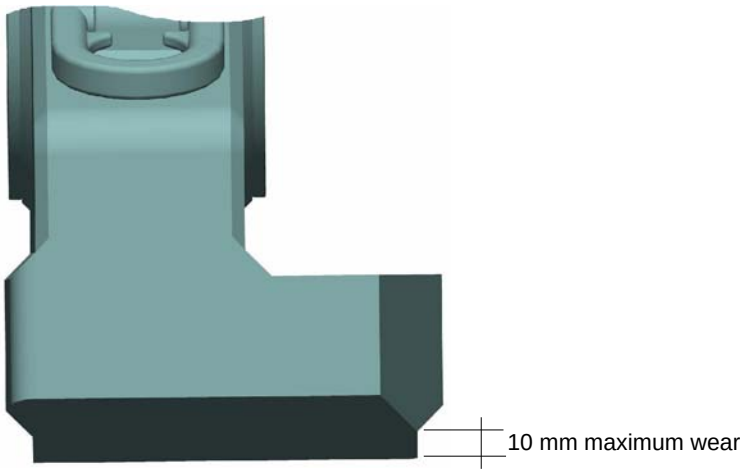
No.	Subject	Maintenance interval				Comment / Reference
		Daily	Weekly	Monthly	Quarterly	
Cutting drums						
M210	Picks and pick boxes	check				see Fig. 66
M220	Retaining and shaft bolts			check		see Fig. 66
M230	Can rotate freely	check				see Fig. 66
M240	Damages?	check				see Fig. 66
M250	Oil leakage	check				see Fig. 66
M260	Dust suppression sprays	check				see Fig. 66
Haulage units						
M270	Oil level	check				see Fig. 67
M280	Motor attachment screws			check		see Fig. 67
M290	Motor quill shafts			check, grease		see p. 5.53
M300	Oil sample for analysis			check		see Fig. 67
M310	Break wear (if break is fitted)			check		see Fig. 67
M320	Change oil (if no contamination analysis is being carried out)				change	see Fig. 67
Powerpack						
M330	Fluid level	check				see Fig. 68
M340	Nominal pressure value	check				see Fig. 68
M350	Leakages?	check				see Fig. 68
M360	Filter conditions	check				see Fig. 68
M370	Hoses and connections		check			see Fig. 68
M380	Functioning of control handles		check			see Fig. 68
M390	Oil sample for analysis			check		see Fig. 68
M400	Pressure and return filter			check/ replace		see Fig. 68/ filter manual
M410	Hydraulic pump fasteners			check		see Fig. 68
M420	Pump motor fasteners			check		see Fig. 68
M430	Control valve fasteners			check		see Fig. 68
M440	Hydraulic fluid				change	see Fig. 68
Water system						
M450	Functioning of all valves	check				see Fig. 133
M460	All visible hoses and connections	check				see Fig. 133
M470	Waterflow and pressure values (MMC)	check + record				see MMC manual

Ranging arms		
No.	**Subject**	**Remarks**
M50	Oil level	Arms horizontal, machine not powered, check oil levels
M60	Correct functioning lifting cylinder	Raise and lower both ranging arms
M80	Water leaks on inlet distributor?	Visual inspection
M90	All covers tight?	Visual inspection
M100	Oil leaks	Visual inspection
M110	Hinge pins mainframe	Hinge pins are connected to remote greasing stations located on the waste side of the machine. Prior to applying lubricant, ensure that the weight of the ranging arm is fully supported (e.g. drum rests on the floor or arm rests on support). Lubricant: Caterpillar Grade GR3
M120	Pin connection lifting cylinder	Visual inspection
M130	Lifting cylinder damaged?	Visual inspection, machine isolated
M140	Oil sample for analysis	Oil changes to be determined based upon results of oil sample analysis
M150	Security of cutter motor retaining fasteners	Knocking test
M160	Wear and correct location of hinge pins	Visual inspection for “play” between the pins and drilled (bore) holes
M170	Change oil (if no contamination analysis is being carried out)	Drain oil (both high speed and epicyclic section) and refill with new oil up to prescribed oil level. Oil capacity High Speed Section: 28 l Oil capacity Epicyclic Section: 30 l
M180	Covers high speed section	Check positioning of covers for security, check for oil loss, check all screws are torqued correctly
M190	Wet cutting shaft seals	Inject grease, Lubricant: Caterpillar Grade GR3
M200	Cowls (if fitted)	Inject grease

Skid shoes

The maximum wear of the face side skid shoes is 10 mm. The skid shoe needs to be replaced if the wear exceeds 10 mm.

Fig. 72: Wear limit skid shoe

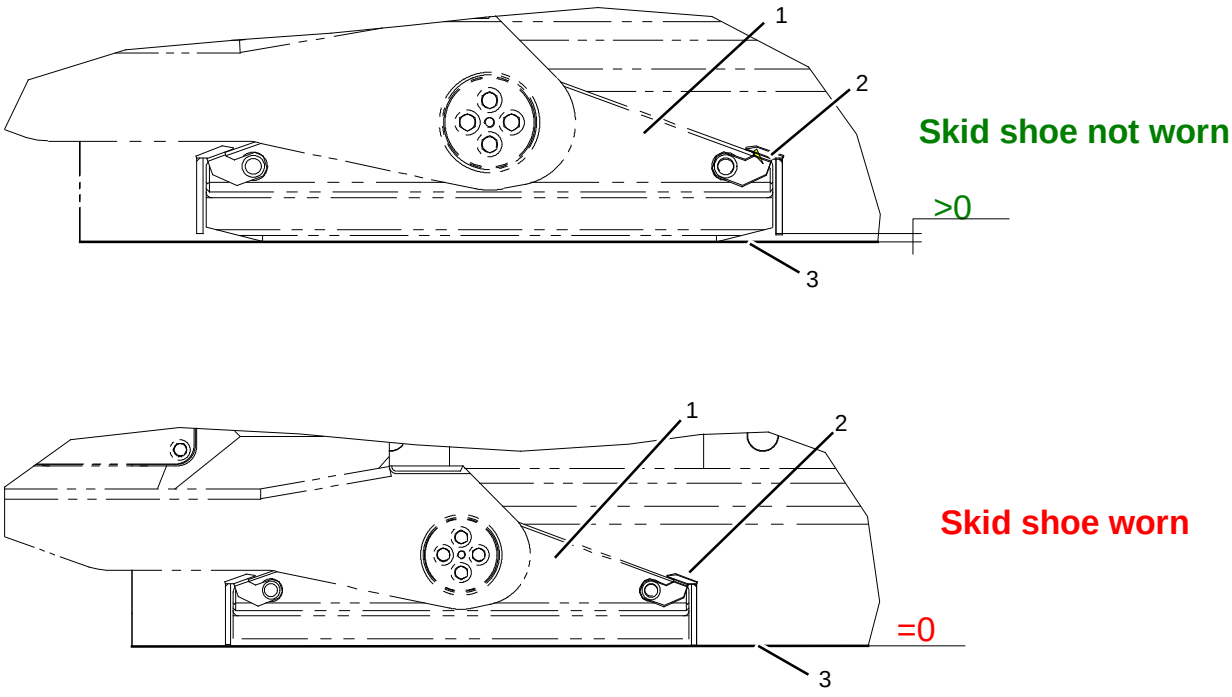


Wear measurement skid shoes

The wear of the skid shoe is measured by means of a wear gauge that is supplied with the special tools for the shearer.

The gauge is placed into the bores on each side of the skid shoe as shown below. The wear limit is reached when the gauge touches the toe plate of the conveyor or cannot be placed into the bores.

Fig. 73: Skid shoe wear measurement



1 skid shoe
2 wear gauge
3 toe plate conveyor

Other replacement procedures

This section provides information for replacing some of the parts of the shearer other than the wear parts listed above. Please note that this information is not exhaustive, i.e. it can not cover every possible replacement work needed.

Haulage motor quill shaft replacement

Danger!
Prior to starting this work, make sure to observe the general safety notes in chapter 2. Isolate the shearer and the conveyor and secure them against unintentional restart!

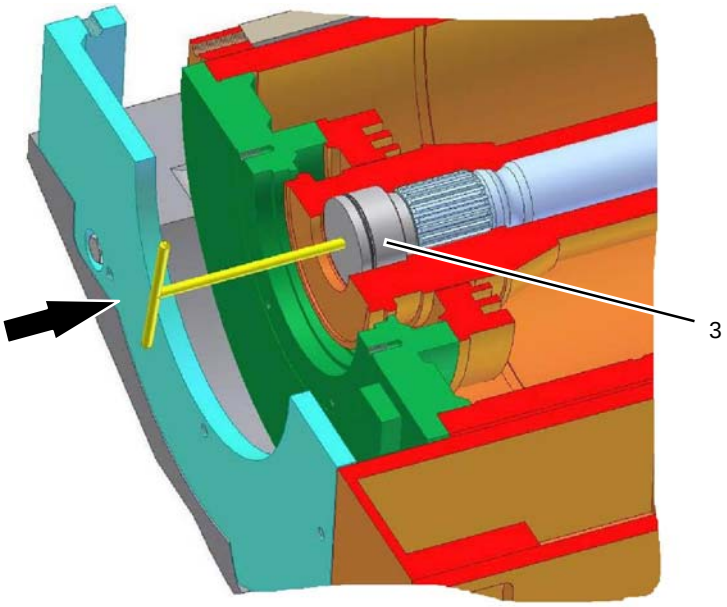
Important!
This procedure does not replace the need for a local risk assessment. Identify the risks that may occur in your mine and make sure the results are being observed during maintenance works.

Warning!
Make sure that all pressure is removed from hydraulic or water hoses before you disassemble them!

To replace the quill shaft, proceed as follows:

☞ Insert the M10 puller bar into the shaft plug.

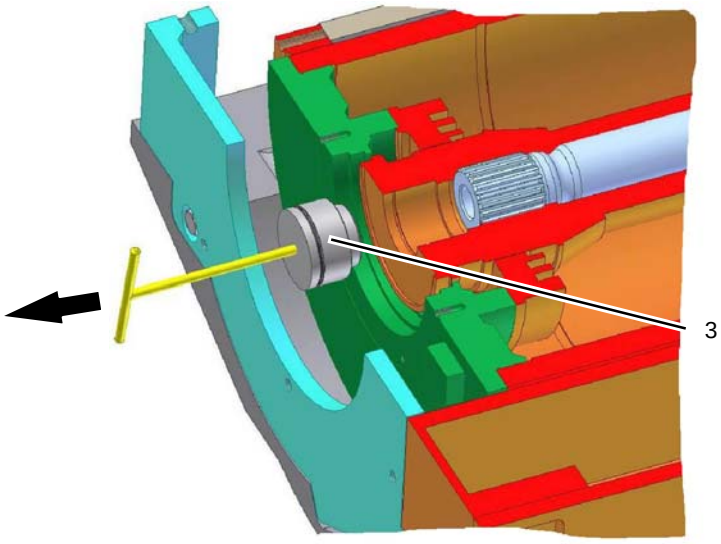
Fig. 102: Insert puller bar



3 shaft plug

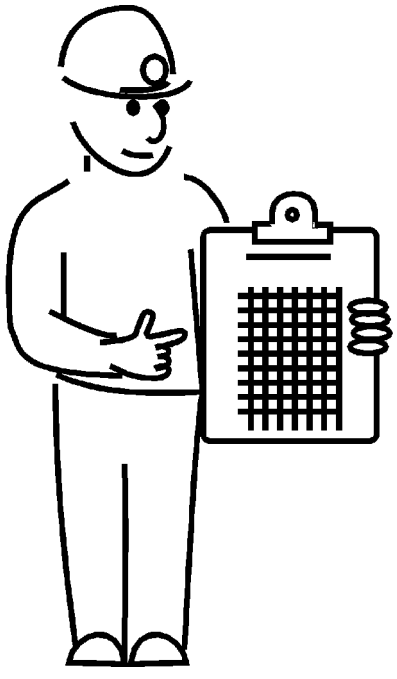
☞ Withdraw the plug.

Fig. 103: Remove shaft plug



3 shaft plug

6 Technical data



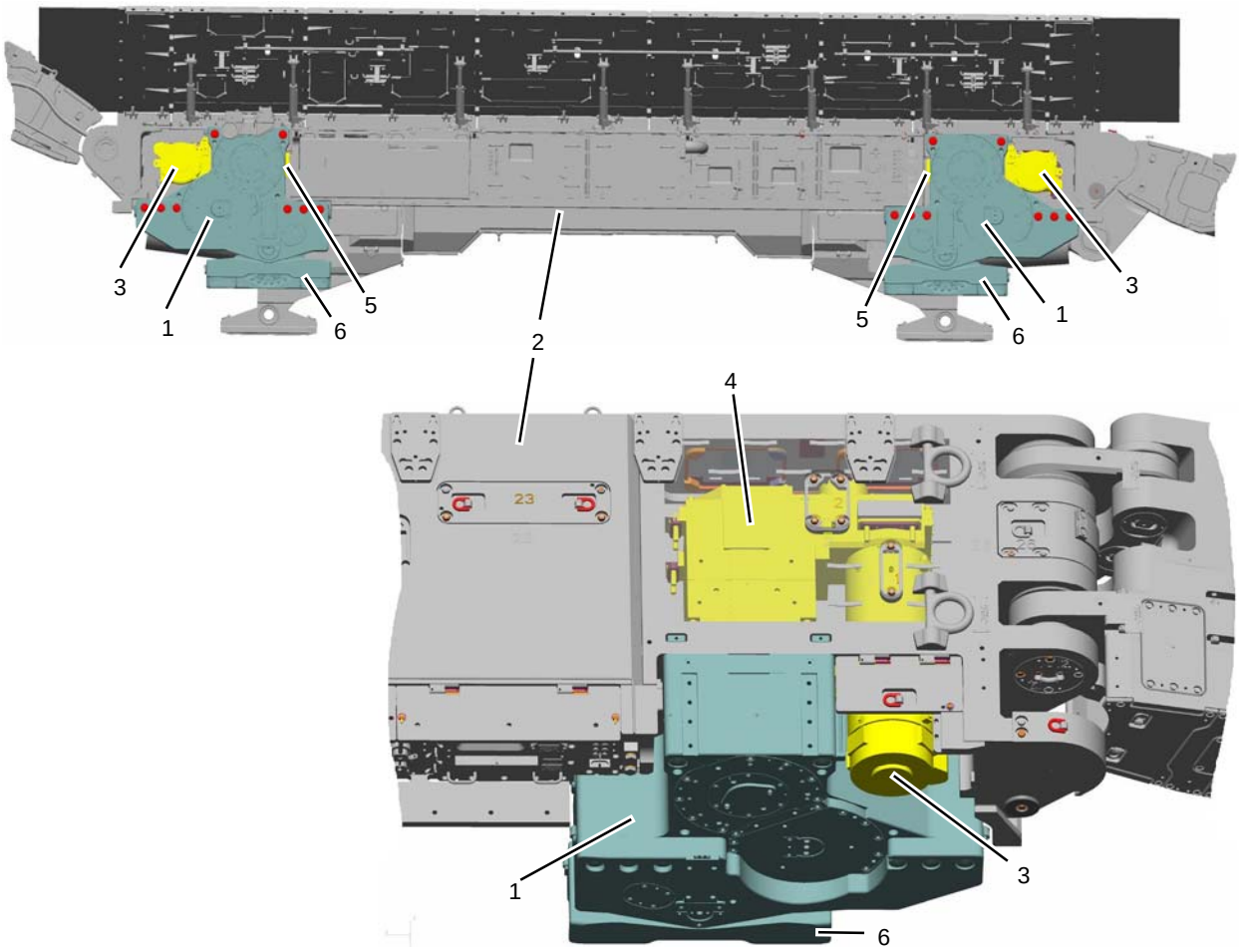
Downdrives

general information The two downdrives transmit the power from the haulage units´ output shaft to the drive sprocket in the trapping shoes.

assembly The complete downdrive is bolted and keyed to the mainframe on the waste side. The bolt retention is by means of Supernuts (see chapter 4, “Assembly”).

oil tank From an oil tank on the inner side of each haulage unit oil is dripped onto the first motion shaft of the downdrive. The oil level can be checked from the waste side of the shearer.

Fig. 114: Downdrives

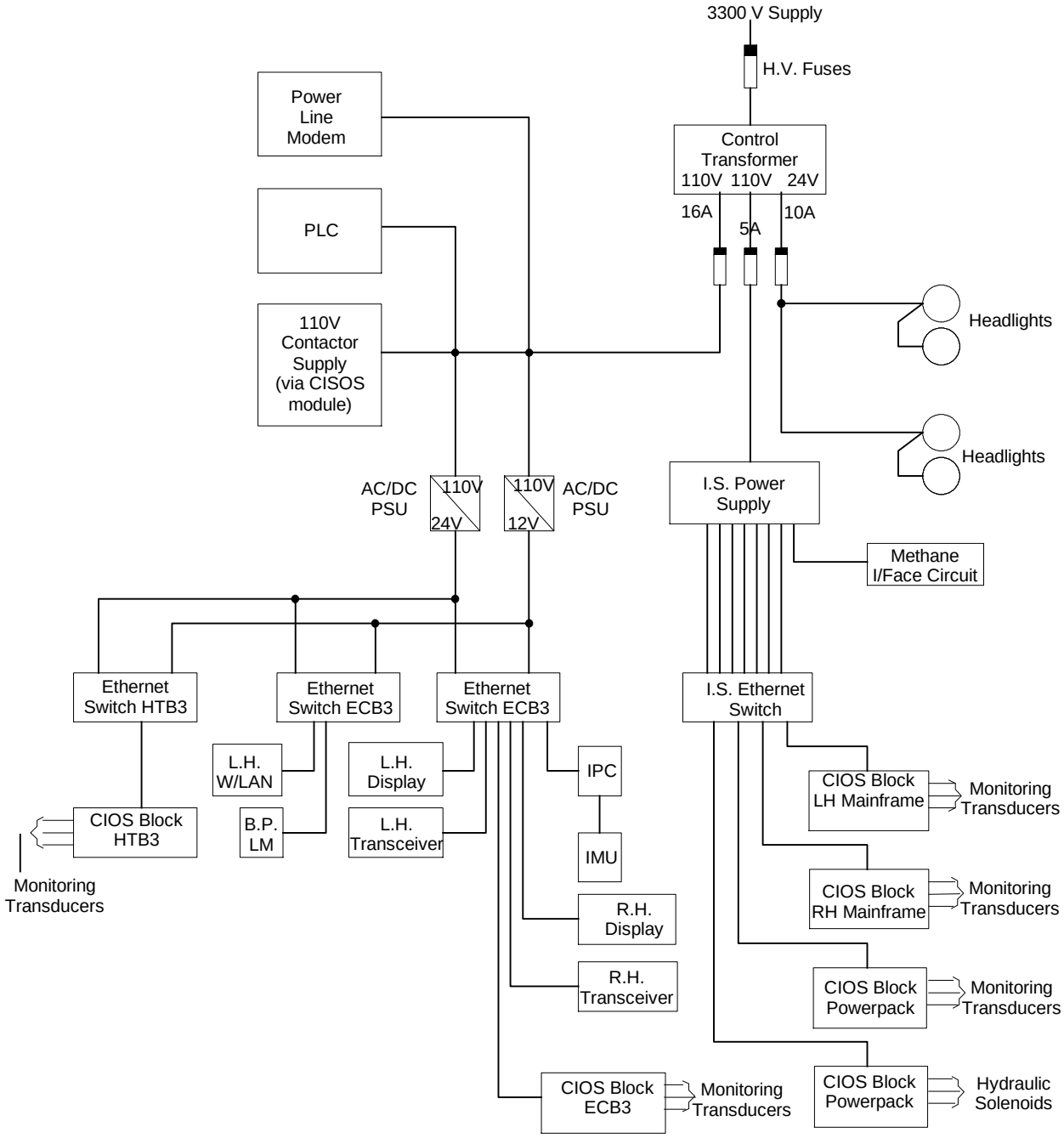


1 downdrive
2 mainframe
3 haulage motor
4 haulage unit
5 oil tank downdrive
6 trapping shoe

Control power distribution

The control power distribution system is illustrated in the block diagram included as Fig. 121.

Fig. 121: Control power distribution block diagram



Test facilities

Pilot circuit test points

By referring to the pilot circuit diagram within the electrical diagrams, it can be seen that various stages of the pilot circuit are connected to a group of connectors. This arrangement, which is conveniently located under a small flameproof cover on the ECB3 control box provides a useful method of carrying out pilot circuit point to point testing.

Technical data
Ranging arm motor

Motor type:	EL 68 A
kW:	620
Rating:	cont.
Voltage:	3300 V
Frequency/Cycles:	50 Hz
Insulation Class:	H
Amps:	129
Voltage Range:	2640 - 3630 V
RPM:	1488
Starting Current:	(7.3 x FLC)
Starting Torque:	(1.4 x FLT)
No of Phases:	3
Connection:	Star
Cooling water quantity:	35 l/min
Cooling water temperature.: . .	max. 30° C
Max. pressure cooling water: .	34,5 bar

Further information can be be found in the separate operating manual or spare parts documentation from the respective manufacturer or supplier.