



# PDT

## Pulse Directional Technologies

# Flashlight Inclination and Azimuthal Gamma at Bit

## DESCRIPTION

The patented Flashlight tool allows the continuous measurement of inclination, azimuth, gamma and azimuthal gamma at the bit. It is a short sub that is placed between the motor and the bit placing sensor inches away from the bottom of the hole. A receiver sub and probe sits in the MWD string and receive data via wireless signal from the at bit sub. Data is then passed to the MWD and telemetered to surface. With the design of the receiver and receiver sub it allows the MWD to be fully retrievable.

The at bit sub can send up real time 50 different variable including status words on health of the tool to compressed azimuthal gamma for faster update times.

Our proprietary manufactured directional sensors and gamma probes provide better control over quality and performance. With our high torque receiver sub we can now achieve unprecedented reliability.

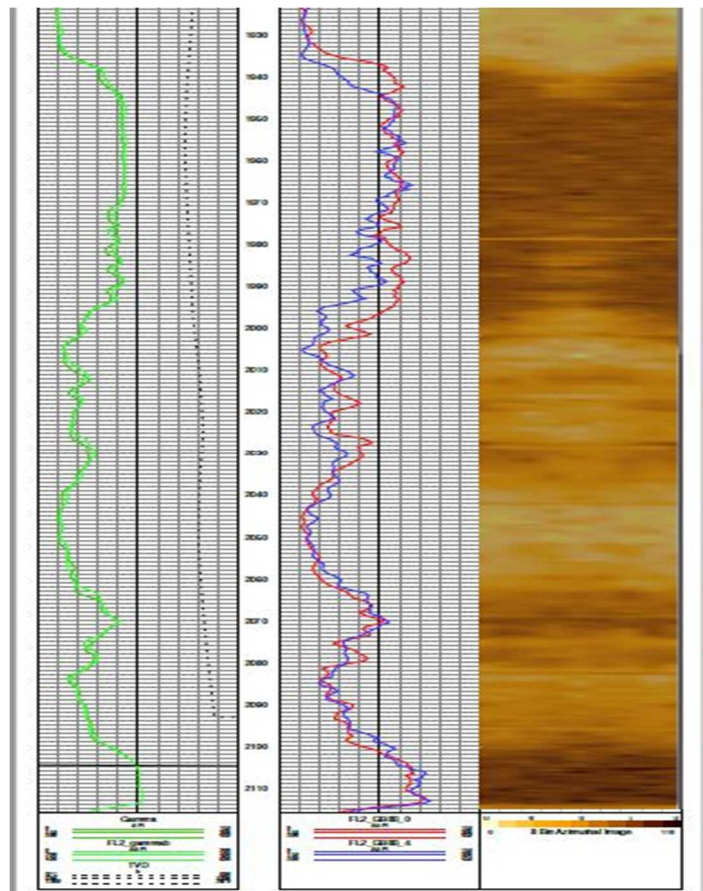
## APPLICATIONS

- Geo Steering.
- Casing point selection from at bit measurement.
- Steering in formation with dipping beds.

## FEATURES & BENEFITS

- Bit to sensor is one foot.
- Reduced doglegs.
- Optimized well placement.
- Adapts to any motor type.
- Signal strength measurement.
- Tri axle accelerometer/magnetometers
- Continuous at bit inclination measurement.

- Vibration at bit measurements.
- Temperature at bit measurement.
- Works in oil and water based muds.
- All information is real time and memory recorded.
- EM short hop.
- Calibrated and operates up to 175°C.
- Dual Battery for longer bit runs
- Increased the dynamic range of the rotatory inclination sensor. This enables it to read more accurately at lower inclinations and more resilient to bad reading from shock and vibration.
- Warning flags to verify tool health and what the rotary algorithm is doing. It acts as a qualifier to tell if the data being sent up hole is good.
- High torque (XT Connection) increases the reliability of the receiver gap sub.





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### SPECIFICATIONS

#### Sensor

Inclination Accuracy	+/- 0.25 °
Inclination Range	0-180°
Sensor Offset	12'' (30cm)
Gravity Accuracy	0.0005 G's
Gravity Range	0 - 2 G's
Gamma Resolution	1 AAPI
Gamma Range	0-1023
Gamma Offset	12'' (30cm)
Temperature	175 °C (347°F)

#### Transmitter Sub

Tool Size	4.75''	6.5''	8''
Length	34'' (86cm)	34'' (86cm)	34''(86cm)
Diameter	5.0''	6.5''	8.0''
Connection	3.5Reg	4.5Reg	6 5/6Reg
Yield Strength	15140lbf.ft	29900lbf.ft	83380lbf.ft
Makeup Torque	14200lbf.ft	23000lbf.ft	57000lbf.ft
Max Drilling torque	9900lbf.ft	22500lbf.ft	47000lbf.ft
RPM on Surface	30 rpm	50 rpm	50 rpm
Max Off bottom flow	Keep minimum	flow	Rate to
Gap Sub connection	3.5 IF, XT39	4.5XH, 4.5IF, XT46	6 5/8 Reg
Gap Sub Torque	9,900 lbf.ft	22,500 lbf.ft	47,000 lbf.ft
Gap Sub Yield strength	18090 lbf.ft	34020 lbf.ft	83380 lbf.ft
Max. Dogleg Sliding	28°/30m (100ft)	20°/30m (100ft)	12°/30m (100ft)
Max. Dogleg Rotating	12°/30m (100ft)	10°/30m (100ft)	7°/30m (100ft)

#### Operating Parameters

Formation	2 -200 Ohm/m optimal
Mud Type	Water & Oil Based mud.
Differential Pressure	Avoid spikes greater than 300 psi.
Torque	Avoid torque spikes greater than 1500 ft.-lbs.
Max Rotary Inc and Gamma	Max 250 RPM (mud motor and string rotation combined)
Max Rotary Azimuthal Gamma	Max 250 RPM (mud motor and string rotation combined)
Reaming Operations	Keep Reaming to an absolute minimum
WOB	As per specifications for bit
Maximum Vibration/Shock	20 G's Axial Shock
Agitator	800 m(2625 ft.) back
<b>Battery Life 14 V Cell</b>	<b>Per Cell</b>
Inclination and Gamma	160 hours
Inclination and Azimuthal Gamma	128 Hours