

HYDRAULICALLY DRIVEN MILLING UNIT

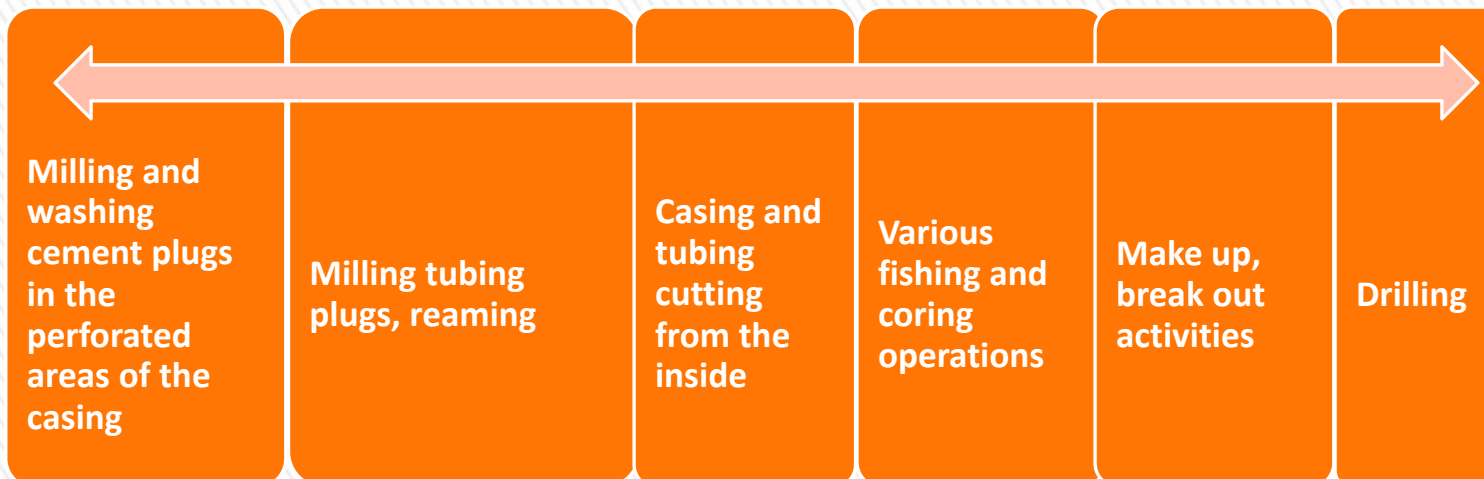


HYDRAULICALLY DRIVEN MILLING UNIT

Description

Milling unit consists of a hydraulic power generator and an 80to power swivel. Hydraulic power generator includes one hydraulic pump driven by a 160CP Cummins diesel. Hydraulic energy is transformed in rotational motion by the power swivel. Milling unit incorporates the functions of the rotary table and rotary swivel. For transportation the unit is provided with a lifting device. Installation of equipment on the skid is designed to facilitate easy access and dismantling if necessary. Operating temperature range is $-29^{\circ}\text{C} \div +45^{\circ}\text{C}$.

Operating range



Equipment components

Main subassemblies installed on the skid:

- Cummins engine 160CP/2200rpm; Max torque 624Nm/1500rpm
- Pump actuation
- Power swivel CHM80tf
- Power swivel support
- Hydraulic system
- Hydraulic oil tank
- Diesel tank
- Engine fuel supply system
- Hose drum
- Protection covers
- Hydraulic control board
- Reactive torque compensation system
- Monitoring system

Hydraulic power generator

It included the hydraulic system that provides flow and pressure variation according to the requirements of the power swivel. On the hydraulic board there are installed controls for power swivel and engine, as well as parameters display for power swivel, engine, hydraulic motor, hydraulic system.

Hydraulic hoses that connect the power unit with the power swivel are reeled on a drum.

Hydraulic board includes a protection cover in case of difficult weather conditions.

Hydraulic power generator

Variable flow pump has the advantage that by adjusting the geometric volume obtains the optimum flow required by the power swivel and the hydraulic fluid sent to the tank through the safety valve.

Another advantage is that the resistant torque due to the pump when starting the engine is considerably lower than the constant volume pump. In order to control the pump the hydraulic system includes a hydraulic distributor LS and proportional controls, that can be actuated from distance by means of a hydraulic panel.

The solution of a hydraulic console came from the fact that the dimensions of the console is much smaller compared to the distributor itself, thus allowing a more flexible operation.

Proportional control enables that at an angular movement on the console to obtain through the distributor a flow corresponding to this angle, therefore a specific speed, without having the flow pass through the safety valve, the relationship between angle and speed being linear.

Command pressure(35 bar) for hydraulic pilots and console is taken from the distribution panel of the distributor that incorporates a low pressure regulator.

Achieving one of the operation modes, high torque or high speed, is made by engaging one or two sections of the distributor, one section for high torque, and two sections for high speed.

When the required speed is high, the console opens an isolation valve that opens a maximum valve thus limiting pressure and torque.

This value is aligned with the design input information and is lower than maximum pressure required for maximum flow.

Power swivel CHM-80

Power swivel is designed in accordance with API specification 8C is supported by the hook of the travelling block and is guided on two $\Phi 22$ mm cables, installed between the platform and the crown block. Resistant torque compensation system can be provided along with the skid or separately. Hydraulic operation provides torque transmission to the drilling string, changing the rotation, speed, torque.

Power swivel functions are:

- supporting and rotating the drilling string;
- transmission of the drilling fluid from the loader through the hydraulic hose to the drilling string;

Power swivel consists of two categories of parts: stationary and moving. In the stationary category we include the body of the swivel that includes the main bearing as well as the lifting ears. The two steps gearbox is designed as robust and compact, on its casing being installed the hydraulic motors with angle body and axial pistons. The unit is delivered with kelly cock having a connection thread $3 \frac{1}{2}$ " IF(left is an option). Power swivel motors have identical geometric volume, their operation being made in parallel in order to avoid uneven wear.



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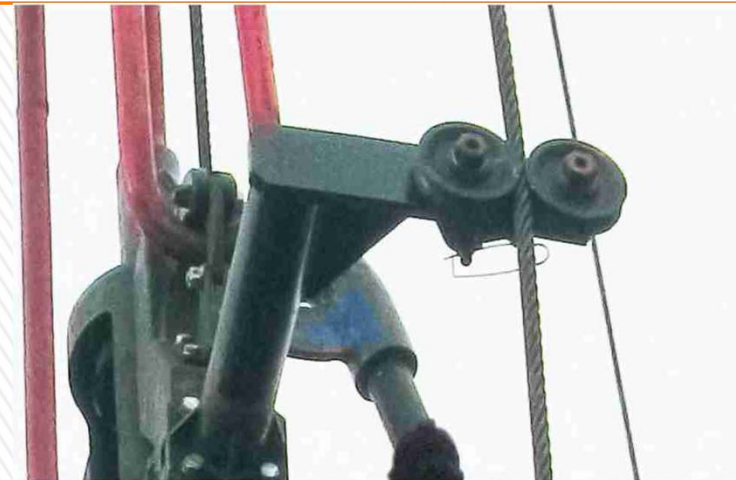
Another adjustment of stem speed can be made by changing engine speed, that can be achieved continuously from 750 rpm to 2200 rpm. Engine console and hydraulic monitoring and control console are installed as to be easily supervised by the operator that can handle simultaneously with both hands hydraulic system and engine controls.

Drum

Hydraulic hose drum is hydraulically actuated for winding and rewinding. In order to actuate the drum it is used an orbitrol hydraulic motor installed on an one step gearbox located on the drum. The control of this motor that generates high torque and can be operated at low speeds, is achieved also from the hydraulic console by means of the hydraulic distributor with proportional control, thus enabling the speed of the hose drum.

Reactive torque compensation system

This system is designed to compensate the reactive torque of CHM80 to power swivel. This device is provided with the skid, to be used on AM12/50 sau AM12/40 rigs. Power swivel has two arms that slide along two $\Phi 22$ mm cables.



Parameters display

Display of hydraulic parameters is made on the operator console by means of three interchangeable electronic modules.



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Characteristic	Value	Unit of Measure
Maximum static load	100	to
Maximum dynamic load(rotating)	80	to
Maximum drilling fluid pressure	340	bar
Minimum passing diameter through stem	52	mm
Gooseneck thread conenction	2 in	LP
Stem thread connection to string	3 1/2 in IF	right
Maximum pressure in hydraulic system	290	bar
Flow in hydraulic system	280	i/min
Maximum torque	800	kgm
Speed at maximum torque	90	rpm
Maximum speed	140	rpm
Torque at maximum speed	500	kgm
Ambient temperature	-29 C...+45C	
Hose diameter	1 1/4 in x 350bar	
Rotation	right/left	
Type of actuation of hydraulic motor	parallel	
Trasport dimensions of skid	length 5460	mm
	width 2000	mm
	height 1990	mm
Oil tank capacity	350	LP
Oil type	H46A	
Engine Cummins QSB 4.5 Tier III Stage III		
Power	160HP/2200RPM	
Torque at maximum speed	624Nm/1500rpm	
Average fuel consumption	310	g/HPH
Main hydraulic pump - type	A17VO 140	
Hydraulic motors - type	A2FM80	
Oil volume axial bearing	10	l
Oil type	T90EP2	
Oil volume gearbox	10	l
Oil type	T90EP2	