

INTRINSICALLY SAFE ENCODERS IN TOP DRIVES

Background

The top drive attaches to the top of the drill string and rotates it with a lot of torque. The drill string, in turn, has a drill bit at the end which cuts into the rock strata below the drilling platform and creates the well hole. The weight of the motor plus any additional weights required to control the force on the drill string are carried by a traveling block and tackle arrangement. This Block and tackle is operated by a winch known as a DrawWorks. This is all big equipment and the encoder has to fit between the motor and a brake. So the encoder has to be compact, allow for high temperature operation, and be able to take high shocks and vibrations.

Solution

It is very important to control the torque and speed of the top drive. Too slow, and the drilling time is not used productively; too fast

and the drill string could break requiring a very expensive “fishing expedition” to retrieve the broken parts from the hole and re-start the drilling operation. Since the well hole is usually aiming for a pocket of oil or gas, there is a chance that potentially explosive fumes could be emitted from the wellbore. This is called a Class 1 Division 1 (Zone 0 in Europe) environment. Class 1 indicates explosive gases or liquids, and Division 1 (Zone 0) indicates that the explosive gas environment is highly likely to be present during normal operation. Therefore it is extremely important that any electrical equipment, such as our LP35 Encoder, be certified for this environment. One of the preferred methods is to use an intrinsically safe product along with a piece of electronic equipment called a “barrier” which limits the amount of energy that the product can produce so that it doesn’t touch off an explosion.

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Encoder installed in gear box



Encoder, gearbox and motor ready for final assembly

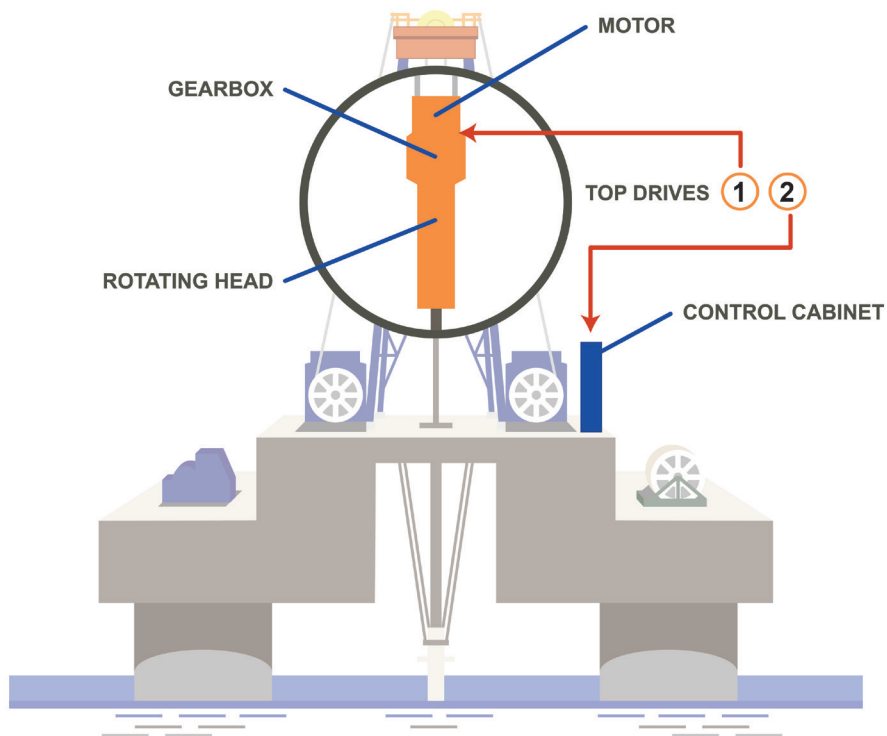


RELATED PRODUCTS

Reference on Diagram	Product	Type	Features	Part Number	Function	Brand
1	 LP35	Intrinsic Safe	<ul style="list-style-type: none"> Rated for class 1 Div 1 Compact Size Ruggedized against shock and vibration High temperature operation 	Standard = LP35-HX-____TX Terminal Box = LP35-HX-____T-Tx	Speed Control	BEI Sensors
2	 IS Barrier	Electronic I/O Module	<ul style="list-style-type: none"> Safety Protection for Encoder 	60004-XXX	Electrical Control	BEI Sensors



GENERAL DIAGRAM



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