

# Mud Pulse Measurement-While-Drilling (MWD)

## Leaders in MWD Technologies

Scientific Drilling is a leading provider of highly-accurate measure-while-drilling (MWD) services. With over 20 years of engineering and manufacturing excellence, our MWD systems have proven reliability and cost-effectiveness worldwide.

## Multi-Faceted Directional Capabilities

MPMWD's pulser systems have a variety of operating ranges and are well suited to all lost circulation material (LCM) types. This positive pulse MWD system is fully programmable and offers an array of precision survey data outputs. The MPMWD provides accurate directional control and transmits calculated data and raw vector parameters. MPMWD provides the following borehole measurements.

- Inclination
- Azimuth
- High-side and magnetic toolface position
- Temperature
- Peak & RMS vibration
- Inclination/azimuth while sliding
- Scintillation/API gamma ray
- Annular pressure
- 2 Mhz resistivity
- MagTraC ranging

## Wide Range of Applications

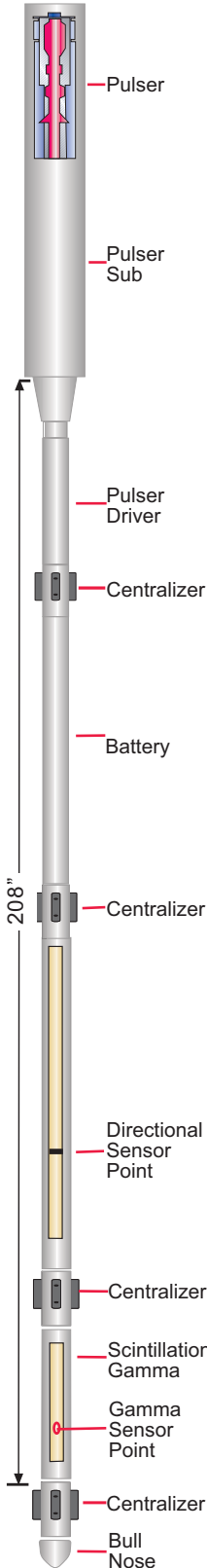
Scientific Drilling's Mud Pulse MWD (MPMWD) high-performance system (the "MP4") comes in all standard collar sizes for a wide range of flow rates. This system is ideal for difficult well scenarios.

- Directional/horizontal wells
- Relief wells
- Re-entry wells

## Leading-Edge Mud Pulse MWD Design Features

The MPMWD pressure-compensated pulser design has one of the widest flow rates in the industry. MPMWD centralizers absorb shock and hold the tool in place during drilling operations. MPMWD has the following design features:

- Accurate memory logging
- Robust electronics and mechanical design
- Sonde-based electronics in interchangeable collar sizes
- Multiple flow rates without adjusting pulser



## ADVANTAGES

- Good for Many Well Types. Has all standard collar sizes for multiple flow rates.
- Wide Range of Measurements. Fully programmable, it produces a variety of real-time measurements.
- High-Quality, Real-Time Output. Sophisticated algorithms correlate, analyze, and produce accurate real-time data.

## Technical Specifications

Outer Diameter:	3 1/8" (7.94cm) 3 1/2" (8.89cm) 4 3/4" (12.07cm) 6 1/2" (16.51cm)	6 3/4" (17.15 cm) 8" (20.32 cm) 9 1/2" (24.13cm)
Pressure Rating:	20,000 psi @ 300°F (30K available) (137,900 kPa @ 150°C)	
Length:	Fits in 30' collar	
Maximum Temperature:	302°F (150°C)	
Power Source:	Lithium Battery	
Operating Time:	150 hours	
Dog Leg Degree per 100' Outer Diameter:	Sliding 12(8"), 20(6 3/4"), 28(4 3/4"), 65(3 1/2"), 65(3 1/8")	Rotating 7(8"), 10(6 3/4"), 12(4 3/4"), 30(3 1/2"), 30(3 1/8")
Lost Circulation Material:	Medium Net Plug 40lbs/bbl (18kg/bbl)	
Telemetry:	Positive	
Maximum Bit Pressure:	No Limit	
Maximum Mudflow Rate:	Tool O. D. 3 1/8" - 3 1/2" 4 3/4" - 6 1/2" 6 1/2" 6 3/4"-8" 9 1/2"	Gallons/Minutes 200 400 600 1,000 1,500

## Directional Specifications

Length	16 4/5' (plus 6' pulser sub)	
Directional Only:	17 1/3' (plus 6' pulser sub)	
Directional + Gamma Ray:	17 1/3' (plus 6' pulser sub) 3.25" (15.9 cm)	
Toolface Update Period:	Minimum = 7 sec @ .5 sec pulse width Maximum = 14 sec @ 1 sec pulse width	
Long Survey Time:	Minimum = 115 seconds Maximum = 230 seconds	
Survey-While-Drilling:	Sliding: Yes	Rotating No



Scientific Drilling