

THREE-COMPONENT MOLECULAR-ELECTRONIC ROTATIONAL SEISMIC SENSOR (SEISMOMETER)

METR-03

OPERATION MANUAL (TECHNICAL PASSPORT)

Model:	METR-03
Serial No:	
Pass band:	0.05 – 20 Hz
Sensitivity:	50 V/(rad/s)
Temperature range:	–12..+55 °C
Manufacturing & testing date:	
Shipment date:	



Manufacturer:	<i>R-sensors LLC</i> , Dolgoprudny, Russia
Manufacturer's signature & stamp:	

1. Introduction

The 3-component molecular-electronic rotational seismic sensor (rotational seismometer) **METR-03** is designed for direct measurements of the rotational components (angular velocity) of seismic vibrations of the ground or various engineering constructions like high-rise buildings and bridges. The external case of the device is made of aluminum and has the dimensions 120×120×102 mm and can be installed at any angle to the vertical. The sensor does not require any presetting or preliminary adjusting before start using.

The sensor METR-03 has 3 orthogonal axes of rotational sensitivity (X, Y and Z), which make a right-hand triple. The alternating rotational motion around this axis gives the output voltage on the output channel wires proportional to the angular velocity of this rotational motion (clockwise rotation gives the positive output signal — see **Annex #1** below).

2. Delivery set

- rotational seismic sensor (seismometer) METR-03 in the external case;
- 1.5 m cable;
- this operation manual.

(As an additional option the sensor can be supplied with a fixing plate with mounting holes and installation legs; this fixing plate is to be mounted to the bottom of the external case)

3. Technical specifications

Parameter	Standard value	Options
Rotational sensitivity axes number	3, orthogonal	
Scale factor	50 V*s/rad	
Output signal type	analog, single-ended	
Frequency range	0,05– 20 Hz	from 0,033 up to 100 Hz
Clip level	± 0,1 rad/s	
Temperature range	–12..+55°C	–40..+55°C
Supply voltage	12 V DC	
Outer dimensions	120×120×102 mm	
Mass	1,5 kg	
Cable length	1,5 m	
Case connector type	RS-10 (Russian “PC-10”)	

4. Installation and connection


Before using the sensor is to be fixed to the tested object (ground).

Connect cable wires to the power supply and data acquisition system according to the following table:

Connector functions	Wire color	Place of connection
Power supply PLUS (+)	BROWN	Positive output of the power source
Power supply common wire (GND)*	BLACK	Common (ground) of the power source
Power supply MINUS (–) **	WHITE-BROWN	Negative output of the power source
Signal output (Z-channel)	GREEN	“+” of input 1 of the data acquisition system
Ground (Z-channel)	WHITE- GREEN	“–” of input 1 (or ground) of the data acquisition system
Signal output (X-channel)	BLUE	“+” of input 2 of the data acquisition system
Ground (X-channel)	WHITE-BLUE	“–” of input 2 (or ground) of the data acquisition system
Signal output (Y-channel)	ORANGE	“+” of input 3 of the data acquisition system
Ground (Y-channel)	WHITE- ORANGE	“–” of input 3 (or ground) of the data acquisition system

* Power ground and signal ground are internally connected.

** In case of bi-polar power supply ± 12 V DC option only. The standard version of the sensor uses uni-polar power supply 12 V DC, and does not have the wire «Power supply minus»!

 **NOTE:** *In case of bipolar power supply it is highly recommended to use some kind of 3-pin connector for connection to the voltage source, so that positive and negative voltages from power supply were applied to sensor's inputs simultaneously. Connection only positive voltage or only negative voltage for a time more that about 30 sec can lead to damage of the sensing element.*

Nominal supply voltage is **12 V DC**.

Allowable supply voltage range is **10,5 – 16 V DC**.

Consumption current (after sensor's turning on and settling) is about 24 mA.

Full operational capability of the device could be reached in about 2–5 min after connecting to the power supply; optimal self-noise level could be reached in 1–2 hours after temperature set up inside the external case.

5. Shipment and storage

The seismic sensor has not the moving mechanical parts, and so it is very rugged and virtually impervious to damage during transportation.

The storage temperature should be from –15 up to +65° C. The impact of lower or higher temperatures could lead to undesirable effects or breakdown of the device.

The environmental protection grade of the external case is **IP 54**.



NOTE: The seismic sensor METR-03 must not be immerse into water or install at a flooded place without additional water protection.

6. Warranty and Service

The warranty period for the seismic sensor is 18 month. Within this period the instrument which proves defective should be returned to the manufacturer. It will be repaired or replaced free of charge. After this period the regular repairing charges will apply.

Under no circumstances shall Manufacturer have any liability for defects resulting from normal wear and tear, accidents, improper use, or use in the manner other than in accordance with the instructions provided by the Manufacturer. The Manufacturer shall not be liable for any defects if the products were adjusted, modified or repaired by a party other than Manufacturer the sensitive or a party specifically authorized to perform such adjustments and repairs by the Manufacturer

Manufacturer:

“R-sensors” LLC

8A, Zhukovskogo St., Dologoprudny, Moscow region, 141700, Russia

tel./fax: +7-498-744-69-95

web: www.r-sensors.ru

e-mail: r-sensors@mail.ru

Annex No. 1:
Axis direction and cable wiring

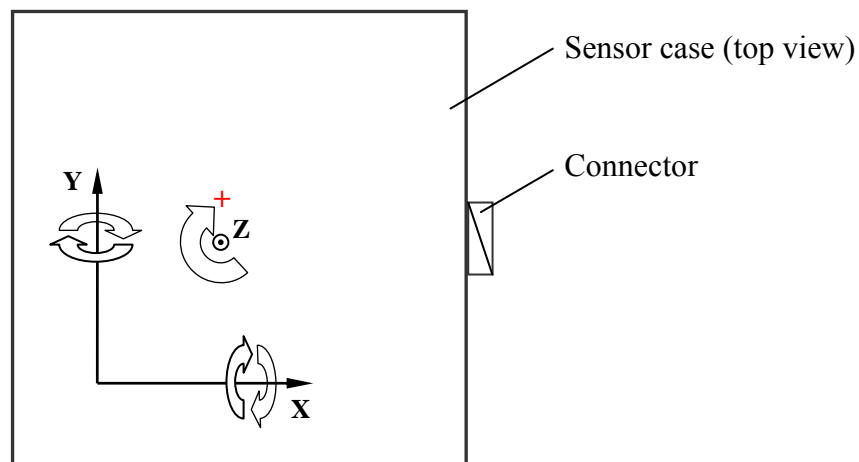
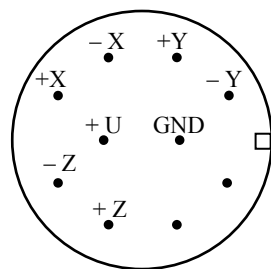


Fig. 1. Direction of the rotational sensing axes of the seismic sensor METR-03.



+ Z	– Green
– Z	– White-green
+ X	– Blue
– X	– White-blue
+ Y	– Orange
– Y	– White-orange
+ U	– Brown
GND	– Black
– U	– White-brown

Fig. 2. Female connector (on the cable) – connection view,
or male connector (on the case) – solder view.