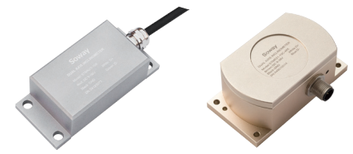
Angle measurement

Angle sensor

P.33

Inclinometer



P.37

Angle sensor

SAHC series sensors are integrated linear contact angle position sensors. The sensor uses Hall effect technology to operate using magnetic fields generated by permanent magnets. The output voltage provided is linearly varying (proportional input voltage) to the rotation angle of the input shaft.

Inquiry Soway

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Data download

www.sowaysensor.com/product/

Sensor linear output, from 0° to 360°, without compensation

Application area

Valve position detection

throttle position detection

Vehicle body height detection

accelerator pedal detection

Product example

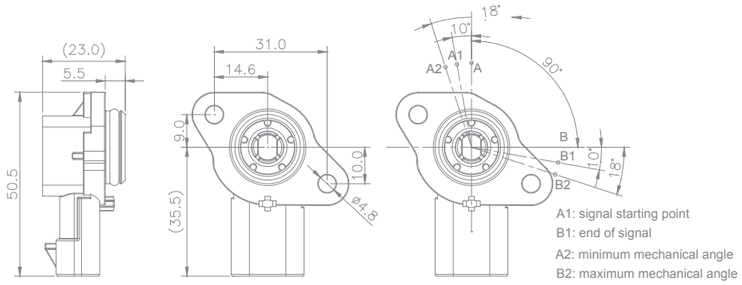
Basic performance parameter

Model	SAHC01-120 series
Input voltage	5.0 VDC ± 10%
Measuring angle	0~120°
Output signal	0.5-4.5V analog quantity, PWM, SENT output optional 5°~85°: The measurement of input voltage from 10% to 90% is linear
Output clamp function	0°-5°: of input voltage 10% 85°-120°of input voltage 90%
Output linearity	±3%F.S
Housing material	Glass fiber reinforced plastics
Life span	Full cycle more than 10 million times
Level of protection	IP67
Anti-seismic performance	1g RMS axial, 5g RMS horizontal, 8g RMS vertical; 20Hz to 2kHz
Working temperature	-40 ℃~+135 ℃
Storage temperature	-40 ℃~+150 ℃
Outgoing mode	Terminal outgoing

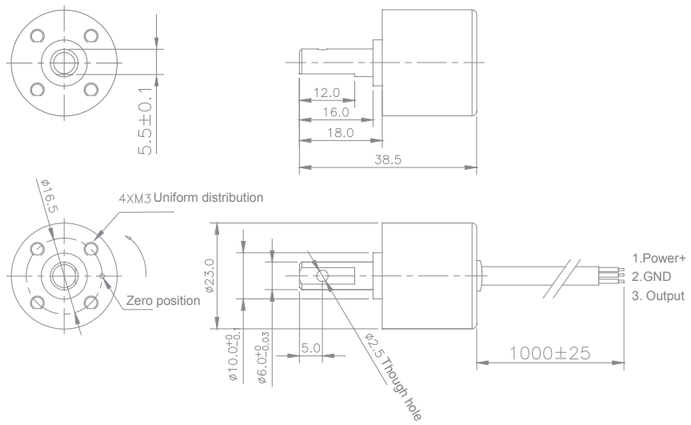
Model	SAHC23-360
Input voltage	12~24 VDC
Measuring angle	360°
Output signal	0~5V
Loadrating	＞4KΩ
Resolution (chip)	12-bit
Precision (chip)	10-bit
Maximum RPM	10000rpm
Working temperature	-40°C~+85°C
Storage temperature	-40°C~+90°C
Service life	Relating to speed and frequency of use
Level of protection	IP65
Housing and shaft material	Aluminum/ stainless steel
Outgoing mode	Terminal outgoing

External dimension

SAHC01-120 Wiring diagram

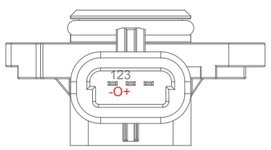


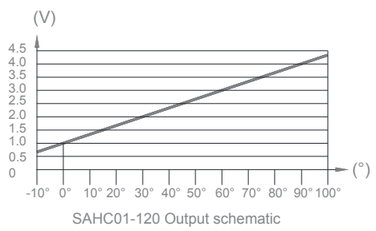
SAHC23-360 Dimension diagram



Wiring method

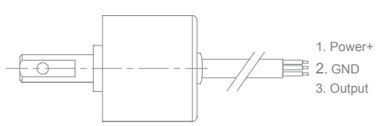
SAHC01-120 Output schematic

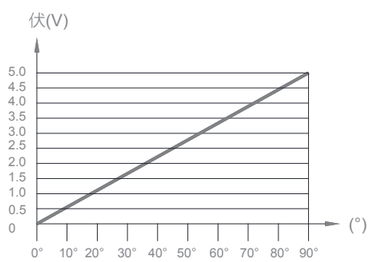




SAHC01-120 Output schematic

SAHC23-360 Wiring diagram





SAHC23-360 Output schematic

Product selection list

SAH	□ □	□	–	□ □ □	–	□ □ □	–	□ □	□	□ □
	Product series	Structural form		Measuring angle		Output signal		Installation information	Electrical connection	Wiring length
	Rectangular structure us size code, cylinder us diameter unit mm series	Default: One-piece R: Split		Unit: degree		A1:4~20mA V2:0~5V V7:0.5~4.5V VR: Ratio output OP:PWM output OS:SENT output OL:LIN output		See Table 1	P: PVC sheathed cable U: PU sheathed cable D: Connector output	Unit: 100mm

Schedule 1-Installation method of body and table of parameters

Method and parameter list of body installation							
Installation mode	Parameters						
□	□						
C: Cylinder	Code	Thread/outside diameter	DN	British system	Code	Thread/outside diameter	British system
M: Standard thread	1			1/8”	D	16	
T: Fine thread	2			1/4”	E	18	
S: Extreme fine thread	3	3	10	3/8”	F	20	
F: Flange DN	4	4	15	1/2”	G	22	2”
G: British thread	5	5	20		H	24	
N: NPT thread	6	6	25	3/4”	I	27	
	7	7	30		J	30	
	8	8	32	1”	M	50	
	9				N	60	
	A	10	40				
	B	12	50				
	C	14	60				

Inclinometer

- Biaxial tilt angle measurement
- High anti-vibration performance> 2000g
- High resolution and high precision

STMR20E is a serial port output biaxial tilt angle sensor for industrial field control, with built-in high-precision A/D differential converter, which can measure the tilt and pitch angle of the sensor output relative to the horizontal plane by using the fifth-order filtering algorithm. Output interface RS485, RS232, CAN and MODBUS are optional.

Due to the built-in ADI high precision digital temperature sensor, the temperature drift of the sensor can be corrected according to the change of the built-in temperature sensor to ensure high repeatability of products in low temperature and high temperature conditions. Output response frequency standard can reach up to 18 Hz, and can be customized according to user's needs if higher response frequency is required. Products belong to the real industrial-grade products, with reliable and stable performance, good scalability, and a variety of output options,- which are suitable for all kinds of harsh industrial control environment.

Inquiry Soway

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Data download

www.sowaysensor.com/product/

Application area

Bridge monitoring

Various construction machinery inclination monitoring

Ship monitoring

Satellite antenna inclination monitoring

Product example

STMR20E biaxial digital output tilt sensor

STMR21 full temperature compensation high precision biaxial digital output tilt sensor

Basic performance parameter

Parameter Table of STMR20E Dual-axis Digital Output Tilt Angle Sensor

Parameter	Condition	STMR20E-10	STMR20E-30	STMR20E-60	STMR20E-90	Unit
Measuring range		±10	±30	±60	±90	°
Measuring shaft		X、Y	X、Y	X、Y	X、Y	
Resolution		0.01	0.02	0.03	0.04	°
Absolute accuracy		0.02	0.05	0.08	0.1	°
Long term stability			0.05	0.05	0.05	
Zero temperature coefficient	-40～85°	±0.006	±0.006	±0.006	±0.006	°/℃
Sensitivity temperature coefficient	-40～85°≤100	≤100	≤100	≤100	≤100	ppm/℃
Store start-up time		0.5	0.5	0.5	0.5	S
Response time		0.02	0.02	0.02	0.02	S
Output speed	5Hz、15Hz、35Hz、50Hz、100HZ Configurable					
Output signal	RS2 32/RS485/CAN/MODBUS					
Electromagnetic compatibility	In accordance with EN61000 和 GBT17626					
Mean trouble-free working time MTBF	≥ 50000 hours per second					
Insulation resistance	≥ 100 mega ohms					
Shock resistance	100g@11ms, triaxial (semi-sine wave)					
Vibration resistance	10grms、10～1000Hz					
Waterproof	IP67					
Cable	Standard configuration: 1 meter long, wear-resistant, oil-proof, wide temperature, shielded cable of 4*0.4 mm2					
Weight	120g (without wire)					

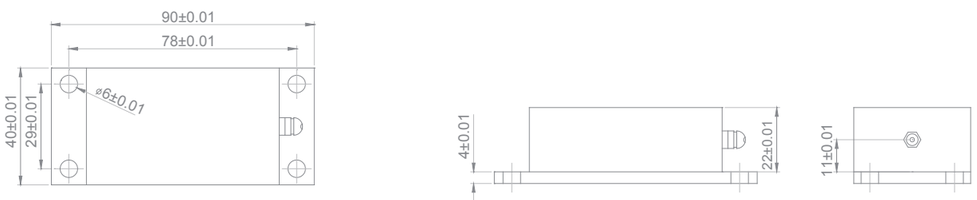
※ The performance parameters only list ± 10°, ± 30°, ± 60°, ± 90°for reference. For other measurement range, please take the nearest parameter as reference.

The Parameter Table of STMR21 Full-temperature Supplement High-precision Double-axis Digital Output Tilt Angle Sensor

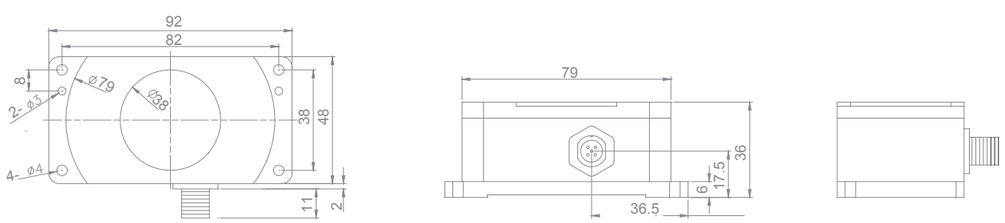
Parameter	Condition	STMR21-5	STMR21-30	STMR21-60	STMR21-90	Unit
Measuring range		±5	±30	±60	±90	°
Measuring shaft		X 、 Y	X 、 Y	X 、 Y	X 、 Y	
Resolution		0.001	0.001	0.001	0.001	◦
Absolute accuracy		0.003	0.01	0.02	0.03	°
Long term stability		0.01	0.02	0.03	0.04	
Zero temperature coefficient	-40～85°	±0.0008	±0.0008	±0.0008	±0.0008	°/℃
Sensitivity temperature coefficient	-40～85°	≤50	≤50	≤50	≤100	ppm/℃
Power-on start-up time		0.5	0.5	0.5	0.5	S
Response time		0.02	0.02	0.02	0.02	S
Output speed	5Hz、15Hz、35Hz、50Hz、100HZ Configurable					
Output signal	RS232/RS485/RS422/TTL/CAN					
Electromagnetic compatibility	In accordance with EN61000 and GBT17626					
Electromagnetic compatibility	≥ 50000 hours per second					
Insulation resistance	≥ 100 mega ohms					
Shock resistance	100g@11ms , Triaxial (semi-sine wave)					
Vibration resistance	10grms、10～1000Hz					
Waterproof degree	IP67					
Cable	Standard configuration: 1 meter long, wear-resistant, oil-proof, wide temperature, shielded cable of 4*0.4 mm2 aviation connector					
Weight	150g (excluding cable)					

Machine size

STMR20E biaxial digital output tilt sensor



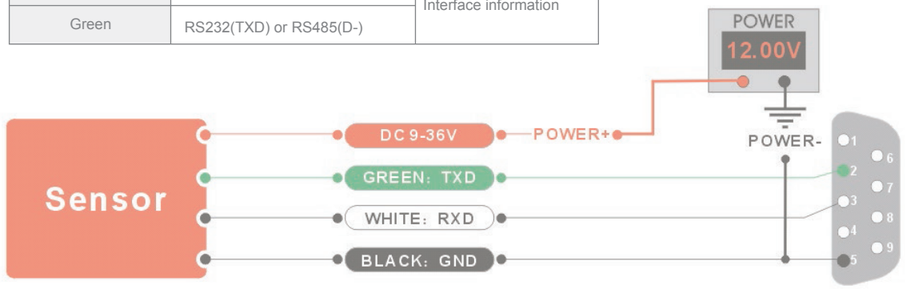
STMR21 full temperature compensation high precision biaxial digital output tilt sensor



Wiring method

STMR20E biaxial digital output tilt sensor

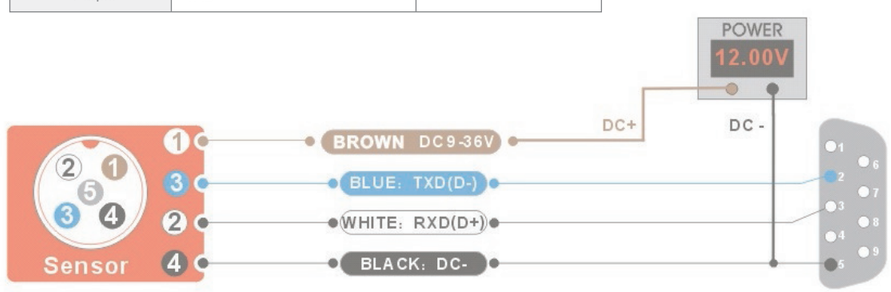
Cable color	Item	Definition
Red	Vcc	Power supply positive
Black	GND	Power supply negative
White	RS232(RXD) or RS485(D+)	Interface information
Green	RS232(TXD) or RS485(D-)	



STMR21 full temperature compensation high precision biaxial digital output tilt sensor

Cable color	Item	Definition
Brown	Vcc	Power supply positive
Black	GND	Power supply negative
White	RS232(RXD) or RS485(D+)	RS232/485 Interface information
Green	RS232(TXD) or RS485(D-)	

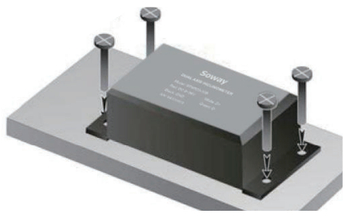
Cable color	Item	Definition
Brown	Vcc	Power supply positive
Black	GND	Power supply negative
Blue	RXD+	RS422 Interface information
Yellow	RXD-	
Orange	TXD+	
Purple	TXD-	

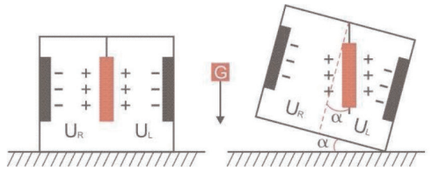


Method of installation

Working principle

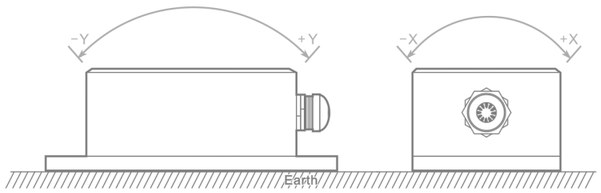
Adopt core control unit imported from Europe, adopt capacitance miniature pendulum principle. Using the principle of earth gravity, when the inclination angle unit is inclined, the earth gravity will produce the weight component on the corresponding pendulum, and the corresponding capacity will change. The inclination angle is obtained by amplifying, filtering and converting the capacitance.





UR and UL are the voltages between the left polar plate and the right polar plate of the pendulum and their respective corresponding electrodes. UR and UL change according to certain rules when the inclination sensor is inclined, so (UR, UL) is a function of the tilt angle a=∫(UR, UL)

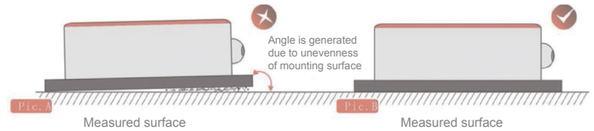
When installing the product in the installation direction, keep the sensor mounting surface parallel to the measured target surface and reduce the impact of dynamic and acceleration on the sensor. This product can be installed horizontally or vertically (vertical installation mode can only apply to single shaft), please refer to the following schematic diagram for installation methods:

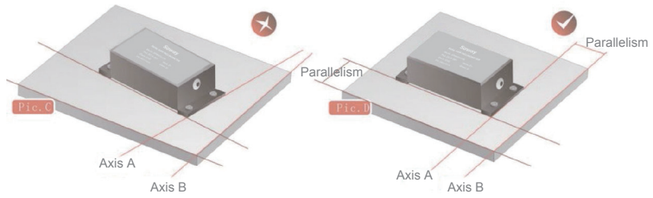


Product installation precautions: Please install the inclination sensor according to the correct method, incorrect installation will lead to measurement error, especially pay attention to one "surface", two "axes":

1) The fixation between the mounting surface of the sensor and the measuring surface must be compact, smooth and stable.If the mounting surface appears uneven, it is easy to cause error of the measuring angle of the sensor. See Figure A, B

2) The axis of the sensor must be parallel to the measured axis, and make sure there is no angle between the two Double Axis ifpossible. See Figure Pic.C、D





Product type selection

STMR	□	0E	–	□□	–	□□□
	Measuring shaft			Measuring range		Output interface
	1: Single Axis 2: Double Axis			10:±10° 15:±15° 30:±30° 45:±45° 60:±60° 90:±90°		232:RS232 485:RS485 CAN:CANOPEN/CAN2.0

STMR	□	1	–	□□	–	□□□
	Measuring shaft			Measuring range		Output interface
	1: Single Axis 2: Double Axis			10:±10° 30:±30° 60:±60° 90:±90°		232:RS232 485:RS485 422:RS422 CAN:CANOPEN/CAN2.0