S410

IN-PLACE
INCLINOMETERS

INCLINOMETERS
& PENDULUMS

SISGEO®

S410_EN_15_05/2026

IN-PLACE
INCLINOMETERS

The S410 MEMS In-Place Inclinometer (double wheel-carriage) is designed to combine the benefits of automatic monitoring with selective probe installation at different depths. The modular string design allows probes to be spaced at any depth interval, making the system easily adaptable to site-specific monitoring requirements and compatible with standard inclinometer casings.
This configuration provides a cost-effective solution when the critical depths are known, allowing probes to be concentrated only at selected locations along the borehole profile.
IPI probes are equipped with biaxial MEMS tilt sensors with digital RS485 Modbus output. Built-in diagnostic sensors for temperature, humidity and power supply enable continuous monitoring of probe operating conditions, supporting data quality verification throughout the measurement period.

APPLICATIONS

- Landslides
- Tunneling
- Diaphragm walls
- Dams
- Deep excavations
- Unstable slopes

FEATURES

- Removable and modular system for multiple-depth installation
- Internal thermometer, humidity and power supply sensors providing additional diagnostic information in the event of sensor malfunction

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

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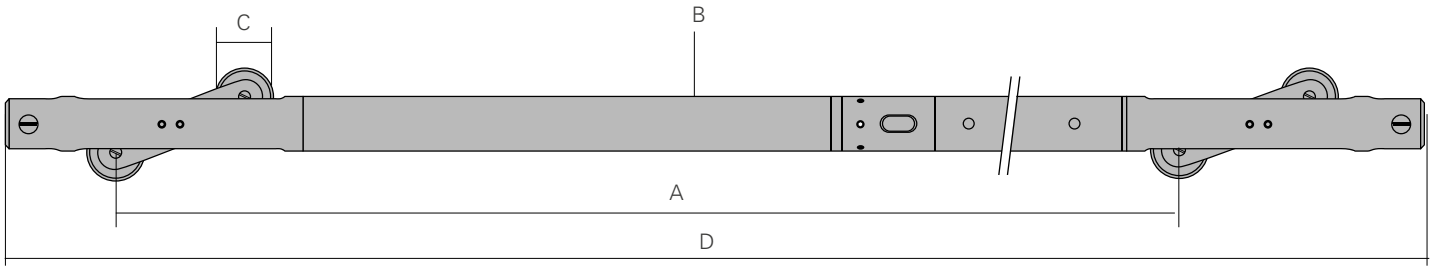
TECHNICAL SPECIFICATIONS(1)

PRODUCT CODES	S412HD151S	S412HD301S
Measurement principle	Biaxial MEMS accelerometer	
Application	vertical inclinometer casing	
Measuring range	±10°, ±15°	±20°, ±30°
Sensor resolution	0.0001°	
Sensor repeatability	±0.001°	
Sensitivity (2)	see individual calibration report	
Sensor accuracy MPE (3)	< ±0.01 % FSR	
Sensor 24h stability (4)	<±0.004° @24h	
Power supply	from 8 to 28 Vdc	
Signal output	RS-485 with Modbus RTU protocol (5)	
A/D converter	sigma-delta 32 bit, 38-KSPS	
Average consumption (per axis)	4,3 mA @ 24 Vdc - 8 mA @ 12 Vdc	
Temperature operating range	-30°C to +70°C	
Offset temperature dependancy	±0.002° / °C	
IP class	IP68 up to 1.0 MPa	
Built-in temperature sensor -range -accuracy	Temperature sensor of electronic board -40°C to +125°C ±1 °C (-10°C to +85°C)	

PHYSICAL FEATURES

PROBE FEATURES	
Gauge (A) and total (D) length	1000 mm (A), 1191 mm (D)
Body (B) and wheel (C)	Ø 30 mm
Material	stainless steel
Casing compatibility	casing ID from 58 mm up to 88 mm (6)



(1) Performance are guaranteed for instruments installed in vertical casings whose inclination stays within ±2° of vertical at any point (see ISO 18674-3)
(2) Sensitivity is instrument-specific and reported in the individual Calibration Report.
(3) MPE = Maximum Permissible Error over the full-scale range (FS). See the Calibration Report for details.
(4) Stability measured as difference after 24 h under repeatability conditions (ISO 18674-3).
(5) RS485 not-optoisolated Modbus communication with RTU Protocol. Default output is sen α, other units available are degree, mm/m and inch/feet (to be requested at order). Sisgeo Modbus protocol manual is available for download at this page.
(6) We strongly suggest to use Sisgeo ABS casing

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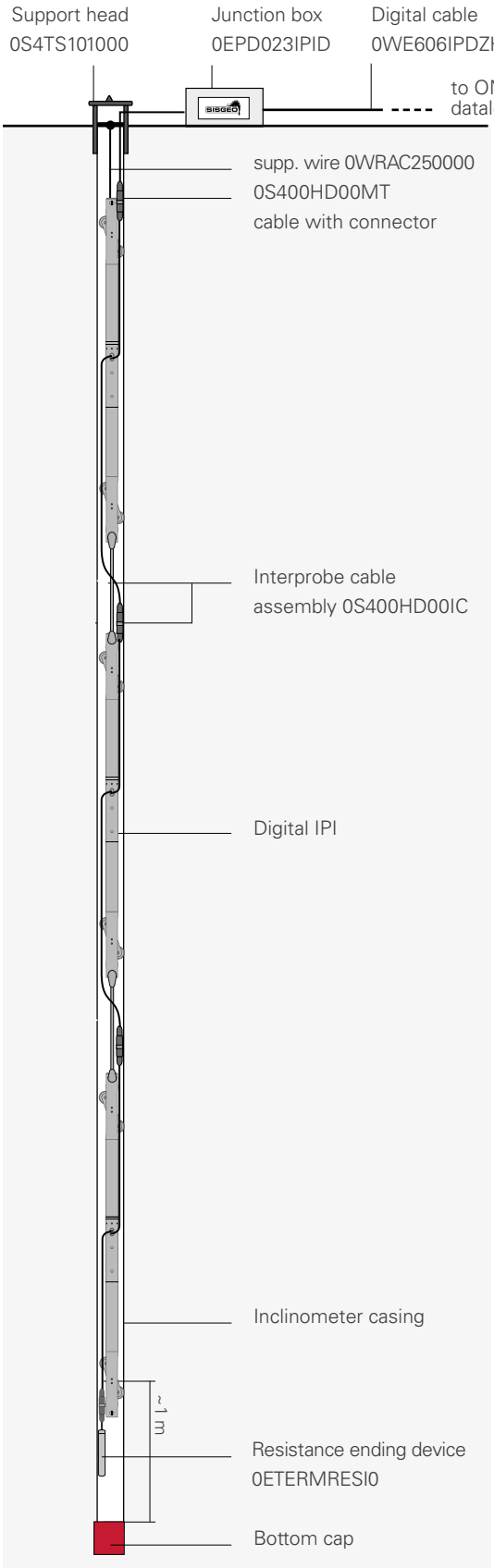
ACCESSORIES AND SPARE PARTS FOR DIGITAL MEMS IPIs



INTERPROBE CABLE ASSEMBLY 0S400HD00IC

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

SUPPORT STEEL WIRE 0WRAC250000

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

IPI SUPPORT HEAD 0S4TS101000

It is installed at the top of inclinometer casings for hanging the in-place inclinometer string.

DIGITAL JUNCTION BOX 0EPD023IPID

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

UPPER CABLE WITH CONNECTOR 0S400HD00MT

Available in different lengths (2m, 5m, 10m, 15m), it is composed of a signal cable with IP68 connector to link the upper inclinometer probe to the junction box or local logger.

DIGITAL IPI CABLE 0WE606IPDZH

LSZH cable for connecting digital IPI chain to OMNIAlog datalogger.

RESISTANCE ENDING DEVICE 0ETERMRESI0

Termination resistance with connector, needed to close every digital IPI chain. The value of resistor depends on the layout of each IPI system. For more detail see the F.A.Q.#076.

RESISTANCES KIT (SPARE) 0ERESIKIT00

Kit composed of 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.

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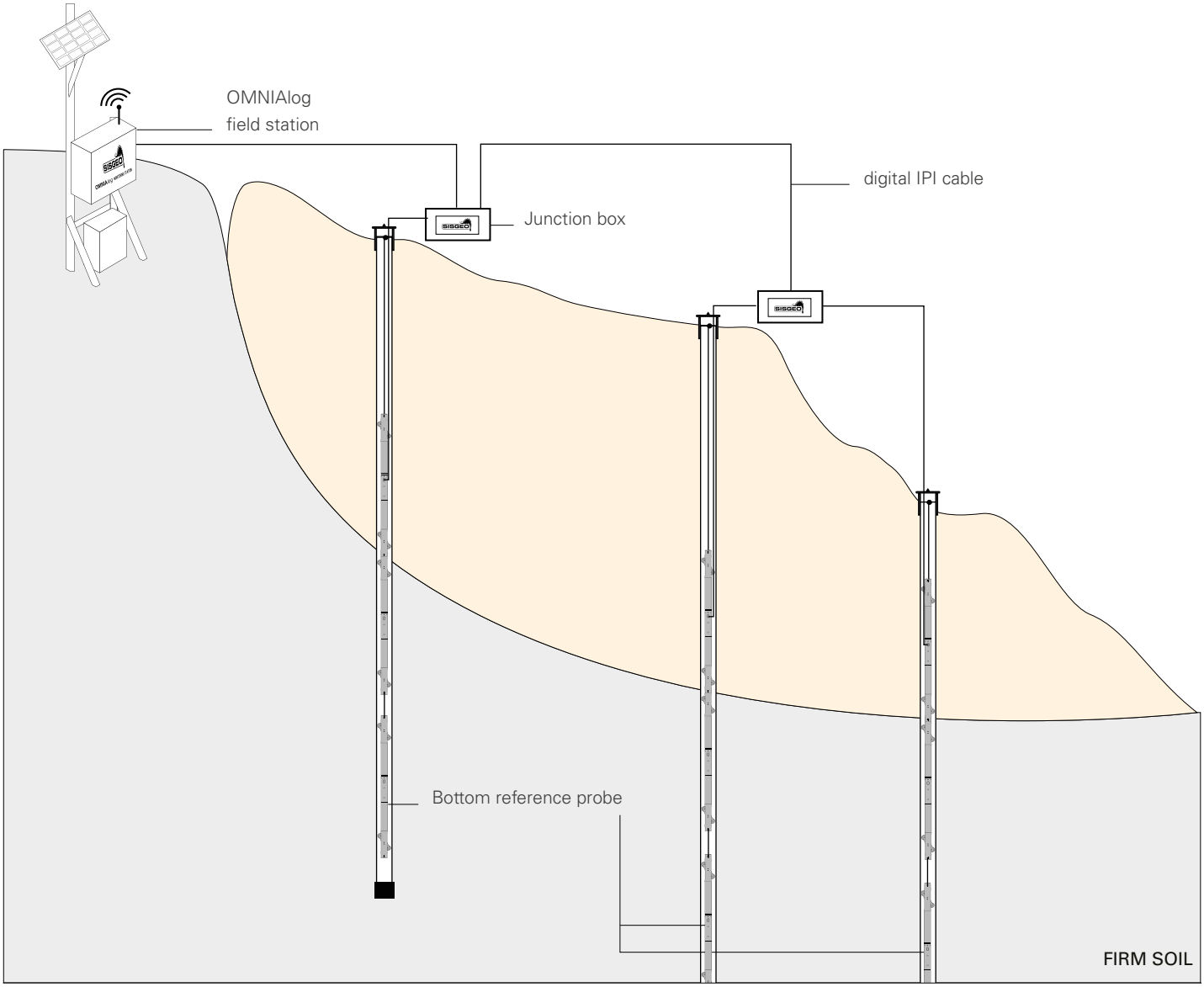
LANDSLIDE APPLICATION

After a number of manual inclinometer surveys, the slip surface is identified. It is therefore possible to set up automatic monitoring by installing IPIs near the identified slip surface depth and one IPI at the bottom of each casing as a reference probe.



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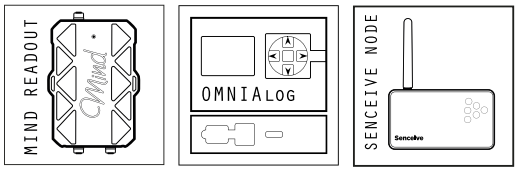

For further information refer to their own datasheets

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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**