



COMPASS DIRECTIONAL GUIDANCE, INC. MEASUREMENT WHILE DRILLING TECHNOLOGY

- Equipment Sales
- Fleet Maintenance & Repair
- Customer Training



Compass MWD Technology

Compass Directional Guidance, Inc. is your point of contact for sales of the most advanced pulse-based or EM measurement-while-drilling (MWD) equipment in the industry today.

For independent directional companies and drilling service firms throughout the Global Oil Industry market, Compass provides critical MWD technology through cost-effective packages that are field-ready. All you need is an operator.

With one of the largest independent fleets of MWD systems, Compass also provides full service tool maintenance and repair, with Quality Assurance to meet the highest industry standards.

Expand your job capabilities and improve the economics of your drilling operations with cost-effective solutions and get reliable MWD technology without expanding your tool inventory. Complete MWD systems and related equipment available for sale.



Experienced MWD operators provide on-site field training to get you up and running fast.

Easy-to-read Remote Monitor
with Safe Area Interface



Summary Points

- Proven, reliable MWD technology for directional-only, or directional + gamma
- System components packaged in complete ready-to-ship kits
- Both positive pulse systems and EM capabilities available
- On-site training and customer support programs get your operations up to speed quickly
- Complete fleet maintenance with tight QC programs are available

COMPASS DIRECTIONAL GUIDANCE, INC.



Benefits

Compass Directional Guidance, Inc. sells a complete modular MWD system designed and packaged for easy and efficient field transportation and assembly. Component modules for directional-only, directional + gamma, and high temperature capabilities allow flexibility in system design, with specific probe configurations depending on application.

This rugged MWD system is fully retrievable and can be retrieved in the event of a stuck-in-pipe incident, reducing the lost-in-hole risk. Because of the modular design, operation is possible in a variety of collar diameters, from 3.5" to 9.5", using standard non-magnetic drill collars. The system is rated to temperatures up to 150°C, with 175°C electronics available. It can operate with flow rates from 75 to 1100 gpm, and is capable of short-radius build rates to 80 degrees per 100 feet.

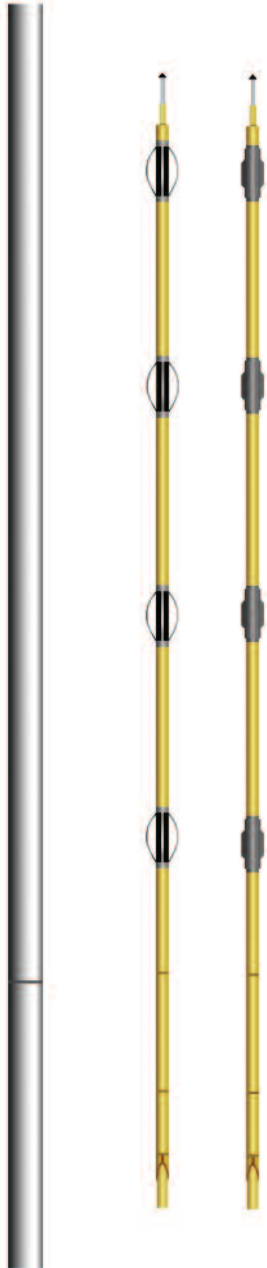
But the greatest advantage of this MWD package is its ease of operation and maintenance. Programmable surface and downhole systems provide reliable, accurate data to meet specific drilling conditions, while user-friendly operating software provides high level filtering and pulse detection with clear readout on the rig floor and through Safe Area interface.

Sale arrangements include comprehensive personnel training, available in the field or at the Compass service center in Houston, Texas.

MWD System Features

- Retrievable design can be reinserted without tripping
- Simple transport and on-site assembly
- Long downhole life, low maintenance
- Adaptable tool configuration and programming flexibility
- Downlink allows selection of operating mode without tripping
- Easy-to-use, Windows® based software/firmware communication system
- Long battery life, low power consumption
- Easy-to-see Rig Floor Monitor with variable screen display and Safe Area Interface

System Specifications and Features



Tool Dimensions

Tool Length (Assembled)	Length OD	Weight (lbs)
Directional-Only	25.5 ft	159 lbs
Directional + Gamma (using shunt on MWD)	32.5 ft	208 lbs
Tandem Power Section		
Directional-Only Assembly	32.5 ft	208 lbs
Directional + Gamma	39.5 ft	250 lbs

Modular MWD System Overview

Available Sensors	Directional, Gamma Ray, Tool Temperature
Standard Assembly	17 ft (5.2m) from top of UBHO sub. (May vary with length of bore in UBHO sub)
Tool Configuration	UBHO sub (muleshoe) and probe. (Probe configuration is variable)
Tool OD (Available)	Directional, Gamma Ray, Tool Temperature
Equivalent Bending Stress	As for standard and flexed NMDC. (Capable of BUR up to 109 degrees)
Max Operating Temp	150 deg C (302 deg F) (Hi-temp tool to 175 deg C special order)
Pressure Drop Across Tool	Flow loop / calculated (water): 170 psi @ 500 gpm (2-11/16" ID drill collar)
Max Hydrostatic Pressure	Directional, Gamma Ray, Tool Temperature
Flow Rate	Up to 1200 gpm (3-1/4" ID collar) Low as 50 gpm (2-1/4" ID collar)
System Operation	
Telemetry Type	Positive mud pulse
Survey Transmission Time	90 seconds
Tool Face Update Rate	17 seconds average
Absolute Accuracies	
Gravity Tool Face	+/- 0.05 degrees to +/- 3.0 degrees, Programmable
Pointing Accuracy	0.15 degrees = 2 ft per 1000 ft displacement
Magnetic Tool Face	+/- 0.05 degrees to +/- 3.0 degrees, Programmable
Azimuth	+/- 1.0 degree (inclination > 5 degrees)
Inclination	+/- 0.1 degree
Crossover to High Side Tool Face	Programmable to any value desired (5 degrees is typical)
Repeatability	Inclination +/- 0.05 degrees Azimuth +/- 0.05 degrees
Readout Resolution	Inclination 0.1 degree Azimuth 0.1 degree Tool Face 1 degree
Gamma Sample Rate	One per 1.8 seconds measured 20 per minute in downhole memory Programmable
Gamma Memory Capacity	120 to 600 hours as function of program

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