



# **HTS6 High-Precision CAN2.0A Output Tilt Sensor**

## **Product manual**

V1.8-20250919

## Technical Highlights

- ❖ Measuring range selectable from  $\pm 1^\circ$  to  $\pm 35^\circ$ ;
- ❖ Small measuring range accuracy  $0.001^\circ$ ;
- ❖ Resolution  $0.001^\circ$ ;
- ❖ High vibration resistance  $>2000g$ ;
- ❖ Wide voltage input DC 9~36V;
- ❖ CAN2.0A signal output.



## Product Introduction

The HTS6-CAN2.0A is a high-performance single/dual-axis tilt measuring instrument independently developed by RUICOM Technology. Building upon the excellent stability of the STS series, it achieves significant improvements in measurement accuracy and temperature drift characteristics. This product employs a high-precision 16-bit A/D differential converter, combined with an advanced fifth-order digital filtering algorithm, to accurately detect the tilt and pitch angles of the sensor relative to the horizontal plane.

The product provides a CAN 2.0A communication interface and integrates a high-precision digital temperature sensor, supporting real-time temperature drift compensation (temperature output optional), ensuring excellent measurement repeatability over a wide temperature range. The default output response frequency is 50Hz, and customized solutions with higher frequencies can be provided according to customer needs.

This product conforms to industrial-grade standards, possesses excellent environmental adaptability and scalability, and can operate stably in various harsh industrial scenarios, meeting high-reliability control requirements.

## Application Scope

Typical applications of this product series include: industrial automation, engineering machinery platform leveling systems, photovoltaic tracking bracket control systems, aerospace attitude reference systems, precision instrument leveling devices, and high-precision tilt measurement fields such as platform leveling.



## Performance Parameters

| HTS6                                                                                                                                                                                                                                                                                  | Condition                                                  | Parameter          |                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|--------------------|--------------------|
| Measurement Range                                                                                                                                                                                                                                                                     |                                                            | ±10°               | ±35°               |
| Measurement Axis                                                                                                                                                                                                                                                                      |                                                            | Single / Dual-axis | Single / Dual-axis |
| Resolution <sup>1)</sup>                                                                                                                                                                                                                                                              |                                                            | 0.001°             | 0.001°             |
| Measurement Accuracy <sup>2)</sup>                                                                                                                                                                                                                                                    | @25℃                                                       | 0.005°(RMS)        | 0.01°(RMS)         |
| Long-Term Stability                                                                                                                                                                                                                                                                   |                                                            | 0.01°              | 0.02°              |
| Zero-Point Temp Coefficient <sup>3)</sup>                                                                                                                                                                                                                                             | -40~85℃                                                    | ±0.002°/℃          | ±0.002°/℃          |
| Sensitivity Temp Coefficient <sup>4)</sup>                                                                                                                                                                                                                                            | -40~85℃                                                    | ≤50ppm/℃           | ≤50ppm/℃           |
| Power-On Startup Time                                                                                                                                                                                                                                                                 |                                                            | 0.5s               | 0.5s               |
| Response Frequency                                                                                                                                                                                                                                                                    |                                                            | 20Hz               | 20Hz               |
| Output Rate                                                                                                                                                                                                                                                                           | 5Hz / 15Hz / 35Hz / 50Hz Configurable                      |                    |                    |
| Output Signal                                                                                                                                                                                                                                                                         | CAN2.0A                                                    |                    |                    |
| EMC                                                                                                                                                                                                                                                                                   | According to EN61000 and GBT17626                          |                    |                    |
| Insulation Resistance                                                                                                                                                                                                                                                                 | ≥100 MΩ                                                    |                    |                    |
| Shock Resistance                                                                                                                                                                                                                                                                      | 100g@11ms, 3 Axial Direction (Half Sinusoid)               |                    |                    |
| Vibration Resistance                                                                                                                                                                                                                                                                  | 10grms/10~1000Hz                                           |                    |                    |
| Protection Class                                                                                                                                                                                                                                                                      | IP67                                                       |                    |                    |
| Cables                                                                                                                                                                                                                                                                                | Standard 2m cable, wire diameter 6.0mm, wire weight < 155g |                    |                    |
| Weight                                                                                                                                                                                                                                                                                | ≤200g (excluding cable)                                    |                    |                    |
| 1)Resolution: The smallest angular change that can be detected within the effective measurement range, reflecting its ability to monitor minute tilt fluctuations.                                                                                                                    |                                                            |                    |                    |
| 2)Measurement Accuracy: A comprehensive evaluation of the sensor's performance indicators under standard ambient temperature, including the overall performance of linearity error, repeatability error, hysteresis error, zero-point offset error, and cross-axis sensitivity error. |                                                            |                    |                    |
| 3)Zero-Point Temperature Coefficient: The ratio of the sensor's output value to temperature when the sensor is in a zero-input state, defined as the ratio of the zero-point offset within the rated operating temperature range to the room temperature reference value.             |                                                            |                    |                    |
| 4)Sensitivity Temperature Coefficient: A stability index of the sensor's full-scale output value with temperature changes, characterizing the drift rate of sensitivity relative to the room temperature reference value within the rated temperature range.                          |                                                            |                    |                    |

## Electrical Parameters

| Parameter             | Condition  | Min | TYP            | Max | Unit |
|-----------------------|------------|-----|----------------|-----|------|
| Power supply voltage  | Standard   | 9   | 12 24          | 36  | V    |
|                       | Customized |     | Other voltages |     |      |
| Operating current     | No load    |     | 50             |     | mA   |
| Operating temperature |            | -40 |                | +85 | °C   |
| Storage temperature   |            | -40 |                | +85 | °C   |

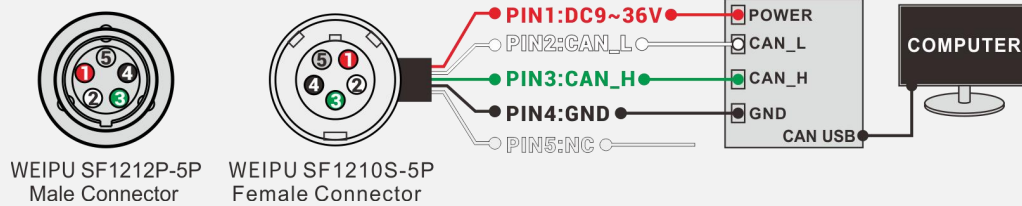
## Order selection

| Model | Axis          | Range               | Communication Protocol | Installation Direction    |
|-------|---------------|---------------------|------------------------|---------------------------|
| HTS6  | X : X-axis    | 10 : $\pm 10^\circ$ | C2 : CAN2.0A Protocol  | H:Horizontal installation |
|       | Y : Y-axis    | 15 : $\pm 15^\circ$ |                        | V:Vertical installation   |
|       | D : Dual-axis | 35 : $\pm 35^\circ$ |                        |                           |

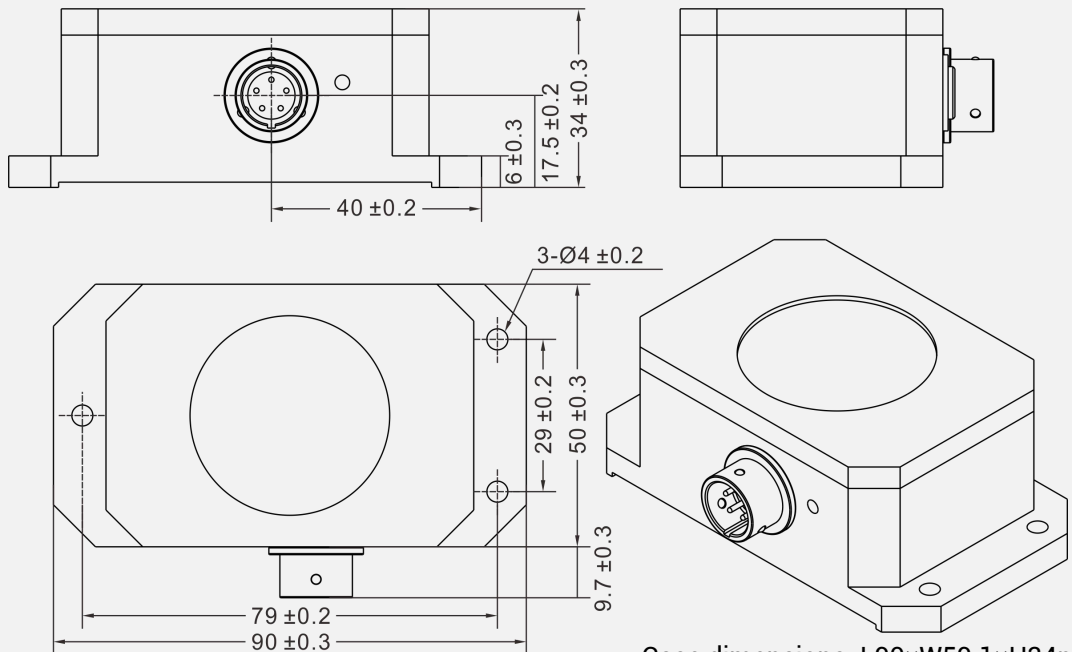
E.g: HTS6X10-C2-H: X-axis / Measurement range  $\pm 10^\circ$  / CAN2.0A protocol / Horizontal installation.

## Interface Definition

| Pin/Thread Color | Definition | Description                    |
|------------------|------------|--------------------------------|
| PIN1 / Red       | DC9~36V    | Positive power supply terminal |
| PIN2 / White     | CAN_L      | Transmits low-level signal     |
| PIN3 / Green     | CAN_H      | Transmits high-level signal    |
| PIN4 / Black     | GND        | Negative power supply terminal |
| PIN5 / -----     | --         | --                             |



## Product Dimensions



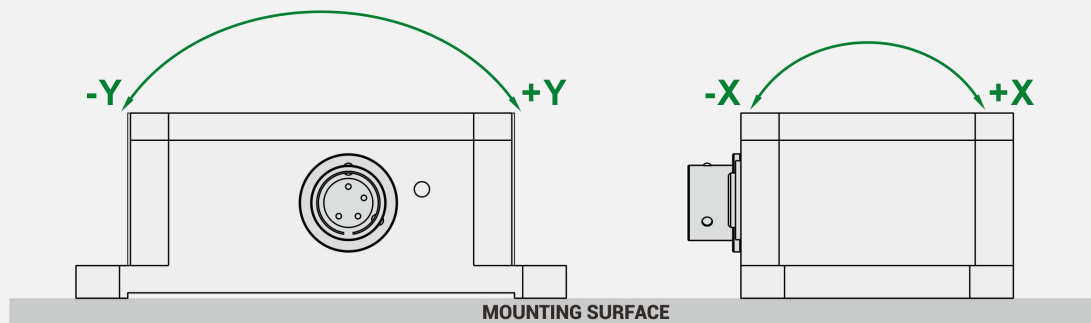
Case dimensions: L90×W59.1×H34mm

Recommended screws: 3 M4 screws

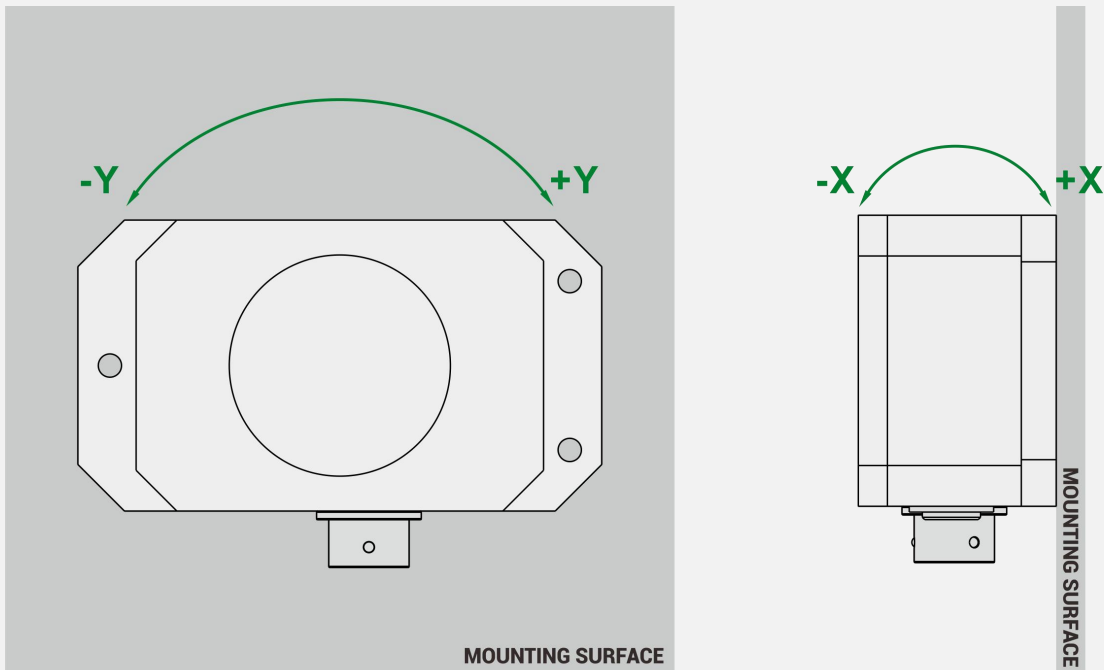
## ✓ Indicator light operation instructions

The red indicator light remains constantly on after the product is powered on. It will begin flashing when a connection is successfully established and data is being transferred. If the red light remains constantly on during the connection process, it indicates a connection failure, and a reconnection operation is required.

## ✓ Measurement direction



**Horizontal installation**



**Vertical installation**

## Communication Protocol

1) Modify the node number; the ID width is 11 bits; the default node number is 0x05.

| CAN-ID     | 1st Byte | 2nd Byte | 3rd Byte | 4th Byte | 5th Byte | 6th Byte | 7th Byte | 8th Byte |
|------------|----------|----------|----------|----------|----------|----------|----------|----------|
| 0x600+0x05 | 0x40     | 0x10     | 0x10     | 0x00     | Node_ID  | 0x00     | 0x00     | 0x00     |

Request message format

| CAN-ID     | 1st Byte | 2nd Byte | 3rd Byte | 4th Byte | 5th Byte | 6th Byte | 7th Byte | 8th Byte |
|------------|----------|----------|----------|----------|----------|----------|----------|----------|
| 0x580+0x05 | 0x40     | 0x10     | 0x10     | 0x00     | Node_ID  | 0x00     | 0x00     | 0x00     |

Response message format

**Note :** If the controller sends CAN-ID=0x600+0x05, and sends the data: 40 10 10 00 10 00 00 00

The sensor returns CAN-ID=0x580+0x05 (default), and sends the data: 40 10 10 00 10 00 00 00. After power-on, the received frame ID is 0x590 (0x580+0x10), indicating that the frame ID was successfully modified

2) Set the CAN baud rate

| CAN-ID     | 1st Byte | 2nd Byte | 3rd Byte | 4th Byte | 5th Byte | 6th Byte | 7th Byte | 8th Byte |
|------------|----------|----------|----------|----------|----------|----------|----------|----------|
| 0x600+0x05 | 0x40     | 0x20     | 0x10     | 0x00     | Baud     | 0x00     | 0x00     | 0x00     |

Table 1-5 Request Message Format

| CAN-ID     | 1st Byte | 2nd Byte | 3rd Byte | 4th Byte | 5th Byte | 6th Byte | 7th Byte | 8th Byte |
|------------|----------|----------|----------|----------|----------|----------|----------|----------|
| 0x580+0x05 | 0x40     | 0x20     | 0x10     | 0x00     | Baud     | 0x00     | 0x00     | 0x00     |

Response message format

**Note :** The fifth byte (Baud) is 0x01, 0x02, 0x03, or 0x04. 0x01 represents a baud rate of 500K bps, 0x02 represents 250K bps, 0x03 represents 125K bps, and 0x04 represents 100K bps. The default baud rate is 125K bps. After sending this command and receiving the returned data, the sensor needs to be powered on again for the baud rate modification to succeed.

3) Angle Data Parsing

1. The sensor outputs an angle immediately upon power-on. The message format is as follows :

| CAN-ID        | 1st Byte | 2nd Byte | 3rd Byte | 4th Byte | 5th Byte | 6th Byte | 7th Byte | 8th Byte |
|---------------|----------|----------|----------|----------|----------|----------|----------|----------|
| 0x580+Node_ID | XL       | XM       | XH       | X sign   | YL       | YM       | YH       | Ysign    |

The CAN-ID is followed by eight bytes of parameters. The first four bytes are the X-axis tilt angle data, and the next four bytes are the Y-axis tilt angle data.

Angle conversion example :

The X-axis angle data is represented by a 24-bit binary number. The high 8 bits are XH, the middle 8 bits are XM, and the low 8 bits are XL, with the sign Xsign. Convert this 24-bit binary number to a decimal number, then divide by 10000; the result is the angle. Xsign = 0x00, the angle is positive; Xsign = 0x01, the angle is negative.

**For example ,** XL=0x43, XM=0x53, XH=0x02, Xsign=0x01, the angle is -15.2387. The conversion process is as follows :

XH      XM      XL  
0x02    0x53    0x43  
0x025343 = 152387  
152387/10000=15.2387°

Xsign=0x01, the final result is -15.2387°