

## LEADING THE INDUSTRY IN PERFORMANCE, EFFICIENCY AND RELIABILITY

FUSION EM electromagnetic (EM) measurement-while-drilling (MWD) system leads the industry in depth achievements and pioneering EM signal reliability in traditionally challenging drilling environments:

- With its proprietary transmitter and gap sub design, FUSION EM delivers more consistent data transmission in a greater range of impedance formations than competitors.
- FUSION EM's advanced digital surface system coupled with the CAT-MWD decoder software enables superior filtering capabilities and data visualization. As a result, operators are able to detect extremely small signals on surface resulting in greater depth capabilities and increased performance.
- Designed for efficiency, FUSION EM's two-way data transmission capabilities enable system parameters to be optimized for the environment while drilling.
- Our **High Wattage Fusion EM** generates stronger signals that enable detection from greater depths, and support longer runs, by reducing battery life limitations encountered in conventional EM systems.

### WHY CHOOSE FUSION EM?



Drill wells faster with 4X data speeds



Drill with fewer limitations on rig hydraulics



Gain rig time-savings by eliminating survey wait times



Reduce NPT. No moving parts means greater reliability and fewer trips

### BENEFITS

- **Increase drilling performance** with talk down capability that enables wireless instructions to be sent on the fly to optimize transmission frequency, power levels and data packets.
- **Utilize EM in more formations** as FUSION EM leads the industry in overcoming formation challenges to achieve reliable data transmission in more areas than conventional EM.
- **Optimize drilling parameters** by using the HAWK's™ real time vibration and shock measurements to alert drillers to potential bit failures, formation changes and downhole issues.
- **Cut rig costs** by eliminating transmission wait times and lowering non-productive time (NPT) as the system is powered by long-life batteries and there are no moving parts.

### APPLICATIONS

- Areas where conventional EM is not reliable
- Areas of total or partial loss of circulation
- Underbalanced and multi-phase drilling
- Air drilling applications including foam, mist, air, nitrogen, and aerated drilling fluid

## FUSION EM FEATURES

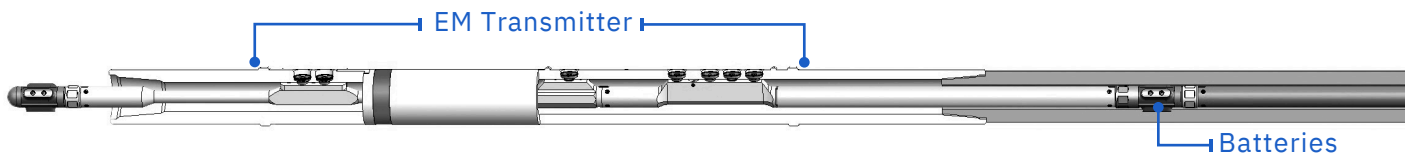
- ✓ Two-way data transmission
- ✓ Real-time data transmission
- ✓ Provides continuous inclination data
- ✓ High output model provides stronger signal without battery limitations
- ✓ No lost circulation material (LCM) or mud property restrictions

Sensor Parameter	Range	Absolute Accuracy
Inclination	0-180 Deg	+/- 0.1 Deg
Azimuth	0-360 Deg	+/- 1.0 Deg
Azimuth at Toolface	0-360 Deg	+/- 1.0 Deg
Magnetic Toolface	1-100 m3	+/- 1.0 Deg
Gravity Toolface	0-360 Deg	+/- 0.5 Deg
Pressure	0-10,000 psi (0-70,000 kPa)	+/- 10 Psi (69 kPa)
Gamma	0-511 cps	+/- 1 AAPI
Temperature	302°F (0-150°C)	1.8°F (+/- 1°C)

Operating Parameter	Range
Telemetry	Electric Dipole Transmission
Power Source	Long life "DD" Lithium Batteries
Transmission Speed	Up to 7.5 bps
Transmission Frequencies	2 to 9 Hz
Transmission Depth	Runs in excess of 16,404' (5,000m)
Collar Size:	
- Standard	4.75-9.50" (121 to 241mm)
- Slimhole	3.50" (89mm)
- Microslim	3.125" (79mm)
Max Operating Temperature	300°F (150°C)
Max Hydrostatic Pressure	20,000 psi (135,000 kPa)
Mud Weight	No Restrictions
LCM Tolerance	No Limit

**DELIVERS CONSISTENT DATA TRANSMISSION IN A GREATER RANGE OF IMPEDANCE FORMATIONS**

OPERATING LIMITS										
Drill Collar OD x ID		Tool Joint Standard	Minimum Torque		Gap Sub Tensile Rating (Static Pull)		Max Flow Rate		Pressure Loss (H2O @ Max Flow)	
(in)	(mm)	Type	(N-M)	(ft-lb)	lbf	daN	Litres	US GPM	kPa	Psi
4.75 x 2.68	121 x 68	NC 38	12,000	9,000	125,000	55,600	1,325	350	200	30
6.50 x 2.81	165 x 71	NC 46	31,000	23,000	150,000	66,700	2,275	600	400	60
6.50 x 3.25	165 x 82	NC 46	28,000	19,000	150,000	66,700	2,650	700	275	40
6.75 x 3.25	171 x 82	NC 46	28,000	19,000	150,000	66,700	2,650	700	275	40
8.00 x 3.25	208 x 82	6-5/8 REG	64,000	47,000	200,000	89,000	3,750	1,000	375	55
8.00 x 3.75	208 x 95	6-5/8 REG	64,000	47,000	200,000	89,000	4,550	1,200	275	40
9.50 x 4.25	245 x 108	7 H90	68,000	50,000	250,000	111,200	5,700	1,500	275	40



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