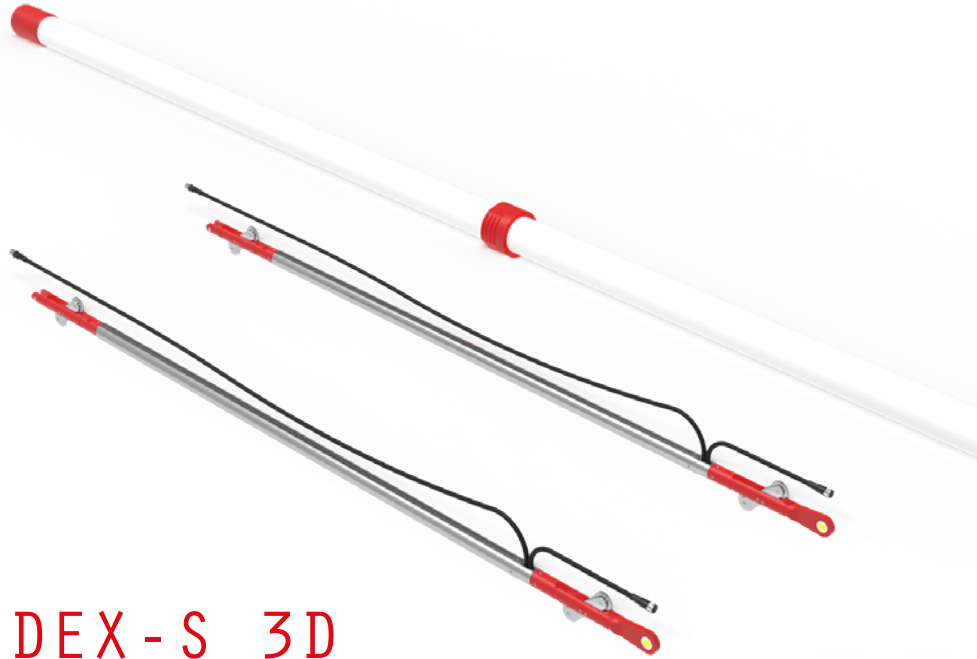


DEX-S

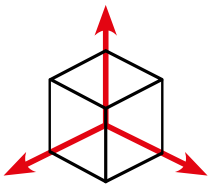
— **DEX-S**  
**3D EXTENSO-INCLINOMETERS**

EXTENSOMETERS





## DEX-S 3D EXTENSO-INCLINOMETERS

**DEX-S 3D PROBE**

The DEX-S extenso-inclinometer is a 3D probe that combines two sensors: a high-accuracy MEMS biaxial inclinometer for monitoring displacements in the horizontal plane, and a contactless magnetic sensor for monitoring vertical displacements.

A string of probes installed in a borehole provides a 3D displacement profile of the casing and the surrounding ground along the installed section.

DEX-S probes are installed in ABS inclinometer casings fitted with special red magnetic rings. These magnetic rings act as reference points for monitoring vertical displacements.

### APPLICATIONS

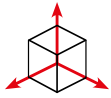
- Monitoring 3D deformation in tunnels and diaphragm walls
- Monitoring settlement in dam foundations
- Monitoring lateral displacements in dams and rockfall areas
- Monitoring settlements at depths up to 200 m

### FEATURES

- 3D borehole displacement profile
- Cost savings by using a single borehole
- DEX-S strings can be removed and re-installed in other projects



*Meets the essential requirements of the EMC Directive 2014/30/EU*



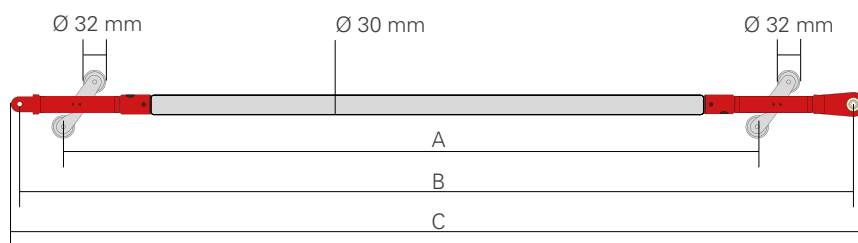
# DEX-S 3D DIGITAL EXTENSO-INCLINOMETERS

PRODUCT CODES	0DEXS01030D	0DEXS05030D	0DEXS10030D
<b>SETTLEMENT SENSOR</b>			
Sensor type	High-performance contactless displacement transducer		
FS and measuring range	100 mm (±50 mm)	500 mm (±250 mm)	1000 mm (±500 mm)
Sensor resolution	0.03 mm	0.1 mm	0.1 mm
Sensor repeatability	0.003 mm	0.02 mm	0.1 mm
Sensor 24 hours stability <sup>(1)</sup>	±0.01 mm	±0.05 mm	±0.1 mm
Sensor accuracy (MPE <sup>(3)</sup> )	±0.3% FS (±0.3 mm)	±0.08% FS (±0.4 mm)	±0.08% FS (±0.8 mm)
Offset temperature dependency	0.015 mm/°C	0.025 mm/°C	0.050 mm/°C
Sensitivity <sup>(2)</sup>	See individual Calibration Report		
<b>TILT SENSOR</b>			
Sensor type	biaxial MEMS inclinometer		
Measuring range	±30°		
Sensor resolution	0.0001°		
Sensor mechanical bandwidth	1 Hz		
Sensor repeatability	0.001°		
Sensitivity <sup>(2)</sup>	See Calibration Report		
Sensor accuracy: MPE <sup>(3)</sup>	<±0.01% FSR		
Sensor 24 hours stability <sup>(1)</sup>	<±0.004°		
Offset temperature dependency	±0.002° / °C		
<b>TEMPERATURE SENSOR <sup>(4)</sup></b>			
Embedded on electronic board			
Measuring range	- 40°C to +125°C		
Accuracy	±1°C with temperature range -10°C to +85°C		
<b>HUMIDITY SENSOR <sup>(4)</sup></b>			
Embedded on electronic board			
Measuring range	0 to 100% RH		
Accuracy	±5% RH with humidity range 0 to 95% RH		
<b>SUPPLY VOLTAGE MONITOR <sup>(4)</sup></b>			
Embedded on electronic board			
Measuring range	0 to 36 V		
Accuracy	±5% FS		
<b>ELECTRICAL INFORMATION</b>			
Signal output	RS-485 with Modbus RTU protocol <sup>(5)</sup>		
Power supply	12 to 24 V dc - default power mode is TIMED <sup>(6)</sup>		
Average consumption	55 mA @ 24 Vdc, 115 mA @ 12 Vdc		
Max cable length to logger	1000 m (for more information see F.A.Q.#077 on Sisgeo web site)		

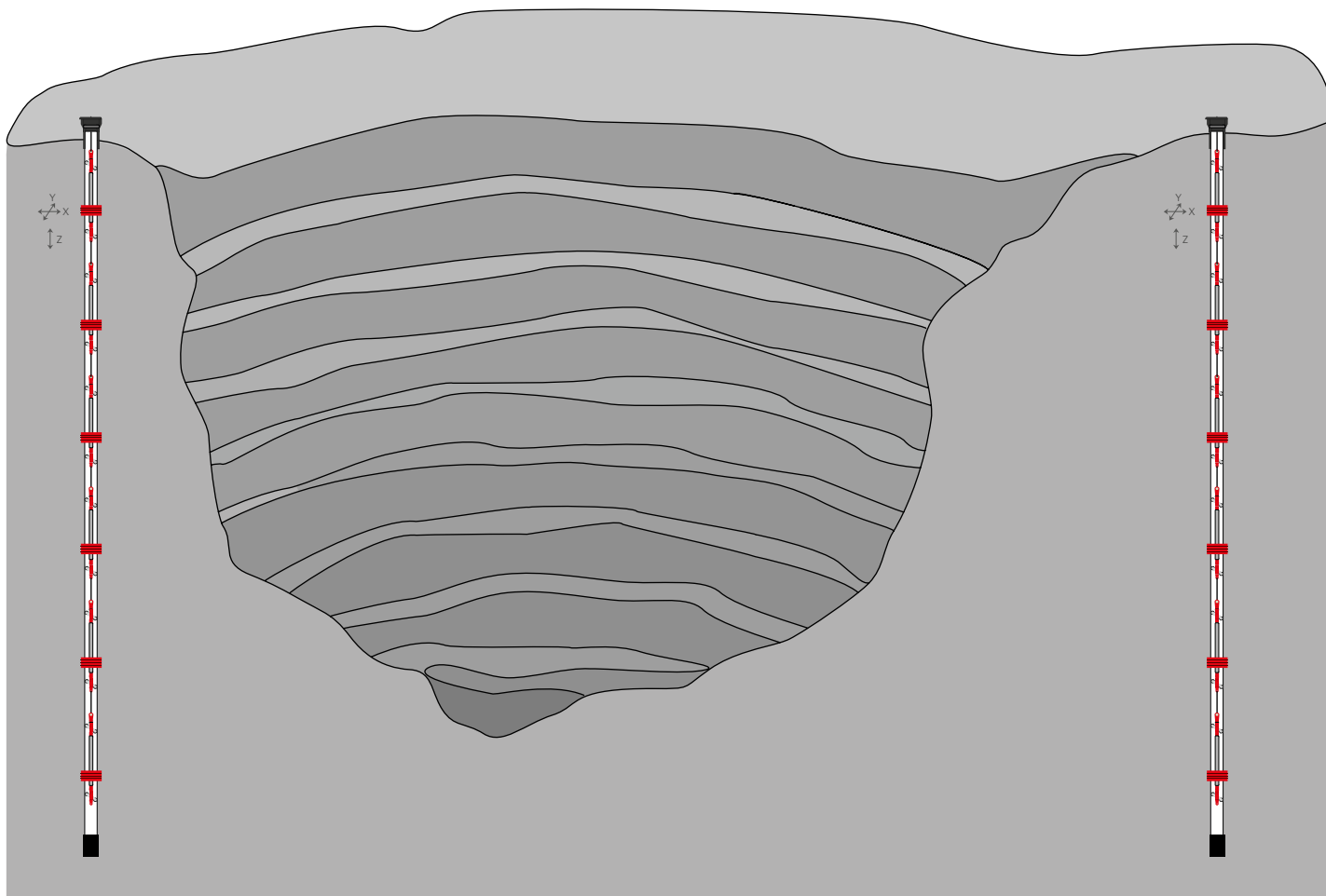
(1) Stability calculated as difference after a 24 h period under repeatability conditions. (2) Sensitivity is a specific parameter and is different for each gauge. Sensitivity is determined during the gauge calibration test and reported in the Calibration Report. (3) MPE is the Maximum Permitted Error on the measuring range (FSR). In the Calibration Report, the accuracies of the gauge are calculated using the linear regression; the error reported is the maximum residual error on the FSR. (4) These sensors are installed on the internal electronic board for diagnostic purposes. (5) RS485 not-optoisolated Modbus communication with RTU Protocol. Default output is [mm] for settlement sensor and [sin α], for tilt sensor. Other units are available and to be requested at order. Sisgeo Modbus protocol manual is available for download on [www.sisgeo.com](http://www.sisgeo.com) (6) For more information regarding powering mode, please visit F.A.Q.#094 on [www.sisgeo.com](http://www.sisgeo.com).

## DEX-S PHYSICAL FEATURES

PROBE FEATURES	PROBES WITH ±50 mm range	PROBES WITH ±250 mm range	PROBES WITH ±500 mm range
Measuring base (A)	850 mm	1250 mm	1750 mm
Distance between suspending holes (B)	1050 mm	1450 mm	1950 mm
Total length (C)	1080 mm	1480 mm	1980 mm
Operating temperature range	-30°C to +70°C		
Pressure rating	IP68, up to 1.0 MPa (higher pressure rating available on request)		
Material	Stainless steel and thermoplastic resin		
Casing compatibility	S143 Easy Lock or S151 Quick-Joint casings, fitted with magnetic rings		

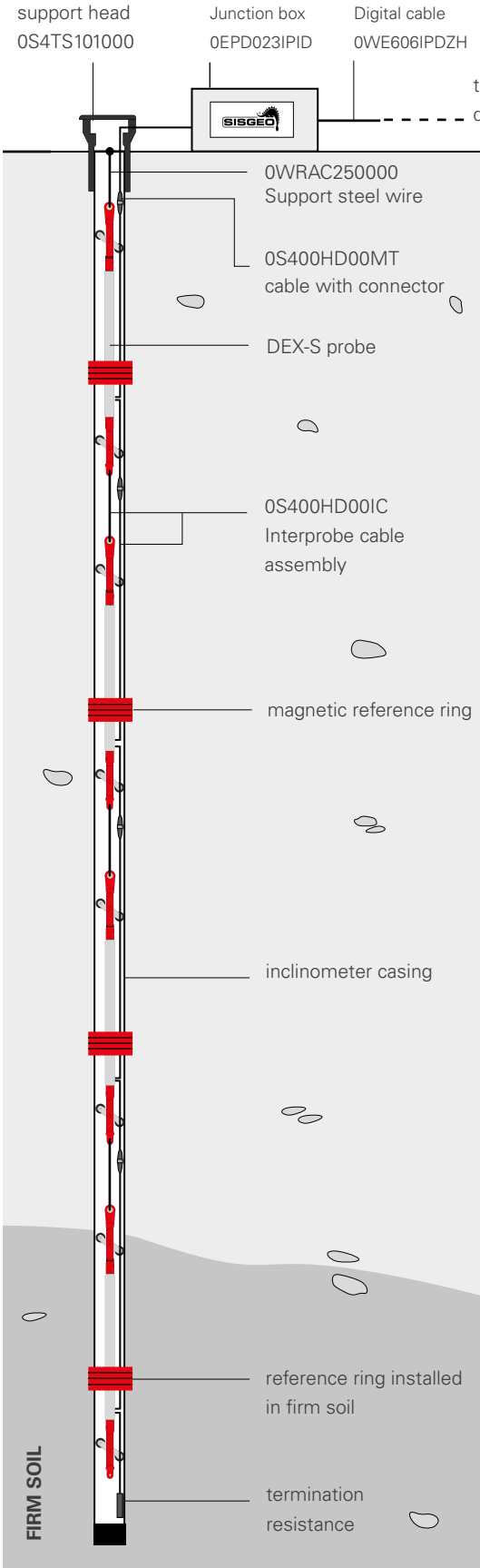


## EXAMPLE OF DEX-S DIGITAL EXTENSO-INCLINOMETER APPLICATION IN AN OPEN-PIT MINE



## DEX-S STRING LAYOUT

After verifying the position of the magnetic rings (e.g. with the C121 BRS magnetic detector probe), the DEX-S probes are suspended from the support head at the required depths. By optically surveying the position of the support head and installing the lower magnetic ring in firm soil, an absolute reference for vertical displacements is established.



to OMNIAlog datalogger

### INTERPROBE CABLE ASSEMBLY 0S400HD00IC

Available in different lengths (2 m, 5 m, 10 m, 15 m), it consists of a digital signal cable with female/male connectors and a stainless steel support wire for connecting a lower probe to the upper one.

### UPPER CABLE WITH CONNECTOR 0S400HD00MT

Available in different lengths (2 m, 5 m, 10 m, 15 m), it consists of a digital signal cable with a connector for connecting the upper probe to the junction box or logger.

### SUPPORT STEEL WIRE 0WRAC250000

Steel wire for suspending the DEX-S string from the upper probe to the support head. Diameter: 2.5 mm.

### SUPPORT HEAD 0S4TS101000

Installed at the top of the inclinometer casing to support the DEX-S string.

### DIGITAL CABLE 0WE606IPDZH

LSZH cable for connecting the digital gauge chain to the OMNIAlog datalogger.

### DIGITAL JUNCTION BOX 0EPD023IPID

Junction box for digital instrument chains, consisting of an IP67 plastic box, an internal wiring board and three cable glands.

### MAGNETIC DETECTOR PROBE 0C121000000

Simple, portable device for verifying the position of magnetic rings after casing grouting. Flat cable with millimetre graduations, mounted on a reel. Available in different lengths.

### INSTALLATION KIT 0S4IPIT00L0

Kit including one crimping tool for copper sleeves and 20 copper sleeves.

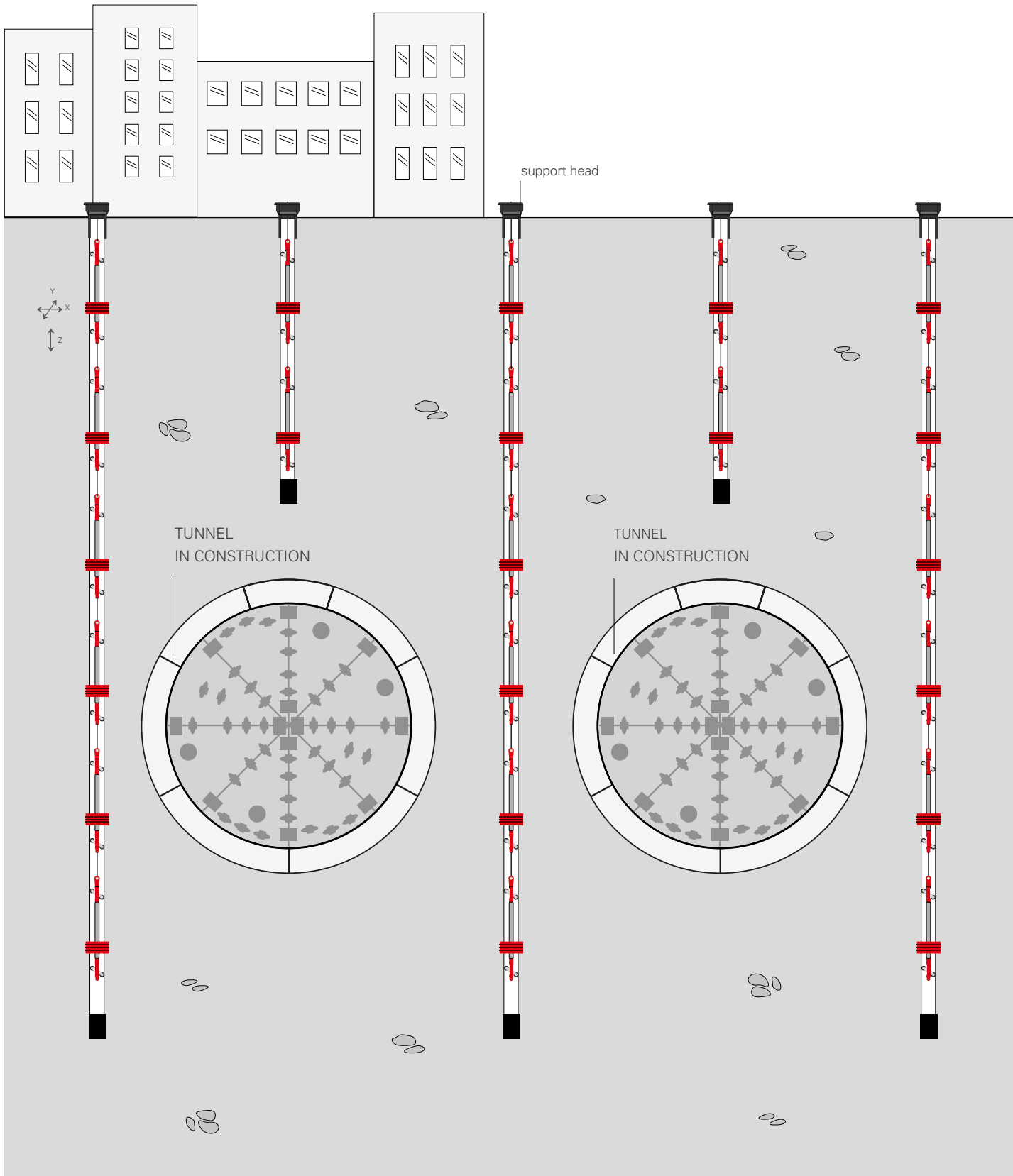
### RESISTANCES KIT (SPARE) 0ERESIKIT00

Kit including one 120 Ohm, two 240 Ohm, three 360 Ohm and four 480 Ohm termination resistors. Each resistor is fitted with an M12 5-pin connector for connection to SISGEO digital gauges. Check compatibility with older digital gauges with your Sales Representative.

### RESISTANCE ENDING DEVICE 0ETERMRESIO

Termination resistor with connector, required to terminate each digital instrument chain. The resistor value depends on the layout of each DEX system. For more details, see FAQ #076.

EXAMPLE OF DEX-S APPLICATION IN TUNNELLING



## CASINGS AND ACCESSORIES

For most installations, ABS inclinometer casing model S143 with DEX magnetic rings is the recommended choice. However, for deeper installations (140–150 m), the Quick-Joint inclinometer casing model S151 is recommended. If you intend to use S151 casing, please inform your Sales Representative when ordering so that the magnetic rings can be installed on the casing during factory assembly. For more information, refer to the datasheets for S143 and S151 casings.

The new DEX-S probes are only compatible with RED magnetic rings, code OREXORINGR0 or OREX0AF71R0. The new DEX-S probes are not compatible with the old BLACK magnetic rings.

### S143 ABS INCLIN. CASING OS143107000

Easy Lock ABS inclinometer casing, model S143, length 3 m, OD 70 mm, ID 58 mm

### S143 BOTTOM CAP OS143TF7000

Top/bottom cap for S143 casings, made of ABS. Suitable for inclinometer column or extenso-inclinometer columns.

### ASSEMBLING KIT FOR 100M OS143KIT000

Assembly kit consisting of 5 O-rings, locking wire and Sisgeo adhesive tape (mandatory).

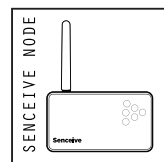
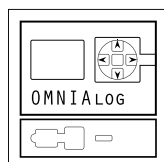
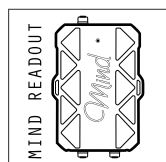
### MAGNET REFERENCE RING OREXORINGR0

Magnetic ring for T-REX, DEX and DEX-S extensometers. OD 93 mm, ID 71 mm. Material: PVC with embedded permanent magnet.

### SPIDER REFERENCE RING OREX0AF71R0

Spider magnetic ring for T-REX, DEX and DEX-S extensometers. OD 93 mm, ID 71 mm. Max. spring span 300 mm. Material: PVC with embedded permanent magnet.

## READABLE BY



For further information, refer to the relevant readout datasheets.

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### TECHNICAL ASSISTANCE

SISGEO offers e-mail technical support to ensure correct installation and use and to maximize system performance. For full installation and maintenance procedures, refer to the Installation & User Manual. For further information, contact: [assistenza@sisgeo.com](mailto:assistenza@sisgeo.com)