

Geomotion
AUSTRALIA



Instrument Datasheet

BH Profile Inclinerometers

DESCRIPTION

BH Profile Gauges are designed for automatic monitoring of critical locations where displacement request a nearly-real time monitoring.

The 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. Each BH profile chain is

composed by a string of gauges with carbon fibre extension rods and an upper terminal wheels assembly.

The gauges are electrically linked one to each other with waterproof male/female connectors, and the string is connected to readout or data logger with single digital bus cable.

MAIN APPLICATIONS

- ✓ Landslides
- ✓ Dams
- ✓ Tunnelling
- ✓ Deep excavations
- ✓ Unstable slopes

FEATURES

- ✓ Carbon fibre rods grants light strings and simpler installation
- ✓ Digital bus simplifies and speeds up the installation process
- ✓ Internal humidity and power supply permit sensors to have more information in the event of gauge malfunction

TECHNICAL SPECIFICATIONS⁽¹⁾

	0S431HD15S0	0S431HD30S0	0S432HD15S0	0S432HD30S0
Measurement principle	UNIAXIAL MEMS inclinometer		BIAXIAL MEMS inclinometer	
Measuring range	$\pm 10^\circ, \pm 15^\circ$		$\pm 10^\circ, \pm 15^\circ$	$\pm 20^\circ, \pm 30^\circ$
Sensor resolution	0.00056° (reading frequency 2 Hz)		0.00056° (reading frequency 2 Hz)	
Sensor repeatability	<0.0013° (reading frequency 2 Hz)		<0.0013° (reading frequency 2 Hz)	
Sensor mechanical bandwidth	18 Hz		18 Hz	
Sensitivity ⁽²⁾	see Calibration Report		see Calibration Report	
Sensor accuracy				
Lin. MPE ⁽³⁾	$\pm 0.025\%$ FS	$\pm 0.070\%$ FS	$\pm 0.025\%$ FS	$\pm 0.070\%$ FS
Pol. MPE ⁽³⁾	$\pm 0.010\%$ FS	$\pm 0.015\%$ FS	$\pm 0.010\%$ FS	$\pm 0.015\%$ FS
Sensor 24h stability ⁽⁴⁾	< ± 0.04 mm / m		< ± 0.04 mm / m (A-axis)	
Repeatability (precision) of a string of BH profile elements ⁽⁵⁾	< ± 2.00 mm / 30 m		< ± 2.00 mm / 30 m (A-axis)	
Offset temperature dependency	$\pm 0.002^\circ / ^\circ\text{C}$		$\pm 0.002^\circ / ^\circ\text{C}$	
Power supply	from 8 to 28 Vdc		from 8 to 28 Vdc	
Signal output and protocol	RS-485 with Modbus RTU protocol ⁽⁶⁾		RS-485 with Modbus RTU protocol ⁽⁶⁾	
A/D converter	sigma-delta 32 bit, 38-KSPS		sigma-delta 32 bit, 38-KSPS	
Average consumption	4.3 mA @ 24 Vdc, 8 mA @ 12 Vdc		5.3 mA @ 24 Vdc, 10.0 mA @ 12 Vdc	
Temperature operating range	from -30°C to +70°C		from -30°C to +70°C	
Built-in temperature sensor range / accuracy	Temperature sensor (embedded in electronic board) from -40°C to +125°C / $\pm 1^\circ\text{C}$ (-10°C + 85°C)		Temperature sensor (embedded in electronic board) from -40°C to +125°C / $\pm 1^\circ\text{C}$ (-10°C + 85°C)	

PHYSICAL FEATURES

	GAUGE AND WHEELS ASSEMBLY	EXTENSION ROD
Material	stainless steel	stainless steel joint tips and carbon fibre rod
IP class	IP68 up to 1.0 MPa (2.0 MPa on request)	--
Casing compatibility ⁽⁷⁾	Min. casing ID 58 mm- Max casing ID 83 mm	--
Gauge length / Total weight ⁽⁸⁾	1.0 m length / 2.30 kg - 1.5 m length / 2.40 kg - 2.0 m length / 2.50 kg	



(1) Performance are granted for instruments installed in vertical casing installations where borehole inclination should be kept within $\pm 2^\circ$ of vertical, at any point along the borehole (ISO18674-3).

(2) Sensitivity is a specific parameter 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 both linear regression (\leq Lin. MPE) and polynomial correction (\leq Pol. MPE).

(4) Stability calculated as difference after a 24 h period under repeatability conditions (ISO18674-3).

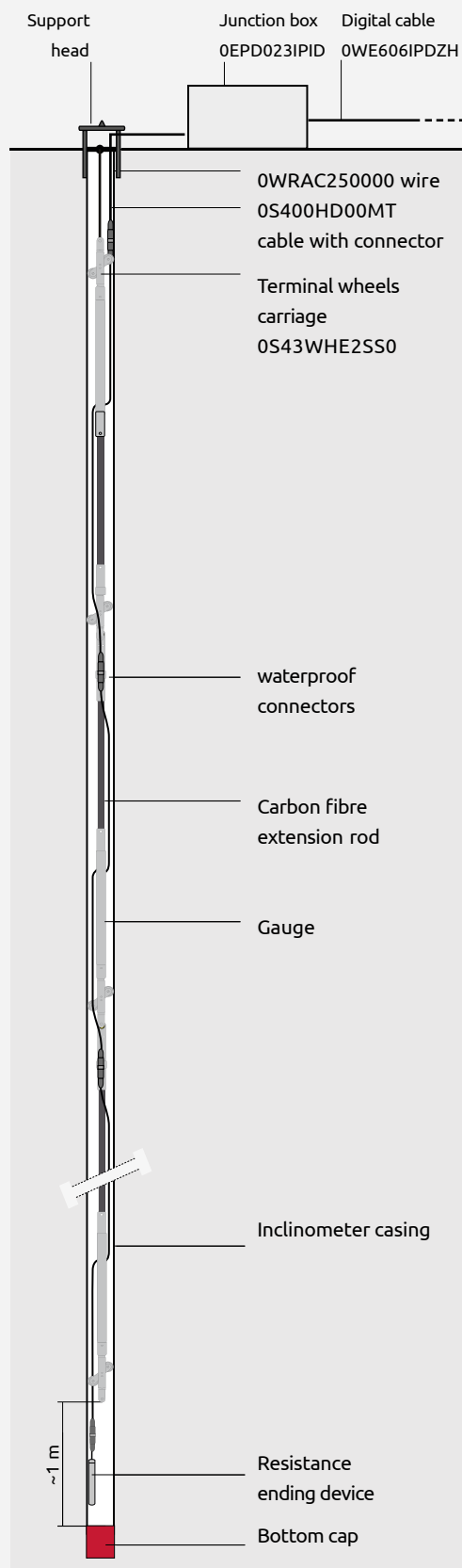
(5) 60 days test, reference reading taken 96 hours after installation, system composed by 15 BH-Profile gauges with 2m elongation rod. Test performed in nearly-repeatability conditions.

(6) RS485 not-optoisolated Modbus communication with RTU Protocol. Default output is sen α , other units available are degree, mm/mand inch/feet (to be requested at order).

(7) We strongly suggest to use Sisgeo ABS casing

(8) As for ISO18674-3 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 data sheet.

ACCESSORIES AND SPARE PARTS



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CARBON FIBRE EXTENSION ROD 0S430EX00RD

Extension rod connected to the BH profile gauge at factory. Available in different dimensions to reach a total length of 1.0 m, 1.5 m and 2.0 m (length to be specified at order).

TERMINAL WHEELS CARRIAGE 0S43WHE2SS0

Composed by stainless steel spring loaded carriage with two wheels. Permits to end the BH profile chain at the top.

UPPER CABLE WITH CONNECTOR 0S400HD00MT

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.

INCLINOMETER SUPPORT HEAD 0S4TS101000

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

DIGITAL INCLINOMETER CABLE 0WE606IPDZH

LSZH cable for connecting digital BH profile chain to OMNIAlog data logger.

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.

SUPPORT STEEL WIRE 0WRAC250000

It is used to suspend the BH profile within the inclinometer casing. Diameter 2.5 mm.

RESISTANCE ENDING DEVICE 0ETERMRESIO

Termination resistance with connector, needed to close every digital BH Profile chain. The value of resistor depends on the layout of each BH Profile system.

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 digital gauges. Contact Geomotion to check compatibility with old digital gauges.

TYPICAL TRENCH INSTALLATION

SECTION VIEW

