SDS HIGH SPEED 185C MWD SYSTEM

The SDS H**igh Speed High Temperature** Pulse Measurement- While-Drilling tool. The system is modular in design and configuration provide optimum performance in a wide range of collar diameters and flow rates. **It is the best in class for speed and high temperature(Hot Hole) MWD systems**. Utilizing 185°C Quartz Flex Accelerometers and proprietary 200°C Flux-Gate Magnetometers, the DM is designed to operate reliably at 185°C and provide accurate and repeatable measurements including Continuous Inclination and Continuous Azimuth . Its qualification and calibration to 185°C ensures performance in the most demanding applications.

In addition to all the standard Survey Measurements, Drilling Dynamics, Battery Voltage and Gamma, SDS provides advance features such as Realtime Compressed Azimuthal Gamma, Rotation Sequence Switching, Asynchronous Downhole Alerts, 36 Generic variables, Rotational Downlink and more.

DM Technical Specifications:

- **Inclination Accuracy +/- 0.1°**
- **TF/Rotation Accuracy +/- 0.5°**
- **Azimuth Accuracy+/- 1.0°**
- **Operating Voltage +18V to +36V**
- **Active Power Consumption 0.9W**
- **Quiescent Power Consumption 0.3W**
- **Protocol Q-Bus**
- **Length 29.7" (754.38mm)**
- **Operating Temperature . . -25°C to 185°C**
- **Survival Temperature . . -40°C to 190°C**
- **Vibration . . . . . 30g pk 50 – 1000Hz**
- **20g rms 50 – 1000Hz Shock 1000g 0.5ms half sine**

Features

- **185°C Quartz-Flex Accelerometers**
- **200°C Precision Flux-Gate Magnetometers**
- **Lower power consumption (~50% less)**
- **High-shock and vibe specifications**
- **On-board coefficients and Memory**
- **Q-Bus compatible**
- **High-Speed Telemetry (0.125 sec PW) .**
- **Pressure/Rotary Downlink**
- **Azimuthal Gamma Compression Support**
- **Realtime Shock/Vibration Measurements**
- **RPM & Stick Slip Detection**
- **Continuous INC (RInc) and AZM (RAzm)**

Surface Rig Display (Acura Embedded)

Automatic Detection Technology

The Surface Decoding Unit does not require operator input, it automatically makes adjustments to optimize decoding. Our competitors' performance is closely dependent on the operator's skill in setting pulse thresholds.

Superior Detection Capability

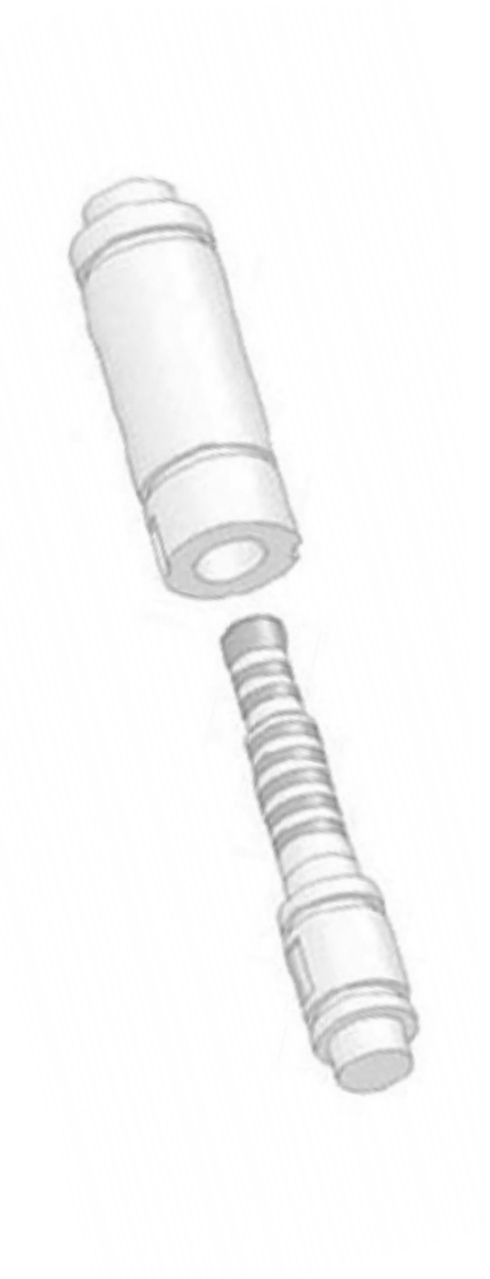
The SDS RFD can decode as low as 1 PSI pulses. Most of the competition's receivers cannot detect pulses less than 3 PSI.

Advanced Synchronization Technology

This technology makes the one pulse sync possible. It opens the door to solutions for various challenging sync patterns caused by poor signal environments such as very deep drilling and PDC Bit drilling, etc. These situations cause the sync pulse patterns and their amplitude to be so distorted that traditional sync technology will not work. SDS RFD makes synchronization possible in the worst conditions.

Surface RFD Specifications

The SDS RFD includes a combination of features to help aid in its use. Including a large 15 ” LED color display with glare blocking, back-lit screen with 32GB of on-board memory. **Certified C1D2, IECEx,ATEX, cLCus, cULus IP Rating IP65 All sides**



Pressure Transducer	Electrically Isolated Digital RS 232 or RS485 or 4-20 mA Loop
Touch Screen Color Display	15'” Captive Multi Touch
Interface Depth Tracking	Pason / Cheemo / Totco / Depth Wheel / Mezintel / Manual depth input
Physical Dimensions	Dimensions are 15.6'' x 12.2” x 2.35”
RFD Operating Temperature	-40 to 140°F (-40 to 60 °C)

Directional Module Universal Compatible

- **Continuous Inclination**
- **Real Time Shock and Vibration**
- **6 Axis 6 decimal Survey**
- **Rotational Down-link**

Pressure While Drilling

High Speed Telemetry

Generic Variables for additional features

Internal Connections

- All internal connections in the SDS High Temp MWD tool are made using the **proprietary 10 pin Rotary Connector.**
- The reliability of the Rotary Connector significantly improves MTBF.
- Reduces repair costs and dramatically increases the integrity of the downhole connections.

Pulser Specifications

SENSITIVITY	Range	Accuracy
Azimuth	0 – 360°	± 0.5°
Inclination	0 – 180°	± 0.1°
Toolface	0 – 360°	± 0.5°
DATA RATES		
Toolface Update	.375 pulse width: 4 seconds	
	0.8 pulse width: 12 seconds	
Toolface and Gamma Update	.375 pulse width: 8 seconds	
	0.8 pulse width: 26 seconds	
Full Survey with all Qualifier	.375 pulse width: 76 seconds	
	0.8 pulse width: 170 seconds	
TOOL DIMENSIONS	**Imperial Units**	**Metric Units**
UBHO Sub O.D.	3.5 – 12 in.	89 – 305 mm
UBHO Sub Length	36 in. (longer on request)	914 mm
Probe OD	1 7/8 in.	47.625 mm
Tool Length (no GR)	23 ft	7010 mm
Tool Length (incl. GR)	26 ft	7937 mm
TOOL CARRIER		
Min ID for 89mm Collar	2.28 in.	58 mm
Min ID for 121mm Collar	2.68 in.	68 mm
Min ID for 165mm Collar	2.68 in.	68 mm
Min ID for 203mm Collar	2.95 in.	75 mm
OPERATING LIMITS		
Min Flow Rate (in water)	130 GPM	0.5 m^3/min
Max Flow Rate (in water)	1060 GPM	4.0 m^3/min
Max Temperature	365 °F	185 °C
Max Operating Pressure	20,000 psi	137.9 MPa
Shock	1000 g / 0.5 ms	
Vibration	25g RMS 30 – 500Hz Random, 30g 50 – 300Hz Sine	
Mud Sand Content	Recommended: less than 1% for wash on tools	
Lost Circulation Material	**Medium Size high limit**	
RETRIEVABILITY		
Tool Size	Minimum ID of Drill String to allow MWD retrieval	
89 mm	>= 51 mm	
121 mm or greater	>= 54 mm	
Pull to cut centralization fins	2200 – 2900 lbs (1.0 – 1.3 kDaN)	

The SDS High Speed ,High Temp MWD out preforms other MWD tools . The SDS High Speed High Temp is cost effective, easily maintained and extremely reliable.

SPECTRAL /ROTATIONAL /AZIMUTHAL GAMMA

The Gamma ray tool produces a measurement of the naturally occurring radiation found in rock formations. The Gamma Log produced by these tools is commonly used for depth correction, correlation with open hole logs and identifying low radiation and high radiation lithology's. Gamma ray tools use a super sensitive hermetically sealed Sodium Iodide Scintillator crystal and a rugged high temperature photomultiplier for maximum log quality.

Mechanical design techniques have been developed specifically for the MWD/Steering tool environment to ensure a rugged and reliable tool. The short single piece aluminum chassis not only provides maximum strength and rigidity but minimizes vibration loads due to the low mass. The electronics are fully temperature compensated to maintain consistent count rates through the 185°C/365°F temperature rating. The tool uses a gross counting discriminator with an energy threshold set at approximately 15KeV, significantly lower than other tools, resulting in higher count rates and greater accuracy. **Real Time Counts every 5 seconds with High Speed Telemetry MWD System. Depth correlation, lithology identification, shale radiation evaluation, rotary geosteering, Shale identification, data correlation to offsets.**

CHOOSE THE RIGHT GAMMA FOR YOUR PROJECT

The SDS High Temp MWD System is compatible with all major Gamma probe suppliers. We have our favorites were sure you do too. Whether its shale reservoir development or Coal bed methane applications we can deliver the right product for your project.

The SDS High Temp Gamma tool can now be ordered to include the complete mechanical assembly. **If you need gamma closer to the bit we can build it into our pulser.**