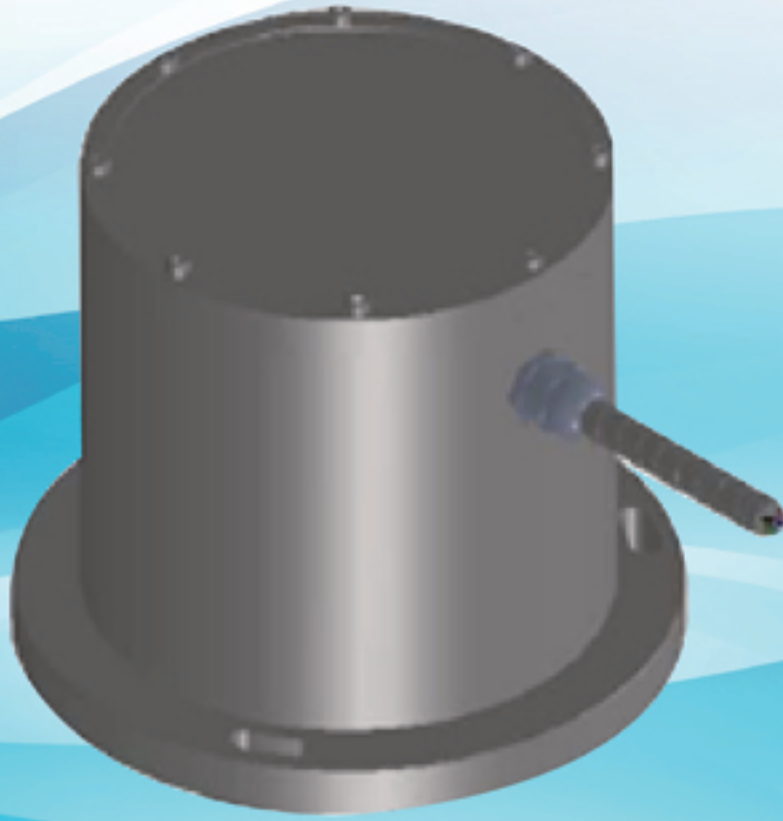# *Thermal-shock-proff Inclinometer*

Thermal-shock-proof Inclinometer

Features

- Withstand 1200℃ thermal shock within 5 minutes
- Special cable protective cover
- IP65 protection grades
- High resolution & accuracy& stability
- Particular high temperature material, structure designX sensitive mar

Descriptions

The thermal-shock –proof inclinometer based on high performance/reliability/stability inclinometer, especially designed from shell material, connector, insulation, cable protection etc, with finite element (FEA) analysis tool, it is a professional tilt angle measuring products in highest temperature environment .

Applications

Electric power, chemical, metallurgy and other industries such as high-temperature region
Metallurgical heating treatment equipment, high-temperature fluid pipeline equipment
Missile launch vehicles, launchers, aircraft carriers and other military equipment exposed to high-temperature region

Dimensions (mm)
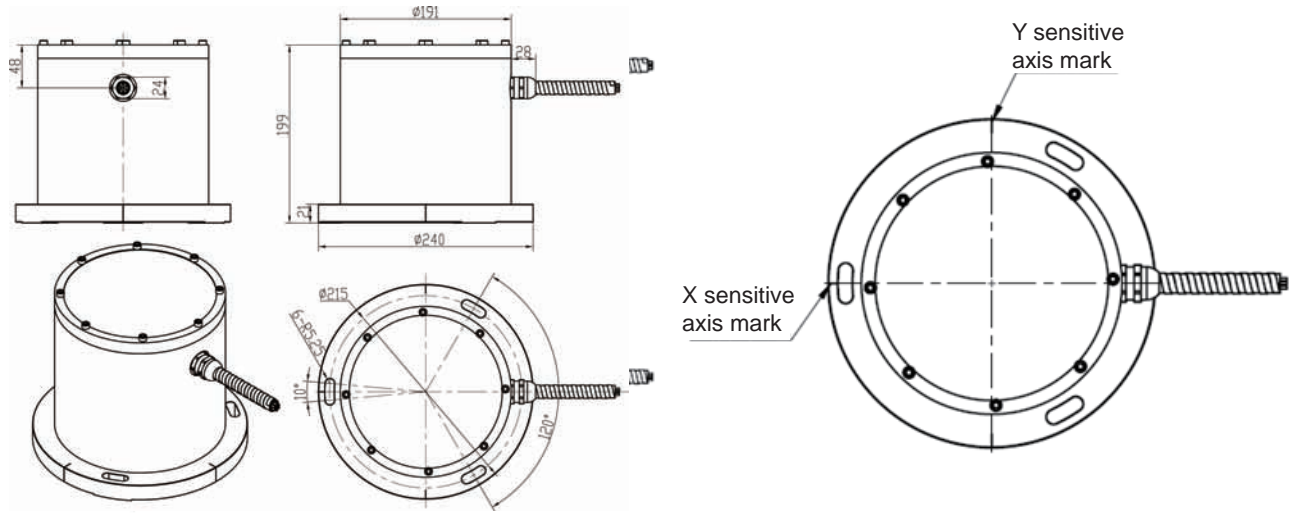
Wiring

Table 2 RS 232 pin definition

Cable wire color	Function
Red	Power+
Black	Power GND
Green	Signal GND
Yellow	NC
White	NC
Blue	RS232—TXD
Brown	RS232—RXD

Performances

Table 1 Specifications

Range		±5°	±10°	±15°	±30°	±45°	±60°
Combined absolute accuracy[①](@25℃))		±0.01°	±0.015°	±0.02°	±0.04°	±0.06°	±0.08°
Accuracy subroutine parameter	Absolute linearity (LSF,%FS)	±0.06	±0.03	±0.03	±0.03	±0.02	±0.02
	Cross-axis sensitivity[②]	±0.1%FS					
	Offset[③]	±0.005°				±0.008°	
	Repeatability	±0.0025°					
	Hysteresis	±0.0025°					
Allowed installation misalignment[④]		±4.0°	±3.0°	±2.5°	±1.5°	±1.2°	±1.2°
Input-axis mislignment		≤±0.1°					
Sensitivity temperature drift coefficient(max.)		≤100ppm/℃	≤50ppm/℃				
Offset temperature drift coefficient(max.)		≤0.003°/℃					
Offset turn on repeatability[⑤]		±0.008°					
Resolution		0.0025°					
Long-term stability(1 year)		≤0.02°					
Measurement axis		1 or 2 axis					
Temperature sensor		Range: -50~125℃, Accuracy:±1℃					
Output		RS232, RS485, RS422, CAN					
RS232 data format		115200 baud , 8 data bit , 1start bit , 1start bit , none parity					
Cold start warming time		60s					
Response time		0.3s(@t_{90})					
Refresh rate		5Hz, 10Hz, 20Hz					
Response frequency		3Hz @-3dB					
Power supply		9~36VDC					
Power consumption		Average working current≤50mA, average power≤1.5W(25℃&24VDC))					
Operation temperature range		Long-term working: -40~500℃ 1200℃ thermal-shock within 5min.					
Storage temperature range		-60~100℃					
EMC		According to EN 61000					
Insulation resistance		100MΩ					
MTBF		≥2500 h/times					
Shock		100g@11ms, three-axis, half-sine					
Vibration		8grms, 20~2000Hz					
Protection		IP65(optional IP67)					
Weight		17Kg(without connector and cable)					

① Combined absolute accuracy means the compositive value of sensor's absolute linearity, repeatability, hysteresis, offset and cross-axis sensitivity error. (in room temperature condition) as

$$\Delta=\pm \sqrt{absolute\ linearity^2+repeatability^2+hysteresis^2+offset^2+ cross\text{-}axis\ sensitivity\ error^2}$$
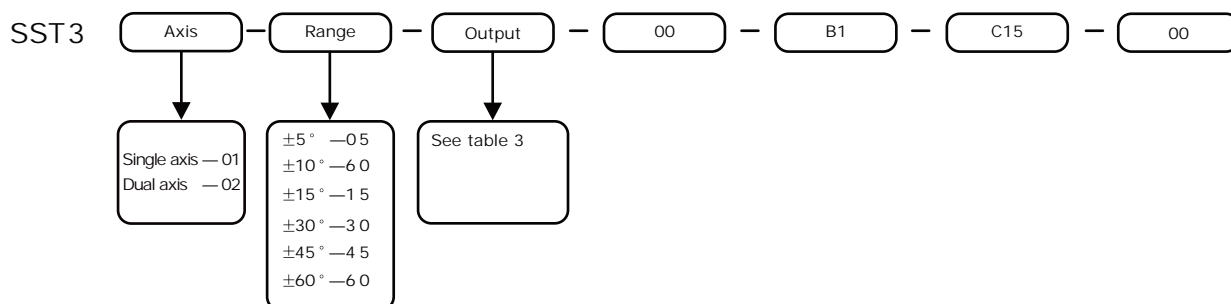
② The cross-axis sensitivity means the angle that the tilt sensor may be banked to the normal tilt direction of sensor. The cross-axis sensitivity (±0.1%FS) shows how much perpendicular acceleration or inclination is coupled to the inclinometer output signal. For example, for the single-axis inclinometer with range ±30°(assuming the X-axis as measured tilt direction), when there is a 10° tilt angle perpendicular to the X-axis direction(the actual measuring angle is no change, example as +8.505°), the output signal will generate additional error for this 10° tilt angle, this error is called as cross-axis sensitivity error. SST300`s cross-axis sensitivity is 0.1%FS, the extra error is 0.1%×30°=0.03°(max), then real output angle should be +(8.505°±0.03°). In SST300 series, this error has been combined into the absolute accuracy

③ Offset means that when no angle input (such as the inclinometer is placed on an absolute level platform), output of sensor is not equal to zero,the actual output value is zero offset value.

④ Allowed installation misalignment means during the installation, the allowable installation angle deviation between actual tilt direction and sensor's nature measurement direction. In general, when installed,SST300 sensor is required that the measured tilt direction keep parallel or coincident with sensor designated edge, this parameter can be allowed a certain deviation when sensor is installed and does not affect the measurement accuracy.

⑤ Offset turn on repeatability means the repeatability of the sensor in repeated by supply power on-off-on many times.

Ordering

SST3 —[Axis]—[Range]—[Output]—[00]—[B1]—[C15]—[00]

Axis:
Single axis — 01
Dual axis — 02

Range:
±5° —05
±10° —60
±15° —15
±30° —30
±45° —45
±60° —60

Output:
See table 3

For example, if order a dual axis thermal shock-proof inclinometer, with range ±15°, room temperature accuracy ±0.02°, output RS422, 2 meters cable with plug, the model should be chosen as: SST302-15-G2-00–B1-C15-00

Accessories & Options

Table 3 Accessories

Item	P/N	Order Code	Accessories name	Function
Output interface	SST003-07-00	00	RS232 output	Directly angle output Data format: Baud rate:115200(adjustable), 8 data bits, 1 start bit, 1 stop bit, none parity Refresh rate:5Hz, optional: 10Hz, 20Hz
	SST003-07-01	G1	RS485 output	Isolated, Compatible with half-duplex or full-duplex communication; ±15kV ESD protection Compatible with ANSI/TIA/EIA-485-A-98 & ISO8482:1987(E) Comply with UL1577---2500V rms for 1min ; Transmission rate up to 500 kbps, support max 256pcs node High common mode transient suppression ability>25kV/us ; Support Modbus-RTU, sensor supply HEX or ASCII communication
	SST003-07-02	G2	RS422 output	
	SST003-07-03	G3	CAN output	Compliance with ISO/DIS 11898, twisted-pair output Support CAN2.0A, CAN2.0B protocol Build-in high-speed photo isolators Support 15 baud rates from 5k to 1000Kbps Transmission distance: 10km Max