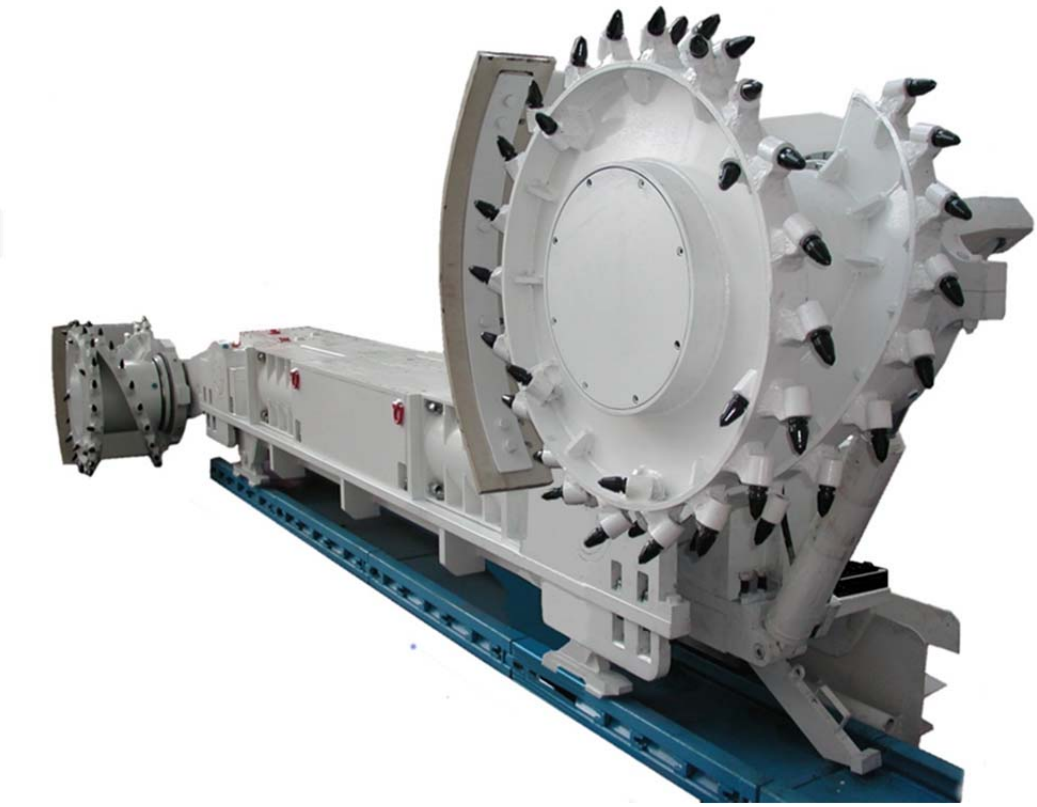
MACKINA - WESTFALIA

PRODUCT DESCRIPTION

SHEARER ON PANZER CHAIN CONVEYOR

PMAP 2x120



GENERAL DESCRIPTION

The PMAP 2x120 shearer is a Coal Shearer on Panzer chain conveyor for bidirectional working of horizontal seams or seams with medium slope (maximum 10,5º without which retention) and thickness from 1,25m to 2,50m.

It is equipped with double drum cutting with self-sharpening pics and can work in both directions.

Movement of the machine is done by the pulling force exerted on a steel chain of 22x86 stretched along all the face and on which engages the drive wheel of the electro-hydraulic winch that incorporates the machine.

The drive is done by an operator standing next to the machine and walking beside to its movement.

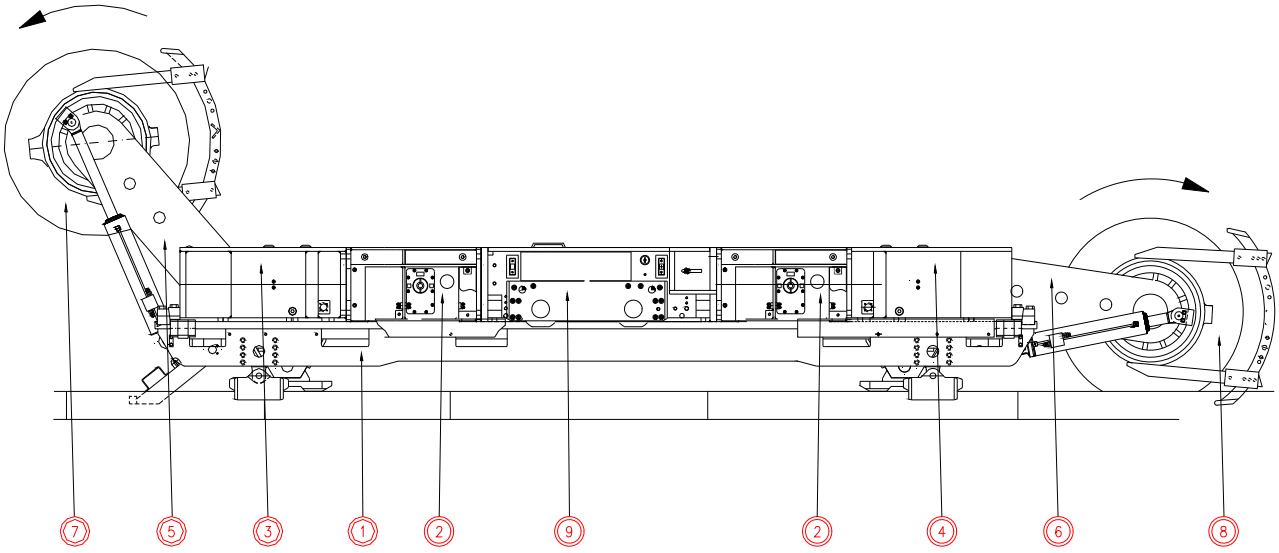
The building of PMAP 2x120 Shearer is based upon the following:

Chassis (1) contains all the elements of the shearer, it is bracket above the panzer conveyor through two skates-guide on the caving side and two skates-support on the face side. The joint of the two skates- guide is through two hydraulic cylinders with double effect in such a way that the machine can tilt towards the face side, in order to be able to follow the coal seam in a line.

In the central part of the machine there are two electric 120 kW motors symmetrically positioned (2) that transmit the power to the gearboxes (3 and 4). At the same time, the right motor with its double gearbox shaft supplies the mechanical energy to the traction winch supplying transmission to its main pump.

The arms (5 and 6) are assembled in the output of the gearboxes, through which the spin movement reaches the drums (7 and 8). The arms with their drums, can oscillate through the ceiling and the wall with both hydraulic cylinders. Furthermore, they both have deflecting devices whose shelves form an Archimedean Screw Pump with the drums screw that facilitates the removal of the extracted materials to the panzer conveyor.

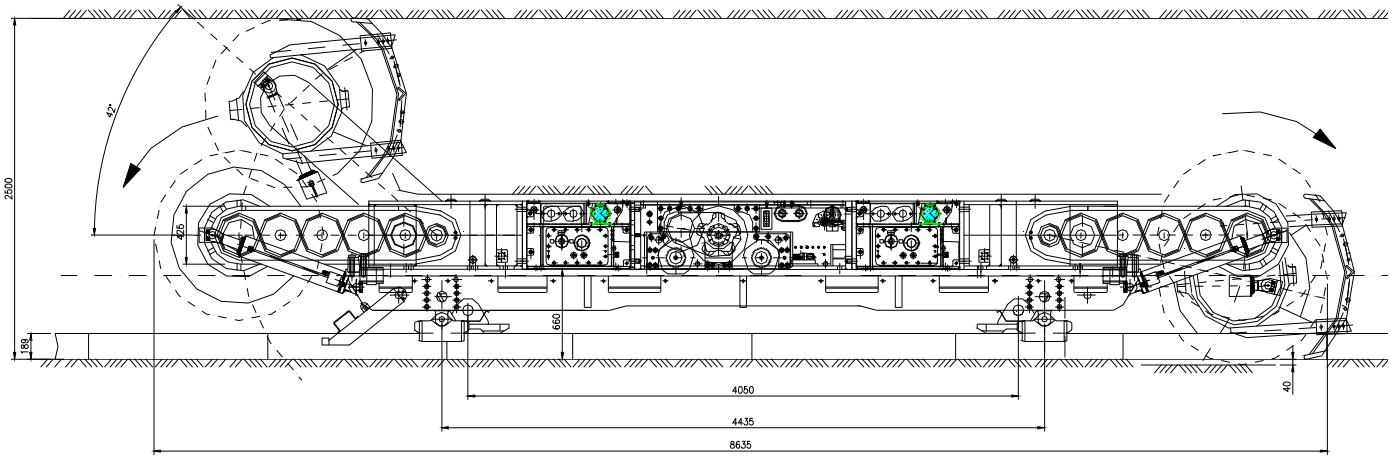
The Hydraulic winch (9) is between both electric motors which is in charge of the movement of the shearer along the mine gallery. This movement is achieved through the traction provided by the motive star of the winch when it engages above a 22 x 66 steel chain placed along the working area and firmly fixed on both sides

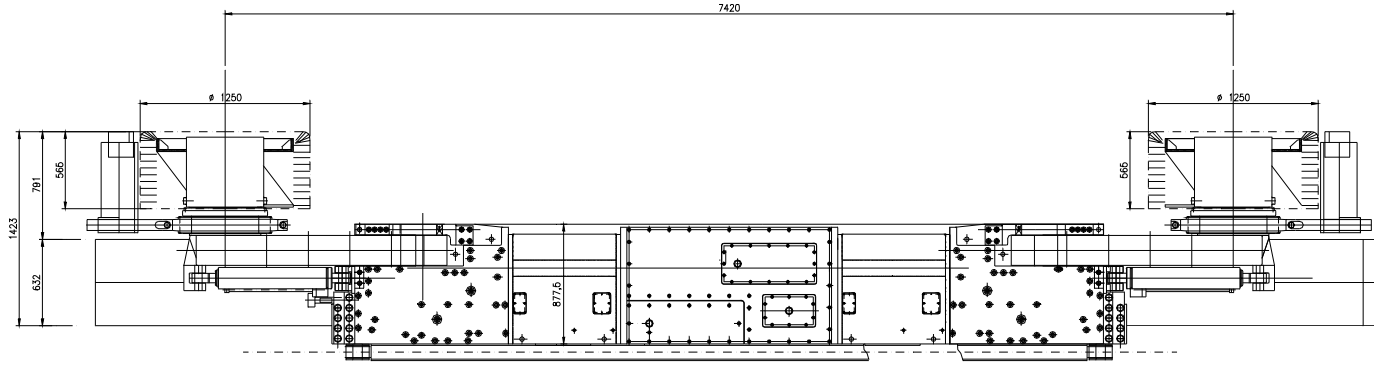


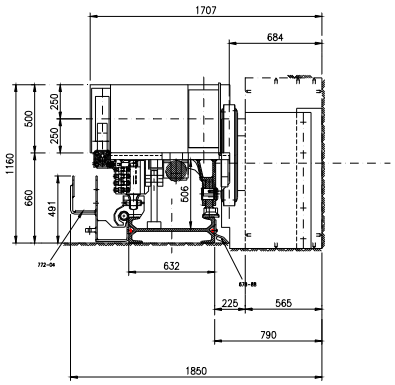
The PMAP 2x120 shearer is certificated ATEX M2

GENERAL CHARACTERISTICS

Dimensions: (For model PMAP2X120/0660/1250/0565 Ref. 51240.9991310 S-P 0135-06)







Length.....8.635 mm
Width.....1.707 mm
Body Height including panzer .....1.160 mm
Approximate weight (depending on version) ..... 18.500 kg
Component Weight:
- Frames Skates and cylinders..... 3.300 Kg
- Electric Motor: 2 x 1.250 ..... 2.500 Kg
- Gearhead + arm + deflector arm + cylinder: 2x4100..... 8.200 Kg
- Winch ..... 2.700 kg
- Drum 1250x650 con picas: 2x625..... 1.250 Kg
- Deflecting tray: 2x150 ..... 300 Kg
- Small components ..... 250 kg

Electrical characteristics:

Installed Power..... 2x120 kW
Supply voltage ..... 1.000 V

Hydraulic Features: Circuit Winch:

- Slow speed ":
  - ✓ Maximum tractive effort .....277 KN
  - ✓ Speed Shift .....from 0 to 347 m/hour
  - ✓ Maximum power drag ..... 32 Kw

- Fast speed:
  - ✓ Maximum tractive effort .....198 KN
  - ✓ Speed Shift .....from 0 to 485 m/hour
  - ✓ Maximum power drag ..... 32 Kw

Auxiliary circuit

- Gear pump 6 cc / rev. that operated at 1500 rpm provides 9 l / min
- General pressure relief valve regulated circuit 200 bars.
- VG 68 hydraulic fluid according to DIN 51524 Parte 2 HLP.

ELECTRIC SYSTEM

The 1000 V supply to the PMAP Shearer must be isolated neutral, from an electric panel with miniature circuit breaker for overloads and short circuits and a permanent measurement of the insulation between the conductors in order to protect against ground faults.

The electric panel supplying the machine must have an automatism that makes the horn sound during at least 10 seconds before the starting of the machine and a disconnection system when the emergency stop button is pushed. Once the emergency stop is pushed, it will be necessary to reshape the automatism in order to resume the motion again.

Motors are cooled by water and they have thermal probes for disconnection in case of overheating beyond 120ºC.

The power connection is done through a flameproof cable with a device to block and absorb the mechanical efforts on this cable.
Likewise, the network between the engines is done through the input and output of the flameproof cable.

The wiring connection is done through flameproof presses M20 x 1.5.

Above the electric motors there is a circuit breaker according with UNE 20-129. Furthermore there is a selector in order to choose its functioning as a commander or to receive orders. The start and stop control on both motors is done from an only control panel, the same way as it is demanded in the machines directive. All the control switchgear is allocated in a flameproof enveloping with a bolted cover with a fixing system that guarantees the lack of voltage inside before its opening.

The selected motor as a commander receives the pressure and temperature signals from the hydraulic circuit.

Emergency stop is done through two flameproof switches placed on both sides of the machine. Switches are blocked after pushing them and they are released with traction.

The control circuit makes a sequence for the following elements:

- Switch connection in the load.
- Three thermal probes set installed in the stator winding of each engine.
- Upper and Lower Emergency stop.
- Pressure stat and temperature controller of the hydraulic circuit with protection degree IP66 controlled by a SI/NSI barrier placed in the flameproof compartment of the commander motor.
- Line end compatible with the pilot control element.
- Ground.

HYDRAULIC SYSTEM

Above the machine there are two hydraulic circuits clearly distinguished, one for the movement through winch with traction wheel above 22x 86 chain according with UNE 22-260 and the other one for the positioning of the drums and the chassis bow in the seam direction.

The main features of the main circuit are the following:

- Hydrostatic transmission pump / motor in closed circuit with hydraulic proportional control on the pump and secondary regulation on the engine.
- Hydraulic deposit with 220 Litres capacity.
- Hydraulic fluid Oiltran EP10/W20 according with DIN 51524 2 HLP.
- Maximum working pressure 250 bar.
- Maximum traction effort 250 kN.
- Maximum Speed 450 m/hour.
- Maximum dragging Power 25 kW.

The main features of the auxiliary circuit are the following:

- Gear assembly pump (8 cc/rev.), which started at 1500 rpm supplies 11 liter/minute.
- Common Hydraulic deposit with winch (220 liters).
- Hydraulic Fluid Oiltran EP10/W20 according with DIN 51524 2 HLP.
- System in open circuit made up of gearbox assemblies pump, pigtail hoses, control valves, two double splitters connected in series and 4 cylinders.
- General pressure limiter valve of the circuit set at 200 bar.

The pump for the auxiliary circuit is assembled in tandem configuration with the winch pump, it receives movement from the right electric motor direct which enables the auxiliary circuit control with the right motor started and the drums disengaged.

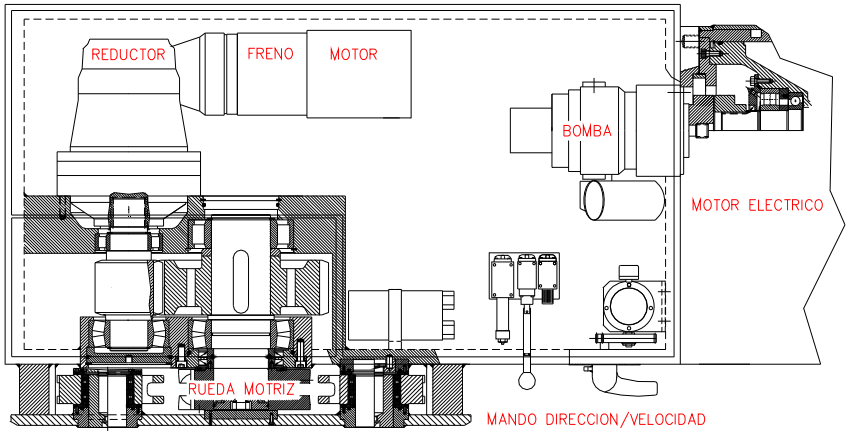
Both circuits are supplied with a 220 liters capacity common oil deposit with a temperature sensor and pressure stat. Depending on the temperature sensor, the electric motors stop in case of going beyond 70 ºC. In case of lack of pressure in the supply caused by a level fault, the machine motors stop as well.

PULLING SYSTEM

The dragging Shearer winch is one of the modules that made up the machine and it is placed between both electric motors.

The winch is the pulling unit of the machine in such a way that one five teeth motive wheel that engages on one 22x86 chain laying and tighten along the whole working area, supplies the traction of the Shearer on both directions.

The motive wheel drive is produced with an hydrostatic transmission in closed circuit between the pump and the motor.



In the output of the hydraulic motor shaft there is a i=50 planetary gear assembly and a pair of i=3 dented wheels that increases the torque in i_{TOTAL} = 150.

In order to improve the static braking of the machine, there is a multidisc brake device with negative effect and a static torque of 400 Nm on the input shaft of the planetary gear assembly, with hydraulic release interlocked with the motion order to the winch.

The energy supply to the pump is received directly from the right electric motor shaft through an elastic assembly.

The drive control of the winch is a lever with a 90º turn starting from a neutral 0 position and selects the direction and speed of the movement of the Shearer.

The control system on the hydraulic circuit may adapt the motor cylinder volume in order to achieve a speed selection long/short depending on the working conditions.

The transmission hydraulic pump has the following features:

- Axial Pistons pump of variable cylinder volume for closed circuit.
- Maximum cylinder volume = 75 cm3 /rev.
- Left rotation (as seen from the shaft).
- Flow control mode: H1 (proportional hydraulic regulator).
- Pressure limiter: by means of limiter valves and pressure cut-off valve.

The hydraulic engine are the following:

- Axial Pistons motor of variable cylinder volume for closed circuit.
- Maximum cubic capacity = 105 cm3 /rev.
- Reverse turn direction.
- 2 positions regulation by pressure type H2
- Cylinder volume limitation.
- With washing valves.

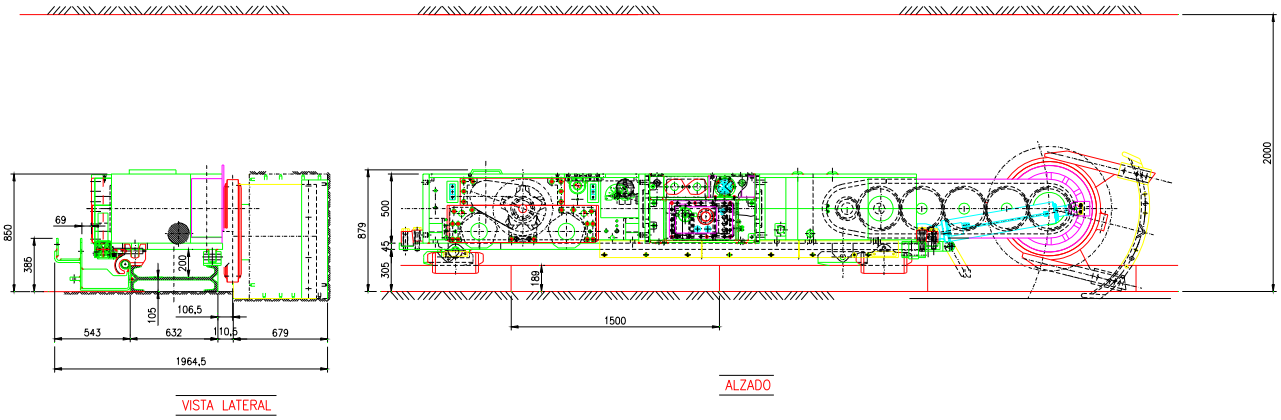
Pressure regulator H2 enables the cylinder volume variation from Vg min to Vg max by means of a pilot signal from a NG-6 valve by manual drive lever in such a way that the motor works at Vg min when it is required under the torque and high speed and Vg max when the maximum torque is required and minimum speed.

COOLING SYSTEM

The machine has a water circuit for cooling and dust cleaning in order to reduce the dust emissions to the working area, for this purpose a water supply is needed of 20 liters/min with an minimum input pressure of 6 bar and a maximum of 12 bar.

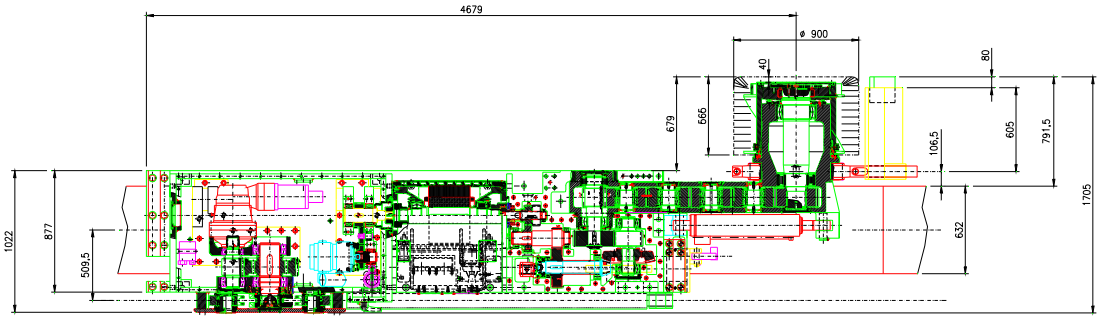
PMAP 1x120 LOW PROFILE VERSION

With the same components of PMAP 2 x 120 can be built a one single drum 1 x 120 Shearer and low profile for thinner coal seams.

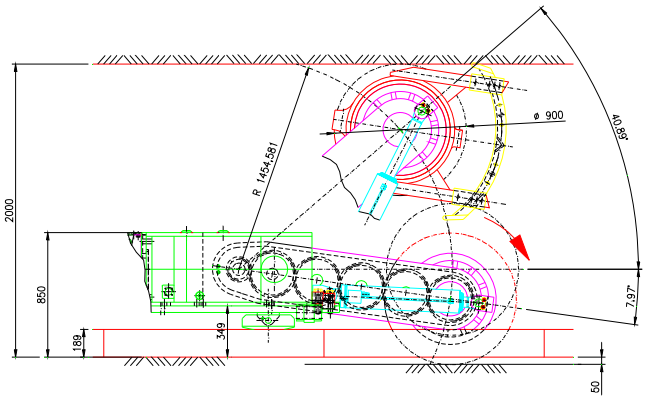


VISTA LATERAL

ALZADO



PLANTA



MACKINA-WESTFALIA, S.A.

Carretera M-300 Km.29,5 28802 Alcalá de Henares MADRID ESPAÑA
Tel. + 34 91 889 44 12 Fax. + 34 91 883 21 74
Email. mackwest@mackina-westfalia.com
Web www.mackina-westfalia.com