

# SST500 Inclinometer



# SST500 Inclinometer

## Features

- Up to  $\pm 0.001^\circ$  bias stability within 12 months
- Bias temperature drift achieve  $\pm 0.0005^\circ/\text{C}$
- Optimization design based on CAE & EDA
- High reliability & flexibility
- Multi-functional management software
- Less than  $\pm 3''$  bias
- Less than  $\pm 1.5''$  absolute linearity error
- Kinds of land & aerospace application interfaces
- 3 classes: Industry class, Universal military class, High-quality military class
- Up to 15000 hours of MTBF
- Successfully applied to missile launch, radar, aerospace and other military projects
- Customized product available



## Descriptions

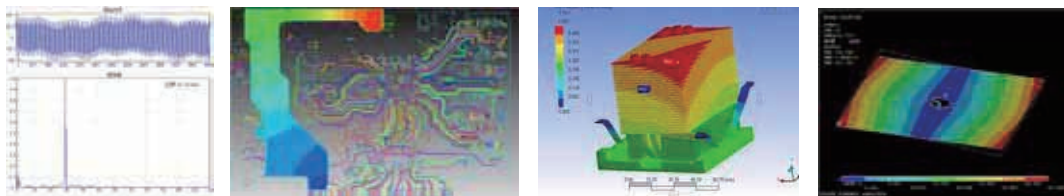
SST500 inclinometer is a revolutionary tilt measurement product, fully absorbs and learns from high precision military inertial navigation technology, precise fusion with machine-electric & inertial test technologies, applied to variety of high-class industrial & military applications.

SST500 inclinometer adopts inertial navigation grade servo accelerometer, with  $< 0.1\mu\text{g}$  resolution,  $> 25\text{Hz}$  frequency response,  $> 120\text{dB}$  signal-noise ratio. Achieve  $\pm 1.3''$  accuracy at room temperature.

SST500 performs excellent dynamic characteristics, long-term stability, and environmental adaptability, experienced with various static & quasi-static long-term works under industrial & military harsh environment.

Thanks Vigor's engineers for making complete modal testing for whole body & key components, to minimize interference from outside shock & vibration.

To maximize reliability of SST500 inclinometer, modeling analysis, regulated software & hardware reliability design, selected proven components directory, finite element analysis (thermal reliability analysis, structural reliability analysis) and FMEA, have been made to ensure the optimal performance and stability as well.



# Applications

Military: missile launch, rocket launch, military radar, mobile communication equipment, fire control system, bunkers monitoring, flight test, laser/video equipment, navigation system, etc.

Civil: large-scale bridge, tunneling guidance equipment, space observations, precision machine tools, optical instrument, etc.



## Referenced Standards

- GB/T 191 SJ 20873 General requirements for Inclinator & levelmeter (China)
- GBT 18459 Methods for Calculation 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

SST20  
SST800

SST30  
SST810

SST100  
SST820

SST200  
SST830

SST300  
SSG100

SST400  
SSG200

SST500  
SST900

## Performances

Table 1 Specifications

Measurement range		±1°	±5°	±10°	±15°	±30°	±45°	±60°
Absolute linearity error(@20°C)		±1.5"	±5"	±10"	±10"	±15"	±25"	±40"
Resolution		0.1"	0.2"	0.5"	0.5"	0.6"	1"	2"
Axis		Single/Double						
Bias repeatability	Industry class	±3.6"	±3.6"	±3.6"	±3.6"	±10"	±18"	±18"
	Universal military class	±3"						
	High-quality military class	±2"						
Bias stability	Industry level @ 6 months	±10"	±10"	±10"	±10"	±18"	±18"	±30"
	Universal military class @ 6 months	±3.6"						
	High-quality military class @ 12 months	±3.6"						
Bias	Industry class	±10"	±10"	±10"	±10"	±18"	±18"	±30"
	Universal military class	±8"						
	High-quality military class	±3.6"						
Bias temperature drift. /°C	Industry class @-20~65°C	±5"	±5"	±5"	±10"	±15"	±20"	±25"
	Universal military class @-40~85°C	±0.5"	±0.5"	±0.5"	±1"	±1"	±2"	±2"
	High-quality military class @-55~125°C	±0.5"	±0.5"	±0.5"	±1"	±1"	±2"	±2"
Sensitivity temperature drift ppm/°C	Industry class @-20~65°C	±35	±35	±40	±40	±50	±50	±60
	Universal military class @-40~85°C	±30	±20	±20	±10	±10	±10	±10
	High-quality military class @-55~125°C	±30	±20	±20	±10	±10	±10	±10
Cross-axis sensitivity	Industry class	±0.1%FS						
	Universal military class	±0.05%FS						
	High-quality military class	±0.02%FS						
Misalignment	Industry class	≤2mrad.						
	Universal military class	≤0.5mrad.						
	High-quality military class	≤0.05mrad.						
Response time	Industry class	0.3~1.0s(depends on requested accuracy )						
	Universal military class	0.1~1.0s(depends on requested accuracy )						
	High-quality military class	0.1~1.0s(depends on requested accuracy )						
Cold start warming time	Industry class	180s						
	Universal military class	120s						
	High-quality military class	60s						
Output	Industry class	Interface: RS232, RS485, CAN update rate: 5Hz						
	Universal military class	Interface: RS422, CAN update rate: 10Hz, 20Hz, 50Hz,						
	High-quality military class	Interface: MIL-STD-1553B, ARINC429, IEEE1394, IBIS, or depend on request						
EMC	Industry class	According to EN 61000 or GBT17626						
	Universal military class	GJB 151A or MIL STD-461						
	High-quality military class	GJB 151A, or MIL STD-461, or depend on request						

MTBF	Industry class	≥5000h/times
	Universal military class	≥10000h/times
	High-quality military class	≥15000h/times
Power supply	Industry class	9~36VDC(unregulated),≤80mA@24VDC
	Universal military class	12~48VDC(unregulated),≤80mA@24VDC
	High-quality military class	12~48VDC(unregulated),consumption depends on request
Shock	Industry class	100g@11ms,3 axis,6directions,half-sine,1times/axis, total 6 times
	Universal military class	100g@11ms,3 axis,6directions,square wave,2times/axis, total 12 times
	High-quality military class	100g@11ms,3 axis,6directions,square wave,3times/axis, total 18 times
Vibration	Industry class	3grms, 20~2000Hz,random
	Universal military class	5grms, 20~2000Hz,random,1g,1oct/min,20~2000Hz,sine
	High-quality military class	6grms, 20~2000Hz,random,2g,1oct/min,20~2000Hz,sine
Rapid temperature change test	Industry class	-40~85°C range,10°C /min ratio
	Universal military class	-40~85°C range,15°C /min ratio
	High-quality military class	-60~125°C range,15°C /min ratio
Storage temperature test	Industry class	-40~85°C range, 24h,according to GJB/MIL or depend on request
	Universal military class	-40~125°C range, 2×24 h,according to GJB/MIL or depend on request
	High-quality military class	-60~125°C range, 7×24 h,according to GJB/MIL or depend on request
Housing	Industry class	6061-T6 aluminum housing,316N base
	Universal military class	Full 316N,10 cycles of heat treatment
	High-quality military class	Full 316N,10 cycles of heat treatment,6months natural stress release, or depends on request
Connecting	Industry class	Military connector or metal pigtail with 2m shield 7-wire cable (heavy duty up to 30kg)
	Universal military class	Military full stainless steel connector, or full stainless steel pigtail with 2m shield 7-wire cable (heavy duty up to 50kg)
	High-quality military class	Military full stainless steel connector, or full stainless steel pigtail with 2m shield 7-wire cable (heavy duty up to 50kg)
Protection	Industry class	IP65
	Universal military class	IP67
	High-quality military class	Depends on request
Operation temperature range	Industry class	-40~85°C
	Universal military class	-40~85°C
	High-quality military class	-55~125°C
Storage temperature range	Industry class	-40~85°C
	Universal military class	-60~125°C
	High-quality military class	-60~125°C
Weight	Industry class	2Kg
	Universal military class	3Kg
	High-quality military class	Depends on request
Size	Industry class	105x65x64mm(without connector and pigtail)
	Universal military class	105x65x64mm(without connector and pigtail)
	High-quality military class	Depends on request
Temperature sensor (internal)	Industry class	Range-50~125°C , accuracy ±1°C
	Universal military class	Range-50~125°C , accuracy ±1°C
	High-quality military class	Range-60~125°C , accuracy ±1.5°C

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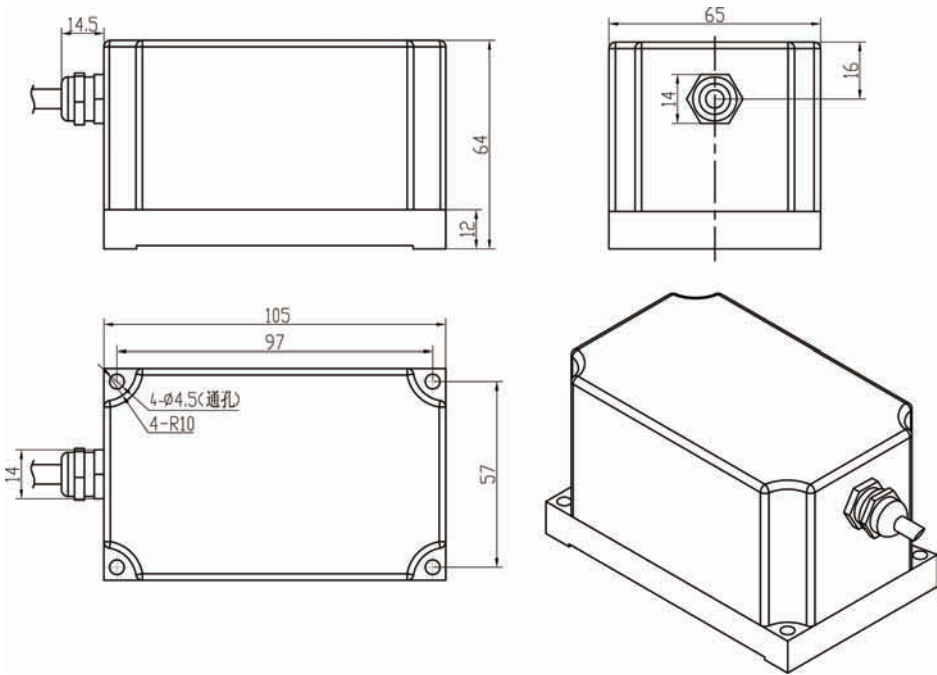
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SST300

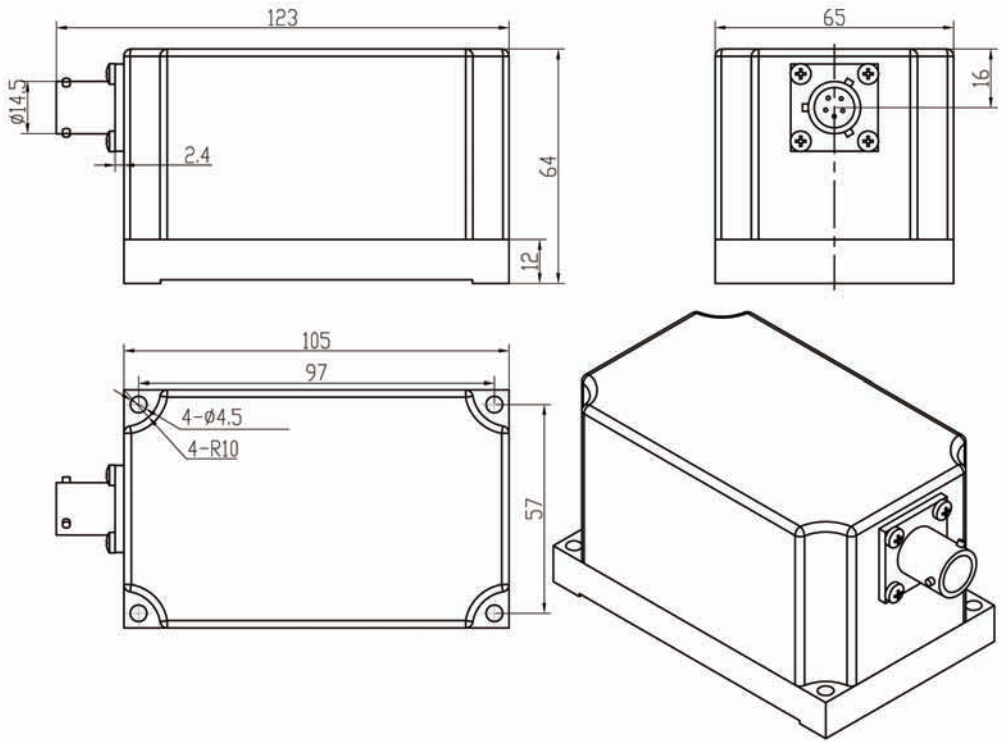
SST400

SST500

# Dimensions (mm)



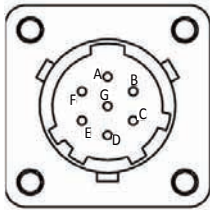
Picture 1 Mechanical draft (Pigtail, suitable to industry class & universal military class)



Picture 2 Mechanical draft (Military connector, suitable to industry class & universal military class)

# Wiring

Table 2 Wiring definition



Picture 3 Connector socket (view from outside)

Socket pin	Pigtail cable	Output(single or double axis)			
		RS232	RS485	RS422	CAN
A	Red	Power +	Power +	Power +	Power +
B	Black	Power -	Power -	Power -	Power -
C	Green	Signal GND	Signal GND	Signal GND	Signal GND
D	Yellow	NC	NC	RS422-RXD+	CANH
E	White	NC	NC	RS422-RXD-	CANL
F	Blue	RS232-TXD	RS485-A	RS422-TXD+	NC
G	Brown	RS232-RXD	RS485-B	RS422-TXD-	NC

Note: 1. Don't connect signal GND and Power GND together.  
 2. Other outputs on request.

# Ordering

