In-Place Inclinometer

Vigor Technology

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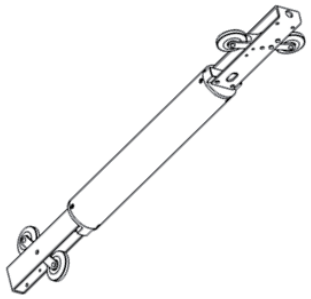
Features



- According to ISO11898-2 standard, support CAN2.0B protocol
- Built-in high-speed optoelectronic isolation
- Set baud rate before delivery, support 5K-1000Kbps total 15 kinds of CiA recommended Baud rate
- Operation temperature -40℃~85℃
- Waterproof cable, 60 m submersible depth

Descriptions

In-Place inclinometer is based on Vigor patent tilt measurement technology and combined with CAN module, further its housing match with all civil engineering applications. It not only has high reliability & high performance, also easily connect each other with slave/master functions.
In-place inclinometer employee with MEMS technology, more durable, high stability to ensure getting higher accurate data and repeatability.
With high-speed optoelectronic isolation, CAN interface support ISO11898-2 standard and CAN2.0B standard protocol, baud rate can be set before delivery within 5~1000Kbps, adopt smaller frame structure (8bytes for each effective frame) with shorter transmission time, strong anti-interference ability. It supports point to point or one point to multipoint communication mode, suit for high speed data rate with longer communication distance.
CAN interface supports acknowledge model/continuous sending mode/parameter setting mode. User can setup CAN interface and set zero point/baud rate/local gravitational value/zero calibration/vibration suppression filter coefficients/ID address/refresh rate, etc..

Applications

Slot milling mixer, Civil engineering

Performances

Table 1 Specifications

Measurement range		±10°other range available
Combined absolute accuracy①(@25℃)		±0.015°
Accuracy subroutine parameter	Absolute linearity (LSF,%FS)	±0.03
	Cross-axis sensitivity②	±0.1%FS
	Offset③	±0.005°
	Repeatability	±0.0025°
	Hysteresis	±0.0025°
Allowed installation misalignment④		±3.0°
Input-axis mislignment		≤±0.1°
Sensitivity temperature drift coefficient(max.)		≤100ppm/℃
Offset temperature drift coefficient(max.)		≤0.003°/℃
Offset turn on repeatability⑤		±0.008°
Resolution		0.0025°
Long-term stability⑥(1 year)⑥		≤0.02°
Measurement axis		2 axis
Temperature sensor		Range: -50~125℃, Accuracy:±1℃
Output		CAN2.0A,CAN2.0B , follow ISO11898-2 standard
		5k~1 MBit/s, 15 kinds of CiA recommended Baud rate
Function		Through CANbus to set and adjust zero point , Baud rate, local Gravitational acceleration value, zero correction, vibration suppression filter coefficients, ID address , refresh rate
Cold start warming time		60s
Response time⑦		0.3s(@t_{90})
Message sending frequency		1~20Hz
Response frequency⑧		3Hz @-3dB
Power supply		9~36VDC
Power consumption		Average working current≤200mA(25℃&24VDC)
Operation temperature range		-40~85℃
Storage temperature range		-60~100℃
Insulation resistance		100MΩ
MTBF		≥25000 h/times
Shock		100g@11ms, three-axis, half-sine
Vibration		8grms, 20~2000Hz
Protection		IP69K
Connecting		Subconn MCIL5F

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

$$\Delta=\pm\sqrt{\text{absolute linearity}^2+\text{repeatability}^2+\text{hysteresis}^2+\text{offset}^2+\text{cross-axis sensitivity error}^2}$$

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 allow able 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.

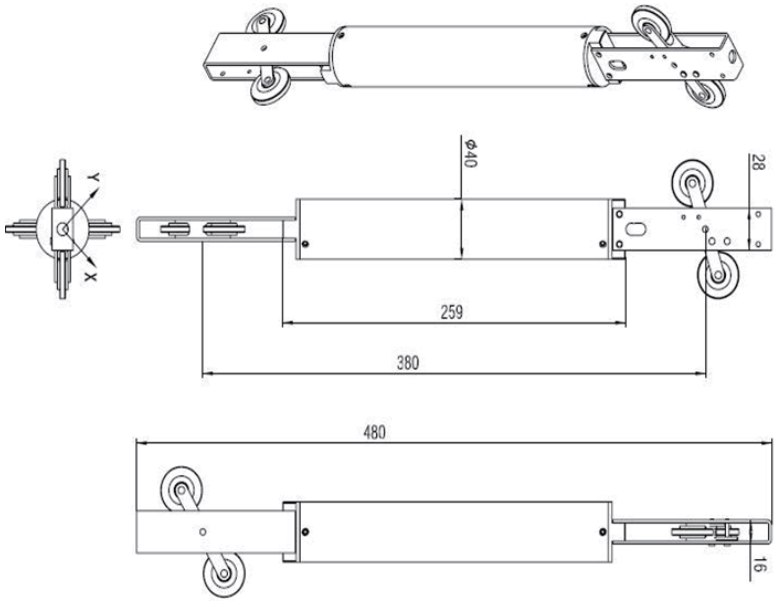
⑤ Offset turn on repeatability means the repeatability of the sensor in repeated by supply power on-off-on many times.

⑥ Long-term stability means the deviation between the statistics of the maximum and the minimum output value after a year of continuous power supply when the sensor is at 20℃ .

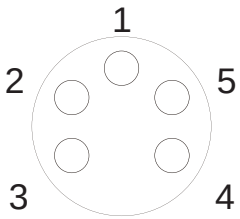
⑦ The response time refers to the angle sensor in a step change (such as the angle changes from -10 ° to +10 °within 5ms), the time required that output of the sensor achieved to the standard value of 90%. The index is different from the sensor set-up time

⑧ Response frequency is for the limitation of the dynamic measurement range, when the dynamic measurement exceeds 3 Hz, because of centripetal force, the output occupied additional random error,this error is difficult to define.

Dimensions (mm)



Wiring



Picture 1 Connector socket (MCIL5F)

Table 2 Pin definition

Pin	Color	Function
1	Black	Power GND
2	White	NC
3	Red	Power+
4	Brown	CANL
5	Blue	CANH

Ordering

SST302 – Range – Output – 00 – B7 – 00 – Temp.drift

Range	Output	00	B7	00	Temp.drift
±5°—05 ±10°—10 ±15°—15 ±30°—30 ±45°—45 ±60°—60	G1~G25 Other: see table 3			C1~C8 Other:see table 3	25℃— 00 Other:D1~D8 See table 3

For example: if order a In-Place sensor, with range ±10°, room temperature accuracy ±0.015°, -20~60℃ accuracy ±0.02, CAN2.0B interface , 2 meters cable, the model should be chosen as: SST302-10-G3-00-B7-00-D3

Accessories

Table 3 Accessories

Item	Order Code	Accessories name	Function
Output interface	G1	RS485 output	Standard industrial ModBus protocol
	G2	RS422 output	Standard industrial interface
	G3	CAN output	Standard industrial interface
	G9	Ethernet interface	Standard industrial TCP/IP interface
	G19	4~20mA output	Standard industrial level
	G21	-5~+5VDC output	Standard industrial level
	G23	-10~+10VDC output	Standard industrial level
Cable/Plug	C2	Tensile reinforced shield cable	Heavy duty up to 50kg
	C4	Armor cover cable	Increasing mechanical strength, erosion and anti-interference ability.
Temperature drift	D1	Temperature drift	Temperature compensation range 0~60℃, accuracy ±0.01°@≤±30°
	D2	Temperature drift	Temperature compensation range 0~60℃, accuracy ±0.01°@>±30°
	D3	Temperature drift	Temperature compensation range -20~60℃, accuracy ±0.02°@≤±30°
	D4	Temperature drift	Temperature compensation range -20~60℃, accuracy ±0.02°@>±30°
	D5	Temperature drift	Temperature compensation range -30~60℃, accuracy ±0.03°@≤±30°
	D6	Temperature drift	Temperature compensation range -30~60℃, accuracy ±0.03°@>±30°
	D7	Temperature drift	Temperature compensation range -40~65℃, accuracy ±0.05°@≤±30°
	D8	Temperature drift	Temperature compensation range -40~65℃, accuracy ±0.05°@>±30°

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