

DATA SHEET



BROADBAND SEISMOMETER WITH DIGITAL OUTPUT

MODEL ESDA-120S

INTRODUCTION

Encardio-rite model ESDA-120S digital feedback broad band seismometer is based on a truly rectilinear suspension system. Internal 8 channel 24 bit high resolution digitizer utilizes the wide dynamic range of the feedback sensor. The unit is manufactured by Encardio-rite in India under license from Gaiacode, UK.

Three axis broad band sensor is housed in an 'O' ring sealed Hard Anodized water proof Aluminium case. The system is self-contained, except for the power source. Three separate concurrent digital data outputs ports are provided, these being Ethernet, USB and serial RS-232 outputs. External GPS module time synchronizes the digital accelerometer. As a backup NTP time synchronization is available.

An isolated wide input range dc-dc converter ensures galvanic isolation of the system and operates from 9 to 36 Volts. The power input is reverse polarity protected including the protection provided by the dc-dc converter.

The analogue feedback accelerometer has an extremely large dynamic range and 8 channel 24 bit acquisition system is incorporated to exploit the full dynamic range of the sensor as high gain and low gain digital outputs.

The low and high gain outputs are set digitally using the Programmable Gain Amplifiers (PGA) of the 8 channel Acquisition system.

Nominally the high gain digital outputs are set to have a 12 times larger output than the low gain outputs. Sensor Analogue outputs are all differential interfaced to the differential inputs of the digitizer. The digital part of the circuit is optically isolated from the front end ADC converter circuitry.



DESCRIPTION

Figure 1 shows the sensor connector turret. The connector turret allows easy connection to the sensor. All the connectors are water proof with O ring seals. The sensor housing including the connectors are water proof to a depth of 3 meters of water.

The standard frequency pass band is flat to velocity from (120 Seconds period) 0.00833 Hz to 150 Hz.

Detailed sensor calibration information is provided with every sensor, including sensor feedback coil constant, frequency response of the instrument and the transfer function in poles/zeroes notation.

The digitizer calibration values for the sensor and digitizer are stored with in the digitizer.

It is extremely simple to install the digital sensor. Three levelling feet ensure that the sensor to be levelled. The North/South ordination pointes are machined on the sensor base to align the sensor accurately. The errors in pointer to the sensor orientation is less than 0.1 degrees.

After installation the sensor output offsets are nulled with motorized zeroing mechanism.

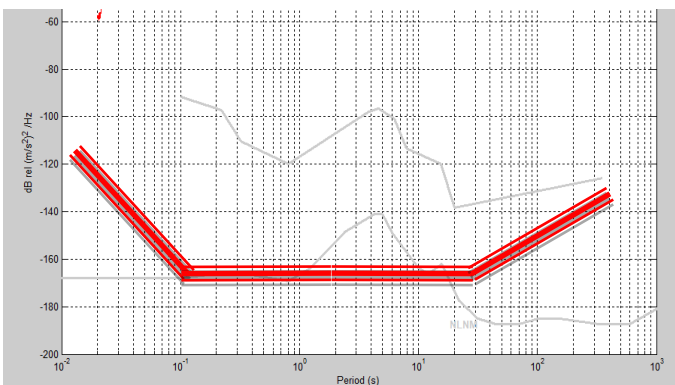


FIGURE 1 STRONG MOTION
ACCELEROMETER



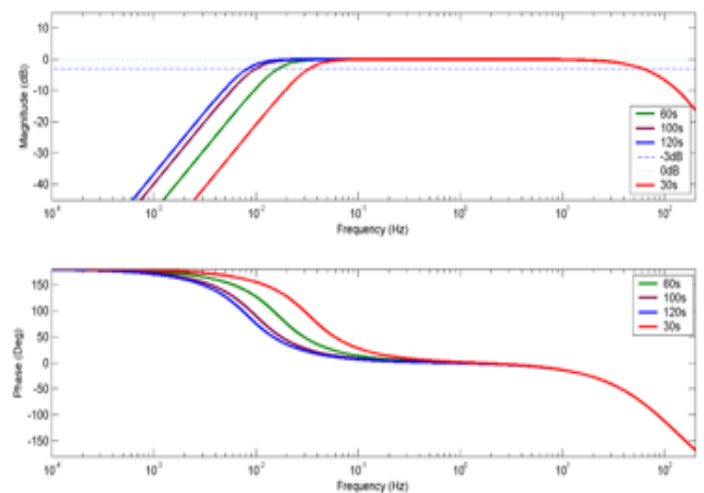
FIGURE 1 STRONG MOTION
ACCELEROMETER

Acceleration Ground referenced Power Spectral noise estimate in 1 Hz bandwidth in units of $(m^2/s^4)/Hz$



Triple red line is estimate of sensor power spectral noise density over the entire seismic spectrum.

The Frequency Response Options For The Broad Band Sensor





SPECIFICATIONS

Standard response	Flat velocity (120 sec) 0.008333 Hz to 150 Hz 2*1200 V/m/s
Other optional responses	0.01666 (60 sec) to 150 Hz 0.03333 (30 sec) to 200 Hz
Controls	
Calibration	The calibration signal can be connected to each axis. Calibration enable line provided. Cal enable lines (active low) <1 mAmp
Mass centering	Microprocessor controlled. Automatic centering with remote control
Mass lock/unlock	Not required
Physical	
Lowest spurious resonance	320 Hz vertical, 375 Hz Horizontal
Mass re-centering range	±4.0° from horizontal
Operating temp. range	- 20 to + 75°C
Base plate and top cap	Hard Anodized Aluminium
Pressure jacket material	Hard Anodized Aluminium
Power/signal connector	Air-tight Connectors
Power	
Standard power supply	+ 9 to 36 Vdc, with internal DC/DC converter
Current at standard (12 V) output	+ 75 mA
Additional cal relay current	< 25 mA
Additional current when recent ring	+ 35 mA (see Operator's

Digitizer Performance	
Standard Output Format	24 Bits
Noise-free Resolution	Sample rate 1K Hz -122.2 dB Sample rate 100 Hz-134.3 dB Sample rate 10 Hz -144 dB
Absolute Accuracy	0.1 %
Differential inputs	All inputs are adjusted o the digitizer output voltage and impedance
Cross talk	<- 110 dB @ 40 s/s
Total harmonic distortion	<-100 dB @ 40 sps
Digital Signal Processor	Multiple sample rates, with causal and a-causal filter selection and 4 concurrent sample rates for each channel
Maximum SAMPLE rate	1000 s/s
Trigger Modes	STA/LTA. Each Channel is programmable
Timing options	
GPS Unit Time format	GPS, GNSS and NTP NMEA, External GPS Receiver with RS232 Interface
Maximum Cable	10 meters
Calibration controls – remotely calibrated	
Step function response	Digitally generated signal. , from 24 bit DAC
Calibration inputs from 24 Bit DAC	Sine, step and pseudo-random inputs may be inserted
Physical	
Power/signal connector	Gold plated water proof D Type connector. Guide)

*All specifications are subject to change without prior notice

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TUNNELS



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