TECHNICAL INFORMATION

PREDICTIVE MAINTENANCE SYSTEMS

SENSONICS LTD

Willmore: MK IIIA Series

- For use in either plane
- Adjustable period 1-3 s
- Integral preamplifier MKIII A/E
- Electronic gain of 2^5 standard
- Bandpass 0.1-150Hz
- Damping adjustable to 8 x critical

The basic Willmore Adjustable-period Seismometer MKIIIA is a velocity sensing devise suited for field or observatory use. The mass is a permanent magnet, which is suspended on ligament springs giving functionless axial movement but restraining it from movements in other planes. When used in the vertical position, the mass is counter-balanced by springs, which are connected to the frame via a lever arrangement that imparts minimal stiffness on axial movement. These counter-balance springs are separated from the mass when the instrument is used horizontally. The output is derived from two coils fixed to the frame, one at each end of the mass. Auxiliary coils are provided for feedback and calibration. The natural period of oscillation of the mass is adjustable so that the instrument may be optimally matched to the required operation conditions.

As options on the basic MK111A there are models with a built in low powered preamplifier. By including the amplifier within the seismometer housing the chance of external interference with the signal is minimised. Adjustable electronic feedback damping is included to give the user, besides the noise reduction of the technique, an instrument capable of detecting earth motion from the micro-seismic to the strong motion range. DC drift may be effectively eliminated by the servo control which also acts as a low frequency cut off. The feedback term may also be shaped in frequency response to give the characteristics of a long period instrument.

The specification of each amplifier option gives instrumental characteristics suited to different applications. Generally the penalty for the lowest noise level is an increase in the power requirements. It will be seen from table 1 that model E.2 is the general purpose model with E.1 having much lower power consumption but a higher noise level and E.3 having lower noise level but a higher power consumption.

All instruments are normally supplied overdamped and it is a simple operation to adjust the damping factor to the desired level. Since the damping is electronically controlled, shaping of the damping amplifier is possible allowing both short and long period responses to be realised. Response curves to the customer's specification can be produced.

Table 1

Amplifier	E.1	E.2	E.3
Nopise ref. to input	10µ V p-p	2µ V p-p	0.5µ V p-p
@ 1-10Hz:			
Bandwidth:	0.1-150Hz (adjustable)		
Max. signal output:	± 10V		
Power requirements	30µA internal or ext. ± 5V	600µA @ ± 5V	3mA @ ± 5V
Power supply rejection ratio	60db		
Gain:	2 to the power of 5 standard		
Inputs:	± 5V		
	Calibration signal 9-12V		
Temp. range:	0 - +50ºC (standard)		

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Specifications:

Range of period adjustment:…….. 1-3 seconds
Mass of magnet…….. 1.2 Kg
Movement range…… ± 2mm ultimate. Working range ± 1.5mm greater than 400 webers/metre. (Greater than 400V/m/s typ, >1500V/m/s with E3 option).
Temperature range…… -40 to +50ºC
Sensitivity variation over temp. range…….. Less than 5%
Period variation over temp. range……..Linear to 200 Hz
Weight……3.5Kg
Packed weight in double carton……. 6Kg

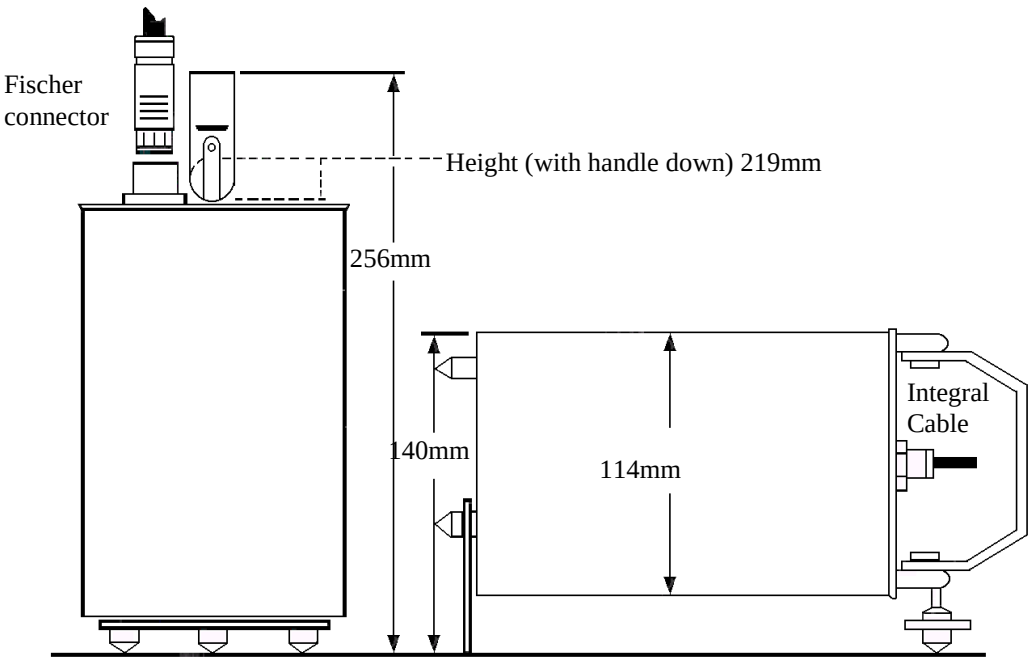
Order codes

	Flying Lead	Fischer Connector	
MKIIIA	/S	/FS	Standard Seismometer
MKIIIA	/E1	/F/E1	Seismometer with micropower amplifier
MKIIIA	/E2	/F/E2	Seismometer with general purpose amplifier
MKIIIA	/E3	/F/E3	Seismometer with ultra-low noise amplifier

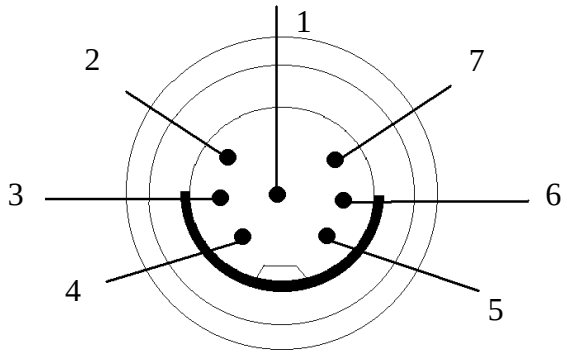
Housing:

Polished stainless steel, magnetic stainless top lid with “O” ring seal.

Controls……..clamping mass position from outside of sealed case. Period from inside case.
Dimensions (approx)…….Overall Height 230mm vert. 135mm horiz. Overall dia.115mm
Coils…….. Two, each having a main winding of 10K ohms and a subsidiary of 500 ohms (turns ratio held to 20: 1 ± 1%).
Connections…….. 1.5m flying lead (MK111A/ES). Fischer waterproof connector (MK111A/EFS)



Fischer socket, View external



ie. Main coils Pins 7 and 3 MK111A/FS

Pin No.	MKIIIA	MKIIIA/E	Cable Colours
1	Lower Aux. Coil Positive ground up	+ V Supply	Blue
2	Lower Aux. Coil Negative ground up	- V Supply	Brown
3	Main Coils Negative ground up	0V	White
4	Case and screen	Case and screen	Green
5	Upper Aux. Coil Positive ground up	Calibration signal	Yellow
6	Upper Aux. Coil Negative ground up	No Connection	Red
7	Main Coils Positive ground up	Output Negative ground up	Black

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