

### Applications

- Unconventional and conventional drilling
- Directional and horizontal drilling
- Geosteering and bed-boundary detection
- Custom and SAGD drilling

### Benefits

- Minimizes costs (up front and long-term maintenance compared to dual-telemetry tools)
- Increases reliability, accuracy, flexibility and operational efficiency
- Improves decision making with accurate borehole compensated measurements
- Decreases trips with a long-lasting single battery pack (expandable)
- Saves time with high-speed memory download: <15 min.

### Features

- High-operating temperature: 175°C (347°F)
- Pre-assembled combined tool with MWD-LWD capabilities
- 400kHz, 2MHz, 8 curves
- Sizes: 4 ¾, 6 ½, 8.0 in.
- Short MWD system w/ gamma
- High-speed telemetry available

## HPR Integrated MWD-LWD System

### Resistivity with Mud Pulse Telemetry

By harnessing the benefits of Bench Tree's high-precision resistivity tool (HPR) and Short MWD system with gamma, the integrated system provides operators with precise and dependable directional and formation evaluation information to maximize drilling efficiency and pay zone exposure in directional and horizontal wells.

The HPR Integrated MWD-LWD system streamlines operations by shipping the tool pre-assembled, with only one battery connection to be made at the rig site.

#### Real Time in a Compact, Efficient, Modular Assembly

The Bench Tree solution's high-speed mud pulse eliminates the need for expensive EM and dual-telemetry systems with limited depth capability. It allows directional, drilling dynamics, resistivity and gamma data to be transmitted in a shorter period of time, saving operators time and money.

Dynamic sequencing also enables faster drilling by switching from providing tool faces to more gamma and continuous inclination data while rotating.

The directional stability and repeatability of the integrated system is unmatched in the industry, since Bench Tree's proven magnetometers, accelerometers and high-temperature electronics are used in the system.

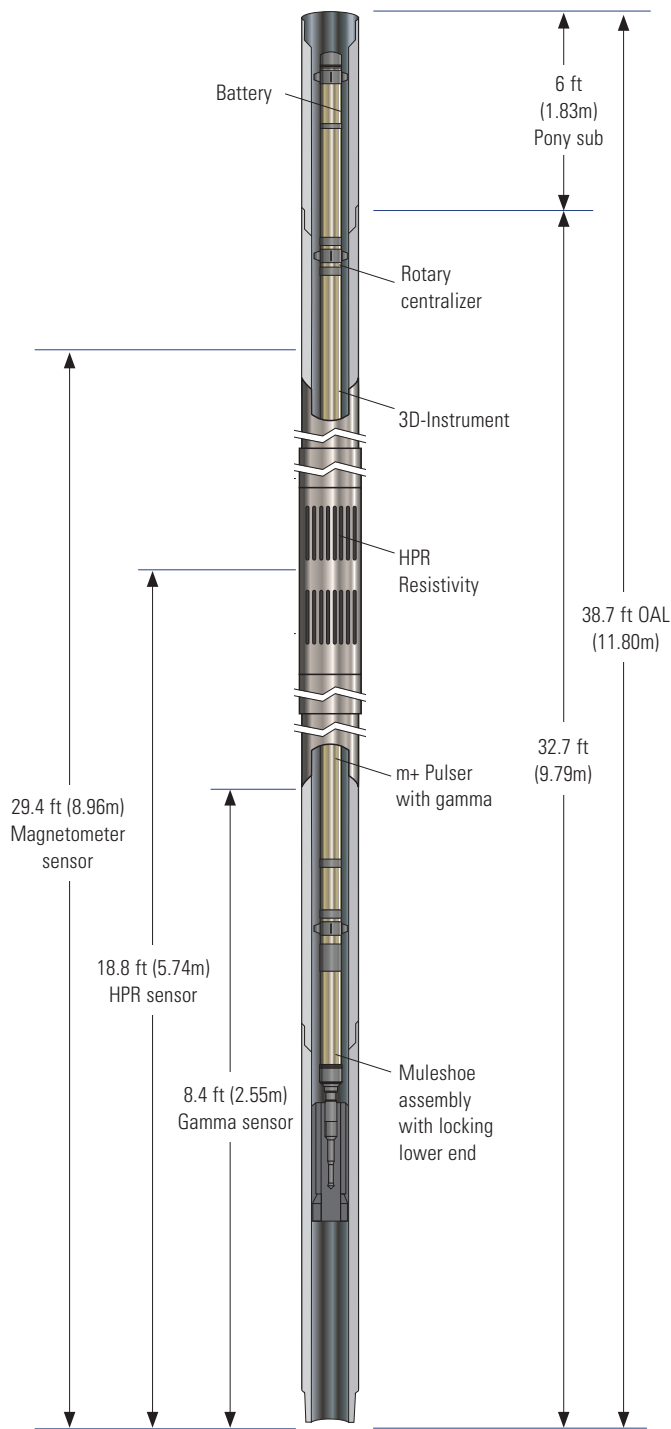
Reliability is improved by attaching the 3D-I drilling and dynamics instrument to the top of the HPR resistivity tool, and the m+ Pulser and gamma section to the bottom. The system also has 95% fewer field-mated connectors and less wiring than legacy configurations.

The HPR Integrated MWD-LWD system comes complete with everything needed for faster and more accurate drilling, including Bench Tree's MWD-LWD surface system and HPR surface interface kit. Full training and support is also offered to help ensure success.

To improve your reliability, accuracy and formation evaluation for greater drilling efficiency, contact the Bench Tree sales team for assistance.



## HPR Integrated MWD-LWD System



- Notes:
- Diameter of the HPR integrated MWD-LWD system is based on the size of the HPR resistivity tool assembled the with Short MWD system
  - HPR resistivity sizes: 4 ¾, 6 ½, 8.0 in.

## HPR Integrated MWD-LWD Specifications

Sizes (in.)	4¾	6½	8.0
Collar length (ft)	37.4	38.7	38.7
Dogleg, max rotating °/100 ft	14	12	10
Dogleg, max sliding °/100 ft	28	24	20
Pressure, max <sup>1</sup> kpsi	15	15	15
Temperature, in spec.	25°C to 175°C (77°F to 347°F)		
Temperature, survival	0°C to 185°C (32°F to 365°F)		
Battery life (2 x 8 DD cells, 29Ahr) @ 10-sec sample w/ 1 sec PW	600 hrs		
Pressure drop @ 450gpm WBM	215 psi		
Range: phase / attenuation	0.1 to 4000 Ω-m / 0.1 to 700 Ω-m		
Accuracy: phase / attenuation	±0.25 mS/m / ±0.50 mS/m		
Inclination	<±0.1°		
Azimuth (dip A <70°, 90° incl)	<±0.2°		
Gravity	<±1.5 mg		
Dip	<±0.15°		
Total mag field	<±0.75 mGauss		
Temperature	<±1°C (± 1.8°F)		
Rotation	(0 to 300) ±12 RPM		
Drilling inclination	±0.35° typical		
Memory download time	< 30 minutes		

