DEX-D

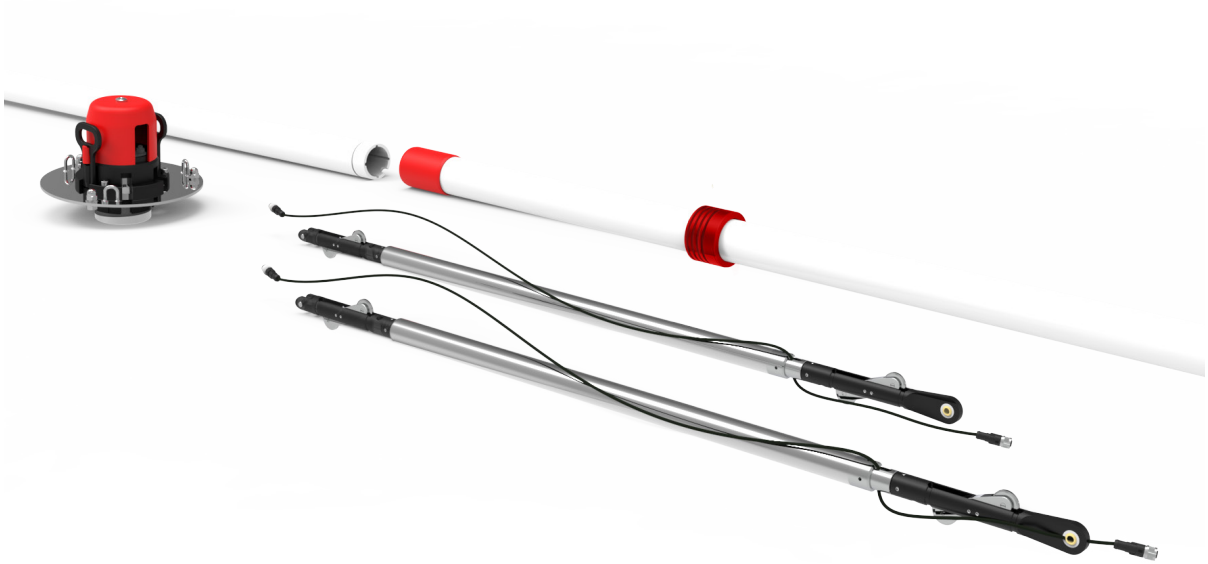
_ DEX AND DEX-S

DIGITAL EXTENSOMETERS

EXTENSOMETERS

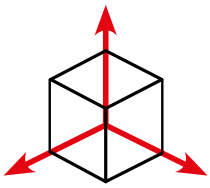
SISGEO®

DEX-D_EN_07_07/2024



DEX AND DEX-S

DIGITAL EXTENSOMETERS



DEX-S 3D PROBE

The DEX-S extenso-inclinometer is a 3D probe with an exclusive merge of two sensors: a high accuracy biaxial MEMS inclinometer to read displacements on horizontal axis, and a contactless magnetic sensor to monitor the vertical displacements.

A chain of probes installed in a borehole allows the unique advantage to return a 3D profile of both the casing and surrounding ground where the chain is installed.

The DEX extensometer is equivalent to DEX-S but without inclinometer sensor, so that a chain of DEX probes is suitable to read vertical displacements only.

DEX and DEX-S are installed into ABS inclinometer casings with special magnet rings.

APPLICATIONS

- Monitoring 3D deformation in tunneling 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

- 3-D borehole profile
- Removable, reusable sensors
- Cost savings by use of single borehole
- mixed chains of DEX-S and DEX extensometer probes are allowed
- DEX-S and DEX chains can be removed and installed in other projects

CE *Meet the essential requirements of the EMC Directive 2014/30/UE*

DEX-S 3D DIGITAL EXTENSO-INCLINOMETERS

PRODUCT CODES	0DEX35S130D (max ±30°)	0DEX35S515D (max ±15°) 0DEX35S530D (max ±30°)	0DEX35SE15D (max ±15°) 0DEX35SE30D (max ±30°)
SETTLEMENT SENSOR			
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 (with OMNIAlog datalogger)	0.0001mm	0.0001 mm	0.0001mm
Sensor repeatability	0.007 mm	-	-
Sensor 24 hours stability (1)	±0.06 mm	-	-
Sensitivity (2)	See Calibration Report		
Sensor accuracy: MPE (3)	< ±0.25% FS (< ±0.25mm)		
TILT SENSOR			
Sensor type	biaxial MEMS inclinometer		
Available measuring range	±20°, ±30°	±10°, ±15°, ±20°, ±30°	±10°, ±15°, ±20°, ±30°
Sensor resolution	0.0001°		
Sensor mechanical bandwidth	1 Hz		
Sensor repeatability	0.001°		
Sensitivity (2)	See Calibration Report		
Sensor accuracy: MPE (3)	<±0.01% FSR		
Sensor 24 hours stability (1)	<±0.004°		
Offset temperature dependancy	±0.002° / °C		
TEMPERATURE SENSOR (4)	Embedded on electronic board		
Measuring range	- 40°C to +125°C		
Accuracy	±1°C with temperature range -10°C to +85°C		
HUMIDITY SENSOR (4)	Embedded on electronic board		
Measuring range	0 to 100% RH		
Accuracy	±5% RH with humidity range 0 to 95% RH		
SUPPLY VOLTAGE MONITOR (4)	Embedded on electronic board		
Measuring range	0 to 36 V		
Accuracy	±5% FS		
ELECTRICAL INFORMATION			
Signal output	RS-485 with Modbus RTU protocol (5)		
Power supply	from 12 to 24 V dc - default powering set up is TIMED (6)		
Average consumption	72 mA @ 24 Vdc, 145 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 paramenter different for every gauge. The sensitivity is calculated during gauge calibration test and inserted into 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 sensor diagnostics. (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 at this page. (6) For more information regarting powering mode, please visit F.A.Q.#094 on www.sisgeo.com.

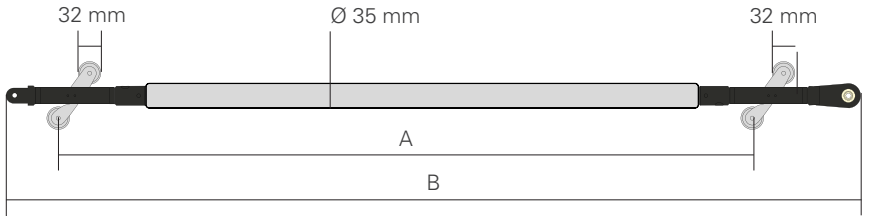
DEX DIGITAL EXTENSOMETERS

PRODUCT CODES	0DEX350100D	0DEX350500D	0DEX351000D
SETTLEMENT SENSOR			
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 (with OMNIAlog datalogger)	0.0001 mm	0.0001 mm	0.0001 mm
Sensor repeatability	0.007 mm	-	-
Sensor 24 hours stability (1)	±0.06 mm	-	-
Sensitivity (2)	See Calibration Report	See Calibration Report	See Calibration Report
Sensor accuracy: MPE (3)	< ±0.25% FS (< ±0.25 mm)	< ±0.08% FS(< ±0.4 mm)	< ±0.08% FS(< ±0.8 mm)
TEMPERATURE SENSOR (4)	Embedded on electronic board		
Measuring range	- 40°C to +125°C		
Accuracy	±1°C with temperature range -10°C to +85°C		
HUMIDITY SENSOR (4)	Embedded on electronic board		
Measuring range and accuracy	0 to 100% RH / ±5% RH (within 0 to 95% RH)		
SUPPLY VOLTAGE MONITOR (4)	Embedded on electronic board		
Measuring range and accuracy	0 to 36 V / ±5% FS		
ELECTRICAL INFORMATION			
Signal output	RS-485 with Modbus RTU protocol (5)		
Power supply	from 12 to 24 V dc - default powering set up is TIMED (6)		
Average consumption	72 mA @ 24 Vdc, 140 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 paramenter different for every gauge. The sensitivity is calculated during gauge calibration test and inserted into 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 expressed using both linear regression (≤ Lin. MPE) and polynomial correction (≤ Pol. MPE). (4) These sensors are installed on the internal electronic board for sensor diagnostics. (5) RS485 not-optoisolated Modbus communication with RTU Protocol. Default output is [mm], other units available and to be requested at order. Sisgeo Modbus protocol manual is available for download at this page. (6) For more information regarting powering mode, please visit F.A.Q.#094 on www.sisgeo.com.

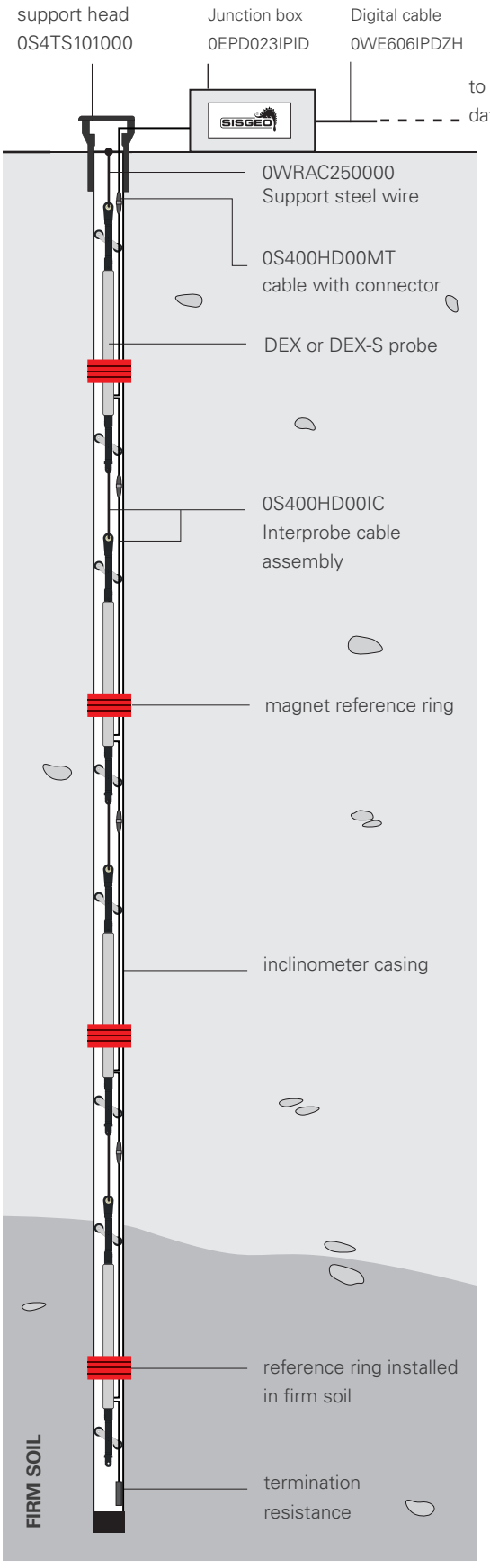
DEX AND DEX-S PHYSICAL FEATURES

PROBE FEATURES	PROBES WITH ±50 mm range	PROBES WITH ±250 mm range	PROBES WITH ±500 mm range
Measuring base (A)	1000 mm (39.4")	1248 mm (49.2")	1800 mm (59")
Total length (B)	1230 mm (48.4")	1478 mm (58.2")	2030 mm (68.1")
Temperature operating 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, equipped with magnet rings		



DEX/DEX-S VERTICAL LAYOUT

After the control of the position of the magnetic rings is verified (i.e. using the C121 BRS magnet detector probe), the DEX/DEX-S probes are suspended from the support head at the proper elevations. Optically surveying the position of the support head or installing the lower magnet ring into firm soil, provides an absolute reference for vertical displacements.



INTERPROBE CABLE ASSEMBLY 0S400HD00IC

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

UPPER CABLE WITH CONNECTOR 0S400HD00MT

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

SUPPORT STEEL WIRE 0WRAC250000

Steel wire for hanging the DEX string from the upper probe to the support head. Diameter 2.5 mm.

SUPPORT HEAD 0S4TS101000

It is installed at the top of inclinometer casings for hanging the DEX/DEX-S string.

DIGITAL CABLE 0WE606IPDZH

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

DIGITAL JUNCTION BOX 0EPD023IPID

Junction box for chains of digital instruments, composed by IP67 plastic box, internal electronic board for wiring and three cable glands.

RESISTANCES KIT (SPARE) 0ERESIKIT00

Kit composed by one 120 Ohm, two 240 Ohm, three 360 Ohm and four 480 Ohm resistance ending devices. Each one has an M12 5-pin connector for linking to SISGEO digital gauges. Check compatibility with old digital gauges with your Sales Representative.

RESISTANCE ENDING DEVICE 0ETERMRESI0

Termination resistance with connector, needed to close every digital instrument' chain. The value of resistor depends on the layout of each DEX system.
For more detail see the FAQ#076.

MAGNETIC DETECTOR PROBE 0C121000000

Simple, portable device to verify position of magnet rings. Flat cable with millimeter graduations, mounted on reel. Available in different lengths.

INSTALLATION KIT 0S4IPIT00L0

Kit composed by one plier for copper sleeves and 20 copper sleeves

DEX HORIZONTAL LAYOUT

After the control of the position of the magnetic rings is verified (i.e. using the C121 BRS magnet detector probe), the DEX horizontal probes are inserted and pushed into the casing using the steel rods. Optically surveying the position of the support head provides an absolute reference for displacements.

UPPER CABLE WITH CONNECTOR OS400HD00MT

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

DIGITAL JUNCTION BOX OEPD023IPID

Junction box for chains of digital instruments, composed by IP67 plastic box, internal electronic board for wiring and three cable glands.

DIGITAL CABLE OWE606IPDZH

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

INTERPROBE CABLE ASSEMBLY OS400HD00IC

Available in different lengths (2m, 5m, 10m, 15m), it is composed by digital signal cable with female/male connectors and stainless steel support wire (not used in horizontal installation)for the connection of a lower probe to the upper one.

RESISTANCE ENDING DEVICE OETERMRESIO

Termination resistance with connector, needed to close every digital instrument' chain. The value of resistor depends on the layout of each DEX system.
For more detail see the FAQ#076.

MAGNETIC DETECTOR PROBE OC121000000

Simple, portable device to verify position of magnet rings. Flat cable with millimeter graduations, mounted on reel. Available in different lengths.

HORIZ. DEX TOP CAP ODEXOTS2350

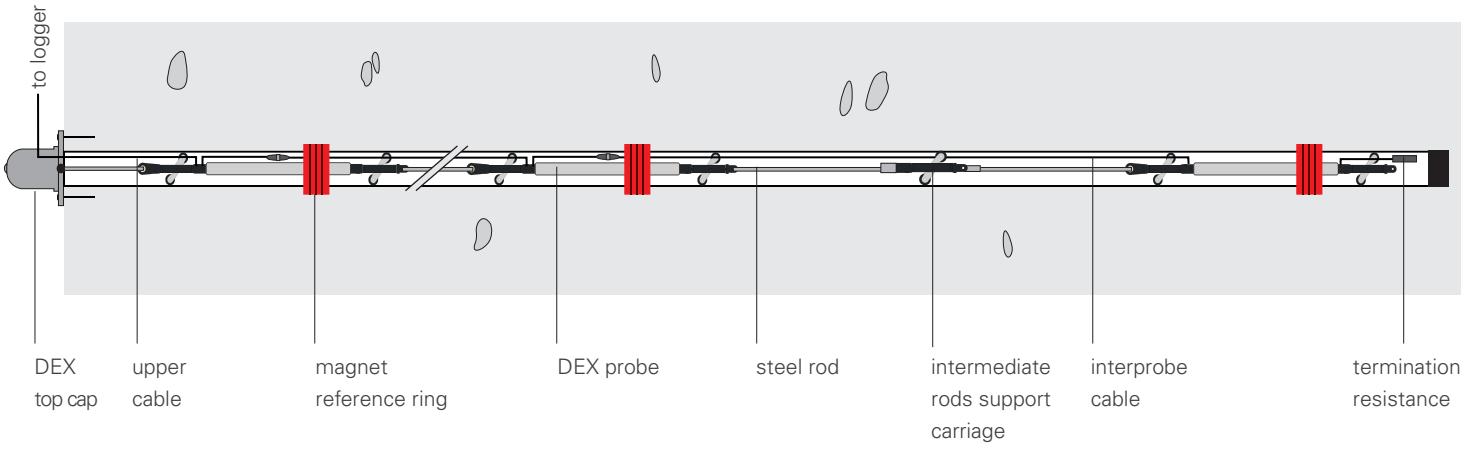
Special cap with No.3 anchor that permits to fasten the horizontal DEX string and fix it into the casing.

STEEL RODS OS4RODOAC00

Threaded steel bar with special ends for pushing DEX chain into the tube and fasten it to the top cap. Available in 1.0, 2.0 and 3.0 m lengths.

HORIZ. RODS SUPPORT CARRIAGE OS4RODOOSUP

Additional carriage to be inserted every 2m length of steel pushing rods in order to support the steel rod chain and to do not have any bending.



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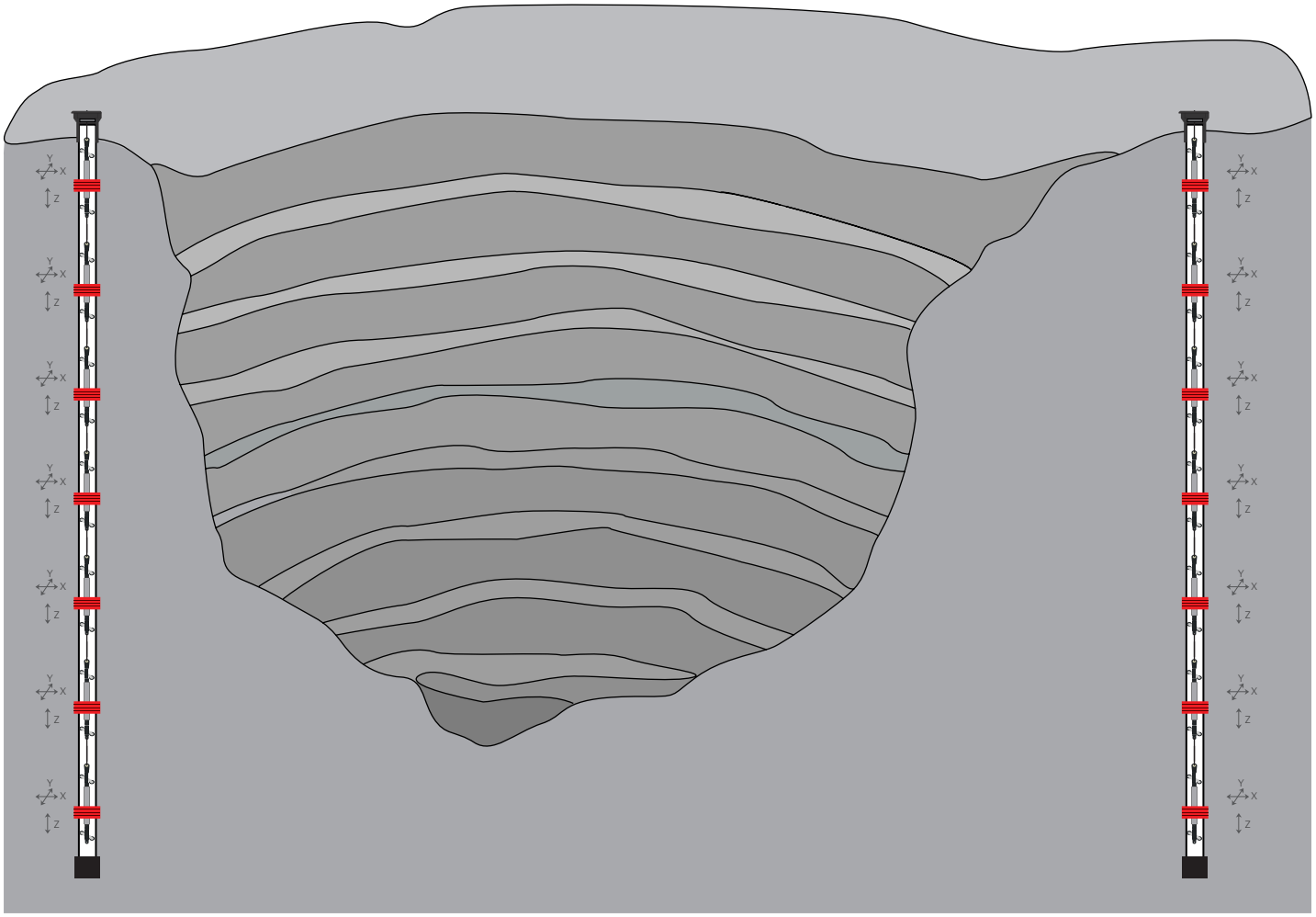
EXAMPLE OF DIGITAL DEX-S EXTENSO-INCLINOMETERS APPLICATION IN OPEN-PIT MINE



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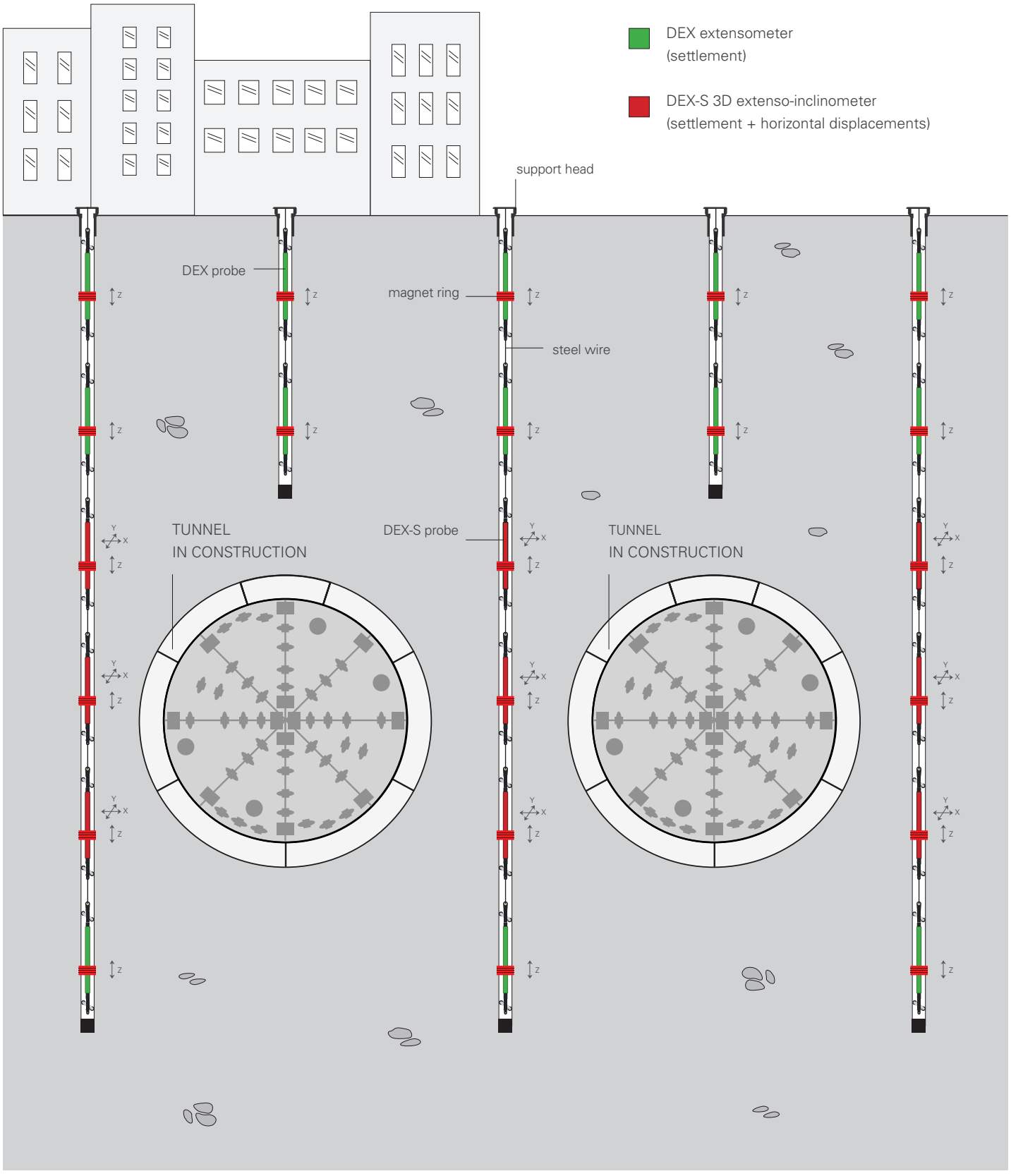
DEX / DEX-S MIXED COLUMN APPLICATION



CASINGS AND ACCESSORIES

For most installations, S143 ABS inclinometer casing with external rings works well. However, for deep installations (140-150m), S151 quick-joint casing is recommended. Inform the sales engineer if you will use quick-joint casing so that rings can be installed during manufacturing. For further information, refer to the S143 and S151 casing datasheet.

S143 ABS INCLIN. CASING
OS143107000

Easy lock ABS inclinometer casing model S143, 3 m length, 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 column.

ASSEMBLING KIT FOR 100M
OS143KIT000

Assembling set composed by 5 O-rings, locking wire and Sisgeo adhesive tape. (Mandatory)

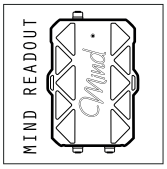
MAGNET REFERENCE RING
OREXORINGRO

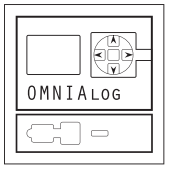
Magnet ring for T-REX, DEX and DEX-S extensometers.
OD 93 mm, ID 71 mm.
Material: PVC with permanent magnet.

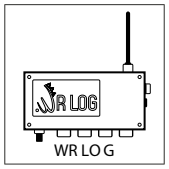
SPIDER REFERENCE RING
OREXOAF71RO

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

READABLE BY







Refer to separate datasheets for further information.

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ADDITIONAL SUPPORT

SISGEO offers customers e-mail and phone assistance to ensure proper use of instruments and readout and to maximize performance of the system.

For more information, please refer to the FAQ pages on our website or email us: **assistance@sisgeo.com**