LTS6 CAN2.0B low-power tilt sensor

Product manual

V1.5-20230921

Technical Highlights

- ❖ Six installation methods ;
- ❖ Resolution 0.1° ;
- ❖ Output method: CAN 2.0B;
- ❖ High vibration resistance >2000g.

Product Introduction

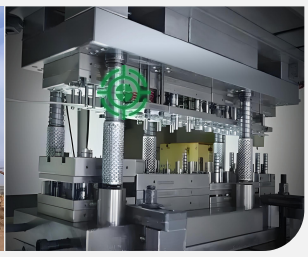
The LTS 6 series is a new generation of dynamic measurement-type, small-volume MEMS tilt sensors launched by RUICOM Technology , capable of stably measuring the attitude of moving vehicles. This product incorporates a dual-channel gravity tilt unit, measuring static gravitational acceleration and converting it into tilt angle changes, thereby obtaining the sensor's output tilt and pitch angles relative to the horizontal plane . The output interface is CAN2.0B. Thanks to the built-in MCU control system, the sensor's output linearity is double-corrected, compensating for the accuracy loss caused by insufficient correction in analog products .

This product employs a non-contact measurement principle, providing real-time output of the current attitude tilt angle. It is easy to operate and eliminates the need to locate two mounting surfaces with relative changes. Suitable for both static and dynamic measurement scenarios, this product is a reliable choice for industrial automation control and platform attitude measurement . It also possesses strong resistance to external electromagnetic interference. It can operate stably for a long time in harsh industrial environments.

Application Scope

- ❖ Agricultural machinery and equipment
- ❖ Aerial work platform
- ❖ Electric vehicle control system
- ❖ Construction hoisting equipment
- ❖ Medical equipment leveling
- ❖ Woodworking machinery



Performance Parameters

LTS6	Condition	Parameter	Unit
Measurement range		± 90°	°
Measuring axis		X axis / Y	axis
Resolution		0.1	°
Static temperature	@25℃	±0.3	°
Dynamic temperature	@25℃	±0.8	°
Zero-point temp coefficient	-40℃~85℃	±0.01	°/℃
Sensitivity temp coefficient	-40℃~85℃	≤ 100	ppm /℃
Power-on startup time		1.5	S
Response frequency		0.05	S
Output signal	CAN2.0B		
EMC	According to EN 61000 and GBT 17626		
Insulation resistance	≥100 megohms		
Impact resistance	100g@ 11 ms , triaxial (half-sine wave)		
Vibration resistance	10grms 10~1000 Hz		
Protection level	IP67		
Cable	Standard 2-meter shielded wire		
Size	L64.5×W50×H18.5mm		
weight	≤100g (excluding cable)		

Electrical parameters

parameter	Conditions	MIN	TYP		MAX	Unit
power supply voltage	Standard	9	12	24	36	V
operating current	no-load		40			mA
Operating temperature		-40			+85	℃
Storage temperature		-40			+85	℃

Ordering Selection

Model	Axis	Range		Signal Output		Installation Direction
LTS6	X: X-axis	10: ±10°	-	C3: CAN2.0B	-	H:Horizontal installation
	Y: Y-axis	15: ±15°				HD:Horizontal downwards
	D: Dual axis	30: ±30°				V:Vertical installation
		45: ±45°				VD:vertically downward
		60: ±60°				VL:Vertical leftwards
		90: ±90°				VR:Vertical rightwards

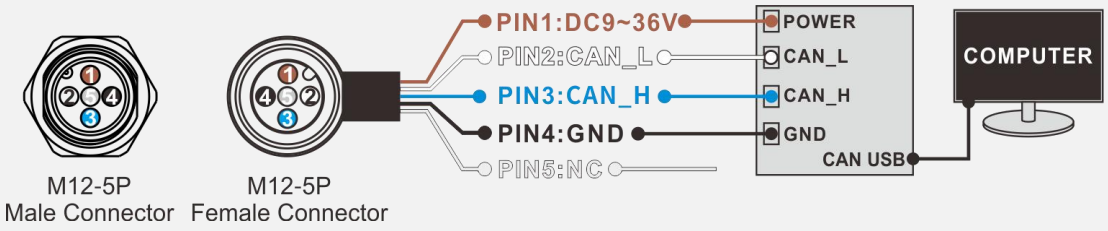
E.g: LTS6X-10-C3-H: X-axis, ±10° Range, CAN2.0B signal output, horizontal installation.

Product dimensions

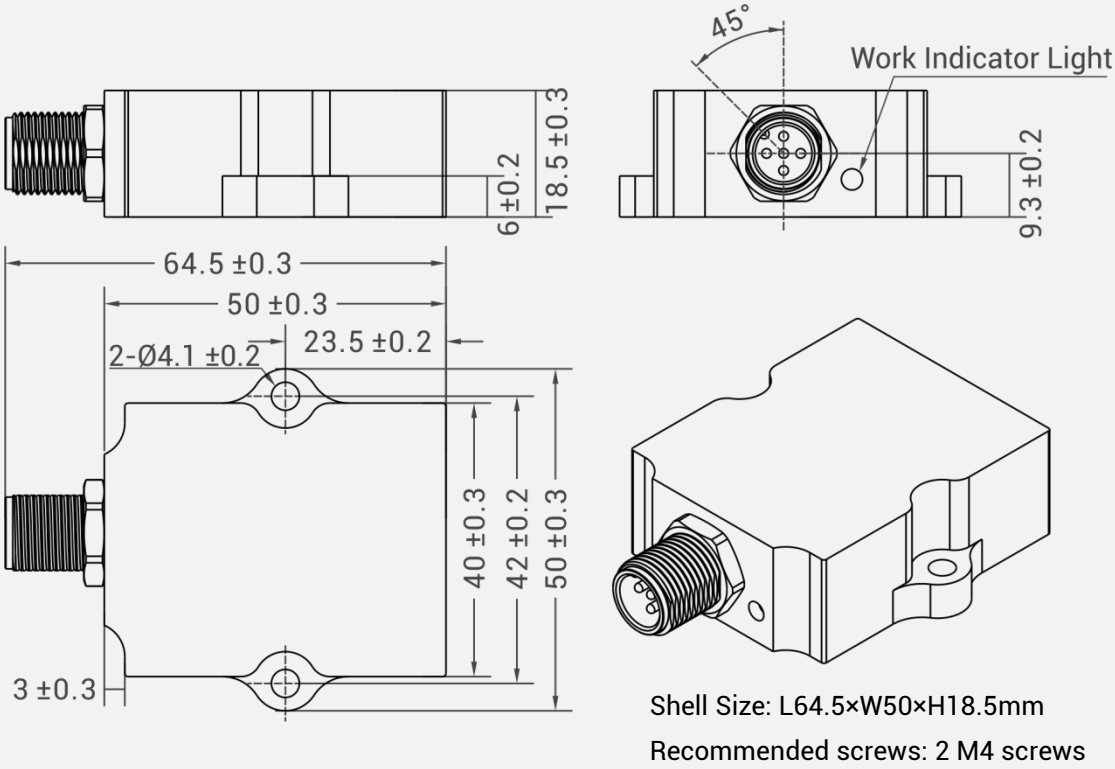
1.Gravity-based tilt sensor. Align its sensing axis parallel to the target tilt axis with flat, tight mounting surfaces for precision.
2.Mount per factory preset orientation. Send zero command after power-up to set current position as zero; parameters auto-save to internal memory.
3.IP67 rated against rain and high-pressure spray. Do not submerge long-term. Water damage repair available at customer expense.
4.Isolate signal wires from power positive to avoid short circuits. Common ground design: securely link sensor GND to acquisition unit GND.

Interface Definition

Pin/wire color	Pin definition	Description
PIN1/Brown	9 ~36V	Positive terminal of power supply
PIN2/White	GND	negative terminal of power supply
PIN3/Blue	CAN_H	Transmitting low-level signals
PIN4/Black	CAN_L	Transmit high-level signal



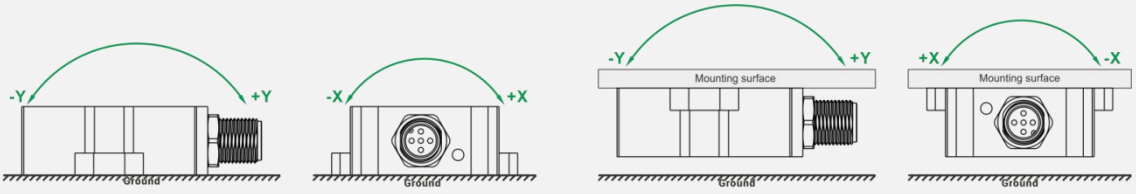
Product dimensions



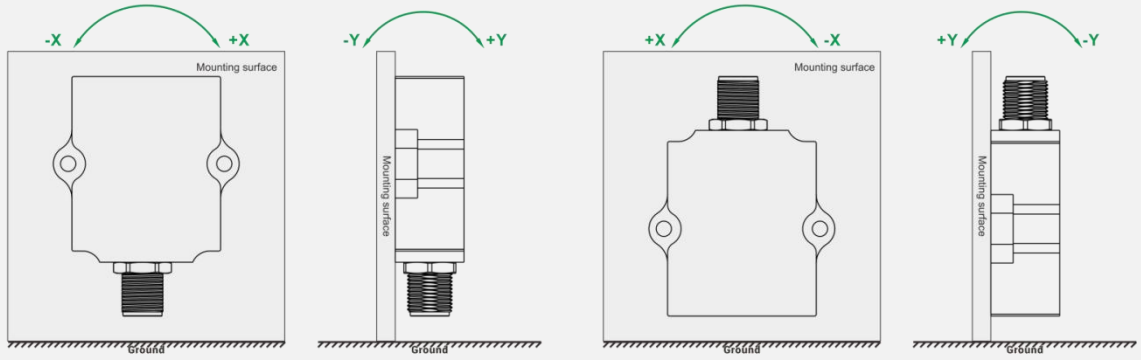
Shell Size: L64.5×W50×H18.5mm

Recommended screws: 2 M4 screws

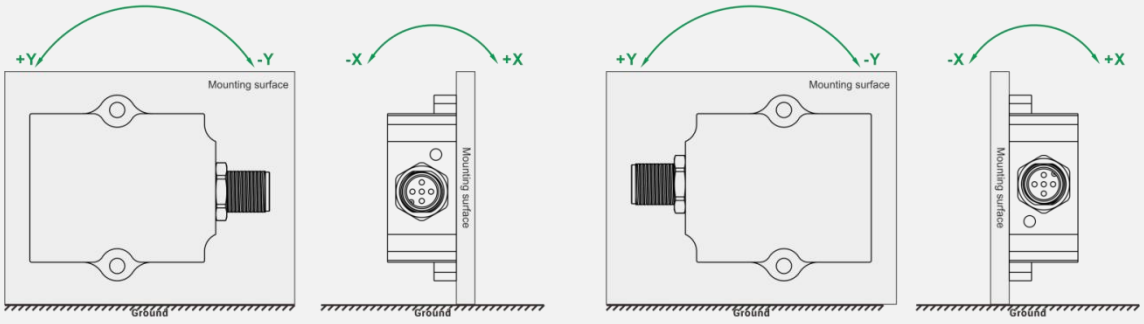
Measurement direction



Horizontal installation　　Horizontal downwards



Vertical installation　　Vertically downward



Vertical leftwards　　Vertical rightwards

Note: During installation, the sensor installation surface should be kept parallel to the measured target surface, and the influence of dynamics and acceleration on the sensor should be reduced. This product can be installed horizontally or vertically (the vertical installation option is only applicable to single axis). Please refer to the following plan for installation.

Communication Protocol

1) Modify the node number, with an ID bit width of 29 bits and a default node number of 0x05

Request message format

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

Response 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

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

The sensor returned CAN-ID=0x580+0x05, and the returned data is: 40 10 00 10 00 00 00. After powering on again, it received a frame ID of 0x590 (0x580+0x10), indicating that the frame ID was successfully modified.

2) Set CAN baud rate

Request message format

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

Response 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

Note: The fifth byte (Baud) is 0x00, 0x01, 0x02, 0x03, 0x04. Among them, 0x00 represents setting the baud rate to 1000K bps, 0x01 represents setting the baud rate to 500K bps, 0x02 represents setting the baud rate to 250K bps, 0x03 represents setting the baud rate to 125K bps, 0x04 represents setting the baud rate to 100K bps, and 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 to be successfully modified.

3) Angle data analysis

After the sensor is powered on, there is an angle output, and 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	XH	Xsign	YL	YH	Ysign	0x00	0x00

After CAN-ID, there are eight byte parameters, with the first three bytes being the X-axis tilt angle parameter and the following three bytes being the Y-axis tilt angle parameter, with the low byte at the beginning and the high byte at the end.

Example of angle conversion:

The size of the X-axis angle data is represented by a 16 bit binary number, with the upper 8 bits being XH, the lower 8 bits being XL, and the sign bit being Xsign.

Convert the 16 bit binary number to a decimal number, then divide by 100, and the result is the angle. Xsign=0x00, The angle is positive, Xsign=0x01, The angle is negative.

For example, XL=0x26, XH=0x15, Xsign=0x01, The angle is -54.14°

XH XL

0x15 0x26

0x1526(5414)

5414/100=54.14°

Xsign=0x01, The final result is -54.14°

4) Set output frequency (factory default output 0x06: 25Hz)

Request message format

CAN-ID	1st byte	2nd byte	3rd byte	4th byte	5th byte	6th byte	7th byte	8th byte
0x600+0x05	0x40	0x30	0x10	0x01	Freq	0x00	0x00	0x00

Response message format

CAN-ID	1st byte	2nd byte	3rd byte	4th byte	5th byte	6th byte	7th byte	8th byte
0x580+0x05	0x40	0x30	0x10	0x01	Freq	0x00	0x00	0x00

Output frequency: 0x00: Turn off output; 0x01: 1Hz ; 0x02: 5Hz; 0x03: 10Hz ;
0x04:15Hz; 0x05: 20Hz; 0x06: 25Hz; 0x07: 35Hz;
0x08: 50Hz; 0x09: 100Hz