



Smart Pulling Head

Prime Horizontal



The Smart Pulling Head is an intelligent pulling head for high density polyethylene (HDPE) pipelines from 160 mm to 315 mm capable of measuring and transmitting pull force and down-hole mud pressure in real time.

Pull force up to 30 tons and mud pressure up to 400 bar are measured directly at the pulling head and displayed to the rig operator in real time during the pipe pulling process.

The system requires no physical access or wire connections in the drill string, measured data is transmitted using a cable installed inside the product line and then wirelessly sent to the simple touch-screen driller's display at the rig, avoiding downtime when pulling pipe. The display unit can be connected to a laptop to store digital data for later reference and in the future will wirelessly communicate with the Prime Horizontal ProData System.

There is no limitation on the depth of boreholes or the length of boreholes making this a flexible solution for measuring pull force and pressure while pulling any suitable HDPE pipe installed with HDD technology.

Smart Pulling Head Apparatus

1



The Pulling Head is an industry standard Polyethylene pull head, modified specifically for the purpose of measuring down hole force and annular borehole pressures. The standard system can measure up to 30 tons of pull force and 400 bar of pressure.

The standard system is available for PE (Polyethylene) pipe sizes from 160mm (SDR 11) up to 315mm diameter. Larger PE diameters are also available.

2



The tail pipe data handler is the electronic unit which is installed in the tail end of the product pipe. Its purpose is to receive the measured

data from the Pull Head via a cable running through the product pipe.

Once the data has been received by the handler it transmits the data via radio frequency to the display unit located with the driller.

3



The Pull Head Driller Display Unit is a touch screen display. It receives information collected by the tail pipe data handler via radio frequency. The measured outputs are then displayed for the driller to see. The output allows the driller to initialize the system by calibrating the sensor output to 'zero' prior to beginning the pipe installation. It is also possible to change the pressure reading from Bar to PSI by applying the appropriate scale factor.

The system is designed to integrate with the Prime ProData system, if available, The two systems will wirelessly see each other and the data will automatically be recorded and saved to the ProData servers.

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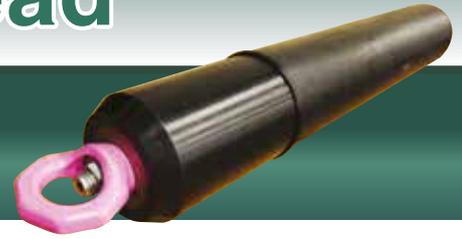
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Pre-requisites

1 Laid down pipe: The pipeline must be laid out in a straight run and not on a roll. Typically we are concerned with force and pressure measurements on pipelines longer than 200m. Normally such a length dictates that the pipeline be built up from sections of pipe up to 10m in length. The product pipeline is by default laid out in a straight line, sometimes on a series of rollers. There can be exceptions to this, usually cramped inner city projects where there is no other option than to weld two rolls together as the pipeline is pulled into the ground.

2 Hot Plate welder: It is required that a hot plate welder be present on site. This is the same system used to weld the pipeline sections together. The pulling head is fused in the same way as the pipe sections to the head of the pipeline, it is the clients responsibility to provide this service.

3 Pull line installed: In order for the pulling head to deliver its measurements to the surface a communication cable is installed through the length of the pipe, connecting the Pull Head with the data handler. It is the responsibility of the client to provide a pull line to facilitate the installation of the communication cable.



Specifications

Available for sizes PE pipe	160mm (6.2") [SDR11] - 315mm (12.4")*
Pulling force	Up to 30 tons
Annular pressure range	0-100 bar (1450 psi)
Transmission range	2.5km (1.5miles) [distance doubled with repeater]
Battery autonomy	8 hours**
Temperature range of downhole sensors	-20 - 60°C (-4-140°F)
Measurement frequency	Every 3 seconds

* Larger PE diameters are also available

** If more than 8 hours is required then a back up battery pack will be provided to give a further 8 hours of measurements.

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