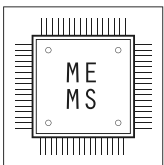


S441

# HORIZONTAL IN-PLACE INCLINOMETERS

INCLINOMETERS  
& PENDULUMS





## HORIZONTAL IN PLACE INCLINOMETERS

Horizontal IPI gauge consists of a stainless steel body with on one side the connection for carbon fibre extension rod and on the other side a stainless steel carriage with spring-loaded wheels.

IPI string is composed by a chain of IPI gauges with carbon fiber extension rods and a terminal wheels assembly. A string of horizontal IPIs is usually installed inside inclinometer casing buried within trenches, foundations or horizontal drill hole for automatic monitoring of settlement or heave.

The string is connected to readout or datalogger with single digital bus cable.

### APPLICATIONS

- Embankment vertical displacements
- Settlement/heave in oil and gas tanks
- Slope deformation in earth and rockfill dams

### FEATURES

- Removable and modular system for multiple installation
- Nearly real-time monitoring with OMNIAlog and miniOMNIAlog
- Internal humidity and power supply sensor permit to have more information in the event of gauge malfunction



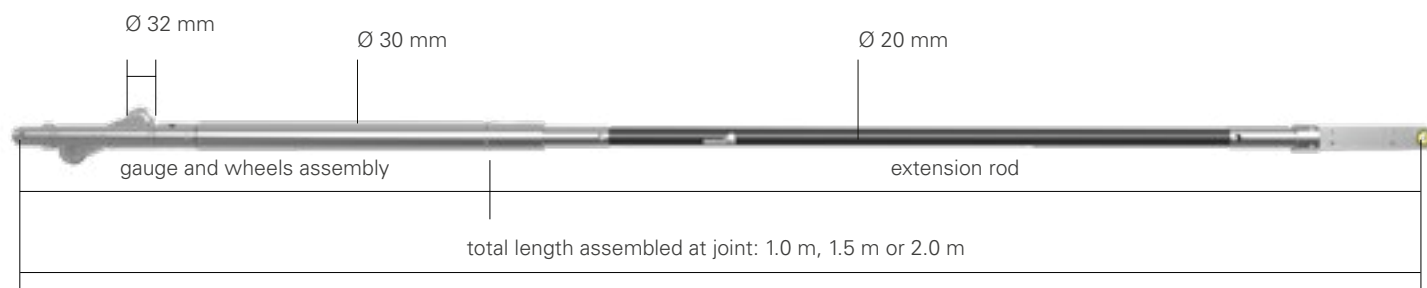
Meet the essential requirements of the EMC Directive 2014/30/UE

## TECHNICAL SPECIFICATIONS

	0S441HD15S0	0S441HD30S0
Measurement principle	UNIAXIAL MEMS inclinometer	
Measuring range	±10°, ±15°	±20°, ±30°
Sensor resolution	0.0001°	
Sensor repeatability	<±0.001°	
Sensor mechanical bandwidth	1 Hz	
Sensitivity <sup>(1)</sup>	see Calibration Report	
Sensor accuracy MPE <sup>(2)</sup>	<±0.01% F.S.R.	
Sensor 24h stability <sup>(3)</sup>	<±0.004°@24h	
Repeatability (precision) of a string of BH profile elements <sup>(4)</sup>	< ±2.00 mm / 30 m	
Offset temperature dependency	±0.002°/ °C	
Power supply	from 8 to 28 Vdc	
Signal output and protocol	RS-485 with Modbus RTU protocol <sup>(5)</sup>	
A/D converter	sigma-delta 32 bit, 38-KSPS	
Average consumption	4.3 mA @ 24 Vdc, 8 mA @ 12 Vdc	
Temperature operating range	from -30°C to +70°C	
Built-in temperature sensor range / accuracy	Temperature sensor (embedded in electronic board) from -40°C to +125°C / ±1 °C (-10°C + 85°C)	

## PHYSICAL FEATURES

	GAUGE AND WHEELS ASSEMBLY	EXTENSION ROD
Material	stainless steel	stainless steel joint tips and carbon fiber rod
IP class	IP68 up to 1.0 MPa (2.0 MPa on request)	–
Casing compatibility <sup>(6)</sup>	Min. casing ID 58 mm - Max casing ID 83 mm	–
Gauge length / Total weight <sup>(7)</sup>	1.0 m length / 2.30 kg - 1.5 m length / 2.40 kg - 2.0 m length / 2.50 kg	



(1) Sensitivity is a specific parameter different for every gauge. The sensitivity is calculated during gauge calibration test and inserted into the Calibration Report.

(2) 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.

(3) Stability calculated as difference after a 24 h period under repeatability conditions (ISO 18674-3).

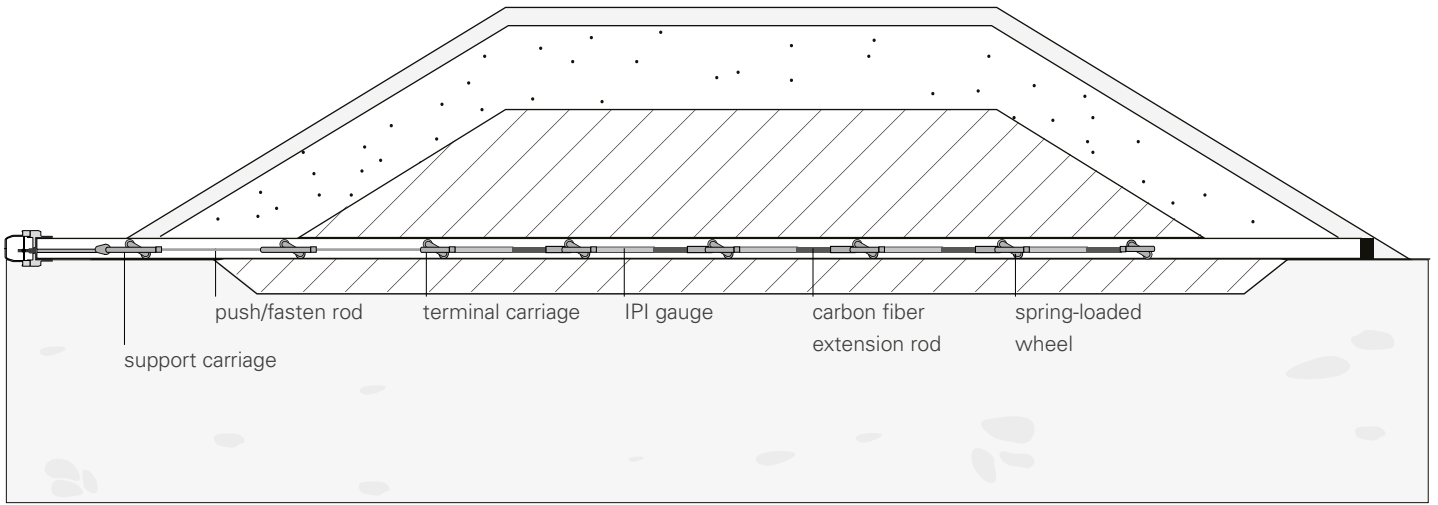
(4) 60 days test, reference reading taken 96 hours after installation, system composed by 15 BH-Profile gauges with 2m elongation rod. Test performed in nearly-repeatability conditions.

(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](#).

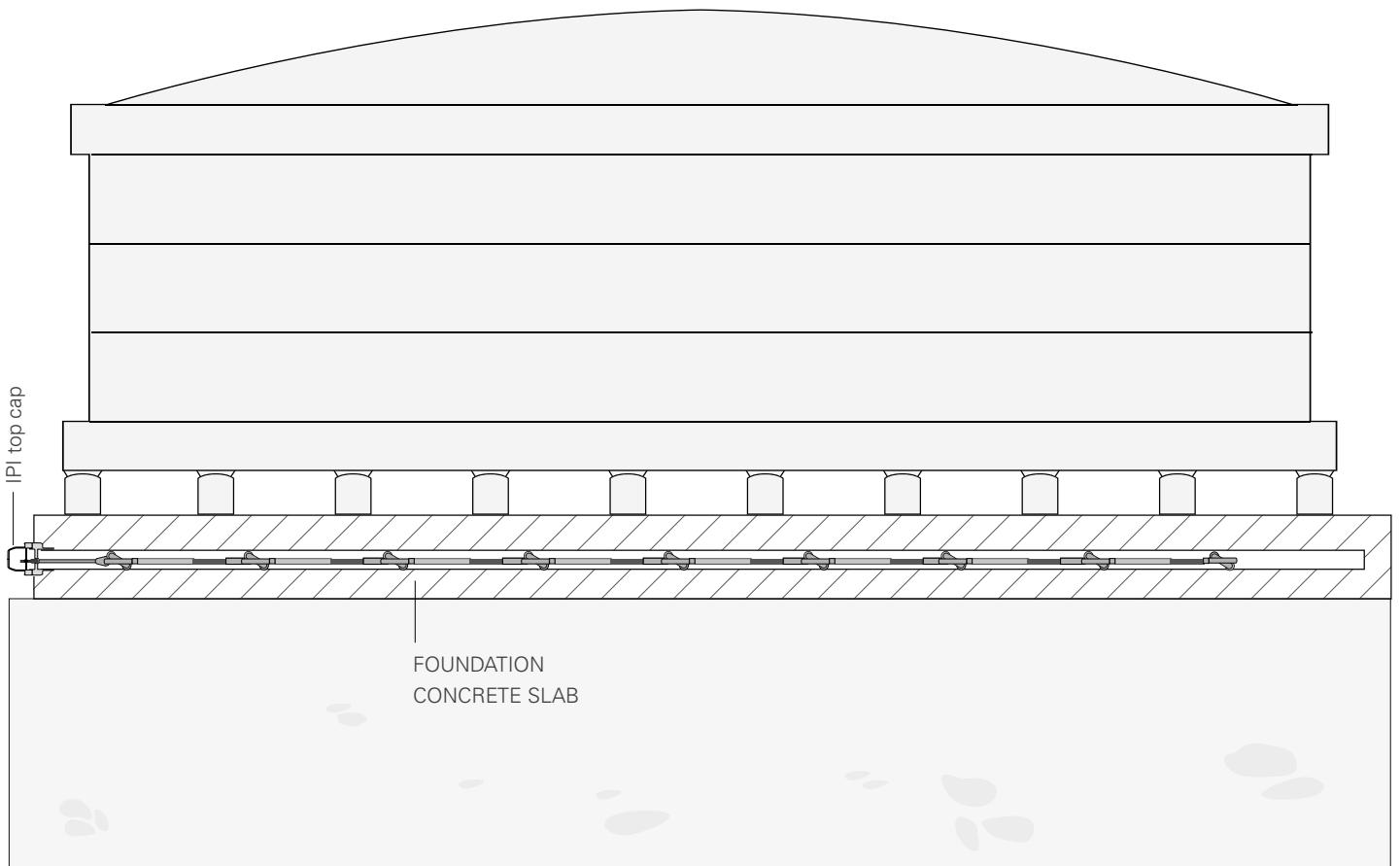
(6) We strongly suggest to use Sisgeo ABS casing

(7) As for ISO 18674-3 standard, total length should not exceed 2 m. Gauges with longer extension rods available on request. Performances of gauges with extension rods longer than 2m could be worst than what reported in this datasheet.

## EMBANKMENT APPLICATION



## LNG TANK APPLICATION



## ACCESSORIES AND SPARE PARTS

### CARBON FIBRE EXTENSION ROD OS430EX00RD

Extension rod rigidly connected to the IPI probe at factory. Available in different dimensions to reach a total probe length of 1.0 m, 1.5 m, 2.0 m and 3.0 m (length to be specified).

### HORIZ. IPI TOP CAP ODEXOTS2350

Special cap with No.3 anchor that permits to fasten the horizontal IPI chain and fix it into the inclinometer tube.

### UPPER CABLE WITH CONNECTOR OS400HD00MT

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

### TERMINAL WHEEL OS44WHE2SS0

Composed by one fixed wheel and one spring loaded wheel. It permits to end the IPI chain.

### 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.

### TERMINATION RESISTANCE OETERMRESIO

Resistance ending device with connector, needed to close every digital IPI chain. The value of resistor depends on the layout of the system. For more detail see the [FAQ#076](#).

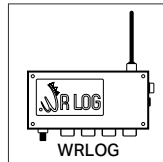
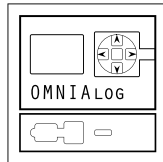
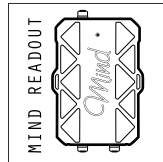
### PUSH/FASTEN RODS OS4RODOAC00

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

### DIGITAL INCLINOMETER CABLE OWE606IPDZH

LSZH cable for connecting digital BH profile chain to OMNIAlog datalogger.

## READABLE BY



For further information refer to their own datasheets

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### ADDITIONAL SUPPORT

SISGEO offers on-line assistance service to the Customers in order to maximize the performance of the system and training on the correct use of the instrument/readout.

For more information contact mail: [assistance@sisgeo.com](mailto:assistance@sisgeo.com)