

SST100 Inclinometer



Vigor Technology

SST100 Inclinometer

Features

- High stability & performance-cost ratio
- Small size,light weight,easy to integrate
- Cross-axis sensitivity up to $\pm 0.3\%FS$
- Omni-direction alarm & dual alarms,analog & digital outputs
- Full-seal,resistant to vibration and shock
- IP67 protection



Descriptions

SST100 inclinometer is high reliable tilt angle measurement product for construction machinery industry application. This inclinometer adopts various technologies on reliability & stability,including full-sealing,strengthen PCBA design,optimized power management,enhanced resistance to shock & vibration,30kg tensile cable,motion simulation of life testing,patented automatic test technology and precision machining of aluminum alloy.

SST100 inclinometer emploies low-g MEMS acceleration sensors with 2000g shock. Through non-linearity compensation,cross-axis sensitivity error compensation,filtering etc,output analog/digital/alarm signals which precise proportional to actual tilt angle or ASCII data of tilt angle,or alarm signal based on setup alarm point.

SST100 inclinometer is suitable for kinds of construction machinery and field equipment,may directly connect with vehicle battery or other unregulated DC power,jitter-free high hysteresis fast ON/OFF output,direct drive such as relays,speakers,sound & light alarm equipment,PLC and other devices,and can setup alarm point online via RS232 interface.

Applications

Mobile construction Machinery, Factory automation, Solar equipment, Transportation machinery, Medical equipment,etc.

Referenced Standards

- GB/T 191 SJ 20873 General requirements for Inclinometer & levelmeter (China)
- GBT 18459 Methods for Calculating the Main static performance specifications for transducers(China)
- JJF 1059 Evaluation and Express of Uncertainty in Measurement(China)
- JJF 1094 Evaluation of the Characteristics of Measuring Instruments(China)
- JJF 1116 Calibration Specification for Linear Accelerometer used precision Centrifuger(China)
- QJ 2318 The test method of gyro & accelerometer(China)
- GJB 2786A General Requirements for Military Software Development(China)
- GJB 2884 General Specification for Three-Axis angular motion simulator(China)
- EN61000-4-11 Voltage dips & Voltage variations
- MIL-HDBD-338B
- MIL-STD-810F-510.4
- MIL-STD-810F-507.4
- ISO 5348 IDT
- MIL-STD-810F-514.5
- EN61000-4-4 EFT
- MIL-STD-810F-501.4
- MIL-STD-810F-516.5
- EN61000-4-5 SURGE
- MIL-STD-810F-502.4
- IEC60529 IP
- EN61000-4-6 CS
- MIL-STD-810F-503.4
- EN61000 -4-2 ESD
- EN61000-4-8 PFMF
- MIL-STD-810F-506.4
- EN61000-4-3 RS
- ISTA-2A

Performances

Table1 SST141/2,SST151/2,SST161/2 Inclinometer

Product type	SST141,SST142,SST151,SST152,SST161,SST162 with analog/digital output							
Measurement range	±5°	±10°	±15°	±30°	±45°	±60°	±90°	±180°
Accuracy(@25°C)	±0.1°							
Temperature drift coefficient /°C @ -20~65°C	±0.004°			±0.005°			±0.009°	
Resolution	0.003°							
Repeatability	±0.02°							
Offset repeatability	±0.02°							
Offset	±0.02°							
Measurement axis	1 axis:SST141,SST151,SST161							
	2 axis:SST142,SST152,SST162							
Response time	0.3s @ t ₉₀							
Cross-axis sensitivity	±0.3%FS							
Digital output for SST161,SST162	RS232(optional RS485),update rate:5Hz(default),10Hz,20Hz optional Format: 19200 baud,8 data bits,1 start bit,1 stop bit,none parity,ASCII							
	CAN2.0: according to ISO11898-2 standard, 5k~1MBit/s baud rate, support 127 nodes, built in high speed photoelectric isolator							
Voltage output for SST141,SST142	0.5~4.5VDC Output Impedance:0.3Ω,load impedance:< 100Ω							
Current output for SST151,SST152	4~20mA Output Impedance:50MΩ,load impedance:150~250Ω							
Cold start warming time	60s							
Power supply	With digital/voltage output:9~36VDC,consumption≤20mA							
	With current output:16~36VDC,consumption≤40mA							
Power supply reject ratio	≥85dB							
Operation temperature range	-40~85°C							
Storage temperature range	-40~100°C							
EMC	According to EN 61000							
Insulation resistance	≥100MΩ							
MTBF	150000h/times							
Shock	100g@11ms,three-axis,half-sine							
Vibration	8grms,20~2000Hz							
Protection	IP67							
Housing	6061-T6 Aluminum alloy							
Connecting	Standard: Binder712 connector,optional: metal pigtail							
Cable	7-wire shielded cable with tensile reinforcement,heavy duty up to 30Kg							
Weight	≤240g(without connector and cable)							

Table 2 SST122 Inclinometer

Product type	SST122 with double alarms output					
Control range	±5°	±10°	±15°	±30°	±45°	±60°
Temp. drift coefficient /°C @ -20~65 °C	±0.004°	±0.004°	±0.004°	±0.004°	±0.005°	±0.005°
Control direction	X & Y axis					
Resolution	0.02°					
Alarm angle error	±0.1°					
Alarm trigger delay	1.0s					
Alarm disconnect delay	1.0s					
Repeatability	±0.05°					
Hysteresis	±0.05°					
Switch endurance	≥5000000 times					
Alarm point	2points/axis					
Alarm setting	Fixed before delivery					
Alarm delay time	0.3~5.0s,default 1.0s					
Output	NO or NC(default NO),OC output,internal isolation					
Alarm switch capacity	1A@5~48VDC,inductive load					
Power supply	9~36VDC,≤50mA(when no load)					
Alarm control supply	9~36VDC					
Connecting	Metal pigtail					
Cable	7-wire shielded cable with tensile reinforcement,heavy duty up to 30Kg					
Power supply reject ratio	≥85dB					
Operation temperature range	-40~85°C					
Storage temperature range	-40~100°C					
EMC	According to EN 61000					
Insulation resistance	≥100MΩ					
MTBF	150000h/times					
Shock	100g@11ms,three-axis,half-sine					
Vibration	8grms,20~2000Hz					
Protection	IP67					
Housing	6061-T6 Aluminum alloy					
Weight	≤240g(without connector and cable)					

SST800

SST20

SST810

SST30

SST820

SST100

SST830

SST200

SSG100

SST300

SSG200

SST400

SST900

SST500

Table 3 SST130 Inclinometer

Product type	SST130 with Omni-direction alarm output					
Control range	±5°	±10°	±15°	±30°	±45°	±60°
Temperature drift /°C @ -20~65 °C	±0.004°	±0.004°	±0.004°	±0.004°	±0.005°	±0.005°
Control direction	Omni-direction(combined with X and Y axis)					
Resolution	±0.02°					
Alarm angle error	±0.1°					
Alarm trigger delay	1.0s					
Alarm disconnect delay	1.0s					
Repeatability	±0.05°					
Hysteresis	±0.05°					
Switch endurance	≥5000000 times					
Alarm point	One alarm point					
Alarm point setting	Online setting via RS232					
Alarm time delay	0.3~5.0s,Default value 1.0s,adjustable.					
Output	NO or NC(default NO),OC output,internal isolation					
Alarm switch capacity	1A@5~48VDC					
Online setting via RS232	Zero setting: available setting range:≤±5°					
	Alarm point setting: Set any angle as alarm point,default value is ±3°					
RS232 interface	Format: 19200 baud,8 data bits,1start bit,1stop bit,none parity,ASCII					
Power supply	9~36VDC,≤50mA					
Alarm control supply	9~36VDC					
Connecting	Standard: Binder712 connector,optional: metal pigtail					
Cable	7-wire shielded cable with tensile reinforcement,heavy duty up to 30Kg					
Power supply reject ratio	≥85dB					
Operation temperature range	-40~85°C					
Storage temperature range	-40~100°C					
EMC	According to EN 61000					
Insulation Resistance	≥100MΩ					
MTBF	150000h/times					
Shock	100g@11ms,three-axis, half-sine					
Vibration	8grms,20~2000Hz					
Protection	IP67					
Housing	6061-T6 Aluminium alloy					
Weight	≤260g(without connector and cable)					

Table 4 SST111 & SST121 Inclinometer

Product type	SST111 & SST121 inclinometer with alarm output					
Control range	±5°	±10°	±15°	±30°	±45°	±60°
Temperature drift /°C @ -20~65°C	±0.004°	±0.004°	±0.004°	±0.004°	±0.005°	±0.005°
Control direction	Single Axis: SST111					
	Dual Axis: SST121					
Resolution	0.02°					
Alarm angle error	±0.1°					
Alarm trigger delay	1.0s					
Alarm disconnect delay	1.0s					
Repeatability	±0.05°					
Hysteresis	±0.05°					
Switch endurance	≥5000000 times					
Alarm point	Single Axis(SST111): one alarm point of X Axis					
	Dual Axis(SST121): one alarm point of each Axis					
Alarm point setting	Online setting via RS232					
Alarm time delay	0.3~5.0s,Default 1.0s,adjustable					
Output	NO or NC(default NO),OC output,internal isolation					
Alarm switch capacity	1A@5~48VDC					
Online setting via RS232	Zero setting: available setting range: ≤±5°					
	Alarm point setting: Set any angle as alarm point,default value is ±3°					
RS232 interface	Format: 19200 baud,8 data bits,1start bit,1stop bit,none parity,ASCII					
Power supply	9~36VDC,≤50mA					
Alarm control supply	9~36VDC					
Connecting	Standard: Binder712 connector,optional: metal pigtail					
Cable	7-wire shielded cable with tensile reinforcement,heavy duty up to 30Kg					
Power supply reject ratio	≥85dB					
Operation temperature range	-40~85°C					
Storage temperature range	-40~100°C					
EMC	According to EN 61000					
Insulation resistance	≥100MΩ					
MTBF	150000h/times					
Shock	100g@11ms,three-axis,half-sine					
Vibration	8grms,20~2000Hz					
Protection	IP67					
Housing	6061-T6 Aluminium alloy					
Weight	≤240g(without connector and cable)					

SST800

SST20

SST810

SST30

SST820

SST100

SST830

SST200

SSG100

SST300

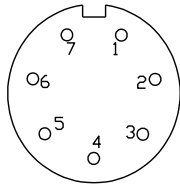
SSG200

SST400

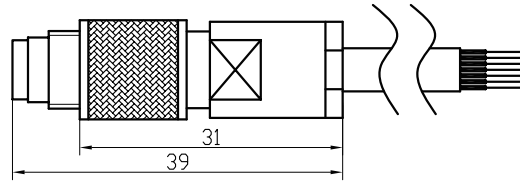
SST900

SST500

Wiring



Picture 1 Binder712 socket
(View from outside)



Picture 2 Binder712 plug and cable

Table 5 SST111 wiring

Binder712 socket Pin	Pigtail wire color (optional)	Function
1	Red	Power +
2	Black	Power -
3	Green	Control GND
4	Yellow	X Axis alarm output
5	White	NC
6	Blue	RS232—TXD
7	Brown	RS232—RXD

Table 6 SST121 wiring

Binder712 socket pin	Pigtail wire color (optional)	Function
1	Red	Power +
2	Black	Power -
3	Green	Control GND
4	Yellow	X Axis alarm output
5	White	Y Axis alarm output
6	Blue	RS232—TXD
7	Brown	RS232—RXD

Table 7 SST130 wiring

Binder712 socket pin	Pigtail wire color (optional)	Function
1	Red	Power +
2	Black	GND
3	Green	Control GND
4	Yellow	Alarm output
5	White	NC
6	Blue	RS232—TXD
7	Brown	RS232—RXD

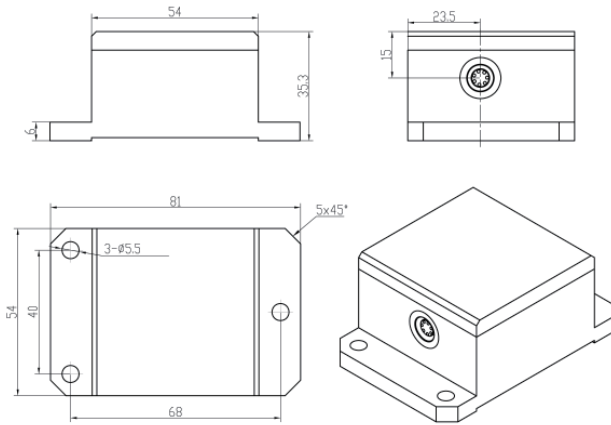
Table 8 SST122 wiring

Pigtail wire color	Function
Red	Power +
Black	GND
Green	Control GND
Yellow	X Axis alarm point 1
White	Y Axis alarm point 1
Blue	X Axis alarm point 2
Brown	Y Axis alarm point 2

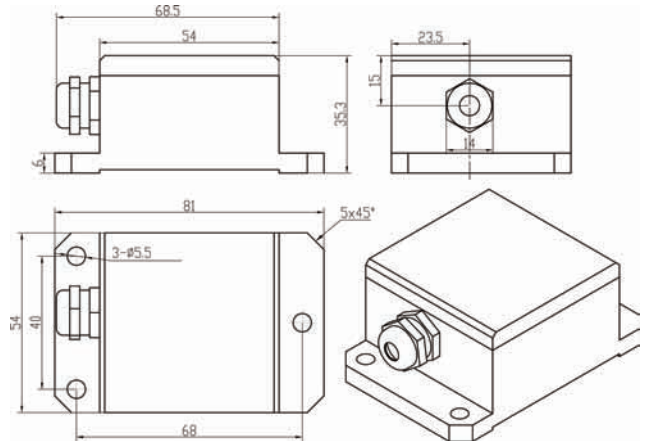
Table 9 Analog/digital output wiring

Binder712 pin	Pigtail wire color	Output							
		SST151	SST152	SST141	SST142	SST161	SST162	Option	
		4~20mA		0.5~4.5VDC		RS232		CAN	RS485
1	Red	Power+	Power+	Power+	Power+	Power+	Power+	Power+	Power+
2	Black	Power -	Power -	Power -	Power -	Power -	Power -	Power -	Power -
3	Green	Signal GND	Signal GND	Signal GND	Signal GND	Signal GND	Signal GND	Signal GND	Signal GND
4	Yellow	Iout	Ioutx	Vout	Voutx	NC	NC	CANH	NC
5	White	NC	Iouty	NC	Vouty	NC	NC	CANL	NC
6	Blue	NC	NC	NC	NC	RS232-TXD	RS232-TXD	NC	RS485-A
7	Brown	NC	NC	NC	NC	RS232-RXD	RS232-RXD	NC	RS485-B

Dimensions (mm)



Picture 3 SST100 with Binder712 connector



Picture 4 SST100 with metal pigtail

Ordering

Model	Axis	Connector	Output	Range
SST111	1	Binder712(-C) ,optional Pigtail (-P)	1 alarm point of X axis	±5°, ±10°, ±15°, ±30°, ±45°, ±60°
SST121	2	Binder712(-C) ,optional Pigtail (-P)	1 alarm point of each axis	
SST122	2	Pigtail (-P)	2 alarm points of each axis	
SST130	Omni-direction	Binder712(-C) ,optional Pigtail (-P)	1 alarm point	
SST141	1	Binder712(-C) ,optional Pigtail (-P)	0.5~4.5VDC	±5°, ±10°, ±15°, ±30°, ±45°, ±60°, ±90°, ±180°
SST142	2	Binder712(-C) ,optional Pigtail (-P)	0.5~4.5VDC	
SST151	1	Binder712(-C) ,optional Pigtail (-P)	4~20mA	
SST152	2	Binder712(-C) ,optional Pigtail (-P)	4~20mA	
SST161	1	Binder712(-C) ,optional Pigtail (-P)	RS232 (RS485, CAN optional)	
SST162	2	Binder712(-C) ,optional Pigtail (-P)	RS232 (RS485, CAN optional)	

SST120

SST130

SST100

SST200

SST300

SST400

SST500

SST800

SST810

SST820

SST830

SSG100

SSG200

SST900

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