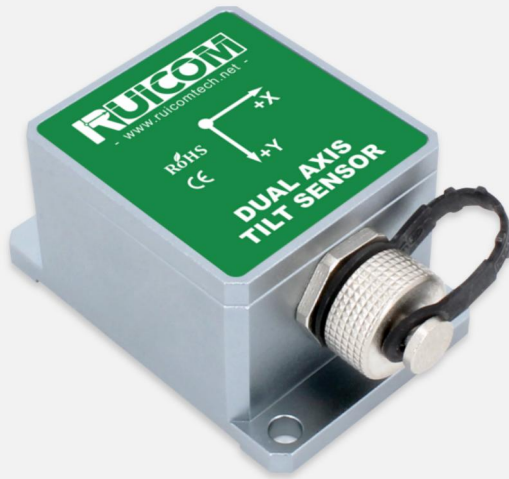




NTS6 voltage output tilt sensor

Product manual

V2.1-20240417



Technical Highlights

- ❖ Output: 0-5V;
- ❖ Measuring range: $\pm 10^\circ$ to $\pm 90^\circ$ selectable;
- ❖ Accuracy: 0.1°;
- ❖ Resolution: 0.02°;
- ❖ High vibration resistance: >3500g.

Product Introduction

The NTS6 series is a small-size, low-cost single-axis tilt sensor launched by Ruicom. Its output voltage, after internal double linearity correction, exhibits excellent linearity, primarily targeting applications with high requirements for installation space and cost. This product integrates a novel tilt-sensing unit based on microelectromechanical systems (MEMS), featuring compact size and low power consumption. MEMS technology also ensures good consistency and stability. The operating temperature range covers industrial-grade -40°C to $+85^\circ\text{C}$, making it a cost-effective tilt module.

This product uses a non-contact measurement principle, providing real-time output of the current tilt angle. It is easy to use, eliminating the need to locate two relatively changing surfaces for installation. Its compact size and strong resistance to external electromagnetic interference and shock vibration make it suitable for industrial equipment, platform attitude measurement, and other applications. It is suitable for both static and slowly changing dynamic angle measurements, exhibiting outstanding electromagnetic interference resistance and capable of long-term stable operation in harsh industrial environments.

Application Scope

- ❖ Angle control for various engineering machinery
- ❖ Monitoring of gimbal operation
- ❖ Four-wheel alignment and control for automobiles
- ❖ Leveling of medical beds
- ❖ Chassis measurement for automobiles
- ❖ Satellite antenna positioning



Performance Parameters

NTS6	Condition	Parameter				Unit
Measurement Range		±30	±60	±90	0~360	°
Measurement Axis		X Y	X Y	X Y	X	Axis
Zero Output	0° output	2.5	2.5	2.5	2.5	V
Resolution		0.02	0.03	0.05	0.08	°
Measurement Accuracy	@25°C	0.1	0.1	0.15	0.2	°
Long-Term Stability		<0.5	<0.5	<0.5	<0.5	°
Zero Temp Coefficient	-40 ~ 85°C	±0.02	±0.02	±0.02	±0.02	%/°C
Sensitivity Temp Coefficient	-40 ~ 85°C	≤150	≤150	≤150	≤150	ppm/°C
Power-On Startup Time		0.5	0.5	0.5	0.5	S
Response Frequency		20	20	20	20	Hz
Electromagnetic Compatibility	Compliant with EN61000 and GBT17626					
Insulation Resistance	≥100 megohms					
Shock Resistance	100g@11ms, triaxial (half-sine wave)					
Vibration Resistance	10grms、10 ~ 1000Hz					
Waterproof Rating	IP67					
Cable	Standard config: 2m shielded cable, weight ≤123g					
Weight	≤112g					

Ordering and Selecting

Model	Housing	Axis	Range	Signal Output	Installation Method
NTS	3: PCBA	X: X Axis	10: ±10°	V1: 0~5V	H: Horizontal installation
	6: Shell	Y: Y Axis	15: ±15°		HD: Horizontal downward
		D: Dual Axis	30: ±30°		V: Vertical installation
			45: ±45°	-	VD: Vertical downward
			60: ±60°		VL: Vertical leftward
			90: ±90°		VR: Vertical rightward
			180: ±180°(only X axis)		
			360: 0~360°(only X axis)		

E.g: NTS3X10-V1-H: PCBA board, X-axis, ±10° measurement range, 0~5V output, horizontal installation.

Note: Measurement range ±180° is limited to single-axis X-axis only, and measurement range ±360° is limited to single-axis X-axis/horizontal installation only.

Angle output calculation formula

Angle = (Output Voltage - Zero-Point Voltage) ÷ Angle Sensitivity

Angle Sensitivity = Output Voltage Range ÷ Angle Measurement Range

E.g: NTS6X10-V1-H (±10° Measurement Range 0 ~ 5V Output Voltage Range)

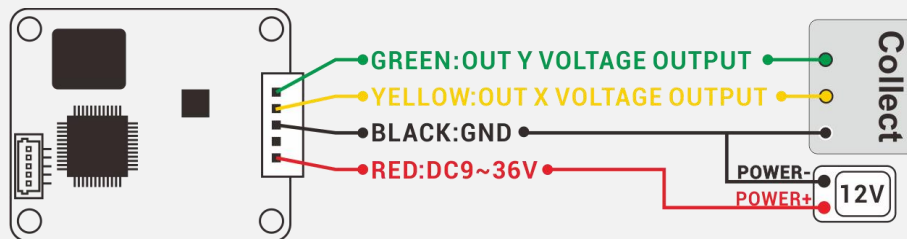
Angle Sensitivity=5V÷(+10°-(-10°))=5÷20=0.25 V/°

✓ Electrical Parameters

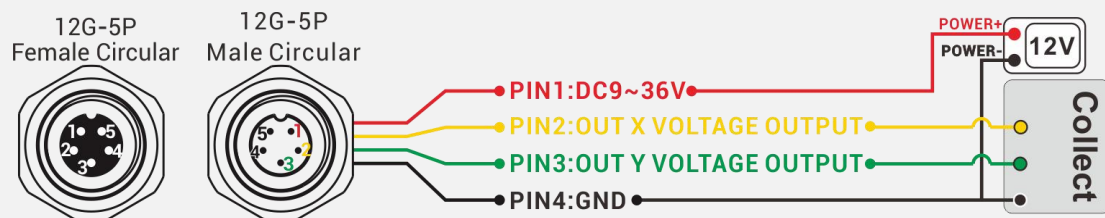
Parameter	Condition	MIN	TYP		MAX	Unit
Supply voltage	Standard	9	12	24	36	V
Operating current			12			mA
Output load	Resistive	10				kΩ
	Capacitive				20	nF
Operating temp		-40			+85	°C
Storage temp		-40			+85	°C

✓ Interface Definition

Wire color	Pin definition	Description
Red	DC9~36V	Power supply positive terminal
Black	GND	Power supply negative terminal
Yellow	Out X	X-axis output voltage
Green	Out Y	Y-axis output voltage

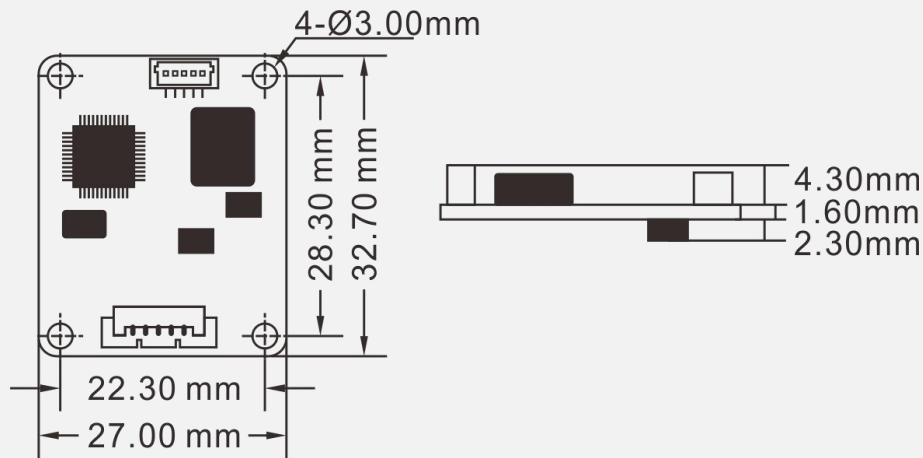


Connector pin/wire colors	Pin definition	Description
PIN1/Red	DC9~36V	Power supply positive terminal
PIN2/Yellow	Out X	X-axis output voltage
PIN3/Green	Out Y	Y-axis output voltage
PIN4/Black	GND	Power supply negative terminal
PIN5/--	NC	No connection



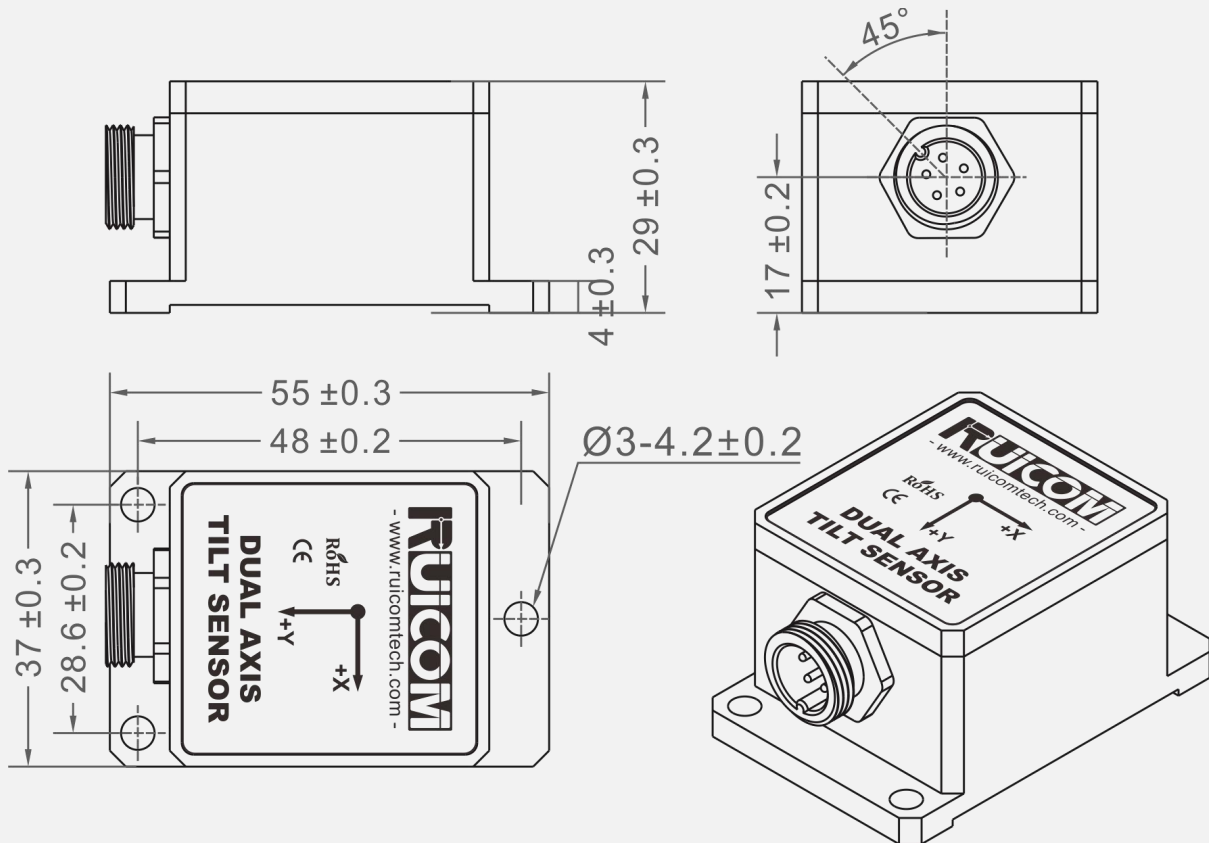
Product Dimensions

PCBA Board Dimensions



PCBA board dimensions: L33 × W27 × H8.2 mm
Recommended screws: 4 × M3 screws

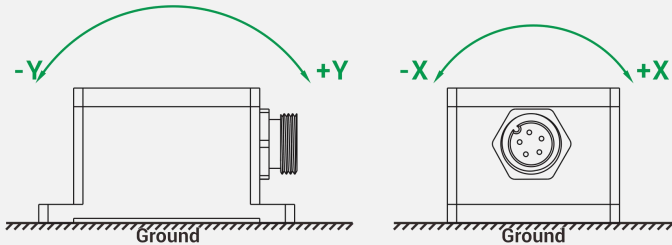
Package dimensions



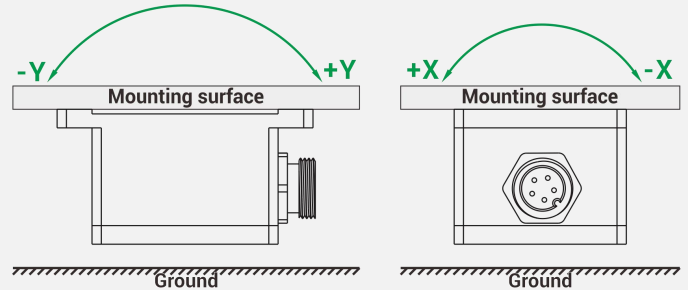
Shell dimensions: L55.5×W37×H29mm
Shell material: anodized aluminum
Connector: aviation plug 12G-5P
Suggested screws: 3 M4 screws

✓ Installation Orientation

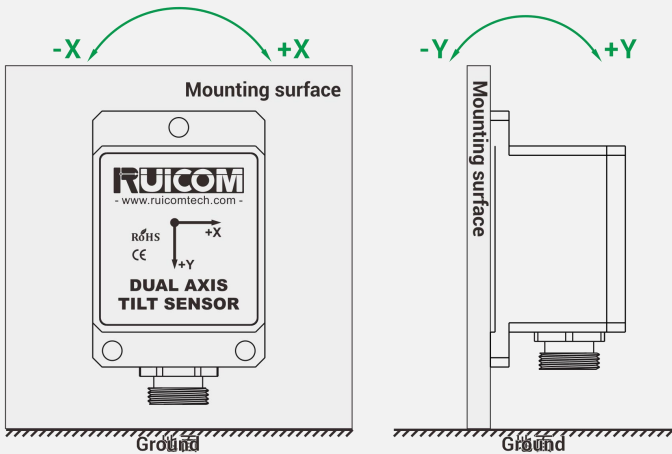
During installation, the sensor mounting surface should be kept parallel to the target surface, and the effects of dynamics and acceleration on the sensor should be minimized. This product can be installed horizontally or vertically; please refer to the diagram below for installation instructions:



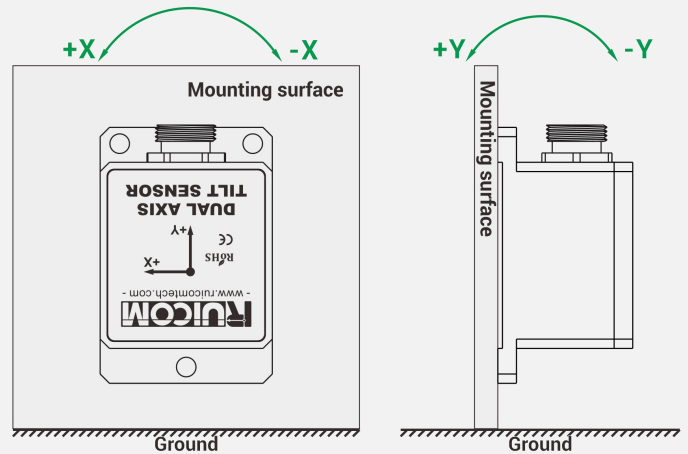
Horizontal installation



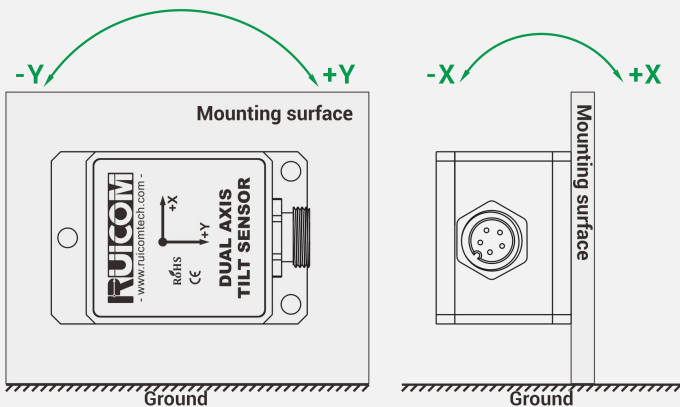
Horizontal downward



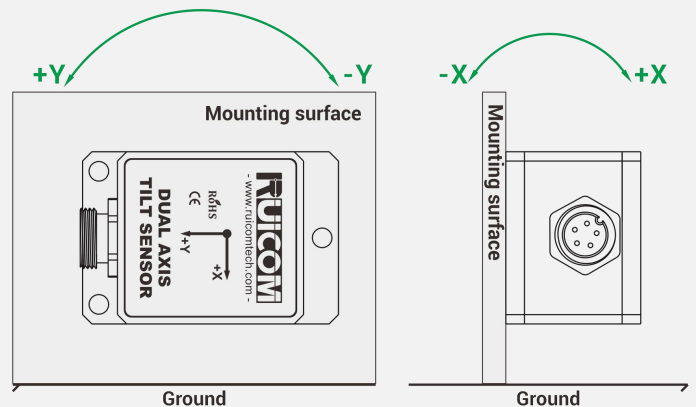
Vertical installation



Vertical downward



Vertical leftward



Vertical rightward