

# Cerebro<sup>®</sup> In-Bit Sensing

## OBTAIN HIGH SPEED DATA FROM THE DRILL BIT TO IMPROVE DRILLING PERFORMANCE

### OVERVIEW

Achieving optimal drilling performance requires efficient conversion of mechanical energy into rock cutting and evacuation. Cerebro<sup>®</sup> in-bit sensors provide direct, in-bit measurements of vibration and rotational speed. Utilizing the insights provided by Cerebro and the Design at the Customer Interface (DatCI<sup>SM</sup>) process, we can collaborate to improve efficiency through bit design, bottom hole assembly (BHA), and parameter selection. Improved drilling efficiency will increase rate of penetration (ROP) and run length, ultimately lowering well construction costs.

Traditional drilling optimization relies on rig surface data that has significant measurement uncertainty, thus limiting accurate understanding of the drilling environment and leaving performance on the table. High resolution collar-based vibration measurement tools have been on the market for some time but they do not directly measure vibration and motion at the bit and are priced out of many applications.

Cerebro sensors provide the most critical drilling performance measurements at the optimal location within the BHA, with zero compromises to the BHA design and low lost-in-hole risk. By being able to measure the motion of the drill bit, we can better understand what type of drilling dysfunction is happening along with pinpointing where the dysfunction is emanating from.



### FEATURES

- » Available in Halliburton fixed cutter and roller cone bits
- » Compact packaging within the API connection
- » Compatible with all logging and measurement while drilling systems
- » Compatible with all drive types: rotary steerable and mud motor
- » Ships armed and ready for autonomous activation
- » Continuous, high-frequency 1,024 Hz recording on all channels
- » Cerebro data can be merged with surface data

### BENEFITS

- » Optimized performance in all drilling applications
- » No effect on bit makeup length for directional performance
- » No compromises or BHA changes required to deploy
- » Zero dedicated personnel or special operations required at the well site
- » Capture high impact downhole events down to the millisecond
- » View in-bit data alongside surface parameters and other sources of downhole information

### Cerebro Sensor Specifications

Vibration	Axes	3
	Range	+/- 8 g
	Accuracy	+/- 40 mg
Shock	Axes	3
	Range	+/- 200 g
	Accuracy	+/- 500 mg
Magnetometer	Axes	3
	Range	+/- 16 gauss
Accel/Mag RPM	Axes	3
	Range	0 to 1,200 rpm
	Accuracy	+/- 7 rpm
Gyro RPM	Axes	3
	Range	+/- 667 rpm
	Accuracy	+/- 0.5 rpm

	3-1/2" Reg	NC35/38/40	4-1/2" Reg	6-5/8" Reg	7-5/8" Reg
Run Time	75 hrs*	135 hrs	135 hrs	135 hrs	135 hrs
Sample Rate	1,024 Hz	1,024 Hz	1,024 Hz	1,024 Hz	1,024 Hz
Max Temperature	130°C	130°C	130°C	130°C	130°C
Max Pressure	20 ksi	20 ksi	20 ksi	20 ksi	20 ksi
TFA	Not Applicable	1.23 in <sup>2</sup>	2.03 in <sup>2</sup>	3.61 in <sup>2</sup>	6.74 in <sup>2</sup>
Pressure Drop Constant	Not Applicable	21,726	65,611	235,236	1,075,593

\* Run time can be extended by utilizing a lower sample rate.

For more information, contact your local Halliburton representative or visit us on the web at [www.halliburton.com](http://www.halliburton.com)

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