PRIME Conveyance

Part of the PRIME digital electro-hydraulic intervention technology platform

Applications

- Long lateral, extended reach horizontal well conveyance of e-line deployed technologies (logging tools, ballistic devices, powered mechanical services)
- Intricate and/or complex mechanical intervention, namely rotational services (debris or component milling) and high expansion completion component manipulation

Features and Benefits

- High degree of instrumentation and multiple sensors providing tool and task parameter intelligence
- An open IOT architecture and high-speed telemetry for real-time communication for tool task management
- Dynamic, in-well optimization of speed, force, torque and power delivery across the tractor and application tools:
- Downhole logic and tool control
- Highly efficient motor controllers
- Hydraulic steering
- Modular and scalable versatility for plug-and-play field configurability, enabling tool integration & combinability for single run/ multifunction operations
- Inherent tandem tractor functionality and reverse tractoring capability
- Tension/Compression subs can be added, both above and below the Tractor
- 3 x times faster conveyance speeds
- Increased mechanical task efficiency, capability and certainty
- Reduced operational risk and field logistics

The PowerTrac® PRIME is inherently designed to provide optimized tractor conveyance in highly deviated wells for a wide range of payload types, wellbore dimension and trajectory environments, resulting in up to three times increased conveyance speeds. The modular design allows the user to select and operate features that are optimum to well conditions and operational needs. A high degree of instrumentation coupled with advances in mechanical, hydraulic, and electronic componentry, as well as software, analytics and visualization, allows real time adjustment and control of tool performance (speed, force) to optimize for the conditions encountered while in the well.

When combined with a Direct Drive Rotation device for mechanical rotational services such as component milling or wellbore cleanout, the tractor provides the rotational anchor in both free-wheeling (rolling) or tractor driven mode, for hi-fidelity control of weight on bit (WOB). WOB is synchronized along with rotational torque and RPM to optimize the rate of penetration (ROP) throughout the task, with the anchor mode switching on the fly for uninterrupted back reaming capability.

Forced Optimized

All Drive Sections open/engaged
- providing a low speed/high force option

Speed Optimized

Reduced Drive Sections open/engaged
- providing a high speed/low force option

Forced Optimized (with Select Drive and additional drive sections)

All Drive Sections open/engaged
- providing a low speed/high force option

Tandem-Upper

Only Upper Drive Sections open/engaged, in low-speed mode
- to navigate (push) lower tractor section past ledge

Tandem-Lower

Only Lower Drive Sections open/engaged, in low-speed mode
- to navigate (pull) top tractor section past ledge

PowerTrac® PRIME	
Tool body OD	2.5 in. (63.5 mm)
Wheel diameter	2.5 in. (63.50 mm) & 2.625 in. (66.68 mm)
Max restriction ID	2.625 in. (66.68 mm) for 2.5 in. wheels 2.75 in. (69.85 mm) for 2.625 in. wheels
Max operating ID	9.2 in. (233.68 mm)
Max pull force[1]	1,375 lbs (625 kg)
Max speed[2]	120 ft/min (36 m/min)
Total length	22.5 ft (6.84 m)
Weight	145 lbs (111 kg)
Pull force/length	61 lbs/ft (91.4 kg/m)
Pressure rating	15,000 psi (1,034 bar)
Temperature rating	350°F (177°C)

The data is for an example configuration utilizing five drive sections

* The number of drive sections can be increased or reduced, and operated selectively or simultaneously

[1] Pull Force can be increased by adding additional drive sections. Max Pull Force 3300 lbs (1500 kg)

[2] Maximum speed reported from actual field operational data. Maximum speed is determined by the specific drive section configuration in use, the well trajectory and tortuosity, and the eline cable properties

Baker Hughes

PRIME Release Sub System

To enable controlled release of stuck toolstrings

Applications

- Logging toolstrings in cased and open hole
- Tractor conveyance and Powered Mechanical Applications

Features and Benefits

- Release energized through wireline or battery
- Extended battery life
- High torque design enabling usage with milling applications
- Real time in-well configuration to adapt for changes in work scope
- Can release even if cable is damaged
- QHSE; reduces personnel exposure to cable breakage at surface due to high overpull
- Improved operational efficiency; less runs, increased measurements per run
- More efficient retrieval/fishing due to clean fishing neck after release

PRIME Release Sub System – The Release Sub System (RSS) has been developed to enable controlled release of stuck toolstrings. Multiple RSS's can be utilized, placed at the top of the toolstring or at relevant positions along its length enabling partial retrieval. The PRIME RSS has integrated PRIME node electronics, enabling full PRIME communication and in-well functionality to PRIME tools positioned below, and in-hole configurability for release parameters. It also provides real-time release status based on sensor reading and battery life measurement.

RSS release is activated by telemetry commands, voltage variation or memory timer mode, enabling controlled release even with damaged cable.

	RSS 218	8 PRIME RSS 212	2 RSS 318
Tool body OD	2.125 in. (54.00 mm)	2.5 in. (63.50 mm)	3.125 in. (79.38 mm)
Length	3.41 ft (1.04 m)	3.63 ft (1.10 m)	3.9 ft (1.19 m)
Min restriction ID	2.5 in. (63.50 mm)	2.625 in. (66.68 mm)	25 in. (82.55 mm)
Pressure rating		15,000 psi (1,034 bar)	
Temperature rating		350°F (177°C)	
Fishing neck	1.38 in. (35.1 mm)	1.75 in. (44.5 mm)	1.75 in. (44.5 mm)

PRIME Logging while Tractoring – Logging while Tractoring (LwT) functionality is available when passenger tool data acquisition is required during conveyance in a highly deviated well. Examples of this are for a down log pass of a Production Logging Tool (PLT) or Wellbore Camera. To achieve this an LwT sub is added to the PowerTrac® PRIME Toolstring.

The LwT can be run either in Conveyance mode - providing full PRIME Tractor communication and in-well functionality, or in LwT mode – enabling two-way communication for third party passenger tools while tractoring, with mode selection done in-well.

For passengers tools that require a lower operating voltage, a Customer Power Converter (CPC) is added. This provides a stepped down voltage for passenger tool operation while maintaining maximum tractor performance and full passenger tool telemetry.

PRIME LwT	
Tool body OD	2.5 in. (63.5 mm)
Length	4.85 ft (1.48 m)
Min restriction ID	2.625 in. (66.68 mm)
Pressure rating	15,000 psi (1,034 bar)
Temperature rating	350°F (177°C)

Note: when utilizing CPC add 6.8 ft (2.07 m)

Baker Hughes