



Settlement and Displacement



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ST110

Magnetic settlement meter



Description

The magnetic settlement meter ST110, suited to be installed in drilling holes, provides an indication of vertical displacements between different ground measuring points.

It consists in a double guided tube (externally wrinkled and internally a PVC tube), around which are placed, at prefixed depth, plastic covered magnetic rings.

The column is built during the insertion in the drilled hole, or step by step during the embankment construction.

At the bottom of the magnetic settlement column is installed a telescopic anchor. At the head is installed a suspension head.

The measurement is obtained by lowering the settlement magnetic meter probe into the tube. Every time the probe enters the magnetic field a reed switch is closed. Measuring the distance between the head of the tube, as reference, and every point in the column, is possible to extract the absolute ground settlement.

The settlement magnetic probe consist of a PVC reel on which is coiled a graduated with cm or mm markings cable of different length. At the end of the cable is placed a reed switch.

In the central reel body are place the acoustic and visual signals supplied by a 9V battery.

on demand you can request for the COMBO probe so you can have 2 instruments in one (the magnetic meter probe and the water level probe).

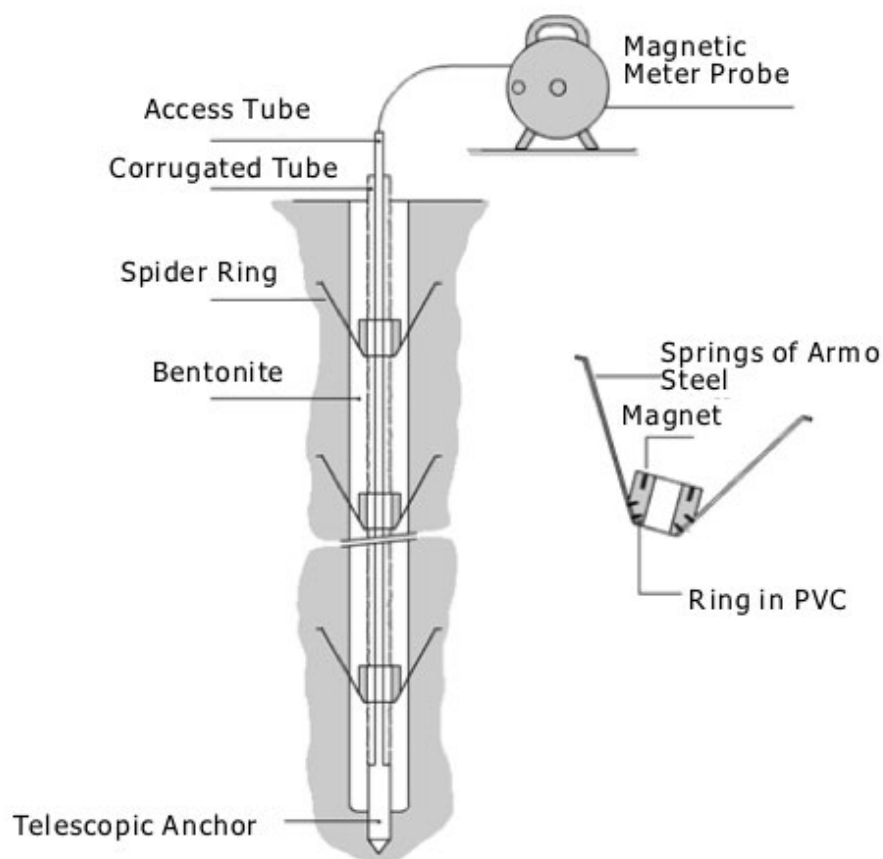
Applications

Monitoring settlement in ground, embankments etc.



ST110

Magnetic settlement meter



Technical features

Magnetic Meter Probe	ST110-SO-CM-XXX* - cm markings cable
Cable	Ext. sheath in transparent polyurethane armoring with Kevlar core, 4 conductors
Cable Diameter	Ø4.7mm
Dimension Probe	Ø12 x 150mm
Length Available	50 - 100 - 150 - 200 - 300 mt
Magnetic Meter Probe	ST110-SO-MM-XXX* - mm markings cable
Cable	polyethylene jacketed measuring tape 2 conductors
Cable Diameter	10 x 1mm
Dimension Probe	Ø12 x 150mm
Length Available	50 - 100 - 150 mt
Spider Ring	ST110-AM-AL
Material	Ring in PVC and 3 Springs of Harmonic Steel
Ring Dimension	Int. Ø60mm Est. Ø90mm x 45mm
Spring Dimension	20 x 400 x 0.7mm
Plate Ring	ST110-AM-PI
Material	Ring and Plate in PVC
Ring Dimension	Int. Ø60mm Est. Ø90mm X 45mm
Spring Dimension	300 x 300 x 2mm
Corrugated Tube	ST110-TU-PR-XXX*
Material	HDPE threading corrugated
Dimension	Int. Ø42mm Est. Ø60mm
Length Available	50 - 100 mt
Access Tube	ST110-TU-IS-XXX*
Material	PVC
Dimension	3/4"
Length Available	1.5 - 2 - 3 mt
Telescopic Anchor	ST110-AN
Dimension	Ø90mm x 1000mm
Material	PVC
Suspension Head	ST110-TS
Dimension	Ø120mm x 120mm
Material	PVC
Combo Probe	Add -CO to the magnetic meter probe

*XXX Indicate the length

ST120

Settlement plate



Description

The ST120 is used to monitor settlement in embankments using an optical survey. The instrument consists of an anchor (500x500x5mm galvanized or stainless steel plate), a galvanized or stainless steel tube fixed on the anchor plate, a special corrugated tube and a measuring point mounted on the top of the steel tube.

The ground settlement is measured topographically referred to the top of the tube.

The settlement plate is delivered with caps and central cylinders for easy and precision mounting of the corrugated tube.

As the height of the embankment continues to rise, the settlement meter plate column can be extended using further rod. Displacement sensor can be used without the use of optical survey.

Every sensor is provided with a calibration certificate that attests the results of the test performed and all electromechanical features.

Manual read out with DATAVIEW.

Automatic read out with MINILOG, MYLOG.

Readout units with NATUN.

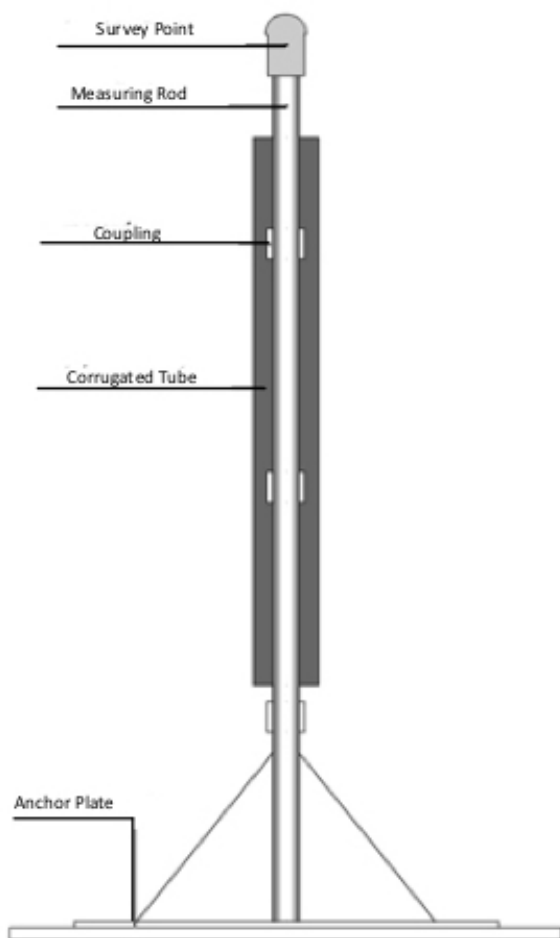
Applications

Monitoring settlement in ground, embankments etc.



ST120

Settlement plate



Technical features

Model	ST120-AC	ST120-IN
Anchor	ST120-AN-AC-XX**	ST120-AN-IN-XX**
Material	Galvanized steel	Stainless steel
Dimension	500 x 500 x 5 mm	
Measuring rod	ST120-AS-AC-XX**	ST120-AS-IN-XX**
Material	Galvanized steel	Stainless steel
Diameter	3/4"	
Length	0.5 - 1 - 2 - 3 mt	
Coupling	Threaded coupling 3/4"	
Threading corrugated tube	ST120-TP5-XX*	
Material	HDPE	
Diameter	Int. Ø42mm Ext. Ø60mm	
Length available	50 - 100 mt	
Head fitting	ST120-RA-SU	
Material	PVC	
Dimension	Ø65 x 50 mm	
Bottom fitting	ST120-RA-IF	
Material	PVC	
Dimension	Ø65 x 50 mm	
Survey point	ST120-RB-ME	
Material	Stainless steel	
Dimension	Ø20 X 50 mm	

Accessories

Coupling 3/4"	ST120-RA-AC	ST120-RA-IN
Top rod	ST120-TP-AC	ST120-TP-IN
Displacement sensor	ST120-DS-MM***	
Range available	200-500-750-1000-1500-2000 mm	
Linearity / repeatability	0.02% FS / 0.01mm	
Supply	18-30Vcc	
Output	4-20mA	
Protection	IP67	
Installation Kit for displacement sensor	ST120-DS-KIT	

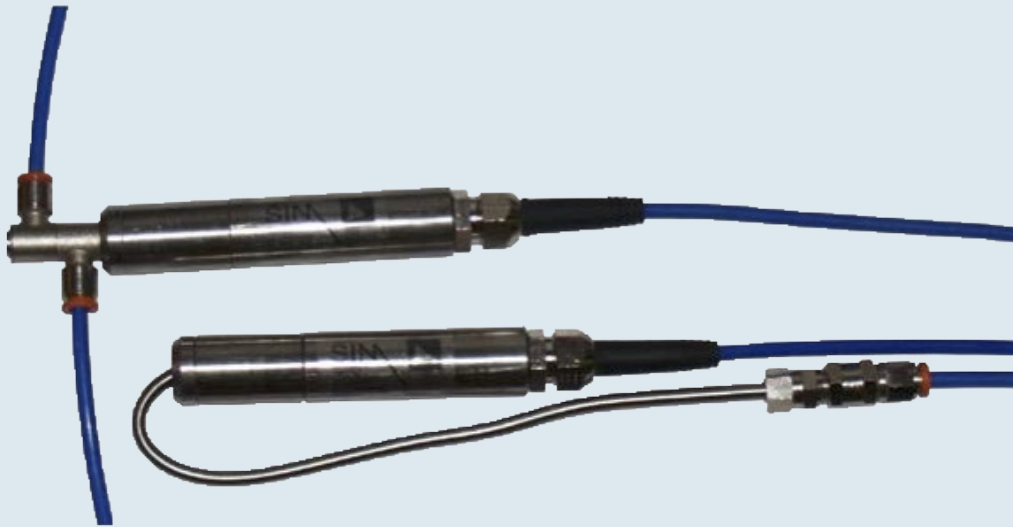
*XX Indicate the tube length (0.5 - 1 - 2 - 3 mt)

**XX Indicate the tube length welded on plate

***MM Indicate the sensor range

ST130

Electric settlement meter



Description

The settlement meter ST130 has been designed by SIM STRUMENTI to measure vertical settlements in embankments and foundations. The instruments are produced with high quality materials in order to assure high precision and measurement reliability for long terms.

The system consists of one or more sensors connected between them by a hydraulic tube to a reference tank.

The sensors are produced in stainless steel allowing, if necessary, to be buried into the ground.

The reference tank, made in PVC material, is provided with a universal mounting bracket allowing to be mounted on any surface. The connection between the reference tank and all elements is done by nylon tubes filled by a special measuring liquid.

The measurement is done by a piezoelectric sensor which measures the pressure of the liquid above him, translating this pressure into vertical settlement. In each particular case, sensors can be used with different ranges.

Every sensor is provided with a calibration certificate that attests the results of the test performed and all electromechanical features.

Manual read out with DATAVIEW.

Automatic read out with MINILOG, MYLOG.

Readout units with NATUN.

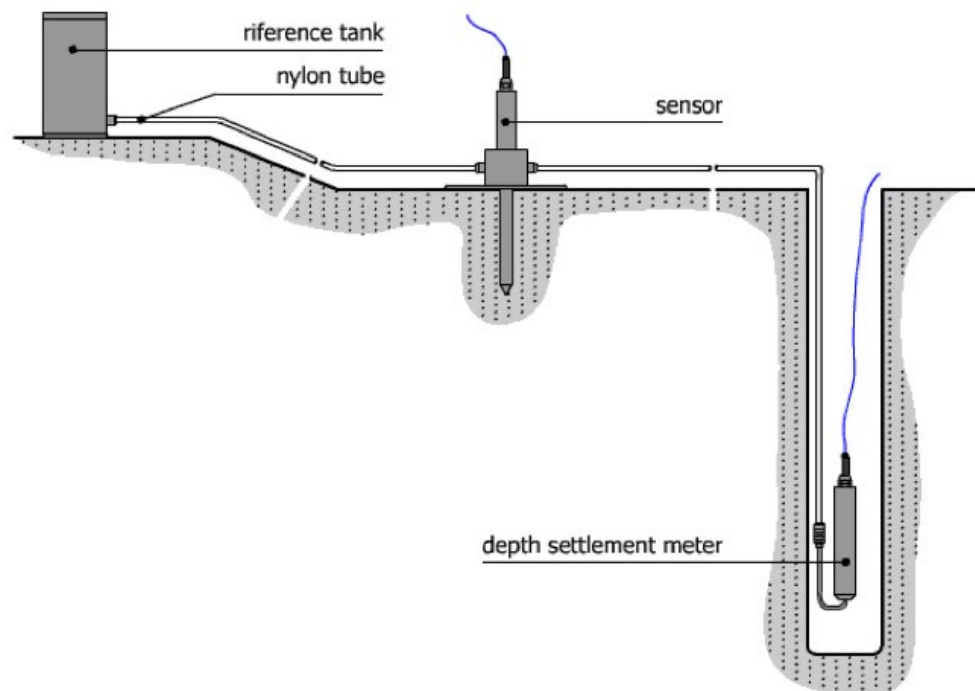
Applications

Settlement measurements of embankments, foundations etc.



ST130

Electric settlement meter



Technical features

Surface settlement meter

ST130-AS-FS*

Range Available	available FS from 0.5 to 5 mt
Supply	8-24Vcc
Output	4-20mA
Linearity	0.25% FS
Repeatability	0.01% FS
Operating temperature	-20 ÷ +70 °C
Protection	IP68

Material	Sensor	Stainless Steel
	Couplings	Stainless Steel
	Plate	Galvanized Steel

Dimensions	250 x 100 x 100 mm
Weight	0.800 Kg

Depth settlement meter

ST130-AP-FS*

Range Available	available FS from 0.5 to 30 mt
Supply	8-24Vcc
Output	4-20mA
Linearity	0.25% FS
Repeatability	0.01% FS
Operating temperature	20 ÷ +70 °C
Protection	IP68

Material	Sensor	Stainless Steel
	Couplings	Stainless Steel

Dimensions	Ø50 x 200 mm
Weight	0.350 Kg

Reference Tank

ST130-TR

Material	PVC / Stainless Steel
Dimensions	Ø150 x 200 mm

Accessories

Hydraulic tube

ST130-TU-ID-XX**

Corrugated tube

ST130-TU-PR-XX**

Liquid

ST130-LI-LL***

Material	50% glycerine 98% and 50% water
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*FS	Indicate the sensor range
**XX	Indicate the length tube
***LL	Indicate liquid quantity in Lt.

ST140

Settlement multipoint system



Description

The level measurement system ST140 has been designed by SIM STRUMENTI to monitor with high precision and continuously the altimetry variations between two or more points placed at great distance one from the other.

The system is used in all applications where high precision settlement monitoring is required and in particular: stages, foundations, bridges, dams, monuments, or structures in general subject to vertical settlement.

One of the greatest advantages of the ST140 settlement system is absence of moving parts, which allow a great reliability of the measurement.

The level system is based on the communicating vessels principle and consist of a PVC tank, completed of stainless steel mounting bracket, connected to one or more instruments of the same family by flexible nylon tubes, one for the hydraulic system and one for the pneumatic circuit.

Every couple of measuring tanks is connected to a high precision differential pressure sensor, which is capable to monitor settlement variations up to 0.01 mm.

An important feature of the system is the possibility to control and set the zero value of the instruments even if already installed and operative.

Every sensor is provided with a calibration certificate that attests the results of the test performed and all electromechanical features.

Manual read out with DATAVIEW.

Automatic read out with MINILOG, MYLOG.

Readout units with NATUN.

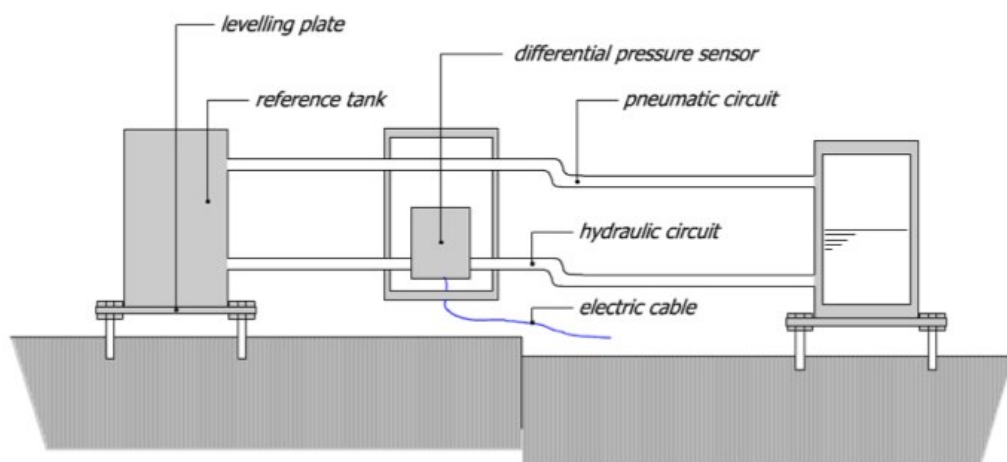
Applications

Measurement of vertical settlements in buildings, bridges, structures etc.



ST140

Settlement multipoint system



Technical features

Differential Pressure Sensor

ST140-SL-FS*

Range Available	±50, ±70, ±100, ±250, ±500, ±1000mm
Supply	15- 45Vcc
Output	4-20mA
Linearity	0.2% FS
Repeatability	0.01% FS
Overpressure	1bar
Protection	IP65
Operating temperature	-40 ÷ +85 °C

Material	Membrane	Stainless Steel
	Sensor case	Stainless Steel / Aluminum
	Coupling	Stainless Steel
	Case	Reinforced Polyester

Dimensions 200 x 300 x 160 mm

Weight 5 Kg

Reference Tank

ST140-TZ

Material	PVC / Stainless Steel
Dimensions	Ø120/150 mm

Adjustable Bracket

ST140-SR

Material	Stainless Steel
Dimensions	Ø20/300 mm
Adjustment	±125mm

Accessories

Hydraulic tube

ST140-LQ-XX**

Material	Rilsan
Dimensions	Ø12/10 transparent

Pneumatic tube

ST140-AR-XX**

Material	Rilsan
Dimensions	Ø12/10 blue

Corrugated tube

ST140-TU-XX**

Liquid

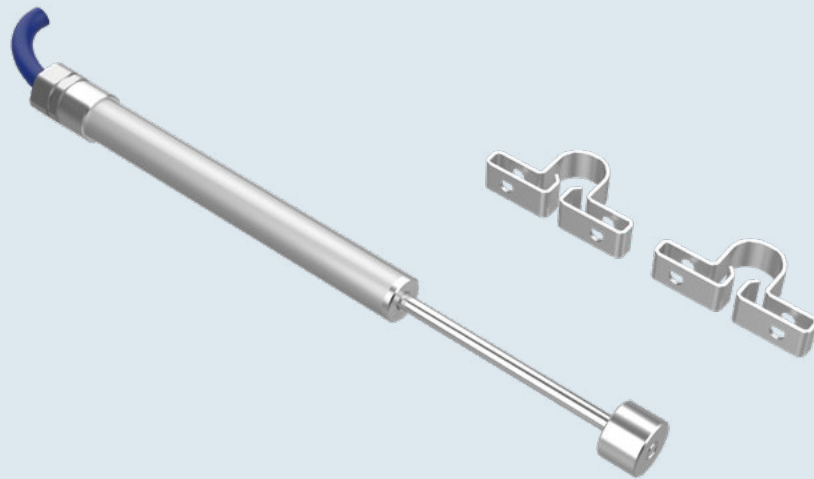
ST140-LI-LL***

Material	50% glycerine 98% and 50% water
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*FS Indicate the sensor range
 **XX Indicate the length tube
 ***LL Indicate liquid quantity in Lt.

DS805

Joint meter



Description

The DS805 joint meters are suitable for measuring displacement between two points, therefore they are used for monitoring cracks or joints in structures or rocks.

Used in any environmental situation, they guarantee high reliability.

The DS805 joint meters are slim and robust. They are constructed with an aluminum body that allows them to also be used outdoors.

They are supplied with copper-braid shielded cable, marine grade jacket.

The DS805 have various technical configurations: several ranges (25...250mm), supplies (1...24Vcc) and outputs (mV, mA).

Every sensor is provided with a calibration certificate that attests the results of the test performed and all electromechanical features.

Manual read out with DATAVIEW.

Automatic read out with MINILOG, MYLOG.

Readout units with NATUN.

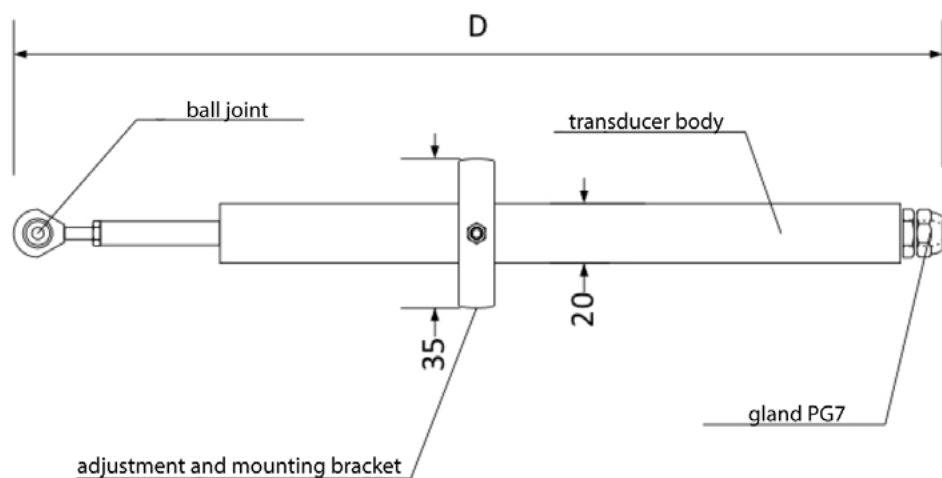
Applications

Structural cracks, structural joints, pile displacements etc.



DS805

Joint meter



Technical features

Model		DS811-AA-FS-AS*					
Sensor		Potentiometer					
Range		25	50	100	150	200	250
Linearity		±0.1 %FS			±0.05 %FS		
Length (D) mm	Min.	285	335	435	585	735	935
	Max.	310	385	535	735	885	1135
Weight (kg)		0.35	0.41	0.58	0.70	0.82	0.94
Possible combinations between Supply / Output		- 01	1-12Vcc / 1000mV/V				
		- 02	7-24Vcc / 0-1V				
		- 03	7-24Vcc / 0-2V				
		- 04	7-24Vcc / 0-5V				
		- 05	8-24Vcc / 4-20mA				
Resolution		0.001 mm					
Operating temperature		-30 ÷ +100 °C					
Insulation		>100MΩ a 500V					
Protection		IP67					
Material: body transducer, rod, ball joint, screw, gland and threaded rod anchors		Aluminum					

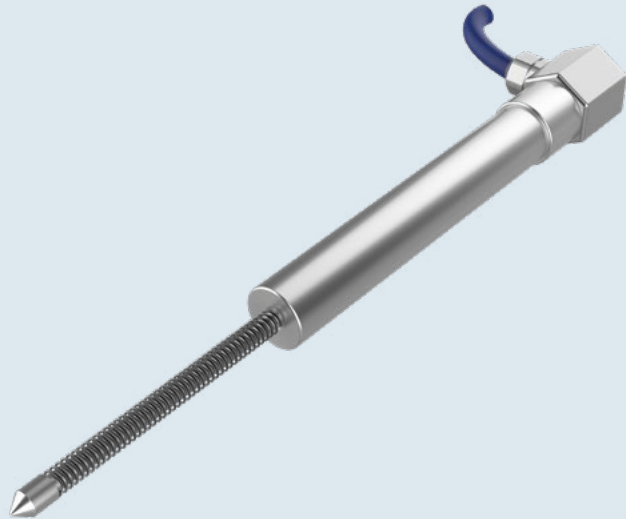
Accessories

Ball joint and mounting bracket	DS805-AX-SGS1
X axis brackets	DS805-AX-MWAX
Y axis brackets	DS805-AX-MWAY
Z axis brackets	DS805-AX-MWAZ

- *FS Indicate the range
 *AA Indicate the combination Supply/Output (-01... -05)
 *AS Indicate measuring axis (-X, -Y, -Z)

DS810

Joint meter



Description

The DS810 joint meters are designed for measuring displacement between two points. Therefore they are used for monitoring cracks or joints in structures or rocks.

They are produced in 3 different versions, using a range of mounting brackets they can be used in orthogonal, vertical or transversal applications. The joint meters are suited for every weather condition maintaining high reliability.

The DS810-01 model is suited to be mounted on the head of the multipoint borehole extensometer.

The DS810 has various technical configurations: several ranges can be chosen (10...100mm), supply (2...12Vcc) and output (mV,mA).

Every sensor is provided with a calibration certificate that attests the results of the test performed and all electromechanical features.

Manual read out with DATAVIEW.

Automatic read out with MINILOG, MYLOG.

Readout units with NATUN.

Applications

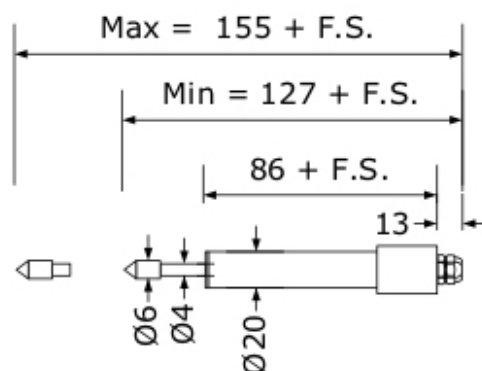
Structural cracks monitoring.



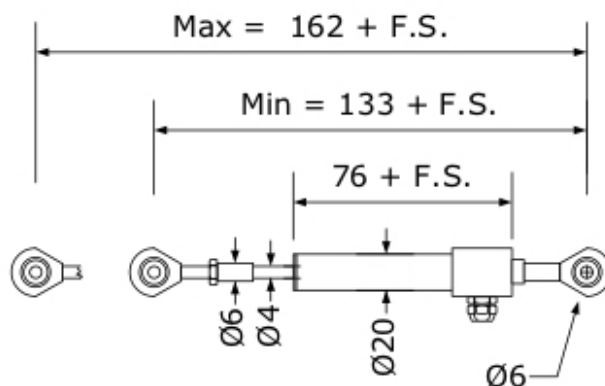
DS810

Joint meter

Mod. DS810-01



Mod. DS810-03



Technical features

Model	DS810-01-AA-FS*	DS810-03-AA-FS*
Sensor	Potentiometer	
Range	25, 50, 100, 150, 200, 250, 300 mm	
Possible combinations between Supply / Output	- 01	1-12Vcc / 1000mV/V
	- 02	7-24Vcc / 0-1V
	- 03	7-24Vcc / 0-2V
	- 04	7-24Vcc / 0-5V
	- 05	8-24Vcc / 4-20mA
Linearity	± 0.1 %FS	
Repeatability	<0.01%	
Resolution	0.01 mm	
Operating temperature	-30 ÷ +100 °C	
Insulation	>100MΩ a 500V	
Protection	IP65	
Material	Stainless Steel	

Accessories

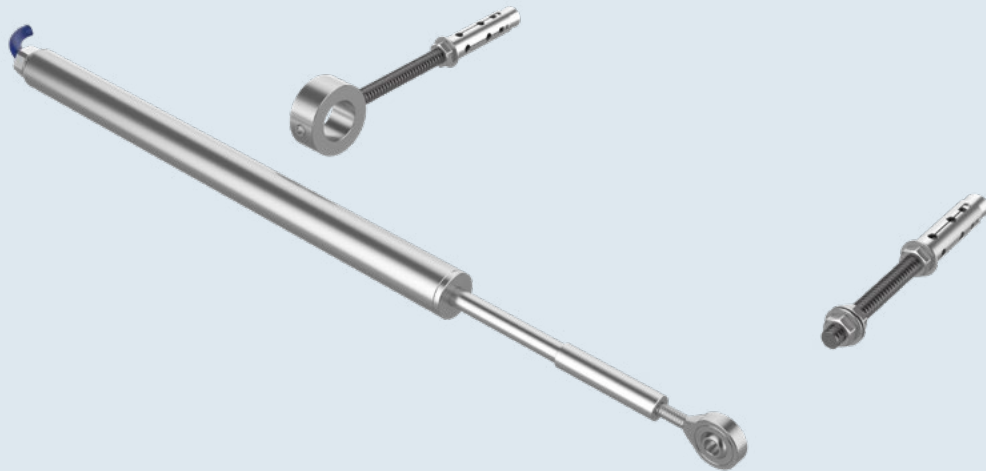
Couple of spherical joints	DS810-AX-SGS1
Mounting bracket with adjustment X axis	DS810-AX-MWAX
Mounting bracket with adjustment Y axis	DS810-AX-MWAY
Mounting bracket with adjustment Z axis	DS810-AX-MWAZ
Triaxial bracket	DS810-AX-MWAT
Demo plate for wall mounting	DS810-AX-MWDP
4-20 mA converter	DS810-AX-BEMA

*FS Indicate the sensor range

*AA Indicate the Supply / Output combination (-01... -05)

DS811

Joint meter



Description

The DS811 joint meters are suitable for measuring displacement between two points, therefore they are used for monitoring cracks or joints in structures or rocks.

Thanks to their sturdiness and protection (IP67) they are particularly suited to an external mounting in harsh environment conditions, ensure high reliability.

They are supplied with standard mounting kit (ball joint, mounting and adjustment bracket), but they can be ordered with more kinds of anchor brackets which allow the use in transverse, orthogonal and vertical position and can be customized on request.

They are supplied with copper-braid shielded cable, marine grade jacket.

The DS811 have various technical configurations: several ranges (25...250mm), supplies (1...24Vcc) and outputs (mV, mA).

Every sensor is provided with a calibration certificate that attests the results of the test performed and all electromechanical features.

Manual read out with DATAVIEW.

Automatic read out with MINILOG, MYLOG.

Readout units with NATUN.

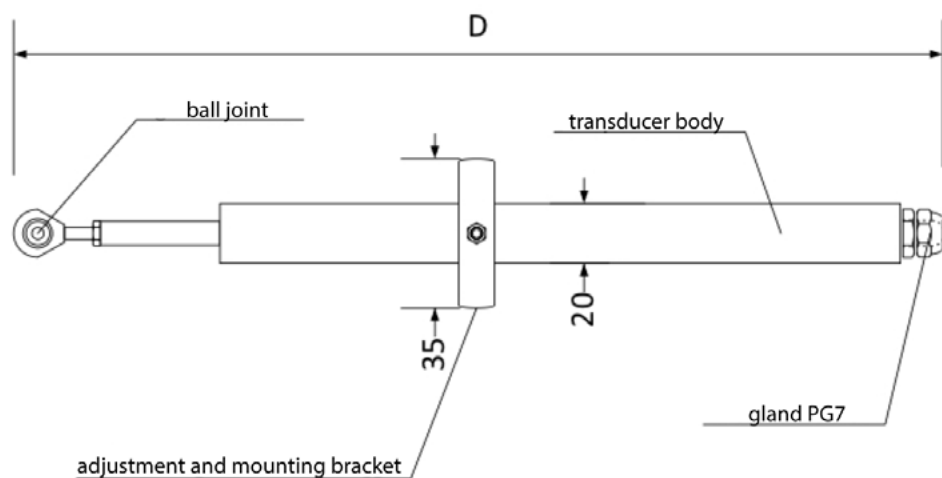
Applications

Structural cracks, structural joints, pile displacements etc.



DS811

Joint meter



Technical features

Model		DS811-AA-FS-AS*					
Sensor		Potentiometer					
Range		25	50	100	150	200	250
Linearity		±0.1 %FS			±0.05 %FS		
Length (D) mm	Min.	285	335	435	585	735	935
	Max.	310	385	535	735	885	1135
Weight (kg)		0.35	0.41	0.58	0.70	0.82	0.94
Possible combinations between Supply / Output		- 01	1-12Vcc / 1000mV/V				
		- 02	7-24Vcc / 0-1V				
		- 03	7-24Vcc / 0-2V				
		- 04	7-24Vcc / 0-5V				
		- 05	8-24Vcc / 4-20mA				
Resolution		0.001 mm					
Operating temperature		-30 ÷ +100 °C					
Insulation		>100MΩ a 500V					
Protection		IP67					
Material: body transducer, rod, ball joint, screw, gland and threaded rod anchors		Stainless Steel					

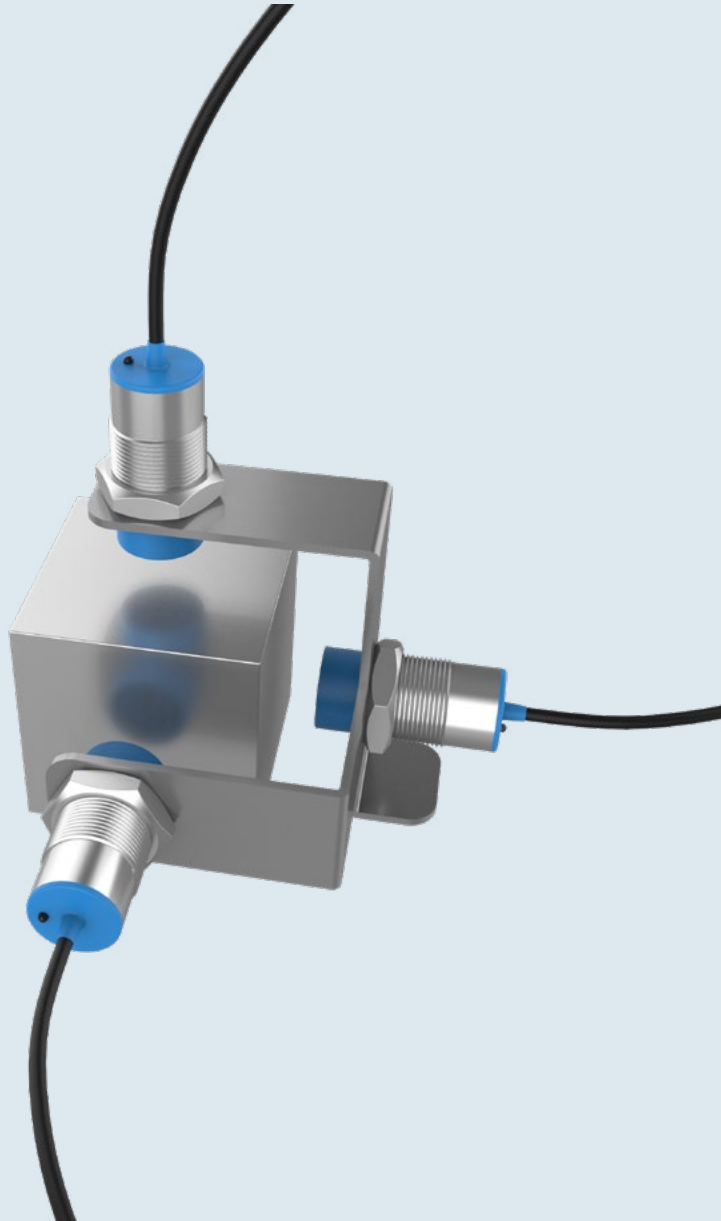
Accessories

Ball joint and mounting bracket	DS811-AX-SGS1
X axis brackets	DS811-AX-MWAX
Y axis brackets	DS811-AX-MWAY
Z axis brackets	DS811-AX-MWAZ

- *FS Indicate the range
 *AA Indicate the combination Supply/Output (-01... -05)
 *AS Indicate measuring axis (-X, -Y, -Z)

DS812

Triaxial joint meter



Description

It is not always possible to detect movements on joints, cracks or fractures using the traditional uniaxial joint meter. In fact, sometimes the result of a displacement is the sum of several components: orthogonal, transversal and vertical.

Then, using the geometrically arranged uniaxial joint meters can become difficult, considering the available space and expensive considering the cost. To this end, SIM INSTRUMENTI has produced the DS812, an instrument capable of simultaneously detecting three axes (X-Y-Z) with electric-type sensors.

In addition to the high reliability inherent in traditional uniaxial joint meters, the triaxial system combines two more advantages:

- mechanical retraction between the sensor and the feedback (this allows not to invalidate in any way the simultaneous readings on three axes, as there are no frictions due to the sensor-feedback contact)
- economic convenience compared to the purchase of three uniaxial joint meters.

Every sensor is provided with a calibration certificate that attests the results of the test performed and all electromechanical features.

Manual read out with DATAVIEW.

Automatic read out with MINILOG, MYLOG.

Readout units with NATUN.

Applications

Structural cracks, structural joints, pile displacements etc.



DS812

Triaxial joint meter

Technical features		
Model	DS812-01	DS812-02
Sensor	Inductive	
Range	1.5 ÷ 15 mm	0.1 ÷ 20 mm
Linearity	±0.15% FS	
Maximum dimensions	150 x 150 x 150 mm	
Weight	0.5 Kg	0.7 Kg
Supply	10 ÷ 30 Vcc	
Output	4 ÷ 20 mA	
Resolution	0.01 mm	
Operating temperature	-10 ÷ +55 °C	
Protection	IP67	
Material: sensor body / feedback / support bracket	Nickel plated brass / Anticorodal / Stainless Steel	
Accessories		
Protection case	DS812-AX-SCA	
Replacement sensor 15 mm	DS812-AX-01	
Replacement sensor 20 mm	DS812-AX-02	

DS820

Wire joint meter



Description

The wire joint meters DS820 measure relative displacement between two points placed horizontally or vertically at a distance not less than 0.5mt and no more than 25mt. An invar wire (material with low thermal coefficient) is connected by one end to the displacement sensor and on the other end to a special bolt and it is tended by a spring.

The mounting kits are of two types: one for vertical and one for horizontal mounting, and can be customized on request.

Thanks to their sturdiness and protection (IP67) they are particularly suited to an external mounting in harsh environment conditions, ensure high reliability.

The DS820 have various technical configurations: several ranges (25...150mm), supplies (1...24Vcc) and outputs (mV, mA).

The invar wire must be protected in a protective tube to prevent breakage.

Every sensor is provided with a calibration certificate that attests the results of the test performed and all electromechanical features.

Manual read out with DATAVIEW.

Automatic read out with MINILOG, MYLOG.

Readout units with NATUN.

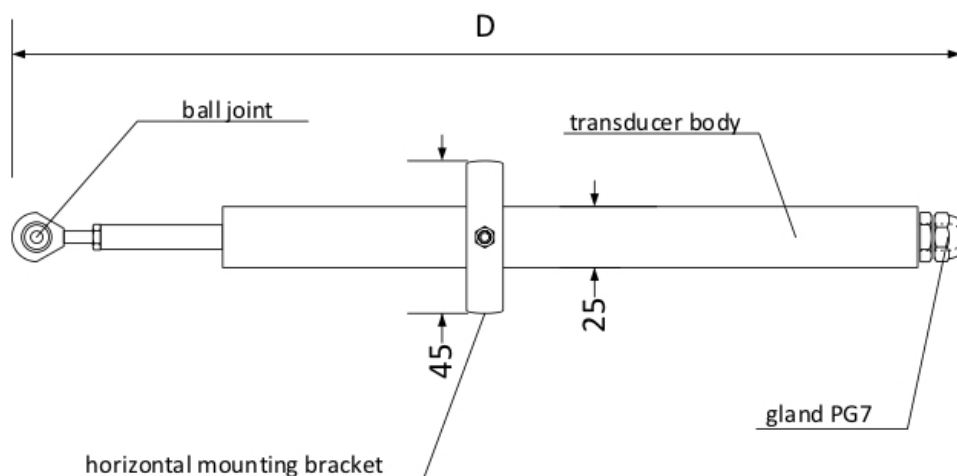
Applications

Structural cracks, structural joints, rock fall etc.



DS820

Wire joint meter



Technical features

Model	DS820-AA-FS-MT*			
Sensor	Potentiometer			
Range	25	50	100	150
Linearity (%FS)	±0.1	±0.1	±0.1	±0.05
Length (D) mm	Min.	380	380	480
	Max.	405	430	580
Weight (kg)	0.45	0.45	0.70	0.90
Possible combinations between Supply / Output	- 01	1-12Vcc / 1000mV/V		
	- 02	7-24Vcc / 0-1V		
	- 03	7-24Vcc / 0-2V		
	- 04	7-24Vcc / 0-5V		
	- 05	8-24Vcc / 4-20mA		
Resolution	0.001 mm			
Operating temperature	-30 ÷ +100 °C			
Insulation	>100MΩ a 500V			
Protection	IP67			
Material: body transducer, rod, ball joint, cardan joint, bracket, bolts and screws, gland and threaded rod anchors	Stainless Steel			

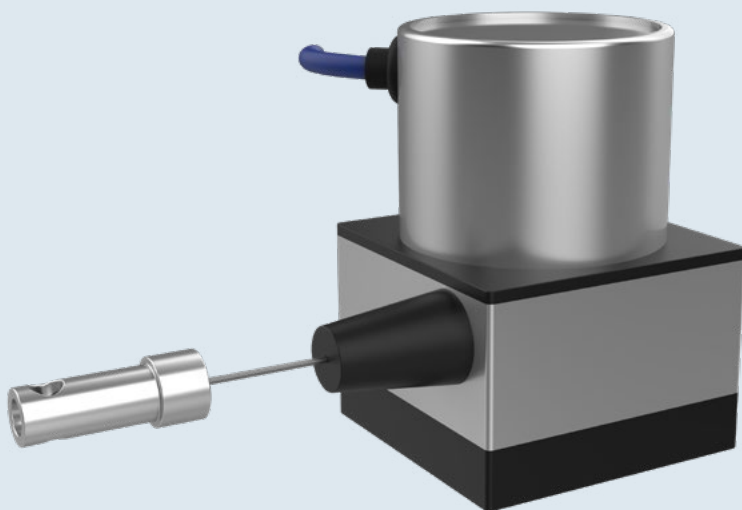
Accessories

Horizontal mounting kit	DS820-OR
Vertical mounting kit	DS820-VE
Invar wire	IN-MT*

- *FS Indicate the sensor range
- *AA Indicate the Supply / Output combination (-01... -05)
- *MT Indicate Invar wire lenght

DS821

Wire extensometer



Description

The wire extensometer DS821 measures the **displacements between two points placed horizontally or vertically**, spaced from each other by a **minimum of 0.5mt** to a **maximum of 10mt**.

The sensor is mounted on one of the points of interest and the end of the wire is fixed to an anchor placed on the other point.

The DS821 model integrates a **spring system** that keeps the wire under tension once it is pulled and fixed. It is advisable to protect the wire with a protective tube to avoid damage.

The standard mounting kits are of two types: one for **vertical mounting** and one for **horizontal mounting**. For specific cases, on request, it is possible to **customize the mounting kit**.

The electrical transducer, available in standard **measuring ranges between 100 and 8000mm**, provides an electrical signal proportional to the displacement.

Thanks to its sturdiness and protection IP65 they are particularly suited to an **external mounting in harsh environment conditions**, ensure high reliability.

Wire extensometer has **various technical configurations**, based on: **range** (100...8000mm), **supply-out** (1...24Vcc) and **output** (mV/mA).

Every sensor is provided with a calibration certificate that attests the results of the test performed and all electromechanical features.

Manual read out with DATAVIEW.

Automatic read out with MINILOG, MYLOG.

Readout units with NATUN.

Applications

Structural cracks, structural joints, rock fall etc.



DS821

Wire extensometer

Technical features			
Model	DS821-01-AA*	DS821-02-AA*	DS821-03-AA*
Sensor	Potentiometer		
Range (mm) [Step (mm)]	100-1000 [100]	1100-4000 [500]	4500-8000 [500]
Linearity	±0.1 %FS		
Repeatability	±0.02 %FS		
Possible combinations between Supply / Output	- 01	1-12Vcc / 1000mV/V	
	- 02	7-24Vcc / 0-1V	
	- 03	7-24Vcc / 0-2V	
	- 04	7-24Vcc / 0-5V	
	- 05	8-24Vcc / 4-20mA	
Resolution	0.01 mm		
Operating temperature	-20 ÷ +80 °C		
Traction	Max 700g	Max 700g	Max 1500g
Protection	IP65		
Material	Housing: Aluminum		
	Wire: Stainless steel and Teflon		
Dimensions (mm) without the wire	50x50x70	87x102x120	
Weight (kg)	0.20	0.70	1.20
Accessories			
Horizontal mounting Kit		DS820-OR	
Vertical mounting Kit		DS820-VE	
*AA	Indicate the Supply / Output combination (-01... -05)		

DS825

Rotary extensometer



Description

The rotary extensometer mod. DS825 was designed and developed to control surface landslides. The instrument is equipped with a multiturn rotary displacement sensor, with a maximum development wheel of 2000mm.

An Invar wire is stretched between two points, where on one side it is fixed to a pole, using a special bracket, while on the other, it is slid around the wheel and held by a ballast. In this way the wire can be stretched for distances up to 40 meters.

The system is easy to assemble and maintain. For the assembly it is sufficient to anchor two piles in the ground at the desired distance and successively install it, with the appropriate supplied brackets: the sensor, its corresponding counter and stretch the wire. In case of need, the system can be quickly and easily moved from one point to another.

Every sensor is provided with a calibration certificate that attests the results of the test performed and all electromechanical features.

Manual read out with DATAVIEW.

Automatic read out with MINILOG, MYLOG.

Readout units with NATUN.

Applications

Monitoring of surface landslide movements.



DS825

Rotary extensometer



Technical features

Model	DS825-AA-FS*	
Sensor	Potentiometer	
Range	From 100 to 2000 mm every 100mm	
Possible power/output combinations	- 01	1-12Vcc / 1000mV/V
	- 02	7-24Vcc / 0-1V
	- 03	7-24Vcc / 0-2V
	- 04	7-24Vcc / 0-5V
	- 05	8-24Vcc / 4-20mA
Linearity	± 0.1 %FS	
Repeatability	<0.01%	
Operating temperature	-30 ÷ +100 °C	
Protection	IP65	
Material	Wheel	Stainless Steel
	Box	Reinforced polyester with fiberglass

Accessories

Wall mounting bracket	DS825- MWWL
Pole mounting bracket	DS825 - MWBM
Invar wire	DS825- WRIN-MM**
4-20 mA converter	DS825 -BEMA
Stainless steel mounting pole (1" x 3mt)	DS825 -PLIN

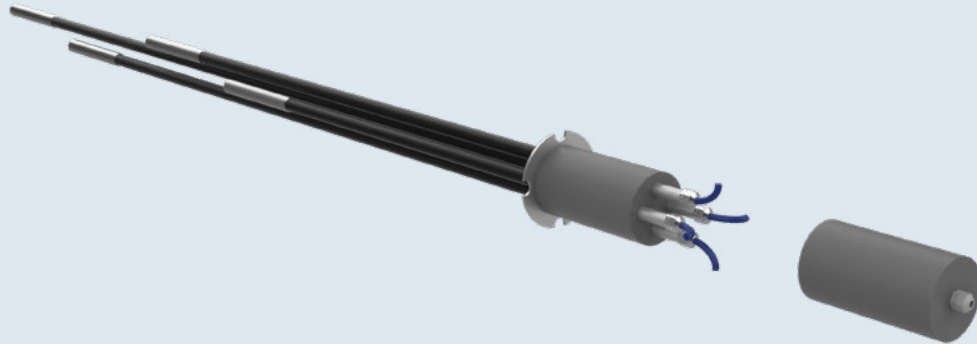
*FS Indicate the range

*AA Indicate the power/output combinations (-01... -05)

**MM Indicate the length

DS830

Multipoint borehole extensometer



Description

The multipoint borehole extensometer is designed to measure soil and rock movements such as subsidence, foundation settlement, convergence measurement etc.

The extensometer measures the variation displacement between two points: the anchor placed at depth and the head placed at surface. The extensometers DS830 are produced in several models, they can have a single or several rods (from 2 to 6 measuring bases). The anchor, produced in a special form, allows a perfect adherence with the concrete ensuring the whole system a great precision. SIM can also provide inflatable anchors that allow a punctual cementation without inserting concrete in the entire hole.

The measuring head is produced entirely in stainless steel in order to ensure longevity to the system.

In case of a multipoint extensometer, the anchors are placed in different depths. The rods (invar, stainless steel, fiberglass), which connect the anchors to the measuring head, are inserted into a sliding protective tube.

The measuring head is prearranged to support a removable mechanical caliper or a displacement sensor (DS810-01).

The multipoint borehole extensometer DS830 can be installed at great depths with great simplicity.

Applications

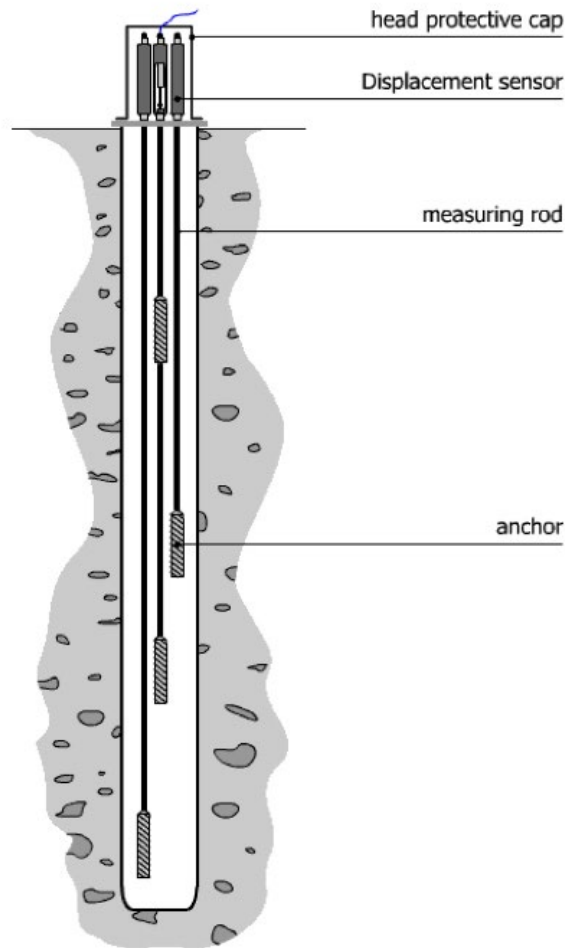
Settlement measurement in rocks and soil.

Used in tunnels, dams, retaining walls etc.



DS830

Multipoint borehole extensometer



Technical features

Head	DS830-NB*		
N. Bases	1 base	2 - 4 bases	5 - 8 bases
Diameter	Ø50 mm	Ø90 mm	Ø115 mm
Diameter of head with rods	Ø50 mm	Ø98 mm	Ø122 mm
Drilling diameter (min-max)	Ø25-40 mm	Ø60-100 mm	Ø80-150 mm
Material	Stainless steel		

Measuring rod	DS830-BS-MA-B1(MM)-B2(MM)....**	
Material	Invar, Stainless Steel, Fiberglass	
Diameter	Invar / Stainless Steel	Ø8 mm
	Fiberglass	Ø9 mm
Diam. sliding tube	Ø 16 mm	
Rod length	Invar / Stainless Steel	1, 2, 3 mt
	Fiberglass	single piece

Anchor		
Material	zinc-plated steel	
Diameter	20 mm	
Length	330 mm	
Dilatation coeff.	Invar	1,5x10E-6/°C
	Stainless Steel	12x10E-6/°C
	Fiberglass	5x10E-6/°C

Accessories

Inflatable anchor	DS830-ANC2
Cover for single-sided head	DS830-TM1
Cover for heads from 2 to 4 bases	DS830-TM2
Cover for heads from 5 to 8 bases	DS830-TM5
Injection tube	DS830-TU-IN-MM***
Digital gauge for manual reading	DS830-CAL
Displacement sensor	DS810-01****

*NB Indicate number of bases

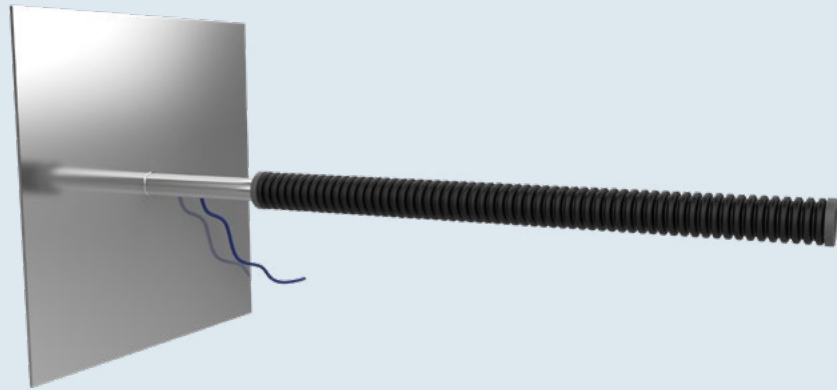
**B1(MM) Indicate each bases lenght ex. B1(20)-B2(40)...
base 1 is 20mt long and base 2 is 40mt long; the injection tube will be of the length corresponding to each base

***MM Indicate the lenght

**** For displacement sensors, see the displacement sensor technical sheet mod. DS810-01

DS835

Extensometer for embankment



Description

The DS835 extensometer for embankments has been designed to measure the lateral deformations caused in the embankment and can be used as a single instrument or as a chain composed of several units.

The strain gauge consists of: two anchor plates, a displacement sensor, a telescopic element, a extension rod (variable in size) and a jointed corrugated pipe in HDPE that acts as both protection which gives anti-friction.

The instrument is installed longitudinally with respect to the embankment for its entire width. For this reason it is advisable to install several units in the same chain, where a displacement sensor is installed between each two anchor plates.

The bottom The scale of the displacement sensor is chosen based on the expected deformation.

Every sensor is provided with a calibration certificate that attests the results of the test performed and all electromechanical features.

Manual read out with DATAVIEW.

Automatic read out with MINILOG, MYLOG.

Readout units with NATUN.

Applications

Embankments monitoring.



DS835

Extensometer for embankment

Technical features

Anchor

Material	Galvanized Steel
Dimensions	500x500x2 mm

Extension cord

Material	Galvanized Steel
Diameter	$\frac{3}{4}$ "
Available lengths	1, 2, 3 mt

Corrugated jointed tube

Material	HPDE
Dimensions	Int. Ø42mm - Ext. Ø60mm
Available lengths	25, 50, 100 mt

Telescopic element

Material	Stainless Steel
Diameter	40 mm
Length	50 mm

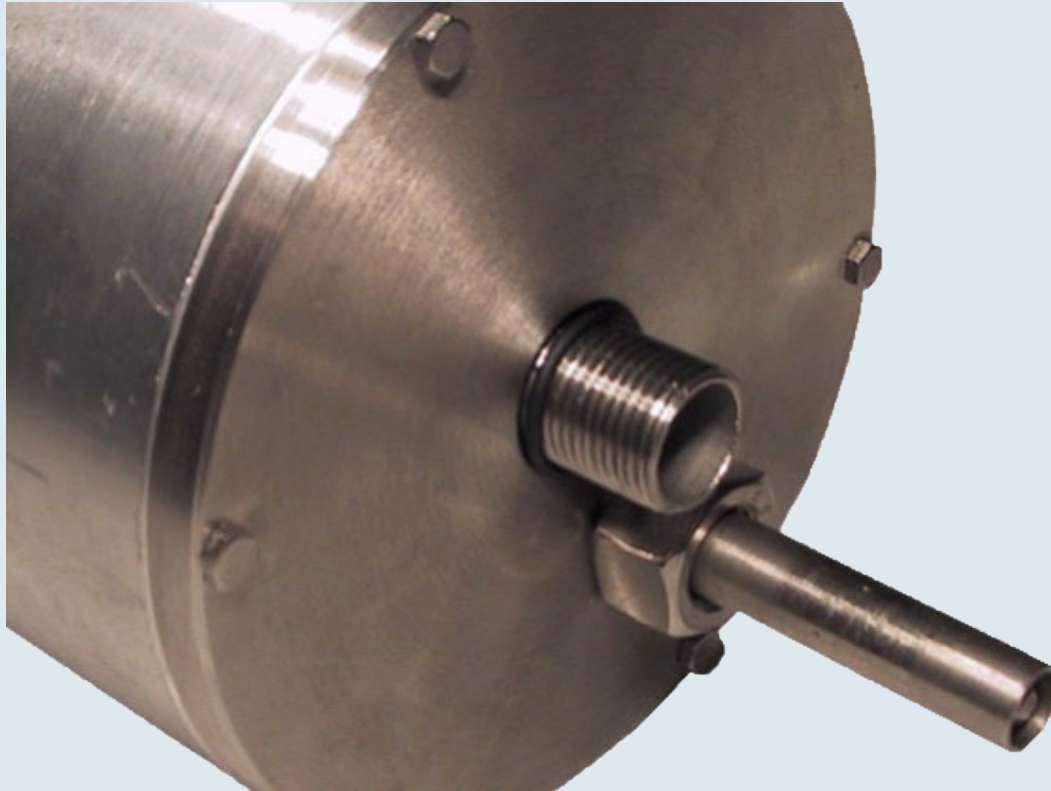
Sensor

DS810-01

Type	Piezometric	Magnetostrictive
Range	50, 100, 150 mm	50, 100, 200 mm
Linearity	0.1%FS	0.02%FS
Supply	DS810 combination	12-24Vcc
Operating temperature	-30 ÷ +75 °C	
Protection	IP68	
Material	Stainless Steel	

DS840

Fixed extrude meter



Description

The fixed extrude meter DS840 was designed to measure the excavation face in tunnels during excavation procedures.

It consists of an anchor and a measuring head placed at a different depth (i.e. anchor at 12 mt. from face and head at 6 mt. from face). In the measuring head are placed a displacement sensor DS810 with a range of 200mm and a radio transmitter allowing to send the data to a data logger and record the movements in real time without needing to stop the excavation works.

SIM provides inflatable anchors that allow a punctual cementation without inserting concrete in the entire hole. As for the measuring head SIM supplies inflatable anchor in order to have a better adherence.

The radio transmitter is equipped with an antenna placed in a metallic tube in order to ensure the data transmission in every situation.

The extrusometer measuring head is produced in anticorrosive and stainless steel material in order to ensure great longevity to the system. The measuring heads are produced with different number of measuring points, from 1 to 4 rods.

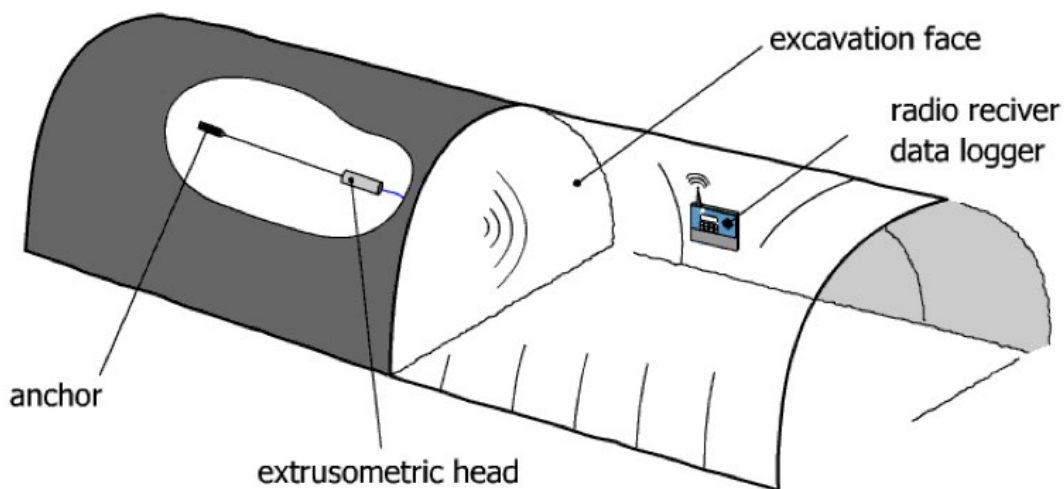
Applications

Tunnel path monitoring during excavation.



DS840

Fixed extrude meter



Technical features

Model	DS840-01		DS840-02		DS840-03		DS840-04	
N.bases	1		2		3		4	
Supply	3.6V				12Vcc			
Material	Stainless steel + Alluminium							
Dimensions	Ø120 x 400				Ø150 x 600			
Displacement sensor		DS815-01-02-200						
Range	200 mm							
Output	0-1Vcc (4-20mA via radio)							
Linearity	0.1% FS							
Repeatability	<0.01%							
Operating temperature	55 ÷ +125 °C							
Measuring rod		DS815-BS-B1(MM)-B2(MM)....*						
Material	Fiberglass							
Diameter	Ø120 mm							
Thermal expansion coefficient	5x10E-6/°C							
Protection tube		DS815-TU-PR-MM**						
Material								
Dimensions	Ø12 / 16							
Injection tube		DS815-TU-IN-MM**						
Material								
Dimensions	Ø12 / 16							
Anchor		DS815-AN						
Material	Steel + Inflatable fabric							
Dimensions	Steel: Ø20x330mm Inflatable: Ø150x500mm							
Radio		DS815-RD-EL						
Frequency	868.525MHz							
Transmission	FM							
Power	500mW							
Transmission speed	19.2Kbps							
Antenna	Coaxial cable RG57							
Antenna protection	Steel tube 1" x 2mt							
Accessories								
Antenna cable		DS815-CV-AN-MM**						
Cable gland for antenna		DS815-PC-AN						
Battery 3.6V		DS815-RD-36						
Battery 12V		DS815-RD-12						

*B1(MM) Indicate the lenght for each base ex. B1(20)-B2(40)...
it means that the base 1 is 20mt and the base 2 is 40mt

**MM Indicate the lenght

DS850

Extrude meter



Description

The removable extensometer DS850 was designed to measure the excavation face in tunnels during excavation procedures. It measures the distance between two magnetic rings allocated along the inclinometer casing.

The system is equipped with a probe, cable, a readout unit ESTRUDAT and a software package.

The probe consists of two wheel-carriages and two contactless magnetoresistant linear transducers. The electric cable is equipped with a waterproof connector up to 50 bar and supports the probe during measurement. The cable has a kevlar core to guarantee the cable non-extendibility and positioning precision. The cable is also equipped with reference marks at 50 cm intervals, has a max error margin of $\pm 5\text{cm}/100\text{m}$ and max extensibility of $<0,05\%$ of the nominal cable length with a load of 20 kg.

The readout unit is equipped with trigger cable power supply and serial cable.

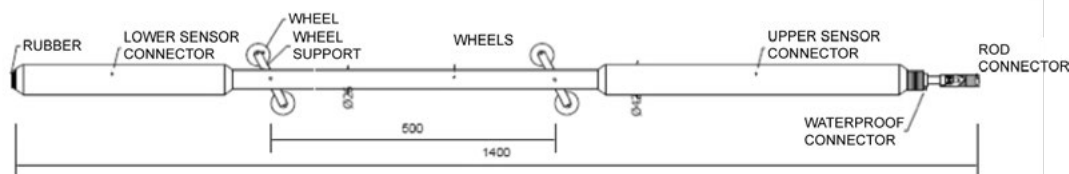
Applications

Tunnel path monitoring during excavation.



DS850

Extrude meter



Technical features

Probe step	1000mm
Range	±100mm
Combined error	±0.02mm
Repeatability	< 0.01mm
Supply	24Vcc
Output	0-5Vcc
Consumption	138mA
Operating temperature	-30 ÷ 75°C
Temperature coeff.	0.005%FS/°C
Protection	IP68
Length	1400
Max. diameter	Ø42
Weight	4.3 Kg
Material	Stainless Steel
Readout unit	ESTRUDAT
Software	ESTRUDAT Manager + Processing

Accessories

Magnetic ring	DS850-RNG1
Positioning rod with quick-joint coupling (2m)	DS850-RDAR
Calibrator	DS850-MWDM

ED-06/22

DS855

Depth fixed extrude meter



Description

The DS855 extrusometer has been designed for high precision monitoring of vertical/horizontal movements, through repeated measurements over time. The variations are detected in relative displacement between reference rings. The probe is especially suitable for use in an assestimetric chain. The system consists of one or more probes connected to each other by means of a wire or a rigid rod (both in stainless steel), a reading unit, an inclinometer tube, a suspension head and magnetic rings.

The extrusometer probe is composed of a two wheel carriers and a magnetostrictive sensor; the electric connection cable is equipped with an external marine grade sheath and a Kevlar core that guarantees readings reliability over time.

The inspection tube is equipped with grooves that guarantee the sliding of the probe inside the tube, while outside the magnetic rings are installed, at pre-set distances, in order to guarantee a good adherence to the surrounding soil. The tube is tightened to the surrounding soil by cementation.

Every sensor is provided with a calibration certificate that attests the results of the test performed and all electromechanical features.

Manual read out with DATAVIEW.

Automatic read out with MINILOG, MYLOG.

Readout units with NATUN.

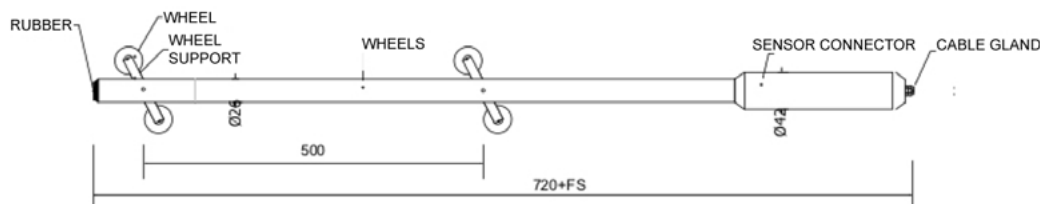
Applications

Settlement monitoring in embankment.



DS855

Depth fixed extrude meter



Technical features

Range	50mm, 100mm, 250mm, 1000mm
Combined error	±0.02mm
Repeatability	< 0.01mm
Supply	24Vcc
Output	4-20mA
Consumption	138mA
Operating temperature	-30 ÷ 75°C
Temperature coeff.	0.005%FS/°C
Protection	IP68
Length	720mm + range
Max. diameter	Ø42
Material	Stainless Steel
Weight	Between 1kg and 2kg, depending on range

Accessories

Magnetic ring	DS850-RNG1
Connecting rod (2mt)	DS855-RD02
Hanging stainless steel wire	DS855-MWDM
Hanging head	DS855-TSSP

*FS Indicate the range



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