



# INSTRUCTION MANUAL

**FISSUROMETER**

**Model REPP-R**

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This product should be installed and operated only by qualified personnel. Its misuse is potentially dangerous. The Company makes no warranty as to the information furnished in this manual and assumes no liability for damages resulting from the installation or use of this product. The information herein is subject to change without notification.

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# 1 INTRODUCTION

The REPP-R is a surface mounting fissurometer used to measure changes in distance between two points caused by, for example, the opening and closing of cracks in concrete or masonry; the changes in width of discontinuities in rock masses; the opening and closing of expansion joints in steel structures; joint or overhanging rock instability or tension cracks or movement of rock blocks in slide areas.

## 2 OPERATING PRINCIPLE

The REPP-R is built around a sensitive linear resistive plastic strip potentiometer. The potentiometer is housed in a two part hermetically sealed housing. The extremities of the housing are fitted with self-aligning pivots, which accept the anchors. The anchors are chosen to suit the application.

## 3 SPECIFICATIONS

### 3.1 Mechanical specifications

The mechanical specifications of the REPP-R are shown in Figure 1 annexed. The REPP-R can also be configured as a convergencemeter or as a single point extensometer.

### 3.2 Electrical specifications

MODEL	REPP-R25	REPP-R50	REPP-R100
Measuring range (mm):	25	50	100
Resolution with the REP-1 readout:	0.01 mm	0.01 mm	0.01 mm
Linearity (standard) (% F.S.):	± 1%	± 1%	± 1%
Linearity (optional) (% F.S.):	±0.5% or ±0.1%	±0.5% or ±0.1%	±0.5% or ±0.1%
Rated resistance (kΩ):	4.7	4.7	10
Dissipated power at 70°C (watts/cm of electrical travel):	0.2	0.2	0.2
Resistance/temperature coefficient:	$-200 \pm 200 \times 10^{-6}/^{\circ}\text{C}$	$-200 \pm 200 \times 10^{-6}/^{\circ}\text{C}$	$-200 \pm 200 \times 10^{-6}/^{\circ}\text{C}$
Operating temperature range:	-40°C to + 105°C	-40°C to + 105°C	-40°C to + 105°C

Table 1: Electrical specifications

## 4 INSTALLATION

The REPP-R is supplied assembled in its mid-range position. A black line indicates the fully collapsed position.

**CAUTION:** Never extend fissurometer beyond its maximum measuring range, as it will permanently damage the fissurometer.

- a) Locate and drill the anchor holes in the structure or mass to be instrumented. Choose a hole spacing that suits to the expected magnitude and direction of the movements being monitored. Refer to Figure 1 of the exact spacing and confirm this spacing by mechanical or electrical (with the readout) measurements.
- b) Firmly secure mechanical or grouted (epoxy or cement) anchors in the anchors holes.
- c) Assemble the REPP-R on the anchors by inserting the threaded end through the self-aligning pivot.
- d) Layout and protect the lead cable.
- e) Provide additional mechanical protection or sealing as necessary. The telescoping assembly is rated to 75 psi (500 kPa).

## 5 ELECTRICAL CONNECTION

The REPP-R is supplied with the required length of cable attached.

The conductors identified 1, 2 and 3 correspond to:

- 1) Power supply - / output signal -
- 2) Output signal +
- 3) Power supply +

User will refer to calibration data sheet for color code.

Connections and mounting should be done with care in order to avoid shorts and undesirable additional impedance.

Accessories to be used: swaging pliers, splicing kit and ohmmeter.

## 6 READINGS AND DATA REDUCTION

The measurements can be carried out with an ohmmeter. However, the readings may include parasitic line and contact resistance changes that may lead to erroneous results. Voltage measurements are preferred and is the recommended method.

### 6.1 Ohmmeter reading

The line resistance is normally quite low compared to the linear resistive strip element.

- Install the fissurometer on the mounts and read the resistance  $R_{1i}$  between leads 1 and 3. It should be approximately equal to 4.7 or 10 k $\Omega$  (as per table 1).
- Read the current resistance  $R_{1j}$  between leads 1 and 2.
- The initial position  $M_i$  of the REPP-R corresponds to:

$$M_i = (R_{1j} / R_{1i}) \times \text{range}$$

The relative displacement between anchor points that occurred from time  $t = i$ , to  $t = c$  is given by:

$$DM = M_i - M_c$$

The data sheet should take into account and record the polarity of signs to indicate movements in tension or compression. Positive values of **DM** signify movements in tension. Negative values of **DM** signify movements in compression.

## 6.2 Voltage measurements

Displacement is calculated using the following formula:

$$D = \frac{CF (L_i - L_o)}{V_{exc}}$$

Where:

- D = Displacement in mm
- CF = Calibration factor
- L<sub>i</sub> = Current LINEAR reading
- L<sub>o</sub> = Initial LINEAR reading
- V<sub>exc</sub> = Power supply in VDC

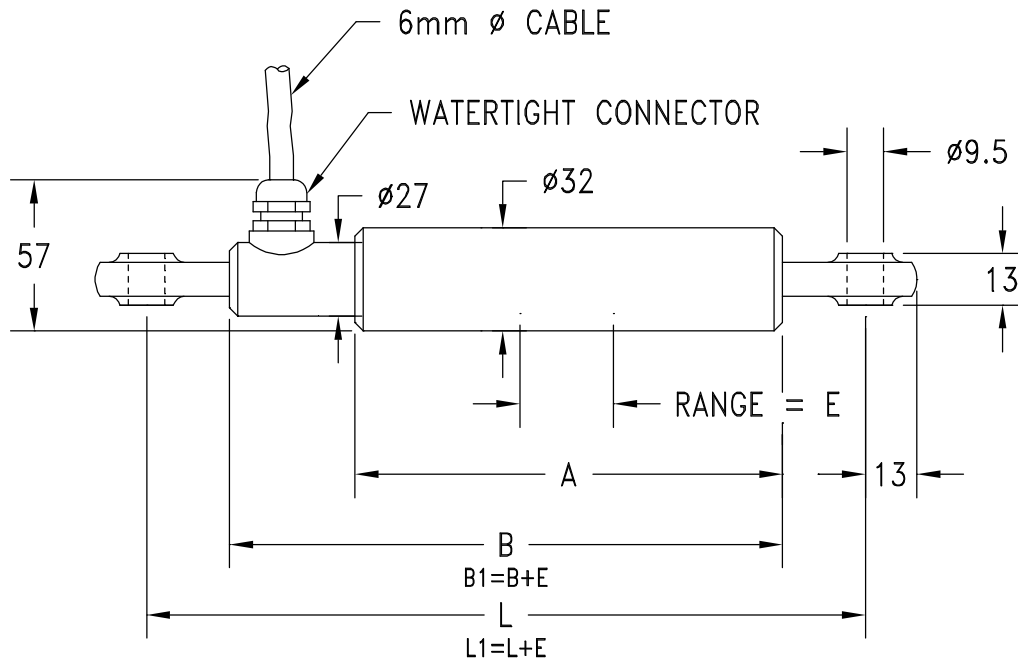
## 7 CONVERSION FACTORS

	To Convert From	To	Multiply By
LENGTH	Microns	Inches	3.94E-05
	Millimeters	Inches	0.0394
	Meters	Feet	3.2808
AREA	Square millimeters	Square inches	0.0016
	Square meters	Square feet	10.7643
VOLUME	Cubic centimeters	Cubic inches	0.06101
	Cubic meters	Cubic feet	35.3357
	Liters	U.S. gallon	0.26420
	Liters	Can-Br gallon	0.21997
MASS	Kilograms	Pounds	2.20459
	Kilograms	Short tons	0.00110
	Kilograms	Long tons	0.00098
FORCE	Newtons	Pounds-force	0.22482
	Newtons	Kilograms-force	0.10197
	Newtons	Kips	0.00023
PRESSURE AND STRESS	Kilopascals	Psi	0.14503
	Bars	Psi	14.4928
	Inches head of water*	Psi	0.03606
	Inches head of Hg	Psi	0.49116
	Pascal	Newton / square meter	1
	Kilopascals	Atmospheres	0.00987
	Kilopascals	Bars	0.01
Kilopascals	Meters head of water*	0.10199	
TEMPERATURE	Temp. in °F = (1.8 x Temp. in °C) + 32		
	Temp. in °C = (Temp. in °F - 32) / 1.8		

\* at 4 °C

E6TabConv-990505

Table 2 Conversion factors



E20139-01

REPP-R MODEL	Dimensions (mm)						Weight (Kg)
	E	A	B	B1	L	L1	
25	25	105	180	205	240	265	0.9
50	50	130	210	260	270	320	1.0
100	100	185	265	365	325	425	1.3

**FIGURE 1: Mechanical dimensions**