



V1.6

HIGH-PRECISION DYNAMIC TILT SENSOR

RION HDA436T

Technical Manual

HDA436T HIGH-PRECISION DYNAMIC TILT SENSOR



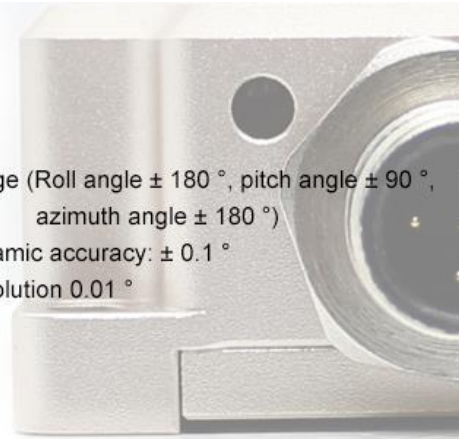
RION QUALIFICATION CERTIFICATION

- Enterprise quality system standard: ISO9001: 2015 standard (certification No.: 128101)
- High-tech enterprise (Certificate No.: GR201844204379)
- CE certification: registration No.:AT18250EC001210
- Revision date: 2022-3-30

Note: Product functions, parameters, appearance, etc. will be adjusted as the technology upgrades.

Please contact our pre-sales business to confirm when purchasing.

HDA436T HIGH-PRECISION DYNAMIC TILT SENSOR



- ★ Range (Roll angle $\pm 180^\circ$, pitch angle $\pm 90^\circ$, azimuth angle $\pm 180^\circ$)
- ★ Dynamic accuracy: $\pm 0.1^\circ$
- ★ Resolution 0.01°

► PRODUCT DESCRIPTION

HDA436T, A new generation of digital MEMS dynamic tilt sensor launched by RION Technology. It can measure the attitude parameters (roll, pitch, and azimuth) of a moving carrier, and suitable for tilt angle measurement under motion or vibration.

HDA436T has a built-in high-precision acceleration and gyro sensor, and integrates the Carman filter algorithm, which can measure the real-time motion data of the carrier under motion or vibration. The signal output modes such as RS485 / RS232 / TTL are optional, and the scalability is strong.

This product adopts non-contact measuring principle, which can output the current attitude and inclination in real time. It is simple to use and does not need to retrieve the relative changes of the two surfaces.

Internally integrated high-precision AD and high-precision gyro units to compensate for non-linear, orthogonal coupling, temperature drift and centrifugal acceleration in real time; greatly eliminate centrifugal errors caused by motion acceleration interference, improve product dynamic measurement accuracy; adapt to long-term complex movements Work in places and harsh environments.

The product is a dynamic and static dual-mode measurement sensor with strong resistance to external electromagnetic interference. It is an ideal choice for industrial automation control and military-civilian dual-use measurement posture.

► KEY FEATURES

- ★ Range (Roll angle $\pm 180^\circ$, pitch angle $\pm 90^\circ$, azimuth angle $\pm 180^\circ$)
- ★ DC 9~6V wide voltage input
- ★ Resolution 0.01°
- ★ High anti-vibration performance $>2000g$
- ★ Dynamic accuracy: $\pm 0.1^\circ$
- ★ Wide temperature operation $-40\sim+85^\circ\text{C}$
- ★ IP67 protection level
- ★ Size: L72xW47xH22.5mm

► PRODUCT APPLICATION

- ★ Railway locomotive monitoring
- ★ Shield pipe jacking application
- ★ Underground drilling rig attitude navigation
- ★ Shield pipe jacking application
- ★ Orientation measurement based on inclination angle
- ★ Various engineering machinery inclination measurement
- ★ Oil drilling equipment
- ★ Geological equipment tilt monitoring
- ★ Ship navigation attitude measurement
- ★ Satellite communication vehicle attitude detection

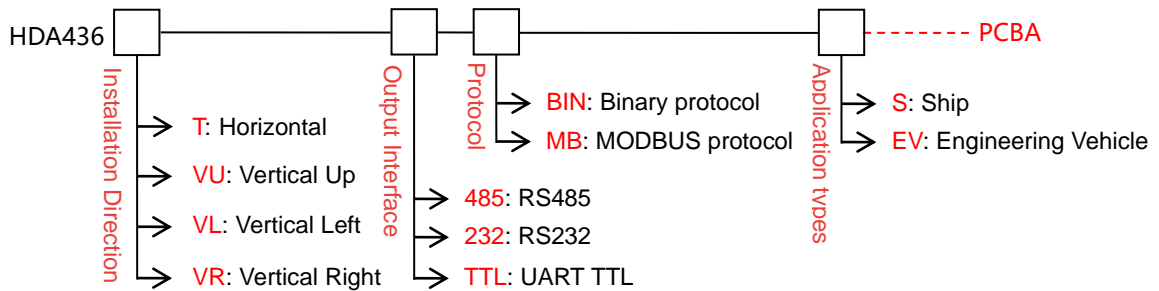


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► TECHNICAL PARAMETERS

HDA436T	CONDITION	INDEX
Measure range	\	Roll $\pm 180^\circ$, pitch $\pm 90^\circ$, azimuth $\pm 180^\circ$ (initial value at power-down is 0°)
Measure axis	\	X axis / Y axis / Z axis
Resolution	\	0.01°
Static accuracy	@ 25°C	$\pm 0.05^\circ$
Dynamic accuracy	@ 25°C	$\pm 0.1^\circ$
Bias Instability (Allan)	\	$8^\circ/\text{h}$
Zero point temp. coefficient	$-40 \sim 85^\circ\text{C}$	$\pm 0.01^\circ/\text{C}$
Sensitivity temp. coefficient	$-40 \sim 85^\circ\text{C}$	$\leq 100\text{ppm}/^\circ\text{C}$
Power-on startup time	1S	
Response time	0.01S	
Output signal	RS485/RS232/TTL	
Electromagnetic compatibility	According to EN61000 and GBT17626	
MTBF	≥ 50000 hours / time	
Insulation resistance	≥ 100 Megohm	
Impact resistance	100g @ 11ms, 3 axial direction (half sinusoid)	
Anti-vibration	10grms, 10 ~ 1000Hz	
Waterproof level	IP67	
Cable	Standard without wiring, optional 2m M12 aviation plug with PVC unshielded cable	
Weight	$\leq 165\text{g}$ (excluding cables)	

► ORDERING



E.g: HDA436T-485-BIN-S:horizontal installation / RS485 Output / BIN: Binary protocol / Ship application .

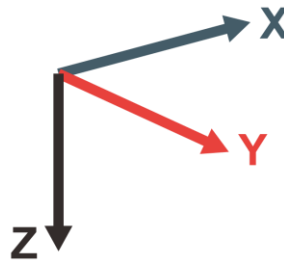
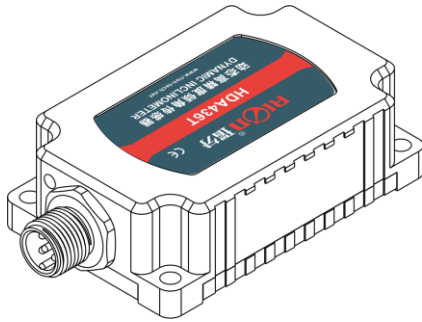
Note: If you choose product module without shell, please add PCBA after the part number.

► INSTALLATION AXIAL

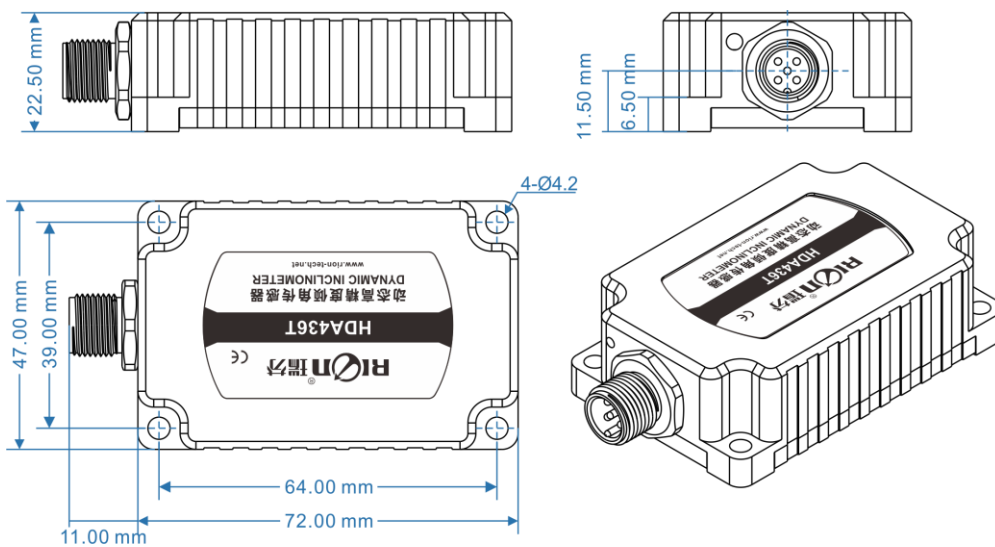
HDA436T follows the NED coordinate system, right-handed.

According to the rotation sequence of ZYX, when the positive direction of the X axis is directed to the front of the carrier, the rotation angle around the Z axis is the heading angle, the rotation angle around the Y axis is the pitch angle, and the rotation angle around the X axis is the roll angle.

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► PRODUCT SIZE CHART



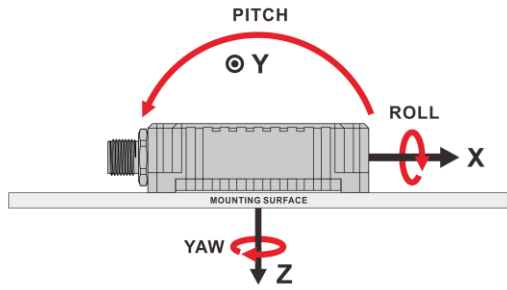
Shell size: 83x47x22.5mm

Installation size: 64x39x6.5mm

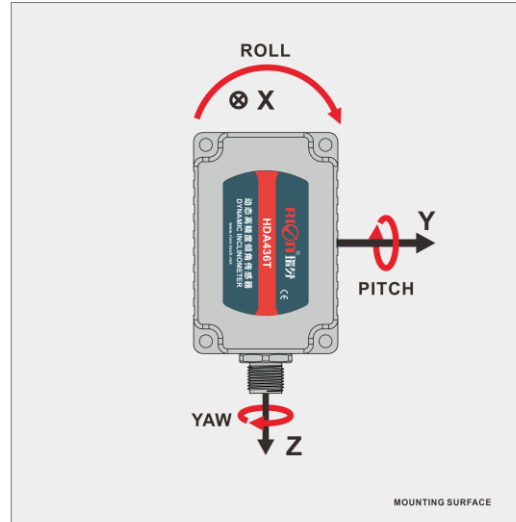
Mounting screws: 4 M4 screws

► INSTALLATION METHOD

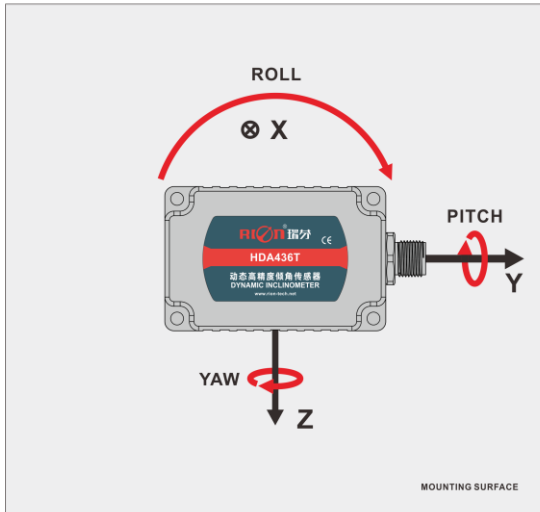
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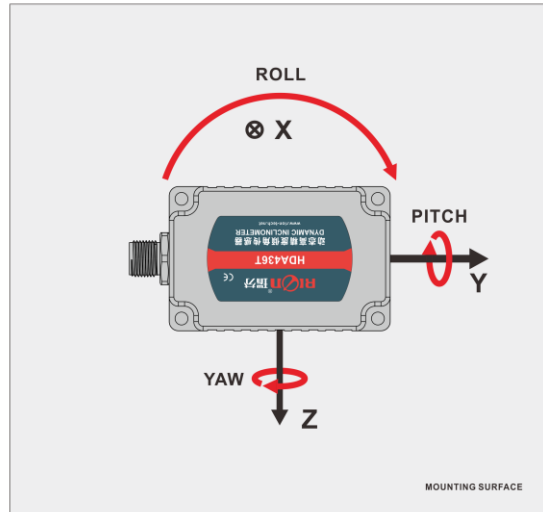
Horizontal Installation



Vertical Installation



Vertical-Left Installation



Vertical-Right Installation