



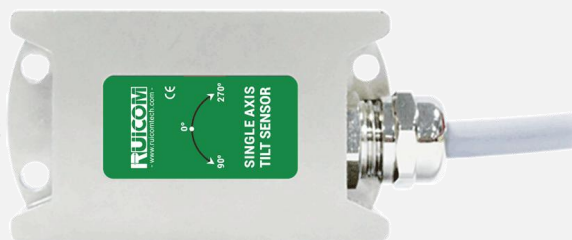
WTS6X Single-Axis Tilt Sensor

Product Manual

V2.0-2026-9-28

✓ Technical Highlights

- ❖ Output interface: RS485;
- ❖ Resolution: 0.1°;
- ❖ Input overvoltage and overcurrent protection;
- ❖ Output surge protection;
- ❖ Operating voltage: DC 9–36V.



✓ Product Introduction

The WTS6X single-axis tilt sensor is a cost-effective tilt-measurement solution developed independently by Ruicom Technology. It features a next-generation, interference-resistant hardware platform and an integrated capacitive MEMS sensing unit. The device offers exceptional performance across a wide temperature range, superior vibration resistance, and long-term operational reliability, with a design service life of up to 10 years.

Utilizing a non-contact, gravity-based measurement principle, the WTS6X employs its internal capacitive MEMS unit to detect components of the Earth's gravitational field, calculating the tilt angle of the target object in real time. Installation is straightforward: the sensor is simply mounted onto the surface of the equipment. It requires no rotating shafts or mechanical linkages, making it free from the constraints typically associated with mechanical moving parts.

Designed for demanding industrial environments, the WTS6X delivers stable performance. It is an ideal choice for attitude monitoring in construction machinery, agricultural equipment, and industrial automation systems, providing a highly cost-effective single-axis tilt-sensing solution for a wide range of industrial applications.

✓ Application Scope

Typical application scenarios for this product series include: structural health monitoring, dual-axis photovoltaic tracking, construction and agricultural machinery, industrial automation platforms, medical rehabilitation equipment, and 2D attitude monitoring for intelligent inspection instruments.

Structural Health Monitoring



New Energy Photovoltaics



Construction Machinery and Agricultural Machinery



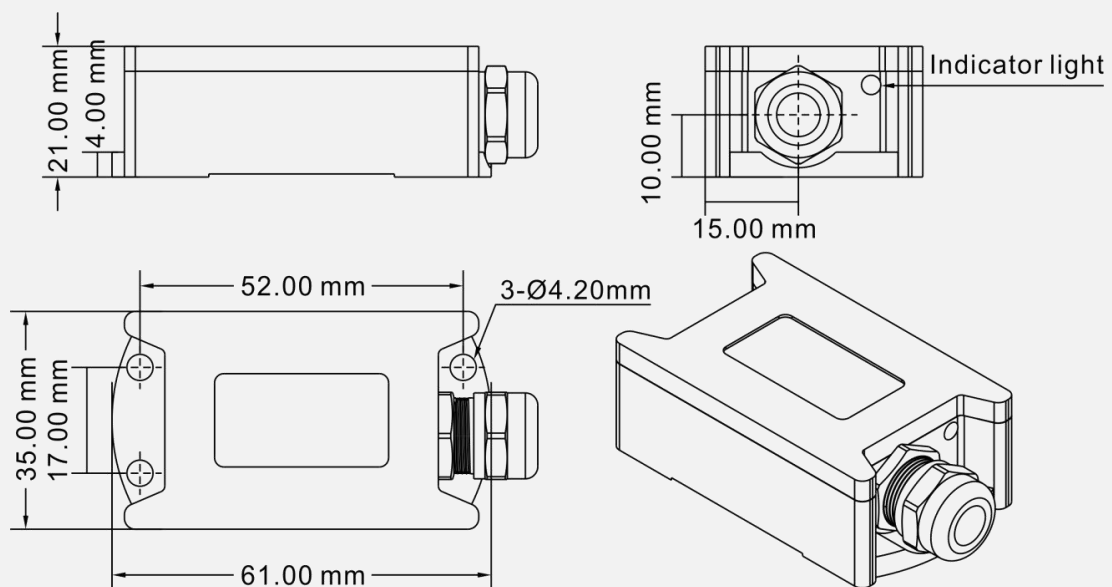
Handheld detection device



Performance Parameters

WTS6X Single Axis	Condition	Parameters	Unit
Measurement Range	Single Axis	0 ~ 360°	°
Resolution	-	0.1	°
Accuracy	25°C	±0.2	°
Temperature Drift	-40 ~ +85°C	±0.003	°/°C
Response Time	No filtering	0.1	s
Operating Temperature	-40°C ~ 85°C		
Output Interface	RS485(MODBUS Protocol)		
Output Load	>500 Ω		
Operating Duration	50,000 hours/cycle (failure-free)		
Insulation Resistance	> 100 MΩ		
Vibration Resistance	10grms、10~1000Hz		
Shock Resistance	100g @ 11ms, three-axis (half-sine wave)		
Weight	≤200g		

Product Dimensions

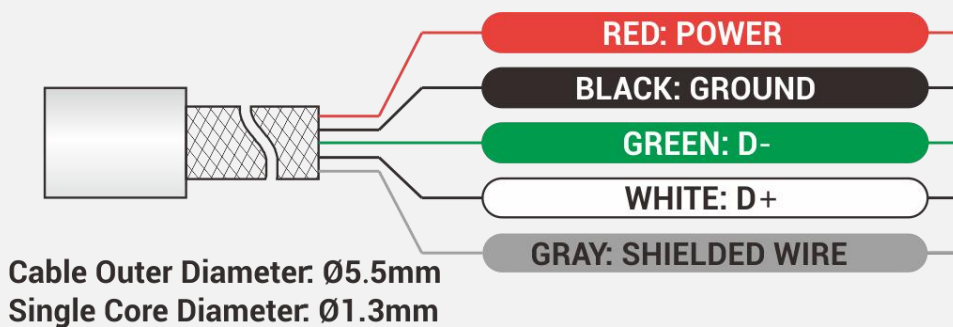


Enclosure dimensions:L61xW35xH21mm

Mounting screws: 3 x M4 screws

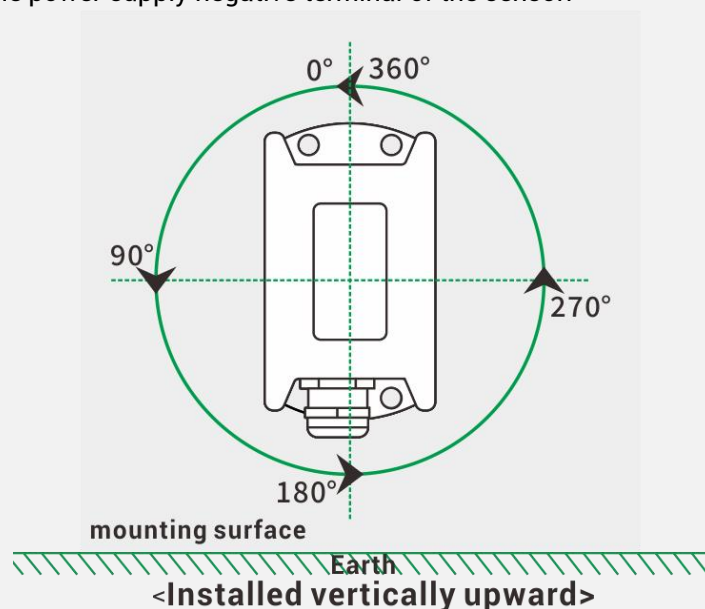
Interface Definition

Thread Color	Definition	Description
Red	DC 9~36V	Positive power supply terminal
Black	GND	Negative power supply terminal
Green	RS485_D-	Receive data
White	RS485(D+)	Receive data
Grey	/	Shielded wire



Instructions for Product Installation, Usage, and Measurement

1. An inclination sensor measures the tilt angle of an object by detecting the Earth's gravitational field. For optimal measurement accuracy, ensure that the sensor's sensing axis is aligned parallel to the tilt axis of the object being measured. The sensor must be mounted securely on a flat, stable surface; an uneven mounting surface may introduce errors in the measured tilt angle.
2. This sensor features an IP67 ingress protection rating, meaning it is resistant to rain and high-pressure water jets. However, do not submerge the sensor in water for extended periods, as this may damage the internal circuitry. The manufacturer offers paid repair services for any damage resulting from such misuse.
3. During installation and wiring, take care to prevent a short circuit between the signal line and the positive terminal of the power supply, as this could burn out the output circuitry. Since the signal negative terminal and the power supply negative terminal are internally connected (shared), ensure that the signal negative terminal at the data acquisition end is connected to the power supply negative terminal of the sensor.





Serial Communication Protocol

1. The communication protocol is compatible with Modbus RTU; default settings: 9600 bps baud rate, no parity, 8 data bits, 1 stop bit.

Register Address	Data Value Name	Data Type	Value Range
0000H	X-axis angle value – high byte	Custom	Measurement Range
0001H	X-axis angle value – low byte	Custom	Measurement Range
0006H	Set/clear relative zero point	Int16U	5A5AH
0007H	Device address	Int16U	0101H~FFFFH(除 6868H)
0008H	Baud rate	Int16U	A0A0H~A2A2H

Use 03H to read registers, 06H to write to registers, and 42H to read the local device address.

2. Command to set sensor address:

Address	Function Code	Register Address High Byte	Register Address Low Byte	Device Address (Target Value)	Device Address (Target Value)	CRC Check
1 Byte	0x06	1 Byte	1 Byte	1 Byte	1 Byte	2 Bytes

Response:

Address	Function Code	Register Address High Byte	Register Address Low Byte	Device Address (Target Value)	Device Address (Target Value)	CRC Check
1 Byte	0x06	1 Byte	1 Byte	1 Byte	1 Byte	2 Bytes

Example: Send command: 01 06 00 07 05 05 [CRC Low] [CRC High]

Return data: 01 06 00 07 05 05 [CRC Low] [CRC High]

This command sets the sensor's address to 0x05; the change takes effect after a restart.

Note: 1. The new address takes effect after a successful response and a subsequent restart.

2. Address 0x68H is a factory-reserved ID and must not be used by customers.

3. Command to read sensor address:

Address	Function Code	Starting address high byte	Starting address low byte	Number of addresses high byte	Number of addresses low byte	CRC Check
0x00	0x42	1 Byte	1 Byte	1 Byte	1 Byte	2 Bytes

Response:

Address	Function Code	Number of returned data bytes	Local address	Local address	CRC Check
1 Byte	0x42	1 Byte	1 Byte	1 Byte	2 Bytes

Example: Send command: 00 42 00 07 00 01 CRC Low CRC High

Return data: 01 42 02 01 01 CRC Low CRC High

This command sets the sensor's address to 0x01.

4. Command to set the sensor baud rate:

Device Address	Function Code	Baud rate starting address (high byte)	Baud rate starting address (low byte)	Baud rate code (high byte)	Baud rate code (low byte)	CRC Check
1 Byte	0x06	1 Byte	1 Byte	1 Byte	1 Byte	2 Bytes

Response:

Device Address	Function Code	Baud rate starting address (high byte)	Baud rate starting address (low byte)	Baud rate code (high byte)	Baud rate code (low byte)	CRC Check
1 Byte	0x06	1 Byte	1 Byte	1 Byte	1 Byte	2 Bytes

Example: Command sent: 01 06 00 08 A0 A0 [CRC Low] [CRC High]

Data returned: 01 06 00 08 A0 A0 [CRC Low] [CRC High]

This command sets the sensor's baud rate to 4800 bps; the setting takes effect after a restart.

Note: a. The baud rate setting becomes effective after a successful acknowledgment and a subsequent restart.

b. Supported baud rates: A0–4800, A1–9600, A2–19200.

5. Command to set or cancel the sensor's relative zero point:

Address	Function Code	Set/Cancel Relative Zero Start Address (High Byte)	Set/Cancel Relative Zero Start Address (Low Byte)	Set/Cancel Relative Zero Command Value (High Byte)	Set/Cancel Relative Zero Command Value (Low Byte)	CRC Check
1 Byte	0x06	1 Byte	1 Byte	1 Byte	1 Byte	2 Bytes

Response:

Address	Function Code	Set/Cancel Relative Zero Start Address (High Byte)	Set/Cancel Relative Zero Start Address (Low Byte)	Set/Cancel Relative Zero Command Value (High Byte)	Set/Cancel Relative Zero Command Value (Low Byte)	CRC Check
1 Byte	0x06	1 Byte	1 Byte	1 Byte	1 Byte	2 Bytes

Example: Send command: 01 06 00 06 5A 5A CRC Low CRC High

Return data: 01 06 00 06 5A 5A CRC Low CRC High

6. Command to read angle data:

Address	Function Code	High byte of the starting address for reading angle data	Low byte of the starting address for reading angle data	High byte of the number of angle data entries to read	Low byte of the number of angle data entries to read	CRC Check
1 Byte	0x03	1 Byte	1 Byte	1 Byte	1 Byte	2 Bytes

Response:

Address	Function Code	Number of bytes for angle data	Hundreds digit of angle data	Tens and units digits of angle data	Decimal digits (tenths and hundredths) of angle data	Reserved decimal place for angle data	CRC Check
1 Byte	0x03	1 Byte	1 Byte	1 Byte	1 Byte	1 Byte	2 Bytes

Example: Send command: 01 03 00 00 00 02 C4 0B

Return data: 01 03 04 01 23 3C 00 [CRC Low] [CRC High]

The returned angle is 135.60° (angle value = $[(1 * 100) + (2 * 16 + 3) + (3 * 16 + 12) / 100]$).