



Fox River Tools

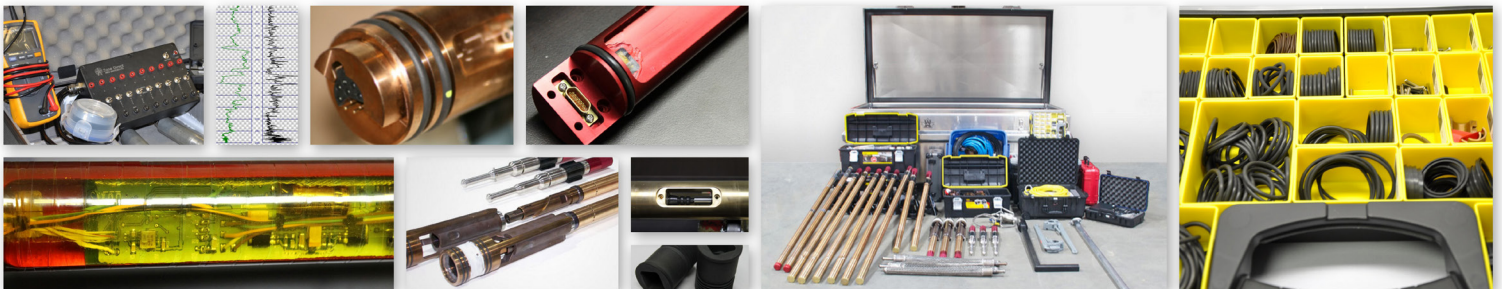
Directional Services

Positive Pulse

Our positive mud pulse MWD system is the complete package you need to provide surveys, telemetry, gamma ray and vibration data transmitted to the surface in real time. The tool has a modular design allowing for easy transportation and assembly at the rig site. Adjustable module configurations enable alternative sensor positions for flexibility of use and centralizers absorb shock and hold the tool in place during drilling operations. A reliable and robust MWD system for today's aggressive drilling conditions.

FEATURES

- ✓ Rugged down-hole directional modules; down-linking capabilities with variable survey and telemetry sequences
- ✓ Motor driven pulser with anti-plugging technology, excellent performance in LCM and high solid environments
- ✓ Industry standard gamma probes and logging software
- ✓ 400 downhole hours on one battery
- ✓ Wireline retrievable and re-insertable design (minimum 2.25" I.D.)
- ✓ High operating temperature (175 °C) and pressure (20,000 psi)
- ✓ Simple operation using a wide range of flow rates and rotary speeds
- ✓ On-board rotary sensor that enables alternative telemetry sequences and faster LWD data rates when rotating



TOOL SPECIFICATIONS

TOOL LENGTH	Pulser/Gamma Combo w/ 1 Battery - 5.8m (19ft) Pulser/Gamma Combo w/ 2 Batteries - 7.36m (24.15ft)
SIZE	47.625mm O.D. (1.875")
PRESSURE RATING	137,895 kPa, (20,000 psi)
BATTERY CONSUMPTION	300-480 hours (medium-rate single 36V battery) 220-320 hours (medium-rate dual 29V battery) 180-260 hours (medium-rate dual 29V battery w/gamma) Consumption factors include resolution and pulse width settings
MAXIMUM OPERATING TEMPERATURE	150 °C (302 °F) 175 °C (347 °F) available
RECOMMENDED ROTARY SPEED	60 RPM
OPERATIONAL MODES	Operator selectable survey and steering sequences, resolution and pulse width settings
DOWNLINK CAPABILITY	Pumps ON/OFF sequences allow for mode selection, steering and survey sequences, and pulse width settings

OPERATING SPECIFICATIONS AND LIMITS

DATA TRANSMISSION TYPE	Positive Mud Pulse
COLLAR SIZES	89mm-203mm (3.5"-8") Additional sizes available
OPERATING FLOW RATE	0.28 - 4.45 m ³ /min (75-1200 gpm)
WIRELINE RETRIEVABILITY	Retrievable and Re-insertable
MINIMUM I.D. FOR RETRIEVABILITY	57mm (2.25")
FLOW SWITCH	Vibration
POWER SUPPLY	Lithium 28 VDC / 3 amp (21 VDC / 5 amp available)
SHOCK LIMIT	1000g, 0.5 msec, ½ sine all axes
VIBRATION LIMIT	5 - 30 Hz @ 1" double amplitude, 30 - 500 Hz, 20g all axes
BEND RADIUS	20° / 10m
LCM TOLERANCE	40 - 50 ppb concentration, any size, premixed
OPERATING PULSE WIDTH	0.600-2.00 sec
DATA TRANSMISSION RATE	10 - 28 sec
ROTARY SENSOR	Yes (RFS available)
MEAN TIME TO SERVICE	Pulser ≈ 500 - 700 hours Electronics ≈ 1200 - 1800 hours

SENSOR SPECIFICATIONS

PARAMETER	RANGE	ACCURACY
Inclination	0 - 180°	+/- 0.10°
Azimuth	0 - 360°	+/- 0.25°
Tool Face	0 - 360°	+/- 0.50°
Dip Angle	0 - +/- 90°	+/- 0.15°
Magnetic Field	0 - 100 μT	+/- 0.075 μT
Temperature	-35 - 200°C	+/- 0.5°C

