

**JooShin Corporation**





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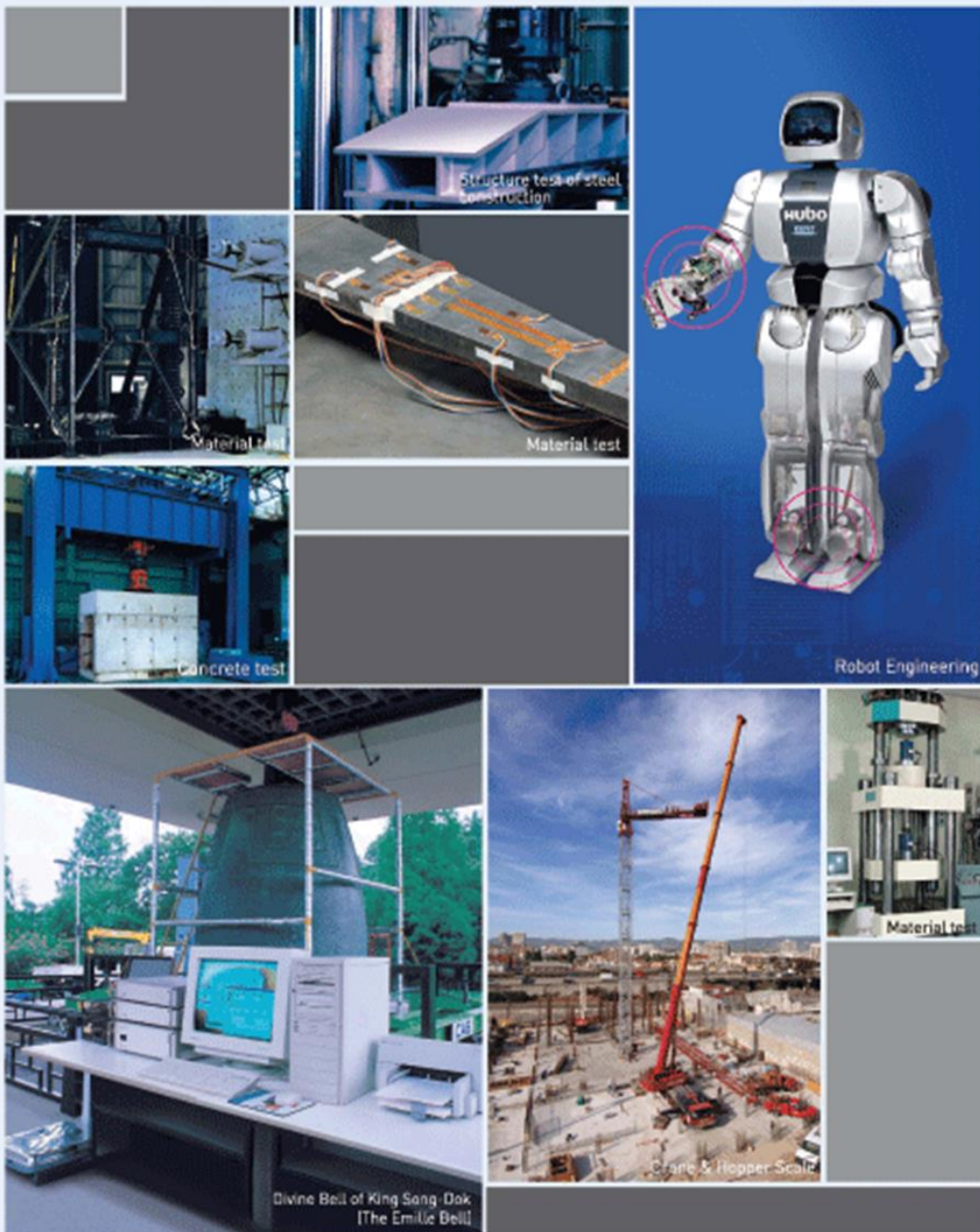


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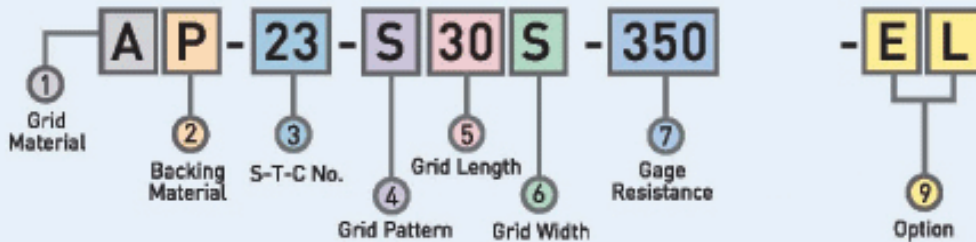
## Measurements Applications



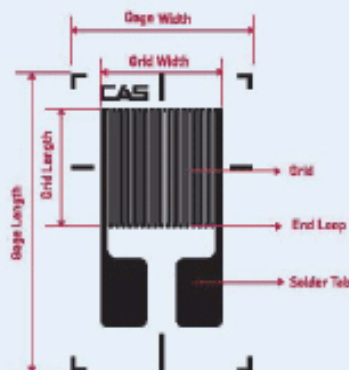


## Coding System

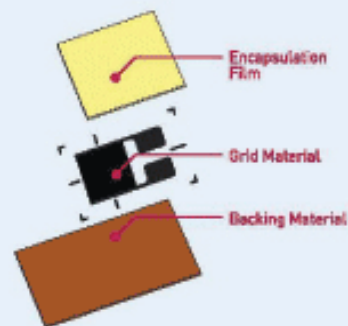
Cas Strain gauges has been manufactured based on international standard of NAS942, OIML and ASTM, and Cas has applied coding system to sort pattern, application, material and resistance of strain gauges.



No	Code	Information
1	A	Grid Material A : Constantan, K : Karma
2	P	Backing Material P : Polyimide film, B : Phenolic resin
3	23	S-T-C No. 11 : Steel, 23 : Aluminum
4	S	Grid Pattern S : Single Linear, T : Tee Rosette, D : Diaphragm, R : 3 elements rosette, Q-Shear
5	30	Grid Length 10(1mm) ~ 900(90mm)
6	S	Grid Width N : Narrow, S : Same, W : Wide (width-length ratio)
7	350	Gage Resistance 120, 350, 700, 1000, 2000, 3000
9	EL	Option E : Encapsulated, L : Lead wire attached, C : Cable attached



Strain Gauge Terminology

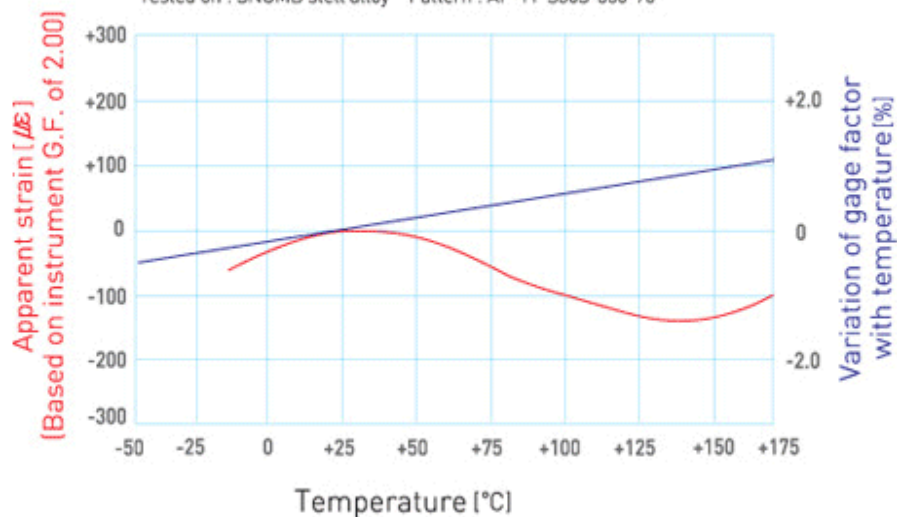


Strain Gauge Structure

## Thermal Output Strain

LOT NO.: PA2S06-08-080617-01

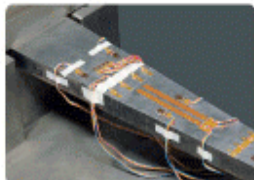
Tested on : SNCMB stell alloy Pattern : AP-11-S30S-350-70



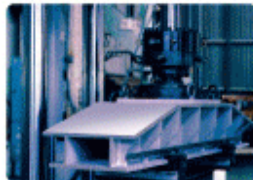
## Wheatstone Bridge Output

BRIDGE/STRAIN	DESCRIPTION	OUTPUT EQUATION- $E_0/E$	BRIDGE/STRAIN	DESCRIPTION	OUTPUT EQUATION- $E_0/E$
		$\frac{E_0}{E} = \frac{FE \times 10^{-3}}{4 + 2FE \times 10^{-6}}$			$\frac{E_0}{E} = \frac{FE \times 10^{-3}}{2 + FE \times 10^{-6}}$
		$\frac{E_0}{E} = \frac{FE(1+V) \times 10^{-3}}{4 + 2FE(1-V) \times 10^{-6}}$			$\frac{E_0}{E} = \frac{FE(1+V) \times 10^{-3}}{2}$
		$\frac{E_0}{E} = \frac{FE}{2} \times 10^{-3}$			$\frac{E_0}{E} = FE \times 10^{-3}$

## Applications



Material bending test



Structure test of steel



Robot engineering



에밀레총



## Strain Gage Installation



1  
Abrading the application



2  
Marking the application



3  
Cleaning the application



4  
Aligning the strain gage



5  
Applying the catalyst



6  
Dropping the adhesive



7  
Pressing the strain gage



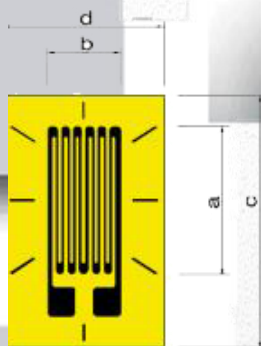
8  
Soldering leading-wires of  
strain gage to the application



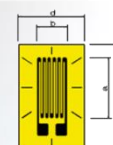
9  
Soldering and locking cables



10  
Coating the application

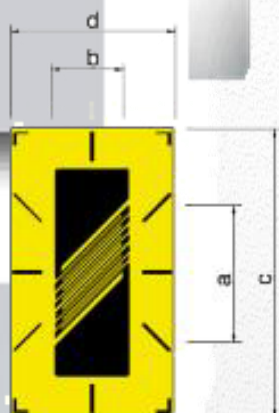


- \* Widely used general purpose linear type strain gauge (S series strain gauge)
- \* Bending application
- \* Grid size : 1 - 90mm
- \* Resistance : 120Ω
- \* Similar geometry pattern available
- \* Cas strain gauge has been manufactured based on international standard of NAS942. OIML and ASTM.

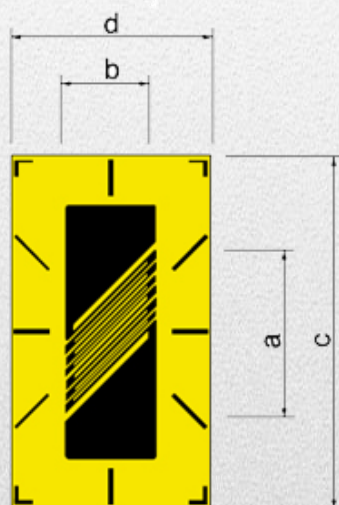


Single Linear type 120Ω strain gauge Model No. for Steel or Concrete			DIMENSION (unit : mm)			
No lead wire type	Lead wire(10mm) type	Cable(1meter) type	a	b	c	d
AP-11-S10S-120-E	AP-11-S10S-120-EL	AP-11-S10S-120-EC	1	1.2	5	3.2
AP-11-S15S-120-E	AP-11-S15S-120-EL	AP-11-S15S-120-EC	1.5	1.5	7	4
AP-11-S30N-120-E	AP-11-S30N-120-EL	AP-11-S30N-120-EC	3	1.7	9	5
AP-11-S50N-120-E	AP-11-S50N-120-EL	AP-11-S50N-120-EC	5	2.1	11	5
AP-11-S80N-120-E	AP-11-S80N-120-EL	AP-11-S80N-120-EC	8	2.5	15	6
AP-11-S300N-120-E	AP-11-S300N-120-EL	AP-11-S300N-120-EC	30	0.6	40	6
AP-11-S600N-120-E	AP-11-S600N-120-EL	AP-11-S600N-120-EC	60	0.8	70	6
AP-11-S900N-120-E	AP-11-S900N-120-EL	AP-11-S900N-120-EC	90	0.9	100	6
Single Linear type 120Ω strain gauge Model No. for Aluminum			DIMENSION (unit : mm)			
AP-23-S10S-120-E	AP-23-S10S-120-EL	AP-23-S10S-120-EC	1	1.2	5	3.2
AP-23-S15S-120-E	AP-23-S15S-120-EL	AP-23-S15S-120-EC	1.5	1.5	7	4
AP-23-S30N-120-E	AP-23-S30N-120-EL	AP-23-S30N-120-EC	3	1.7	9	5
AP-23-S50N-120-E	AP-23-S50N-120-EL	AP-23-S50N-120-EC	5	2.1	11	5
AP-23-S80N-120-E	AP-23-S80N-120-EL	AP-23-S80N-120-EC	8	2.5	15	6
AP-23-S300N-120-E	AP-23-S300N-120-EL	AP-23-S300N-120-EC	30	0.6	40	6
AP-23-S600N-120-E	AP-23-S600N-120-EL	AP-23-S600N-120-EC	60	0.8	70	6
AP-23-S900N-120-E	AP-23-S900N-120-EL	AP-23-S900N-120-EC	90	0.9	100	6

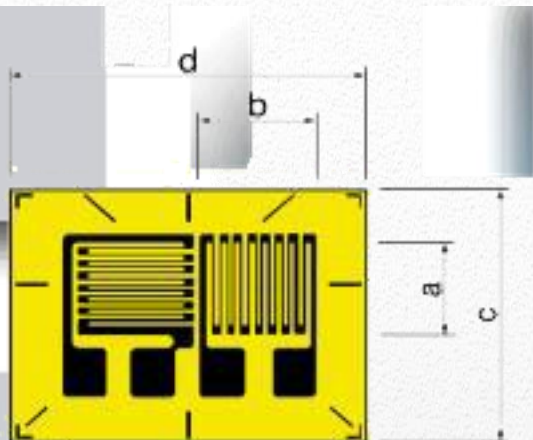




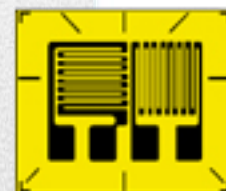
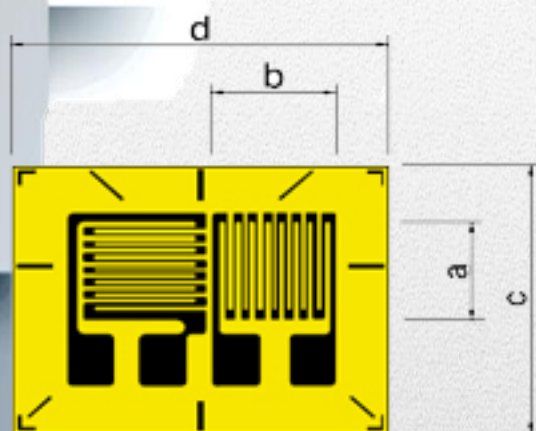
- \* General shear type strain gauge  
(Q series : Single shear)
- \* Shear & torque application
- \* Grid size : 1 - 10mm
- \* Resistance : 120Ω
- \* Similar geometry pattern available
- \* Cas strain gauge has been  
manufactured based on international  
standard of NAS942. OIML  
and ASTM.



Single Shear type 120Ω strain gauge Model No. for Steel or Concrete			DIMENSION (unit : mm)				
No lead wire type	Lead wire(10mm) type	Cable(1meter) type	a	b	c	d	e
AP-11-Q15N-120-E	AP-11-Q15N-120-EL	AP-11-Q15N-120-EC	3.6	1.4	8	4	1.5
AP-11-Q30N-120-E	AP-11-Q30N-120-EL	AP-11-Q30N-120-EC	5.1	2.6	10	5.6	3
Single Shear type 120Ω strain gauge Model No. for Aluminum			DIMENSION (unit : mm)				
AP-23-Q15N-120-E	AP-23-Q15N-120-EL	AP-23-Q15N-120-EC	3.6	1.4	8	4	1.5
AP-23-Q30N-120-E	AP-23-Q30N-120-EL	AP-23-Q30N-120-EC	5.1	2.6	10	5.6	3

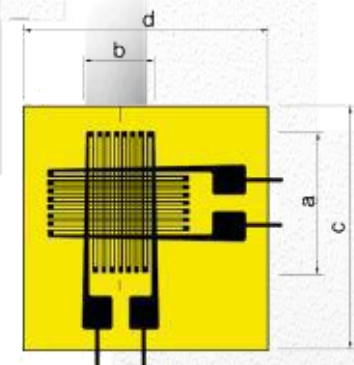


- \* Tee Rosette type strain gauge (T series : 2-90°)
- \* Shear, torque and point stress analysis application
- \* Resistance : 120Ω
- \* Cas strain gauge has been manufactured based on international standard of NAS942. OIML and ASTM.

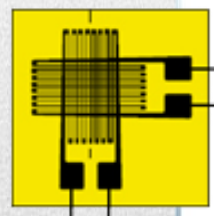
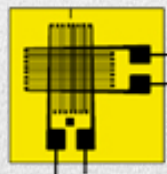
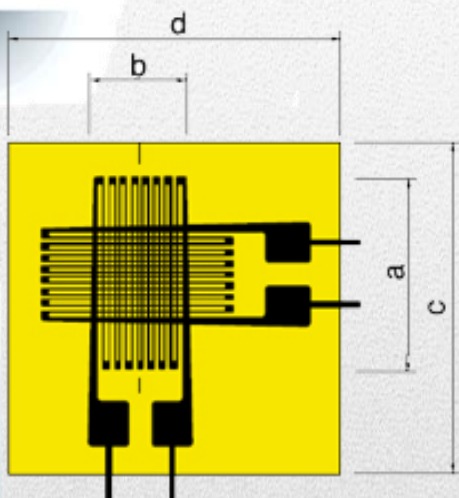


Tee Rosette type 120Ω strain gauge Model No. for Steel or Concrete			DIMENSION (unit : mm)			
No lead wire type	Lead wire(10mm) type	Cable(1meter) type	a	b	c	d
AP-11-T10S-120-E	AP-11-T10S-120-EL	AP-11-T10S-120-EC	1	1.2	5.3	6
AP-11-T15S-120-E	AP-11-T15S-120-EL	AP-11-T15S-120-EC	1.5	1.5	6.5	7
AP-11-T30S-120-E	AP-11-T30S-120-EL	AP-11-T30S-120-EC	3	3	9	11
Tee Rosette type 120Ω strain gauge Model No. for Aluminum			DIMENSION (unit : mm)			
AP-23-T10S-120-E	AP-23-T10S-120-EL	AP-23-T10S-120-EC	1	1.2	5.3	6
AP-23-T15S-120-E	AP-23-T15S-120-EL	AP-23-T15S-120-EC	1.5	1.5	6.5	7
AP-23-T30S-120-E	AP-23-T30S-120-EL	AP-23-T30S-120-EC	3	3	9	11

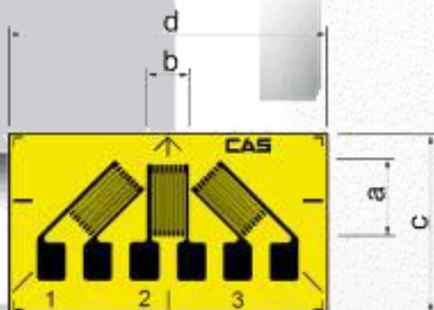




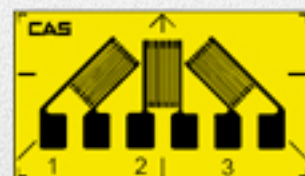
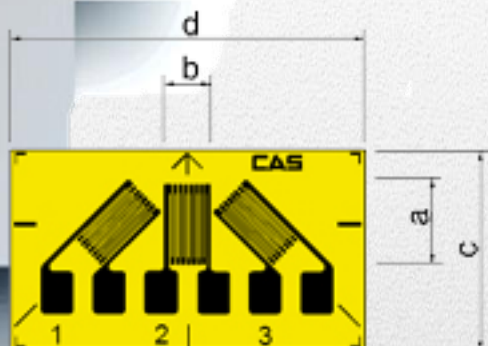
- \* Tee Rosette type strain gauge (TS series : 2-90°)
- \* Shear, torque and point stress analysis application
- \* Resistance : 120Ω
- \* Cas strain gauge has been manufactured based on international standard of NAS942. OIML and ASTM.



Tee Rosette type 120Ω strain gauge Model No. for Steel or Concrete			DIMENSION (unit : mm)			
No lead wire type	Lead wire(10mm) type	Cable(1meter) type	a	b	c	d
AP-11-TS10S-120-E	AP-11-TS10S-120-EL	AP-11-TS10S-120-EC	1	1.2	5	5
AP-11-TS30N-120-E	AP-11-TS30N-120-EL	AP-11-TS30N-120-EC	3	1.7	9	9
AP-11-TS50N-120-E	AP-11-TS50N-120-EL	AP-11-TS50N-120-EC	5	2.1	11	11
Tee Rosette type 120Ω strain gauge Model No. for Aluminum			DIMENSION (unit : mm)			
AP-23-TS10S-120-E	AP-23-TS10S-120-EL	AP-23-TS10S-120-EC	1	1.2	5	5
AP-23-TS30N-120-E	AP-23-TS30N-120-EL	AP-23-TS30N-120-EC	3	1.7	9	9
AP-23-TS50N-120-E	AP-23-TS50N-120-EL	AP-23-TS50N-120-EC	5	2.1	11	11

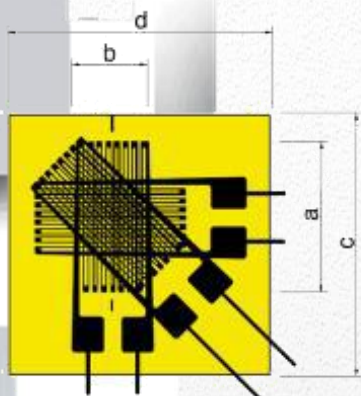


- \* Tee Rosette type strain gauge (R series : 3- element)
- \* Shear, torque and point stress analysis application
- \* Resistance : 120Ω
- \* Cas strain gauge has been manufactured based on international standard of NAS942. OIML and ASTM.

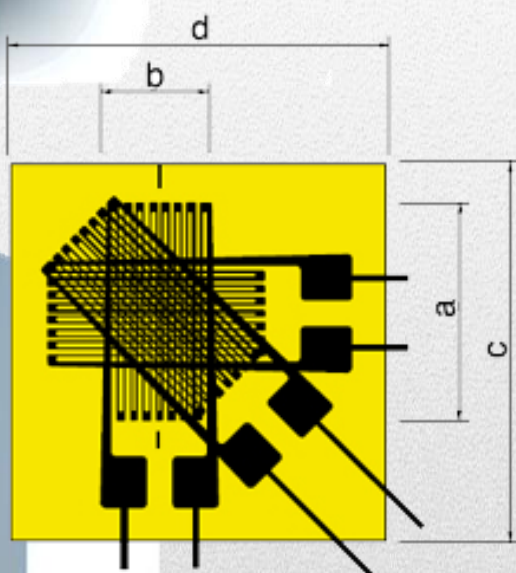


3-Element Rosette type 120Ω strain gauge Model No. for Steel or Concrete			DIMENSION (unit : mm)			
No lead wire type	Lead wire(10mm) type	Cable(1meter) type	a	b	c	d
AP-11-R10S-120-E	AP-11-R10S-120-EL	AP-11-R10S-120-EC	1	1.2	6	9
AP-11-R15S-120-E	AP-11-R15S-120-EL	AP-11-R15S-120-EC	1.5	1.5	7	12
AP-11-R30N-120-E	AP-11-R30N-120-EL	AP-11-R30N-120-EC	3	1.3	9	15
3-Element Rosette type 120Ω strain gauge Model No. for Aluminum			DIMENSION (unit : mm)			
AP-23-R10S-120-E	AP-23-R10S-120-EL	AP-23-R10S-120-EC	1	1.2	6	9
AP-23-R15S-120-E	AP-23-R15S-120-EL	AP-23-R15S-120-EC	1.5	1.5	7	12
AP-23-R30N-120-E	AP-23-R30N-120-EL	AP-23-R30N-120-EC	3	1.3	9	15

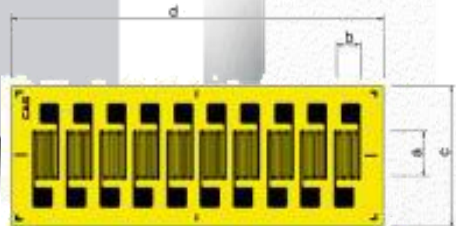




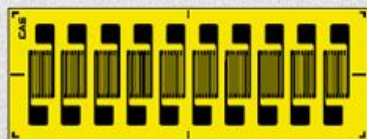
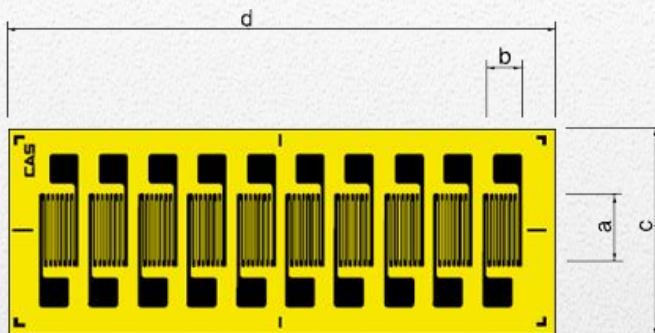
- \* Tee Rosette type strain gauge  
(RS series : 3- element stacked)
- \* Shear, torque and point stress analysis application
- \* Resistance : 120Ω
- \* Cas strain gauge has been manufactured based on international standard of NAS942. OIML and ASTM.



3-Element Rosette type 120Ω strain gauge Model No. for Steel or Concrete			DIMENSION (unit : mm)			
No lead wire type	Lead wire(10mm) type	Cable(1meter) type	a	b	c	d
AP-11-RS30N-120-E	AP-11-RS30N-120-EL	AP-11-RS30N-120-EC	3	1.7	9	9
AP-11-RS50N-120-E	AP-11-RS50N-120-EL	AP-11-RS50N-120-EC	5	2.1	11	11
3-Element Rosette type 120Ω strain gauge Model No. for Aluminum			DIMENSION (unit : mm)			
AP-23-RS30N-120-E	AP-23-RS30N-120-EL	AP-23-RS30N-120-EC	3	1.7	9	9
AP-23-RS50N-120-E	AP-23-RS50N-120-EL	AP-23-RS50N-120-EC	5	2.1	11	11

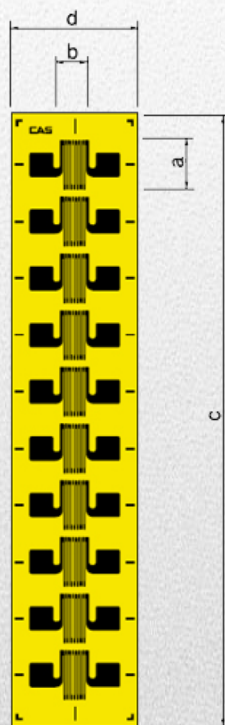
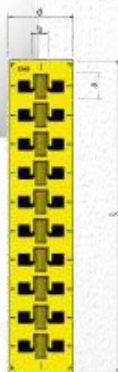


- \* Strip Gauge type strain gauge (SH series)
- \* Bending application
- \* Resistance : 120Ω
- \* Cas strain gauge has been manufactured based on international standard of NAS942. OIML and ASTM.



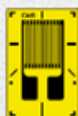
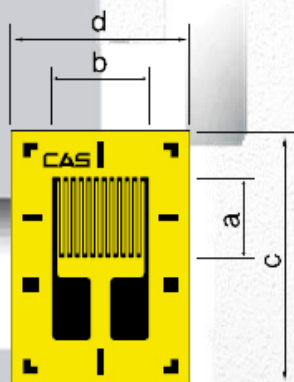
Strip gauge type 120Ω strain gauge Model No. for Steel or Concrete			DIMENSION (unit : mm)			
No lead wire type	Lead wire(10mm) type	Cable(1meter) type	a	b	c	d
AP-11-SH15S-120-E	AP-11-SH15S-120-EL	AP-11-SH15S-120-EC	1.5	1.5	7.5	22
AP-11-SH30N-120-E	AP-11-SH30N-120-EL	AP-11-SH30N-120-EC	3	1.5	9.7	27
Strip gauge type 120Ω strain gauge Model No. for Aluminum			DIMENSION (unit : mm)			
AP-23-SH15S-120-E	AP-23-SH15S-120-EL	AP-23-SH15S-120-EC	1.5	1.5	7.5	22
AP-23-SH30N-120-E	AP-23-SH30N-120-EL	AP-23-SH30N-120-EC	3	1.5	9.7	27





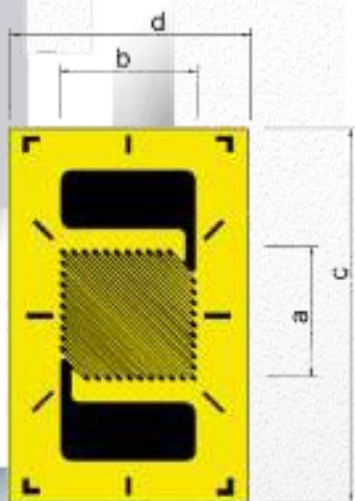
- \* Strip Gauge type strain gauge (SV series)
- \* Bending application
- \* Resistance : 120Ω
- \* Cas strain gauge has been manufactured based on international standard of NAS942, OIML and ASTM.

Strip gauge type 120Ω strain gauge Model No. for Steel or Concrete			DIMENSION (unit : mm)			
No lead wire type	Lead wire(10mm) type	Cable(1meter) type	a	b	c	d
AP-11-SV15S-120-E	AP-11-SV15S-120-EL	AP-11-SV15S-120-EC	1.5	1.5	27	8
AP-11-SV30N-120-E	AP-11-SV30N-120-EL	AP-11-SV30N-120-EC	3	1.6	44.5	8.8
Strip gauge type 120Ω strain gauge Model No. for Aluminum			DIMENSION (unit : mm)			
AP-23-SV15S-120-E	AP-23-SV15S-120-EL	AP-23-SV15S-120-EC	1.5	1.5	27	8
AP-23-SV30N-120-E	AP-23-SV30N-120-EL	AP-23-SV30N-120-EC	3	1.6	44.5	8.8

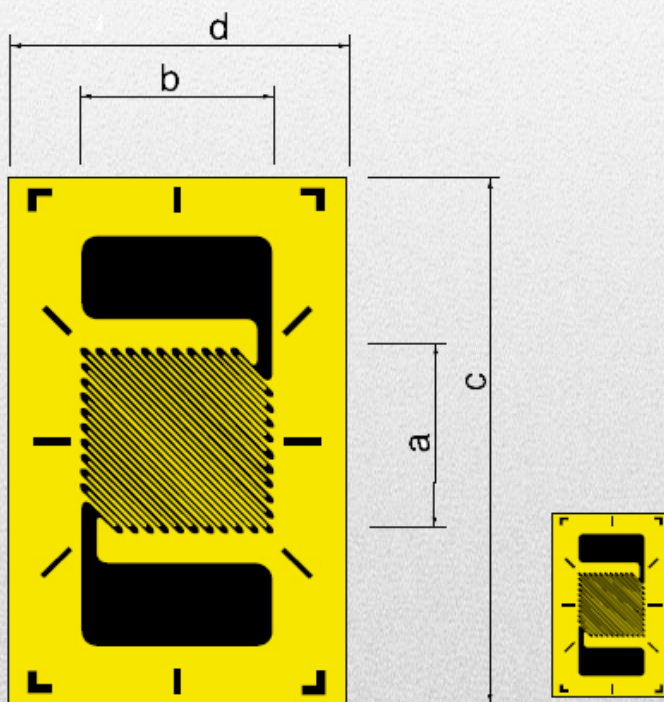


- \* Widely used general purpose linear type strain gauge (S series strain gauge)
- \* Bending application
- \* Grid size : 1 - 90mm
- \* Resistance : 350Ω
- \* Similar geometry pattern available
- \* Cas strain gauge has been manufactured based on international standard of NAS942. OIML and ASTM.

Single Linear type 350Ω strain gauge Model No. for Steel or Concrete			DIMENSION (unit : mm)			
No lead wire type	Lead wire(10mm) type	Cable(1meter) type	a	b	c	d
AP-11-S15S-350-E	AP-11-S15S-350-EL	AP-11-S15S-350-EC	1.5	1.7	4.8	3.2
AP-11-S15W-350-E	AP-11-S15W-350-EL	AP-11-S15W-350-EC	1.5	3.5	5	5
AP-11-S20W-350-E	AP-11-S20W-350-EL	AP-11-S20W-350-EC	2	2.6	6	4
AP-11-S20N-350-E	AP-11-S20N-350-EL	AP-11-S20N-350-EC	3	1.3	5.4	2.9
AP-11-S30N-350-E	AP-11-S30N-350-EL	AP-11-S30N-350-EC	3	1.3	6.5	2.5
AP-11-S30S-350-E	AP-11-S30S-350-EL	AP-11-S30S-350-EC	3	3	7.9	4.9
Single Linear type 350Ω strain gauge Model No. for Aluminum			DIMENSION (unit : mm)			
AP-23-S15S-350-E	AP-23-S15S-350-EL	AP-23-S15S-350-EC	1.5	1.7	4.8	3.2
AP-23-S15W-350-E	AP-23-S15W-350-EL	AP-23-S15W-350-EC	1.5	3.5	5	5
AP-23-S20W-350-E	AP-23-S20W-350-EL	AP-23-S20W-350-EC	2	2.6	6	4
AP-23-S20N-350-E	AP-23-S20N-350-EL	AP-23-S20N-350-EC	3	1.3	5.4	2.9
AP-23-S30N-350-E	AP-23-S30N-350-EL	AP-23-S30N-350-EC	3	1.3	6.5	2.5
AP-23-S30S-350-E	AP-23-S30S-350-EL	AP-23-S30S-350-EC	3	3	7.9	4.9

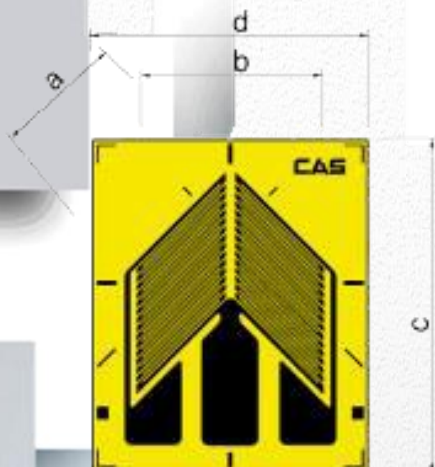


- \* General shear type strain gauge  
(Q series : Single shear)
- \* Shear & torque application
- \* Grid size : 1 - 10mm
- \* Resistance : 350Ω
- \* Similar geometry pattern available
- \* Cas strain gauge has been manufactured based on international standard of NAS942, OIML and ASTM.

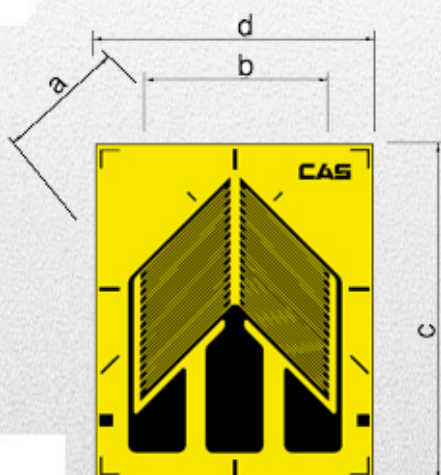


Single shear type 350Ω strain gauge Model No. for Steel or Concrete			DIMENSION (unit : mm)			
No lead wire type	Lead wire(10mm) type	Cable(1meter) type	a	b	c	d
AP-11-Q30S-350-E	AP-11-Q30S-350-EL	AP-11-Q30S-350-EC	3.1	3.1	8.5	5
Single shear type 350Ω strain gauge Model No. for Aluminum			DIMENSION (unit : mm)			
AP-23-Q30S-350-E	AP-11-Q30S-350-EL	AP-11-Q30S-350-EC	3.1	3.1	8.5	5

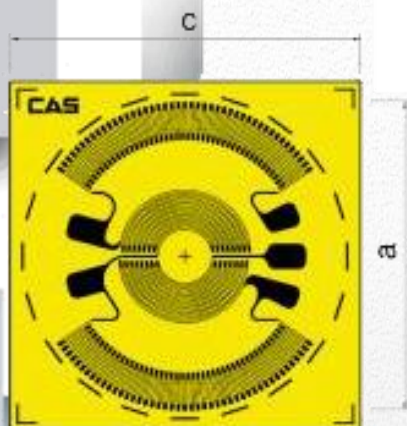




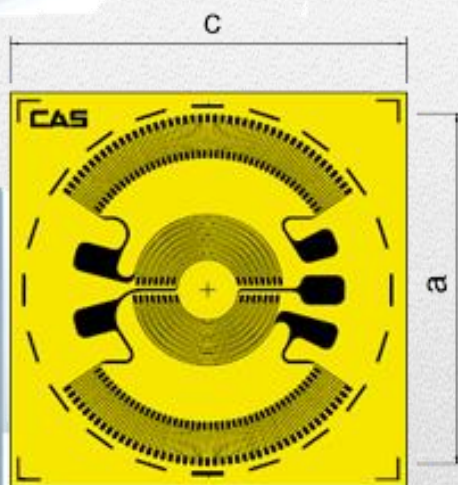
- \* Double shear type strain gauge (T series)
- \* Shear, torque application
- \* Grid size : 1 - 10mm
- \* Resistance : 350Ω
- \* Similar geometry pattern available
- \* Cas strain gauge has been manufactured based on international standard of NAS942. OIML and ASTM.



Double shear type 350Ω strain gauge Model No. for Steel or Concrete			DIMENSION (unit : mm)			
Model	Model	Model	a	b	c	d
AP-11-T15N-350-E	AP-11-T15N-350-EL	AP-11-T15N-350-EC	1.5	3	6.5	5
AP-11-T20N-350-E	AP-11-T20N-350-EL	AP-11-T20N-350-EC	2	3.5	7	6
AP-11-T25N-350-E	AP-11-T25N-350-EL	AP-11-T25N-350-EC	2.5	4.1	7.5	6.4
AP-11-T30N-350-E	AP-11-T30N-350-EL	AP-11-T30N-350-EC	3	4.8	8.5	7
Double shear type 350Ω strain gauge Model No. for Aluminum			DIMENSION (unit : mm)			
AP-23-T15N-350(3 tab)	AP-23-T15N-350(3 tab)	AP-23-T15N-350(3 tab)	1.5	3	6.5	5
AP-23-T20N-350-E	AP-23-T20N-350-EL	AP-23-T20N-350-EC	2	3.5	7	6
AP-23-T25N-350-E	AP-23-T25N-350-EL	AP-23-T25N-350-EC	2.5	4.1	7.5	6.4
AP-23-T30N-350-E	AP-23-T30N-350-EL	AP-23-T30N-350-EC	3	4.8	8.5	7



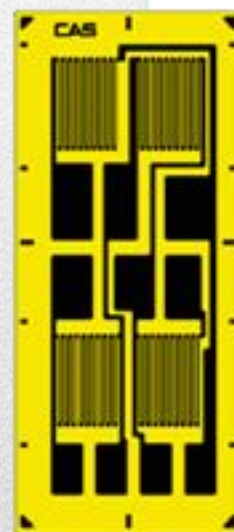
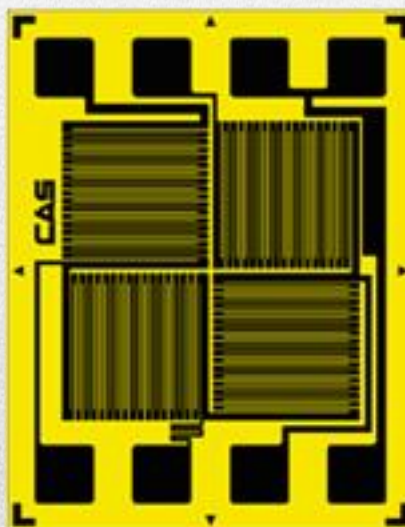
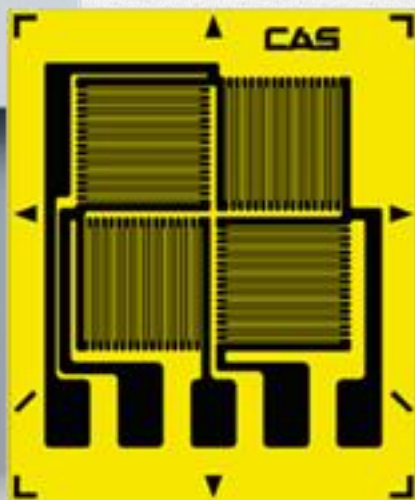
- \* Diaphragm type strain gauge (D series)
- \* Pressure sensor special application
- \* Resistance : 350Ω
- \* Cas strain gauge has been manufactured based on international standard of NAS942. OIML and ASTM.



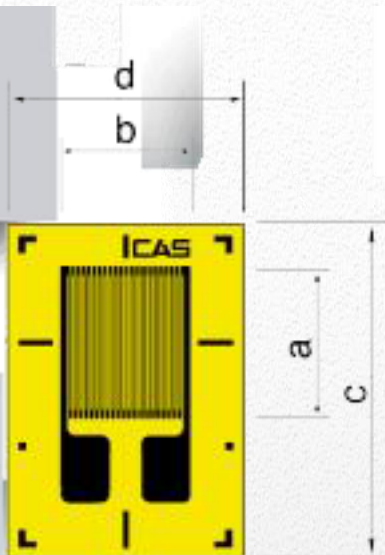
Diaphragm shear type 350Ω strain gauge Model No. for Steel or Concrete			DIMENSION (unit : mm)	
Model	Model	Model	a	b
AP-11-D100-350-E	AP-11-D100-350-EL	AP-11-D100-350-EC	10	10
AP-11-D130-350-E	AP-11-D130-350-EL	AP-11-D130-350-EC	13	13
AP-11-D170-350-E	AP-11-D170-350-EL	AP-11-D170-350-EC	17	17
Diaphragm shear type 350Ω strain gauge Model No. for Aluminum			DIMENSION (unit : mm)	
AP-23-D100-350-E	AP-23-D100-350-EL	AP-23-D100-350-EC	10	10
AP-23-D130-350-E	AP-23-D130-350-EL	AP-23-D130-350-EC	13	13
AP-23-D170-350-E	AP-23-D170-350-EL	AP-23-D170-350-EC	17	17



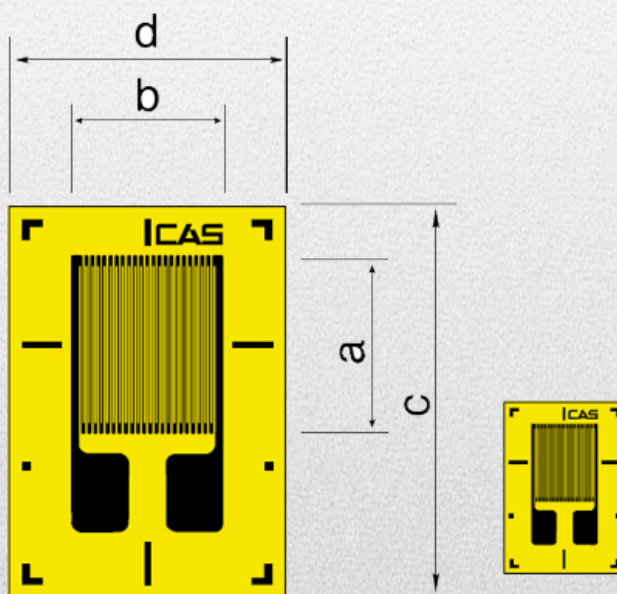
- \* Full-Bridge type strain gauge (FB series)
- \* Special order
- \* Resistance : 350Ω
- \* Cas strain gauge has been manufactured based on international standard of NAS942. OIML and ASTM.



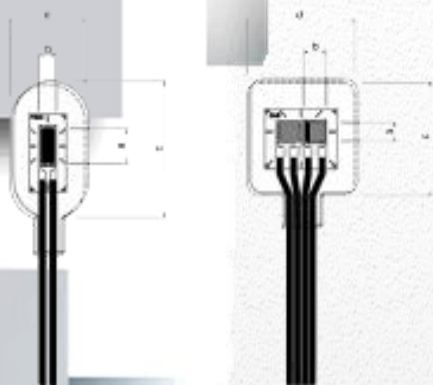




- \* Linear type strain gauge (S series)
- \* Resistance : 1,000 $\Omega$
- \* Cas strain gauge has been manufactured based on international standard of NAS942. OIML and ASTM.



Linear shear type 1K $\Omega$ strain gauge Model No. for Steel or Concrete			DIMENSION (unit : mm)			
Model	Model	Model	a	b	c	d
AP-11-S30S-1K-E	AP-11-S30S-1K-EL	AP-11-S30S-1K-EC	3	2.7	7	4.8
AP-11-S40S-1K-E	AP-11-S40S-1K-EL	AP-11-S40S-1K-EC	4	3.8	8	5.5
Linear shear type 1K $\Omega$ strain gauge Model No. for Aluminum			DIMENSION (unit : mm)			
AP-23-S30S-1K-E	AP-23-S30S-1K-EL	AP-23-S30S-1K-EC	3	2.7	7	4.8
AP-23-S40S-1K-E	AP-23-S40S-1K-EL	AP-23-S40S-1K-EC	4	3.8	8	5.5



- \* Linear type or Double shear strain gauge (S or T series)
- \* Resistance : 120Ω
- \* Cas strain gauge has been manufactured based on international standard of NAS942. OIML and ASTM.

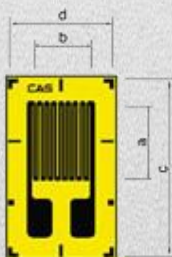
Steel or Concrete	DIMENSION (unit : mm)			
Model	a	b	c	d
AP-11-S50N-W	3	2.7	7	4.8
AP-11-S30S-W	4	3.8	8	5.5
Aluminum	DIMENSION(unit : mm)			
AP-23-S30S-2K-E	3	2.7	7	4.8
AP-23-S40S-2K-E	4	3.8	8	5.5

## High Temperature type Strain Gauge

### High Temperature K-Series Strain Gage (Only Steel)

- \* High Temperature type strain gauge
- \* Steel only
- \* Resistance : 350Ω or 1KΩ
- \* Cas strain gauge has been manufactured based on international standard of NAS942. OIML and ASTM.

A P - 23 - S 30 S  
 350 - 50 - E L



Model No.	DIMENSION (unit : mm)			
	a	b	c	d
KP-11-S30S-350	3	2.4	7.5	4.4
KP-11-S40S-1K	3	2.7	7.5	4.9



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This data logger is portable and handy type strain measurement system that can measure 4 strain gauge bridge sensors, 1 gauge and 2 gauge. And 3.2" TFT touch screen, 4GB save memory, Lithium ion battery, USB charging and communication are built-in for multi function.

## Feature

- \* 1 channels static & dynamic data logger.
- \* Multi functions with touch screen and built-in data memory
- \* Built-in 120 $\Omega$ , 350 $\Omega$  bridge circuit
- \* Remove noise by low pass filter.
- \* Auto zero by auto zero button
- \* 1gauge 3wire type, 2gauge, 4gauge bridge can be connected.
- \* Use both Tajimi and 5p Screw connector



## Specification

Model	GTDL-H20
Display	3.2 inch TFT touch LCD
Internal battery	Lithium-ion 3.7V, 18000mAh
Input sensor	<ul style="list-style-type: none"> <li>- 1gauge &amp; 2gauge : 120<math>\Omega</math>, 350<math>\Omega</math></li> <li>- 4gauge bridge sensor : 0.5mV/V - 10mV/V</li> <li>- Potentiometer Sensor</li> <li>- Pt100 RTD</li> </ul>
Internal data memory	4G Byte data memory
Strain input range	$\pm 30,000$ [uStrain]
A/D conversion	24 bit
A/D conversion speed	50 times/sec
Data save	4,000 point save
Interface	USB
Program	Multiscan S/W & Multiload S/W
Dimension	98(W) * 200(H) * 32(D) mm

This data logger is 4 channels dynamic & static strain measurement equipment which can monitor result and record data with PC and SD memory card. Strain measured after strain gage is wired, and strain gauge type sensors as like load cell, pressure sensor, torque sensor, LVDT and can be potentiometer and so forth, can be measured. The data can be transmitted to PC easy through the front side USB port.

## Feature

- \* 4 channels static & dynamic data logger.
- \* Multi functions with touch screen and built-in data memory
- \* Built-in 120Ω, 350Ω bridge circuit
- \* Remove noise by low pass filter.
- \* Auto zero by auto zero button
- \* 1gage 3wire type, 2gage, 4gage bridge can be connected.
- \* Use both Tajimi and 5p Screw connector
- \* Small size, light weight and USB interface



## Specification

Model	GTDL-150
Number of channel	4 Channels
Measure frequency	1,000Hz
Display & Data memory	4G SD DATA memory, USB memory stick port (EXT)
Input sensors	- 1Gage & 2gage : 120Ω , 350Ω - 4 Gage bridge sensor : 0.5mV/V - 100mV/V - Potentiometer type sensor - Pt100 RTD - Voltage output type sensor ±10V
Strain input range	- Gain 1000 : ±10,000 [uStrain] - Gain 100 : ±100,000 [uStrain] - Gain 10 : ±1,000,000 [uStrain]
Low Pass Filter	Selectable 10Hz, 100Hz, 1Khz by program
EXC Voltage	Selectable 2Volt , 5Volt , 10Volt by Program
Interface	USB
Program	Multiscan S/W & Multiload S/W
Dimension	140(W) * 190(D) * 270(H) mm
Power	Free voltage AC85~264V , 50~60Hz



This data logger is 4 channels dynamic & static strain measurement equipment which connect with PC, and display graph and record data. This data logger can measure static test without PC because has built-in SD memory and touch screen. Strain can be measured after strain gage is wired, and strain gauge type sensors as like load cell, pressure sensor, torque sensor, LVDT and potentiometer and so forth, can be measured also. The data can be transmitted to PC easy through the front side USB port.

## Feature

- \* 4 channels static & dynamic data logger.
- \* Multi functions with touch screen and built-in data memory
- \* Built-in 120Ω, 350Ω bridge circuit
- \* Remove noise by low pass filter.
- \* Auto zero by auto zero button
- \* 1gage 3wire type, 2gage, 4gage bridge can be connected.
- \* Use both Tajimi and 5p Screw connector
- \* Small size, light weight and USB interface



## Specification

Model	GTDL-152
Number of channel	4 Channels
Measure frequency	1,000Hz
Display & Data memory	5.6" TFT touch LCD 4G SD DATA memory, USB memory stick port (EXT)
Input sensors	<ul style="list-style-type: none"> <li>- 1Gage &amp; 2gage : 120Ω , 350Ω</li> <li>- 4 Gage bridge sensor : 0.5mV/V - 100mV/V</li> <li>- Potentiometer type sensor</li> <li>- Pt100 RTD</li> <li>- Voltage output type sensor ±10V</li> </ul>
Strain input range	<ul style="list-style-type: none"> <li>- Gain 1000 : ±10,000 [uStrain]</li> <li>- Gain 100 : ±100,000 [uStrain]</li> <li>- Gain 10 : ±1,000,000 [uStrain]</li> </ul>
Low Pass Filter	Selectable 10Hz, 100Hz, 1Khz by program
EXC Voltage	Selectable 2Volt , 5Volt , 10Volt by Program
Interface	USB
Program	Multiscan S/W & Multiload S/W
Dimension	140(W) * 190(D) * 270(H) mm
Power	Free voltage AC85~264V , 50~60Hz



This data logger is 8 channels dynamic & static strain measurement equipment which connect with PC and display graph and record data. Strain can be measured after strain gage is wired, and strain gauge type sensors as like load cell, pressure sensor, torque sensor, LVDT and potentiometer and so forth, can be measured. The data can be transmitted to PC easy through the front side USB port.

## Feature

- \* 8 channels static & dynamic data logger.
- \* Built-in 120Ω, 350Ω bridge circuit
- \* Remove noise by low pass filter.
- \* Auto zero by auto zero button
- \* 1gage 3wire type, 2gage, 4gage bridge can be connected.
- \* Use both Tajimi and 5p Screw connector
- \* Small size, light weight and USB interface



## Specification

Model	GTDL-160
Number of channel	8 Channels
Measure frequency	1,000Hz
Input sensors	<ul style="list-style-type: none"> <li>- 1Gage &amp; 2gage : 120Ω , 350Ω</li> <li>- 4 Gage bridge sensor : 0.5mV/V - 100mV/V</li> <li>- Potentiometer type sensor</li> <li>- Pt100 RTD</li> <li>- Voltage output type sensor ±10V</li> </ul>
Strain input range	<ul style="list-style-type: none"> <li>- Gain 1000 : ±10,000 [uStrain]</li> <li>- Gain 100 : ±100,000 [uStrain]</li> <li>- Gain 10 : ±1,000,000 [uStrain]</li> </ul>
Low Pass Filter	Selectable 10Hz, 100Hz, 1Khz by program
EXC Voltage	Selectable 2Volt , 5Volt , 10Volt by Program
Interface	USB
Program	Multiscan S/W & Multiload S/W
Dimension	435(W) * 300(D) * 132(H) mm
Power	Free voltage AC85~264V , 50~60Hz

This data logger is 8 channels dynamic & static strain measurement equipment which connect with PC, and display graph and record data. This data logger can measure static test without PC because has built-in SD memory and touch screen. Strain can be measured after strain gage is wired, and strain gauge type sensors as like load cell, pressure sensor, torque sensor, LVDT and potentiometer and so forth, can be measured also. The data can be transmitted to PC easy through the front side USB port.

## Feature

- \* 8 channels static & dynamic data logger.
- \* Built-in 120 $\Omega$ , 350 $\Omega$  bridge circuit
- \* Remove noise by low pass filter.
- \* 1gage 3wire type, 2gage, 4gage bridge can be connected.
- \* Use both Tajimi and 5p Screw connector
- \* Small size, light weight and USB interface



## Specification

Model	GTDL-162
Number of channel	8 Channels
Measure frequency	1000Hz
Display & data memory	7" Touch screen 16G SD Data Memory , USB Memory Stick Port (EXT)
Input sensors	<ul style="list-style-type: none"> <li>- 1Gage &amp; 2gage : 120<math>\Omega</math> , 350<math>\Omega</math></li> <li>- 4 Gage bridge sensor : 0.5mV/V - 100mV/V</li> <li>- Potentiometer type sensor</li> <li>- Pt100 Thermocouple</li> <li>- Voltage output type sensor <math>\pm 10V</math></li> </ul>
Strain input range	<ul style="list-style-type: none"> <li>- Gain 1000 : <math>\pm 10,000</math> [uStrain]</li> <li>- Gain 100 : <math>\pm 100,000</math> [uStrain]</li> <li>- Gain 10 : <math>\pm 1,000,000</math> [uStrain]</li> </ul>
Low Pass Filter	Selectable 10Hz, 100Hz, 1KHz by program
EXC Voltage	Selectable 2Volt , 5Volt , 10Volt by Program
Interface	USB
Program	Multiscan S/W & Multiload S/W
Dimension	435(W) * 300(D) * 132(H) mm
Power	Free voltage AC85~264V , 50~60Hz



This data logger is 16 channels dynamic & static strain measurement equipment which can monitor result and record data with PC and SD memory card. Strain measured after strain gage is wired, and strain gauge type sensors as like load cell, pressure sensor, torque sensor, LVDT and can be potentiometer and so forth, can be measured. The data can be transmitted to PC easy through the front side USB port.

## Feature

- \* Max. 16 channels static & dynamic data logger.
- \* Real-time measurement by USB port
- \* 4channels per slot type
- \* 1kHz frequency measurement by each channel
- \* Built-in 120Ω, 350Ω bridge circuit
- \* Remove noise by low pass filter.
- \* 1gage 3wire type, 2gage, 4gage bridge can be connected.
- \* Selectable both Tajimi or 5p Screw connector



## Specification

Model	GTDL-350
Number of channel	Max. 16 Channels (4, 8, 12)
Measure frequency	1,000Hz
Connector for sensor	Selectable 5p screw connector or Tajimi
Input sensor	<ul style="list-style-type: none"> <li>- 1Gage &amp; 2gage : 120Ω , 350Ω</li> <li>- 4 Gage bridge sensor : 0.5mV/V - 100mV/V</li> <li>- Potentiometer type sensor</li> <li>- Pt100 RTD, Thermocouple (J, K, T, E, R, S)</li> <li>- Voltage output type sensor ±10V</li> </ul>
Strain input range	<ul style="list-style-type: none"> <li>- Gain 1000 : ±10,000 [uStrain]</li> <li>- Gain 100 : ±100,000 [uStrain]</li> <li>- Gain 10 : ±1,000,000 [uStrain]</li> </ul>
Low Pass Filter	Selectable 10Hz, 100Hz, 1Khz by program
Interface	USB
Program	Multiscan S/W & Multiload S/W
Dimension	260(W) * 190(H) * 270(D) mm
Power	Free voltage AC85~264V , 50~60Hz



This data logger is Max. 32 channels dynamic & static strain measurement equipment which can monitor result and record data with PC and SD memory card. Strain measured after strain gage is wired, and strain gauge type sensors as like load cell, pressure sensor, torque sensor, LVDT and can be potentiometer and so forth, can be measured. The data can be transmitted to PC easy through the front side USB port.

## Feature

- \* Max. 32 channels static & dynamic data logger.
- \* Real-time measurement by USB port
- \* 4channels per slot type
- \* 1kHz frequency measurement by each channel
- \* Built-in 120Ω, 350Ω bridge circuit
- \* Remove noise by low pass filter.
- \* 1gage 3wire type, 2gage, 4gage bridge can be connected.
- \* Selectable both Tajimi or 5p Screw connector



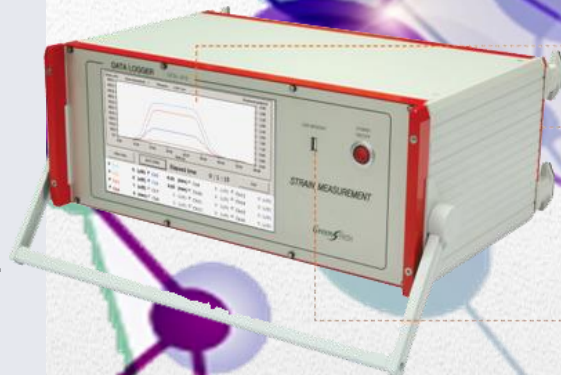
## Specification

Model	GTDL-360
Number of channel	Max. 32Channels (4, 8, 12,16,20,24,28)
Measure frequency	1,000Hz
Connector for sensor	Selectable 5p screw connector or Tajimi
Input sensor	<ul style="list-style-type: none"> <li>- 1Gage &amp; 2gage : 120Ω , 350Ω</li> <li>- 4 Gage bridge sensor : 0.5mV/V - 100mV/V</li> <li>- Potentiometer type sensor</li> <li>- Pt100 RTD, Thermocouple (J, K, T, E, R, S)</li> <li>- Voltage output type sensor ±10V</li> </ul>
Strain input range	<ul style="list-style-type: none"> <li>- Gain 1000 : ±10,000 [uStrain]</li> <li>- Gain 100 : ±100,000 [uStrain]</li> <li>- Gain 10 : ±1,000,000 [uStrain]</li> </ul>
Low Pass Filter	Selectable 10Hz, 100Hz, 1Khz by program
Interface	USB
Program	Multiscan S/W & Multiload S/W
Dimension	470(W) * 190(H) * 320(D) mm
Power	Free voltage AC85~264V , 50~60Hz

This data logger is Max.32 channels dynamic & static strain measurement equipment which connect with PC, and display graph and record data. This data logger can measure static test without PC because has built-in SD memory and touch screen. Strain can be measured after strain gage is wired, and strain gauge type sensors as like load cell, pressure sensor, torque sensor, LVDT and potentiometer and so forth, can be measured also. The data can be transmitted to PC easy through the front side USB port.

## Feature

- \* 32 channels static & dynamic data logger.
- \* 10" large touch screen and built-in 16G SD memory
- \* 4 chs per slot type
- \* Remove noise by low pass filter.
- \* Auto zero by auto zero button
- \* 1gage 3wire type, 2gage, 4gage bridge can be connected.
- \* Selectable both Tajimi or 5p Screw connector
- \* Small size, light weight and USB interface



## Specification

Model	GTDL-610
Number of channel	Max. 32Channels (4, 8, 12,16,20,24,28)
Measure frequency	1,000Hz
Display & Data memory	10.2" TFT touch LCD 4G SD DATA memory, USB memory stick port (EXT)
Input sensors	- 1Gage & 2gage : 120Ω , 350Ω - 4 Gage bridge sensor : 0.5mV/V - 100mV/V - Potentiometer type sensor - Pt100 RTD - Voltage output type sensor ±10V
Strain input range	- Gain 1000 : ±10,000 [uStrain] - Gain 100 : ±100,000 [uStrain] - Gain 10 : ±1,000,000 [uStrain]
Low Pass Filter	Selectable 10Hz, 100Hz, 1Khz by program
EXC Voltage	Selectable 2Volt , 5Volt , 10Volt by Program
Interface	USB
Program	Multiscan S/W & Multiload S/W
Dimension	450(W) * 180(H) * 310(D) mm
Power	Free voltage AC85~264V , 50~60Hz



This data logger is Max.56 channels dynamic & static strain measurement equipment which connect with PC, and display graph and record data. This data logger can measure static test without PC because has built-in SD memory and touch screen. Strain can be measured after strain gage is wired, and strain gauge type sensors as like load cell, pressure sensor, torque sensor, LVDT and potentiometer and so forth, can be measured also. The data can be transmitted to PC easy through the front side USB port.

## Feature

- \* Static & dynamic multi functions data logger for site
- \* Easy movement and strong and waterproof case
- \* 8 chs per slot type
- \* Remove noise by low pass filter.
- \* Auto zero by auto zero button
- \* 1gage 3wire type, 2gage, 4gage bridge can be connected.
- \* Selectable both Tajimi or 5p Screw connector
- \* Selectable 12V power



## Specification

Model	GTDL-600
Number of channel	Max. 56Channels (8, 16, 24, 32, 40, 48)
Measure frequency	1,000Hz
Connector for sensor	Selectable Tajimi or 5p Screw connector
Display & Data memory	7" TFT touch LCD 16G SD DATA memory, USB memory stick port (EXT)
Input sensors	- 1Gage & 2gage : 120Ω , 350Ω - 4 Gage bridge sensor : 0.5mV/V - 100mV/V - Potentiometer type sensor - Pt100 RTD - Voltage output type sensor ±10V
Strain input range	- Gain 1000 : ±10,000 [uStrain] - Gain 100 : ±100,000 [uStrain] - Gain 10 : ±1,000,000 [uStrain]
Low Pass Filter	Selectable 10Hz, 100Hz, 1Khz by program
EXC Voltage	Selectable 2Volt , 5Volt , 10Volt by Program
Interface	USB
Program	Multiscan S/W & Multiload S/W
Dimension	500(W) * 380(D) * 190(H) mm
Power	Free voltage AC85~264V , 50~60Hz

This data logger is Max.56 channels dynamic & static strain measurement equipment which connect with PC and display graph and record data. Strain can be measured after strain gage is wired, and strain gauge type sensors as like load cell, pressure sensor, torque sensor, LVDT and potentiometer and so forth, can be measured also. The data can be transmitted to PC easy through the front side USB port.

## Feature

- \* Static & dynamic multi functions data logger for site
- \* Easy movement and strong and waterproof case
- \* 8 chs per slot type
- \* Remove noise by low pass filter.
- \* Auto zero by auto zero button
- \* 1gage 3wire type, 2gage, 4gage bridge can be connected.
- \* Selectable both Tajimi or 5p Screw connector
- \* Selectable 12V power



## Specification

Model	GTDL-620
Number of channel	Max. 64Channels (8, 16, 24, 32, 40, 48, 56)
Measure frequency	1,000Hz
Connector for sensor	Selectable Tajimi or 5p Screw connector
Input sensors	<ul style="list-style-type: none"> <li>- 1Gage &amp; 2gage : 120Ω , 350Ω</li> <li>- 4 Gage bridge sensor : 0.5mV/V - 100mV/V</li> <li>- Potentiometer type sensor</li> <li>- Pt100 RTD</li> <li>- Voltage output type sensor ±10V</li> </ul>
Strain input range	<ul style="list-style-type: none"> <li>- Gain 1000 : ±10,000 [uStrain]</li> <li>- Gain 100 : ±100,000 [uStrain]</li> <li>- Gain 10 : ±1,000,000 [uStrain]</li> </ul>
Low Pass Filter	Selectable 10Hz, 100Hz, 1Khz by program
EXC Voltage	Selectable 2Volt , 5Volt , 10Volt by Program
Interface	USB
Program	Multiscan S/W & Multiload S/W
Dimension	500(W) * 380(D) * 190(H) mm
Power	Free voltage AC85~264V , 50~60Hz



This amplifier has strain measurement and analog output function and more various functions and easy operation by built-in 5.6" TFT screen. Various signals from sensors are inputted and carry out an operation and indicate them to LCD screen and output analog signal  $\pm 10V$ .

## Feature

- \* Real data value and out voltage can be checked.
- \* Kind of sensor, sensor spec, decimal points can be settled by touch screen.
- \* No need bridge box by Built-in  $120\Omega$ ,  $350\Omega$  bridge circuit.
- \* 19" rack (3U) can be installed.
- \* D/A offset and D/A span can be settled
- \* Kind of sensor, EXT voltage, amplification rate and filter frequency can be selectable by each channel.
- \* 2channels per slot type
- \* Use both circular type connector or 5p Screw connector



## Specification

Model	GTSA-16
Number of channel	Max. 16 Channels (2, 4, 6, 8, 10, 12, 14)
Display	5.6" TFT touch LCD
Measure frequency	10kHz
Measure frequency	10kHz
Input sensor	<ul style="list-style-type: none"> <li>- 1Gage &amp; 2gage : <math>120\Omega</math> , <math>350\Omega</math></li> <li>- 4 Gage bridge sensor : <math>0.5mV/V</math> - <math>100mV/V</math></li> <li>- Potentiometer type sensor</li> <li>- Voltage output type sensor <math>\pm 10V</math></li> </ul>
Strain input range	<ul style="list-style-type: none"> <li>- Gain 1000 : <math>\pm 10,000</math> [uStrain]</li> <li>- Gain 100 : <math>\pm 100,000</math> [uStrain]</li> <li>- Gain 10 : <math>\pm 1,000,000</math> [uStrain]</li> </ul>
Low Pass Filter	Selectable 10Hz, 100Hz, 1KHz by program
EXC Voltage	Selectable 2Volt , 5Volt , 10Volt by Program
A/D conversion	16bit 10,000 times/sec
D/A conversion	16bit 10,000 times/sec
Dimension	450(W) * 132(H) * 280(D) mm, 19" rack 3U size
Power	Free voltage AC85~264V , 50~60Hz

This data logger is temperature or humidity measurement system that can measure temperature or humidity without P.C through 3.2" TFT touch screen, 4GB memory, USB port. And this data logger include blue tooth system and can operate wireless data measurement.



Blue  
tooth

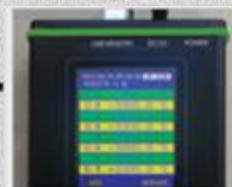


## Feature

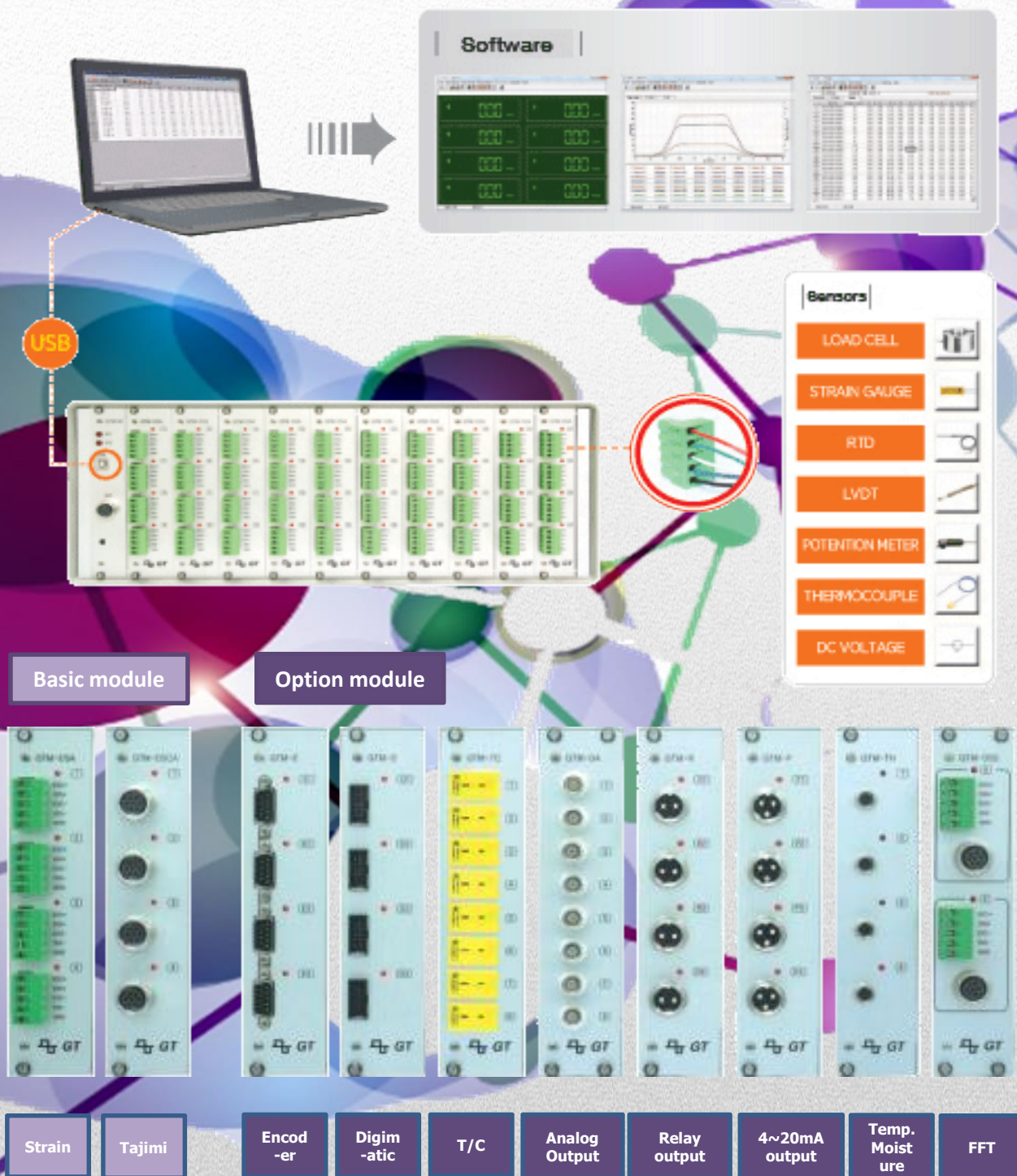
- \* GTDL-TC20 : Thermocouple
- \* GTDL-TH20 : Humidity
- \* Read data by excel through USB memory stick
- \* Save data by absolute time interval
- \* Settable each sensor offset and CJC offset
- \* Wireless measurement by blue tooth
- \* Independent operation and P.C by USB cable
- \* settable alarm and database interlock, etc.

## Specification

Model	GTDL-TC20	GTDL-TH20
Input Sensor	Thermocouple J,K,T,E,R,S	Humidity sensor
Number of channel	8 channels	4 cannels
Display	3.2" TFT Touch LCD	
Internel data memory	4GB Data Memory	
Data save interval	2sec, 5sec, 10sec, 30sec, 1min, 5min., 10min, 30min	
Interface	Bule tooth	USB
Power	DC12V	USB
Dimension	110(W) * 170(D) * 35(H)mm	
Program	Multiscan S/W & Multiload S/W	







Channel extension by  
extension port

Channel extension by  
USB port

## Wiring

<b>1 GAGE 3WIRE</b> 	<b>2 GAGE</b> 	<b>4 GAGE(STRAN)</b> 																		
<b>4 GAGE(SENSOR)</b> <table border="1"> <tr><td>Loadcell</td><td>EXC+</td><td>A</td></tr> <tr><td></td><td>SIG+</td><td>B</td></tr> <tr><td>Lvdt</td><td>EXC-</td><td>C</td></tr> <tr><td></td><td>SIG-</td><td>D</td></tr> <tr><td>Pressure</td><td></td><td>E</td></tr> <tr><td>Acce.meter</td><td>SHD.</td><td></td></tr> </table>	Loadcell	EXC+	A		SIG+	B	Lvdt	EXC-	C		SIG-	D	Pressure		E	Acce.meter	SHD.		<b>POTENTION METER</b> 	<b>DC VOLT</b> 
Loadcell	EXC+	A																		
	SIG+	B																		
Lvdt	EXC-	C																		
	SIG-	D																		
Pressure		E																		
Acce.meter	SHD.																			
<b>Pt 100 RTD</b> 	<b>4~20mA Output Sensor</b> 	<b>Thermocouple</b> 																		



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The inclinometer SJ-5000 we developed is easy to see the working power and display on the large LCD and Back-Light screen adopting the directory menu function which is easy to handle and use. The size is compact less than other ordinary meters so it is easy to carry and when it is not used for more than 10 minutes the power is automatically off. Moreover, the Indicator-Read Cable and Indicator-Enter Key communication is wireless to get easy for carrying and testing unlike other products using the cable communication method connected each part.



## Components

- \* Probe
- \* Indicator
- \* Reel Cable & Drum
- \* Remote Control
- \* Others: PC Connect Cable, charger, hand carrying box and case

## Feature

- \* The accelerating sensor with high precision is superior to other servo accelerating types in terms of the shock survivability, so that it can minimize the tolerances of the shock caused by vibration and moving in the surrounding field.
- \* Quick testing speed and outstanding stability of the data
- \* Easy to carry and test due to the wireless communication method adopted.
- \* Product's localization and quick A/S based on in-house production system
- \* Compact size and light weight for each components

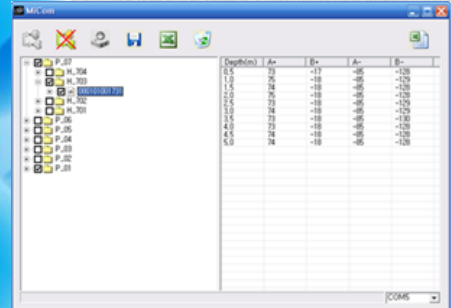


## Specification

Model		SJ-5000	SJ-5010
Probe	Cable Length	50meter	100 meter
	Sensor Type	MEMS Accelerating Type	
	Measurement range	+/-15° (2 axle direction displacement measurement)	
	Total System Accuracy	+/-3.94mm / 30M	
	Formula to obtain Sinθ	$\sin \theta = \arcsin (\text{readout value}/16000)$	
	Formula to obtain distance (m/m)	Distance=Sin θ *Measurement distance (ex: 500 for 5cm distance)	
	Product's size	Length: 680mm, Weight: 1.4kg	
	Material	Stainless steel	
	Working temp.	-20 ° C ~ 50 ° C	
Indicator	LCD screen	Large LCD	
	Illumination	Back-Light LCD	
	Power	Rechargeable Li-Ion Battery	
	Internal Flash Memory	40 MB	
	Operating Time	32 Hours	
	Serial PC Port (USB)	115,600 bps	
	Total Project Name	7 pcs	
	No. of Holes per Project	50 pcs	
	No. of Data file per Hole	5 pcs	
	Power interruption & save	Auto power off when not operated for more than 10 min. (For Power Off, Time Back-Up as Sleep Mode)	
	Product size	Length: 25*100*165mm, Weight: 0.5kg	
	Working temp	-20 ° C ~ 80 ° C	
Reel cable	Cable length	50m	
	Measurement distance ID	0.5m	
	Product's size	Length: 50m*100mm, Weight: 0.0kg	
	Material	Urethane	
	Signal cable	485 COM Digital	

## Software

The software operating system for this product is available for Windows, LINUX and Macintosh and it is easy to install and operate. Also it is easy to use because of the Excel File converting function.



Our ABS inclinometer casing is designed to operate or install portable servo accelerometer type inclinometer or in-place inclinometer that monitor under ground horizontal displacement. And inside 4 guide groove can control direction of inclinometer probe to measure the stability of embankments, slopes, rock cuts, foundation, excavation wall, piles and dams, etc.

## Application

- \* Pillings
- \* Landfills stability
- \* Prock cuts
- \* Under large storage tanks
- \* Embankment stability
- \* Bridge pier, abutments deflection
- \* Landfills
- \* Slopes stability
- \* Dam stability

## Characteristic

Our inclinometer casing is composed of casing and coupling and end cap basically and telescopic casing is option.

If heavy torision force casing, inclinomter cannot be inset to casing.

Our material of casing is ABS(Acrylonitrile Butadiene Styrene) resin that is very strong and lightweight abd corroison resistnace and environmental resistnace.

And we manufacture inclinometer casing and casing by extrusion and cutting and keep tolerance of groove within  $0.2^\circ$  by precise processing.

Therefore our inclinometer casing protect inclinometer against heavy spiral force and deformation and guide inclinometer probe to measure slop stably.

## Telescopic section

If settlement or uplift of the ground is expected to exceed 1-2%, telescope section must be installed to protect inclinometer casing against vertical strain. To install telescopic section with inclinometer casing, additional same quantity coupling is need with installationtelescopic section quantity.

Maximum length : 750mm

Minimum length : 600mm



SJ-5000 Slope indicator

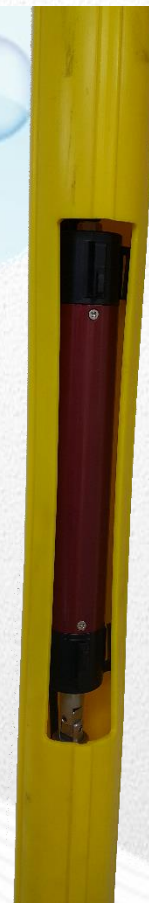


SJ-6900 In-place inclinometer



## Installation

Inclinometer casing shall be installed by special monitoring company. If settlement or uplift of the ground is expected, telescope section shall be installed. Inclinometer casing shall be not pushed by drilling equipment to remove buoyancy. Optimum grouting shall be selected according to soil environment. Before installation, borehole depth shall be checked. Groove shall be installed to meet direction that is expected displacement. Grooves of our inclinometer casing is on casing to meet direction easily. After installation, if direction casing is changed, it is caused by spiral force that is caution of measurement error, therefore groove direction is met carefully at the installation. Inclinometer casing shall be jointed by coupling and fixed by rivet. The joint parts shall be sealed and waterproofed by sealing materials like silicon, and tape.



## Specification

Model	60 CASING	60 COUPLING	70 CASING	70 COUPLING
Load test	600kg or more			
Collapsing Pressure	225psi or more			
Processing method	Pultrusion and cutting.			
KIWI processing accuracy	within 0.2°			
Heating penetration test	80 ° C and more			
Temp. range	-20 ° C ~ 100 ° C			
Humidity range	0 ~ 100%			
Material type	ABS(Acrylonitrile Butadiene Styrene) RESIN			
O.D (mm)	60±0.2	70±0.5	70±0.2	80±0.5
I.D (mm)	50±0.2	60.5±0.2	60±0.2	70.5±0.2
Length(mm)	3000±5	200±5	3000±5	200±5
Weight	2.0	0.3	3.1	0.6

※ The product spec is subject to change without prior notice in order to enhance the product's quality.





We developed portable type digital tiltmeter SJ-705 is applied by our developed control technology of digital sensor and tuning technology for accurate and stable output. SJ-705 is single body type that include built-in battery and compensation function for easy operation in site, office, laboratory and everywhere.



## Components

- \* Digital tiltmeter body
  - built-in battery
  - Accurate mold housing
    - No deformation metal housing for stable application to structure or tilt plate
- \* Portable bag : Hard case including optimum buffer



## Tilt Plate



## Feature

- \* Dual axis
- \* Portable design for Excellent durability and mobility
- \* Output mode : A mode, B mode, AB mode  
(Display of sensor output and calculated angle)
- \* Built-in "Hold " function
- \* Built-in Battery(charging type)
- \* Separable tilt sensor with housing



## Specification

Model		SJ-705
Sensor	Sensor Type	MEMS Accelerating Type
	Measurement range	$\pm 15^\circ$ (dual axial tilt measurement)
	Temp. compensation	Built-in self Temp. compensation function
Body	LCD screen	Large LCD
	Illumination	Back-Light LCD
	Power	Rechargeable Li-Ion Battery
	Operating Time	32 Hours
	Serial PC Port	Built-in port
	Material	Stainless steel case and ultra light alloy metal
	Resolution	0.001785714 (Degrees/mV)
	Diension	147(L) X 105(W) X 165mm(H), Weight: 1.2kg
	Operation Temp.	-20 ° C ~ 45 ° C

## Product Photo

### The side of housing



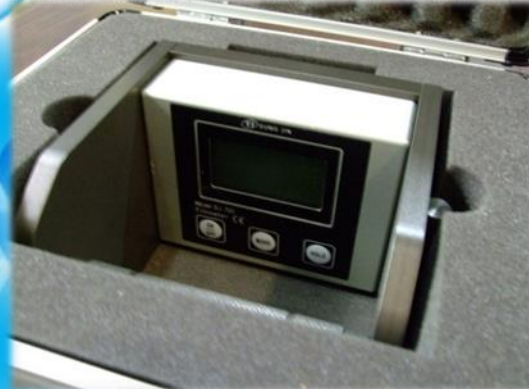
### Screen and control parts



### Port for recharge and calibration



### Loading in potable hard case





Automatic measurement system SJ-1000 can connect digital sensor and frequency output VW sensors and analog sensors (mV, mA), and acquire, save and control data.



## Application

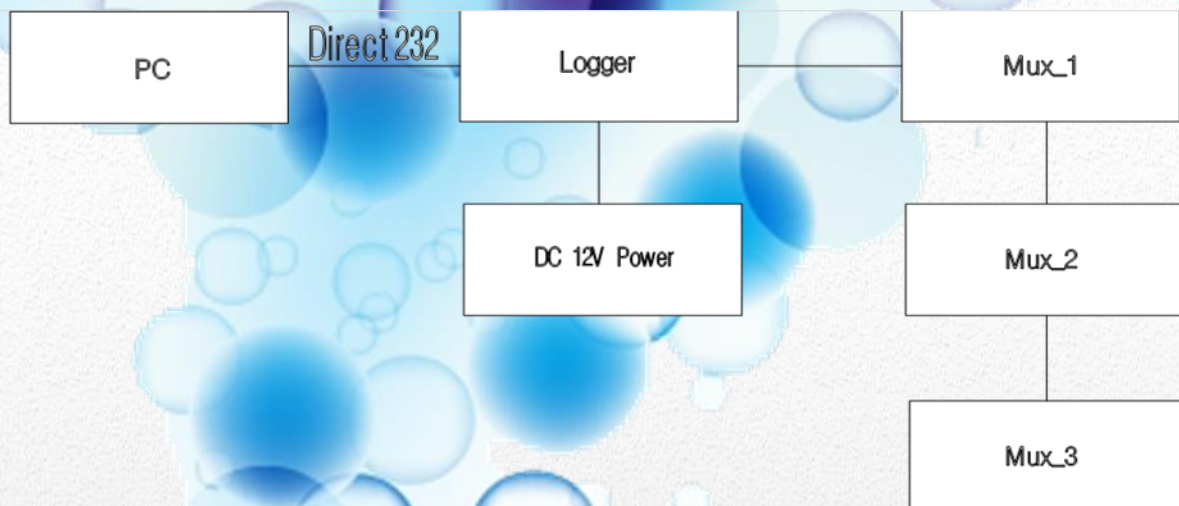
- \* Automatic measurement of hard to access site as like harbor, bridge and subway
- \* Much electrical noise site in city as like subway
- \* Other soft ground, tunnel, sheathing site

## Characteristic

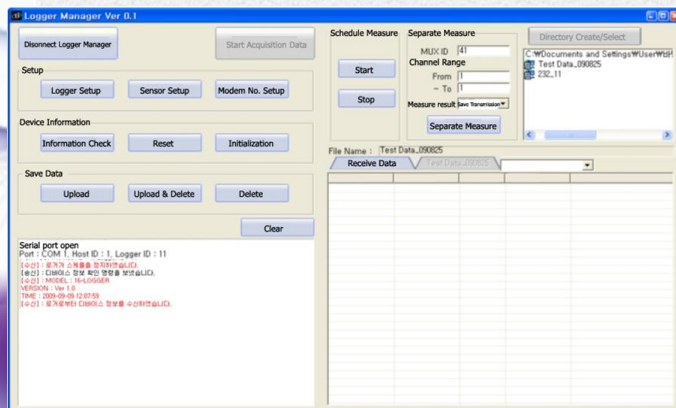
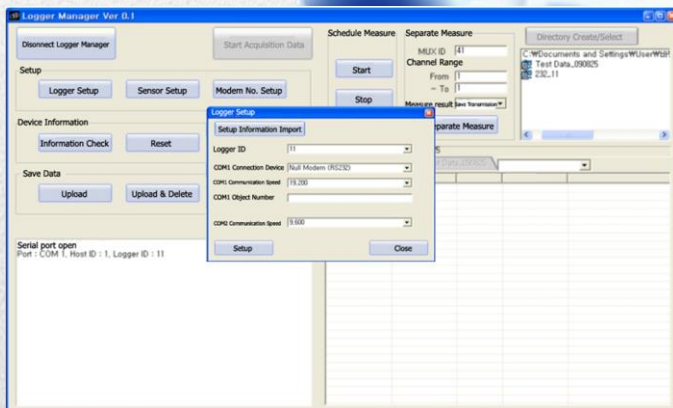
Automatic static data logger SJ-100 is structured by measuring terminal, communication module and wiring panel. Measuring terminal is 16channels and can be expanded to 68channels by connection of 3 muxs. RS485 module can measure 86 sensors by communication only. Power is DV 12V and Min. 9.8V can operate data logger. Built in memory is 32MB and various digital or analog sensor can be measured.

## Feature

- \* 16 Channels data logger : 16 Sensors can be connected to data logger.
- \* Avail to connection with 3 Muxs : Each Mux has 16 channels and Max. 3 Mux can be connected by series.
- \* Small quiescent current : 20mA
- \* Small sleep current : 40uA (Clock can be operated for 9 months by Ni-Cd battery without main power.
- \* Big memory (32MB)
- \* 4 kinds output sensors can be connected.: Vibration wire type, voltage, current, digital(485)
- \* Accurate measurement
- \* Strong design
- \* Not only logger manager also data acquisition function
- \* Test data can be changed easily to excel file.
- \* Test data can be analyzed because test data are divided into logger (Modem) and arrange data in order of sensors.
- \* Auto time setup
- \* Auto start : If operator not start schedule, when data logger start data acquisition, data logger start schedule.
- \* Data logger can test by sensors and save data separately without PC.



## Software



## Specification

Model	SJ - 1000
Number of channel	16 channels / 90 channels by 5 muxs (16 channels)
Input power	DC 12V
Built-in save memory	32MByte
Operation Temp.	-20 °C ~ 50 °C
Dimension	205mm(W) X 100mm (L) X 50mm (H)
Communication standard	Frequency : 2.4GHz / Communication speed 100mm / Communication model : CDMA
Digital sensor accuracy	±0.05% FSR
Analog sensor accuracy	±0.001 V

※ The product spec is subject to change without prior notice in order to enhance the product's quality.



Model SJ-1200 VW Readout Unit, is composed of body (battery contained), sensor connecting cable and charger.

The body is equipped with two buttons and large LCD and it is designed in such a way that anyone can handle conveniently to read the data easily. The mode selection suitable to VW sensor and the engineering unit by the mode are displayed at the same time. The external case uses durable cabinet materials with waterproof connector and rubbers.



## Components

- \* SJ-1200 main body
- \* Sensor testing Cable
- \* Charger

## Features

- \* Resolving power: 0.01uS
- \* Charging display function
- \* Continuous use hour : 20 hours
- \* Battery indicator
- \* LCD Back-Light

## Specification

Model	SJ – 1200
Sensor	All VW sensors
Measurement scope	450Hz ~ 6000Hz, 5V square wave
Resolution	0.01uS
Accuracy	+/-50ppm
Working Temp.	-20 ° C ~ 80 ° C
Storage Temp.	-20 ° C ~ 80 ° C
Temp. measurement resolution	0.1 ° C
Temp. measurement range	-50 ° C ~ 80 ° C
Display	128 x 64 Dot STN Graphic LCD
Battery	3.8V Li-Ion
Charger	4.2V / 1A, Charging lamp
Weight	450g
External dimension	93 x 154 x 27mm

※ The product spec is subject to change without prior notice in order to enhance the product's quality.

Model SJ-1300, VW Readout Unit, is composed of body (battery contained), sensor connecting cable and charger.

The body is equipped with two buttons and large LCD and it is designed in such a way that anyone can handle conveniently to read the data easily. The mode selection suitable to VW sensor and the engineering unit by the mode are displayed at the same time. The external case uses durable cabinet materials with waterproof connector and rubbers.



## Components

- \* SJ-1300 main body
- \* Sensor testing Cable
- \* Charger

## Features

- \* Resolving power: 0.01uS
- \* Charging display function
- \* Continuous use hour : 20 hours
- \* Battery indicator
- \* LCD Back-Light
- \* SD card port

## Specification

Model	SJ – 1300
Sensor	All VW sensors
Measurement scope	450Hz ~ 6000Hz, 5V square wave
Resolution	0.01uS
Accuracy	+/-50ppm
Storage device	SC card
Working Temp.	-20 ° C ~ 80 ° C
Storage Temp.	-20 ° C ~ 80 ° C
Temp. measurement resolution	0.1 ° C
Temp. measurement range	-50 ° C ~ 80 ° C
Display	128 x 64 Dot STN Graphic LCD
Battery	3.8V Li-Ion
Charger	4.2V / 1A, Charging lamp
Weight	450g
External dimension	93 x 154 x 27mm

※ The product spec is subject to change without prior notice in order to enhance the product's quality.



Model SJ-1400 is the exclusive sensor tester for inclinometer, accelerometer, CRACK Gauge, Strain Gauge and Analog DC Voltage and the body is equipped with two buttons and large LCD so that anyone can handle it conveniently to read the tested data. The mode selection suitable to sensor property and the engineering unit by the mode are displayed at the same time. The external case uses good endurable cabinet materials with waterproof connector and rubbers.



## Components

- \* SJ - 1400
- \* Sensor testing Cable
- \* Charger

## Features

- \* Resolving power :1 mV
- \* Charging display function
- \* Continuous use hour : 20 hours
- \* Battery indicator
- \* LCD Back-Light

## Specification

Model	SJ - 1400
Sensor	Inclinometer, Accelerating meter, Crack gauge, Strain gauge, Analog DC Vol Sensor
Measurement scope	+/-0 ~ 2,500mV
Resolution	1mV
Accuracy	+/-50ppm
Working temp	-20 ° C ~ 50 ° C
Temp measure. resolv. Power	0.1 ° C
Temp measure. Scope	-50 ° C ~ 80 ° C
Display	128 x 64 Dot STN Graphic LCD
Battery	3.8V Li-Ion
Charger	4.2V / 1A
Weight	400g
External dimension	93 x 154 x 27mm

※ The product spec is subject to change without prior notice in order to enhance the product's quality.

VW Piezometer type pore pressure meter is designed to test the pore water pressure and liquid pressure of pressure

vessel, pipe line, soft ground or embankment foundation, embankment and inside the boring hole.

## Application

- \* Measurement of pore water pressure at soft ground field
- \* Water level measurement at river, reservoir and standpipe
- \* Research of stability of slope and ground
- \* Measurement of leakage and underground water flow of dam, embankment and lake.



## Feature

- \* High stability that can be worked under extreme conditions.
- \* Excellent reproducibility and responsibility which is free from the cable length and change of resistance
- \* Optimization by use and supersensitive design
- \* High accurate temp sensor and lightning protection device mounted.

## Characteristic

VW Piezometer and pressure gauge is to convert the water pressure transmitted to the diaphragm into the frequency signal due to the interaction between the vibration wire and magnetic coil using the vibration wire sensor.

VW Piezometer used the principle of vibration wire tensile force by water pressure or pneumatic pressure transmitted to the diaphragm. When the frequency signal generated is transmitted to the output device then the output device will display the necessary engineering unit by applying the conversion factor. Special metal material was used to minimize the thermal expansion coefficient due to the temperature change and also the high precise diaphragm which is the sensing element was adopted. High accurate resistance temp sensor and arrestor were mounted in order for zero calibration due to the temp change and also high density epoxy resin and stainless steel special materials were adopted to allow semi-permanent measurement.

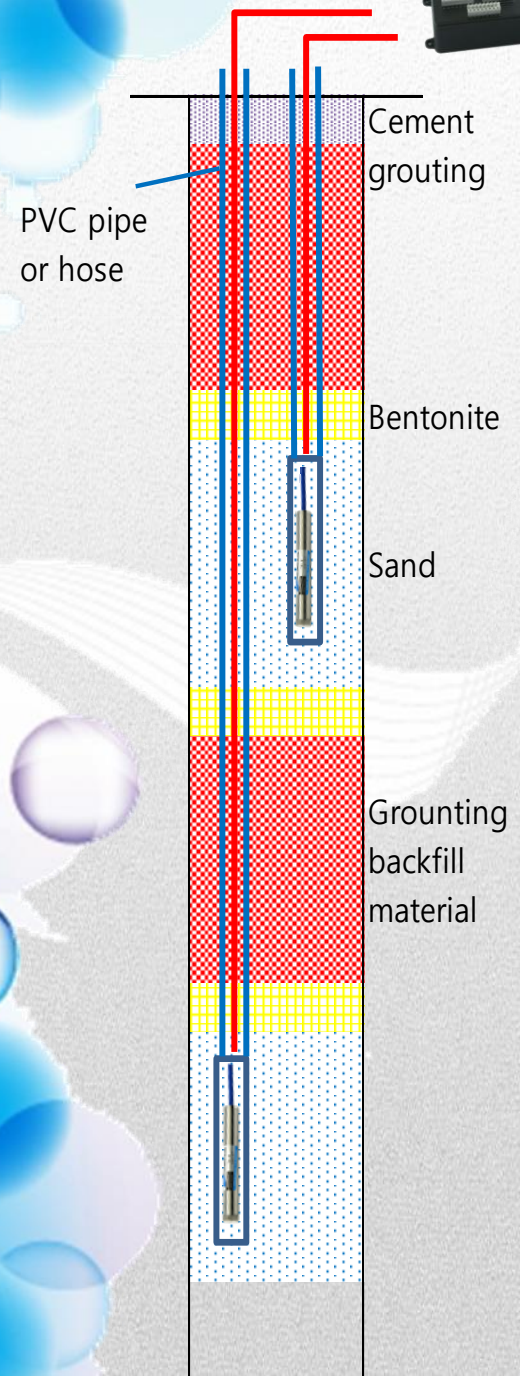
## Specification

Model	SJ - 4000	SJ - 4050
Type	General	Heavy duty
Capacity	2-70kg/cm <sup>2</sup>	
Max. Pressure	150 % FSR	
Resolution	0.025% FSR	
Accuracy	+/-0.1% Full scale	
Operatrion Temp.	-40 °C ~ 80 °C	
Temp sensor	NTC Thermistor (3KD-ATF)	
Temp sensor operation range	Thermistor: -40 °C ~ 80 °C	
Temp sensor accuracy	Thermistor : ±1°C	
Filter	Stainless sintered filter 70µm	
Lightening Protection	Tube Gas Arrestor (Frequency output line)	
Main material	Stainless special steel, High density epoxy potting	
Dimension	133mm X Ø19.1mm	133mm X Ø25.4mm
Signal cable	Ø6 4core shield	



## Installation

- \* If Air is in piezometer, reading value can be lower than real value.  
So piezometer shall be inputted to water from before 24 hours of installation
- \* If many cable can cause loss of pore pressure. So installer install less than 3 piezometers in one bore hole.
- \* If settlement is occurred and signal cable has not extra length, cable can be cut. So When piezometer is installed, 10-20% extra length cable is installed.
- \* if isolation between piezometer is poor, reading value can be not accurate.
- \* Installer shall not use bentonite power, use bentonite pellet.
- \* If top of signal cable is contacted with ground, water can be insert to cable. Therefore top of cable shall be cover by cable cap or others.
- \* The initial days of installation, pore pressure can be increaded by expansion of bentonite. But over pressure is disappeared after few days.
- \* Signal cable shall be protected by PVC pipe or hose



This Casarande water level meter measure under ground water level to check load increase by increase under ground water pressure. And also check change of water by excavation to grasp effect of around structure and study environment damage by exhaustion of under ground water, and stability by settlement.

## Operation

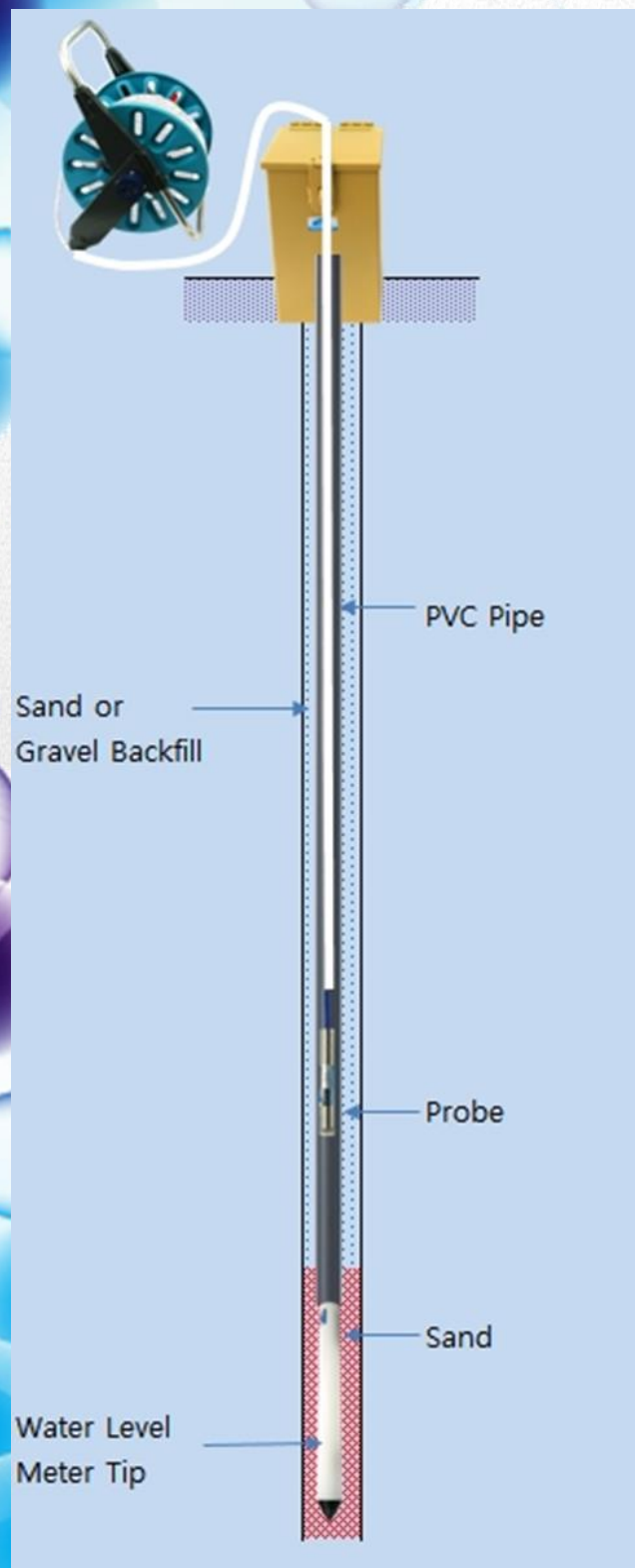
When water level probe is reached to under water through PVC pipe that is installed with water level filter, sensor is connected to electrode and buzzer is rung on and lamp is on. At the moment, operator read tape measure that is connected to probe.



## Specification

Probe and reel	SJ-4100	SJ-4110
<b>Measurement range</b>	50 meter	100 meter
<b>Probe dimension</b>	Ø19 X 180mm	
<b>Tape Accuracy</b>	1mm	
<b>Resolution</b>	±1mm	

※ The product spec is subject to change without prior notice in order to enhance the product's quality.





# Standpipe (Casagrande) Water Level Meter Tip

Water level meter tip is connected with the PVC Stand Pipe to install the water level meter and it is to filter foreign substances when the underground water flows into the PVC pipe inside from the lowest bottom in earth drill.

It is desirable to use the sand bag as subsidiary material to avoid filter blocking by fine particles for construction of soft ground or long-term construction.



## Characteristic

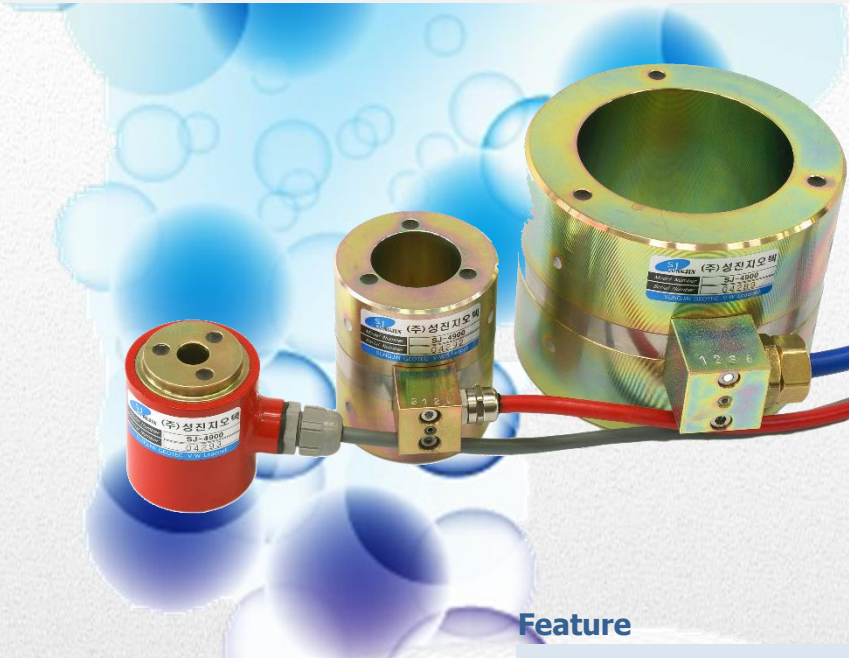
Basic components are ABS casing, coupling and end cap. The filter tip material uses PVC resin.

## Specification

Type	Description
Size	1 Type: 300mm*30mm, 2 Type: 500mm*50mm
Material type	Filter tip (PVC Synthetic resin)
Density	40um

※ The product spec is subject to change without prior notice in order to enhance the product's quality.

VW Load Cell is to measure the reaction force available at Earth Anchor to analyze in connection with the change of the retaining wall and judgment of the stability of the support after construction of anchor. Also, it is to measure the axial force affecting the strut.



## Application

- \* To measure the reaction force available at Earth Anchor
- \* To measure axial force affecting the strut
- \* To ensure the stability of the support system such as retaining wall and tie back, etc.

## Feature

- \* Excellent reproducibility and responsiveness which is free from cable length or resistance change
- \* Perfect waterproof structure
- \* High stability and high sensibility
- \* High accuracy even for the eccentric load
- \* High accurate resistance temp sensor mounted.
- \* Two types separated considering the load pattern

## Characteristic

For VW Load Cell, the VW stainless gauge was mounted by trisection (quadrisection) equally in the cylindrical cell hole precisely processed for the heat treated alloy materials. The principle is that when the cell is affected by the load the tensile force of the VW gauge mounted will be changed. When the VW Load Cell is magnetized by the magnetic coil mounted due to the load the vibration wire will generate the resonant frequency and this frequency will be transmitted to the output device to display the necessary engineering unit. It can be calculated as the load unit accurately and easily by the conversion coefficient provided. The reliability of the VW Load Cell is guaranteed since it is calibrated for each product through the verification of the effectiveness of the certified load tester. To get the best result, the load cell should be installed between upper and lower bearing plate and the Earth Anchor should be located in the center of the cell. The bearing plate will prevent it from bending or absorbing compression power to help affect the distribution load on the entire load cell. The housing and signal cables are completely waterproof and humid-resistant to get the data on a stable basis for long time, so that it can be used under the extreme conditions at civil work while protecting from external shock, etc.



## Specification

Model	SJ-50	SJ-100	SJ-130	SJ-150
Capacity	50 tonf	100 tonf	130 tonf	150 tonf
Max. applied load	150 % FSR (Field Service Regulations)			
Resolution	0.01 % FSR			
Accuracy	0.1 % FSR			
Cell section (External)	80.11mm <sup>2</sup>		80.49mm <sup>2</sup>	
Cell material	SCM family alloy steel			
No. of gauge mounted	3 VW Strain gauge (4 Strain gauge)			
Thermal expansion coefficient	10.8 x 10-6/C			
Operation Temp.	-29 ~ 105 ° C			
Temp. sensor	NTC Thermistor (3KD-ATF)			
Temp. sensor operation range	-40 °C ~ 80 ° C			
Storage Temp.	-40 °C ~ 80 ° C			
Temp sensor accuracy	Thermistor : ±1°C			
Waterproof capacity	Fluoro family O-Ring, High density vacuum grease coating			
Airtight material	Stainless steel, High density epoxy potting			
Signal cable	Ø10 4core shield			

※ The product spec is subject to change without prior notice in order to enhance the product's quality.

## Reference

Linear Value (KHz2)

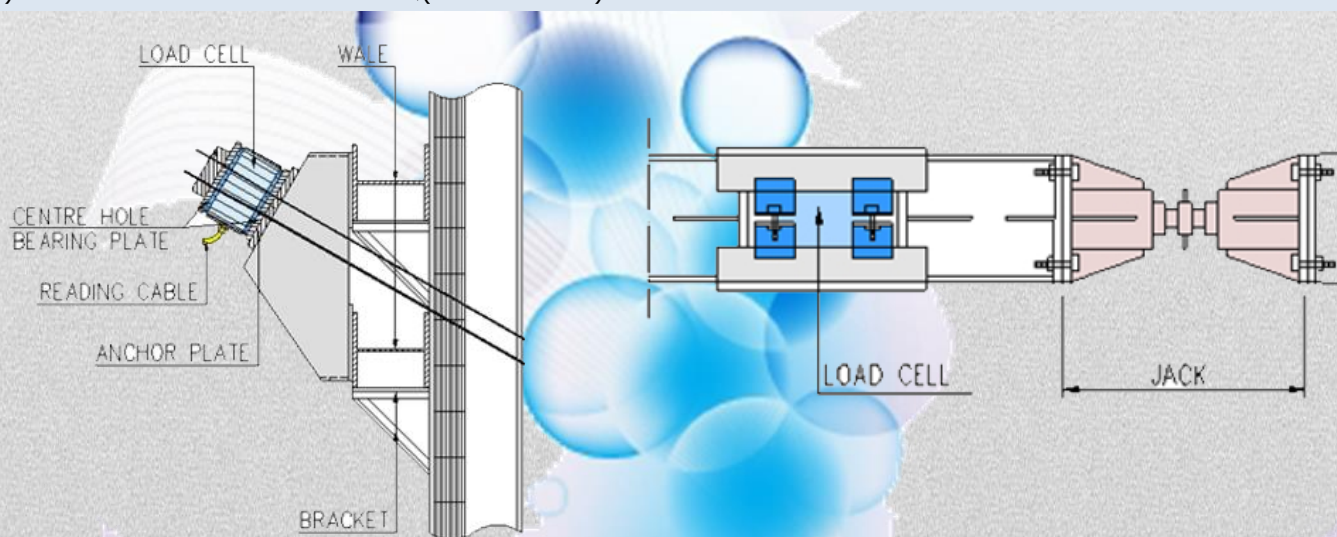
- Application: It can be used for load cell and VW pressure meter. It is also mainly used when the frequency value is decreased according to the increase in the engineering unit which is the reference standard for calibration.

- Unit: 103Hz2

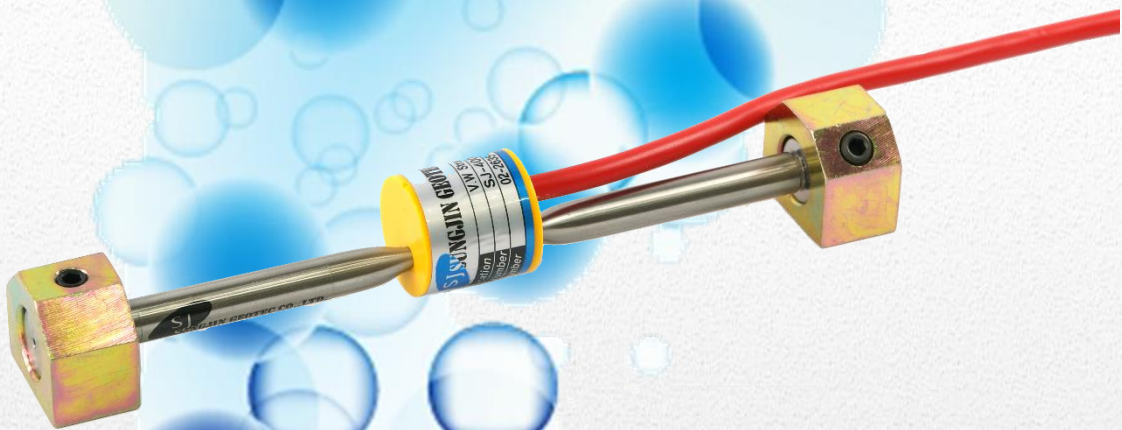
- Unit Conversion

a) Hz is converted into 103Hz2 :  $103\text{Hz}^2 = \text{Hz} \times \text{Hz} / 1000$

b) 103Hz2 is converted into Hz :  $\text{Hz} = \sqrt{(103\text{Hz}^2 \times 1000)}$



VW Arc-Weldable Strain Gauge is mounted on the steel or steel structure to test the stress changing condition of the structure caused by the excavation or surrounding work while predicting the stability of retaining wall and provisional facilities or testing the changing condition of the concrete structure by reclamation in the concrete.



## Application

- \*To measure axial force of the strut for shielding or timbering.
- \*To measure strain for shielding steel materials of bridge and building which is under construction or finished construction
- \*To measure the strain for supports and tunnel lining
- \*To measure the stress concentration of pipe line
- \*To measure the concrete strain using anchor for concrete surface mounting.

## Feature

- \* Excellent reproducibility and responsiveness which is free from cable length or resistance change
- \* Perfect waterproof structure
- \* High stability and high sensibility
- \* High accurate resistance temp sensor mounted.

## Characteristic

The body of VW Arc-Weldable Strain Gauge is composed of the sensor processed by airtight epoxy, stainless steel tube and the mounting block welding on both edge. Magnetic coil is mounted in the sensor inside. Vibration wire with proper tensile force on both edges is mounted in the body of the stainless steel tube. The displacement of two mounting blocks for welding both edges causes different tensile force in vibration wire to change the magnetic field, so this will generate the resonant frequency to the electron beam. This resonant frequency is transmitted to the output device to display the engineering unit and it can be calculated as the stress and strain easily and accurately by the conversion coefficient provided. The vibration sensor has the excellent responsiveness and reproducibility and it is almost not affected by the secular change, so it is most suitable for permanent measurement. The vibration sensor measurement outputs vibration counts instead of voltage and one of the greatest advantages is that it is almost not affected by the resistance change of electronic cable, electric leakage, noisy and contact resistance with the ground. High accurate resistance temp sensor is mounted to compensate the thermal expansion factor of the gauge due to the change of temp.



## Specification

Model	SJ-2000
Sensor	VW sensor type
Measurement range	3,600 micro strain
Resolution	0.3 micro strain
Accuracy	0.1 % FSR
Thermal expansion coefficient	10.8ppm/ ° C
Operation Temp.	-20° C ~ 105° C
Temp sensor	NTC Thermistor (3KD-ATF)
Temp sensor operation range	Thermistor: -40° C ~ 80° C
Temp. sensor accuracy	Thermistor: +/-1° C
Main material	Stainless steel 300, Fluoro O-ring, High density epoxy potting
Waterproof capacity	100m H2O
Weight	0.2 Kg
cable	6.4 mm, 0.235mm <sup>2</sup> x 4C Shield PVC SYS cable

\* The product spec is subject to change without prior notice in order to enhance the product's quality.

## Reference

\* Strain ( $\mu\epsilon$ ) calculation:

$$\text{Microstrain } (\mu\epsilon) = \text{Gage Factor} \times 10^{-3} \times F_2 = \text{Gage Factor} \times 109 / N_2$$

Whereas, F=Hz measurement value, N=microsec measurement value, Gage Factor=4.062

\* Stress ( $\sigma$ ) calculation:

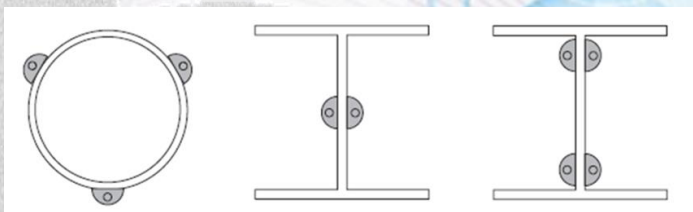
$$\text{stress } (\sigma : \text{kg. cm}^2) = -1.0 \times \text{Strain } (\epsilon) \times \text{Material elastic modulus } \epsilon$$

\* Axial force (P) calculation:

$$\text{Axial Force } (P : \text{ton}) = \text{Stress } (\sigma) \times \text{Material cross section } (A) \div 1000$$

\* Standard installation : Steel pipe and Strut

## Anchor type Mounting Block for concrete surface installation (Option)



## Application

- \* To measure strain for building, bridge and steel structures
- \* To measure strain for tunnel lining, support system
- \* To measure eccentric load affecting pipe line
- \* To measure distributed load for pile test

## Feature

- \* High accurate resistance temp sensor mounted.
- \* High stability and high sensibility



## Characteristic

SG-2100 is equipped with coil housing with gauge and magnetic coil connected with stainless steel tube and flange in waterproof and anti-corrosion. SG4150 contains stainless steel tube and gauge and magnetic coil in waterproof and anti-corrosion. The vibration sensor has the excellent responsiveness and reproducibility and it is almost not affected by the secular change, so it is most suitable for permanent measurement.

## Specification

Model	SJ - 2100	SJ - 2150
Measurement range	2,500 micro strain	
Resolution	0.1 micro strain	
Accuracy	0.1% FSR	
Thermal expansion coefficient	11X10 <sup>-6</sup> / °C	
Operation Temp.	-20°C ~50°C	
Temp sensor	NTC Thermistor( 3KD-ATF)	
Coil resistance	180Ω	50Ω
Temp sensor operation range	Thermistor: -40° C ~ 50° C	
Temp sensor accuracy	Thermistor: +/-1° C	
Gauge length	50.8 mm	
Main material	Stainless steel 300, Fluoro O-ring, High density epoxy potting	
Waterproof capacity	100m H2O	
Weight	0.1 Kg	
Signal cable	6.4 mm, 0.235mm2 x 4C Shield PVC SYS cable	

※ The product spec is subject to change without prior notice in order to enhance the product's quality.



VW embedment strain gauge is embedded in the concrete structure to measure the effective strain affecting the concrete inside.

## Application

- \* To measure maintenance of dam, bridge, subway structure, etc.
- \* To measure construction of slab, tunnel lining, etc.

## Feature

- \* High density epoxy molding with shock-resistance of connecting part
- \* 200m H2O waterproof
- \* Permanent anti-corrosion material adopted
- \* 100% absorption of material strain



## Characteristic

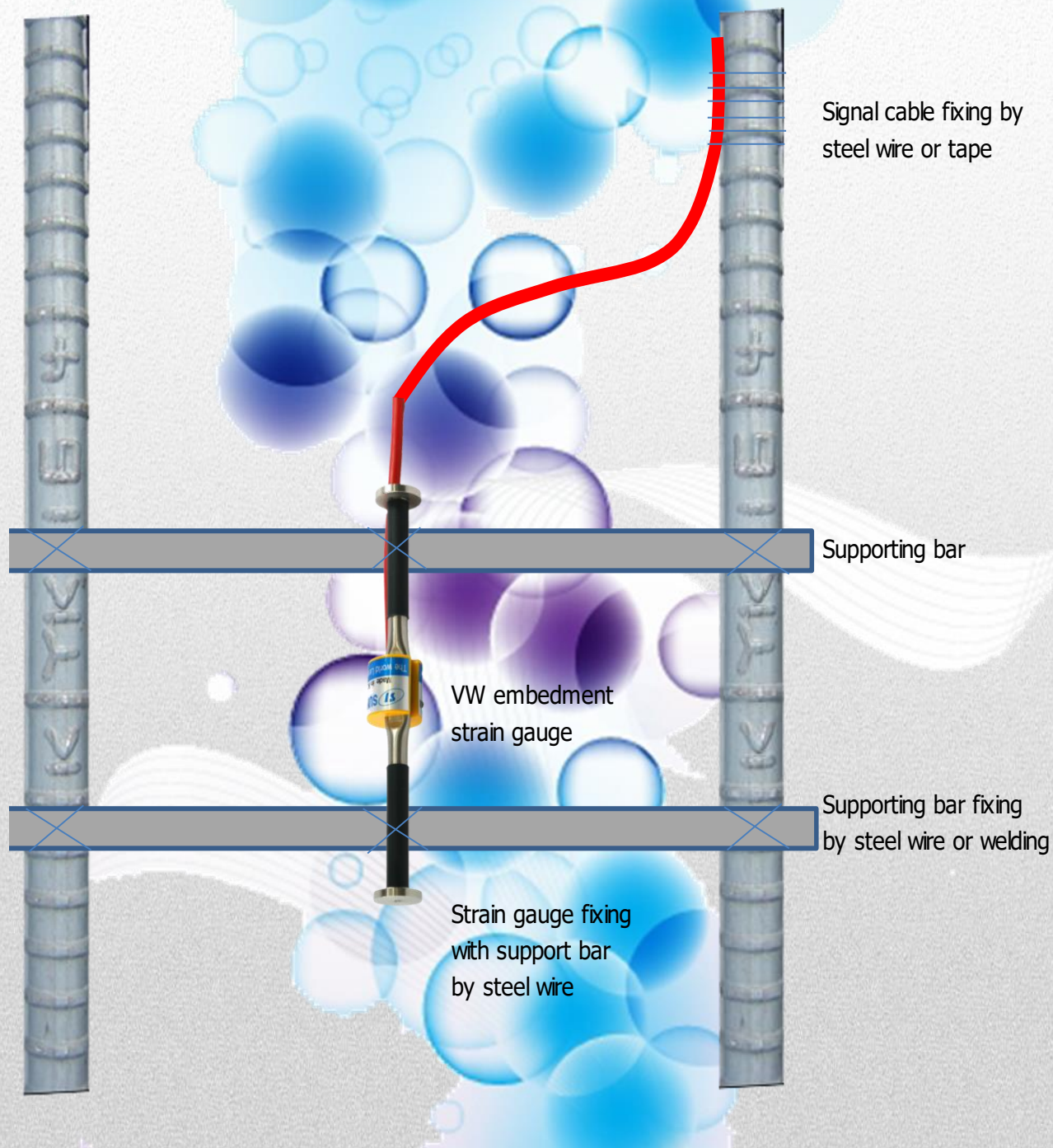
This product can measure stress, distribution direction and trend of strain, etc. with the strain gauge in 2-4 directions using the Rosette Block. Also, non-stress strain gauge case can be used to compare and verify the non-stress condition and load applying condition in dam, bridge, subway structure, etc. which are required for long-term measurement. In addition, it can be installed easily to get accurate measurement using the bracket for radial direction or tangential direction of the stress for shortcrete accelerating cement which is used for tunnel lining material.

## Specification

Model	SJ - 2200
Measurement range	3,600 micro strain
Resolution	0.3 micro strain
Accuracy	0.1% FSR
Thermal expansion coefficient	10.8ppm/ °C
Operation Temp.	-20°C ~50°C
Temp sensor	NTC Thermistor( 3KD-ATF)
Temp sensor operation range	Thermistor: -40° C ~ 80° C
Temp sensor accuracy	Thermistor: +/-1° C
Main material	Stainless steel 300, Fluoro O-ring, High density epoxy potting
Waterproof capacity	200m H2O
Weight	0.18 Kg
Signal cable	Ø6.4 mm, 0.235mm <sup>2</sup> X 4C Shield PVC SYS cable

※ The product spec is subject to change without prior notice in order to enhance the product's quality.

## Installation





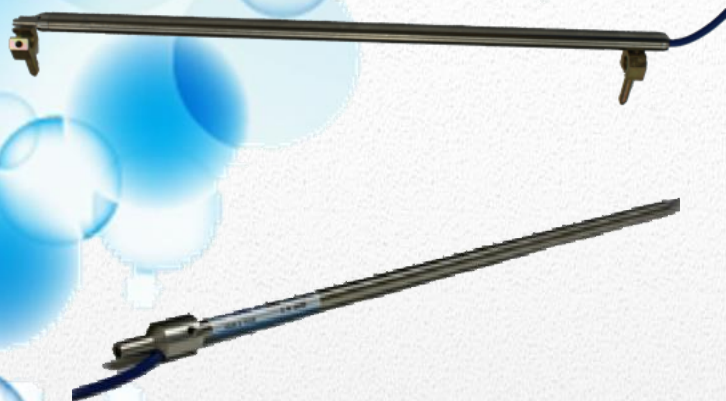
VW Crack Meter is to measure the development of the crack size on the structure surface and connecting area.

## Application

- \* To measure the development of the crack size in the adjacent building or connecting area of the structure caused by the construction work
- \* To check the crack condition of the structure caused by the earthquake

## Feature

- \* 10m H2O waterproof structure
- \* High accurate resistance temp sensor mounted
- \* Two types of the gauge for 50 and 100mm of measurement area



## Characteristic

VW Crack Meter is composed of sensor part and anchor fixing part. Both edges of the crack crossing the crack space are fixed with the anchor bolt. The development of the crack condition is transmitted to the sensor part through anchor and body and when the vibration wire is magnetized by the magnetic coil due to the tensile force changed the vibration wire will generate the resonant frequency and then this frequency will be transmitted to the output device to display the engineering unit. Two types of the gauge are available for different measurements, so it is optional depending on the crack size. It can be measured semi-permanently using anti-corrosive and rust-resistant materials.

## Specification

Model	SJ-3000	SJ-3010	SJ-3015	SJ-3020
Measurement range	0 ~ 50 mm	0 ~ 100 mm	0 ~ 150 mm	0 ~ 200 mm
Resolution	0.025% FSR (0.01mm)			
Accuracy	±0.5 % FSR			
Thermal expansion coefficient	11X10 <sup>-6</sup> /°C			
Operation Temp.	-20°C ~50°C			
Temp sensor	NTC Thermistor( 3KD-ATF)			
Temp sensor operation range	Thermistor: -40° C ~ 80° C			
Temp sensor accuracy	Thermistor: +/-1° C			
Waterproof capacity	10m H2O			
Main material	Special steel, High density epoxy			
Weight	0.51 Kg			
Signal cable	Ø6.4 mm, 0.235mm <sup>2</sup> X4C Shield PVC SYS cable			

※ The product spec is subject to change without prior notice in order to enhance the product's quality.

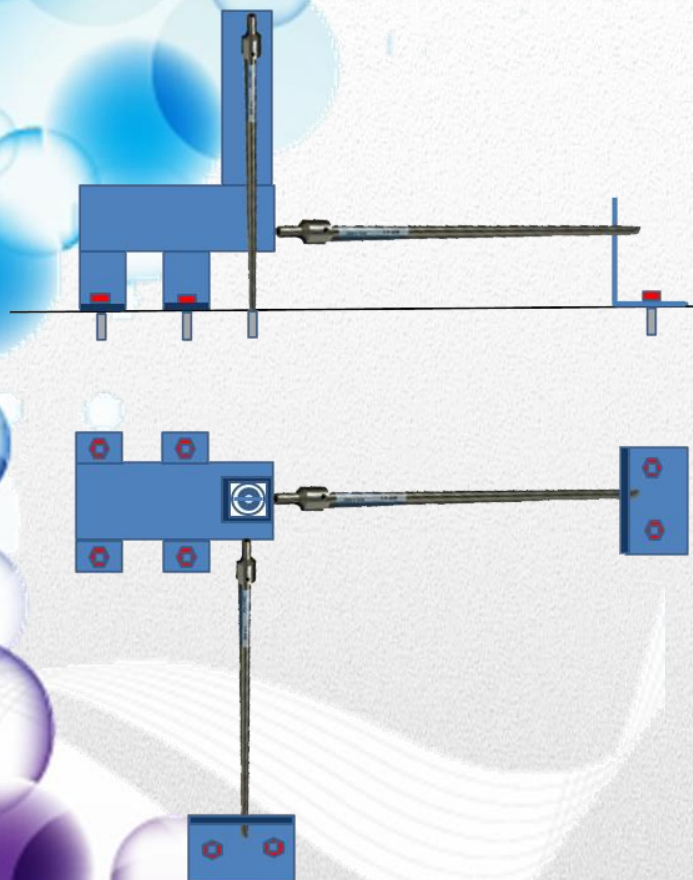
## Description

This is a mounting jig that measure displacement as triple axial by waterproof type displacement meter.

This mounting jig with displacement is installed to measure movement at the expansion joint and crack in dam or tunnel or tank.

The design of mounting jig can be changed to meet purpose at the site.

The Max. range of displacement meter is 50mm, 100mm and 150mm.



## Specification

Model	SJ-3100	SJ-3110	SJ-3115
Measurement range	0 ~ 50 mm	0 ~ 100 mm	0 ~ 150 mm
Resolution	0.025% FSR (0.01mm)		
Accuracy	±0.5 % FSR		
Thermal expansion coefficient	11X10 <sup>-6</sup> /°C		
Operation Temp.	-20°C ~50°C		
Temp sensor	NTC Thermistor( 3KD-ATF)		
Temp sensor operation range	Thermistor: -40° C ~ 80° C		
Temp sensor accuracy	Thermistor: +/-1° C		
Waterproof capacity	10m H2O		
Main material	Special steel, High density epoxy		
Mounting jig material	Stainless steel		
Signal cable	Ø6.4 mm, 0.235mm <sup>2</sup> X4C Shield PVC SYS cable		

※ The product spec is subject to change without prior notice in order to enhance the product's quality.



This is a mounting jig that measure displacement as triple axial by 3sets dial gauge.

This mounting jig with dial gagues is installed to measure movement at the expansion joint and crack in dam or tunnel or tank.

The design of mounting jig can be changed to meet purpose at the site.

The Max. range of displacement meter is 12.5mm, 25mm and 50mm.



## Specification

Model	3200	3225	3250
Measurement range	±12.5 mm	±25 mm	±50 mm
Resolution	0.01mm		
Mounting jig material	Stainless steel		
Weight	2.6 kg	3.2 kg	5.5 kg
Anchor	Deformed rebar		

※ The product spec is subject to change without prior notice in order to enhance the product's quality.

The electric crack meter is to measure the development of the crack size on the concrete structure surface or connecting area.

## Application

- \* To measure the development of the crack size in the adjacent building or connecting area of the structure caused by the construction work
- \* To check the crack condition of the structure caused by the earthquake

## Feature

- \* High stability and reliability
- \* Excellent reproducibility and responsiveness due to the high precise linear potentiometer mounted
- \* Various measurement size (10mm~300mm)

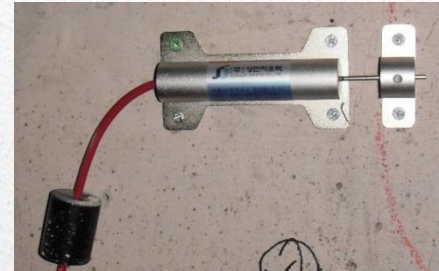
## Characteristic

The electric crack meter is equipped with high precise linear Potentiometer inside the stainless housing, so when the strain is caused the rod will push or pull the sensor and it is transmitted to the Potentiometer to convert the length variation to the electric signal transmitting to the output device. This output signal can revert to the length displacement easily by applying the conversion coefficient. The displacement is the difference between the initial measurement value and the current measurement value. It can measure the development speed of the crack, percentage and ongoing progress. The gauge is optional depending on the size of the crack and application.

## Specification

Model	SJ-3300
Sensor	Potentiometer type
Measurement range	For 10mm ~ 300mm
Resolution	Below 0.1 mm
Accuracy	Below 0.1%
Resist. thermal expan. Coefficient	+/-400ppm°C
Rated power	0.6W ~ 4W
Linearity	Below +/-1%
Total resistance deviation	+/-20%
Weight	500g
Signal cable	Ø6.4 mm, 0.235mm <sup>2</sup> X 4C Shield PVC SYS cable

※ The product spec is subject to change without prior notice in order to enhance the product's quality.





The gage of MEMS type Beam Sensor is usually manufactured in 1 – 2m and it is to check the displacement (slope, declining, elevation or uplift and horizontal displacement) of the target structure in meter unit.

## Application

- \* To check the stability of the adjacent structure caused by the excavation and tunnel work
- \* To check declining, stress concentration and slope changing for retaining wall, bridge, dam and subway, etc.
- \* Vertical EL Beam Sensor is to check the lateral displacement or convergence while horizontal EL Beam Sensor is to measure the elevation or declining.



## Characteristic

SJ-6000 is equipped with electric sensor inside the aluminum pipe treated by waterproof and anti-corrosion, so it is semi-permanent and almost not affected by the temp change. Also, the temp is automatically calibrated at normal temperature 10~25℃ displaying accurate measurement value. It also contains specially designed module not to be affected by the vibration due to the work.

## Specification

Model	SJ-6000S	SJ-6000D
Axis	Single	Dual
Sensor	MEMS Sensor	
Measurement range	±5°	
Accuracy	0.1%	
Resolution	1 arc seconds	
Operation Temp.	-20℃ ~ 50℃	
Product dimension	40*40*500mm, 40*40*1,000mm, 40*40*2,000mm	
Material	Stainless steel pipe	
Signal cable	Ø6.4 mm, 0.235mm <sup>2</sup> X4C Shield PVC SYS cable	

※ The product spec is subject to change without prior notice in order to enhance the product's quality.



Installation Picture of EL Beam Inclinator



Installation Picture of EL Beam Inclinator



Installation Picture of EL Beam Inclinator with Crack Meter



Installation Picture of EL Beam Inclinator with Cover



MEMS type Tiltmeter is to measure the slop and deviation angle for the target structure to determine the stability by the slop displacement.

## Application

- \* To check the stability of the adjacent structure caused by the excavation and tunnel work
- \* To check declining, stress concentration and slope changing for retaining wall, bridge, dam and subway, etc.



## Characteristic

This product is used for similar purpose to EL Beam and the electric sensor is mounted inside the stainless steel pipe treated by waterproof and anti-corrosion, so it is semi-permanent and almost not affected by the temp change. Also, the temp is automatically calibrated at normal temperature 10~25°C displaying accurate measurement value. It also contains specially designed module not to be affected by the vibration due to the work.

## Specification

Model	SJ-6100S	SJ-6100D
Axis	Single	Dual
Sensor	MEMS Sensor	
Measurement range	±3, 5, 10, 15°	
Operation Temp.	-20℃ ~ 50℃	
Accuracy	0.03%	
Resolution	1 arc seconds	
Product dimension	W: 100 * H: 150 * H: 50	
Material	Stainless steel pipe	
Signal cable	Ø6.4 mm, 0.235mm <sup>2</sup> X 4C Shield PVC SYS cable	

※ The product spec is subject to change without prior notice in order to enhance the product's quality.

MEMS type Tiltmeter is to measure the slop and deviation angle for the target structure to determine the stability by the slop displacement.

## Application

- \* To check the stability of the adjacent structure caused by the excavation and tunnel work
- \* To check declining, stress concentration and slope changing for retaining wall, bridge, dam and subway, etc.



## Characteristic

This product is used for similar purpose to EL Beam and the electric sensor is mounted inside the stainless steel pipe treated by waterproof and anti-corrosion, so it is semi-permanent and almost not affected by the temp change. Also, the temp is corrected automatically at operation temperature -20~50°C. It also contains specially designed module not to be affected by the vibration at the work.

## Specification

Model	SJ-6300S	SJ-6300D
Axis	Single	Dual
Sensor	MEMS Sensor	
Measurement range	±3, 5, 10°	
Operation Temp.	-20°C ~ 50°C	
Sensitivity	0.03%	
Resolution	0.0012°(±3°) / 0.002°(±5°) / 0.004°(±10°)	
Product dimension	Sensing parts (φ=85mm, H=54mm), Plate(φ=125mm, H=5mm)	
Material	Aluminum	
Signal cable	Ø6.4 mm, 0.235mm <sup>2</sup> X 4C Shield PVC SYS cable	

※ The product spec is subject to change without prior notice in order to enhance the product's quality.



MEMS type Tiltmeter is to measure the slop and deviation angle for the target structure to determine the stability by the slop displacement.

## Application

- \* To check the stability of the adjacent structure caused by the excavation and tunnel work
- \* To check declining, stress concentration and slope changing for retaining wall, bridge, dam and subway, etc.



## Characteristic

This product is used for similar purpose to EL Beam and the electric sensor is mounted inside the stainless steel pipe treated by waterproof and anti-corrosion, so it is semi-permanent and almost not affected by the temp change. Also, the temp is automatically calibrated at normal temperature 10~25°C displaying accurate measurement value. It also contains specially designed module not to be affected by the vibration due to the work.

## Specification

Model	SJ-6200S	SJ-6200D
Axis	Single	Dual
Sensor	MEMS Sensor	
Measurement range	±5°	
Operation Temp.	-20°C ~ 50°C	
Accuracy	0.03%	
Resolution	0.001785714(degree/volte)	
Product dimension	φ = 32mm, L = 160mm	
Material	Stainless steel pipe	
Signal cable	Ø6.4 mm, 0.235mm <sup>2</sup> X 4C Shield PVC SYS cable	

※ The product spec is subject to change without prior notice in order to enhance the product's quality.

Model SJ-6900 is used to measure underground horizontal displacement by different depths at the excavation work. High accuracy accelerometer is applied to measure accuracy displacement.



## Application

- \* Measurement of displacement at the sheating and excavation work
- \* measurement of critical surface of slop

## Characteristic

Single and dual axial accelerometer is applied to Model SJ-6900. The optimum housing is applied to measure reliable value to meet site characteristic. ABS inclinometer casing is applied to maximum repeatability at the measurement of displacement. Sensor wheel is taken down along grooves of inclinometer casing.

## Specification

Model	SJ-6900
Sensor Type	MEMS Type
Axial	Dual Axial
Measurement Range	$\pm 15^\circ$
Operation Temp.	-20°C - 50°C
Sensitivity	0.002%
Resolution	0.001785714 (Degree/Volt)
Temp sensor mounted	300mm(L)*36mm(Ø)
Material	Stainless steel pipe
Signal cable	O6.4mm, 0.235mm <sup>2</sup> x 4C Shield PVC SYS cable 3m

Protective cover

in-place  
Inclinometer

Inclinometer  
ABS casing



※ The product spec is subject to change without prior notice in order to enhance the product's quality.



Model SJ-6600 is used to measure underground horizontal displacement by different depths at the excavation work. High accuracy accelerometer is applied to measure accuracy displacement.



## Application

- \* Measurement of displacement at the sheating and excavation work
- \* measurement of critical surface of slop

## Characteristic

Single and dual axial accelerometer is applied to Model SJ-6900. The optimum housing is applied to measure reliable value to meet site characteristic. ABS inclinometer casing is applied to maxium repeatability at the measurement of displacement. Sensor wheel is taken down along grooves of inclinometer casing.

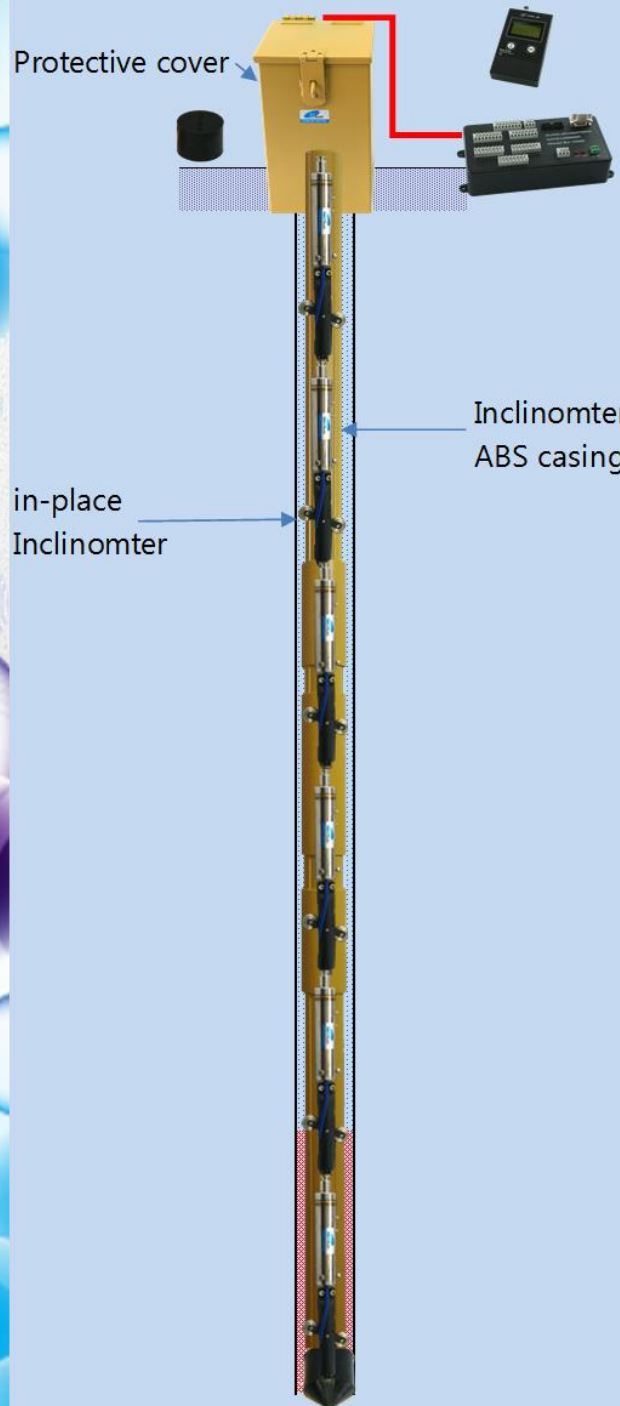
## Specification

Model	SJ-6600
Sensor Type	MEMS Type
Axial	Dual Axial
Measurement Range	$\pm 15^\circ$
Operation Temp.	-20°C - 50°C
Sensitivity	0.002%
Resolution	0.001785714 (Degree/Volt)
Temp sensor mounted	300mm(L)*36mm(Ø)
Material	Stainless steel pipe
Signal cable	O6.4mm, 0.235mm2 x 4C Shield PVC SYS cable 3m

Protective cover

in-place Inclinator

Inclinometer ABS casing



※ The product spec is subject to change without prior notice in order to enhance the product's quality.

VW shotcrete stress meter is installed before laying S/C with a sensor to measure the stress generated in the shotcrete for tunnel work and also it measures the compression and tensile capability of the tangential direction in the radius and tunnel radius direction.

## Features

- \* High accurate resistance temp sensor mounted
- \* High stability and high sensibility
- \* Anchor can be mounted required for installation



## Characteristic

Shotcrete Stress meter is equipped with stainless steel tube gauge SG-5500 and magnetic coil which are treated by waterproof and anti-corrosion. The vibration sensor has outstanding responsiveness and reproducibility that is almost not affected by the secular change, so it is suitable for permanent measurement.

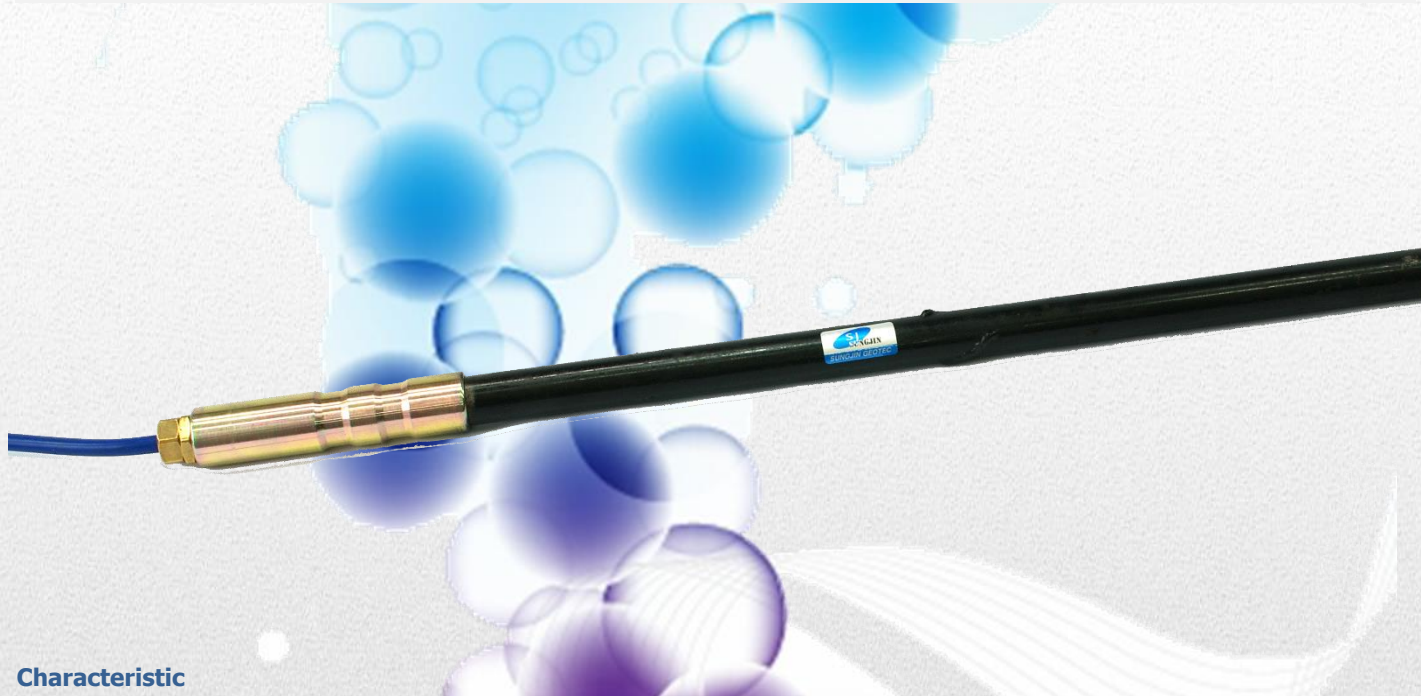
## Specification

Model	SJ-5500
Measurement range	2,500 micro strain
Resolution	0.1 micro strain
Accuracy	0.1% FSR
Thermal expansion coefficient	11X10 <sup>-6</sup> / °C
Operation Temp.	-20°C ~ 50°C
Temp sensor mounted	NTC Thermistor ( 3KD-ATF)
Coil resistance	50Ω
Temp sensor working range	Thermistor : -40°C ~ 80°C
Temp sensor accuracy	Thermistor : ±1°C
Gauge length	50.8 mm
Main materials	Stainless steel 300, Fluoro O-Ring, High density epoxy potting
Waterproof capacity	100 m H <sub>2</sub> O
Weight	0.1 kg
Signal cable	O6.4mm, 0.235mm <sup>2</sup> x 4C Shield PVC SYS cable 3m

※ The product spec is subject to change without prior notice in order to enhance the product's quality.



VW Rock Bolt Stressmeter is to measure the axial force transmitted to the rock bolt to verify the effectiveness of the rock bolt (effective length, quantity and stress of rock bolt). It is designed to measure accurate axial force applying to the rock bolt to be reinforced and installed for strengthening the rock at the construction field such as tunnel, mining, hanger, cable tunnel, etc.



## Characteristic

Model 5600 VW rock bolt stress meter is equipped with each high precise VW strain sensor at 4 areas divided by four in total length of the anchor inside the rock bolt anchor to fix the grouting in the tunnel rock and it was treated by waterproof anti-humidity and anti-corrosion. When the rock is subject to load due to its development, relaxation and joint, fine strain is made in the anchor due to the axial force. The built-in VW strain sensor will absorb all of these displacements. The gauge body inside is equipped with the adjusted VW at approx. 1,800Hz. When horizontal displacement occurs, it is detected by strain gauge to make it magnetized and the VW resonant frequency will generate the frequency to transmit to the output device. The output device will display the frequency as a required engineering unit. Our VW rock bolt stress meter can calculate the stress distribution area and the size easily and accurately using 4 measuring points method for which the material mechanics concept was introduced. Also, it is equipped with the precise resistance temp sensor to calibrate the gauge's thermal expansion coefficient due to the temp change. The rock bolt anchor is manufactured in 2-6m length for optional use depending on the construction field conditions. The rock bolt anchor is made of high carbon piping steel material with the inside diameter  $\varnothing 16.2 \times$  outside diameter  $\varnothing 27.2\text{mm}$ , so that it can be easily installed in the ordinary hole size with the inside diameter  $\varnothing 38\text{mm}$  at tunnel. The VW rock bolt stressmeter has cleared the inaccuracy occurring at the electric sensor and it is easy to measure the error or tolerance caused in the manual machine type. Precise and semi-permanent measurement is possible due to the waterproof and anti-corrosion treated.

## Specification

Model	SJ-5600				
Sensor type	VW Type Sensor				
Measurement range	Total 3,300 microstrain (Tensile 1700, Compression 1600 microstrain or equivalent)				
Accuracy	0.1% FSR				
Resolution	0.5 microstrain				
Thermal expansion coefficient	11X10 <sup>-6</sup> / °C				
Operation Temp.	-20°C ~ 50°C				
Temp sensor working range	RTD : -45 ~ 100°C Thermistor : -30 ~ 80°C				
Temp sensor accuracy	RTD : ±0.7°C Thermistor : ±1°C				
Measurement point number	4 Points				
Minimum hole diameter	Ø38mm or above				
Product's length	2m	3m	4m	5m	6m
Gauge length with sensor	500mm	750mm	1,000mm	1,250mm	1,500mm
Weight	6.0kg	9.0kg	12.0kg	15.0kg	18.0kg
Anchor nominal size	Inside dia. Ø16.2 x External dia. Ø27.2mm				
Anchor cross section area	374.95 mm <sup>2</sup>				
VW gauge effective load	Approx. 15 ton.f				
Anchor elastic coefficient/Yield point	2.1 x 10 <sup>4</sup> / dir 17 ton.f (Assume that elastic strain is 4,500 kg/cm <sup>2</sup> )				
Anchor material	High carbon piping steel (film coated)				
Signal cable	Ø10mm, 0.235mm <sup>2</sup> x 8C Shield PVC SYS cable 3m				

※ The product spec is subject to change without prior notice in order to enhance the product's quality.

## Reference

This is VW type sensor to output the frequency signal to be connected with the VW sensor output units (Readout, Datalogger, and Multiplex Module for measurement of automation). It is compatible with any other company products. (except temp sensor)



VW Rod Extensometer is useful to measure the horizontal and vertical displacement of rock or soil in the tunnel or strain of slope or displacement of surrounding ground caused by the stress concentration for excavation work at the tunnel or mining and cable tunnel, etc.



## Specification

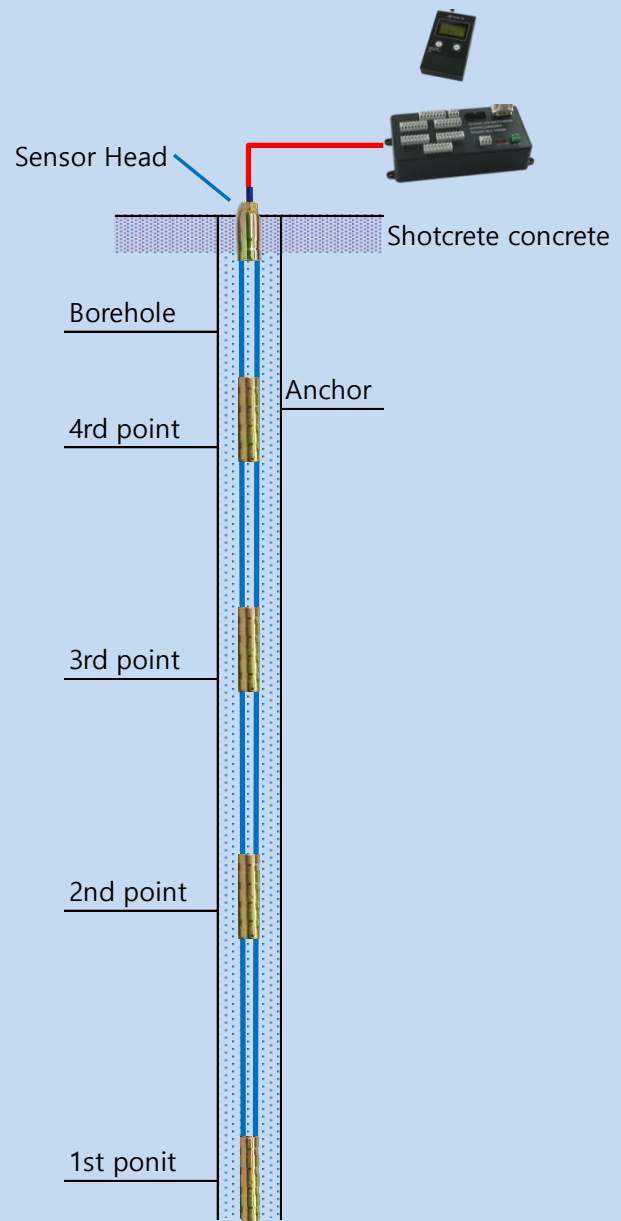
Model	SJ-5700				
Sensor type	VW Type Sensor				
Measurement range	0 ~ 50mm				
Resolution	0.025% FSR				
Sensor accuracy	±0.25% FSR				
System accuracy	±0.5% FSR				
Working temp	-20℃ ~ 50℃				
Temp sensor working range	RTD : -45 ~ 100℃ Thermistor : -30 ~ 80℃				
Temp sensor accuracy	RTD : ±0.7℃ Thermistor : ±1℃				
Thermal expansion coefficient	11 × 10 <sup>-6</sup> ℃				
No. of anchor for measurement	4 Points				
Minimum hole diameter	Ø38mm or above				
Product's length	2m	3m	4m	5m	6m
Gauge length	500mm	750mm	1,000mm	1,250mm	1,500mm
Weight	3.4kg	3.7kg	4.0kg	4.3kg	4.6kg
Sensor part	Stainless special steel, alloy steel (coated)				
Anchor rod	Stainless steel (Φ 4 x Φ 6mm)				
Anchor rod protection cover	Nylon Tube (Φ 8 x Φ 10mm)				
Signal cable	Ø10mm, 0.235mm <sup>2</sup> x 8C Shield PVC SYS cable 3m				

※ The product spec is subject to change without prior notice in order to enhance the product's quality.

## Characteristic

Model 5700 VW Rod Extensometer is made up with sensor part having 4 sensors of small VW displacement treated by waterproof and anti-humidity and anchor rod having stainless steel tube to transmit the anchor and displacement for treatment of grouting at tunnel rock to the sensor. When the displacement occurs due to the development or relaxation and joint of rock, it is transferred to VW displacement sensor by anchor rod transforming the tensile force of vibration wire. If the vibration wire is magnetized by the magnetic coil then the resonant frequency is generated and then this frequency is transmitted to the output device to display the necessary engineering unit, so you can check the displacement velocity, percentage, size and displacement distance easily. Our VW rod extensometer is designed for slim type so that the measurement anchor can be installed easily in  $\varnothing 38\text{mm}$  which the minimum hold size for installation of rock bolt as 4 measurement points method. VW displacement sensor is designed for total 50mm measurement scope. When the slab on the reference point sensor head is adjusted setting at normally 25mm distant point after the grouting of anchor part has been solidified, the tensile force and compression volume can be measured up to each 25 mm exactly and the frequency property for the displacement before delivering the sensor can be easily calculated using the exclusive calibrator for each item to apply the accurate calibration coefficient by recording the result. The anchor length of VW rod extensometer is 2-6m which is based on longest anchor and it is optional to use depending on the civil engineering designated length or construction site conditions. Also, the precise resistance temp sensor was mounted to compensate the thermal expansion coefficient of the gauge caused by the temp change. The VW rod extensometer has got over any inaccuracy caused in the electric sensor and it is not difficult at all to measure any error or measurement error caused in manual machine type. It is also possible to do precise and semi-permanent measurement because it was treated by waterproof and anti-humidity.

## Installation



## Reference

This is VW type sensor to output the frequency signal to be connected with the VW sensor output units (Readout, Datalogger, and Multiplex Module for measurement of automation). It is compatible with any other company products. (except temp sensor)



Rod extensometer measure each layer settlement of foundation ground to predict consolidated settlement and decide stability.

## Application

- \* Measurement of settlement and heave of foundation ground.
- \* Check of stability of tunnel, slop and fill
- \* Check of stability of adjacent ground for long structure building work

## Feature

- \* High stability of available operation in inferior environment
- \* High repeatability and responsibility by no effect from cable length and change of resistance
- \* Optimum high sensitivity design by application

## Characteristic

VW type rod extensometer include anchor, rod, protection tube and sensing parts. Displacement can be measured accurately by VW type sensor that sense different frequency output by displacement of ground as like settlement heave. Sensed frequency output is transmitted to output device and display need engineering unit to check displacement speed, rate and section. Our SJ-3500 include high accuracy NTC Thermistor and lightning protection so that compensate zero point by change of temperature, and can operate continuously by high density epoxy potting and stainless steel.

## Specification

Model	SJ-3500
Sensor Type	VW Type
Max. Displacement meter No.	4 sets displacement meter/head
Max. over load	150 % FSR
Accuracy	±0.1% full scale
Operation Temp.	-20°C ~ 50°C
Temp sensor mounted	NTC Thermistor (3KD-ATF)
Temp sensor accuracy	Thermistor : ±1°C
dimension	φ = 158mm, L = 106mm
Material	Stainless steel 300, High density epoxy potting

※ The product spec is subject to change without prior notice in order to enhance the product's quality.



## Components

**Displacement meter  
(SJ-3000/  
3010/  
3015)**



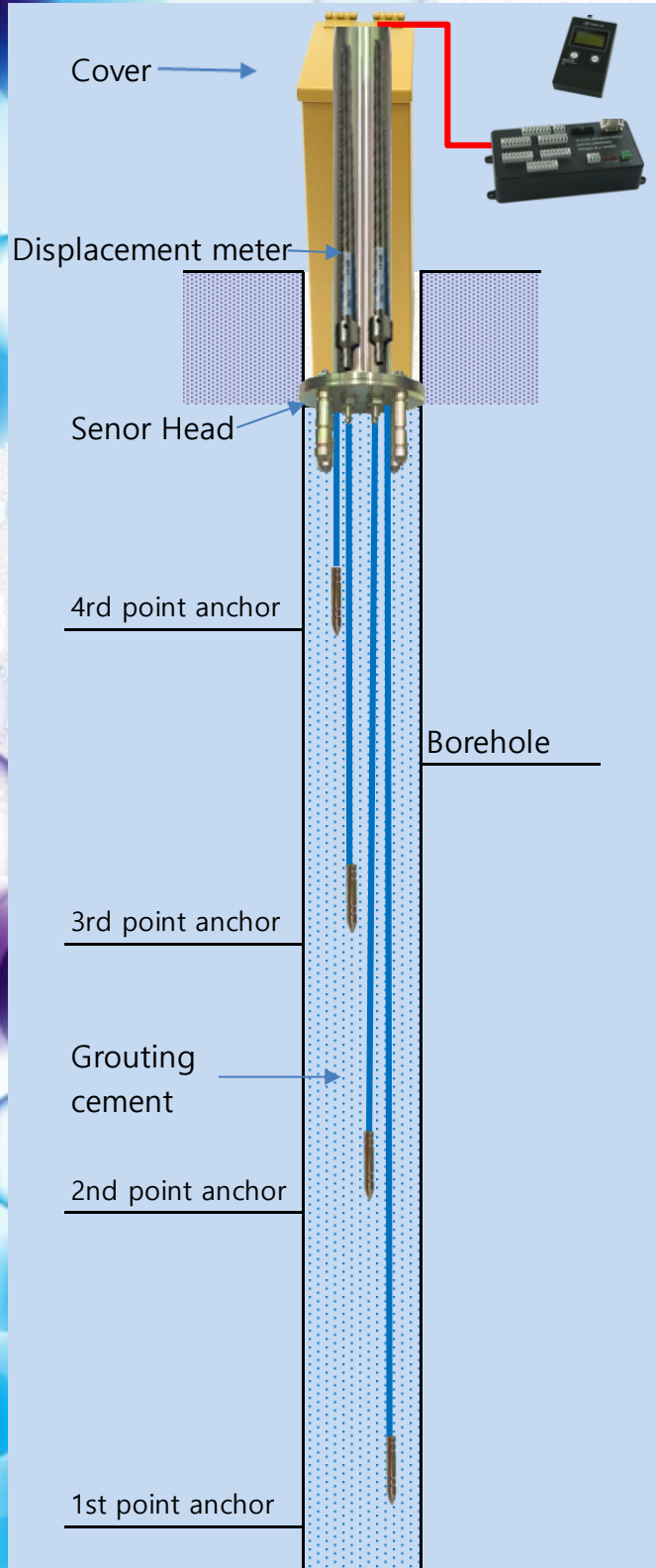
**Head  
(SJ-3500)**



**Rod  
(SJ-3510)**

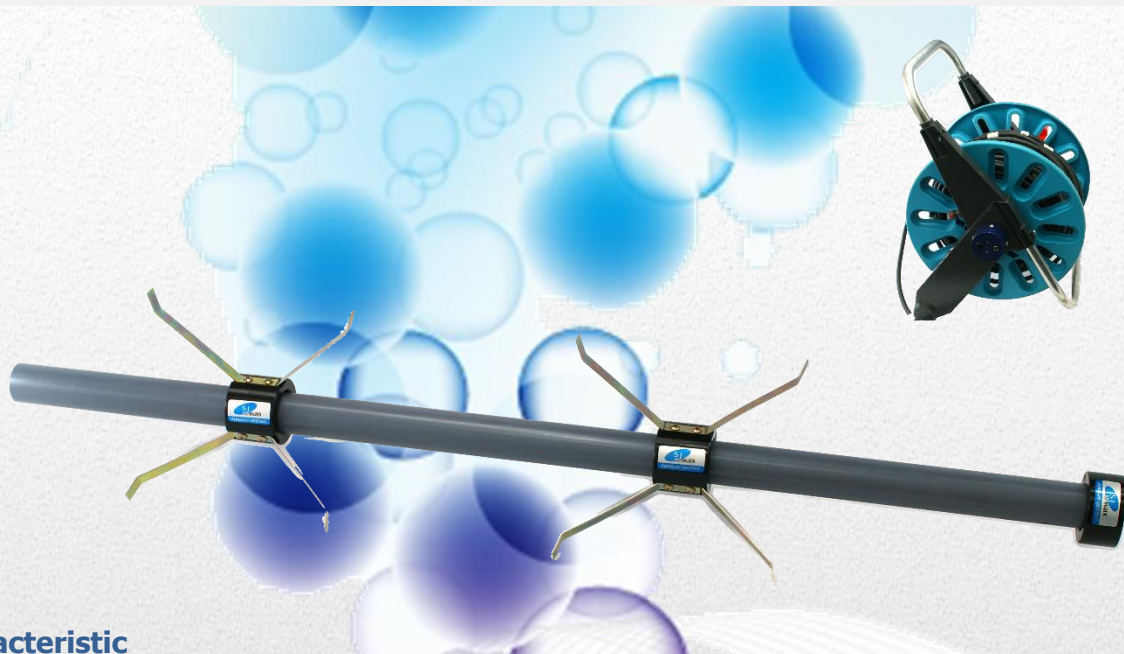


**Anchor  
(SJ-3520)**





Model SJ-7000 magnetic probe extensometer is designed to measure settlement or heave through movement of probe in PVC access pipe. Ring magnet and Spider magnets and magnet plate are installed at PVC access pipe and borehole. Probe sense magnetic position. If probe reach spider magnet, LED lamp is "ON" and buzzer rings. When signal is "On", operator measure millimeter graduation in tape.



## Characteristic

Ring magnet at the bottom of access pipe and immovable layer and insert spider magnets at planning depths. Reed switch is installed in probe and, if probe sense magnet filed during probe is lifted down, reed switch close and buzzer and LED lamp is operated automatically.

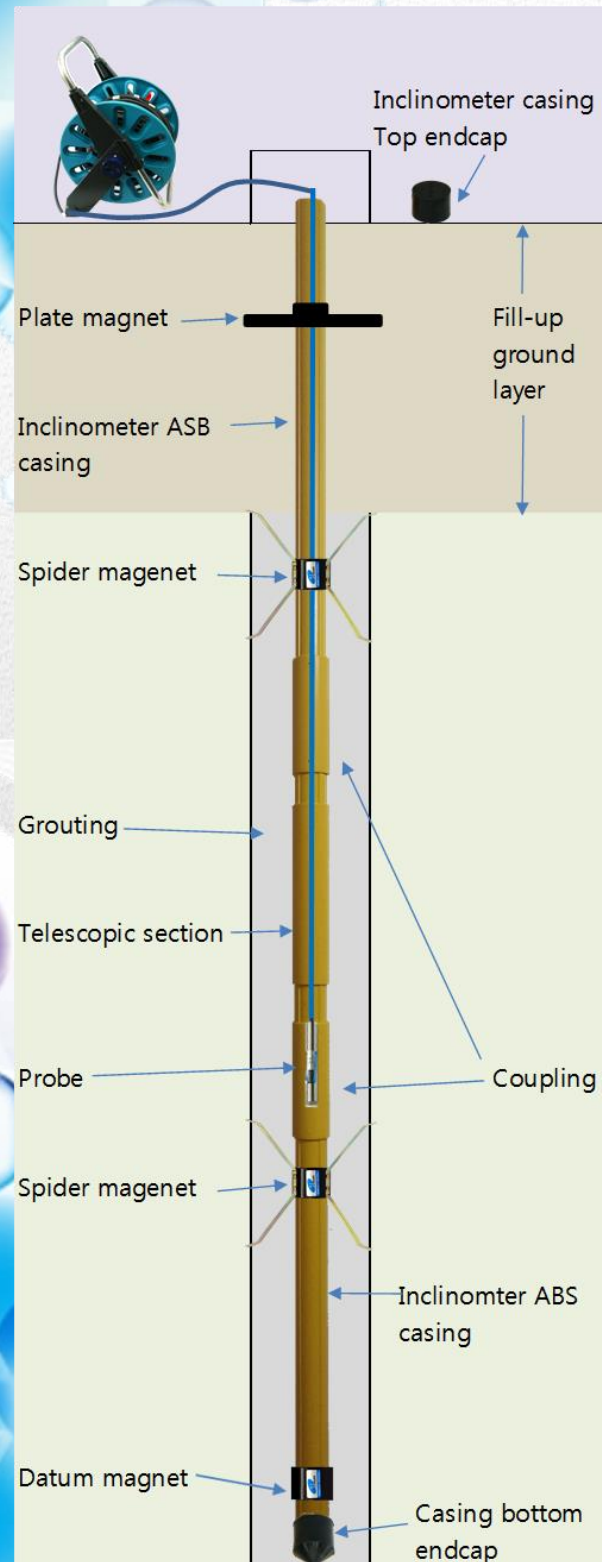
## Specification

Magnetic probe and reel	SJ-7000			SJ-7010
Measurement range	50 meter			100 meter
Probe dimension	Ø19 X 180mm			
Tape Accuracy	1mm			
Resolution	±1mm			
Spider magnet	SJ-7130	SJ-7140	SJ-7160	SJ-7170
Diameter	Ø30 (for PVC pipe)	Ø40 (for PVC pipe)	Ø60 (for inclinomter casing)	Ø70 (for inclinomter casing)
Ring magnet (Datum magnet)	SJ-7230	SJ-7240	SJ-7260	SJ-7270
Diameter	Ø30 (for PVC pipe)	Ø40 (for PVC pipe)	Ø60 (for inclinomter casing)	Ø70 (for inclinomter casing)
Magnet plate	SJ-7330	SJ-7340	SJ-7360	SJ-7370
Diameter	Ø30 (for PVC pipe)	Ø40 (for PVC pipe)	Ø60 (for inclinomter casing)	Ø70 (for inclinomter casing)

※ The product spec is subject to change without prior notice in order to enhance the product's quality.

## Installation

- \* Operator shall fix datum magnet (ring magnet) by screw nail or clamp the above 50cm from the bottom of PVC access pipe (or inclinometer casing).
- \* Operator fix datum magnet at the steady layer as like rock and install spider magnet by installation rod or leg at the plaining depth step by step.
- \* Size of magnetic sensors depend on diameter of borehole, and datum magnet is smaller than borehole and spider magnetic including spider leg is bigger than diameter of borehole to protect slip.
- \* Operator insert tremie pipe or grout pipe grout in borehole and grout borehole from bottom by pump.
- \* Operator shall install magnetic spider to has enough space from coupling for protection that magnetic sensors are caught by coupling during settling.





Jack out type

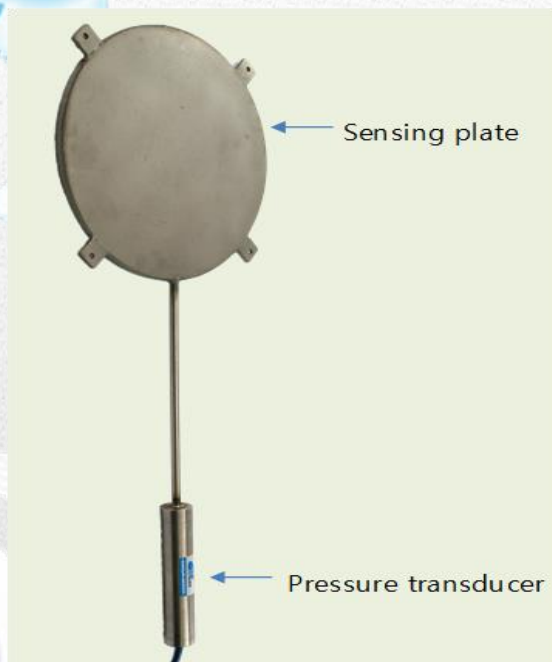


Standard type



## Characteristic

VW type Model SJ-8000 consists of sealed by stainless 2 plates and 2 plates is welded and space of 2 welded plated is filled in by hydraulic fluid. If pressure is transmitted to sensing plate, the hydraulic fluid is flowed to diaphragm in pressure transducer. VW type Model SJ-8000 is used to measure ground soil pressure. Model SJ- 8000 is standard type and measure whole pressure that affect at the embankment work, and is wall type to measure soil pressure at the retaining wall. Our earth pressure cell measure stress of mass and direction in embankment dams and measure the back soil pressure at the retaining wall and measure the change of soil pressure by the load of fill in ground. At the tunnel, stress of tunnel linings is measured by earth pressure cell.



## Specification

Model	SJ-8000	SJ-8100
Sensor type	VW & Standard type	VW & Jack out type
Resolution	0.025%FS	
Accuracy	±1.0%FS	
Measurement range	2 ~ 70 kg/cm <sup>2</sup> (30 psi ~ 1,000 psi)	
Operatrion Temp.	-40 °C ~ 80 ° C	
Storage Temp.	-40 °C ~ 80 ° C	
Signal cable	O6.4mm, 0.235mm2 x 4C Shield PVC SYS cable 3m	
Dimension	Ø 230mm	Ø 150mm

Reaction force meter measure the base reaction force to study stability of foundation ground and effect to structure. And this meter is used to verify contact pressure by expecting soil or wave pressure at the design.

## Application

- \* Measurement of reaction force of foundation ground at the bottom of cassion structure
- \* Measurement of reaction force of foundation ground of suction pile or concrete structure

## Feature

- \* High stability of available operation in inferior enviroment
- \* High repeatability and responsibility by no effect from cable length and change of resistance
- \* Optimum high sensitivity design by application
- \* Built-in high accuracy thermistor and lightening protection



## Characteristic

For VW type reaction force meterl, the VW stainless gauge was mounted at the cylindrical cell that is processed precisely by the heat treated alloy material. It is use prinple when the cell is affected by the load, the tensile force of the mounted VW gauge is changed. Reaction force meter guarantee reliability by calibration by recognized load testing machine. For long and stable operation, housing and cable of this meter is designed as waterproof and dustproof structure by that can be operate in inferior environment and protected from the out side shock.

## Specification

Model	SJ-8500	SJ-8510	SJ-8515	SJ-8520	SJ-8525	SJ-8530
<b>Measurement range</b>	5kgf/cm <sup>2</sup>	10kgf/cm <sup>2</sup>	15kgf/cm <sup>2</sup>	20kgf/cm <sup>2</sup>	25kgf/cm <sup>2</sup>	30kgf/cm <sup>2</sup>
<b>Sensor type</b>	VW type					
<b>Operation Temp.</b>	-20°C ~ 60°C					
<b>Resolution</b>	±0.02 % FSR					
<b>Accuracy</b>	±0.025 % FSR					
<b>Waterproof</b>	Fluoro O-ring, High density grease coating					
<b>Sealing material</b>	Stainless steel, High density epoxy potting					
<b>dimension</b>	φ = 158mm, L = 105mm					
<b>Material</b>	SCM line alloy steel material					
<b>Signal cable</b>	O6.4mm, 0.235mm <sup>2</sup> x 4C Shield PVC SYS cable 3m					

※ The product spec is subject to change without prior notice in order to enhance the product's quality.



## Application

- \* Measurement of rebar strain inside of concrete to check structural health and stability
- \* Measurement of reaction force of foundation ground of suction pile or concrete structure



## Feature

- \* High stability and high sensitivity design
- \* Built-in high accuracy thermistor and lightning protection

## Characteristic

Model SJ-7513 and 7519 is strain gauge direct installation type to rebar, and strain gauge is structured by waterproof and rust-proofing stainless steel tube and connected gauge by flange and coil housing by built-in magnet coil. This VW sensor is simple installation than old type(sensor installation after processing rebar separately), and high responsibility and repeatability and suitable to permanence measurement due to no effect almost by secular change.

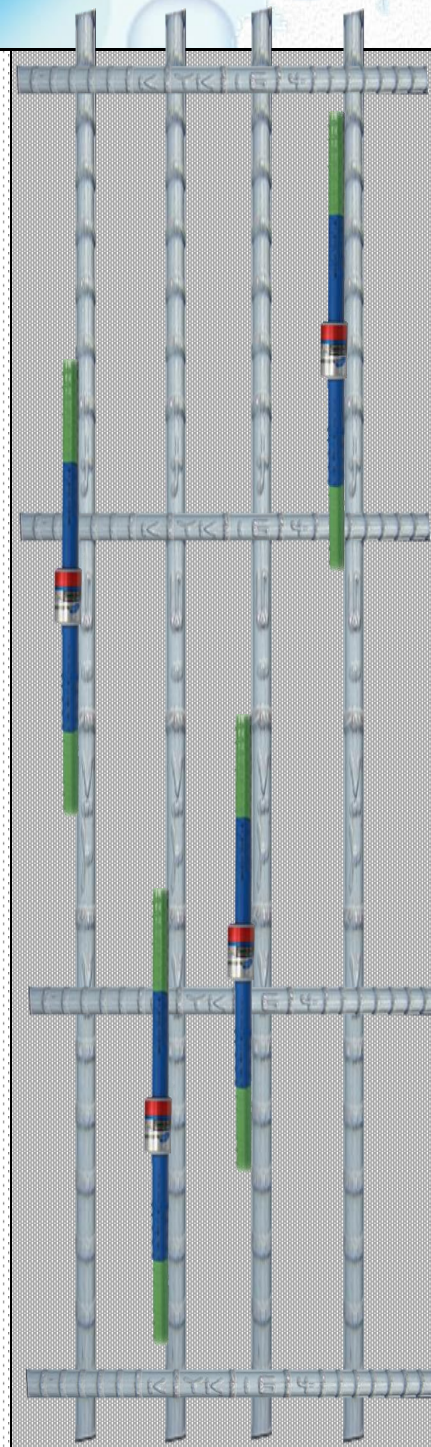
## Specification

Model	SJ-7513	SJ-7516	SJ-7519	SJ-7525
<b>Rebar Diameter(approx)</b>	Ø12.7mm	Ø15.9mm	Ø19.1mm	Ø25.4mm
<b>Sensor type</b>	VW type			
<b>Measurement range</b>	2,500 microstrain			
<b>Resolution</b>	0.1 microstrain			
<b>Accuracy</b>	0.5% F.S			
<b>Thermal expansion coefficient</b>	$11 \times 10^{-6} \text{ }^{\circ}\text{C}$			
<b>Operation Temp.</b>	$-20^{\circ}\text{C} \sim 80^{\circ}\text{C}$			
<b>Temp sensor mounted</b>	NTC Thermistor ( 3KD-ATF)			
<b>Temp sensor working range</b>	Thermistor : $-40^{\circ}\text{C} \sim 50^{\circ}\text{C}$			
<b>Temp sensor accuracy</b>	Thermistor : $\pm 1^{\circ}\text{C}$			
<b>Material</b>	Stainless steel 300, Fluoro O-ring, High density epoxy potting			
<b>Waterproof</b>	100 m H <sub>2</sub> O			
<b>Signal cable</b>	Ø0.64mm, 0.235mm <sup>2</sup> x 4C Shield SYS cable 2m			

※ The product spec is subject to change without prior notice in order to enhance the product's quality.

## Rebar Diameter

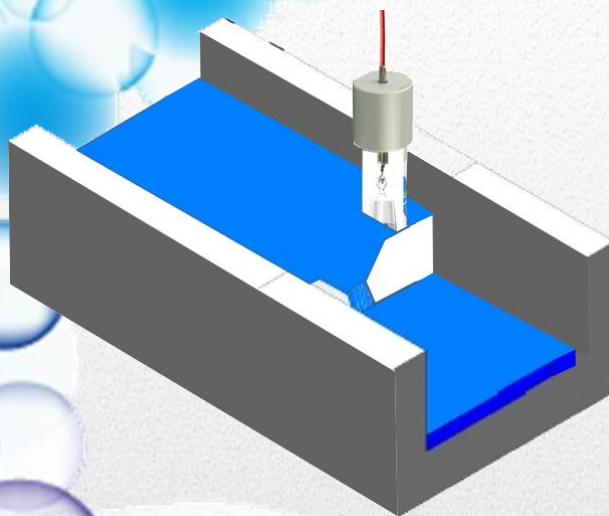
Model	Diameter	Length
<b>D10</b>	Ø 9.53	1,000 mm
<b>D13</b>	Ø 12.7	
<b>D16</b>	Ø 15.9	
<b>D19</b>	Ø 19.1	
<b>D22</b>	Ø 22.2	
<b>D25</b>	Ø 25.4	
<b>D26</b>	Ø 26	
<b>D29</b>	Ø 28.6	
<b>D32</b>	Ø 31.8	
<b>D35</b>	Ø 34.9	
<b>D28</b>	Ø 38.1	
<b>D41</b>	Ø 41.3	
<b>D51</b>	Ø 50.38	



※ The product spec is subject to change without prior notice in order to enhance the product's quality.



Our weir monitor SJ-4300 series are water level monitoring sensing system for V notch system that is used to measure water leakage variation. This monitor is installed near surface impermeable wall. The sensitive floating cylinder is hanged in housing, and connect vibration wire type displacement meter. Water level that is passed to distributing plate, is changed by leakage volume. The water level in same with the our side water level and if this water level is changed, the buoyance of floating cylinder is changed and this change is sensed by displacement meter.



## Feature

- \* High sensitivity
- \* High stability
- \* Long time measurement
- \* Automatic measurement

## Application

- \* V notch weirs
- \* Water tanks
- \* Stream levels
- \* Reservoir levels

## Specification

Type	SJ-4303	SJ-4306	SJ-4315
Capacity	300mm	600mm	1500mm
Resolution	0.25% F.S		
Accuracy	±0.1% F.S		
Linearity	±0.5% F.S		
Stability	±0.05% F.S /year		
Operation temperature	-20 °C ~ 80 °C		
Temp. Sensor	Thermistor		
Material	Stainless steel and PVC		
Signal cable	Ø0.64mm, 0.235mm <sup>2</sup> x 4C Shield SYS cable 2m		

※ The product spec is subject to change without prior notice in order to enhance the product's quality.

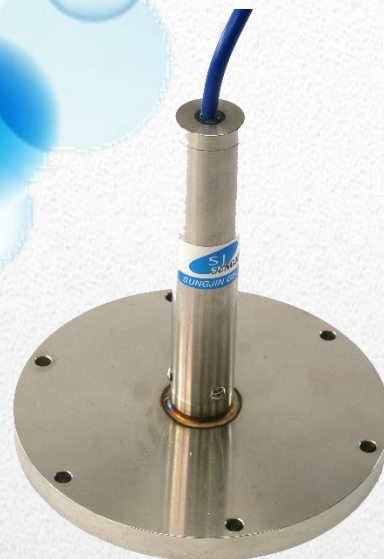
Wave pressure cell measure wave pressure that influence cassion structure at dock contruction work, and understand the ocean character of work section through connection analysis with output of tide level gauge

## Application

- \* Measurement of wave pressure to influence cassion structure at dock construction work

## Feature

- \* High stability of available operation in inferior enviroment
- \* High repeatability and responibility by no effect from cable length and change of resistance
- \* Optimum high sensitivity design by application
- \* Built-in high accuracy thermistor and lightening protection



## Characteristic

Wave pressure cell use electrical sensor that change water pressure that is transmitted to diaphragm, to electrical signal. the built-in strain gauge resistance is changed by the transmitted water or pneumatic pressure to diaphragm. The changed signal is transmitted to output device and display need engineering unit to check pressure. Our water pressure cell include high accuracy NTC Thermistor and lightening protection so that compensate zero point by change of temperature, and can operate continuously by high density epoxy potting and stainless steel.

## Specification

Model	SJ-4700	SJ-4710
Sensor Type	Pressure cell	
Capacity	50 psi	100 psi
Max. over load	150 % FSR	
Accuracy	±0.1% full scale	
Operation Temp.	-20°C ~ 50°C	
Temp sensor mounted	NTC Thermistor (3KD-ATF)	
Temp sensor accuracy	Thermistor : ±1°C	
dimension	φ = 150mm, L = 100mm	
Material	Stainless steel 300, High density epoxy potting	

※ The product spec is subject to change without prior notice in order to enhance the product's quality.



Tide level gauge measure tide level at the dock construction work, and understand the ocean character of work section through connection analysis with output of tide gauge.

## Application

- \* Measurement of water level at river, reservoir and stainless pipe
- \* measurement of tide level at the dock construction work

## Feature

- \* High stability of available operation in inferior enviroment
- \* High repeatability and responibility by no effect from cable length and change of resistance
- \* Optimum high sensitivity design by application
- \* Built-in high accuracy thermistor and lightening protection



## Characteristic

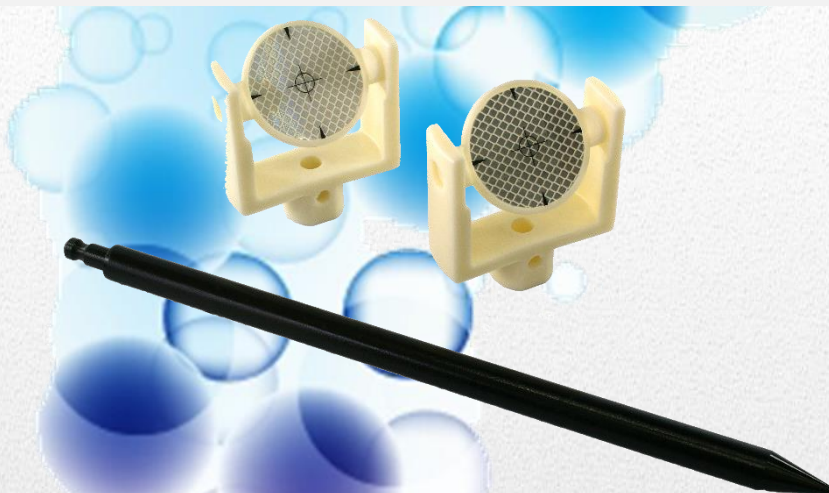
Tide level gauge use foil strain gauge that change water pressure that is trransmitted to diaphragm, to electrical signal. the built-in strain gauge resistance is changed by the transmitted water or pneumatic pressure to diaphragm. The changed signal is transmitted to output device and display need engineering unit to check pressure. Our water pressure cell include high accuracy NTC Thermistor and lightening protection so that compensate zero point by change of temperature, and can operate continuously by high density epoxy potting and stainless steel.

## Specification

Model	SJ-4500
Measurement range	70psi
Max. over load	150 % FSR
Accuracy	±0.1% full scale
Operation Temp.	-20°C ~ 50°C
Temp sensor mounted	NTC Thermistor (3KD-ATF)
Temp sensor accuracy	Thermistor : ±1°C
Filter	Stainless sintered filter 70μm
lightening protection	Tube Gas Arrester (Frequency output wire)
dimension	φ = 27mm, L = 150mm
Material	Stainless steel 302, High density epoxy potting

※ The product spec is subject to change without prior notice in order to enhance the product's quality.

It is to check the development of the surrounding ground as well as graded and displacement convergence condition in tunnel section by obtaining the absolute settlement figure of each section and crown settlement for tunnel work, estimating the loosing area of the adjacent ground. It is also used for fundamental data to determine timing for tunnel face closing and the stability due to the tunnel construction while checking the support effect and reviewing the succeeding process.



## Features

- \* To measure crown settlement and displacement in tunnel section
- \* To measure displacement and development of the retaining wall, bridge and dam structure

## Characteristic

Using for electronic wave surveying target is mainly divided into triple prism and refraction type target (to measure the displacement using a reflecting sheet). For refraction type target, the reflecting sheet with ultra high brightness is attached. The measurement accuracy of the displacement is not better than that of triple prism method but the 2-D measurement is possible because of the short distance. It is much used for measuring the crown settlement and displacement for tunnel work.

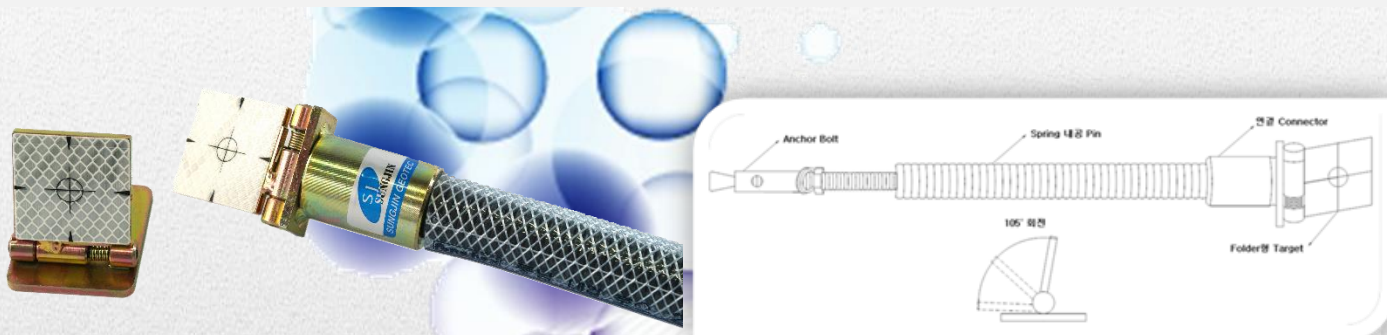
## Specification

Model	SJ-8800
Accuracy	Angle : $\pm 0.5$ Mgon, Distance Measurement : 1.2mm
Reflection sheet size	60mm
Reflection sheet material	High Brightness Sheet
Inner displacement target material	ABB Synthetic Resins
Inner displacement pin size	25 X 300mm, 25 X 500mm
Inner displacement pin material	Steel

※ The product spec is subject to change without prior notice in order to enhance the product's quality.



The most important item in "A" measurement of the tunnel is the crown settlement and displacement measurement. The purpose of measurement for crown settlement and displacement is to check the stability of the surrounding ground of the tunnel as well as the development caused by the tunnel excavation so that the final displacement can be predicted and it will be an important data to determine whether the lining should be added or not. However, the thing is that the tunnel collapse accident is still happened due to many other reasons despite the engineer always stays at tunnel site to install various gauges and instruments to control the measurement. In order to make sure of the effect of the primary supporting material and stability of the tunnel in excavating the tunnel it is necessary to install the instruments at the near tunnel face as quickly as possible to do the measurement but the initial displacement is lost from time to time due to missed timing of the installation because of the shotcrete laying problem. If the instrument is damaged due to debris scattered when the excavation by machine and blasting is done at the same time, it is not easy to determine the entire stability because of lack of data continuity.



## Characteristic

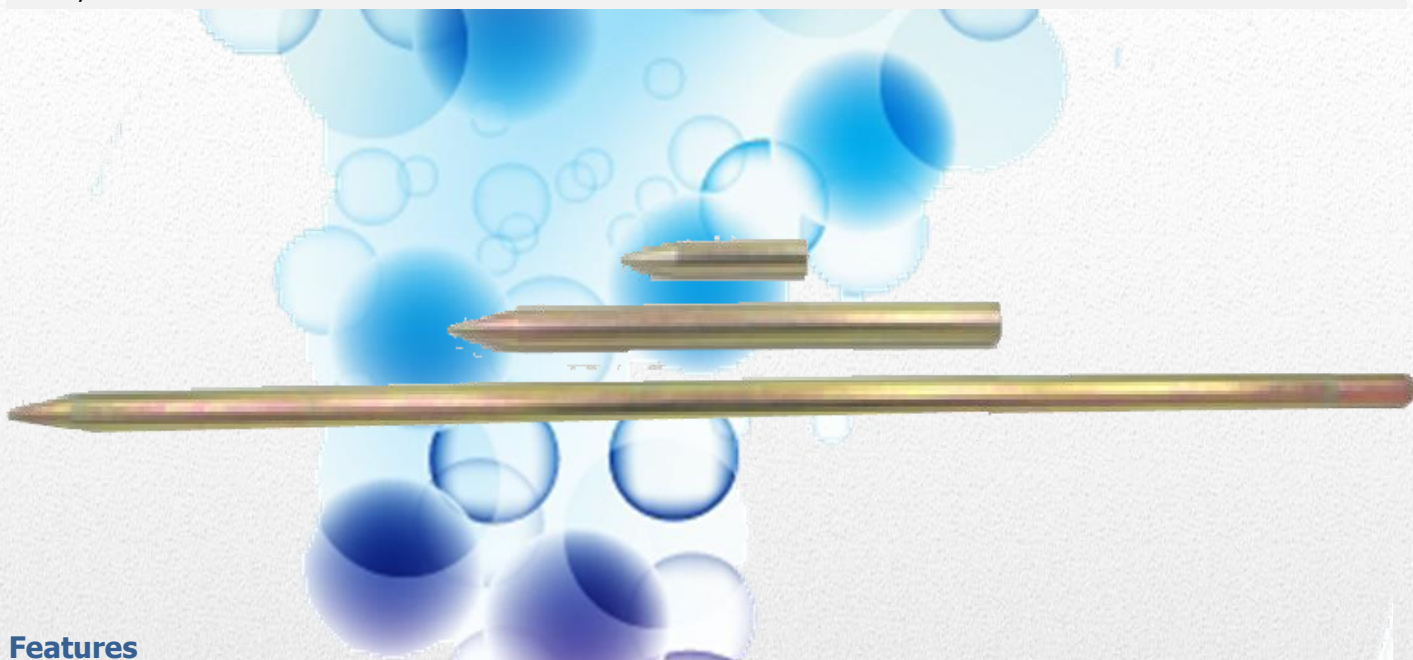
The conventional measurement target for crown settlement and displacement at the tunnel site can not do any resistance when the blasting is done and the target loss rate is as much as 20 ~ 30%. The conventional way is that they would delay the installation timing or separate the target according to the blasting time to reduce the loss rate and then they mount it again one by one to do measurement. However, spring folder type measurement target simply recovers to the original position by the spring and fixing device connected with the prism when it is hit by the debris scattered by blasting.

## Specification

Model	SJ-8600(Patent: 10-0951811)
Target material	3D Reflection sheet: Polyvinyl chloride. Main body: Steel
Target size	Reflection plate (45mmx50mm), Fixing plate(50mmx60mm), Thick: 4mm
Target rotation angle	Φ56. 110 ° (One-way), Reset to the original position
Spring inner pin material	Special steel
Spring inner pin size	Spring inner pin (400mmx25mm), Target connector (50mmx25mm) Anchor bolt (145mm x 10mm), Total length when connected: 470mm
Spring inner pin rotation angle	180° (Front/Rear/Left/Right), Reset to original position

※ The product spec is subject to change without prior notice in order to enhance the product's quality.

This pin measure settlement during civil work to use basic data to check level of settlement of ground or structure and stability.



## Features

- \* To measure settlement of subject ground at the work of soft ground or sheathing.
- \* To measure settlement or movement at the harbors or bridge or structure

## Characteristic

Surface settlement pin is used to fix measurement point at the subject ground or structure when measure level by leveler or meausre coordinates by total station. If installation point is ground, select long type pin and fix pin by mortar, and if installation point is concrete, select short type pin and insert pin after drilling and fix it by epoxy.

## Specification

Model	SJ-8700
Dimension	Long type : 13mm(Ø) X 500mm(L) Short type : 13mm(Ø) X 70mm(L)
Material	Steel

※ The product spec is subject to change without prior notice in order to enhance the product's quality.



Rotary type terminal box is connected with signal cables from sensors from various locations at the side and the connected cables are connected with data logger(SJ-1000) by multi core cables. It is available to make cable work simply by that many cables are connected with 1 or 2 multi core cable in terminal box. Therefore our terminal box supply cost saving, time saving. Specially, our terminal box is useful to large scale civil work site.



## Characteristic

Our terminal box is consisted of case, terminal block, connector and rotary switch. Case is waterproof type and impact resistance type. Our terminal box SJ-8512 can connected 12 channels and SJ-8524 can be connected 24 channels.

## Specification

Model	SJ-1512	SJ-1524
Channel number	12	24
Operattion Temperature	-20 °C ~ 80 ° C	
Case Material	Reinforcement glassfiber plastic	
Dimension	280 X 190 X 130 mm	350 X 250 X 150 mm
Weight	2 kg	3 kg

※ The product spec is subject to change without prior notice in order to enhance the product's quality.

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<b>Load Cell</b>	<b>94</b>
<b>Reaction Meter</b>	<b>103</b>
<b>Wave Pressure Gauge</b>	<b>104</b>
<b>Soil Pressure Meter</b>	<b>105</b>
<b>Pore Pressure Meter</b>	<b>109</b>
<b>Water Level Meter</b>	<b>112</b>
<b>Displacement Transducer</b>	<b>114</b>
<b>Poisson Ratio Tester</b>	<b>115</b>
<b>Extensometer</b>	<b>116</b>
<b>Tunnel Convergence Meter</b>	<b>117</b>
<b>Rod Extensometer</b>	<b>119</b>
<b>Settlement Meter</b>	<b>122</b>
<b>In Place Inclinator</b>	<b>125</b>
<b>Tiltmeter</b>	<b>127</b>
<b>Electrolyte type EL Beam Tiltmeter</b>	<b>131</b>
<b>Rock Bolt Axial Force Transducer</b>	<b>132</b>
<b>Reinforcing Bar Meter</b>	<b>133</b>
<b>Concrete Stress Meter</b>	<b>134</b>
<b>Tape Extensometer</b>	<b>135</b>
<b>Crack Gauge</b>	<b>136</b>
<b>Tell-tale Type Crack Meter</b>	<b>137</b>



This load cell is a center hole type that measure the axial force of rock bolt, earth anchor for material safety and causes search, and is also used for tie back and loading test etc.

## Feature

- Waterproof and dustproof
- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment
- Compensation of eccentric load by assistant ring



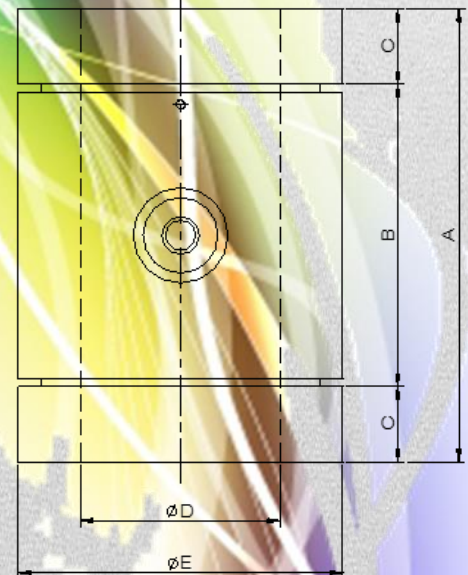
## Specification

Type	ELC - □ □ □
Capacity	50tf ~ 500tf
Rated Output	Approx. 1~1.5mV/V
Non-linearity	1% RO
Hysteresis	1% RO
Safe Temperature Range	-10 ~ 60°C
Over Load	1.5
Resistance	350Ω or 700 Ω
Safe Exciting Voltage	10V
Electrical Connection	4Core Shield



## Dimension

Type	A	B	C	ØD	ØE
ELC-50	132	136	80	100	122
ELC-100	180	120	30	100	150
ELC-200	184	180	110	151	175
ELC-300	217	228	130	180	206
ELC-500	274	318	160	235	265



This SLC type load cell is used to measure axial force of strut for safety and causes search of its material and is designed for crew-jack of 50ton or 100ton.

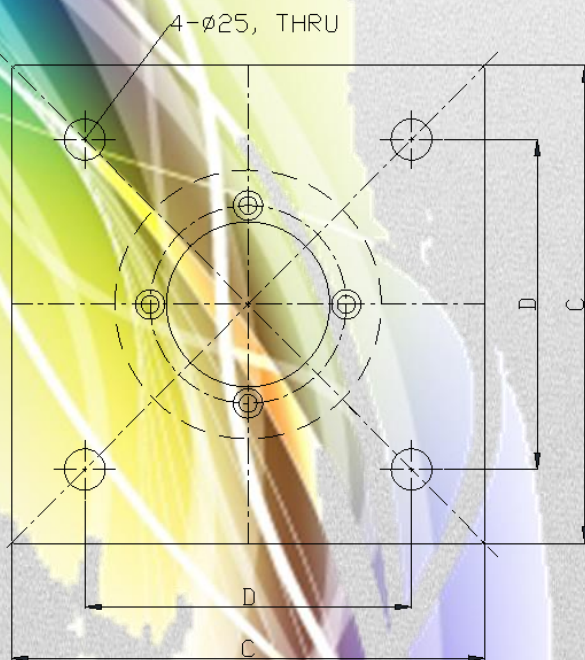
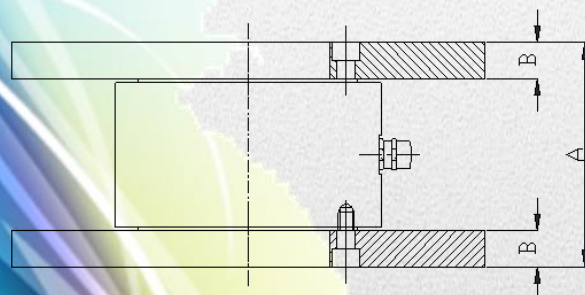
## Feature

- Waterproof and dustproof
- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment



## Specification

Type	SLC - □ □ □
Rated Capacity	100tf
Rated Output	Approx. 1mV/V ( $2,000 \times 10^{-6}$ )
Non-linearity	1% RO
Hysteresis	1% RO
Safe Temperature Range	-10 ~ 60°C
Over Load	1.5
Resistance	350Ω or 700 Ω
Safe Exciting Voltage	10V
Electrical Connection	4Core Shield



## Dimension

Type	A	B	C	D
SLC-100	136	22	290	200



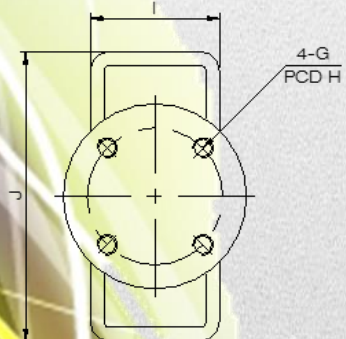
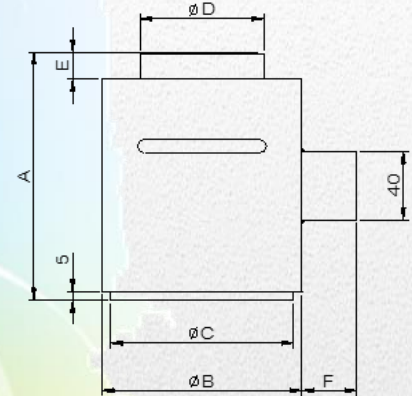
This load cell is a hopper tank type and is used to measure load change of industrial work site or civil work site through various loading test for safety and causes search.

## Feature

- Waterproof and dustproof
- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment

## Specification

Type	PLC - □ □ □
Capacity	10tf ~ 500tf
Rated Output	Approx.1~1.5mV/V
Non-linearity	1% RO
Hysteresis	1% RO
Safe Temperature Range	-10 ~ 60°C
Over Load	1.5
Resistance	350Ω or 700 Ω
Safe Exciting Voltage	10V
Electrical Connection	4Core Shield



## Dimension

Type	A	ØB	ØC	ØD	E	F	G	H	I	J
PLC-10	80	70	60	33	8	25	M8 DP10	40	-	-
PLC-20	100	70	60	33	8	25	M8 DP10	40	-	-
PLC-30	110	88	78	51	10	25	M8 DP10	60	-	-
PLC-50	110	88	78	51	10	25	M8 DP10	60	-	-
PLC-100	145	118	108	73	16	27	M12 DP15	810	76	174
PLC-200	165	148	138	103	16	27	M16 DP15	100	76	204
PLC-300	190	178	160	126	18	27	M16 DP18	120	80	238
PLC-500	250	211	195	162	22	27	M20 DP20	140	80	271

This TPLC type load cell is compression and tension type and used to measure the change of load at the industrial site.

## Feature

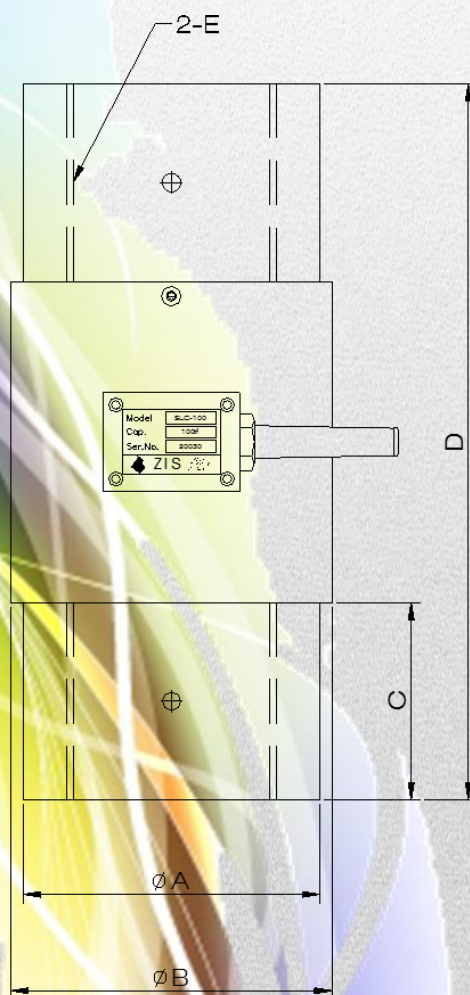
- Waterproof and dustproof
- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment

## Specification

Type	TPLC - □ □ □
<b>Rated Capacity</b>	30tf ~ 200tf
<b>Rated Output</b>	Approx. 1mV/V ( $2,000 \times 10^{-6}$ )
<b>Non-linearity</b>	1% RO
<b>Hysteresis</b>	1% RO
<b>Safe Temperature Range</b>	-20 ~ 80°C
<b>Over Load</b>	1.5
<b>Resistance</b>	350Ω or 700Ω
<b>Safe Exciting Voltage</b>	10V
<b>Electrical Connection</b>	Ø9mm, 0.5mm <sup>2</sup> , 4Core Shield

## Dimension

Type	ØA	ØB	C	D	E
<b>TPLC-30</b>	85	95	50	250	M 60×3 DP60
<b>TPLC-50</b>	110	120	60	320	M 80×3 DP80
<b>TPLC-100</b>	150	160	90	420	M100×3 DP100
<b>TPLC-200</b>	220	230	180	600	M150×4 DP150





This CTLC-12 type load cell is designed for special measurement for tension of bridge wire and mono-jack test etc. This load cell is used for stability and finding cause.

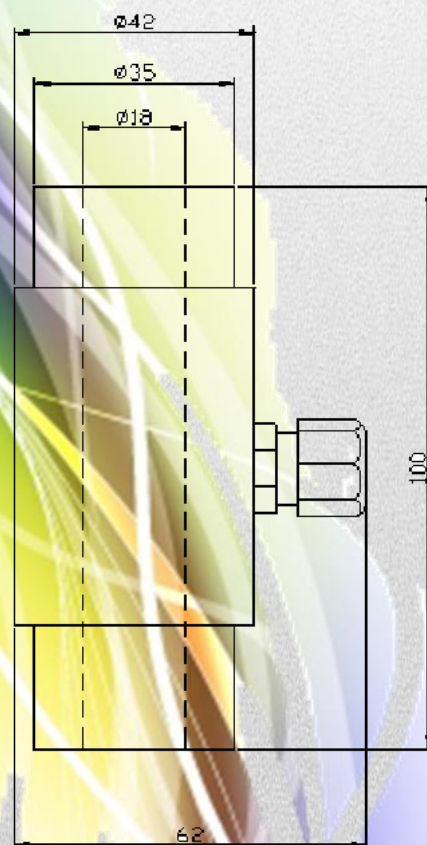
## Feature

- Waterproof and dustproof
- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment



## Specification

Type	CTLC-12
Rated Capacity	12tf
Rated Output	Approx. 1 - 1.5mV/V
Non-linearity	1% RO
Hysteresis	1% RO
Safe Temperature Range	-10 ~ 60℃
Over Load	1.5
Resistance	350Ω or 700Ω
Safe Exciting Voltage	10V
Electrical Connection	4Core Shield



## Dimension

Type	ØA	ØB	ØC	D
SELC-12	18	35	42	100

This SFLC type loadcell is designed for special measurement of concrete specimen test etc.

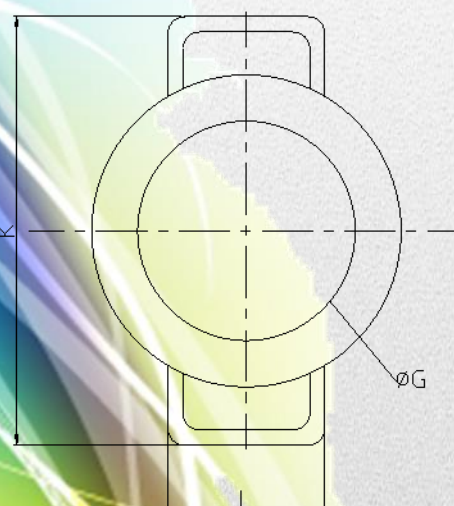
## Feature

- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy connection with automatic measuring equipment



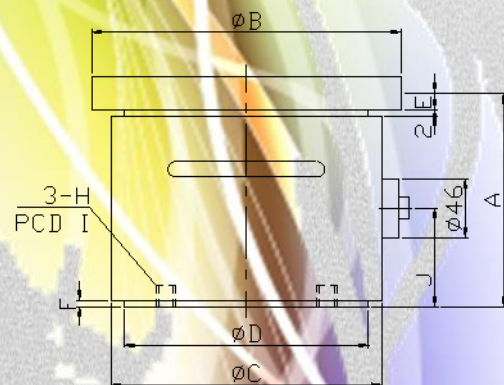
## Specification

Type	SFLC - □ □ □
Rated Capacity	100tf
Rated Output	Approx. 1.5mV/V
Non-linearity	1% RO
Hysteresis	1% RO
Safe Temperature Range	-10 ~ 60℃
Over Load	1.5
Resistance	350Ω or 700Ω
Safe Exciting Voltage	10V
Electrical Connection	4Core Shield



## Dimension

Type	A	ØB	ØC	ØD	E
SFLC-100	155	220	190	180	25
Type	F	ØG	H		
SFLC-100	2	153	M12 D.P15		
Type	I	J	K	L	
SFLC-100	124	65	280	120	





This TSLC type load cell is tension type and used to measure the change of load at the industrial site.

## Feature

- Waterproof and dustproof
- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment

## Specification

Type	TSLC - □ □ □
Rated Capacity	5tf ~ 200tf
Rated Output	Approx. 1mV/V ( $2,000 \times 10^{-6}$ )
Non-linearity	1% RO
Hysteresis	1% RO
Safe Temperature Range	-20 ~ 80°C
Over Load	1.5
Resistance	350Ω or 700Ω
Safe Exciting Voltage	10V
Electrical Connection	4Core Shield

## Dimension

Type	A	B	C	ØD	E	ØF	ØG
TSLC-5	234	80	77	60	40	70	37
TSLC-25	390	120	135	110	72	125	60
TSLC-100	690	210	240	195	130	210	102
TSLC-200	890	230	330	290	130	170	140



This SELC-12 type load cell is designed specially for special measurement for tension of bridge wire and, is used for stability and finding cause.

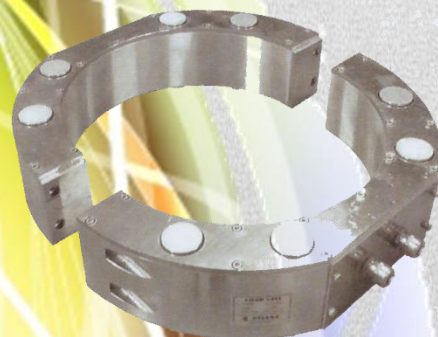
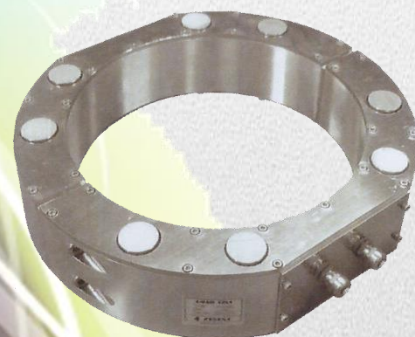
## Feature

- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment



## Specification

Type	HLC - □ □ □
Rated Capacity	10 ~ 16tf
Rated Output	Approx. 1 - 2mV/V
Non-linearity	1% RO
Hysteresis	1% RO
Safe Temperature Range	-10 ~ 60℃
Over Load	1
Resistance	350Ω or 700Ω
Safe Exciting Voltage	10V
Electrical Connection	4Core Shield





This FLC type load cell is designed for special measurement for axial force of rock bolt, earth anchor and bolt etc.

## Feature

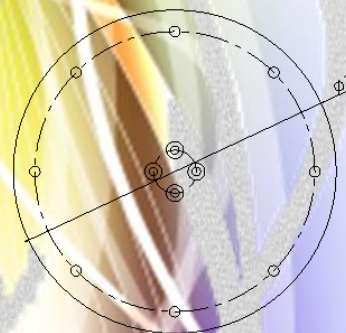
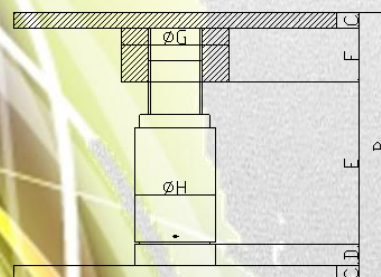
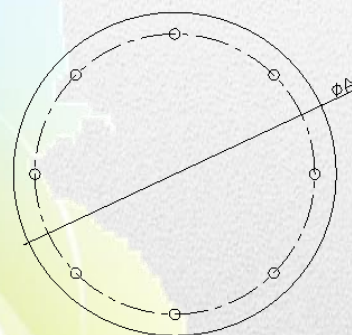
- Waterproof and dustproof
- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment

## Specification

Type	FLC-10
Rated Capacity	10tf
Rated Output	Approx. 1 - 1.5mV/V
Non-linearity	1% RO
Hysteresis	1% RO
Safe Temperature Range	-10 ~ 60℃
Over Load	1.5
Resistance	350Ω or 700Ω
Safe Exciting Voltage	10V
Electrical Connection	4Core Shield

## Dimension

Type	ØA	ØB	ØC	D	E	F
FLC	300	250	15	20	150	50
Type	ØG	ØH	ØI			
FLC	100	75	300			



This meter measure reaction force of cassion, suction pile or concrete foundation agasint ground to use prediction construction, design and stability.

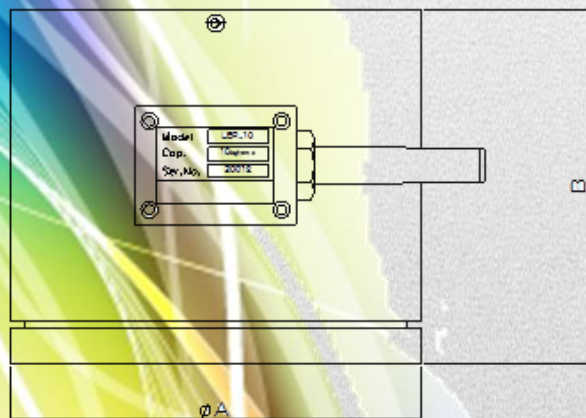
## Feature

- Waterproof and dustproof
- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment



## Specification

Type	SRF-□
<b>Rated Capacity</b>	1 ~ 30kgf/cm2
<b>Rated Output</b>	Approx.1.5~2mV/V
<b>Non-linearity</b>	1% RO
<b>Hysteresis</b>	1% RO
<b>Safe Temperature Range</b>	-20 ~ 70°C
<b>Over Load</b>	120%
<b>Resistance</b>	350Ω or 700Ω
<b>Safe Exciting Voltage</b>	10V
<b>Electrical Connection</b>	4Core Shield





This meter is installed at marine structure as like breakwater for measurement of wave pressure.

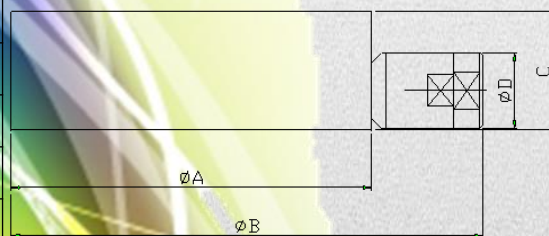
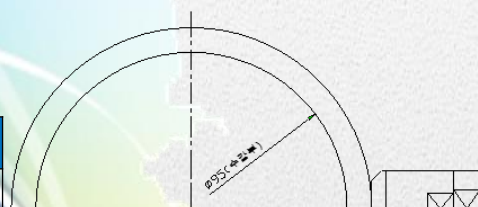
## Feature

- Abrasion of sensor surface is no effect to output.
- Load cell type for no effect by flexural strength
- Long measurement by strong durability and safety
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment



## Specification

Type	FWP- □ □
Rated Capacity	2 ~ 10kgf/cm <sup>2</sup>
Rated Output	Approx. 0.6~1mV/V
Non-linearity	1% RO
Hysteresis	1% RO
Safe Temperature Range	-20 ~ 60°C
Over Load	1.5
Resistance	350Ω or 700Ω
Safe Exciting Voltage	10V
Electrical Connection	4Core Shield



## Dimension

Type	ØA	ØB	C	ØD
FWP-XX	110	114	36	23

This meter is used to measure soil pressure of the around ground load for check of ground stability.

## Feature

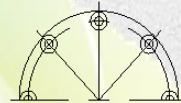
- Waterproof and dustproof
- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment



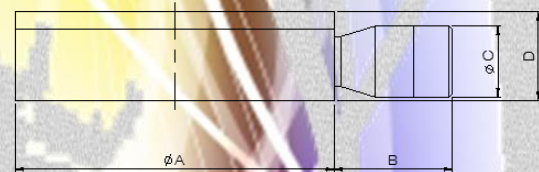
## Specification

Type	FSP- □ □
Rated Capacity	2 ~ 20kgf/cm <sup>2</sup>
Rated Output	Approx. 0.6~1mV/V
Non-linearity	1% RO
Hysteresis	1% RO
Safe Temperature Range	-20 ~ 60°C
Over Load	1.5
Resistance	350Ω or 700Ω
Safe Exciting Voltage	10V
Electrical Connection	4Core Shield

∅ A Size : ∅ 50



∅ A Size : ∅ 100 / ∅ 200



## Dimension

Type	∅ A	B	∅ C	D
FSP-2 / 5 / 10 / 20	50	13	4	8.8
FSP-2 / 5 / 10 / 20	100	37	20	25
FSP-2 / 5 / 10 / 20	200	37	20	25



This meter is used to measure soil pressure of the around ground load for check of ground stability.

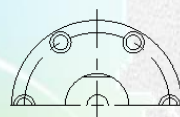
## Feature

- Waterproof and dustproof
- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment

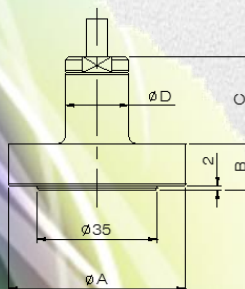


## Specification

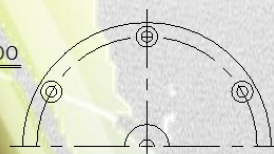
Type	BSP- □ □
Rated Capacity	2 ~ 20kgf/cm <sup>2</sup>
Rated Output	Approx. 0.6~1mV/V
Non-linearity	1% RO
Hysteresis	1% RO
Safe Temperature Range	-20 ~ 60°C
Over Load	1.5
Resistance	350Ω or 700Ω
Safe Exciting Voltage	10V
Electrical Connection	4Core Shield



φA Size : φ50

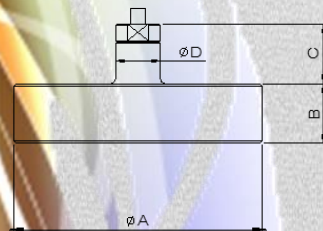


φA Size : φ100 / φ200



## Dimension

Type	ØA	B	C	ØD
BSP-2 / 5 / 10 / 20	50	12	24	18
BSP-2 / 5 / 10 / 20	100	20	40	30
BSP-2 / 5 / 10 / 20	200	25	40	30



This meter is used to measure soil pressure by the around ground load for check of ground stability.

## Feature

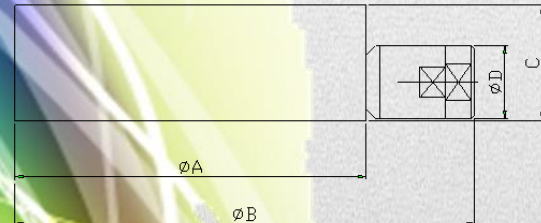
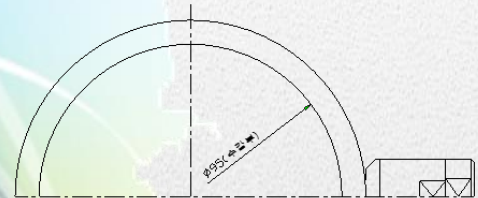
- Waterproof and dustproof
- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment

## Specification

Type	LSP- □ □
Rated Capacity	2 ~ 20kgf/cm <sup>2</sup>
Rated Output	Approx. 0.6~1mV/V
Non-linearity	1% RO
Hysteresis	1% RO
Safe Temperature Range	-20 ~ 60°C
Over Load	1.5
Resistance	350Ω or 700Ω
Safe Exciting Voltage	10V
Electrical Connection	4Core Shield

## Dimension

Type	ØA	ØB	C	ØD
LSP-XX	110	144	36	23





This meter is a simulated testing transducer to be used for liquefaction test, centrifuge loading test and hydraulic experiment.

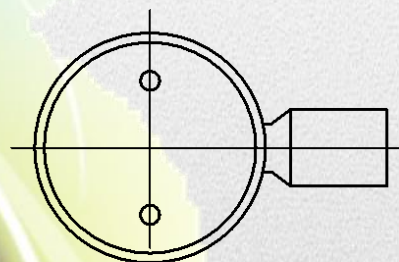
## Feature

- Proper for simulation test by micromini and ultralight
- High precision and stability
- Waterproof and dustproof
- Easy connection with automatic measuring equipment



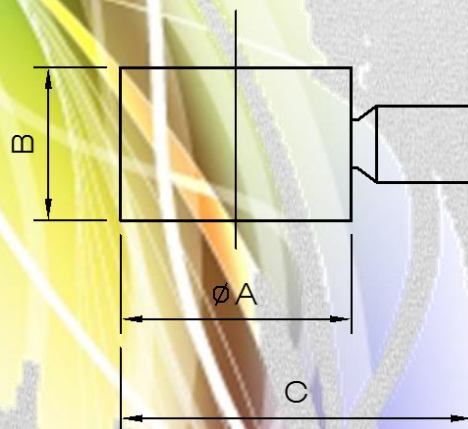
## Specification

Type	MSP- □ □
Rated Capacity	2 ~ 20kgf/cm <sup>2</sup>
Rated Output	Approx. 0.2~1mV/V
Non-linearity	1% RO
Hysteresis	1% RO
Safe Temperature Range	-10 ~ 60°C
Over Load	1.5
Resistance	350Ω
Safe Exciting Voltage	5V
Electrical Connection	4Core Shield



## Dimension

Type	ØA	B	C
MSP-2	12	8	18.5
MSP-5	12	8	18.5
MSP-10	12	8	18.5
MSP-20	12	8	18.5



Measure safety of the ground due to change of pore pressure  
by excavation.

## Feature

- Waterproof and dustproof
- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment

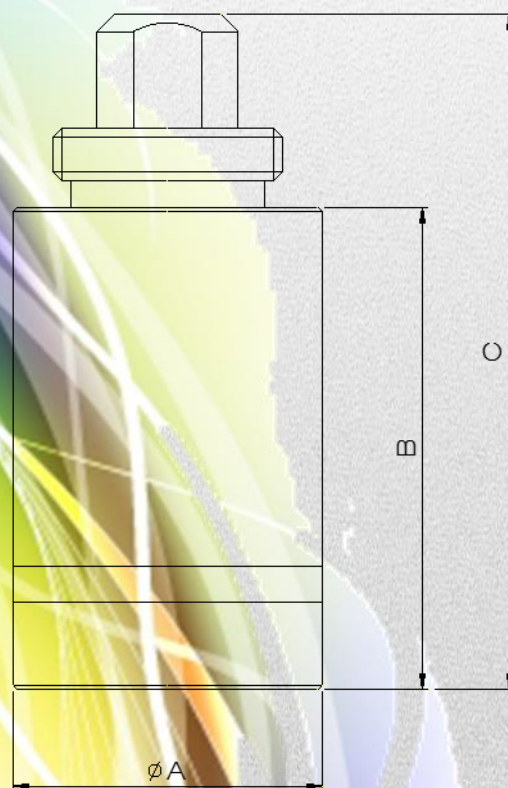


## Specification

Type	SPP - □ □
Capacity	2 ~ 20 kgf/cm <sup>2</sup>
Rated Output	Approx. 0.6~1mV/V
Non-linearity	1% RO
Hysteresis	1% RO
Temperature Range Allowable	0 ~ 60°C
Over Load	1.5
Resistance	350Ω or 700 Ω
Allowable Exc. Voltage	10V
Electrical Connection	4Core Shield

## Dimension

Type	ØA	B	C
SPP-2	35	55	77
SPP-5	35	55	77
SPP-10	35	55	77
SPP-20	35	55	77





This meter used to check the change of pore pressure in the ground  
for the ground safety according to excavation.

## Feature

- Waterproof and dustproof
- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment



## Specification

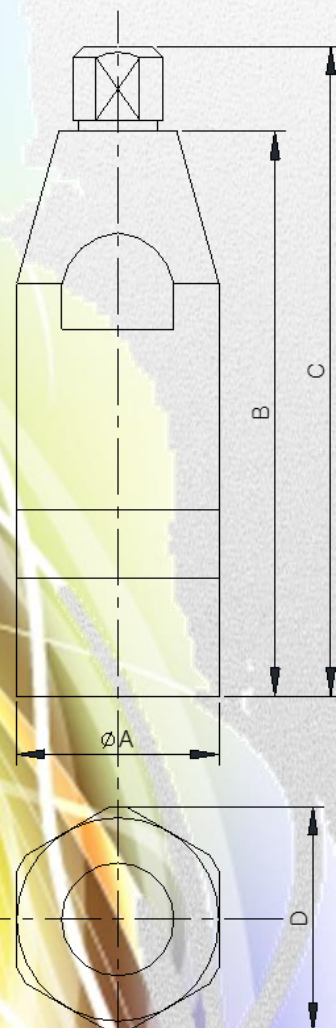
Type	LPP-□□V / LPP-□□A
Rated Capacity	0.1 - 2 kgf/cm <sup>2</sup>
Rated Output	0.1~2 kgf/cm <sup>2</sup>
Accuracy	±0.3%FS
Thermal Effect On Zero	±0.05%FS/°C
Thermal Effect On Span	±0.05%FS/°C
Compensation Temperature Range	0 ~ 70°C
Safe Temperature Range	-20 ~ 80°C
Safe Exciting Voltage	12~24VDC
Output	1~5VDC, 4~20mA
Electrical Connection	4Core Shield

\* LPP-□□V : 1-5 VDC

\* LPP-□□A : 4-20 mA

## Dimension

Type	ØA	B	C	D
LPP-□	36	100	113	40



MPP type pore pressure meter is a simulated testing transducer to be used for liquefaction test, centrifuge loading test and hydraulic experiment.

## Feature

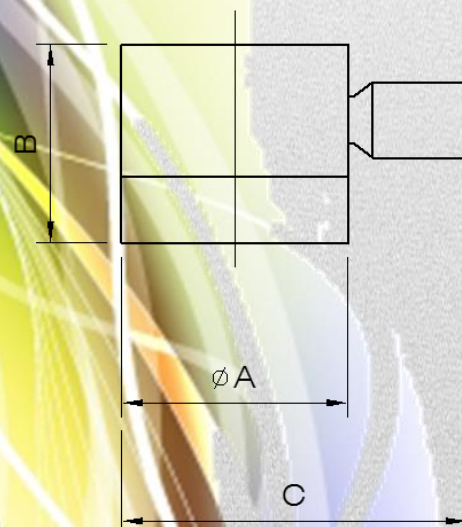
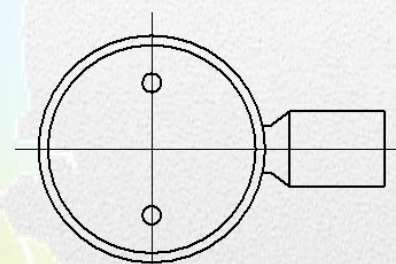
- Proper for simulation test by micromini and ultralight
- High precision and stability
- Waterproof and dustproof
- Easy connection with automatic measuring equipment

## Specification

Type	MPP-□ □
Rated Capacity	2 ~ 20kgf/cm <sup>2</sup>
Rated Output	Approx. 0.2~1mV/V
Non-linearity	1% RO
Hysteresis	1% RO
Temperature Range Allowable	0 ~ 60°C
Over Load	1.2
Resistance	350Ω
Allowable Exc. Voltage	5V
Electrical Connection	4Core Shield

## Dimension

Type	ØA	B	C
MPP-2	12	11	18.5
MPP-5	12	11	18.5
MPP-10	12	11	18.5
MPP-20	12	11	18.5





This meter is a water pressure type water level meter to measure not only water level of dam and river but change of ground water level in landside area. This meter can measure more precision because this meter does not need compensation of effect of atmospheric pressure change.

## Feature

- Waterproof and dustproof
- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment



## Specification

Type	PWL- □ □
Rated Capacity	0.1~35 kgf/cm <sup>2</sup>
Accuracy	±0.15%RO
Thermal Effect On Zero	±0.03%RO/°C
Thermal Effect On Span	±0.03%RO/°C
Compensation Temperature Range	0 ~ 70°C
Safe Temperature Range	-20 ~ 80°C
Safe Exciting Voltage	11 ~ 24VDC
Output	1~5VDC, 4~20mA(2Wire)
Electrical Connection	Ø7 Vented Tube Polyurethane Cable

\* PWL-XX V : 1~5VDC

\* PWL-XX A : 4~20mA

## Calculation

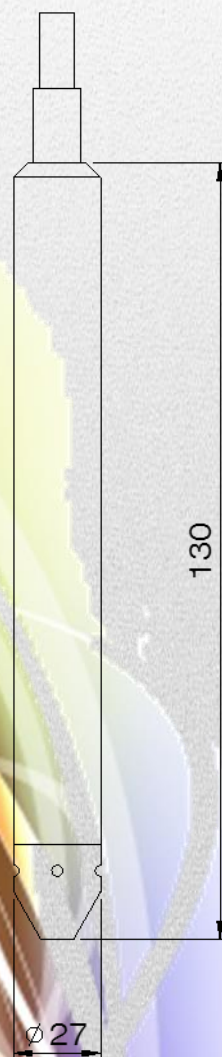
**Actual water level = Cable length – Indicated level on indicator**

ex) Cable length : 50m

Indicated level on indicator : 12.25m

50m - 12.25m = 37.75m (Actual water level)

\* In case to mark meter on indicator.



This meter is a water pressure type water level meter to measure not only water level of dam or river but change of ground water level in landside area.

## Feature

- Waterproof and dustproof
- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment



## Specification

Type	CWL- □
Rated Capacity	2~5 kgf/cm <sup>2</sup>
Rated Output	Approx. 0.6 ~ 1mV/V
Non-linearity	1% RO
Hysteresis	1% RO
Temperature Range Allowable	0 ~ 60°C
Over Load	1.2
Resistance	350Ω
Allowable Exc. Voltage	5V
Electrical Connection	4Core Shield

## Dimension

Type	ØA	B
CWL-2	40	100
CWL-3	40	100
CWL-5	40	100





This meter is applicable to static and dynamic test due to compact type displacement transducer, and can measure high accuracy data by high output and special stability.

## Feature

- High precision and stability
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment

## Specification

Type	JDP- □ □ □
Rated Capacity (mm)	50, 100
Rated Output	Approx. 5mV/V
Non-linearity	0.5% RO
Safe Temperature Range	-10 ~ 80°C
Resistance	350Ω
Recommended Excitation Voltage	Less than 2V
Safe Excitation Voltage	5V
Electrical Connection	4Core Shield

## Dimension

Type	A	ØB	C	D	E
JDP-5	M2.5	6	55	175	34
JDP-100	M2.5	6	110	275	34



## Poisson Ratio Tester

This is a tester to measure horizontal extension and axial strain by putting compressive load to cylindrical concrete specimen for calculation of Poisson ratio and elastic modulus.



## Specification

MODEL	JPT
Type	Digital
Sample Type	Ø15×30
Support Points	200 mm
Material	Aluminum Alloy
Fitting Bar	1 set
Accessories	Box
Dimension	400×400×350

## Compressor Meter Tester

This is a tester to measure horizontal extension by putting compressive load to cylindrical concrete specimen for calculation of Poisson ratio.



## Specification

MODEL	JET
Sample Type	Ø15×30
Material	Aluminum Alloy
Fitting Bar	1 set
Accessories	Box
Dimension	300×300×300
Weight (kg)	5

## Extensometer Tester

This is a tester to measure axial strain by putting compressive load to cylindrical concrete specimen for calculation of elastic modulus of the concrete.



## Specification

MODEL	JCT
Sample Type	Ø15×30
Support Points	200 mm
Material	Aluminum Alloy
Fitting Bar	1 set
Accessories	Box
Dimension	300×300×350



This extensometer is used to measure displacement of length of structure or incline.

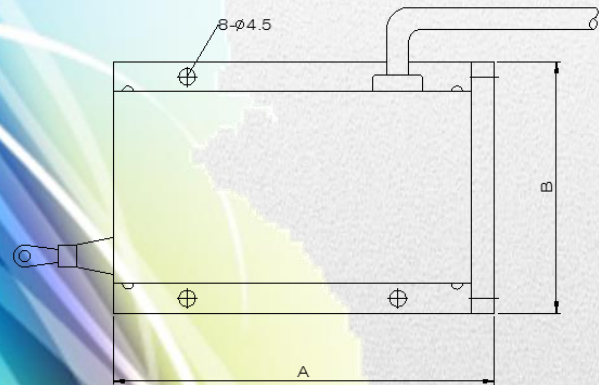
## Feature

- High precision and stability
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment



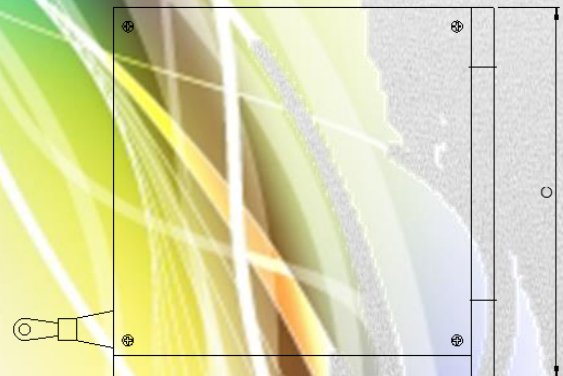
## Specification

Type	PDP-□□□		
Rated Capacity	500mm	1,000mm	2,000mm
Rated Output	Approx. 5mV/V		
Non-linearity	1% RO		
Safe Temperature Range	-10 ~ 80°C		
Resistance	350Ω		
Recommended Excitation Voltage	Less than 2V		
Safe Exciting Voltage	5V		
Electrical Connection	4Core Shield		



## Dimension

Type	A	B	C
PDP-500	88	68	76
PDP-1000	88	68	76
PDP-2000	103	68	100



This extensometer is used to measure rounding displacement by angle and length displacement in the tunnel.

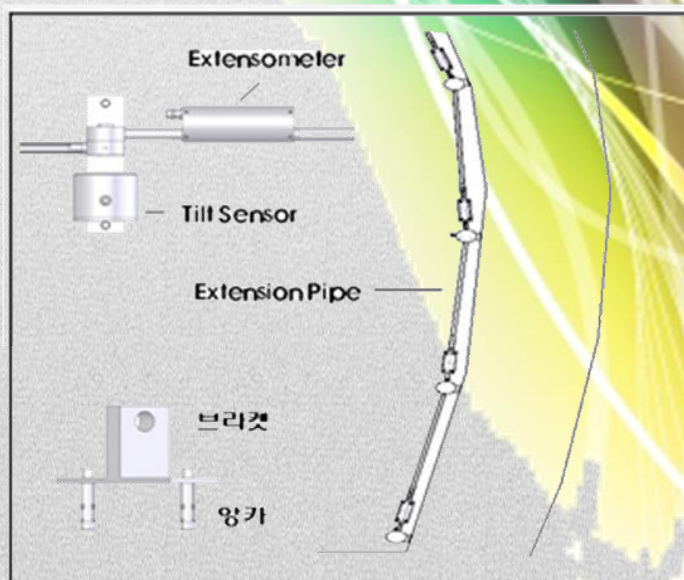
## Feature

- Waterproof and dustproof
- High precision and stability
- Long measurement by strong durability and safety
- Easy connection with automatic measuring equipment



## Specification

Type	Tiltmeter	Extensometer
Rated Capacity	$\pm 5$ deg	20mm
Resolution	$\pm 0.0033$ deg	0.01mm
Accuracy	0.1% RO	
Safe Temperature Range	$-20 \sim 80^{\circ}\text{C}$	
Material	Stainless steel or Aluminum	
Safe Exciting Voltage	5V	
Electrical Connection	6 Core Shield	





This extensometer is used to measure rounding displacement by angle displacement in the tunnel.

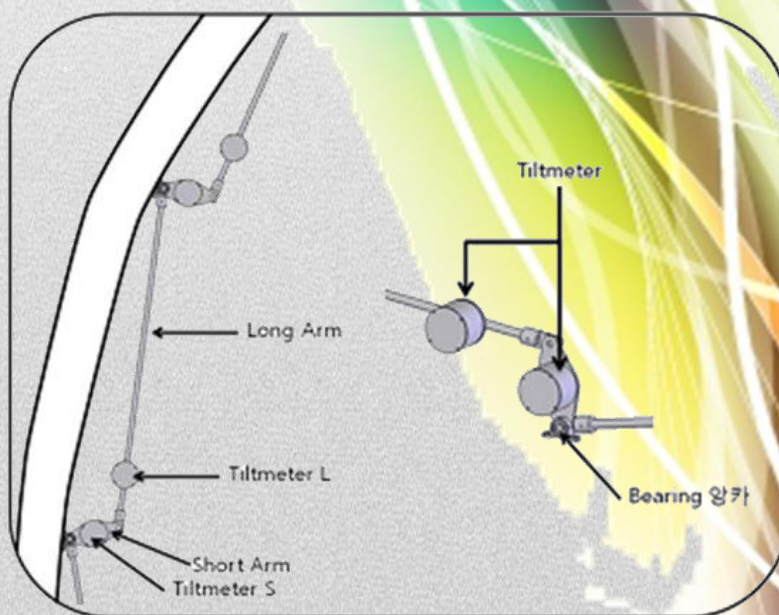
## Feature

- Waterproof and dustproof
- High precision and stability
- Long measurement by strong durability and safety
- Easy connection with automatic measuring equipment



## Specification

Type	Tiltmeter L	Tiltmeter S
Rated Capacity	±5 deg	±5 deg
Resolution	±0.0033 deg	±0.0033 deg
Accuracy	0.1% RO	
Safe Temperature Range	-20 ~ 80°C	
Material	Stainless steel or Aluminum	
Safe Exciting Voltage	5V	
Electrical Connection	6 core Shield	



This meter is laying and water pressure anchor type and measure settlement at the measuring point.

## Feature

- High precision and stability
- Sure installation by water pressure anchor at the measuring point.
- Waterproof and dustproof
- Easy connection with automatic measuring equipment

## Specification

Type	EMS-□
Range	0.5 ~ 5m
Conversion Method	Potentiometer
Settlement type	Water pressure anchor
Non-linearity	1% RO
Safe Temperature Range	-20 ~ 60 °C
Resistance	350 Ω
Safe Exciting Voltage	Less than 5V
Isolation resistance	More than 50 MΩ

This meter is installed by water pressure anchor in the borehole, and installation surface is wide and strong, so this meter is fixed strongly at the installation point and cannot occur to move point of anchor.





This Meter is used measure movements of the around ground for check relaxed zone.

## Feature

- High precision and stability
- Long measurement by strong durability and safety
- Easy connection with automatic measuring equipment

## Specification

Type	AEM-□ L-O
Point	1~6
Rated Capacity	100~1,000mm
Rated Output	Approx. 2~5 mV/V
Non-linearity	1% RO
Safe Temperature Range	0 ~ 60 °C
Resistance	350 Ω
Excitation Recommended	Less than 2V
Safe Exciting Voltage	5V
Electrical Connection	Point 1~3 : Ø12mm, 12Core Shield Point 4~6 : Ø17mm, 24Core Shield

■ □ of MODEL is measuring length. (Customer request size)

■ ○ of MODEL is number of points. (Customer request size )

### ● Installation

1. Bore deeper 1~2m than measurement depth.
2. Put sensor in boring hole and press water pressure anchor by water pressure pump.
3. Fix flange by anchor bolt.
4. Measure the initial value by indicator.

### ● Measurement

5. After Measurement by depth Gauge, substitute measured value for the following formula.

6. Physical volume=(Measured value-Initial value)×f

Initial vlaue : Refer each sensor test report sheet.

f(Compensation coefficient) : Refer each sensor test report sheet.

Ex) Initial Value : 50μ

Measured value : 2500μ

≫ (2500-50)×0.0130=31.85mm



Hydraulic anchor



PROTECTION COVER

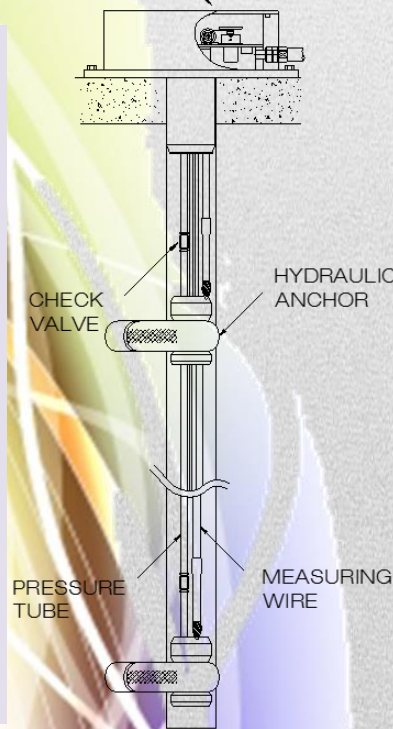


CHECK VALVE

HYDRAULIC ANCHOR

PRESSURE TUBE

MEASURING WIRE



This Meter is used to measure movements of the around ground  
for check relaxed zone.

## Feature

- Long measurement by strong durability and safety
- Precious measurement by water pressure anchor type.

## Specification

Type	WEM-□ L-O
Rated Capacity	Customer optional
Point	Customer optional
Anchor Size	Ø60 X 100mm
Hydraulic Pressure of Anchor Expansion	30 kgf/cm <sup>2</sup>

- □ of model is measuring length. (Customer request size)
- o of mdl is number of points. (Customer request size )

### • Installation

1. Bore deeper 1~2m than measurement depth.
2. Put sensor in boring hole and press water pressure anchor by water pressure pump.
3. Fix flange by anchor bolt.
4. Measure the initial value by depth gauge.

### • Measurement

5. After Measurement by depth Gauge, substitute measured value for the following formula.

6. Physical volume=(Measured value-Initial value)´f

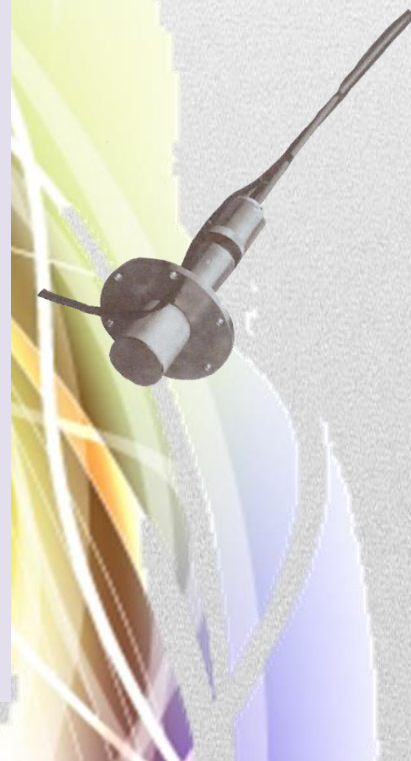
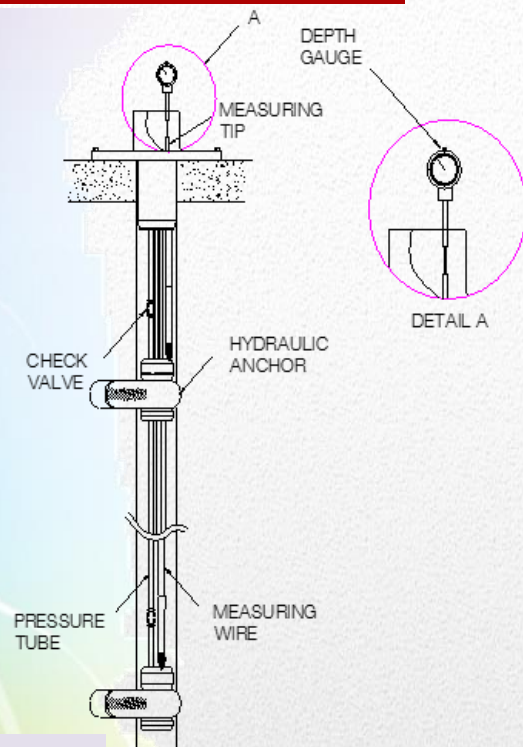
Initial Value : First measure value after installation

Measured Value : Measuring value after initial value

Ex) Initial value : 2.22mm

Measured Value : 2.12

≫ 2.22-2.12=0.10mm





This meter is used to measure deflection of structure as like bridge or sinking of embankment.

## Feature

- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment

## Specification

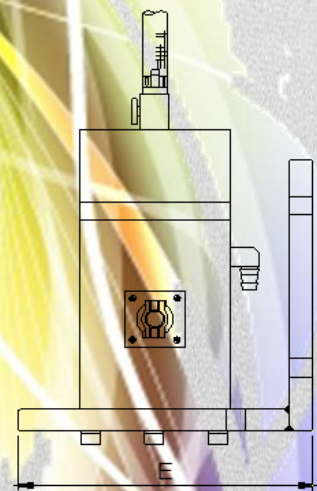
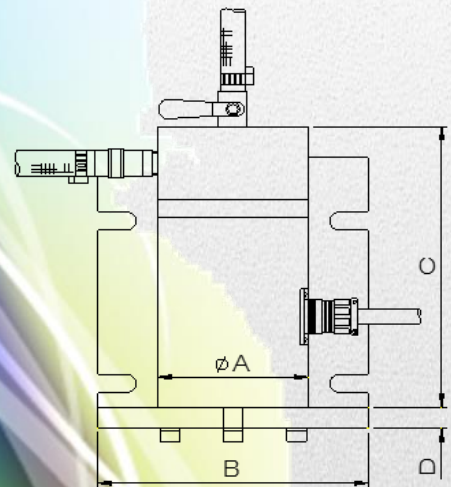
Type	SDT-5V /A	SDT-10 V/A	SDT-20 V/A
<b>Rated Capacity</b>	500mm	1,000mm	2,000mm
<b>Accuracy</b>	$\pm 0.15\%FS(RSS)$		
<b>Thermal Effect On Zero</b>	$\pm 0.03\%FS/^{\circ}C$		
<b>Thermal Effect On Span</b>	$\pm 0.03\%FS/^{\circ}C$		
<b>Compensated Temperature Range</b>	0 ~ 70 $^{\circ}C$		
<b>Safe Temperature Range</b>	-20 ~ 80 $^{\circ}C$		
<b>Safe Exciting Voltage</b>	12 ~ 24VDC		
<b>Output</b>	4~20mA, 1~5VDC		
<b>Electrical Connection</b>	4Core Shield		

\*I SDT-X V : 1~5VDC

\*I SDT-X A : 4~20mA

## Dimension

Type	ØA	B	C	D	E
<b>SDT-5</b>	78	140	155	12	152
<b>SDT-10</b>	78	140	155	12	152
<b>SDT-20</b>	78	140	155	12	152



This meter is used to measure deflection of structure as like bridge or sinking of embankment.

## Feature

- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment

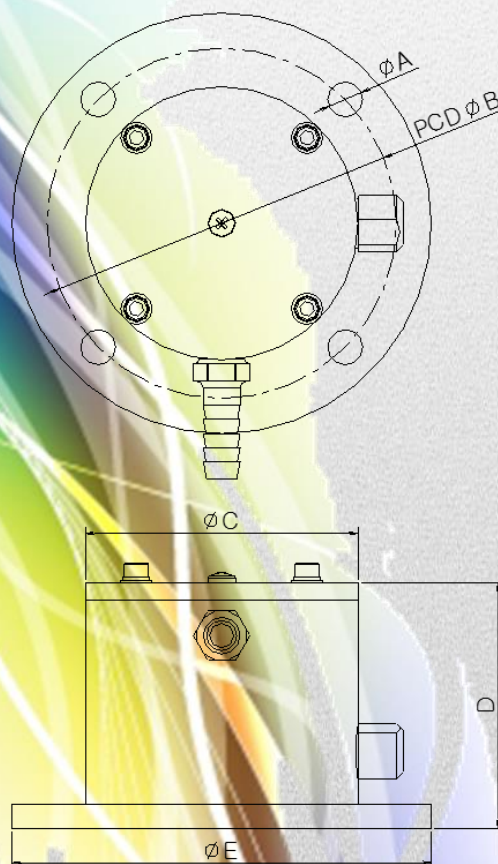


## Specification

Type	RDT-5V /A	RDT-10 V/A	RDT-20 V/A
Rated Capacity	500mm	1,000mm	2,000mm
Accuracy	$\pm 0.15\%FS(RSS)$		
Thermal Effect On Zero	$\pm 0.03\%FS/^{\circ}C$		
Thermal Effect On Span	$\pm 0.03\%FS/^{\circ}C$		
Compensated Temperature Range	0 ~ 70 $^{\circ}C$		
Safe Temperature Range	-20 ~ 80 $^{\circ}C$		
Safe Exciting Voltage	12 ~ 24VDC		
Output	4~20mA, 1~5VDC,		
Electrical Connection	4Core Shield		

## Dimension

Type	ØA	ØB	ØC	D	ØE
RDT	10	100	78	70	120





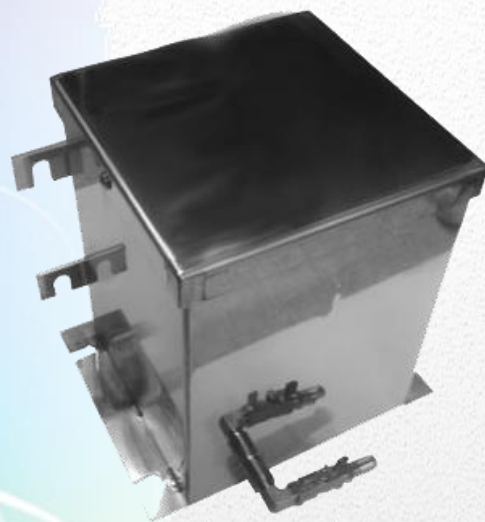
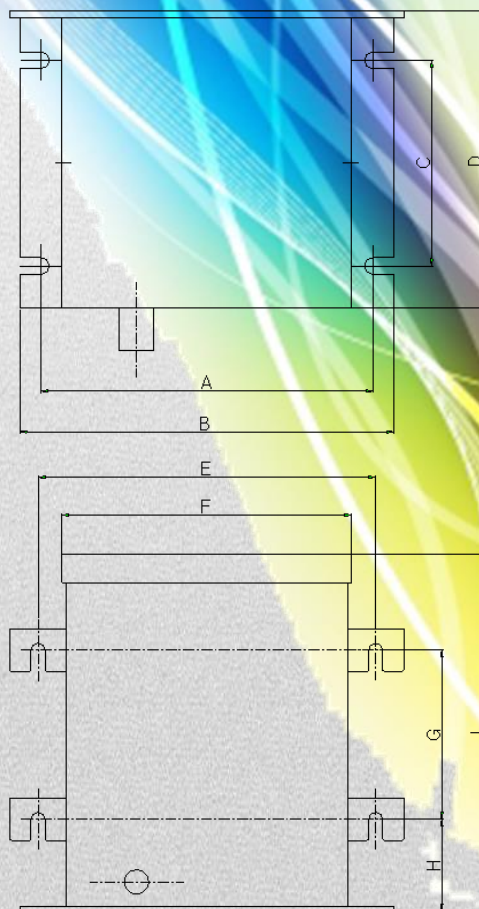
This tank is used to measure deflection of structure as like bridge or sinking of embankment.

## Feature

- Long measurement by strong durability
- Easy installation by small size

## Dimension

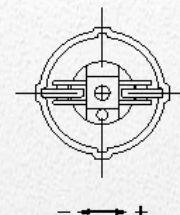
Type	ØA	B	C	D	E
WT	223	266	146	211	240
	F	G	H	I	
	206	120	65	253	



This inclinometer is used for automatic measurement of displacement of the ground or structures, which is connected by several inclinometers in inclinometer protection casing.

## Feature

- Single axial
- Waterproof and dustproof
- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment



## Specification

Type	SMI-5	SMI-10
Rated Capacity	±5 deg	±10 deg
Rated Output	Approx. 1mV/V ( $2,000 \times 10^{-6}$ )	
Non-linearity	1.0% RO	
Hysteresis	1.0% RO	
Safe Temperature Range	-20 ~ 80°C	
Over Load	150%	
Resistance	350Ω	
Safe Exciting Voltage	5V	
Electrical Connection	4Core Shield	

## Dimension

Type	A	ØB	C
SMI-5	220	34	485
SMI-10	220	34	485

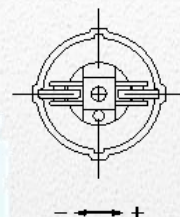




This inclinometer is used for automatic measurement of displacement of the ground or structures, which is connected by several inclinometers in inclinometer protection casing.

## Feature

- Dual axial
- Waterproof and dustproof
- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment



## Specification

Type	DMI-5	DMI-10
Rated Capacity	±5 deg	±10 deg
Rated Output	Approx. 1mV/V ( $2,000 \times 10^{-6}$ )	
Non-linearity	1.0% RO	
Hysteresis	1.0% RO	
Safe Temperature Range	-20 ~ 80°C	
Over Load	150%	
Resistance	350Ω	
Safe Exciting Voltage	5V	
Electrical Connection	4Core Shield	

## Dimension

Type	A	ØB	C
SMI-5	220	34	485
SMI-10	220	34	485



This tiltmeter is installed at structures, retaining and bridge to measure inclination.

## Feature

- Single axial
- Waterproof and dustproof
- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment

## Specification

Type	STM-5	STM-10
Capacity	±5 deg	±10 deg
Rated Output	Approx. 1mV/V ( $2,000 \times 10^{-6}$ )	
Non-linearity	1% RO	
Hysteresis	1% RO	
Temperature Range Allowable	-20 ~ 60°C	
Over Load	150%	
Resistance	350Ω	
Allowable Exc. Voltage	5V	
Electrical Connection	4Core Shield	

## Dimension

Type	A	ØB	C	D	E
STM-5	220	34	133	75	71
STM-10	220	34	133	75	71





This tiltmeter is installed at structures, retaining and bridge to measure inclination.

## Feature

- Dual axial
- Waterproof and dustproof
- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment

## Specification

Type	DTM-5	DTM-10
Capacity	±5 deg	±10 deg
Rated Output	Approx. 1mV/V ( $2,000 \times 10^{-6}$ )	
Non-linearity	1% RO	
Hysteresis	1% RO	
Temperature Range Allowable	-20 ~ 60°C	
Over Load	120%	
Resistance	350Ω	
Allowable Exc. Voltage	5V	
Electrical Connection	8Core Shield	

## Dimension

Type	A	ØB	C	D	E
STM-5	220	34	133	75	71
STM-10	220	34	133	75	71



This tiltmeter is installed at foundation, beam, retaining, tunnel and bridge to measure inclination.

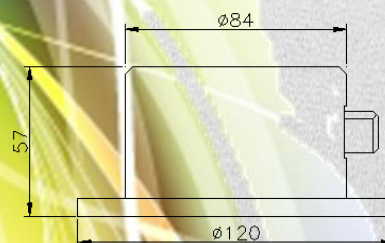
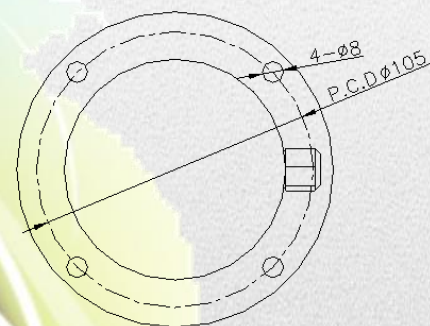
## Feature

- Waterproof and dustproof
- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment



## Specification

Type	ETM-5S (1 axial)	ETM-5D (2 axial)
Capacity	$\pm 5$ deg	
Rated Output	Approx. 1 ~ 4 V	
Non-linearity	1.0% RO	
Temperature Range Allowable	$-20 \sim 80^{\circ}\text{C}$	
Over Load	110%	
Safe Exciting Voltage	5V	
Electrical Connection	4Core Shield	





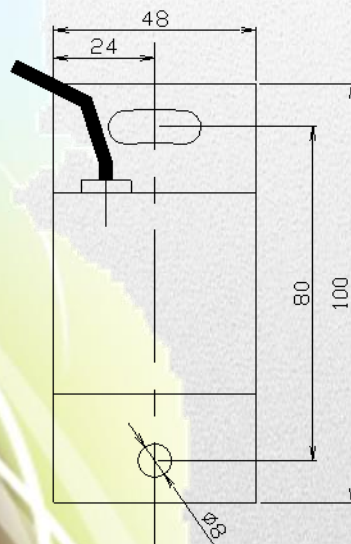
This tiltmeter is installed at foundation, beam, retaining, tunnel and bridge to measure inclination.

## Feature

- Waterproof and dustproof
- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment

## Specification

Type	MTM-5S (1 axial)	MTM-5D (2 axial)
Capacity	±5 deg	
Rated Output	Approx. 1 ~ 4 V	
Non-linearity	1.0% RO	
Temperature Range Allowable	-20 ~ 80°C	
Over Load	110%	
Safe Exciting Voltage	5V	
Electrical Connection	4Core Shield	



This tiltmeter is installed at foundation, beam, retaining, tunnel and bridge to measure inclination.

## Feature

- Electrolyte type
- Waterproof and dustproof
- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy installation by change of jig direction at the wall surface or the ground
- Easy connection with automatic measuring equipment

## Specification

Type	BTM-1 -5S/5D	BTM-2 -5S/5D
Capacity	$\pm 5$ deg	
Rated Output	1 ~ 4 V	
Non-linearity	0.5% RO	
Hysteresis	0.5% RO	
Temperature Range Allowable	$-20 \sim 80^{\circ}\text{C}$	
Over Load	110%	
Current consumption	15mA	
Safe Exciting Voltage	5V DC	
Electrical Connection	4Core Shield	

## Dimension

Type	A	B	C	D
BTM-1-5/5D	1000	920	50	60
BTM-2-5/5D	2000	1920	50	60

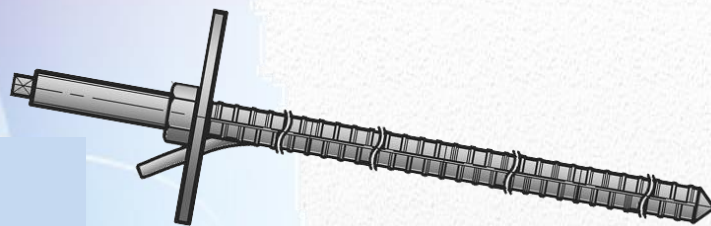




This transducer is to measure axial force so as to estimate whether increase numbers of rock bolt or not, and grasp displacement to estimate length of rock bolt.

## Feature

- Long measurement by strong durability and safety
- Easy installation
- Easy connection with automatic measuring equipment

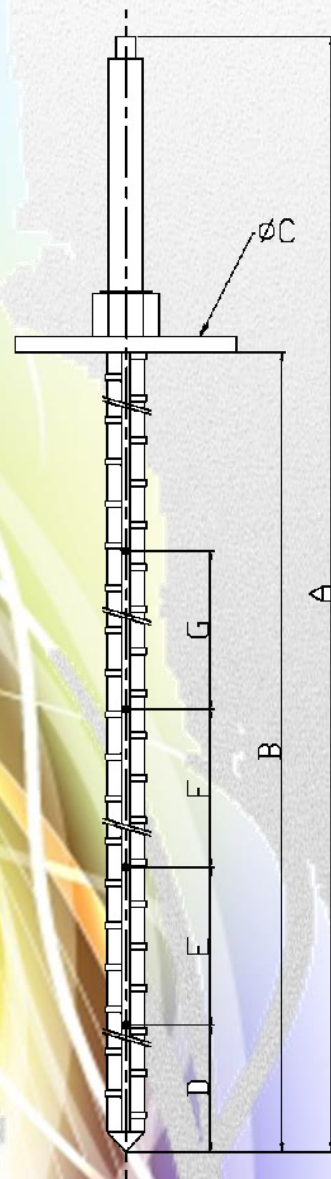


## Specification

Type	RFT-2	RFT-3	RFT-4
No. of measurement	2	3	4
Reinforcing rod	D25		
Breaking point	More than 11tf		
Tensile strength	More than 16tf		
Measurement system	Quarter bridge 3-wire		
In·Output resistance	350Ω		
Safe temperature range	-10 ~ 80℃		
Safe Exciting Voltage	5V		
Electrical Connection	4Core Shield		

## Dimension

Type	A	B	ØC	D	E	F	G
RFT-2	2000	1800	150	500	1000	-	-
RFT-3	3000	2800	150	500	1000	1000	-
RFT-4	4000	3800	150	500	1000	1000	1000



This meter is used to measure the pressed stress of reinforcing bar of ferroconcrete structure.

(Size can be selected according to size of reinforcing bar)

## Feature

- Waterproof and dustproof
- High precision and stability by Electric resistance type
- Long measurement by strong durability and safety
- Easy installation by small size and light weight
- Easy connection with automatic measuring equipment

## Specification

Type	RBS- □ □
Rated Capacity	3,000~3,500 kgf/cm <sup>2</sup>
Rated Output	Approx. 2~2.5mV/V
Non-linearity	1% RO
Hysteresis	1% RO
Safe Temperature Range	-20 ~ 80°C
Over Load	1.5
Resistance	350Ω or 700Ω
Safe Exciting Voltage	10V
Electrical Connection	4Core Shield

## Dimension

Type	A	ØB	ØC
RBS-13	90	45	13
RBS-16	95	48	16
RBS-19	95	51	19
RBS-22	95	54	22
RBS-25	95	57	25
RBS-29	95	61	29
RBS-32	95	64	32





This meter is installed to measure hardened and hardening stress of concrete or plastics,  
and subsidiary materials of steel bridge.

## Feature

- self-compensation of temperature type similar  
coefficient of linear expansion with concrete
- High precision and stability
- available to measure hardening process due to low modulus  
of elasticity



## Specification

Type	SGT-100
Rated Capacity	$\pm 5,000 \times 10^{-6}$
Gauge Length	100
Rated Output	Approx. 2 - 2.5mV/V
Non-linearity	1.0% RO
Temperature Range Range Allowable	-20 ~ 60°C
Over Load	150%
Resistance	350Ω
Electrical Connection	4 Core Shield

## Dimension

Type	A	ØB	ØC	D	E	F
SGT-100	104	20	17	100	4	M3, D.P6



**Weldable Jig**



**Concrete Surface Jig**

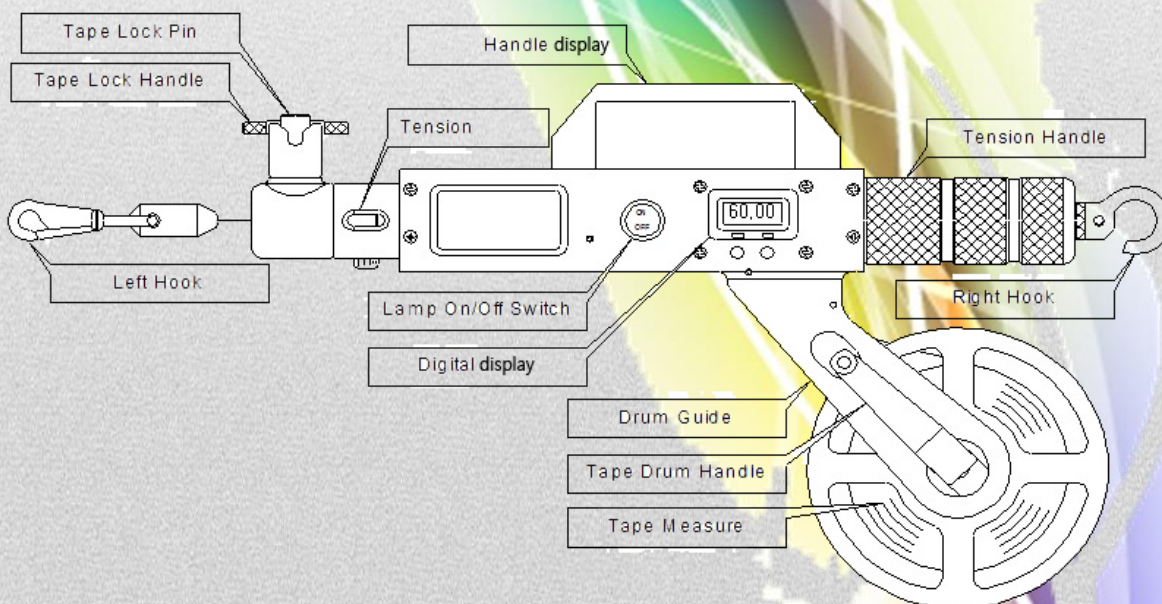
After excavation of mining, This meter is used to estimate final volume of displacement as soon as possible for check of safety and decision of additional lining, and check safety of the first lining by excavation of footwall.

## Feature

- This meter is useful to sense transformation of tunnel wall by measurement of distance between anchors that are installed at the inside of tunnel.
- This meter can monitor transformation of tunnel caused by excavation of underground intensively.
- This meter can measure transformation of structure of retaining wall, supports of bridge and other structures.
- Groutable anchor can be settled at the measuring standard point.
- The inside parts are protected by strong aluminum case and digital displayer has backlight.

## Specification

Type	TMC-20	TMC-30
Rated Capacity	0.6 ~ 20m	0.6 ~ 30m
Resolution Of Display	0.01mm	
Applicable Tension	Approx.130N	
Thermal Coefficient	$11,5 \times 10^{-6}/^{\circ}\text{C}$	
Dimensions	L459×H250×D50mm	





This gauge is used to measure crack displacement on the surface of concrete or structure.

This gauge can be installed easy



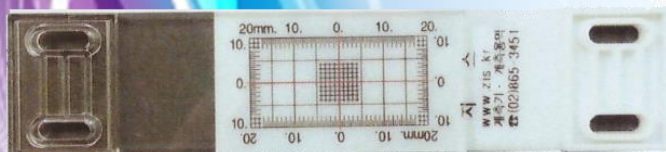
## Feature

- Simple design
- High precision and safety
- Excellent responsibility
- Easy installation and control

## Specification

Type	SCG-5
Gauge Length (Span)	100mm
Capacity	±5mm
Rated output	Approx. 2.5mV/V
Sensitivity(X $10^{-6}$ Strain/mm)	Approx. 1,000
Non-linearity	1% RO
Temperature Range allowable	0 ~40°C
Resistance	350 $\Omega$
Recommended excitation voltage	Less than 2V
Electrical connection	4 Core shield

This meter is used to measure crack that need not high precise measurement. This crack meter can be installed easy and check crack by naked eye.



## Specification

Type	CM-100
Measurement Range	1 ~ 30kgf/cm <sup>2</sup>
Resolution	1 mm
Dimension	32 X 102 X 5 mm
Installation	Bolt or epoxy



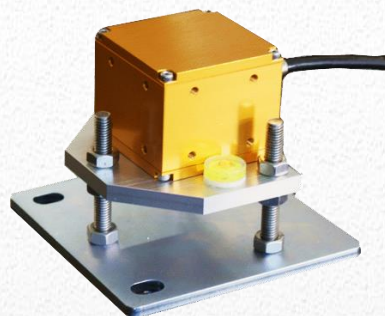


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## Feature

- High precision and accuracy tilt meter
- Built to different specifications
- Applicable to bridges, special structures, vessel subway and factory facilities, etc.
- Suitable for intended use before requiring.



## General Specification

Item	Specification	Unit	Remarks
Axis	Single(X)/Dual(X,Y)		
Response Time	< 0.5	sec	
Power	24	Vdc	mA-output
	12	Vdc	Vdc-output
Operating temperature	-40 to 125	°C	Max.
	-25 to 85	°C	Typical
Water proof grade	IP65		
Dimension	W65 X D65 X H55	mm	

## Specification for each types

## 1) High Resolution of Ceramic Type

[illegible]

## 2) High Resolution of MEMS Type

<b>Item</b>	<b>Specification</b>	<b>Unit</b>	<b>Remarks</b>
<b>Measuring Range</b>	$\pm 3 / \pm 5 / \pm 10 / \pm 15$	degree	
<b>Resolution</b>	< 1/1000	degree	
<b>Accuracy</b>	< 1/1000	degree	mA-output
<b>Non-Linearity</b>	< 3	%	Max.
<b>Output</b>	Analog (mA / Diff. Vdc)		FS
<b>Ordering Code</b>	Cube-□ - □ - □ - □ - M		



## 3) Medium Resolution of MEMS

Item	Specification	Unit	Remarks
Measuring Range	$\pm 10 / \pm 15 / \pm 30$	degree	
Resolution	$< 1/100$	degree	
Non-Linearity	$< 0.38$	%	FS
Output	Analog (mA / Diff. Vdc)		
Ordering Code	Cube-□-□-□-□- M		

## 3) Low Resolution of MEMS Type for RS485

Item	Specification	Unit	Remarks
Measuring Range	$\pm 180$	degree	
Resolution	$< 1/100$	degree	
Accuracy	$< 1/10$	degree	
Non-Linearity	$< 0.25$	%	Max.
Response Time	$< 0.08$	sec	
Output	RS485		
Power(only for low resolution)	101 to 30	Vdc	

### Ordering Code

CUBE

#### Axial type

S = Single Axis

D = Dual Axis

#### Output type

MA = Analog : mA

MV = Analog : Vdc

485 = RS485

#### Range type

0.5 =  $\pm 0.5^\circ$

1 =  $\pm 1^\circ$

3 =  $\pm 3^\circ$

5 =  $\pm 5^\circ$

10 =  $\pm 10^\circ$

15 =  $\pm 15^\circ$

#### Sensor type

C = Ceramic

M = Mems

#### Mounting type

W = Wall Mount

F = Floor Mount

#### Option

EL = EL-Beam

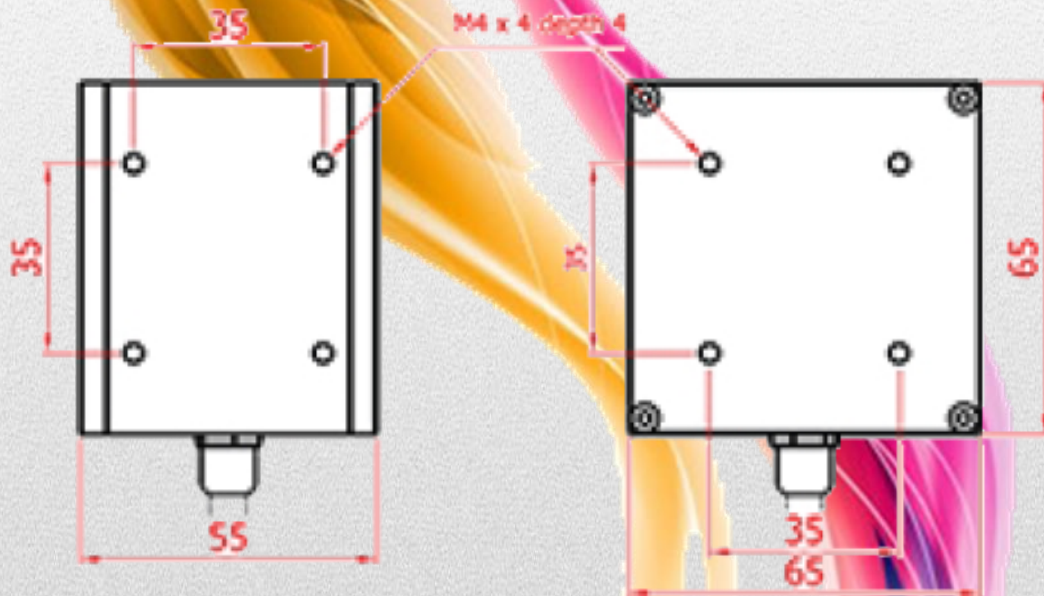
Jig = Tripod

## Wiring Connection



Wire No.	mA/Vdc	Diff. Vdc	RS485
Red	V+	V+	V+
Black	GND	GND	GND
Green	X-Out	X-Out[Hi]	485-B(N)
White		[Low]	485-A(P)
Blue		Y-Out[Hi]	
Purple		[Low]	

## Dimension

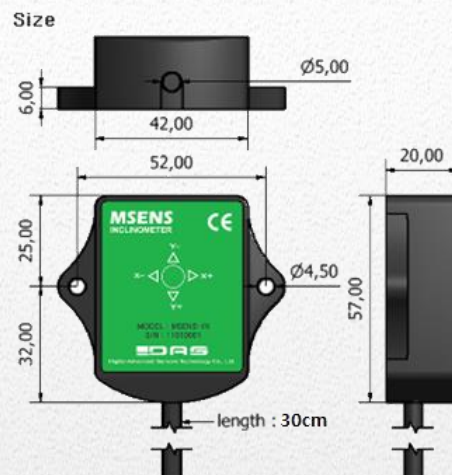




MEMS-based tilt sensor and output within  $\pm 180^\circ$  angle can be set. In addition, Microprocessor mounted for temperature compensation, filtering, noise reduction and extended Kalman filter is applied. MSENS-IN is a leading tilt sensors by height performance and affordable price

## Feature

- 1 or 2-Axis inclinometer based on MEMS applied the Extended Kalman Filter
- The settable angle output ( $\pm 180^\circ$ )
- Microprocessor for Temp. drift fitting, noise, calibration
- High performance, economical price
- Designed to be resistant to noise by the inner shield
- The function to set the output mode
- Easy to use output (4~20mA or 0~5Vdc, only 1-axis)
- RS485 data output
- Wide range input power (10~30Vdc)



## Specification

Description	Specification	Unit	Remark
<b>Range (Deg)</b>	$\pm 180$	$^\circ$	Settable
<b>Axial</b>	1 or 2		X, Y
<b>Resolution(Deg)</b>	0.1	$^\circ$	
<b>Non-linearity</b>	0.25	%(FS)	
<b>Response time</b>	<0.08	Sec	Max.
<b>Output(Digital)</b>	RS485		Max. 1.2Km
<b>Output(Analog)</b>	mA/mV		Max. 1.2Km
<b>Input</b>	12	Vdc	10 ~ 30V
<b>Operating temp.</b>	-25 ~ 85	$^\circ\text{C}$	
<b>Waterproof</b>	IP65		
<b>Weight</b>	68	g	Approx.

**Ordering number format**

**MSENS -IN - □ - □□ - □□ - □ - □**

S/D(single or Dual) □

MV/MA/485 (Voltage or Current or 485)

10/30/60/90/180(Degree)

Signal increasing(CW, CCW)

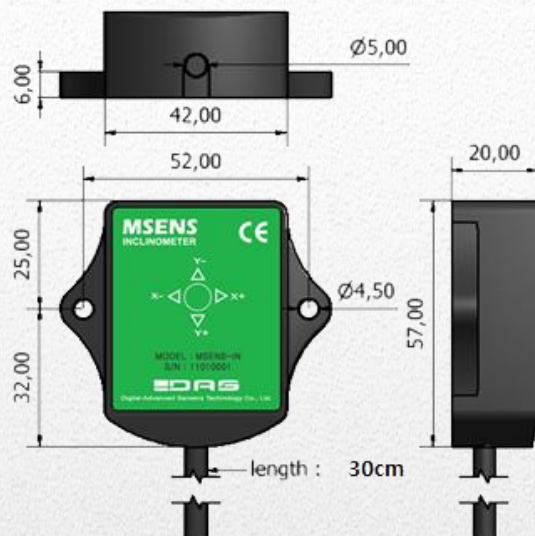
Mount(W : Wall , F : Floor)

Ex) MSENS - IN - S - MV - 90 - W - CW

MEMS-based tilt sensor and output within 0 - 360 ° angle can be set. In addition, Microprocessor mounted for temperature compensation, filtering, noise reduction and extended Kalman filter is applied. MSENS-IN is a leading tilt sensors by high performance and affordable price.

## Feature

- 1 or 2-Axis inclinometer based on MEMS applied the Extended Kalman Filter
- Microprocessor for Temp. drift fitting, noise, calibration
- High performance, economical price
- Designed to be resistant to noise by the inner shield
- The function to set the output mode
- Easy to use output (4~20mA or 0~5Vdc, only 1-axis)
- RS485 data output
- Wide range input power (10~30Vdc)



## Specification

Description	Sepecification	Unit	Remark
<b>Range (Deg)</b>	360	°	Settable
<b>Resolution(Deg)</b>	0.1	°	
<b>Non-linearity</b>	0.25	%(FS)	
<b>Response time</b>	<0.08	Sec	Max.
<b>Output(Digital)</b>	RS485		Max. 1.2Km
<b>Output(Analog)</b>	mA/mV		
<b>Input</b>	12	Vdc	10 ~ 30V
<b>Operating temp.</b>	-20 ~ 85	°C	
<b>Waterproof</b>	IP65		
<b>Weight</b>	68	g	Approx.
<b>Current</b>	<60	mA	at 12Vdc

## Ordering number format

**MSENS -IN - 360 - □ □ - □ - □**

MV : Analg mV output 0.5~4.5V

MA : Analog mA output 4~20mA

485 : Digital output RS-485

□ CW : Signal increasing CW

□ CCW : Signal increasing CCW

□ F/W : Floor mount / Wall mount



MEMS type tilt module, output 0.5 ~ 4.5Vdc and +5 Vdc input is exported. Very simple to use and is used in various fields.

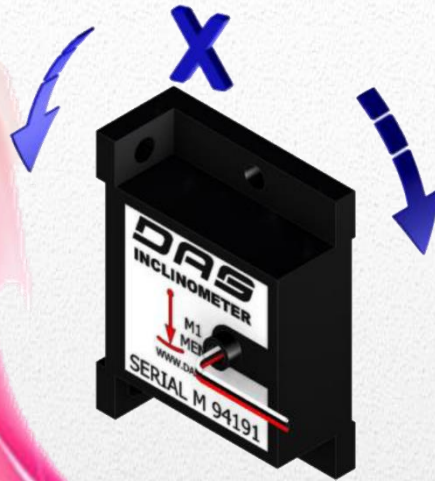
Typical automotive wheel alignment correct application attitude control equipment or heavy equipment, etc. are used.

## Feature

- Built-in Microprocessor
- Small Size of 28X12X31mm
- High Precision
- Light Weight of 13g

## Application

- Hwileolrain Entertainment
- Construction Equipment
- Antenna Position Correction System
- Solar Tracker

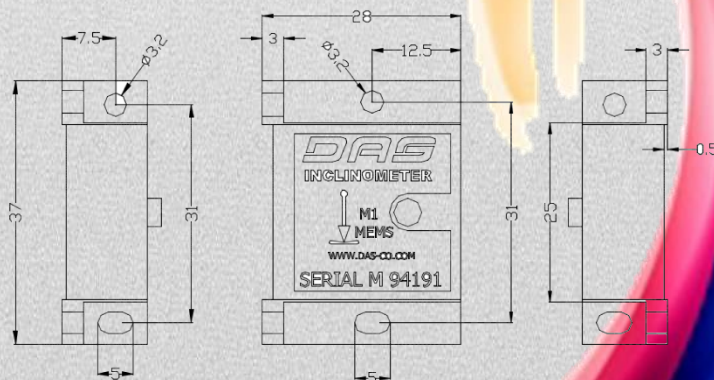


## Specification

Model	M1
Range	±30
Resolution(Deg)	<0.005
Response time	<0.3 second
Output	0.5~4.5Vdc
Power	5VDC
Zero offset	2.5±0.1V
Operating Temp.	-40 ~ 85°C
Sensitivity Temp	-30...+85°C, ±0.014°
Cable	30cm / Molex

## Sensitivity

Tilt Angle	Straight line conversion error
0°	0
1°	0.0027
2°	0.0058
3°	0.0094
4°	0.0014
5°	0.0198
10°	0.0787
15°	0.2185
30°	1.668



SA1N is built- in micro processor and the newest Mems technology is applied.

Specially this sensor is single axial and very small size and low price.

## Feature

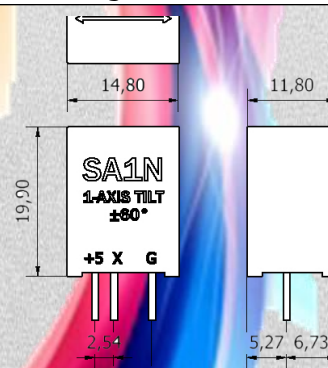
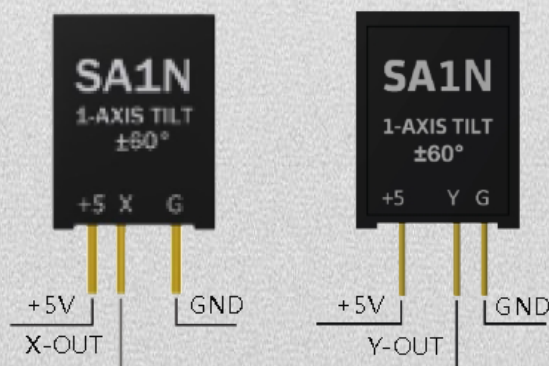
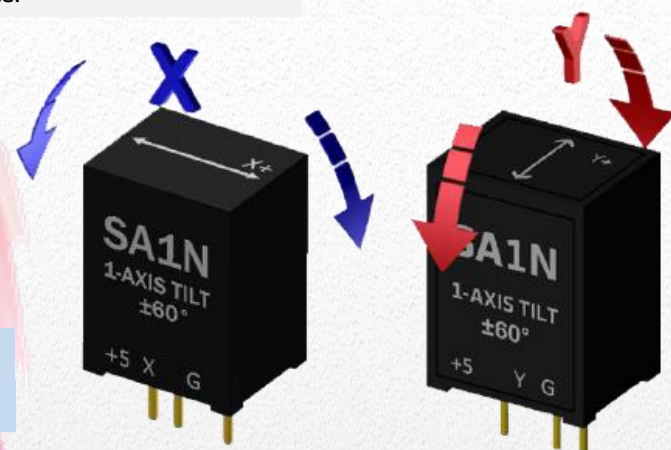
- MEMS techology
- Small Size of 15×12X20mm
- High strength PC ABS case
- Light Weight of 10g

## Application

- Robot
- Solar pannel and tracking
- Various control
- Other Motion Detection

## Specification

Model	SA1N		
Range(Deg)	$\pm 30^{\circ}$	$\pm 60^{\circ}$	$\pm 90^{\circ}$
Resolution(Deg)	<0.1		
Non-linearity	<3% FS		
Transverse sensitivity	<0.5% at $\pm 60^{\circ}$ tilt		
Response time	<0.1 second		
Temp. drift	0.1%/°C		
Output impedance	10kOhm		
Power supply	5VDC		
Output	0.5 - 4.5 Vdc		
Power consumption	<10mA		
Operating Temp.	$-30 \sim 80^{\circ}\text{C}$		
Storage Temp.	$-45 \sim 120^{\circ}\text{C}$		
Zero offset	$2.5 \pm 0.1$ Volt		
Weight	10g		





SA2 is built- in micro processor and the newest MEMS technology is applied.

Specially this sensor is single axial and very small size and low price.

## Feature

- MEMS techology
- Small Size of 15×12X20mm
- High strength PC ABS case
- Light Weight of 10g

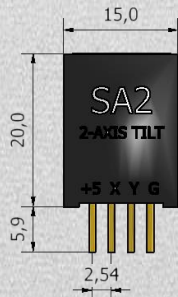
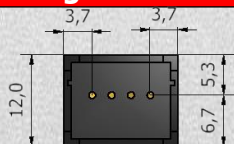
## Application

- Robot
- Solar panel and tracking
- Various control
- Other Motion Detection



## Specification

Model	SA2		
Range(Deg)	$\pm 30^\circ$	$\pm 60^\circ$	$\pm 90^\circ$
Resolution(Deg)	<0.1		
Non-linearity	<1% FS		
Transverse sensitivity	<0.5% at $\pm 60^\circ$ tilt		
Response time	<0.1 second		
Temp. drift	0.1%/°C		
Output impedance	10kOhm		
Power supply	5VDC		
Output	0.5 - 4.5 Vdc		
Power consumption	<10mA		
Zero offset	2.5±0.1 Volt		
Operating Temp.	-30 ~ 80°C		
Dimesion	W 15 X D 12 X H 19 mm		
Weight	10g		



MEMS-based and extended Kalman filter is applied to the 1,2-axis tilt sensor and alarm output is within  $\pm 90^\circ$  angle can be set. In addition, This sensor is high performance and economic price by mounting Microprocessor for temperature compensation, filtering and noise reduction.

## Feature

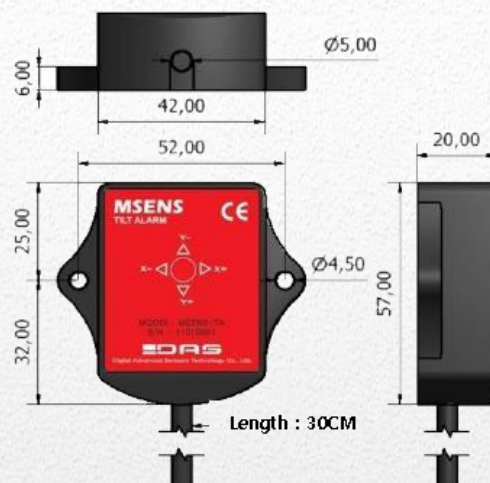
- Shielded internal shielding designed to drop through the noise
- Within  $0.1^\circ$  a stable drift is detected
- 2 built-in one 1A output relay
- Various output mode setting feature
- Powerful built-in surge protection circuit
- 10~30Vdc input power for a wide range

## Application

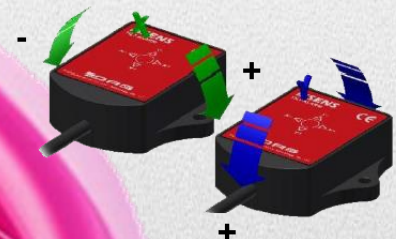
- Bench heights
- Tower Crane
- Fire engine
- Lifter
- Agricultural
- Pesticide sprayer

## Specification

Description	Specification	Unit	Remark
Range (Deg)	$\pm 90$	$^\circ$	Settable
Axial	1 or 2		X, Y
Resolution(Deg)	0.1	$^\circ$	
Off delay	2	Sec	Reset
On delay	2	Sec	Trigger
Output	2 Relay		1A
Input	10 ~ 30	Vdc	
Current	<150	mA	at 12Vdc
Turn-on time	<50	ms	
Waterproof	IP65		
Operating Temp.	-20 ~ +85	$^\circ\text{C}$	
Weight	68	g	Approx.
Cable	5P		Shield cable



## Direction



## Connection



## Ordering number format

**MSENS-TA**    - □    - □    - □    - □  
 S/D(single or Dual)    \_\_\_\_\_  
 H / L (Active output hight(V+) / Active output hight(0V))    \_\_\_\_\_  
 3/5/10/15/30 (Degree)    \_\_\_\_\_  
 W : Wall mount  
 F : Floor mount



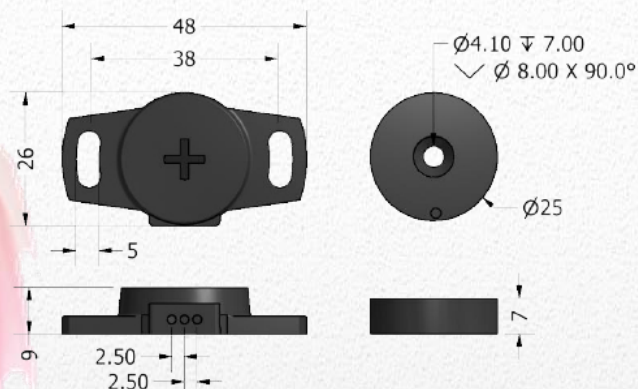
Contactless magnetic angle sensor in the way of the absolute rotating angle can be measured with high precision sensors.  
The main applications of construction machinery, medical equipment, servo motor can be applied to the rotor.

## Feature

- Very long life and compact design
- Drift stable detection within 0.1°
- Built-in powerfull surge protection circuit
- Wide range of 10 ~ 30 Vdc input power
- High-strength plastic metal case
- Dual output (option)

## Specification

Description	Specification	Unit	Remark
Range (Deg)	0 ~ 360	°	
Resolution(Deg)	0.1	°	
Linearity	±1	%	FS
Mechanical range	360	°	Continuous
Mechanical life	Infinite		
Electrical life	10	year	
Input power	10 ~ 30	Vdc	
Current consumption	<15	mA	at 12Vdc
Waterproof	IP68		
Operating Temp.	-20 ~ +85	°C	
Weight	28	g	Approx.
Dimensions	48 X 28 X 8	mm	
Cable	4	p	L=1500mm



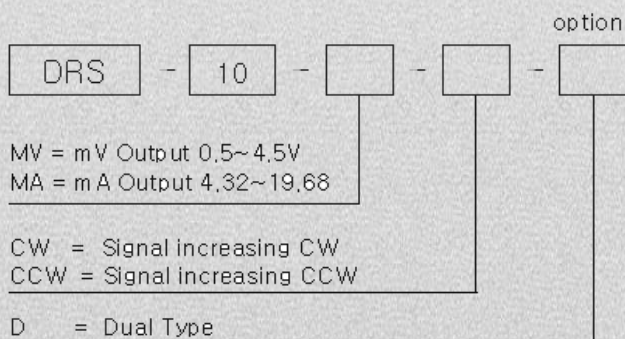
## Direction



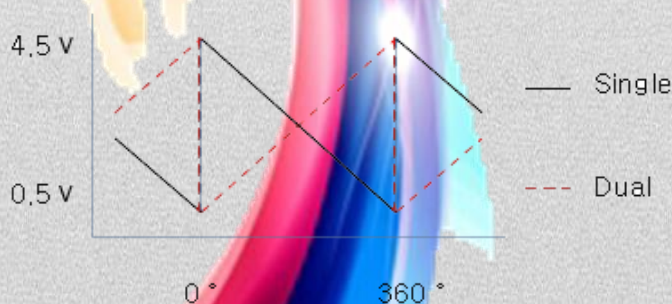
## Connection



## Ordering number format



## Output



UWT2 is 1 axis 360° tilt sensor and applied MEMS-based extended Kalman filter. And Microprocessor is applied for compensation of temperature, filtering and removal of noise. And UWT2 is protected from water and shock by stainless case.

## Feature

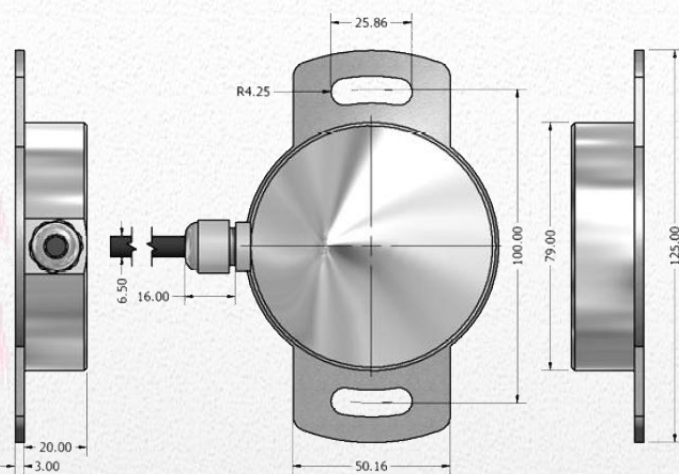
- High precision to 0.1°
- Available to set tilt direction and various setup
- Available to select various output (mV, mA, RS-485)
- Wide input power (10-30Vdc)
- Strong structure by stainless case

## Application

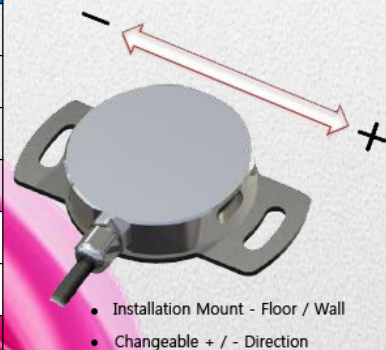
- Bridge post
- Floodgate tilt measurement
- Safety monitoring for under water structure

## Specification

Items	Specification	Unit	Remark
<b>Range (Deg)</b>	±360	°	Settable
<b>Resolution(Deg)</b>	0.1	°	
<b>Linearity</b>	<0.2	%FS	
<b>Response time</b>	<0.08	Sec	
<b>Output(Digital)</b>	RS-485	Vdc	Max. 12km
<b>Output(Analog)</b>	mV or mA	Vdc	Selectable
<b>Storage Temp.</b>	-40 ~ +110	°C	
<b>Shock</b>	10,000	g	g for 0.1ms
<b>Input power</b>	12	Vdc	10 - 30 Vdc
<b>Current</b>	50	mA	
<b>Weight</b>	68	g	Approx.
<b>Case</b>	Stainless Steel, IP67		
<b>Cable</b>	PU 4C, 1.5M		
<b>Dimension</b>	24 X 50 X 30 mm		



## Direction



## Wiring

Red	: +10 ~30 Vdc
Green	: 485 +
White	: mV/mA out, 485 -
Black	: GND

## Ordering number format

**UWT2**    - ☐    - ☐    - ☐    - ☐    W : Wall mount  
 S/D(single or Dual)    \_\_\_\_\_    F : Floor mount  
 MV / MA (analog mV output / (analog 4 - 20 mA output)) \_\_\_\_\_  
 3/5/10/15/30 (Degree)    \_\_\_\_\_



Extended Kalman filter is applied and ultra-high-precision MEMS-based gyro sensor suitable for heavy-duty environment is very harsh optimized to 0.5 ° / h bias stability of less than superlative and RS-232, 4 ~ 20mA, 0 ~ 5Vdc output of type can be selected.

## Feature

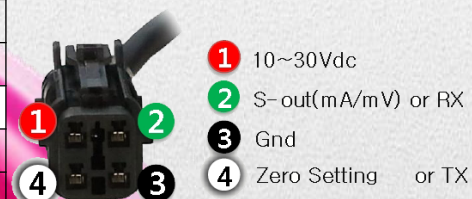
- High precision gyro sensor based on MEMS
- Excellent protection for vibration and impact
- Low bias drift
- Low noise
- Continuous self-diagnostics
- Output of Yaw angle
- Highest bias stability less than 0.5°/h
- Various output : RS-232  
5.6~18.4mA, 0~5Vdc

## Specification

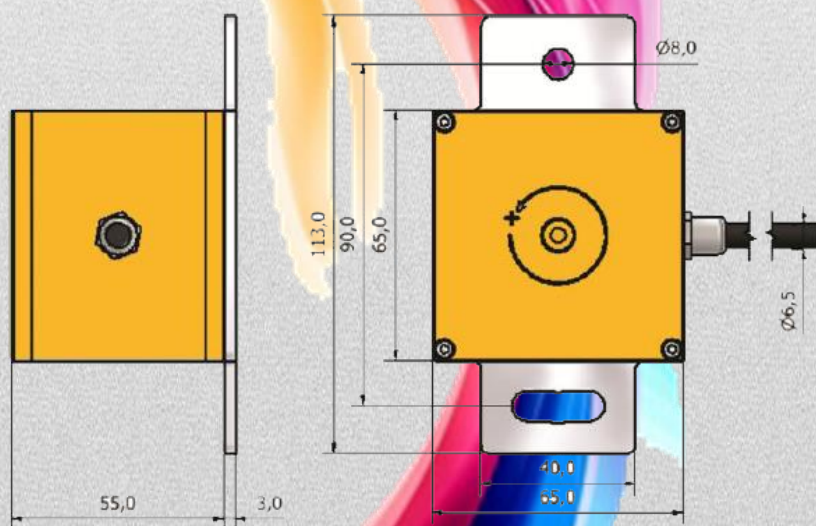
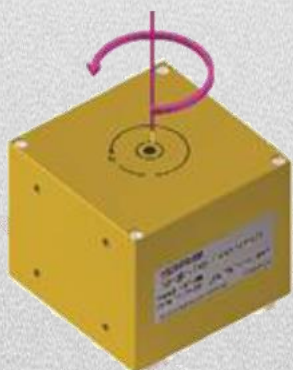
Description	Specification	Unit	Remark
<b>Range</b>	±360	°	
<b>Operating Range</b>	±100	°/s	
<b>Output (mA)</b>	5.6 ~ 18.4	mA	12mA at 0°
<b>Output (mV)</b>	0.5 ~ 4.5	Vdc	2.5V at 0°
<b>Operating Temp.</b>	-4 ~ +85	°C	
<b>Input power</b>	10 ~ 30	Vdc	
<b>Current consumption</b>	100	mA	
<b>Start-up time</b>	1	s	
<b>Sampling Frequency</b>	2000	SPS	Normal
<b>Mechanical shock</b>	3000	g	
<b>In-run bias instability</b>	<0.5	°/h	
<b>Angular random walk</b>	<0.45	°/√h	
<b>Weight</b>	550	g	
<b>Dimensions</b>	65 X 65 X 55	mm	



## Connection



## Axis direction



\* If over 360°, increase from -360°

\* If over -360°, increase from 360°

Extended Kalman filter is applied to MEMS-based 3-axis gyro sensor mounted Microprocessor converts the angle value output by the angular velocity or angular velocity that can be output as a value product. RS-485 output and an output shaft only analog (mA/mV) output.

## Feature

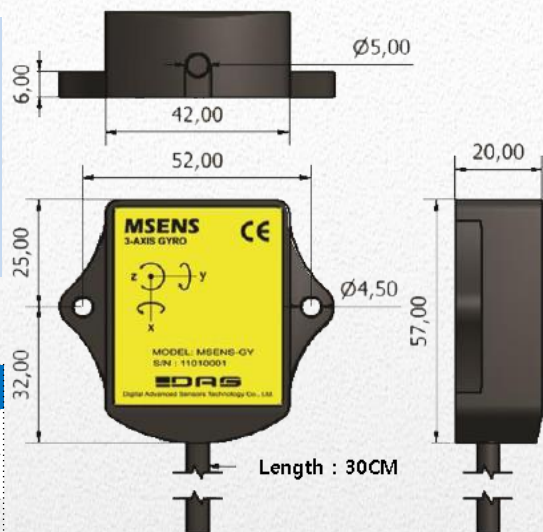
- Built-in shield for low noise
- Highest bias less than 12°/h
- setup function for motion sensing
- Selectable in mV or mA (1 axis selection)
- Various RS485 output (Pitch, Roll, Yaw)
- Wide range of 10 ~30 Vdc input power

## Application

- Bench heights
- Crawler drill
- Tower Crane
- Agricultural
- Medical Equipment

## Specification

Description	Specification	Unit	Remark
<b>Range</b>	±180	°	Pitch, Roll, Yaw
<b>Sensing Speed Range</b>	±250 ~ 2000	°/s	Pitch, Roll, Yaw
<b>Start-up time</b>	2	s	
<b>Digital out data rate</b>	100	Hz	Normal
<b>In-run bias instability</b>	<12	°/h	
<b>Angular random walk</b>	<3	°/√h	
<b>Mechanical shock</b>	10,000	g	g for 0.1ms
<b>Output(Digital)</b>	RS-485	Vdc	
<b>Output(Analog)</b>	mV or mA	Vdc	2.5V at 0°
<b>Operating Temp.</b>	-40 ~ +85	°C	
<b>Input power</b>	10 ~ 30	Vdc	10 ~ 30V
<b>Current consumption</b>	60	mA	
<b>Weight</b>	68	g	



Axis direction



## Ordering number format

## Connection



- 1 10~30Vdc
- 2 S-out(mA/mV) or 485-A(P)
- 3 GND
- 4 Tigger or 485-B(N)

MSENS	GY			
X	=	ANALOG OUT	X AXIS	
Y	=	"	Y AXIS	
Z	=	"	Z AXIS	
YAW	=	ONLY	YAW	
mv	=	Analog mv output	0.5~4.5V	
ma	=	Analog ma output	4.32~19.68	
485	=	Digital output	RS-485	
1	=	±250 DPS		
2	=	±500 DPS		
3	=	±2000 DPS		





# MEMS Type Accelerometer (GSENS-AC)

JooShin  
Corporation

## Feature

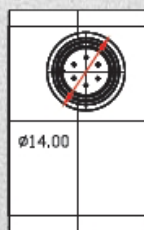
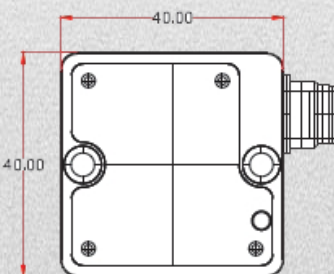
- High-Performance MEMS Accelerometer for analysis vibration
- Ultra -Low\_ Nois analog output
- High\_Frequency responses provided
- High-Performace with Economy-price



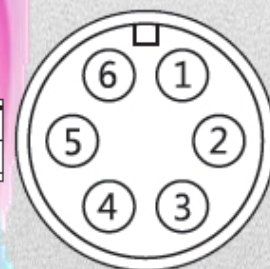
## Specification

Description	Specification	Unit	Remark
Range	$\pm 2, \pm 6, \pm 12$	g	Variable Selection
Zero drift	$\pm 0.1$	mg/°C	0°C to 70°C
Sensitivity	1,000	mV/g	$\pm 2g$
	333	mV/g	$\pm 6g$
	166	mV/g	$\pm 12g$
Output Voltage	0.35 to 4.5	Voltage	0g=2.5V
Transverse Sensitivity	$\pm 3.5$	%	
Linearity Error	$\pm 0.5$	% Span	typical
Temperature Error	$\pm 1$	% Span	typical
Frequency	400(DC)	Hz	-3dB LP
Operating Temp.	-20 ~ +85	°C	
Storage Temp.	-40 ~ +110	°C	
Power	12	Vdc	9.6 to 16 Vdc
Current Drain	10	mA	Maximum
Dimension	W40 X D40 X H24	mm	
Weight	68	gram	Approx.

## Dimensions



## Connector



## Wiring Connection

Axis	1	2	3	4	5	6
Z-Axis	V+	Z1-Out	GND	nc	nc	nc
Dual Z-Axis	V+	Z1-Out	GND	V+	Z2-Out	GND
X,Y -Axis	V+	X-Out	Y-Out	GND	nc	nc

AT100 has high efficiency tilt meter and indicator. Usually At100 is used for earth drill and monkey engine, and is designed to endure coarse site as like shock and dust. And AT100 is designed also to be strong change of temperature and weather in construction site.

## Feature

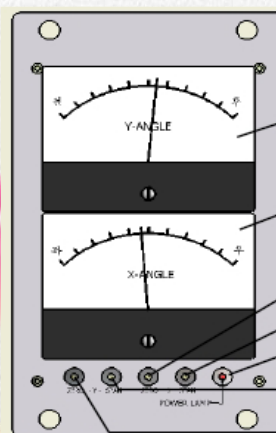
- High efficiency tilt meter for earth drill and indicator
- Protection circuit for inverse voltage
- Dual axial sensor, analog display, data cable, power cable
- Offset/span setting, anti-vibration and waterproof structure



## Specification

Description	Tiltmeter	Indicator
Range (deg)	±5 ( X axi, Y axi)	±5 ( X axi, Y axi)
Resolution (deg)	0.00025	0.5 deg / div
Operating voltage	9 - 30 Vdc	17 - 30 Vdc
Operating current	-	50mA
Output	4 - 20mA	Analog display
Operating Temp.	-40 ~ +80℃	
Cable lenmgth	12M	6M
Weight	1200g	
Dimension	87(W)*87(D)*104(H)	110(W)*190(D)*70(H)

## Indicator



Y axis. meter

X axis, meter

Y axis gain VR

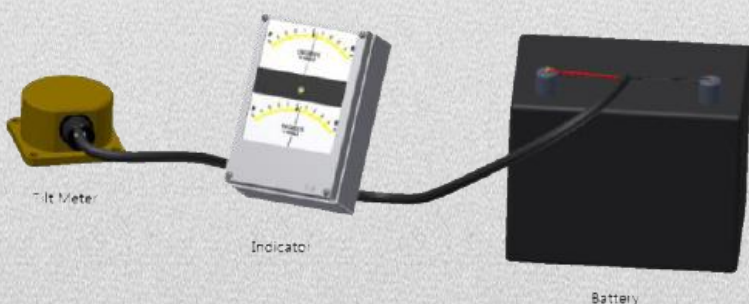
Y axis zero VR

Power Lamp

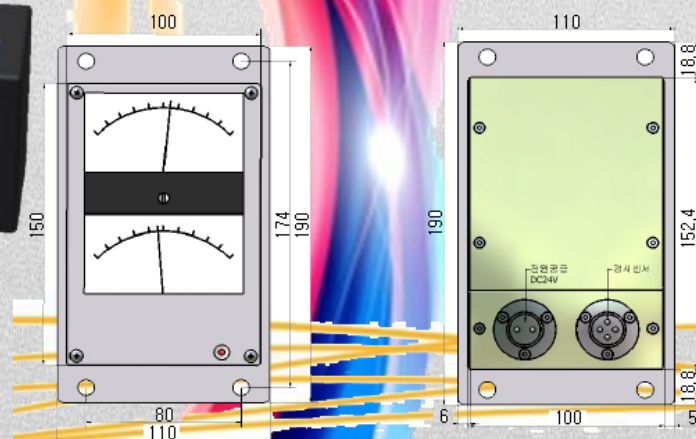
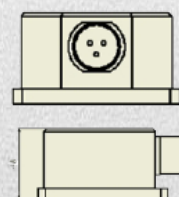
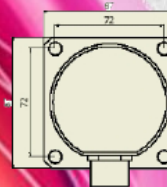
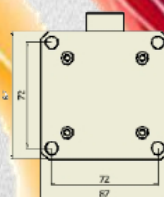
X axis gain VR

Y axis zero VR

## Wiring



## Dimension





Inclination angle and the horizontal level measurement, precision electronic inclination angle of the sensor system is built. The measuring range is  $\pm 15^\circ$  adoption of liquid crystal display system. Has been designed with low power consumption. It also can be charged via USB on your PC and portable recommended.

## Feature

- Built-in precision electronic tilt sensor
- LCD method display Low power consumption design
- High-strength precision aluminum processing case



## Application

- Retaining angle measurement
- Platform leveling
- Antenna position appointed
- Pitch and roll monitoring
- Vehicle tilt monitoring

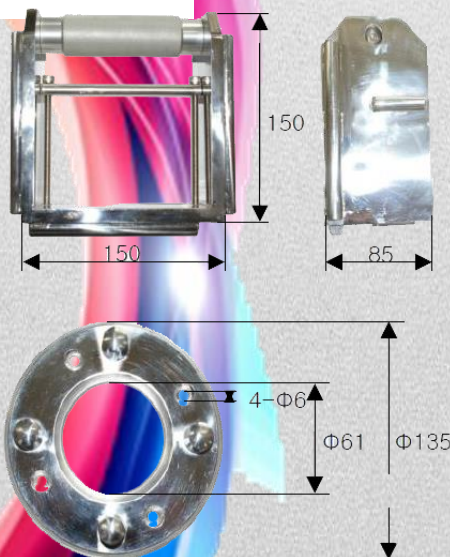
## Specification

Model	Sepecification
Range (Deg)	$\pm 15^\circ$
Resolution(Deg)	$\pm 0.0013^\circ$
Panel Display	0.01° (0.01 mm)
Cross Axis Error	< 1% up to $15^\circ$ cross axis angle
Voltage supply	Chargeable Lithium (500mAh, 3.7V) battery
Battery life	approx. 150 hours
Operating temp.	0~ 65°C
Weight	300 g

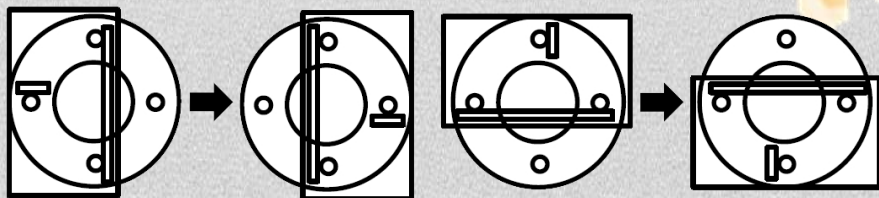
## Dimension



## Jig Dimension



## Measure



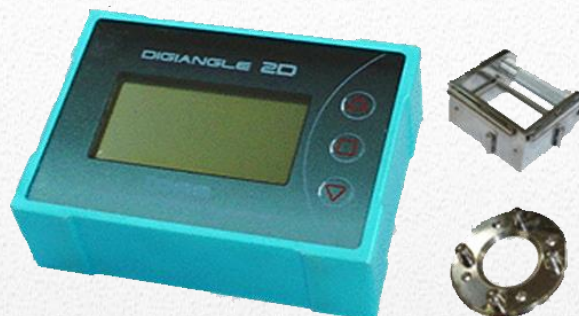
Measuring the slope angle and the horizontal level. Built-in tilt sensor is an electronic precision inclinometer. The measuring range is  $\pm 30^\circ$  display and dual axial and dopted LCD, and has been designed with low power consumption. It also can be charged via USB on your PC and portable recommended.

## Feature

- Built-in precision electronic tilt sensor
- LCD method display Low power consumption design
- High-strength precision aluminum processing case

## Application

- Retaining angle measurement
- Pitch and roll monitoring
- Platform leveling
- Vehicle tilt monitoring
- Antenna position appointed



## Specification

Model	Specification
Range (Deg)	$\pm 30^\circ$
Resolution(Deg)	$\pm 0.035^\circ$
Axis	Dual axis
Panel Display	0.01°
Cross Axis Error	< 1% up to 15° cross axis angle
Voltage supply	Chargeable Lithium (500mAh, 3.7V) battery
Battery life	approx. 150 hours
Operating temp.	0~ 65°C
Weight	300 g

## Accessories



## Dimension



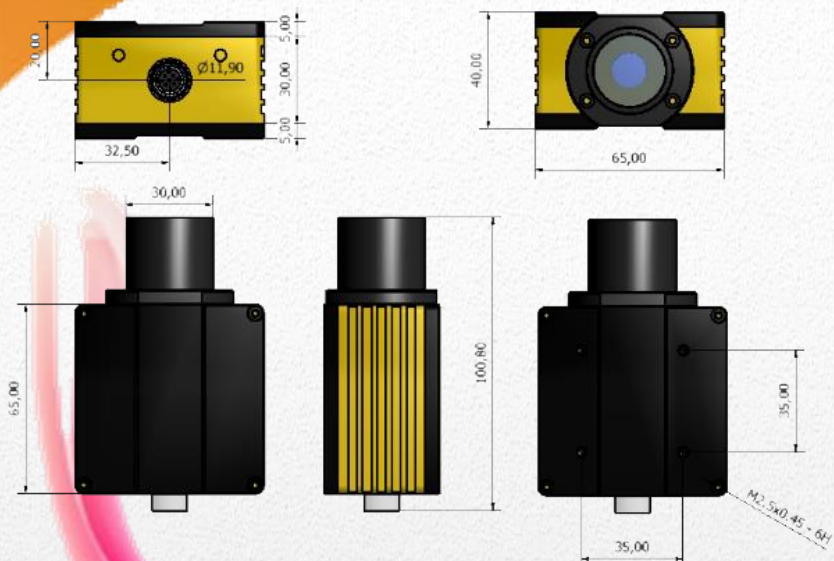
## Jig assembly





## Feature

- Max. 80meter laser distance measurement
- 0.1mm resolution and  $\pm 1$ mm accuracy
- Various output and alarm output function
- Excellent performance and economic price
- Various installation by compact design
- ASCII code at RS485 communication
- 10 - 30 Vdc wide input power
- High-strength Aluminum case
- Lense protection cap
- IP65 class waterproof and dustproof



## Specification

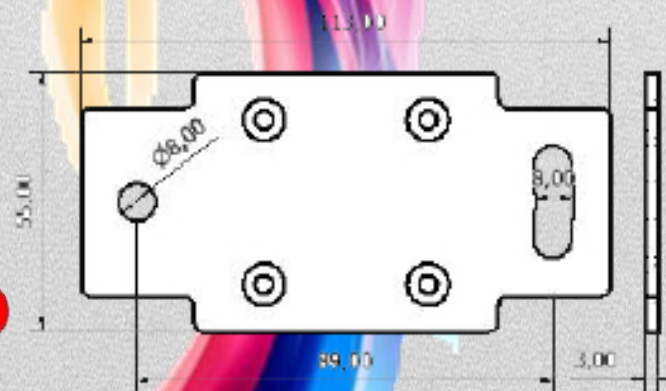
Description	Specification	Unit	Remark
Range	0.05 to 80	meter	
Resolution(Deg)	0.1	mm	
Accuracy	$\pm 1$	%	FS
Laser class	2 class	2007	IEC608025
Laser output	<0.95	mW	
I-Out	4.13 - 20	mA	
Communication	RS485		
Input power	10 - 30	Vdc	option
Power consumption	<50	mA	at 12Vdc
IP Class	IP 65	$^{\circ}\text{C}$	
Weight	48 X 26 X 16	mm	Approx.
Cable	6P X 1 sq		Length=1000mm

## Wiring

1. TRANSPARENT : 4~20mA OUT
2. RED : 10~30Vdc
3. ORANGE : 485 HIGH
4. WHITE : 485 LOW
5. BLUE : NC
6. BLACK : GND

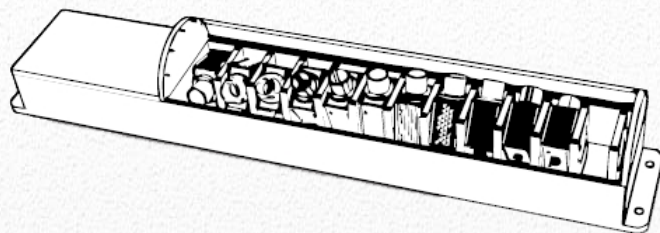


## Jig



## Feature

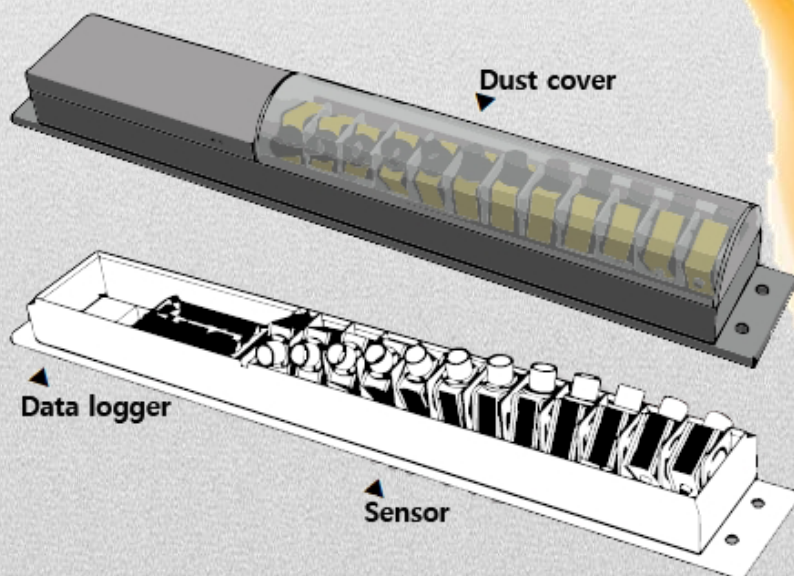
- Laser Convergence Monitoring System
- Simple installation and maintenance
- Decrease of loss by parallel design causing sensor trouble
- advantage against temperature comparing inclinometer type



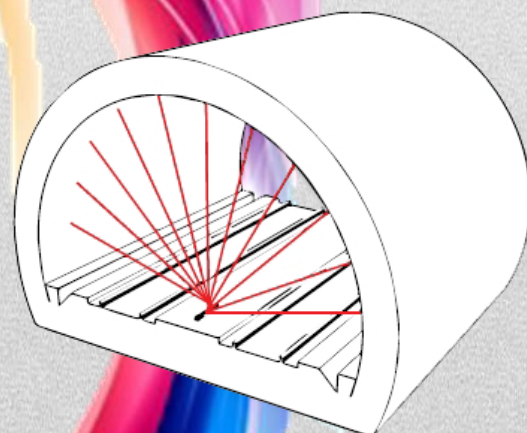
## Specification

Monitoring System TCS-L10	Sepecification	Unit	Remark
<b>Power</b>	DC 10 - 30 V		
<b>Power consumption</b>	Max. 18.5	W	
<b>Operation Temperature</b>	From -20 to 70	°C	
Data logger Dpro3	Sepecification	Unit	Remark
<b>Moemory</b>	1	GB	
<b>Communication</b>	RS-232 or RS-485	mm	
<b>Baud rate</b>	9,600		
Laser Sensor DLD-420	Sepecification	Unit	Remark
<b>Range</b>	0.05 to 80	meter	
<b>Resolution(Deg)</b>	$\pm 1$	%	
<b>Accuracy</b>	$\pm 1$	mm	
<b>Laser class</b>	2 class	2007	IEC608025
<b>Laser output</b>	<0.95	mW	
<b>Input power</b>	10 - 30	Vdc	
<b>Power consumption</b>	<50	mA	at 12Vdc
<b>IP Class</b>	IP 65	°C	

## System structure



## Monitoring





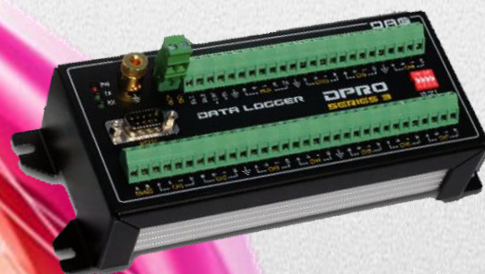
DPRO3 equipment is controlled by even the most novice, but powerful feature is designed. Almost every one of the equipment sensor can be measured and various data communication methods can be obtained. Also equipped with a high-capacity memory can store data for a long time.

## Feature

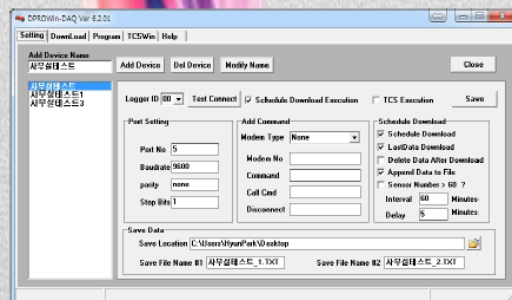
- RS-232, RS-485 Communication
- Small Size, Low cost
- Civil measurement system
- Easy to use
- 2Gb Memory(FAT16)
- Connection with multiplexer over 100meter

## Specification

Model	Sepecification
Input channel	Differential : 10 ch
	Single : 30 ch
	Three wire : 10 ch
	Four wire : 10 ch
	Expansion : by external RS485 Line (Not Multiplexer)
Output Power	12Vdc 1ch, 5Vdc 1ch
Power Supply	12V ~ 30V (AC or DC), 2.4W (Innormal mode)
Normal Current	69 mA at 12 Vdc
Active Current	138 mA at 12 Vdc
Sensor Support	4 ~ 20mA, Diff mV, mV, VW, Full Bridge, Ther mistor, Multi type
Wireless support	CDMA, Bluetooth(option)
Data output (ASC II )	RS232 (9600 Baud), RS485 (9600 Baud)
A/D Resolution	16bit
Memory	32Mb ~ 1Gb (Basic 512Mb) SD Card
Logger to Logger	RS485 (9600 Baud, 1Km)
Sampling Speed	Max 25Hz
Physical Dimensions	212mm × 85mm × 61.5mm
Environment Temperature	-45℃ ~ +70℃
Housing	Steel & Aluminum



Software : DPROWin-DAQ



## Feature

- Perfectly Compatible with CR10X & CR1000 of Campbell Scientific, Inc.
- Multiplexes up to 32 sensors at a time, connects many sensors to single datalogger
- Supports many types of sensors including inclinometers, vibrometers, thermistors, potentiometers and more
- Decreases the cost of cabling individual sensors on long wire runs
- Protects the equipment from electrical surges and shocks
- Economy price and Compact size



## Specification

Model	Specification
Power	9.6 to 16 Vdc
Current Drain	Sleep Mode : < 1 mA @12 Vdc Active : 25 mA @12 Vdc
Operating Temperature	-25 to +70 Celsius
Maximum Switching Current	500 mA
Maximum Switching Voltage	50 Vdc
Relay Operation	break before make
Frequency	1 kHz
Dimensions	Without Mounts : 8.35 x 4.04 x 1.01 in With Mounts : 9.33 x 4.04 x 1.01 in
Weight	490g approx.

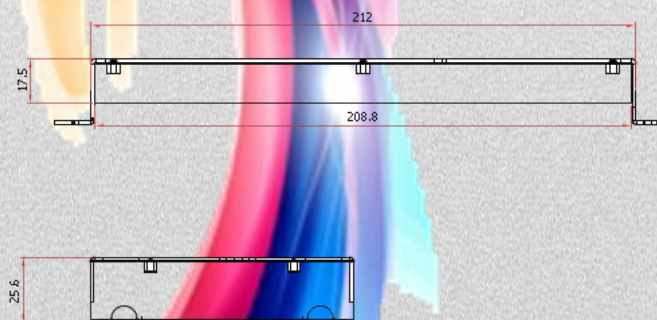
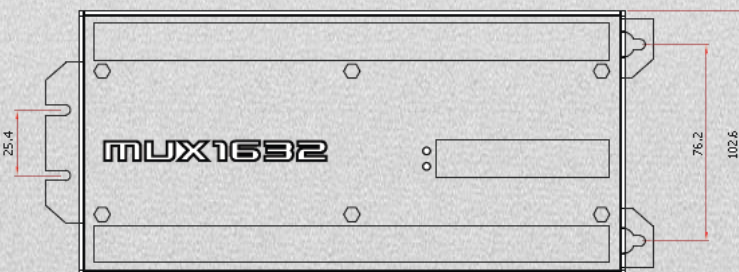
## Connection

- The Maximum number of multiplex sensors through one MUX1632 depends on the type of sensors measured.
- MUX1632 can multiplexes...
  - 64 single-ended sensors
  - 32 single-ended or differential sensors that require two wires (e.g. half bridges)
  - 16 single-ended or differential sensors that require four wires (e.g. full bridges)

## Applications

- Measurements of civil works
- Meteorological observations
- Water level/quality monitoring and more

## Dimension





Main function of Digiangle -multi is read and display measurement value for various Das sensors.

Digiangle can read out 2channel (DC voltage) at the same time and can output read value to PC through USB

communication by cp2102 chip and can be recharged battery by USB. 3.7V 1000mA battery has automatic on/off function.

## Feature

- Indicator for various Das DC voltage type sensors
- Output power to sensor
- 3.7 Vdc battery and USB recharge
- Read Differential Voltage
- Indicating 2channel at the same time
- USB communication output



## Specification

Description	Specification	Unit
Range	from -5 to 5	Vdc
Linearity	0.01	%
Offset error	±2mV	Voltage
Sensitivity error	0.1	%
Linearity Error	±0.5	%
Output Voltage	10Vdc	Vdc
Weight	400	gram
Dimension	110 X 80 X 32	mm
Serial interface	RS232 to USB(CP3210X)	

## Cable

- Red : Sensor power
- Black : GND
- Green : X axis +
- White : X axis -
- Blue : Y axis +
- Yellow : Y axis -

## Connector

## Application

## Dimensions



This system is to measure tilt at the site of embankment, dam and excavation. Probe is inputted to inclinometer casing to measure tilt. Data of angle, tilt and direction are output and draw graph automatically. This system include excellent linearity and repeatability high precision inclinometer. And also include high probe cable and strong connection pin against damage and corrosion.

## Feature

- Light weight and low cost
- Simple cable
- Wireless communication by bluetooth
- Simple probe connection
- 1/1000° High resolution inclinometer
- Over 25 hours measurement by large capacity battery

## Specification

Inclinometer Probe	
Axis	Dual Axis ( X, Y )
Capacity	$\pm 30^\circ$
Resolution (deg)	1/1000°
Repeatability	2/1000°
Operating Temp.	-20 ~ +70°C
Probe material	Stainless steel
Wheel base	500 mm
Waterproof	IP67
Inclinometer casing	Both Ø60 and Ø70

**SI-200**  
SMART TILT READER





## Bluetooth Reel

<b>Battery</b>	3.7V 2,000mAh * 3 (Li-ion)
<b>Recharge time</b>	About 4 hours
<b>Operation time</b>	about 25 hours (continuous)
<b>Recharge input</b>	100-260VAC 60Hz
<b>Recharge output</b>	+19V 2A
<b>Probe material</b>	Stainless steel
<b>Power consumption</b>	< 6W
<b>Waterproof</b>	IP65



## Application

<b>Tablet PC</b>	7 inch touch pad (Android OS)
<b>Application</b>	Smart tilt reader
	Automatic measurement, graph, e-mail
<b>Switch</b>	Wire switch



## Cable

<b>cable</b>	Ø5.5 / 1P
<b>Material</b>	Urethane, Shield
<b>Length</b>	50m
<b>Lable interval</b>	0.5m











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