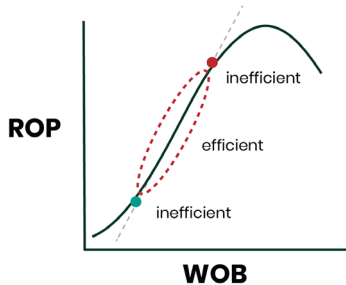


PRIME Milling

Part of the PRIME digital electro-hydraulic intervention technology platform

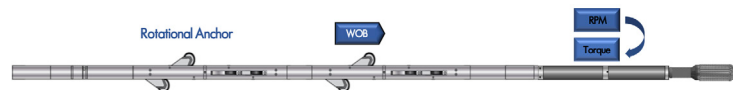


Critical to optimized and efficient milling of wellbore completion components is the ability to provide the required milling parameters of torque, weight on bit (WOB) and RPM, combined with a specifically designed mill bit, in turn delivering optimized rate of penetration (ROP) throughout the task at hand.

Also critical is the ability to monitor, control and adjust these parameters throughout the milling exercise, to handle variations in component material, shape, and dimensions, as well as the surrounding fluid changes and swarf build up.

The PRIME Direct Drive Rotation (DDR) is a highly instrumented, high torque rotational device with real-time in-well monitoring, control and adjustment capability.

Built on a common tool architecture, the PRIME DDR is seamlessly integrated with the PowerTrac® PRIME Tractor which, in addition to providing efficient conveyance of the milling toolstring to task depth, provides the required rotational anchor and the WOB control in deviated wells. On-the-fly adjustment of tractor force offers seamless adjustments to WOB allowing optimum milling parameters to be maintained throughout the operation.



Further efficiency gains come from active stall control recovery which vastly improves effective milling time. On-the-fly switching capability of the rotational anchor between free-wheeling (rolling) or tractor driven mode enables uninterrupted back reaming capability.

Free-rolling Anchor



All Drive Section arms extended; wheels disengaged
 –to provide rotational anchor for Milling service support

Driven Anchor



All Drive Section Arms extended; only lower wheels engaged
 –to provide rotational anchor with driving force for Milling WOB

	PRIME DDR 212	PRIME DDR 318
Tool body OD	2.5 in. (63.5 mm)	3.307 in. (84.00 mm)
Length	7.78 ft (2.37 m)	7.64 ft (2.33 m)
Pressure rating	15,000 psi (1,034 bar)	15,000 psi (1,034 bar)
Temperature rating	350°F (177°C)	350°F (177°C)

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	PRIME RSS 212	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)	3.25 in. (82.55 mm)
Pressure rating	5,000 psi (1,034 bar)	5,000 psi (1,034 bar)	5,000 psi (1,034 bar)
Temperature rating	350°F (177°C)	350°F (177°C)	350°F (177°C)
Fishing neck	1.38 in. (35.1 mm)	1.75 in. (44.5 mm)	1.75 in. (44.5 mm)