



# Gyro Measurement-While-Drilling (gMWD)

## Powerful Keeper Gyro/MWD Surveys

Scientific Drilling's Gyro Measurement-While-Drilling (gMWD) makes simultaneous use of our high-accuracy Keeper Gyro System coupled with our Mud Pulse MWD. This powerful combination facilitates fast top-hole drilling operations in a multi-well environment.

## Symbiotic Gyro/Magnetic Surveys

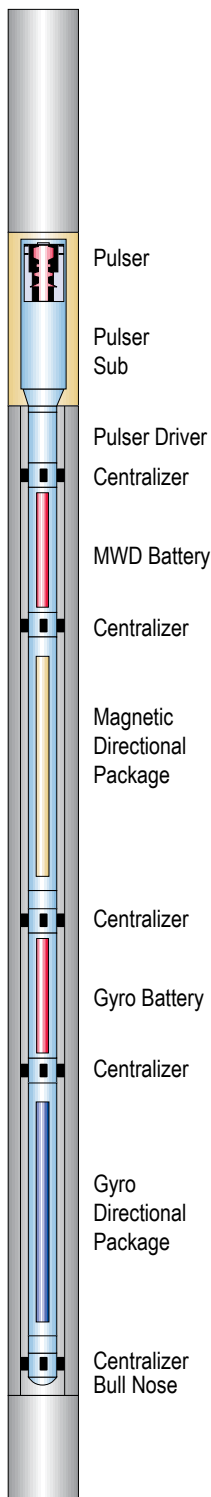
gMWD's synergy between gyro and magnetic orientations produces the maximum survey accuracy and speed. gMWD uses initial gyro orientations and surveys for kickoff. When the magnetic influence depth has been reached (using cross comparison between magnetic and gyro surveys), the gyro section is shut down and the hole section is completed using the MWD magnetic readings.

## gMWD Reaches New Performance Heights

Scientific Drilling's reputation for engineering excellence is defined by our commitment to continuous product improvement. Having drilled more than 1.8 million feet of hole, gMWD sets the standard for high performance and ruggedness. gMWD is optimized for multi-well tophole and reentry/sidetrack applications.

gMWD's many capabilities include:

- Robust communications and power management
- Ruggedized sensor vibration and shock handling
- Fast sensor shutdown and reinitialization resulting in rapid cross correlations between gyro and magnetic sensors
- High-speed toolface
- True north-referenced "Gyro Toolface" aids in real-time steering near vertical.



## ADVANTAGES

- Multi-Mode Surveys. Gyro and/or magnetic surveys and orientations
- Faster Survey Times. Pumps off is 3.5 minutes to record survey
- Closer to Bit Surveys. X and Z gyros are 15 feet closer to the bit than standard MWD magnetic sensors
- Multi-Mode Toolfaces. Gyro or magnetic toolfaces then highside toolfaces at user-defined inclination threshold.
- Positive Pulse Telemetry.
- Supports Both Gamma Ray (GR) and Propagation Resistivity (PRT).
- Multi-Mode Transmission Trigger. Vibration or rotation "On/Off" or pumps "On/Off"
- Includes Peak and RMS Vibration (Gs) Data.

## TECHNICAL SPECIFICATIONS

<b>Tool Collar Sizes</b>	3.125 in (7.94 cm)	6.5 in (16.5 cm)
	3.5 in (8.89 cm)	6.75 in (17.15 cm)
	3.875 in (9.84 cm)	8 in (20.32 cm)
	4.75 in (12.07 cm)	9.5 in (24.13 cm)
	6.25 in (15.75 cm)	
<b>Dog Leg Degree per 100 ft O.D.</b>	<b>Sliding:</b>	<b>Rotating:</b>
	12° (9.5 in)	6° (9.5 in)
	12° (8 in)	7° (8 in)
	19° (6.75 in)	8° (6.75 in)
	20° (6.5 in)	10° (6.5 in)
	20° (6.25 in)	10° (6.25 in)
	28° (4.75 in)	12° (4.75 in)
	30° (3.875 in)	30° (3.875 in)
	37° (3.5 in)	15° (3.5 in)
40° (3.125 in)	17° (3.125 in)	
<b>Pressure Rating</b>	20,000 psi (30,000 available) (137,900 kPa)	
<b>Temperature Rating</b>	MWD: 302°F (150°C) Gyro: 302°F (150°C)	
<b>Lost Circulation Material (LCM)</b>	Medium nut plug 40 lbs/bbl (18 kg/bbl)	
<b>Sensor Accuracy</b>	Subject to well profile	
<b>Length</b>	30 ft (9.14 m)	
<b>Maximum Pressure Drop</b>	250 psi @ 1,500 gal/min in 10 lb. mud	
<b>Range of Flow Rates per Tool Size</b>	<b>Tool OD</b>	<b>Gallons/Minute</b>
	3.125 – 3.875 in	50 - 200
	4.75 – 6.5 in	100 - 400
	6.25 - 6.5 in	200 - 600
	6.75 – 8 in	250 - 1,000
9.5 in	300 - 1,500	
<b>Toolface Update Rate</b>	8 – 14 seconds	

Specifications are subject to change without notice.



The Leading Force in Wellbore Navigation

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