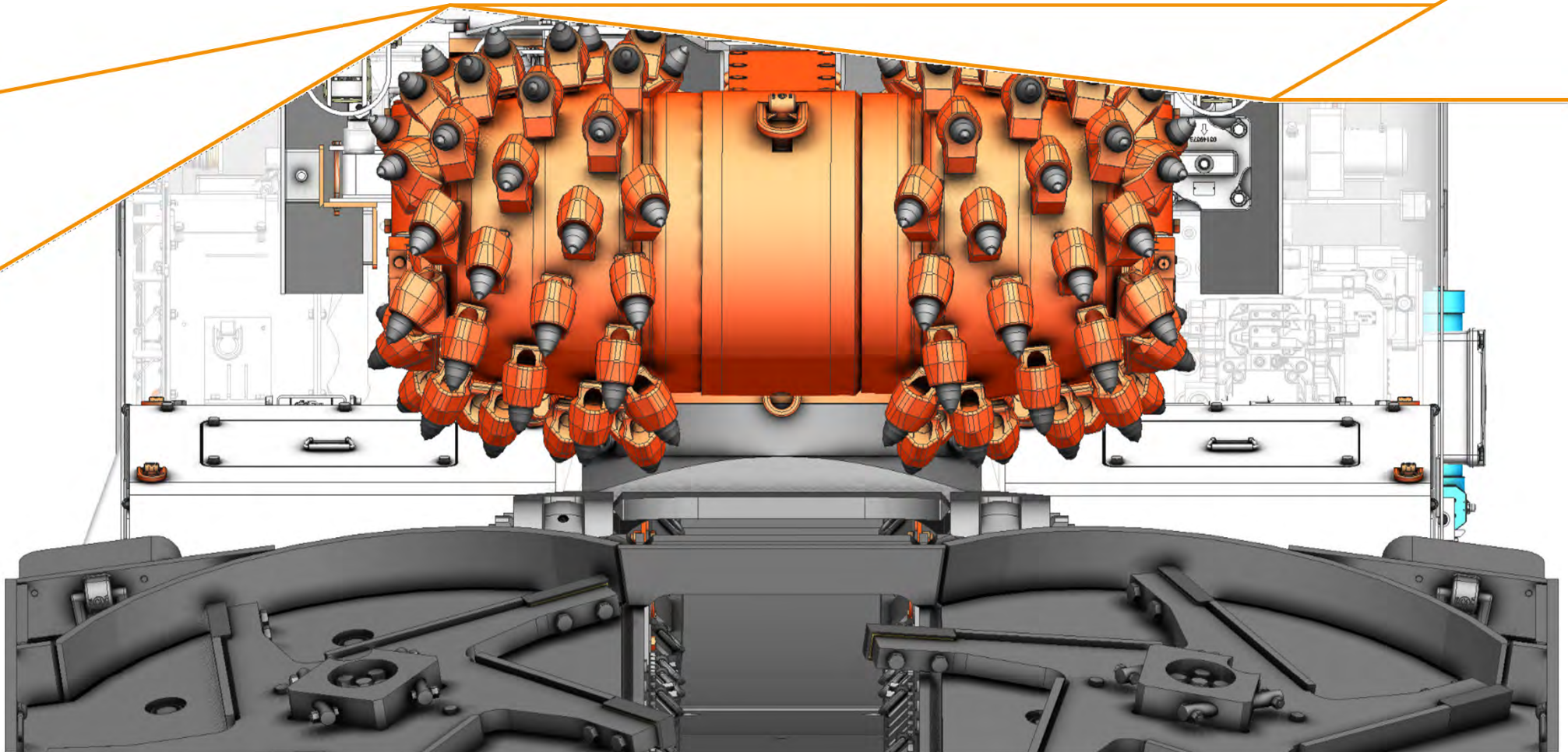


TECHNICAL PRESENTATION

Roadheader MR361



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Safety first

Sandvik's objective is zero harm to our people, the environment we work in, our customers and our suppliers



PROTECTIVE
EQUIPMENT



FIRST AID
KIT



ALARM



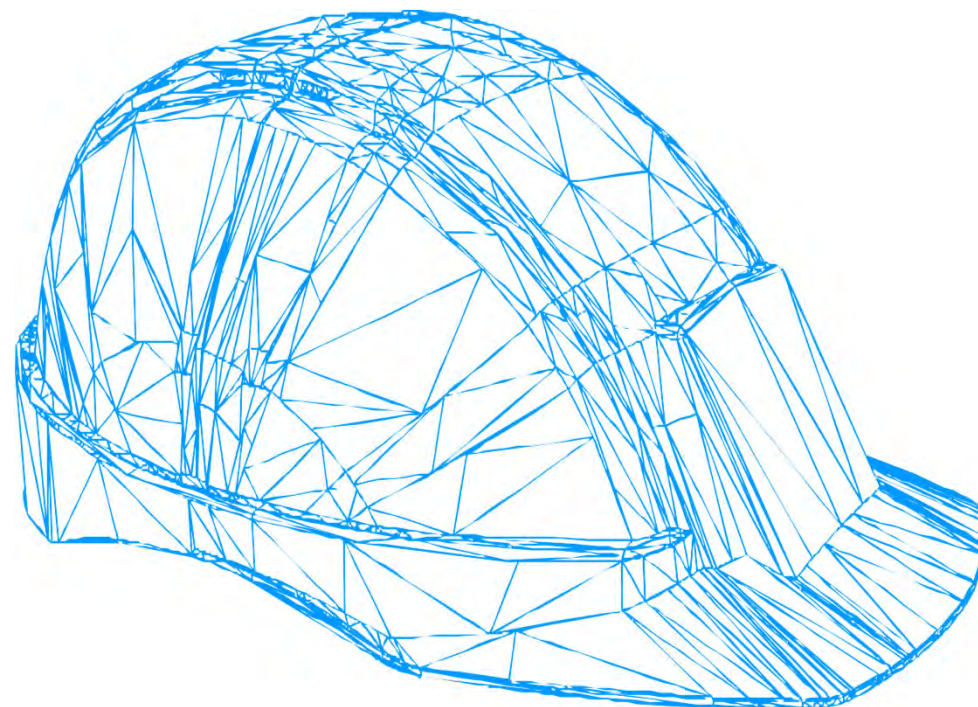
EMERGENCY
NUMBER



EMERGENCY
EXIT



ASSEMBLY
POINT



Roadheader MR361

The machine is a road-header part-face machine, suitable for cutting rock. The cutting limits are predominantly defined by the type of rock to cut, rock mass features and the cutting tools (picks).

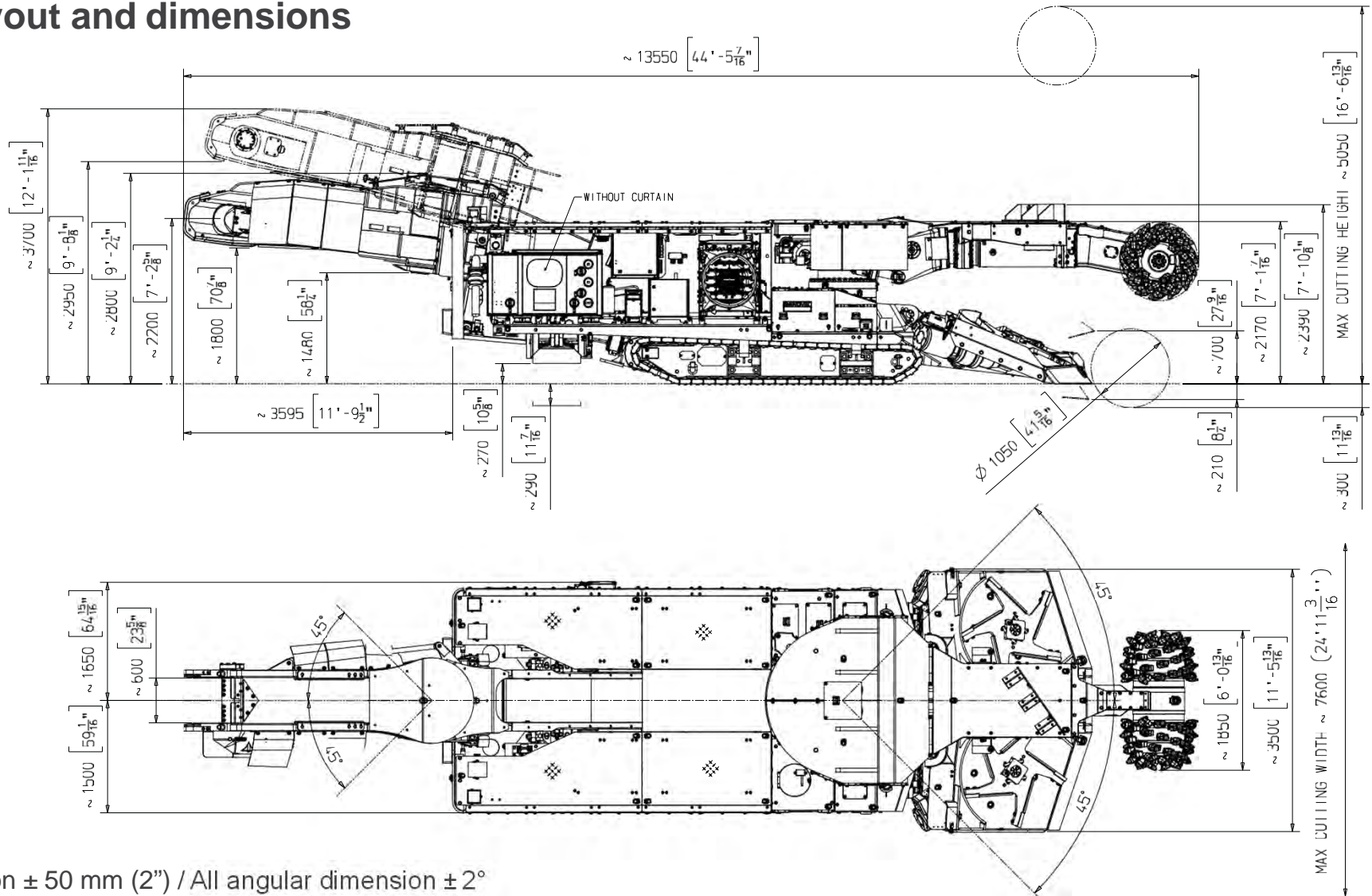
Moreover, the electro-hydraulically driven machine is also applied as production machine for potash, coal, etc.

Features, Advantages

- The part-face cutting principle with cutter boom slewing to all directions make it possible to cut any required profile (between minimum and maximum profile) in a single pass.
- Optional integrated spraying systems efficiently suppress dust and cool cutting tools.
- Low ground pressure of crawler tracks.
- Additional accessories such as integrated swivel chain conveyor, and high tramming speeds for relocations make the machine also suitable for room & pillar mining operations.
- Available as intelligent PLC (Programmable Logical Controlled) or manual hydraulic controlled machine
- Modular design allows easy maintenance and rapid assembly and disassembly.
- Automated greasing system for low service requirements.



Machine layout and dimensions



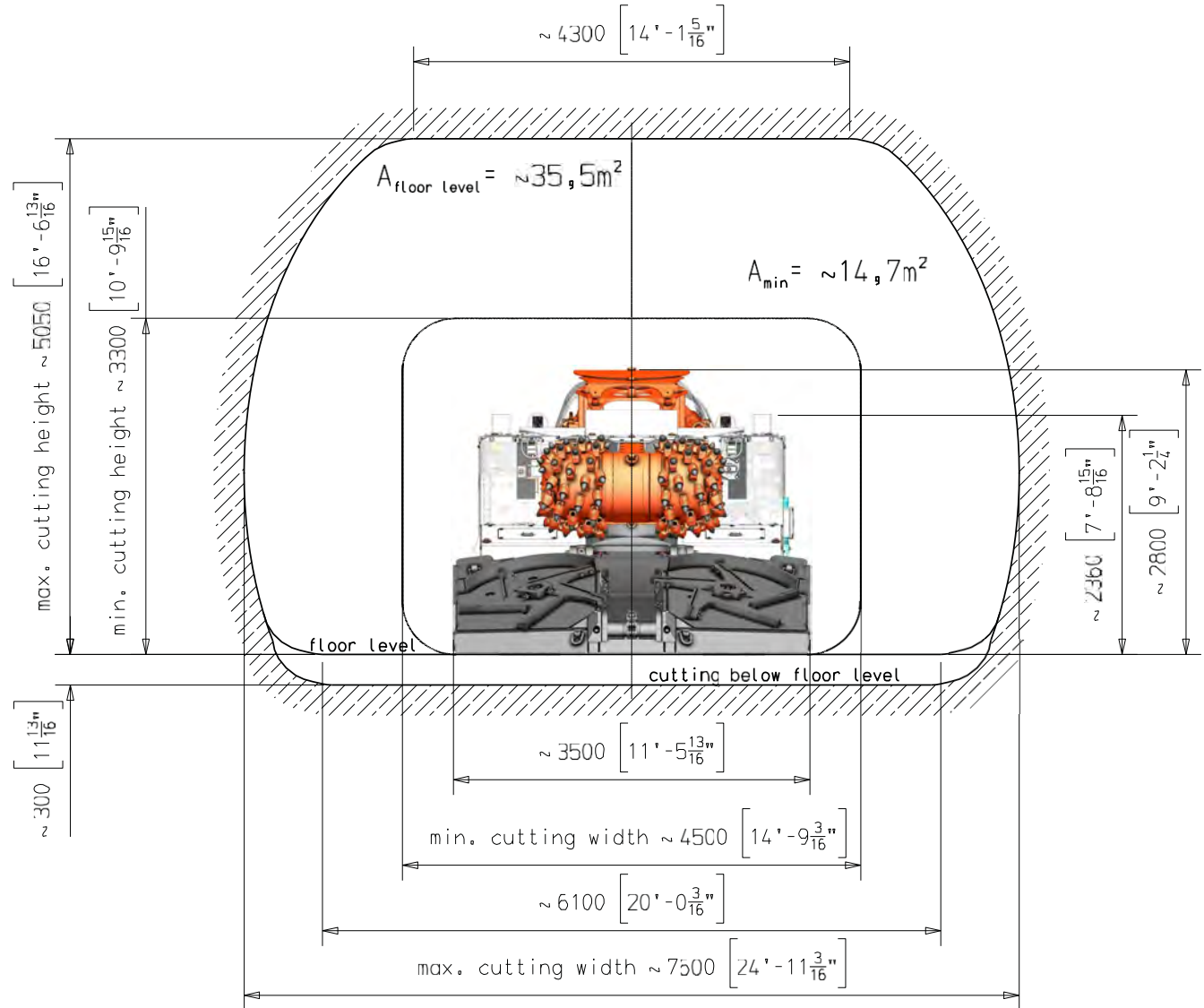
All linear dimension ± 50 mm (2") / All angular dimension $\pm 2^\circ$

Cutting profile

MR361 - Cutting profile

Maximum cutting height 5,05 m (16.57 ft)

Maximum cutting width 7,60 m (24.93 ft)



Technical data

General data

Designation	Unit	Type / Value
Total length	mm	~ 13550 (44.46)
Machine width - (tracks)	mm	2600 (8.53 ft)
Machine width	mm	3500 (11.48 ft)
Min. travel height	mm	~ 2900 (9.51 ft)
Total height	mm	~ 2800 (9.19 ft)
Loading table width	mm	3500 (11.48 ft)
Total weight basic machine	t	approx. 72
Ground clearance	mm	270 (10.63")
Total available power	kW	422 (566 hp)
Machine ground pressure	MPa	~ 0.17

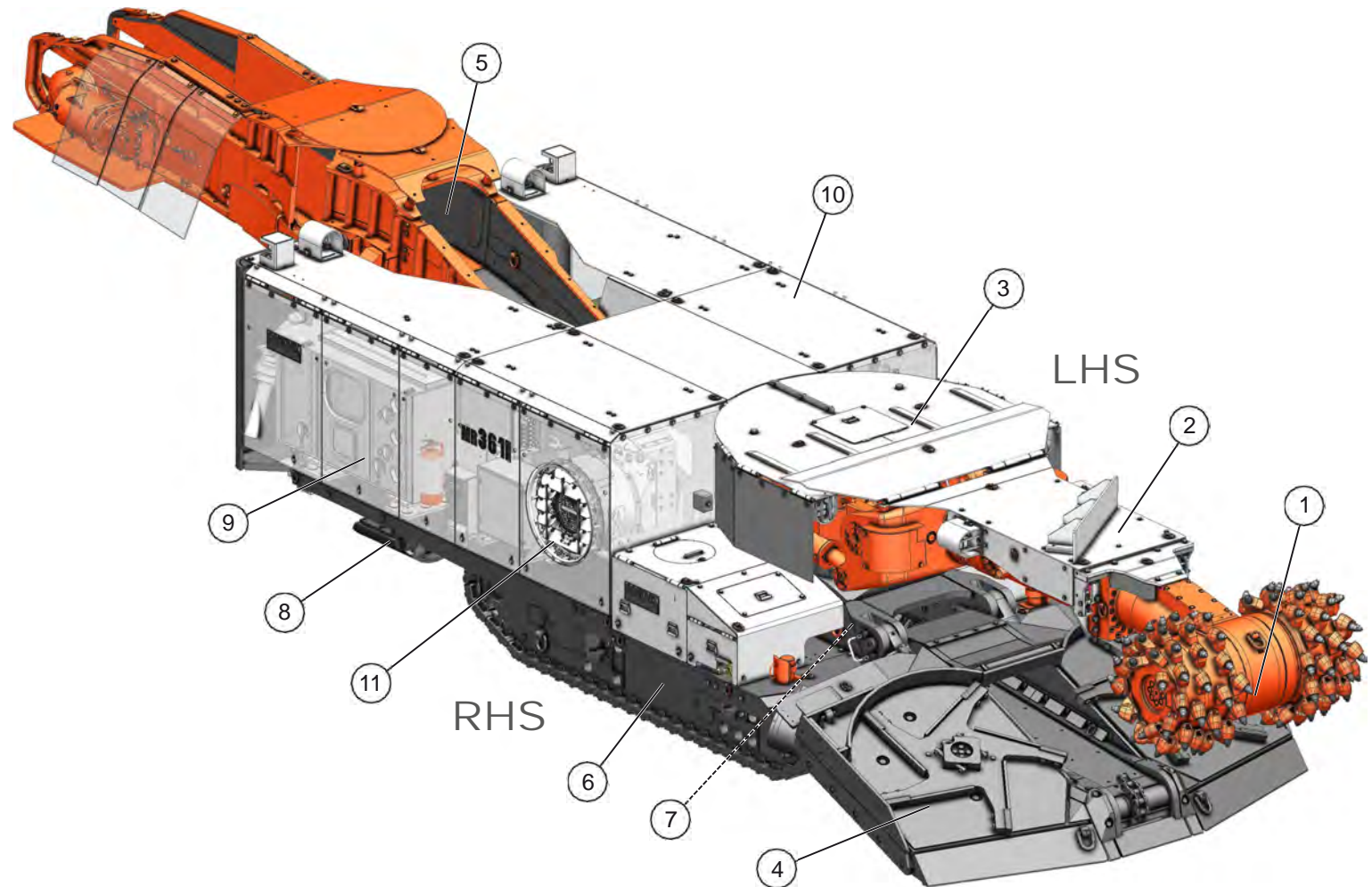
Navigable area of application

Designation	Unit	Type / Value
Cone radius, min.	m	~ 25 (82.02 ft)
Basin radius, min.	m	~ 20 (65.62 ft)
Slope side, max. in rock	°	± 5
Slope upgrade / incline max.	°	± 18
Cutable uniaxial compressive strength with cutter head R251-TC50 (EF58)	Mpa	50 - 100
Power supply	V / Hz	1000 / 60

For detailed information regarding technical data refer to the Operator's and Maintenance Manual.

Main assembly groups

- 1 Cutter head, cutter gear
- 2 Cutter boom with E-Motor
- 3 Turret
- 4 Loading table with spinners
- 5 Chain conveyor
- 6 Crawler track
- 7 Frame
- 8 Rear stabilizer
- 9 Electric equipment
- 10 Hydraulic equipment
- 11 Cooling system



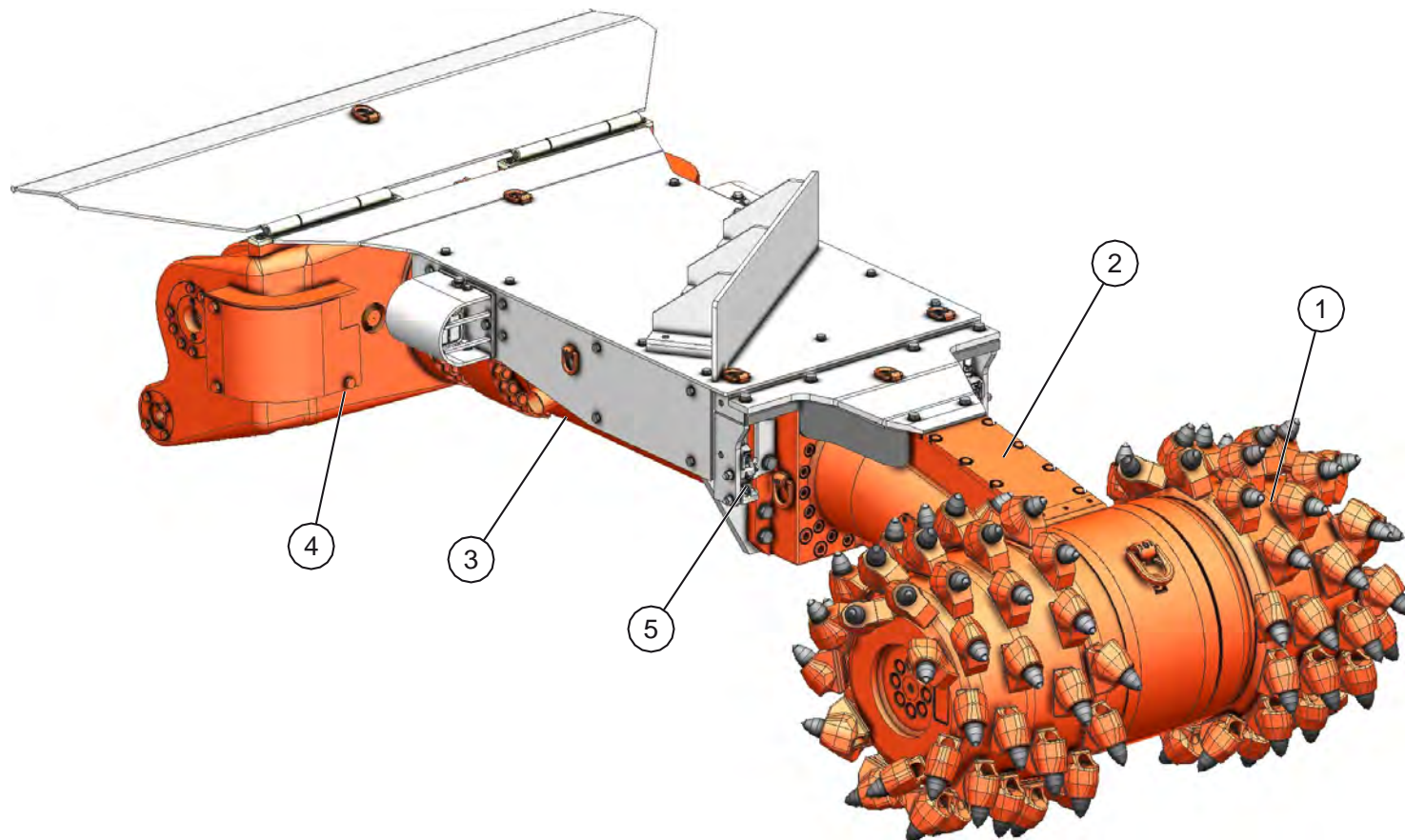
Machine orientation

- Back (rear)
- Left (LHS)
- Front
- Right (RHS)

Cutter boom

The cutter assembly comprises the cutter boom base, cutter motor, cutter gear and cutter head.

- 1 Cutter head LH / RH
- 2 Cutter gear
- 3 Cutter motor
- 4 Cutter boom base
- 5 Spraying system



Cutter head R251-TC50

Technical data for cutter head R251-TC50 (EF58 conical)

Type	R251-TC50
Optimum range of operation	Rock with uniaxial compressive strength from 50 to 100 MPa. (UCS)
Tooled with	2 x 50 pick boxes suitable for 38 mm (1.49") shank-diameter picks. Locked by a retainer each in the pick holder
Cutter gear box type	SG250
Diameter	1120 mm (44.01")
Width (included gearbox)	1740 mm (68.50")
Cutting speed (50 Hz)	2.31 m/sec. (7.58 ft/sec.)
Slewing speed	0.26 m/sec. (0.85 ft/sec.)

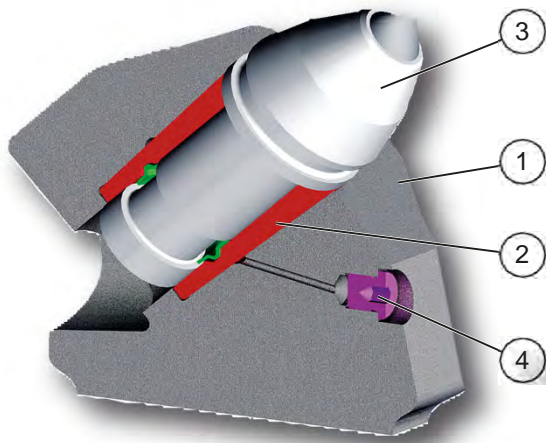


Cutting tool system

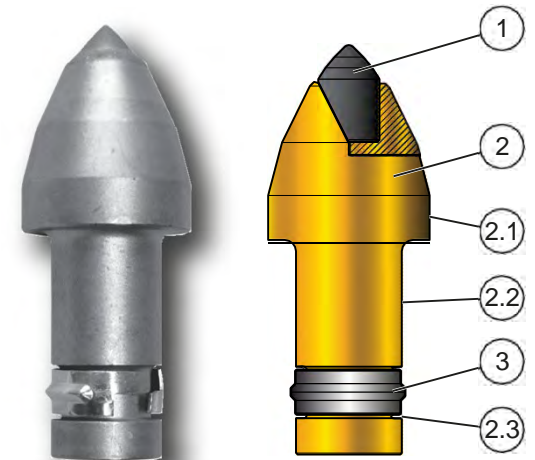
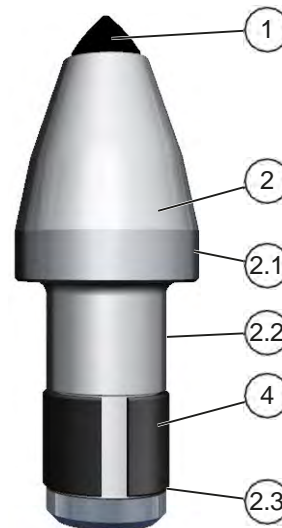
The cutting tool system EF-58 with conical bushing is used for various type cutter heads.

The cutter pick rotates due to frictional forces during cutting operation.

- 1 Pick holder
- 2 Conical bushing
- 3 Cutter pick with friction retainer
- 4 Plug (connection for oil pump)



- 1 Tip (Carbide)
- 2 Pick body (Steel)
 - 2.1 Pick Shoulder
 - 2.2 Pick Shank
 - 2.3 Groove for retaining ring
- 3 Retaining ring
- 4 Friction ring

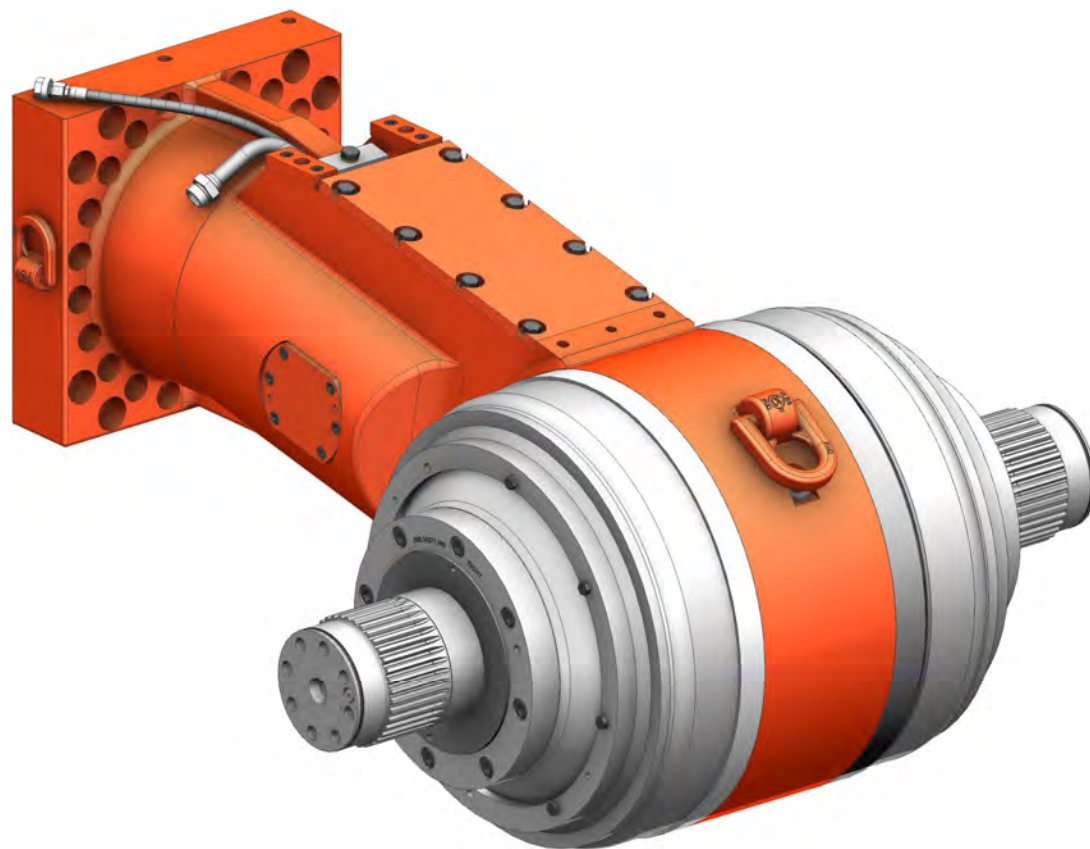


Cutter gear box

The cutter gearbox is driven by an electric motor. An elastic bolt coupling is used for force transmission between the cutter motor and the gear.

Technical data

Nominal power	kW	230 (308 hp)
Revolution at 50 Hz	rpm	1470
Output speed	rpm	42
Ratio, i (Type L)		34.97
Oil volume (min)	l	80 (21.13 gal)

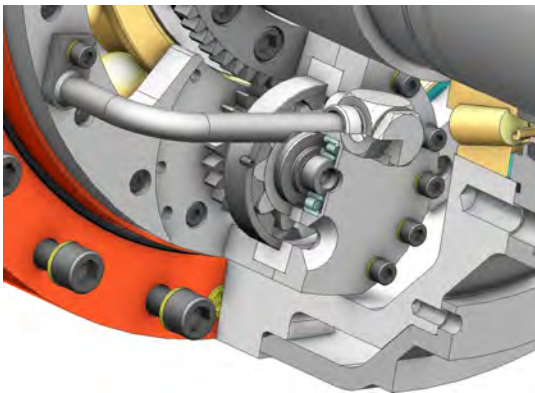
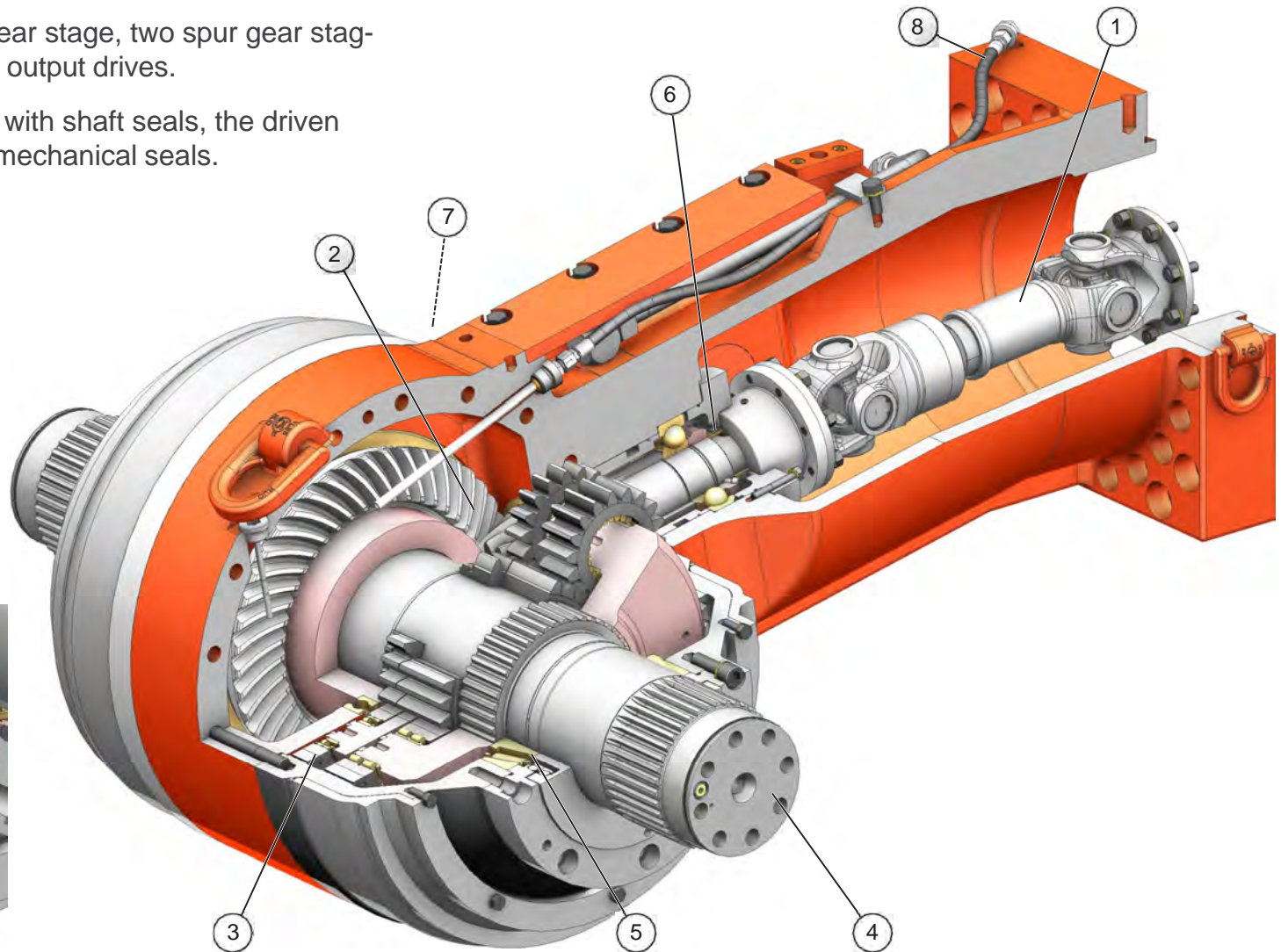


Cutter gear box

The gearbox consists of one bevel gear stage, two spur gear stages and planetary gear stages at both output drives.

The driving shaft bearing is provided with shaft seals, the driven shaft bearing is sealed with rotating mechanical seals.

- 1 Cardan shaft
- 2 Bevel gear stage
- 3 Planetary gear stages
- 4 Drive shaft
- 5 Rotating mechanical seal
- 6 Shaft seal
- 7 Oil pump
- 8 Breather



Cutter gear oil cooling and filtration

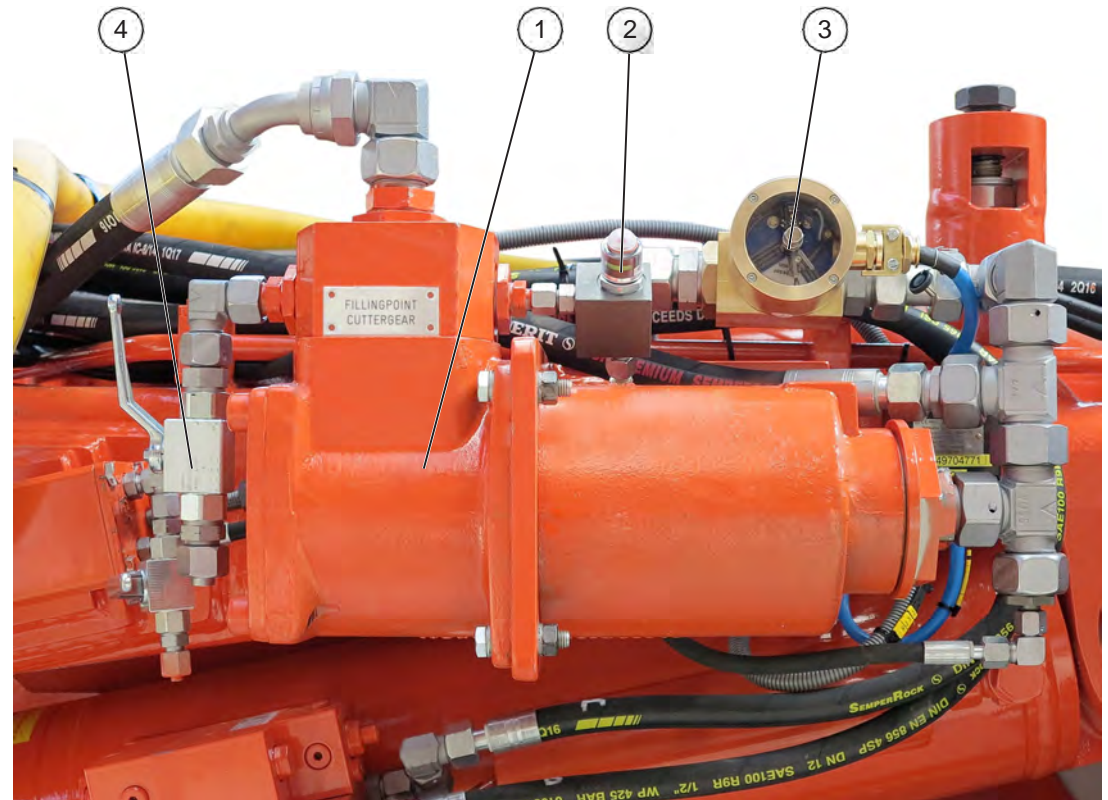
The cutter gearbox oil is circulated through a filter and a heat exchanger for cooling and filtration of the gear oil. The oil flow is monitored by a flow switch or alternative by a pressure and temperature sensor (PLC control version).

The in-line filter is provided with a bypass valve and clogging indicator. The clogging indicator actuates when the filter element needs changing or because of high fluid viscosity in ,cold start' conditions.

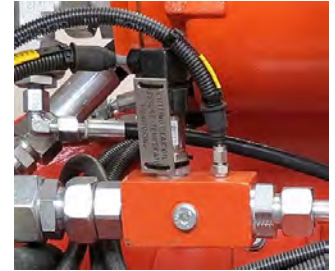
A bypass check valve with 5 bar (73 psi) is installed in the circuit to limit the pressure in cold start condition.

- 1 Gear oil filter
- 2 Contamination indicator
- 3 Flow switch
(Alternative: Pressure and temperature sensor)
- 4 Oil filler point

Cutter gear oil filter, MR300 series

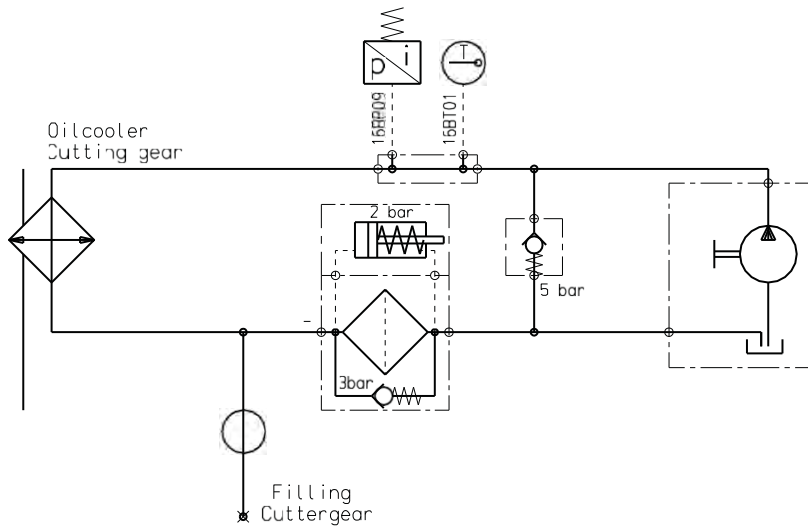


Pressure and temperature sensor

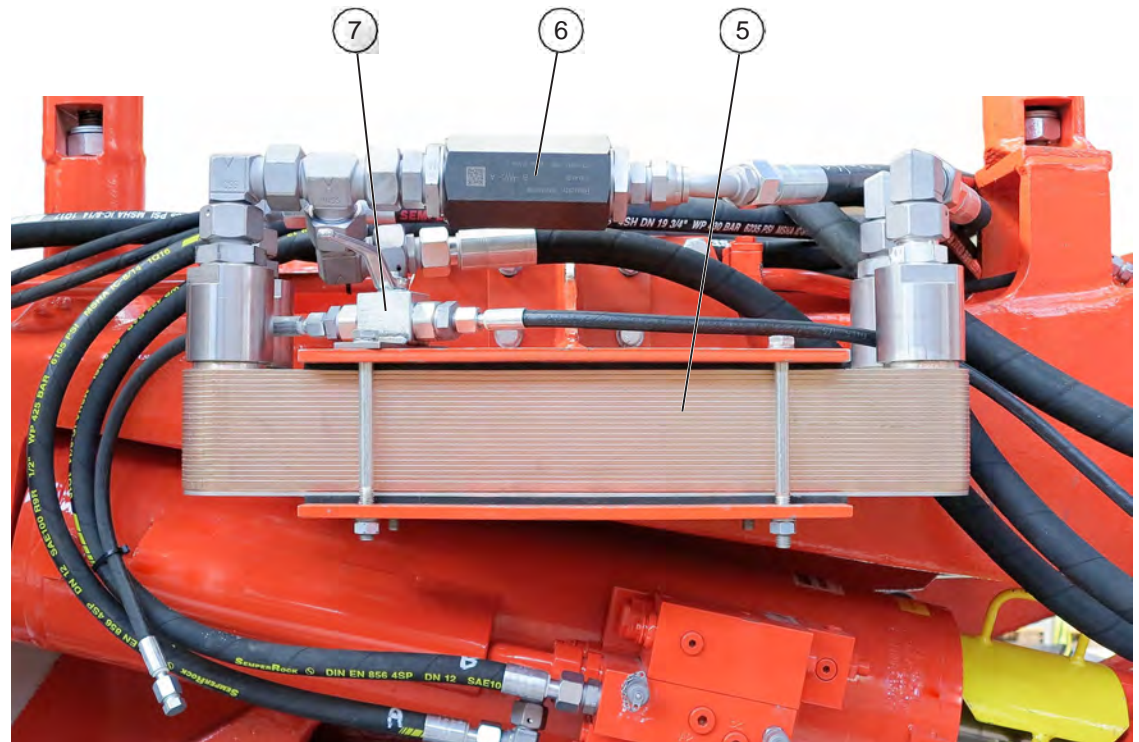


Cutter gear oil cooling and filtration

- 5 Oil cooler
- 6 By pass check valve
- 7 Bleeding for cutter motor



Cutter gear oil cooling circuit



Cutter gear oil cooler, MR300 series

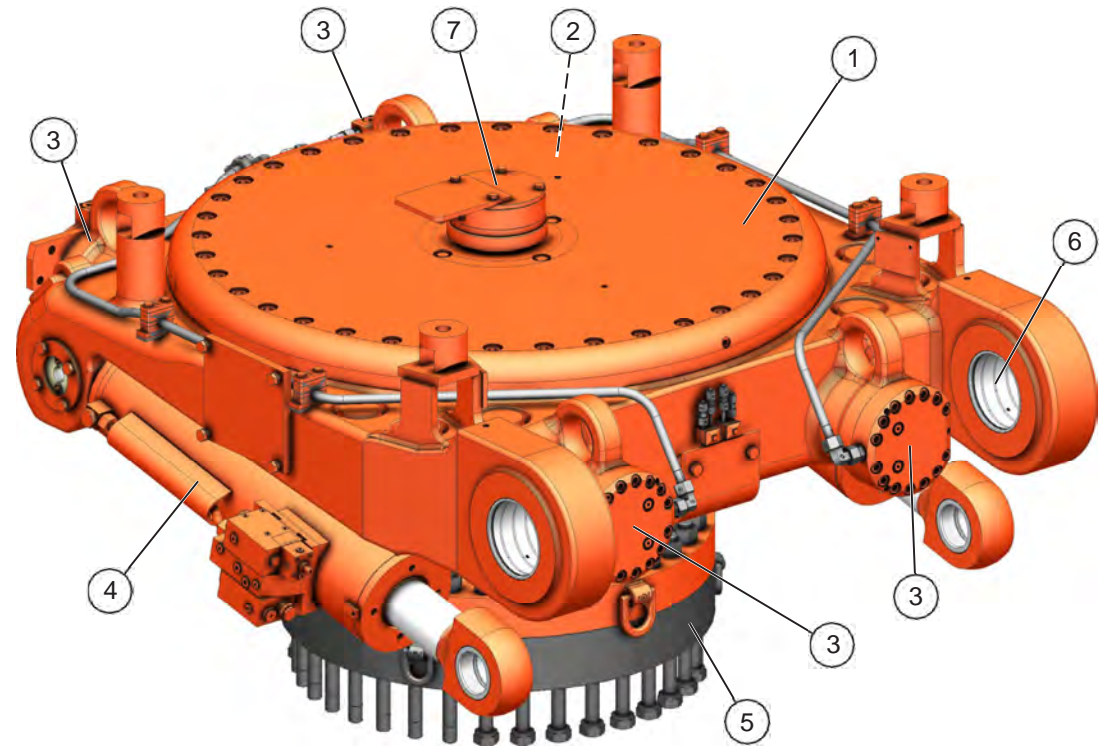
Turret

The turret is used to move the cutter boom in vertical and horizontal direction. It is linked to the frame. A disk-bearing ensures that very little vibration occurs during operation even when difficult conditions are experienced.

Horizontal pivoting is achieved with the aid of four hydraulic cylinders. Pivoting range approx. 45° each to the right and left.

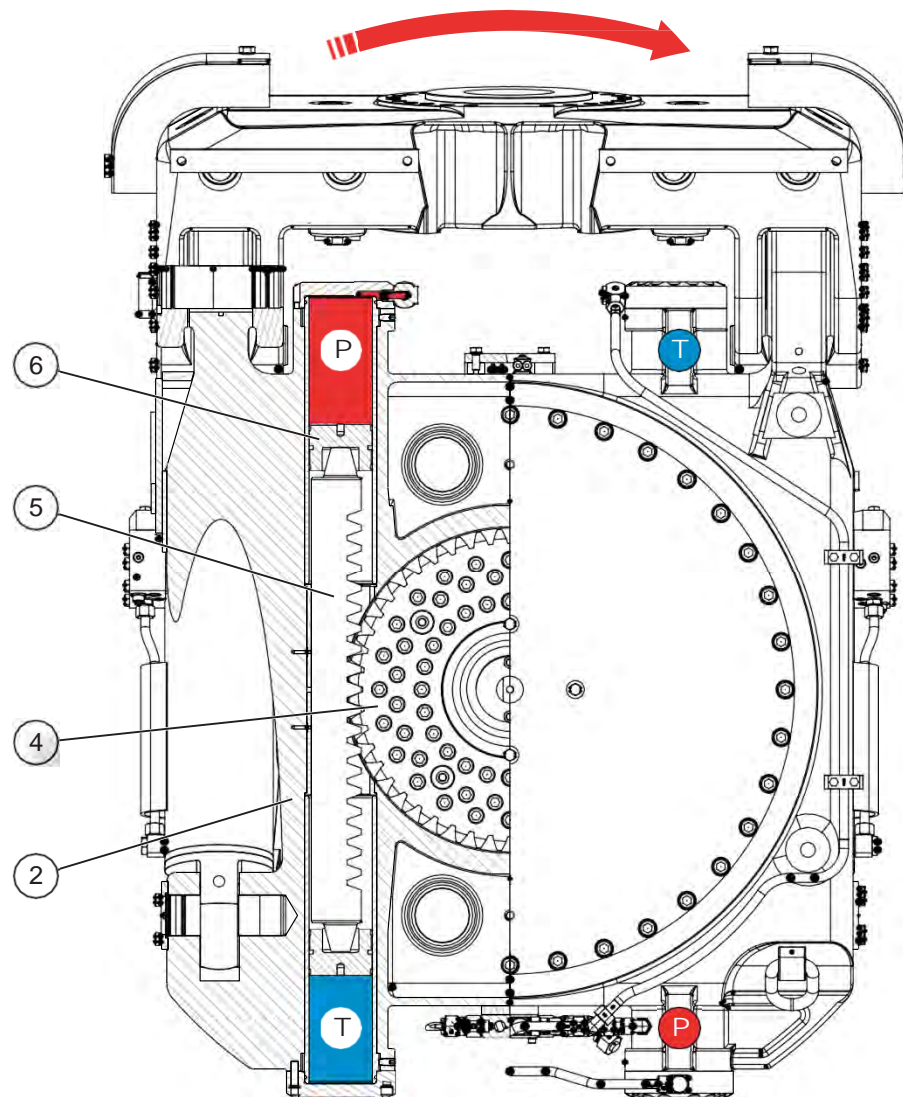
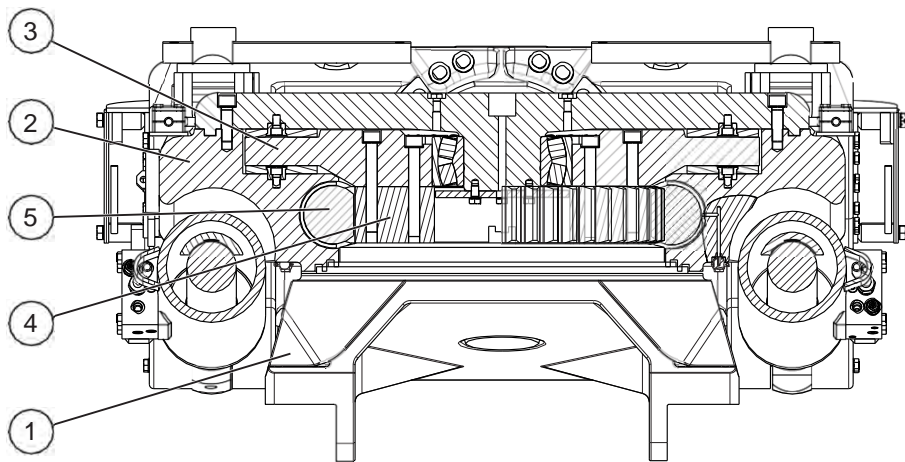
Vertical pivoting is achieved with the aid of two hydraulic cylinders. Pivoting range approx. 75°.

- 1 Disk bearing housing
- 2 Disk bearing
- 3 Cylinders for horizontal movement
- 4 Cylinders for vertical movements
- 5 Turret height extension
- 6 Cutter boom base bearing
- 7 Rotation sensor



Turret function

- 1 Bridge
- 2 Disk bearing housing
- 3 Disk bearing
- 4 Ring gear
- 5 Rack
- 6 Piston (Hydraulic cylinder)
- P Pressure
- T Tank line

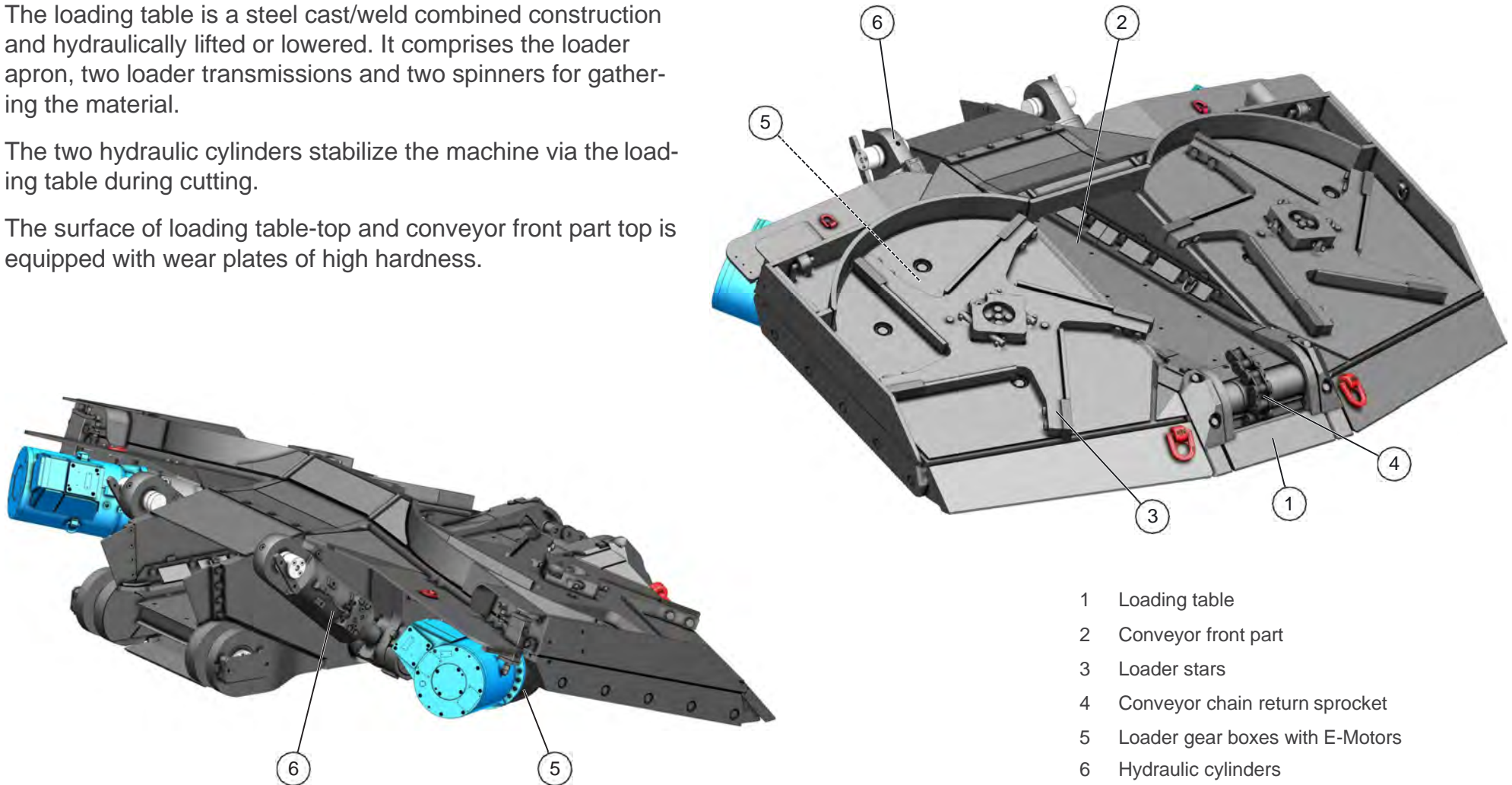


Loading device

The loading table is a steel cast/weld combined construction and hydraulically lifted or lowered. It comprises the loader apron, two loader transmissions and two spinners for gathering the material.

The two hydraulic cylinders stabilize the machine via the loading table during cutting.

The surface of loading table-top and conveyor front part top is equipped with wear plates of high hardness.



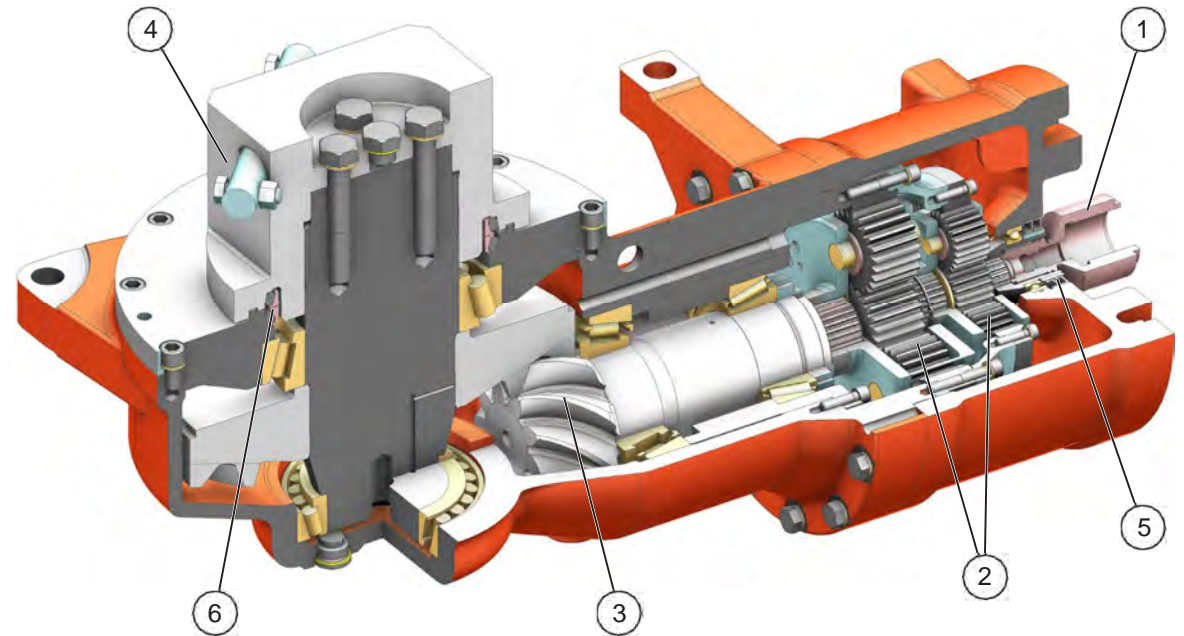
Loader gear box

The loader gear consists of the spur gear stage and bevel gear stage to the output drive. The input shaft bearing is provided with a shaft seal, the driven shaft bearings are sealed with rotating mechanical seals.

Technical data

Nominal power	kW	36 (48 hp)
Revolution at 50 Hz	rpm	1440
Ratio, i		49.78
Output speed	rpm	28.93
Oil volume	l	~ 30 (7.93 gal)

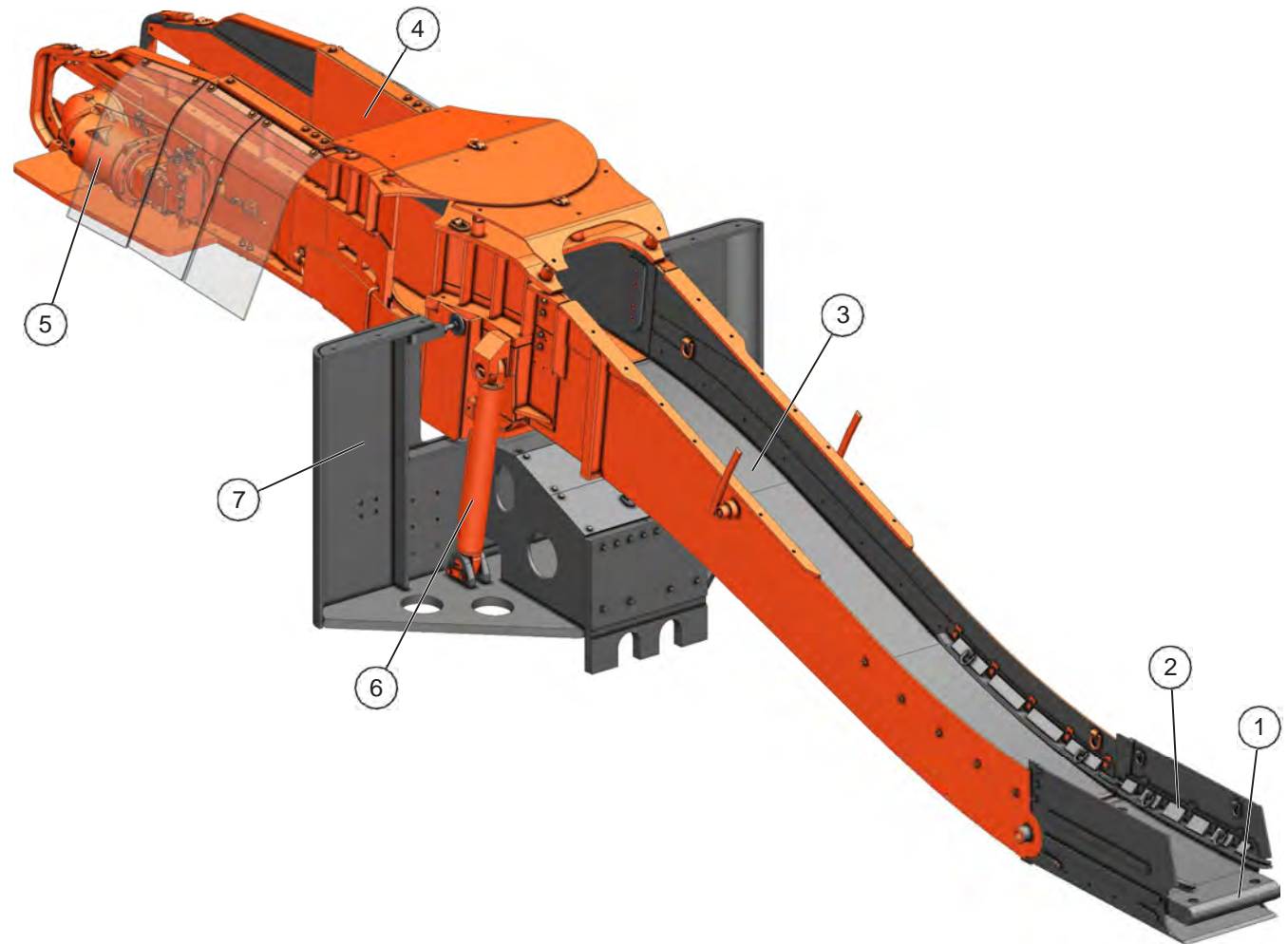
- 1 Coupling (Electric motor)
- 2 Planetary drives
- 3 Bevel gear
- 4 Drive shaft for loader star
- 5 Shaft seal
- 6 Rotating mechanical seal



Swivel chain conveyor

The swivel chain conveyor is arranged in the middle of the machine. It transports the material which is supplied by the two loader stars, to the machine back using a single chain conveying system.

The conveyor chain is driven via the conveyor transmission by an hydraulic motor.



- 1 Connection to loading device
- 2 Conveyor center part
- 3 Conveyor rear part
- 4 Conveyor swivel part
- 5 Drive station with tensioning device
- 6 Lifting cylinders
- 7 Rear bumper

Conveyor gear box

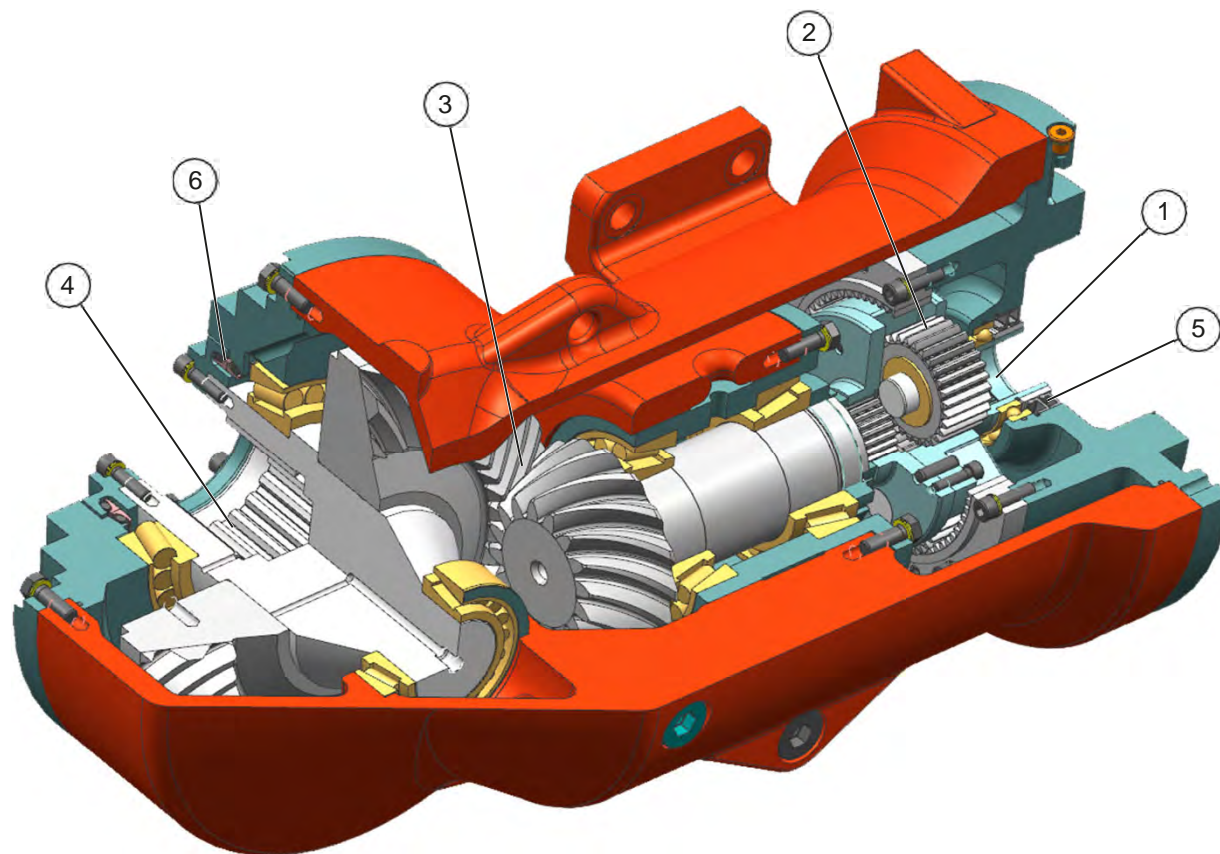
The conveyor drive gear is a combination of a planetary and a bevel gear.

The gear is driven by one hydraulic motor.

Technical data

Ratio, i		24.11
Oil volume	l	~ 19 (5.02 gal)

- 1 Input drive shaft
- 2 Planetary gear
- 3 Bevel gear
- 4 Spline for output shaft
- 5 Shaft seal
- 6 Rotating mechanical seal



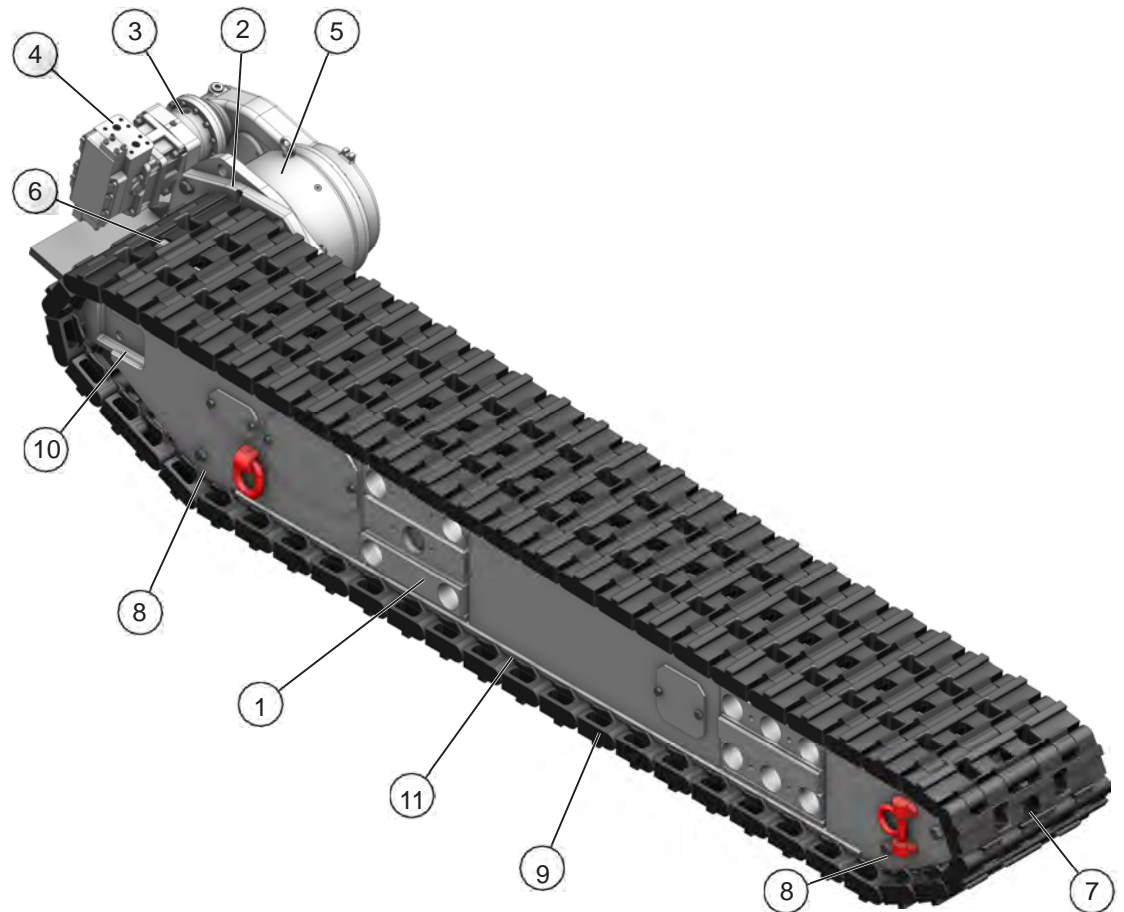
Track equipment

The tracks are used to manoeuvre the machine during cutting and for tramming the machine.

The crawler system is driven by two hydraulic motors with brakes which are hydraulically released. In case of a hydraulic pressure drop the brakes immediately respond and bring the roadheader to a standstill.

The crawler chains are tensioned via single acting grease cylinders.

- 1 Track frame
- 2 Drive unit with cocking slide
- 3 Multiple disk brake
- 4 Variable hydraulic motor
- 5 Track drive gear
- 6 Drive sprocket
- 7 Return idler sprocket
- 8 Track rollers
- 9 Track chain
- 10 Tensioning device
- 11 Slide plates



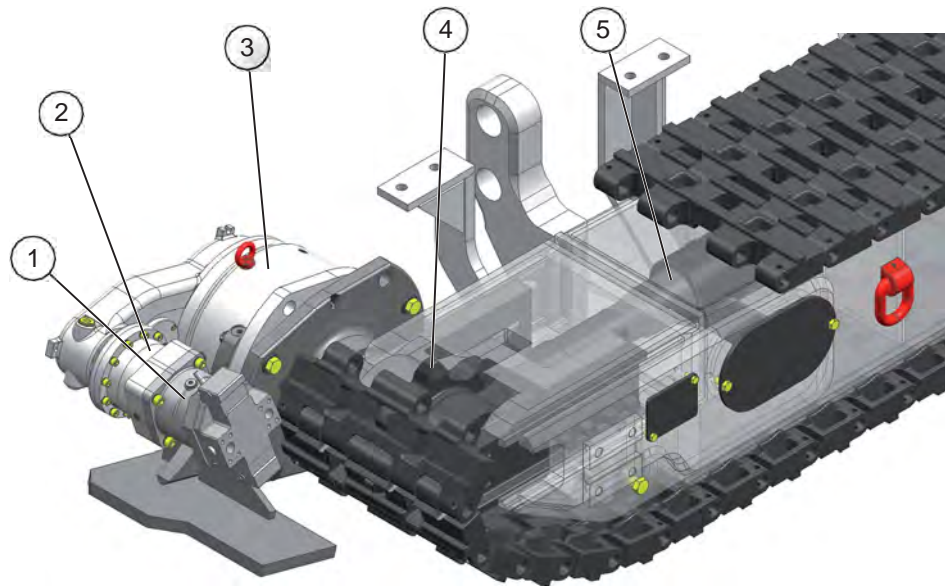
Track drive unit

The hydraulic motor together with the multiple disk brake is directly flanged to the track gear. Power drive is over two spur gear and two planetary gear steps.

Technical data

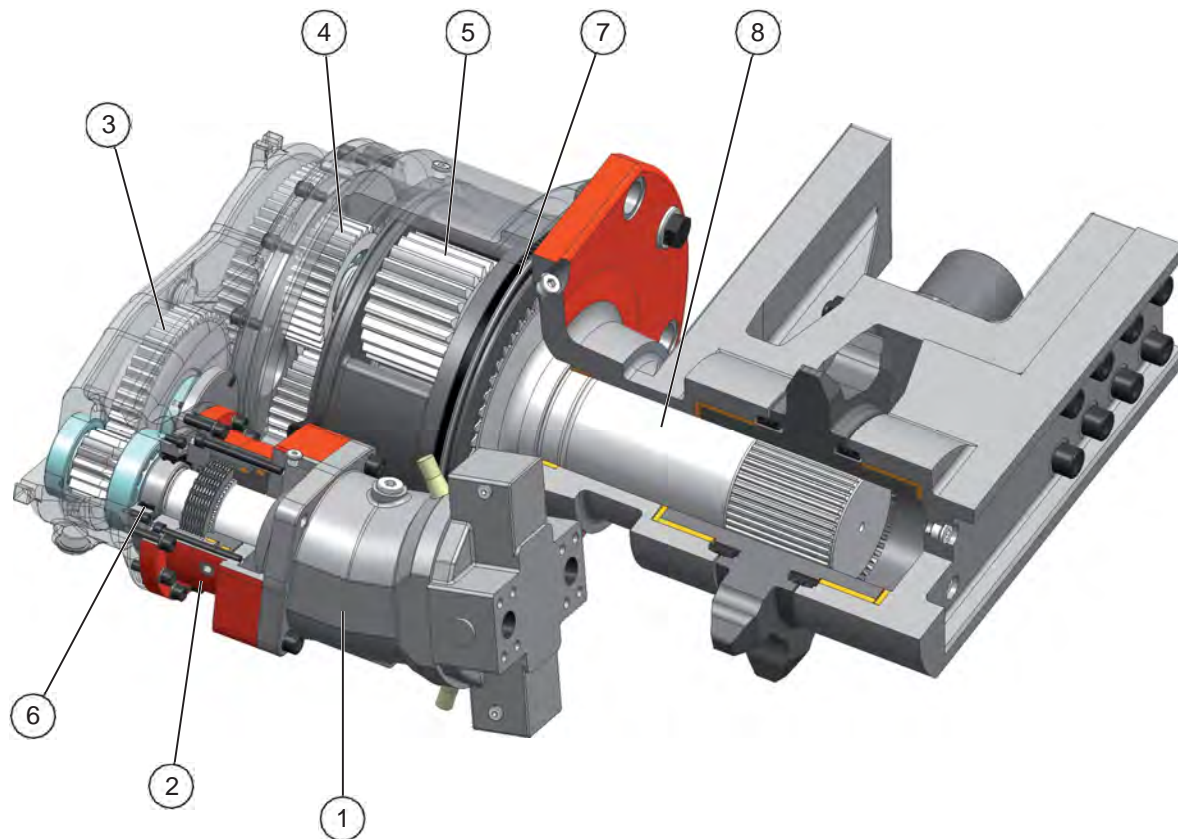
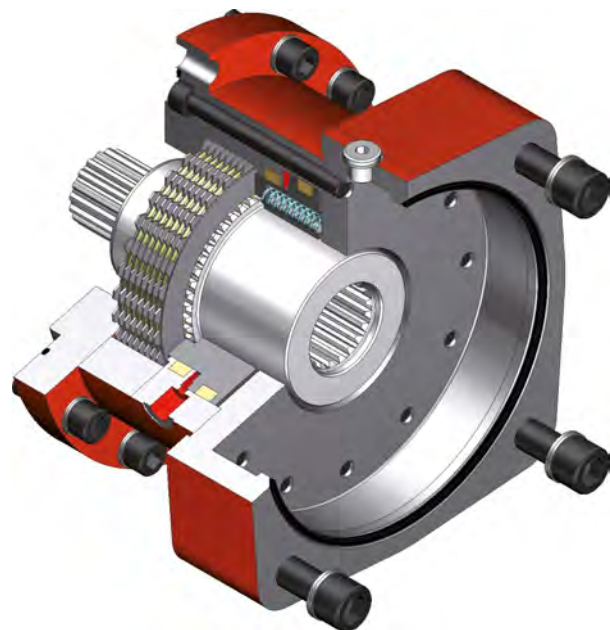
Gear transmission ratio, i		180,64
Gear oil quantity	l	15 (3.96 gal)
Oil quantity brake	l	0,5 (0.13 gal)

- 1 Hydraulic motor
- 2 Multiple disk brake
- 3 Track drive gear
- 4 Drive sprocket
- 5 Grease tensioning cylinder



Track gear details

- 1 Hydraulic motor
- 2 Multiple disk brake
- 3 Spur gear steps
- 4 Planetary gear step
- 5 Planetary gear step
- 6 Shaft seal (input shaft)
- 7 Shaft seal (output shaft)
- 8 Drive shaft for sprocket

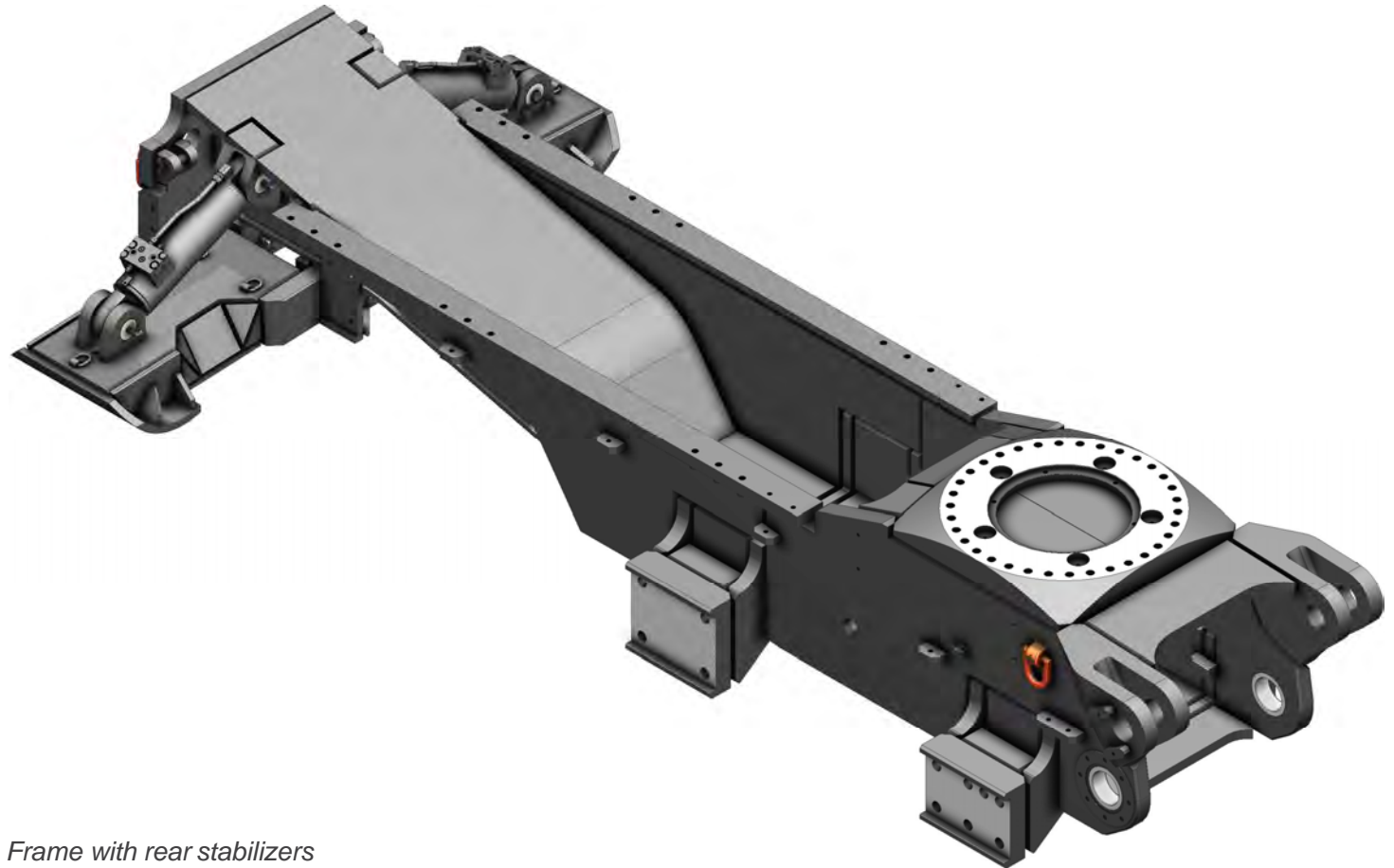


Frame and rear stabilizers

The one-piece frame carries all other assembly groups. The stabilizers on the right and left of the frame backside can be lifted and lowered with the aid of hydraulic cylinders.

The stabilizers serve as rear support during cutting as well when cutting over a small cone radius.

The stabilizers can also be used as a service jack to raise the machine for maintenance.



Frame with rear stabilizers

Operator controls

The control system comprises the receiver and monitoring unit and the radio remote control transmitter. Coded radio signals from a portable transmitter are processed and converted into appropriate solenoid and interposing relay selections, which in turn control the various functions of the Roadheader.

The system monitors various fault- and position sensors located around the machine and provides the operator with a detailed machine status on a built-in monitoring screen.

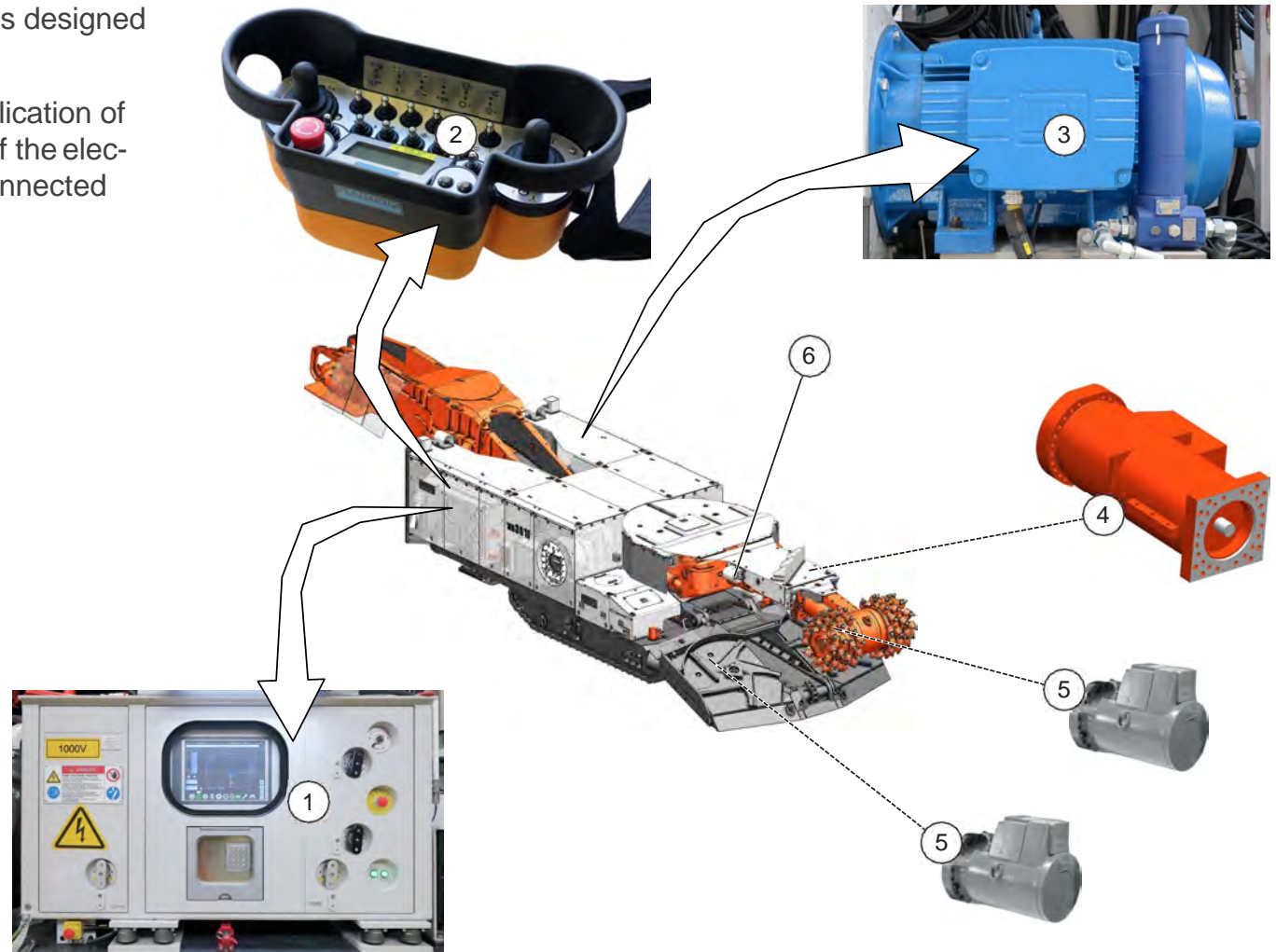


Electric system

The electric equipment of the Roadheader is designed to work on 1000 [V] / 60 [Hz].

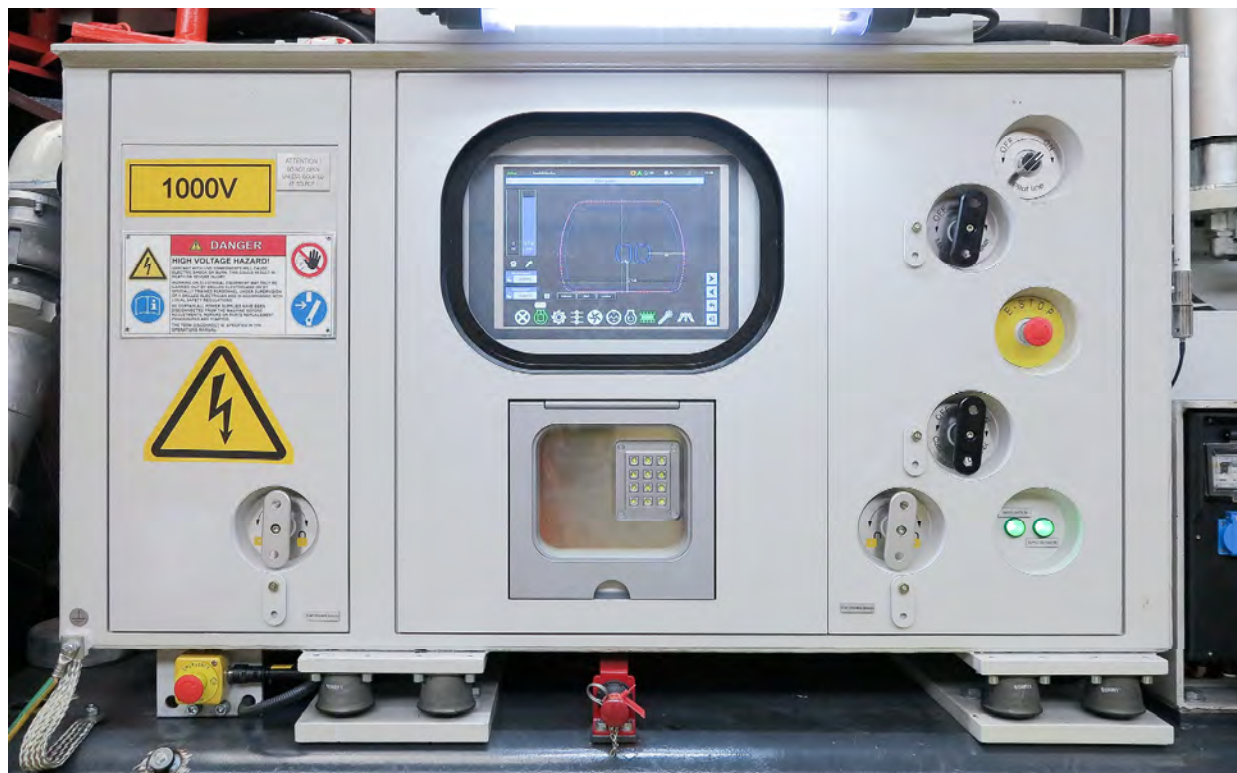
The electric equipment is based on the application of the protective conductor system. All parts of the electric system which have body contact are connected with a protective conductor.

- 1 Main panel
- 2 Radio remote control
- 3 Hydraulic pumps drive motor
- 4 Cutter motor
- 5 Loader motors
- 6 Light system



Main panel

All switch gear is placed in a non flameproof heavy duty enclosure (machine distributor) to where motors, head lights, solenoids, warning horn and trailing cable are connected to.



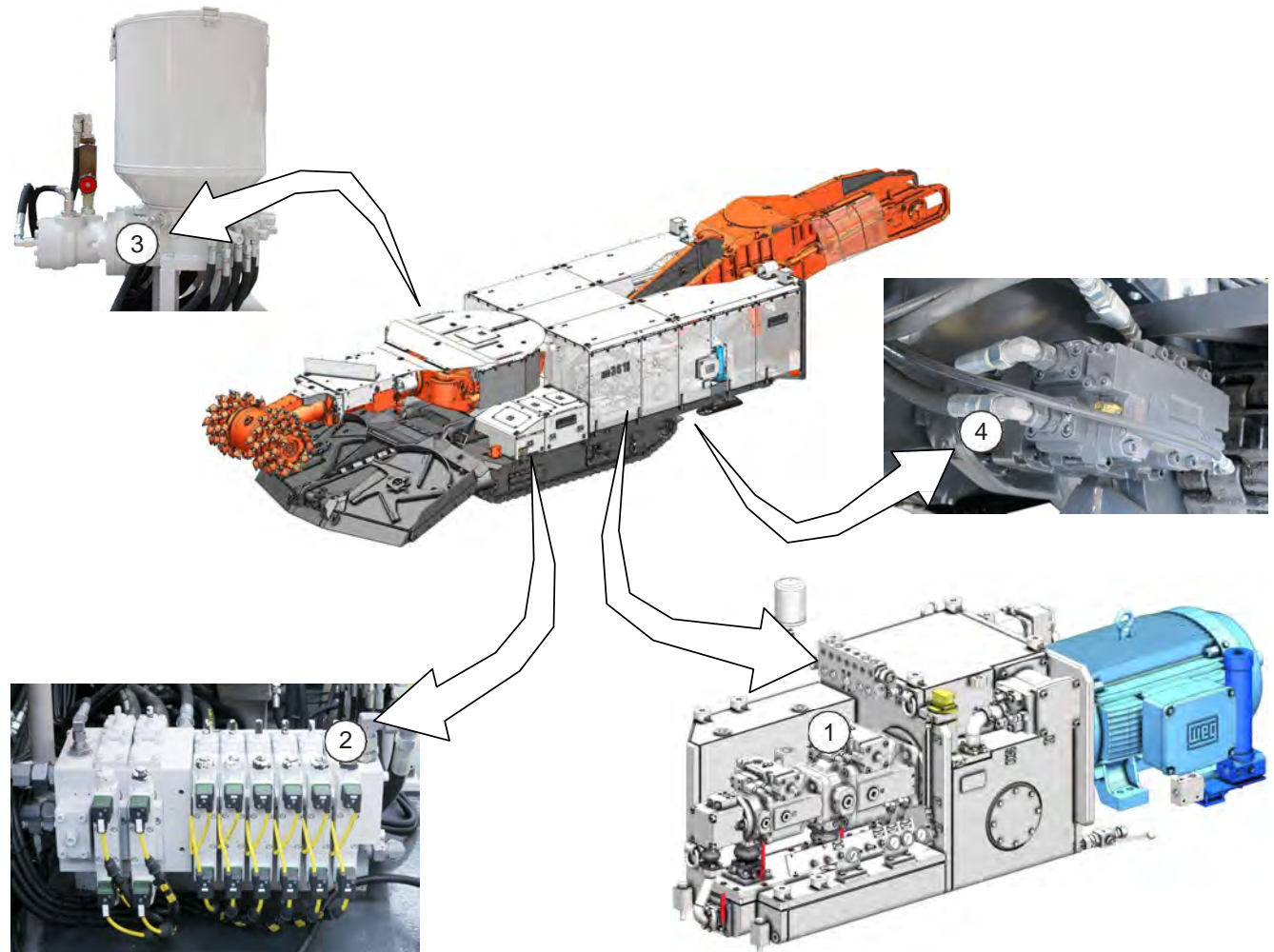
Main panel with PLC control

Hydraulic system

The hydraulic system is an open circuit system and consists of independent hydraulic circuits.

The main circuits are fed with hydraulic energy by means of variable axial piston pumps with pressure- and flow control (Loadsensing).

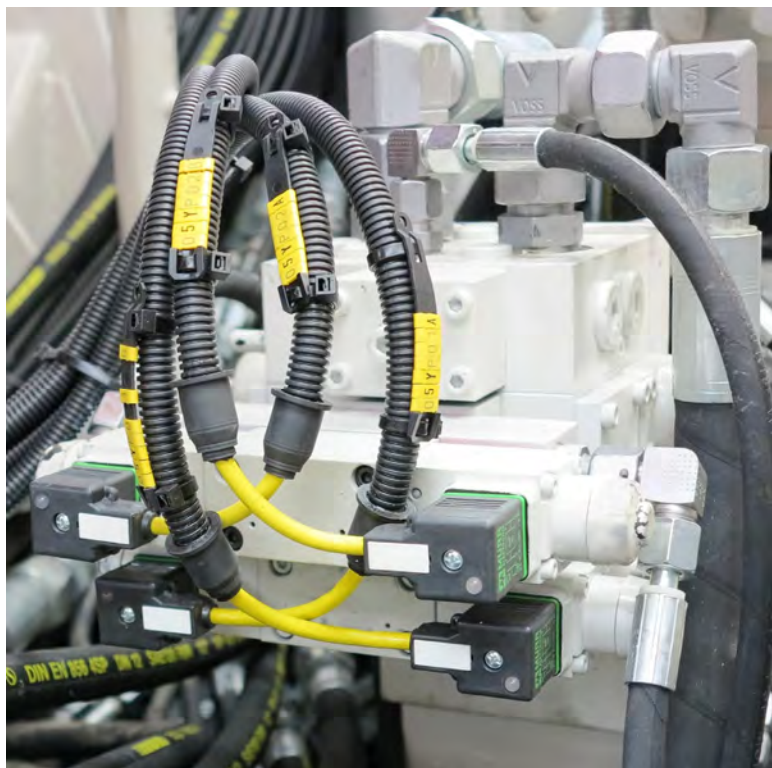
- 1 Hydraulic power back
- 2 Hydraulic control valves
- 3 Grease pump drive
- 4 Track drive motor



Hydraulic control valves

The hydraulic control valves for the actuators are direct and pilot operated via pilot control valves.

The control valves are proportional control valves with load pressure feedback to the variable displacement pumps (Loadsensing principle).

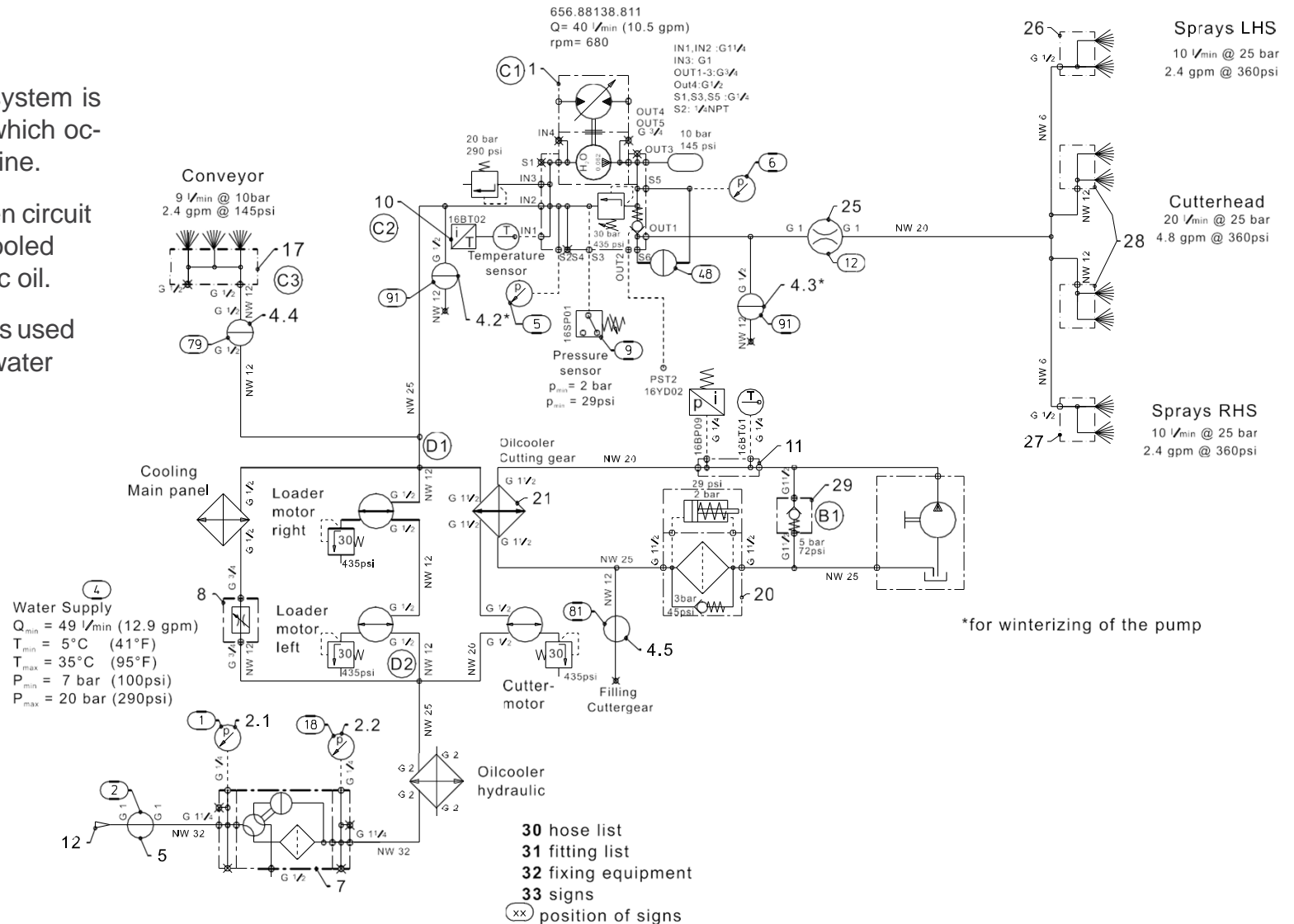


Water system

The purpose of the cooling system is to dissipate the heat losses which occur when operating the machine.

The cooling system is an open circuit system and cools all water cooled components and the hydraulic oil.

A high pressure water pump is used for the cutter head spraying water supply.



Lubrication system

The Roadheader is equipped with one hydraulic driven **multi line lubrication pump**.

The multi line lubrication pump accommodate pump elements to supply various lubricating points. Grease is continuously supplied to the lubricating points connected.

Manual lubrication points

Lubrication stripes serve as a central distributor for the connected lubrication points. Lubricated with grease gun.

Individual lubricating points are directly lubricated by means of a grease gun. It is important to ensure that no dirt gets into the greasing points

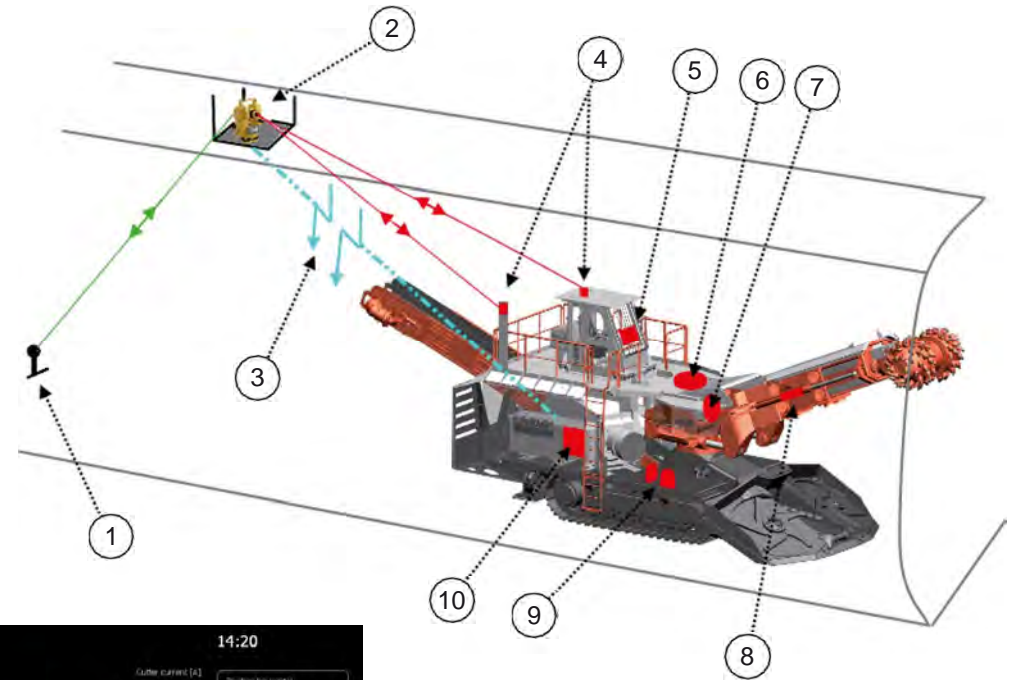


Additional equipment

Roadheader guidance system

Profile accuracy is a key parameter to successfully minimize excavation costs. The ability to exactly and efficiently excavate a desired profile can only be achieved by the use of exact geodetic guidance and integrated profile management.

The system is designed to periodically track the actual 3D position and orientation of a road header's cutter head during operation and to visualize this data together with the actual center line and profile geometry on the monitor.



- 1 Prism for reference direction
- 2 Theodolite
- 3 Radio link
- 4 Prism for position control of Roadheader
- 5 Display in drivers cabin
- 6 Sensor for horizontal boom position
- 7 Sensor for vertical boom position
- 8 Elongation sensor for boom telescope
- 9 2-axis inclinometer (pitching and rolling)
- 10 Data processor



Accessories and tools

Special tools

Special tool set for assembly and cutter head maintenance.



Cutting head tool kit



Torque wrench 40 - 200 Nm
(29 - 148 lbf-ft)



Sealant and lubricant



Torque wrench 750 - 2000 Nm (533 - 1475 lbf-ft)

Standard tools

The standard toolset depends on machine type and includes:

- Tool box
- Hand tools
- Tool set electric
- etc.

