LTIN

_ LT-INCLIBUS

INCLINOMETERS
& PENDULUMS

SISGEO®

LTIB_EN_00_01/2021

LT-INCLIBUS

The LT-Inclibus gauge is able to monitor local tilting along a line, assuring the alignment, distance and measuring axis orientation between the gauges.
The standard segment is composed by a 2m fibre glass rod with two biaxial waterproof gauges, 1m spaced.
The chain of LT- Inclibus can be installed within a borehole, mounted to a surface of a structure, laid along a trench or buried in a concrete mass.
It is possible to have one or four gauges on the 2m rod upon request.
The rods are connected through mechanical joints, while the gauges are connected in a RS485 chain. The logger can read both the inclination of the two axis in engineering units and the internal sensor diagnostics for each measuring point (temperature, relative humidity and voltage supply).
Customers can use any electronic device compatible with RS485 and Modbus RTU protocol as a logger. The LT-Inclibus gives a complete and transparent array of data in engineering unit, as a result.

MAIN APPLICATIONS

- Embankments
- Unstable slopes
- Settlements
- LNG tanks
- Deep excavations
- Tunneling
- Dam slope stability
- Deck bridges deformation

FEATURES

- Light and flexible array
- Simple and fast to install
- Number of measuring points customizable
- Each mesuring point is individually calibrated following high level metrologic procedures

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

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TECHNICAL SPECIFICATIONS

PRODUCT CODE	0LTIBV20102	0LTIBH20102
TILTMETER [1]		
Application	Vertical, biaxial	Horizontal, biaxial
Measurement principle	TRIAXIAL MEMS inclinometer 2 axis used	TRIAXIAL MEMS inclinometer 2 axis used
Measuring range	standard ±10° (other ranges available on request)	
Sensor resolution	0.0002°	
Sensor repeatability	<±0.008°	
Sensitivity [2]	see the Calibration Report	
Sensor accuracy Lin. MPE[3] Pol. MPE[3]	 <±0.10% F.S. <±0.05% F.S.	
Sensor 24h stability [4]	< ±0.1mm/m	
Sensor mechanical bandwidth	10 Hz	
Sensor offset temperature dependancy	A axis: <±0.01°/°C B axis: <±0.004°/°C	A axis: <±0.004°/°C B axis: <±0.004°/°C
Temperature operating range	from -30°C to +70°C	
TEMPERATURE SENSOR [5]	Embedded on electronic board	
Measuring range	- 40°C to +125°C	
Accuracy	±1°C with temperature range -10°C to +85°C	
HUMIDITY SENSOR [5]	Embedded on electronic board	
Measuring range	0 to 100% RH	
Accuracy	±5% RH with humidity range 0 to 95% RH	
SUPPLY VOLTAGE MONITOR [5]	Embedded on electronic board	
Measuring range	0 to 36 V	
Accuracy	±5% FS	
ELECTRICAL SPECIFICATIONS		
Signal output	RS485 non-optoisolated communication with MODBUS RTU protocol [5]	
Maximum reading frequency	2.5 reading per second (1 Hz)	
Power supply	from 8 to 28 Vdc	
Average consumption	3.2 mA @ 24 Vdc, 4.6 mA @ 12 Vdc	
Max cable length to logger	1000 m (for more information see F.A.Q.#077 on Sisgeo web site)	

(1) Technical characteristics are referred to ±10° measuring range
(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 both linear regression (≤ Lin. MPE) and polynomial correction (≤ Pol. MPE)
(4) Stability calculated as difference after a 24 h period under repeatability conditions (ISO 18674-3).
(5) These sensors are installed on the internal electronic board for sensor diagnostics.
(6) RS485 not-optoisolated Modbus communication with RTU Protocol. Legacy mode is not supported by this instrument 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 on www.sisgeo.com.
(7) Faster reading are available under request, but the performance of the system will be lower due to the increment of noises.

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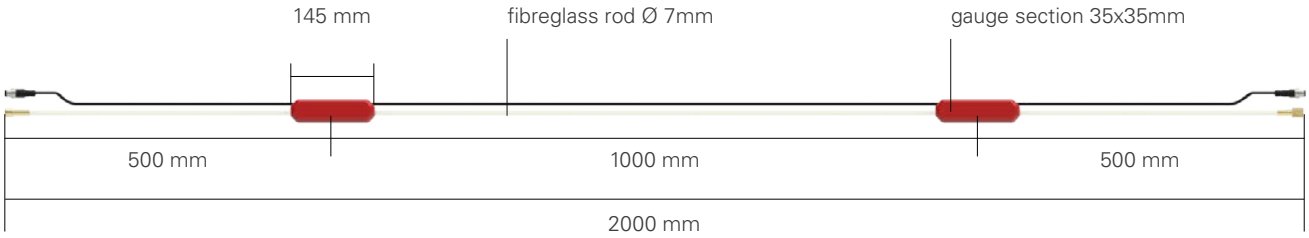
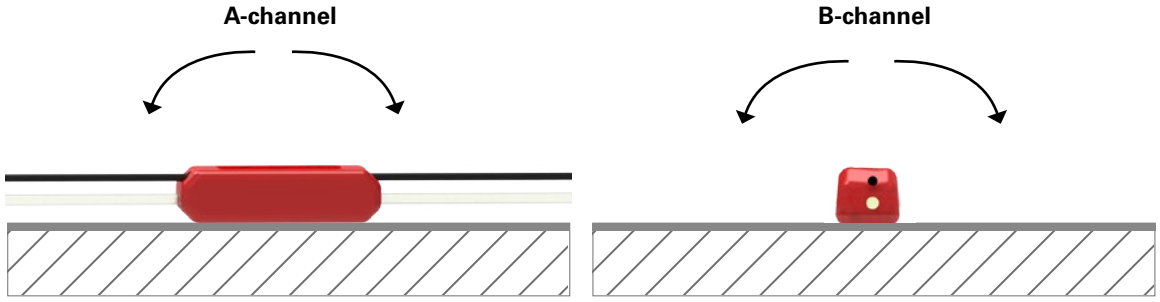
PHYSICAL FEATURES

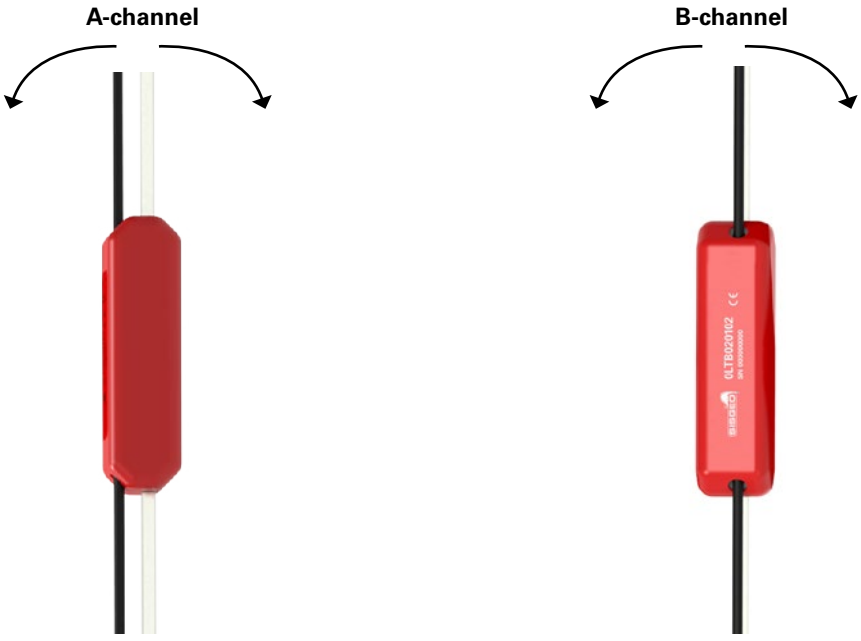
	GAUGE	FIBERGLASS ROD
Material	polycarbonate	stainless steel joint tips and fibre-glass rod
IP class	IP68 up to 1.0 MPa (2.0 MPa on request)	–
Dimensions	145mm x 35mm x 35mm	2m length, rod Ø 7 mm
Weight	200 gr	200 gr



MEASURING AXIS IN HORIZONTAL APPLICATION



MEASURING AXIS IN VERTICAL APPLICATION



ACCESSORIES AND SPARE PARTS

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 nearest gauge to local logger, wireless node or junction box.

TERMINATION RESISTANCE OETERMRESI0

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 details, please see the FAQ#076.

2M FG ELONGATION ROD OLTIBROD020

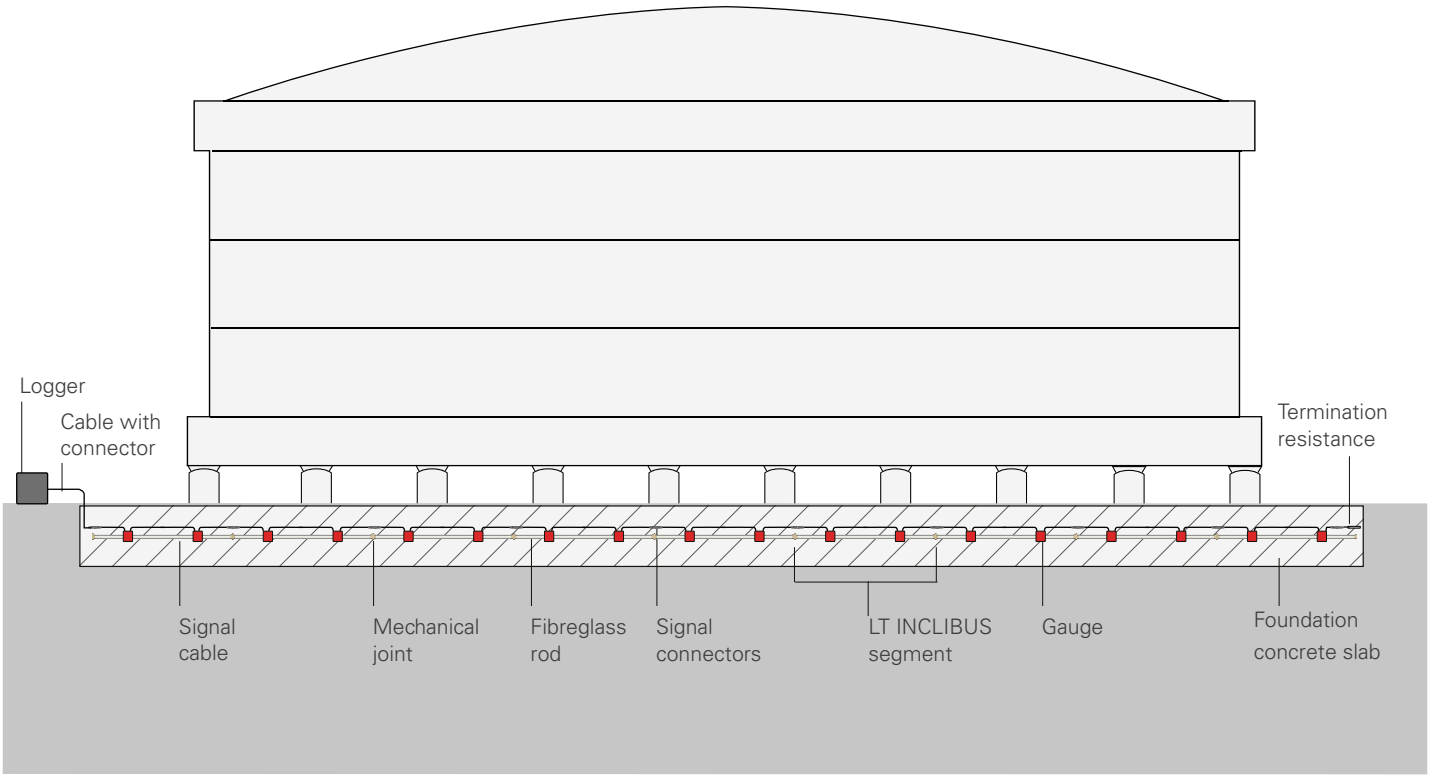
Fibre glass rod for chain elongation, 2m lenght, including mechanical joints and signal cable with connectors assembled at factory.

DIGITAL CABLE OWE606IPDZH

LSZH cable for connecting digital guage chains to OMNIAlog datalogger.

RESISTANCES KIT (SPARE) OERESIKIT00

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



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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***