

MODEL 851

NARROW DIAMETER NATURAL GAMMA SENSOR

FEATURES

- Digital interface
- High sensitivity crystal - photomultiplier tube design
- Rugged design for use in high shock and vibration environments
- Axial and transverse 50 gee accelerometers for vibration monitoring

APPLICATIONS

- Evaluation of downhole strata in drilling and logging applications
- Evaluation of downhole vibration and shock magnitudes

The Applied Physics Systems Model 851 Natural Gamma Sensor measures the background gamma radiation occurring in well bores. The sensor detects the presence of porous petroleum reservoirs (sands and limestones), which are generally less radioactive than nonporous strata (shales).

The Model 851 can be used either as a standalone system or with Model 850 Directional Sensors.

- When used as a standalone system, communication with the Model 851 is accomplished using a bidirectional serial port operating at TTL logic levels. An ASCII command language is used to send commands to the Model 851 and data from the Model 851 is sent out in ASCII format.
- When the Model 851 is used with a Model 850 Directional Sensor, a NET interface is used for communication. For the NET configuration, data from the Model 851 is continually requested by the Model 850 Directional Sensor and is combined with directional data and transmitted out the Model 850 main serial data interface.



To achieve high gamma sensitivity, a scintillation crystal is used to detect gamma rays. The sensitivity (in a 1.875 inch beryllium copper pressure barrel) is 0.5 count per API.

The Model 851 also has two 50 gee vibration sensors to monitor drilling induced vibration and shock. The vibration sensors are oriented to measure axial and lateral shock and vibration.

Related Products (others available)

Model 751 Standard

Model 751F Focused Gamma Sensor with Vibration and Shock Detection

Model 751AZ Azimuthal Gamma Sensor with Vibration and Shock Detection

PIN	FUNCTION
1	TTL Serial Out (from Gamma)
2	TTL Serial In (to Gamma)
3	Voltage
4	Ground
Remaining pins	No used

ELECTRICAL

Input Voltage Range	+15 V to +30 V
Current Draw	90 mA @ 15 V 45 mA @ 30 V
Power Requirement	1.5 W (max)
Logic Level	TTL/CMOS
Baud Rate	User Programmable up to 9600 baud
Protocol	User Selectable: ASCII or binary

ENVIRONMENTAL

Operating Temperature Range	0°C to +150°C
Storage Temperature Range	-25°C to +175°C
Shock	1000 G 1 ms half sine wave
Vibration	10 GRMS, 50 Hz to 250 Hz

PERFORMANCE

Accuracy	±5%
Thin Bed Resolution	6" (152.4 mm) in an 8" (203.2 mm) diameter hole
Range	0 - 511 API counts/second (30 second intervals)
Vibration and Shock Detection	2 axis ± 50 gee 400 Hz

PHYSICAL

Outside Diameter (OD)	1.04" (26.41 mm)
Length	17.185" (436.49 mm) with standard connectors
Weight	1.1 lb (498.9 grams)
Photomultiplier Tube	Hamamatsu Model 3991A
Main Connector	MDM9
Mating Connector	MDM9

OPERATIONAL GUIDANCE**SHOCK AND VIBRATION LEVELS**

LEVEL	SHOCK	VIBRATION
GREEN	< 17 g	< 4 g
YELLOW	17 to <26 g	4 to <6 g
ORANGE	26 to <36 g	6 to <5 g
RED	+35 g	+ 8 g

Specifications are subject to change without notice.