HPM SRL
HYDRAULIC PERFORMANCE MACHINES

# HPM 250

## *HPM 250 DRILLING RIG PRESENTATION*

Hpm 250 machine was designed to perform large diameters' piling, also on lands particularly challenging.
In the standard configuration It's able to perform diameter drilling up to 2900 mm (9' 6") and up to 49m (160') depth.

Even if It has remarkable performances, also thanks to the use of high strength steel, HPM 250 machine has a compact size.
This enhances its mobility on construction sites and its transport.

In addition to the standard version is available the short mast one, very useful to work in areas with limited height. It's also possible the switching from one version to another by simply replacing the telescopic kelly bar and the crowd cylinder.

**HPM 250**

**HPM 250 Short Mast**

## BASE

HPM 250 uses a Caterpillar Cat 336E base, the same used in standard excavators.
This base has a C9.3 ACERT Tier 4 diesel engine with a power of 233 kW (fly wheel). The Tier 4 Diesel type is suitable for European and the U.S. countries.

According to particular request , HPM 250 can be provided on the Cat 336D Tier 3 basis for the other countries.
On this basis, HPM adds his Hydraulic system  for positioning operations and motion of the rotary.
This just to send the entire power to the rotary or to main winch in order to maximize the productivity.

| BASE CARRIER | US | METRIC |
|---|---|---|
| Model | Caterpillar 336E | Caterpillar 336E |
| Installed power (fly wheel) | 316 hp | 233 Kw |

## UNDERCARRIAGE

The tracked undercarriage is supplied by Caterpillar according to the specifications of HPM.

It  has a length of 5860mm (19' 2.5 "), shoes those measure 720mm (2' 4") and a width of 4270mm (14 ') that is hydraulically reducing to 3000mm (9'10 ") for the transport phase. It has a single speed travel, but it has a remarkable traction force for the movement in the jobsite.

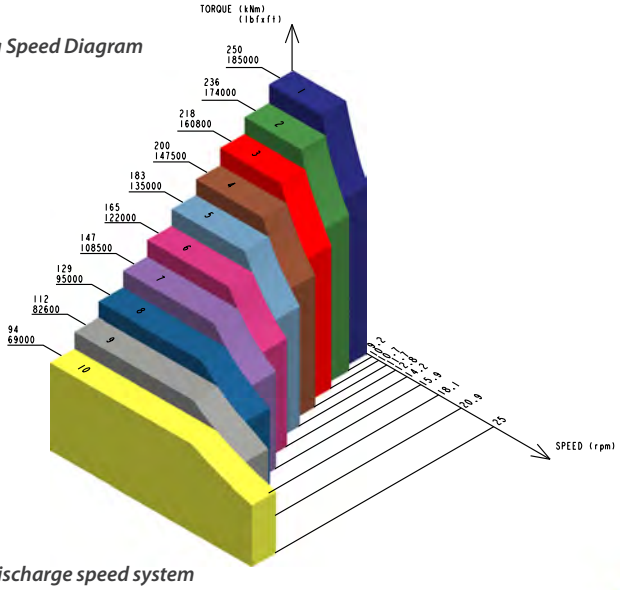
| UNDERCARRIAGE | US | METRIC |
|---|---|---|
| Track length | 19 ft 2.5 in | 5860 mm |
| Shoes width | 2 ft 4 in | 720 mm |
| Overall width (extended) | 14 ft | 4270 mm |
| Overall width (retracted) | 9 ft 10 in | 3000 mm |
| Traction Force | 102000 lbf | 453 KN |

## ROTARY

The Rotary of HPM 250 is constructed using two large pinions and a ring gear of supported by high-speed rotation bearings.
The pinions are put into motion by two bent-axis, variable displacement motors, (Parker) and two gearboxes fitted with power shift transmission (Zollern).
The rotary is able to provide a maximum and effective torque of 250 kNm (185000 lbf – ft) @ 6.5 rpm, the working speed can be set by the operator in the cab to values between 9 and 25 rpm. Also, the speed for downloading the augers can be set by the operator and the maximum speed of discharge is 120 rpm.

| ROTARY | US | METRIC |
|---|---|---|
| Maximum torque (effective) | 185000 lbf -ft | 250 kNm |
| Working Speed | 9 -24 rpm | 9-24 rpm |
| Discharge Speed | 120 rpm | 120 rpm |

*Working Speed Diagram*




*Patented discharge speed system*

During the working phase the operator can choose the right speed of rotation of the rotary, having ten-speed level choices.
In order to discharge the augers, HPM has a gear control system that allows you to quickly reach the optimum discharge speed (patent pending).

## CROWD SYSTEM

The rotary's motion is implemented using a hydraulic cylinder. The cylinder has a pull force of 400 kN (90,000 lbf) pull force and a push force of 330 kN (74,000 lbf). The cylinder used in the short mast is shorter. In the HPM 200 standard machine the stroke is 5639mm (17'7 ") in the short mast is 2667mm (8'9").

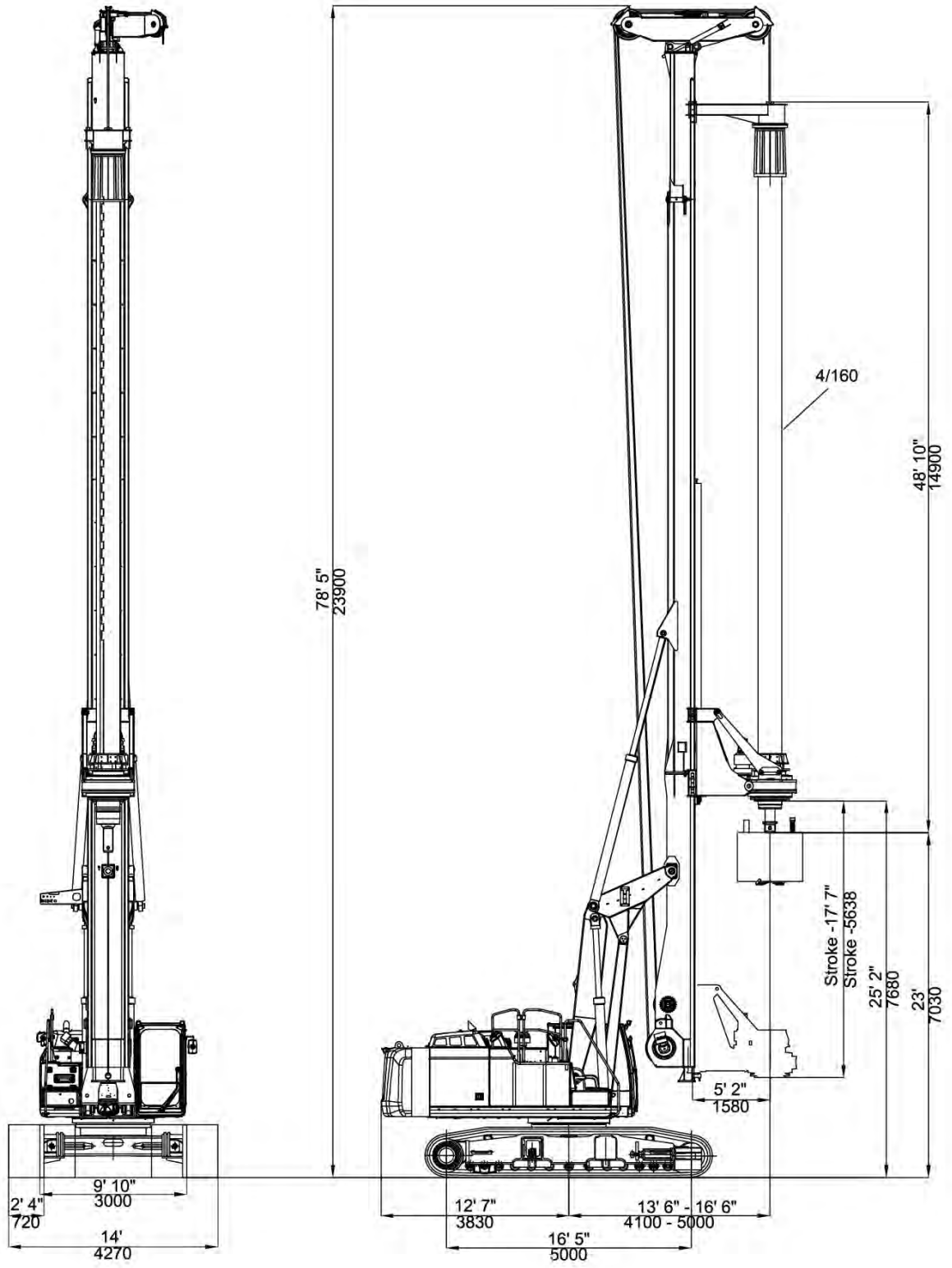
| CROWD SYSTEM | US | METRIC |
|---|---|---|
| Cylinder stroke | 17 ft 7 in | 5639 mm |
| Pull Force | 90000 lbf | 400 kN |
| Push Force | 74000 lbf | 330 kN |

The winches are supplied by the Zollern company , and they have the drum with a particular channel obtained by fusion designed to ensure a long service life of the wire ropes.
The main winch works by a 28mm (1 "1/8) wire rope diameter. His effective maximum pull force is 230 kN (51,700 lbf). The maximum speed was fixed at 70m/min (230 ft / min), but higher speeds can be obtained. The main winch is equipped with an automatic feed device which works during the advancement of the rotary head and a device that prevents the unwiding of the wire rope when the tools arrive to the bottom hole.
The auxiliary winch uses 22mm (7/8") wire rope. diameter. It has a maximum pull of 115 kN (26,000 lbf) and a maximum speed of 50 m / min (200 feet/min).

| **MAIN WINCH** | US | METRIC |
|---|---|---|
| Maximum pull force (1st layer) | 51700 lbf | 230 kN |
| Starting pull force (1st layer) | 56200 lbf | 250 kN |
| Line Speed | 230 f/min | 70 m/min |
| Cable Diameter | 1" 1/8 | 28 mm |
| **AUXILIARY WINCH** | | |
| Maximum pull force (1st layer) | 26000 lbf | 115 kN |
| Line Speed | 180 ft/min | 70 m/min |
| Cable Diameter | 7/8" | 22 mm |

## STRUCTURE

The drilling structure is composed of a drilling mast and an articulation as a parallelogram.
The mast is supported by a central hinge and two cylinders. During the work phase can be obtained inclinations front and side of 6 °.
This particular articulation allows the translation of the work axis without losing the verticality of the mast. It's possible to vary the distance of the work axis from the axis of the machine from a minimum of 4100mm (13'6 ") to a maximum of 5000mm (16' 5").

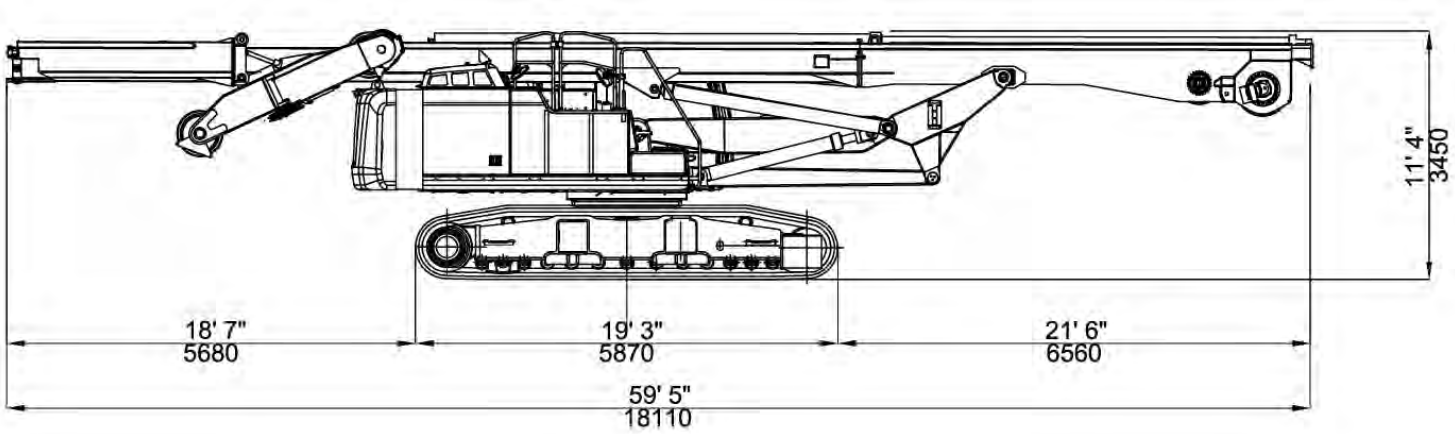



| WORKING DIMENSION | US | METRIC |
|---|---|---|
| Max Diameter | 9 ft 6 in | 2900 mm |
| Standard Kelly Bar 4/130 | 160 ft depth | 40 m depth |
| Optional Kelly Bar 4/155 | 197 ft depth | 60 m depth |
| | | |
| Working Radius | 13 ft 6 in to 16 ft 5 in | 4.1 m - 5 m |
| Height | 78 ft 5 in | 23900 mm |
| Width | 14 ft | 4270 |
| Operative Weight | 156500 lbf | 71000 kg |

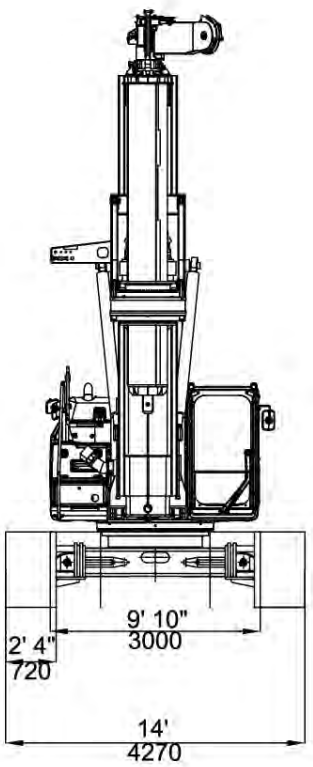
The height of the HPM 250 standard is 23.9 meters (78 ' 5").

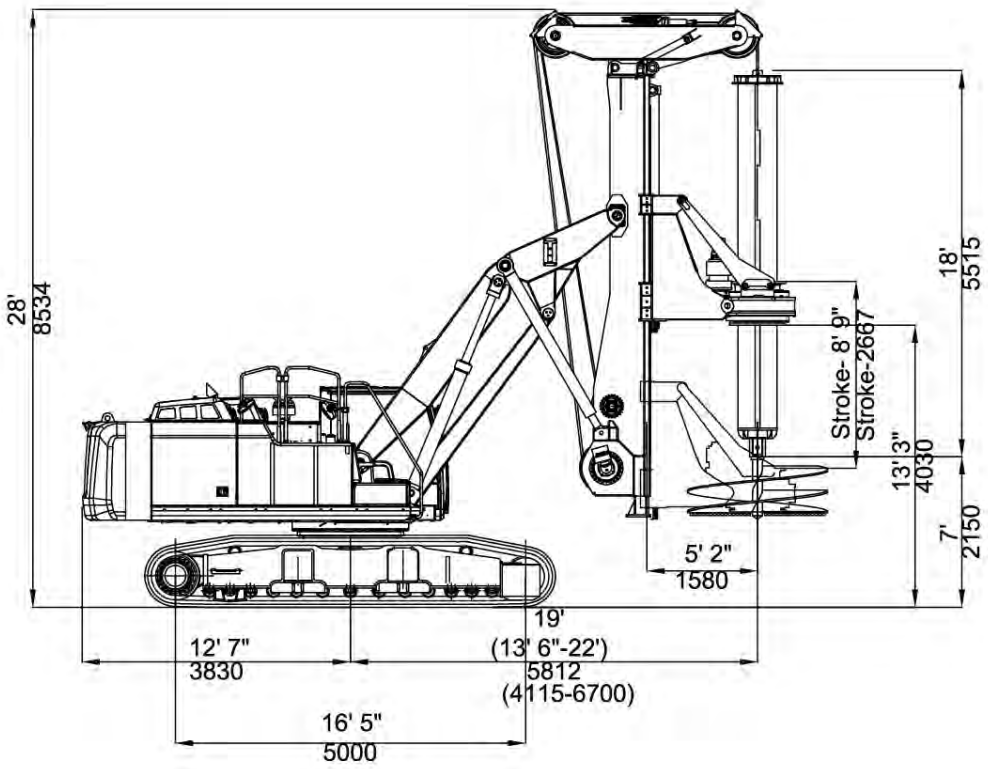
The mast head containing the pulleys winch has a Y-shaped configuration and It's suitable for standard and short machine. It has hydraulic moving cylinders to allow to pass from the work configuration to the transport.

During the transport the standard machine has a width of 3 meters (9'10 "), a height of 3450mm (11'4"), a length of 18110mm (59'5 "). The weight of the standard machine in transport phase is 50.5tons (111,300 lbf) (without counterweight).




| TRANSPORT DIMENSION | US | METRIC |
|---|---|---|
| BASE | | |
| Height | 11 ft 4 in | 3450 mm |
| Length | 59 ft 5 in | 18110mm |
| Width | 9 ft 10 in | 3000 mm |
| Weight | 111300 lbf | 50500 Kg |
| | | |
| ROTARY | | |
| Weight | 9900 lft | 4500 Kg |
| | | |
| COUNTERWEIGHT | | |
| Weight | 18700 lbf | 8500 Kg |
| | | |
| STANDARD KELLY BAR 4/130 | | |
| Lenght | 48 ft 10 in | 14900 mm |
| Weight | 16530 lbf | 7500 Kg |



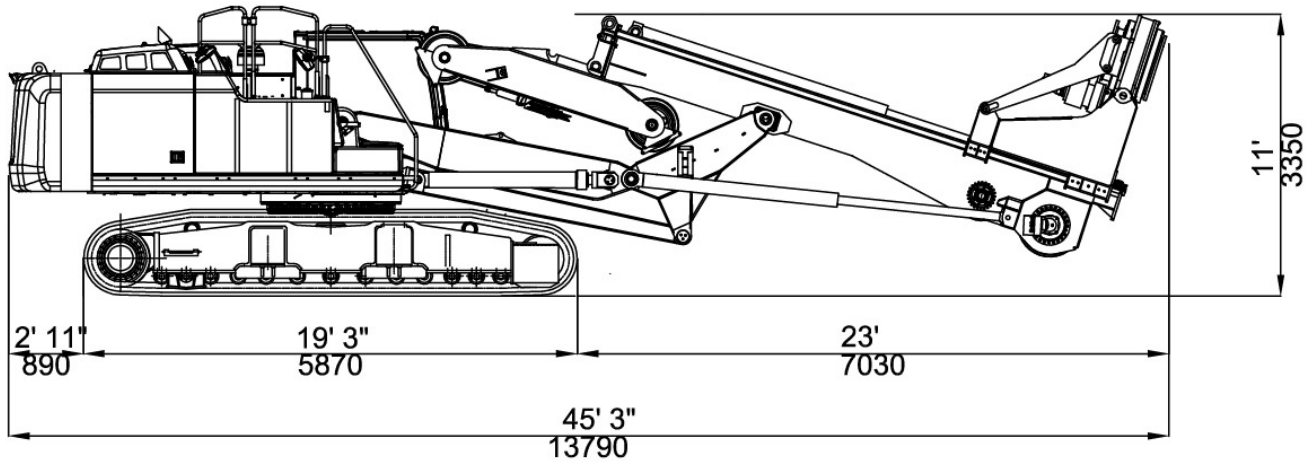




| WORKING DIMENSION | US | METRIC |
|---|---|---|
| Max Diameter | 9 ft 6 in | 2900 mm |
| Standard Kelly Bar 4/130 | 85 ft depth | 26 m depth |
| Working Radius | 13 ft 6 in to 22 ft | 4.1 m - 6.7 m |
| Height | 28 ft | 8534 mm |
| Width | 14 ft | 4270 mm |
| Operative Weight | 148800 lbf | 67500 kg |

The height of the HPM 250 Short Mast is 8.5 m (28').

The mast head containing the pulleys winch has a Y-shaped configuration and It's suitable for standard and short machine. It has hydraulic moving cylinders to allow to pass from the work configuration to the transport.

The HPM 250 Short Mast, during transport, has a width of 3 meters (9'10"), a height of 3350mm (11') and a length of 13.79m (45' 3"). The machine has a weight of 51 tons (102,000 lbf) (without counterweight).

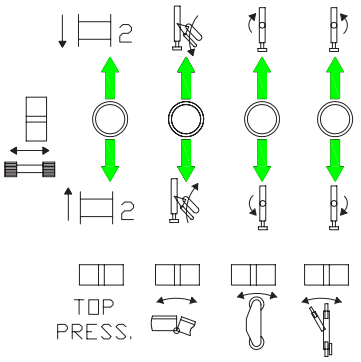


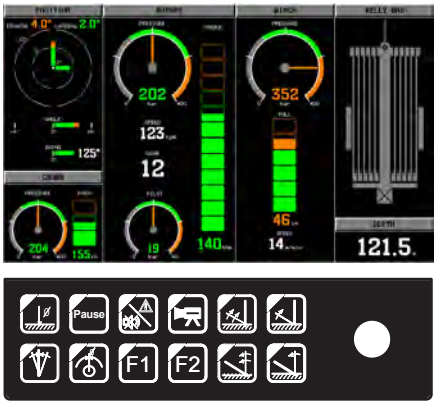

| TRANSPORT DIMENSION | US | METRIC |
|---|---|---|
| BASE* | | |
| Height | 11 ft | 3350 mm |
| Length | 45 ft 3 in | 13790 mm |
| Width | 9 ft 10 in | 3000 mm |
| Weight | 120000 lbf | 53900 Kg |
| | | |
| ROTARY | | |
| Weight | 9900 lft | 4500 Kg |
| | | |
| COUNTERWEIGHT | | |
| Weight | 18700 lbf | 8500 Kg |
| | | |
| STANDARD KELLY BAR 4/130 | | |
| Lenght | 16 ft | 14900 mm |
| Weight | 11200 lbf | 5100 Kg |

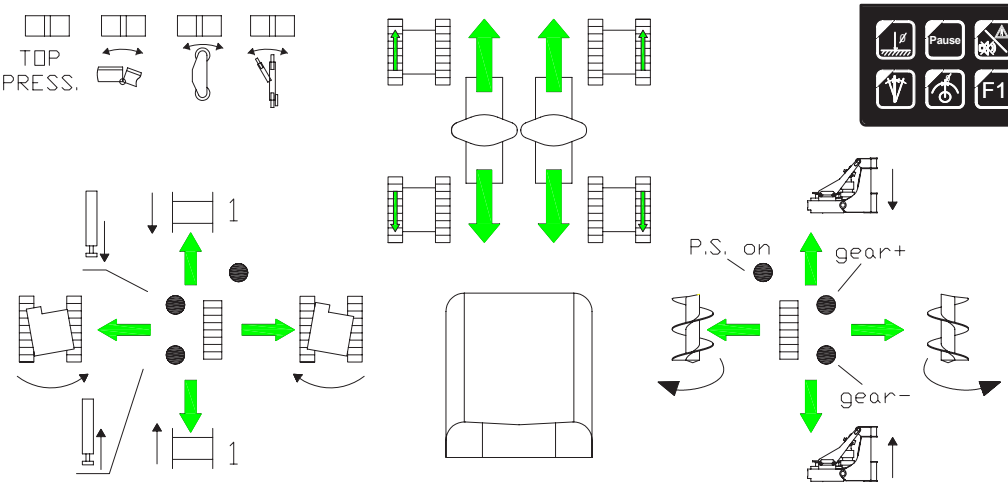
**Reduced weight without rotary 128500 lb (58300 kg)*

## CONTROL SECTION

HPM 250 drilling rig uses a custom control system able to transmit the user all the information needed for a good perforation: an in-cab monitor that transmits data relevant to verticality, depth, torque and rotation speed of the rotary, pulling and speed winch, the crowd cylinder pushing force.
All the necessary commands for the drilling phase focused on the two main joystick. The movements of the swing, main whinch, foot cylinder and automatic return of the swing (if available) are operated by the left joystick. The movements of rotary, crowd cylinder, discharge speed, and velocity change, are positioned on the right joystick.
Auxiliary controls such as auxiliary winch, parallelogram, tilting cylinders, undercarriage extension and movement of the mast head cylinders are placed on a console at the left of the operator.
The onboard computer provides all the necessary information for proper drilling: verticality of the mast, depth, pushing force of the crowd cylinder, speed and pull of the main winch, speed and torque of the rotary, instantaneous position of the kelly bar. The computer is also used to automatically verticalize mast.



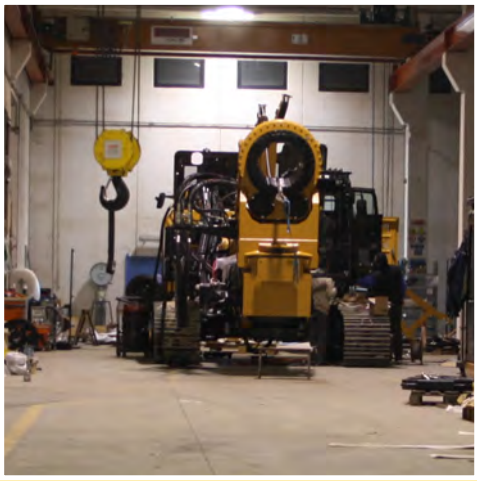




## KELLY BAR

The kelly bars are made from concentric tubes of high resistance. The shape of coupling devices has been optimized according to the requests of important companies in drilling field: they are sufficiently large in order to reduce and facilitate rehabilitation and sufficiently close so as to speed up the steps of coupling and uncoupling. The rods are fitted with innovative solutions to prevent unwanted hookings during the ascent phase.
The standard square for tools measures 200x200, but It's possible to provide Kelly Bars with 177x177 square joint.
The transmission of torque and push from the rotary to kelly is performed by an adapter reduction. It's possible to use every other kind of Kelly bar (friction type or owned by the customer) by replacement of that adapter.

HPM STANDARD is supplied as standard with a 4/160 kelly bar, suitable to reach the depth of 49 meters (160 feet). With this kelly is possible to insert elements of casing tubes 5.5 meters long (18 feet).
It's also possible to provide kelly bars with larger depth, as the 4/197 (60 meters depth )
The HPM short mast is provided with a kelly bar 6/85 type (26 meter depth).

The HPM 250 machines are designed and manufactured at HPM factory in Italy, but all the machines, excluding prototypes, which are intended for the U.S. market are assembled at HMC factory, in Indiana.
HMC is the exclusive dealer for the entire area represented below.



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