



QUAD ORBITAL GAMMA

Azimuthal Gamma and Rotary Inclination

DESCRIPTION

With azimuthal gamma, operators can see the dip and direction of the formation while rotating. By combining four gamma sensors into one probe, the Quad Orbital Gamma can capture Azimuthal gamma readings while sliding.

The Quad Orbital module will give a clearer crisper image than previous azimuthal gamma probe designs because of the increased amount of sensor inputs. It is designed to be incorporated with the MWD tool string and replace the existing MWD gamma module. Using PDT's surface decoder, an 8 bin azimuthal gamma can be compressed down hole and decompressed on surface for blazing fast decoding.

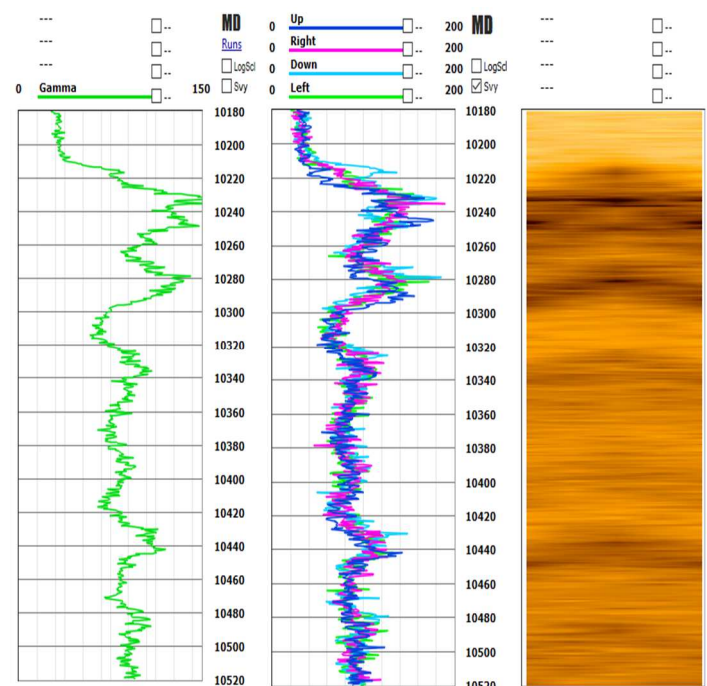
APPLICATIONS

- Conventional Drilling.
- Vertical, directional and horizontal drilling.
- Unconventional Drilling.
- Coal Bed Methane/ coal seam gas.
- Mining/degasification and delineation of fields.
- Detecting Faulted Formations.
- Rotary inclination feature allows for continuous survey while drilling.



FEATURES & BENEFITS

- Selectable between 2, 4 and 8 bin azimuthal gamma.
- Gamma can be sent to surface using conventional 1 bin at a time transmission or data compression methods.
- Ability to slide and still see up and down gamma.
- Off center detectors for higher contrast logs.
- More detectors for greater detection of small differences between each bin.
- Proprietary algorithms to reduce the shine thru from the shielded part of the detector.
- Memory recorded for post processing.
- Rotary inclination.
- Shock and vibration.
- Conventional gamma.
- Down hole RPM.
- Works with BHA magnetic interference.
- Real time transmission of tool status for ensuring proper tool operation.
- Field adjustable gamma sampling period and filtering.
- Stick Slip Detection.
- Fully retrievable.



Mechanical Specifications

Diameter	1.875"
Length	69.5" (176cm)
End Connections	10 Pin kintec connectors
Input Voltage Range	17V-30V
Input Voltage Range	1023V
Vibration(3 axis) 50-1000 Hz Random Spectrum	20 G's
Shock(z-Axis)	500 G.,0.5 mS
Shock(X or Y Axis)	1000 G., 0.5mS
Sensitivity	0.2 CPS
Max Operating Pressure	20,000 PSI
Max Operating Temperature	175°C (347° F)

Available Measurements

Inclination at bit	degree
Azimuth at bit	degree
Dip angle	degree
Gravity	G
Magnetic field	Gauss
Battery voltage	volts
Temperature	°C
Gap resistance	Ohms
Counts of Z-Accel over 20g	counts
Counts of XY-Accel over 20g	counts
Inclination at bit while drilling	degree
RPM at bit while drilling	RPM
Gravity X-Axis	G
Gravity Y-Axis	G
Gravity Z-Axis	G
Magnetic field X-Axis	Gauss
Magnetic field Y-Axis	Gauss
Magnetic field Z-Axis	Gauss
Flashlight Logging Flags	Flags
Flashlight Survey Flags	Flags
Gamma at bit	counts/second
Azm Gamma - Up/North 2 bin	counts/second

Rotary Orientation Sensor Specification

Two Bin Gamma Up and Down	180° windows
Four Bin Gamma, Up, Down, Left, Right	90° windows
Eight Bin Gamma	45° windows
Rotary Inclination Accuracy	+/-0.25 °
RPM Measurement	+/-1 RPM
Max RPM	100 RPM
Shock Measurement Range	100 G
Shock Measurement Accuracy	+/-1G
RMS Vibration Measurement Accuracy	+/-1G
Shock Count Threshold	Field Programmable
Temperature	1° C Resolution

Azm Gamma - Down/South 2 bins	counts/second
Azm Gamma - Up/North 4 bins	counts/second
Azm Gamma - Right/East 4 bins	counts/second
Azm Gamma - Down/South 4 bins	counts/second
Azm Gamma - Left/West 4 bins	counts/second
Mid Res Azm Gamma - 2 bins 4 bits	packed
Mid Res Azm Gamma - 4 bins 4 bits	packed
Low Res Azm Gamma - 8 bins 2 bits	packed
Upper Mid Res Azm Gamma - top 4 bins 5 bits	packed
Upper Mid Res Azm Gamma - bottom 4 bins 5 bits	packed