

Gordon Technologies'

# HEAT MISER™

PROTECT YOUR DRILLING SYSTEM AND REDUCE FAILURES RELATED TO HIGH-TEMPERATURE WELLS

**HM180**  
HEATMISER 180°C

**HM190X**  
HEATMISER 190°C EXTREME



## OVERVIEW

Gordon Technologies' MWD is a faster, more robust, and more reliable MWD system than any other on the market. GT-MWD and GT-Shock Miser were specifically designed to address the most common points of MWD failure in today's unconventional drilling environments, namely hostile environments, shock, and vibration. The combination of Gordon's patented pulser and patented shock and vibration mitigation system creates a faster, more robust, and more reliable MWD system that is achieving industry-leading performance. The Heat Miser class of GT-MWD family offer ultrahigh-temperature ratings of 180°C and 190°C (HM180 and HM190X respectively) through engineering component and system designs coupled with predictive and prescriptive analytic driven maintenance.

## FEATURES

### SHOCK MISER™ TECHNOLOGY

- ▶ Decades of MWD research and development, combined with precision engineering, yield a fully inclusive solution to dampen shock and vibration from a broad band of damaging harmonics and frequencies. Lowering shock and vibrate transmissibility allows operators to have less restrictive drilling parameters, ensuring the GT-MWD system is not a limiting factor.
- ▶ Shock Miser isolation technology is incorporated notably in the MWD UBHO and distributed throughout the string with Shock Miser influence of component design and proprietary inner barrel suspension packaging of PCBs and control modules.

### DATA TRANSMISSION

- ▶ GT-MWD contains a fully re-designed and patented pulser and mud pulse transmission assembly generating an industry leading pulse amplitude providing faster and more dense data with better confidence at deeper depths than the typical MWD systems.
- ▶ Flow configurations are flexible and work across a wide range of flowrates.
- ▶ Proprietary data compression algorithms and dual transducer decoding for high-speed logging

### REAL-TIME DATA ACQUISITION

- ▶ Drilling dynamics; environmental sensors provide measurements of axial and lateral shock and vibration, RPM, and stick-slip.
- ▶ 6-axis, 6-decimal place raw survey capability for survey management

### ADVANCED MECHANICAL DESIGN

- ▶ Retrievable MWD options
- ▶ Innovative module packaging allows a shorter and easier MWD tool to build and service
- ▶ Proprietary MWD centralizers and internal shock mounting for improved life of electronic components

### OPTIONAL ADVANCED SERVICES AVAILABLE

- ▶ GT-Tracker™ : RSS Compatible MWD
- ▶ GT-PWD : Pressure While Drilling
- ▶ Azimuthal Gamma : Geological and Reservoir Awareness
- ▶ Remote Operations : Increased Safety and Reduced Costs

For more information, contact us at [www.gordontechnologiesllc.com](http://www.gordontechnologiesllc.com)

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Directional Sensor			
Parameters	Accuracy	Repeatability	Resolution
Azimuth (Degree)	+/-0.5 min	+/- 0.5	0.1
Inclination (Degree)	+/- 0.1 min	+/- 0.05	0.1
Temperature (°C)	+/- 2.0	+/- 1.0	0.1
Local Magnetic Field (Total Magnetic Field, microTeslas)	+/- 0.1 mT	+/- 0.1 mT	0.05 mT
Gravitational Position- front of the unit (Highside Toolface, Degrees)	+/- 0.5	+/-n 0.5	0.1
Magnetic Position- front of the unit (Magnetic Toolface referenced to Grid or True North, Degrees)	+/- 1.0	+/- 1.0	0.1
Azimuth position- front of the unit (Magnetic Toolface referenced to Grid or True North, Degrees)	+/- 1.0	+/- 1.0	0.1

Directional Sensor Specifications	
Operating Temperature	-20 degC to 180 degC / 190 degC
Vibration	20 Grms, 10Hz- 500 Hz
Operating Shock	500 G
Operating Voltage Range	18-31 VDC
Current (@28 Volts)	125 mA max
Memory (logging environmental data)	36 MB
Service time	2 hours

Pulser Specifications	
Battery Life @ 1.5 DR	500 hours
Average Power	1.04 watts
Longevity	3,000 hours
EM Interference	Low
Service time	2 hours
Operating Temperature	175°C – 190°C
MTBF	>6,000 hours

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Gamma Ray Sensor			
Parameters	Accuracy	Repeatability	Resolution
Gamma Ray Real Time	1.4 CPS per API	Average 14 seconds (with Dynamic Sequence enabled and .5 sec pulse Width)	.5 ft @ 50 ft/hr ROP 1.0 FT @ 100 ft/hr ROP 1.5 FT @ 150 ft/hr ROP

Gamma Ray Sensor Parameters	
Accuracy	+/- 2% to 300°F (150°C) , +/- 5% to 356°F (180°C)
Vertical Resolution	Gamma ray sensor: 6.8"
Shock: Z- Axis	500g/ 0.5 milliseconds
Vibration	20g RMS

Directional Only Transmission Rates (Sliding/Rotating)					
Data Rate	Raw Survey from Pumps On	Tool Face	Sliding XYZ Shock/Temp	Rotating XYZ Shock	Rotating Temp/ Dynamic Inclinations
.375	1 min 54 sec	5 seconds	3.5 minutes	7 seconds	2 min 49 sec
.5	2 min 17 sec	7 seconds	5 minutes	9 seconds	3 min 45 sec
.6	2 mi 35 sec	8 second	6 minutes	1 seconds	4 min 30 sec
.8	3 min 12 sec	11 seconds	8 minutes	14 seconds	6 min
1.0	3 min 49 sec	14 seconds	10 min	18 seconds	7 min 30 sec

Gamma/ Directional Transmission Rates								
Data Rate	Raw Survey from Pumps On	Tool Face	Gamma Sliding	Gamma Rotating	Sliding XYZ Shock	Rotating XYZ Shock	Dynamic Inclinations	Dynamic Azimuth
.375	1 min 54 sec	5 seconds	16 sec	5 sec	2 min 56 sec	17 sec	4 min 9 sec	4 min 32 sec
.5	2 min 17 sec	7 seconds	21 sec	7 sec	3 min 55 sec	23 sec	5 min 32 sec	6 min 3 sec
.6	2 min 35 sec	8 second	25 sec	8 sec	4 min 50 sec	28 sec	6 min 38 sec	7 min 16 sec
.8	3 min 12 sec	11 seconds	34 sec	11 sec	6 min 27 sec	37 sec	8 min 51 sec	9 min 41 sec
1.0	3 min 49 sec	14 seconds	42 sec	14 sec	8 min 0.4 sec	46 sec	11 min 4 sec	12 min 6 sec

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## Gordon MWD System Tool Size & Flow Rate Ranges (Transmission Rates)

Tool Size	Flow Rate Range [gpm]	Dog Leg Severity Rotating/Sliding	LCM Restrictions (Med/Fine Nut Plug)[lb/bbl]	AVG/MAX Pressure Drop [psi]	Tool Length Dir-Gam [ft/ft]
3-1/2" O.D.	60 -180	40/60 °/100 ft	20	350/500	19/23
4-3/4" & 5" O.D.	140 – 350	30/40 °/100 ft	40	250/350	19/23
5-1/2" O.D.	250 – 425	30/40 °/100 ft	40	250/350	19/23
6-1/2" O.D.	200 – 900	DS Dependent	40	250/350	19/23
8" O.D.	300 – 1200	DS Dependent	40	250/350	19/23
9-1/2" O.D.	300 – 1200	DS Dependent	40	250/350	19/23

Sub Size [inch]	Flow Range (WBM) [gpm]	Flow Range (OBM) [gpm]	TFAOpen [in <sup>2</sup> ]	ΔP @ Min Flow 9 / 14 ppg mud [psi]	ΔP @ Max Flow 9 / 14 ppg mud [psi]
4-3/4 & 5 ULF	150 – 230	150 – 250	0.695	100/150	150/210
4-3/4 & 5 LF	180 – 250	180 – 280	0.787	100/130	150/190
4-3/4 & 5 SF	220 – 280	220 – 320	0.831	120/150	180/220
4-3/4 & 5 HF	250 – 350	250 – 350	0.976	110/140	180/220
5-1/4 HF	280 – 375	280 – 375	0.976	140/170	200/280
5-1/4 XF	300 – 425	300 - 425	1.073	140/180	210/290
6-1/2 & 6-3/4 ULF	250 -500	250 - 550	0.976	150/180	180/220
6-1/2 & 6-3/4 LF	250 – 500	250 – 600	1.072	140/170	210/280
6-1/2 & 6-3/4 SF	350 – 650	350 - 650	1.261	160/200	260/280
6-1/2 & 6-3/4 HF	550 – 800	700 - 800	1.498	180/230	300/400
6-3/4 HF SUPER	550 – 800	700 – 800	1.498	180/230	300/400
6-3/4 XF SUPER	700 - 1000	700 - 1200	1.749	160/220	320/470
8 LF	350 – 550	350 – 690	1.072	150/200	210/280
8 SF	450 – 600	450 – 750	1.261	150/200	260/350
8 HF	550 – 750	550 – 940	1.498	180/230	300/400
8 XF	700 – 1200	700 – 1500	1.749	160/220	320/420
8 MF	1000 – 1300	1000 – 1625	1.98	210/330	360/560

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