SUMMIT MEASUREMENT WHILE DRILLING
Elevated Downhole Performance

RELIABLE MWD PERFORMANCE FOR PRECISION AND REACH

Summit is Altitude's field-proven, legacy MWD system. It combines in-house designed components with industry-leading sensors delivering improved safety, precise wellbore placement, and extended reach capabilities.

Summit is available in mud pulse telemetry with data rates up to 2.6 bps. It comes in various sizes to seamlessly integrate with BHA configuration requirements.

FEATURES

- Available in 5"- 9½" BHA Sizes
- Available in retrievable, latched or locked down modes
- Modular design allows integration to a wide variety of third-party solutions, including RSS, and Azimuthal Gamma Ray
- Telemetry compatible with multiple surface decoding systems
- Industry-leading patented pulser and shock mitigation technology
- Extensive in-house engineering, manufacturing and service support

BENEFITS

- Reliable mud pulse data transmission
- Data rates up to 2.6 bps
- Advanced memory logging and diagnostic capabilities
- Provides high quality, precise wellbore placement in a wide range of basins and drilling programs

Mechanical						
BHA O.D. in (cm)	5 (12.7)	5¼ (13.3)	6½ (16.5)	6⅝- 7 (16.8 - 17.8)	8 (20.3)	9.5 (24.1)
Collar I.D. in (cm)	2.69 (6.8)	2.81 (7.1)	2.81 (7 .1)	3.25 (8.3)	3.50 (8.9)	3.50 (8.9)
Maximum Dogleg Severity (DLS), rotating, slick, deg/100 ft	15	15	10	10	8	8
Maximum Dogleg Severity (DLS), sliding, flex, deg/100 ft	30	30	20	20	15	15
Maximum Dogleg Severity (DLS), rotating, slick, deg/100 ft	25	25	15	15	12	12
Maximum Dogleg Severity (DLS), sliding, flex, deg/100 ft	30	30	20	20	15	15
Threaded Connection	XTF™39 / uXT™39	XTF™40 / uXT™40	4½ IF (NC50)	4½ IF (NC50)	6⅝ API REG	7⅝ API REG
Minimum Make-Up Torque, klbf·ft (kN·m)	20.3 (27.5)	21.9 (29.6)	29.8 (40.4)	32.3 (43.8)	53.3 (72.3)	84.2 (114.2)
Maximum Make-Up Torque, klbf·ft (kN·m)	24.4 (33.1)	26.3 (35.7)	32.8 (44.5)	35.5 (48.2)	58.6 (79.5)	92.7 (125.7)
Flow Range GPM	125-350 (0.47-1.23)	125-400 (0.47-1.51)	250-650 (0.97-2.46)	250-750 (0.97-2.84)	350-1000 (1.23-3.79)	350-1300 (1.23-4.92)

Environmental		
Minimum Temperature	32 °F	0 °C
Maximum Temperature, standard batteries	329 °F	165 °C
Maximum Temperature, high-temp batteries	347 °F	175 °C
Maximum External Pressure	20 klbf/in	137.8 Mpa
Maximum Shock, [2]	1,000 g	9,800 m/sec^2
Maximum Vibration, 30-500 Hz, [3]	20 g	196 m/sec^2

Telemetry	
Available Pulse Widths, sec	0.188, 0.250, 0.375, 0.500 0.600, 0.800, 1.000, 1.200
Maximum Data Rate	2.66 bits/sec
Downlink Method	Flow ON/OFF
Telemetry Sequences Available, [4]	6
Telemetry Modes	Survey, Slide & Rotate

Directional Sensor	
Inclination, accuracy	±0.1 °
Inclination, repeatability	±0.05 °
Azimuth, accuracy, >5° inclination	±1.0 °
Azimuth, repeatability, >5° inclination	±0.5 °
Toolface, accuracy, >5° inclination	±0.5 °
Toolface, repeatability, >5° inclination	±0.05 °
Dynamic Inclination, accuracy	±0.25 °
Dynamic Inclination, repeatability	±0.1 °
Dynamic Azimuth, accuracy	±0.25 °
Dynamic Azimuth, repeatability	±0.1 °
Dynamic Magnetic Toolface	±5.0 °

Gamma Sensor	
Detector Type	Sodium Iodide (NaI) Scintillation
Sensitivity, [6]	1.1 CPS/API
Accuracy, 0°-150°	±5 %
Accuracy, 0°-175°	±10 %
Repeatability, 0°-150°	±5 %
Repeatability, 0°-175°	±10 %

Tool Specifications[5]		
Length, directional & gamma, single battery	19.7 ft	6 m
Length, directional & gamma, dual battery	24.9 ft	7.6 m

Mud Specifications[7]	
Granular LCM	Medium Nut Plug, 80 lbm/bbl (228 kg/m^3)
Fibrous LCM	Ceder Fiber, 15 lbm/bbl (43 kg/m^3)
Maximum Sand Content	1%

1 : Maximum survival temperature depends on many factors and maybe reduced in application. Please contact AEP for more details.
2: 0.5 msec, ½ sine, 10 times, all axes.
3: Limited to 1 in [2.54 cm] double amplitude for 5-30 Hz.
4: Contact AEP for more details regarding data telemetry sequences available.
5: Length of MWD tool probe. BHA makeup length determined by tubulars on location.
6 : Sensitivity is for raw sensor. Contact AEP for details regarding effect of drilling fluid and tubulars.
7: All LCM must be premixed and added to avoid slugging the tool to reduce risk of service interruptions or pipe blockage.