



SPECIFICATIONS

Item No.: LCA320T

Description: Voltage Type Dual-axis Inclinometer

Production implementation standard reference

- Enterprise quality system standards: ISO9001: 2008 standard (certification number: 128101)
- Tilt sensor production standards: GB / T 191 SJ 20873-2003 inclinometer general specification of Level
- The Academy of metrology and quality inspection Calibrated in accordance to: JJF1119-2004 Electronic Level calibration Specification
- Gyro accelerometer test standard: QJ 2318-92 Gyro accelerometer test methods
- Software development reference standard: GJB 2786A-2009 military software development General requirements
- Product environmental testing standards: GJB150
- Electromagnetic anti-interference test standards: GB / T 17626
- Ver.:06
- Date:2014.8.1

LCA320T- Voltage Type Dual-axis Inclinometer



General Description

The LCA320T series inclinometer, developed by Rion Company for market with special requirement on volume and cost, is a small volume low cost MEMS dual-axis tilt sensor. Due to the latest built-in MEMS technology inclination unit, it achieves small size, low cost, consistence and stability, capable of long-term working in the industry harsh environment. It is a cost-effective product.

This product adopts non-contact measuring principle, outputting real-time current attitude angle, simple to use, no need to find the relative sides of a angle. It is a ideal choice for Industrial automation control and platform measuring.

Features

- Dual-Axis Inclinometer
- Accuracy: refer to the technical data
- Output interface :0~5V
- IP67 protection class
- Resolution: 0.1°
- Measuring range $\pm 0^{\circ} \sim \pm 90^{\circ}$ optional
- Wide voltage input: 9~36V
- Wide temperature working: $-40 \sim +85^{\circ}\text{C}$
- Highly anti-vibration performance $>3500\text{g}$
- Small Volume : $55 \times 37 \times 24\text{mm}$ (customized)

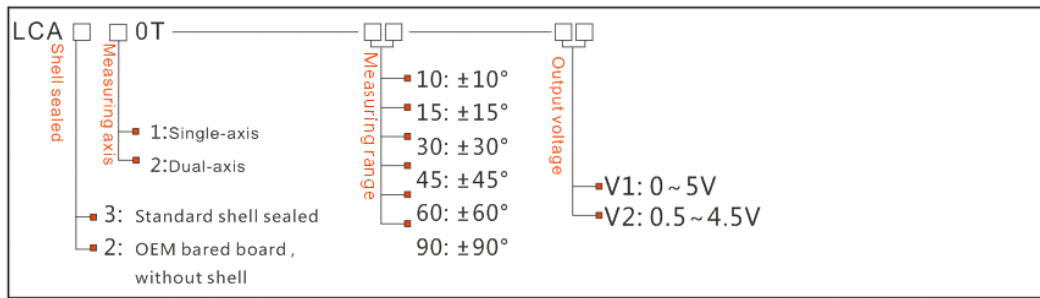
Application:

- Electric blind man chair leveling
- Satellite antenna positioning
- Car Chassis Measurement
- engineering mechanical measurement of dip angle
- Cloud deck operating monitor
- Medical equipment leveling
- Four - wheeled positioning system



LCA320T- Voltage Type Dual-axis Inclinometer

Ordering information:



E.g: LCA320T-10-v1: Dual-axis/Standard /±10°Measuring range/0-5V output voltage

Technical Data

Parameters	Conditions	LCA320T-10	LCA320T-30	LCA320T-60	LCA320T-90	Unit
Measuring range		±10	±30	±60	±90	°
Measuring axis		X,Y	X,Y	X,Y	X,Y	
ZERO output	0° output	2.5	2.5	2.5	2.5	V
Resolution		0.1	0.1	0.1	0.1	°
Absolute accuracy		0.1	0.2	0.3	0.4	°
Long term stability		<0.5	<0.5	<0.5	<0.5	
Zero temperature coefficient	-40~85°	±0.008	±0.008	±0.008	±0.008	°/°C
Sensitivity temperature coefficient	-40~85°	≤150	≤150	≤150	≤150	ppm/°C
Power on time		0.5	0.5	0.5	0.5	S
Response time		0.05	0.05	0.05	0.05	s
Response frequency		1~20	1~20	1~20	1~20	Hz
Electromagnetic compatibility	According to EN61000 and GBT17626					
MTBF	≥45000 hours/times					
Insulation Resistance	≥100M					
Shockproof	100g@11ms、3Times/Axis(half sinusoid))					
Anti-vibration	10grms、10~1000Hz					
Protection glass	IP67					
Cables	Standard 1M length、wearproof、grease proofing、wide temperature、Shielded cables4*0.4mm2					
Weight	90g(without cable)					

*This Technical data only list ± 10 °, ± 30 °, ± 60 °, ± 90 ° series for reference, other measuring range please refer to the adjacent parameters.

Electronic Characteristics

Parameters	Conditions	Min	Standard	Max	Unit
Power supply	Standard	9	12、24	36	V
	Optional		5		V
Working current			50		mA
Output overload	Resistive	10			kΩ
	Capacitive			20	nF
Working temperature		-40		+85	°C
Store temperature		-55		+125	°C

Key words:

Resolution: Refers to the sensor in measuring range to detect and identify the smallest changed value.

Absolute accuracy: Refers to in the normal temperature circumstances, the sensor absolute linearity, repeatability, hysteresis, zero deviation, and transverse error comprehensive error.

Long term stability: Refers to the sensors in normal temperature conditions, the deviation between the maximum and minimum values after a year's long time work.

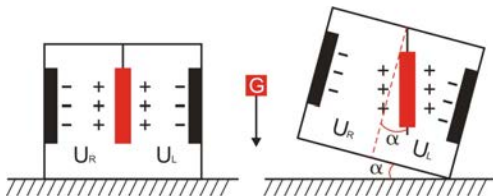
Response time: Refers to the sensor in an angle change, the sensor output value reached the standard time required.

Mechanical Parameters

- Connectors: 1m lead cable (customized)
- Protection glass: IP67
- Enclosure material : Aluminum Oxide
- Installation : 3*M4 screws

Working Principle

Adopt the European import of core control unit, using the capacitive micro pendulum principle and the earth gravity principle, when the the inclination unit is tilted, the Earth's gravity on the corresponding pendulum will produce a component of gravity, corresponding to the electric capacity will change, , by enlarge the amount of electric capacity , filtering and after conversion then get the inclination.

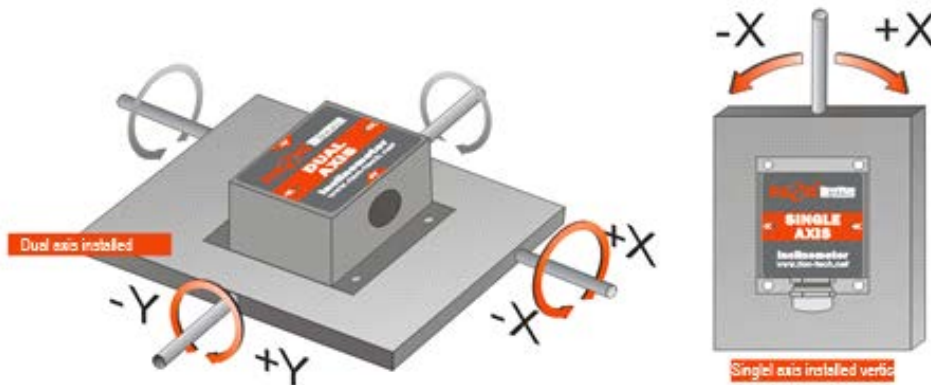


U_R, U_L respectively is the pendulum left plate and the right plate corresponding to their respective voltage between the electrodes, when the tilt sensor is tilted, U_R, U_L will change according to certain rules, so $f(U_R, U_L, \alpha)$ On the inclination of α function:

$$\alpha = f(U_R, U_L)$$

Measuring Directions&Fix

The installation must guarantee the product bottom is parallel to measured face, and reduce the influence of dynamic and acceleration to the sensor. This product can be installed horizontally or mounted vertically (mounted vertically selection is only applicable to the single axis), for installation please refer to the following scheme.



Angle output calculation formula

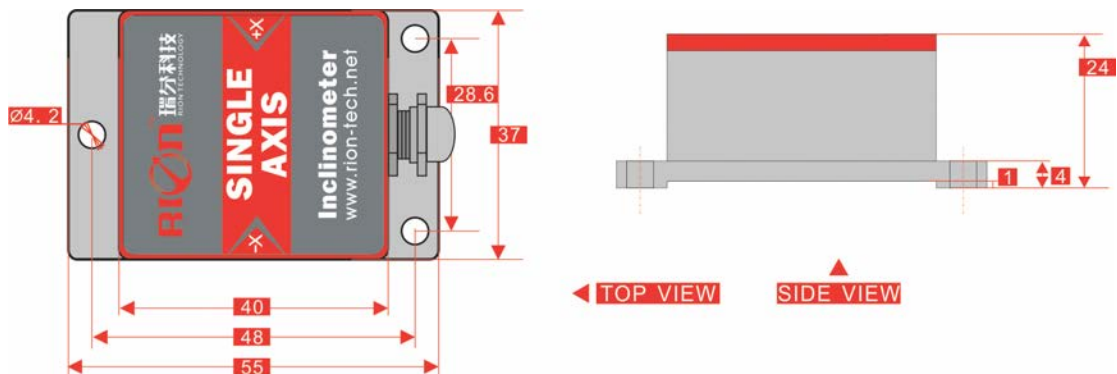
$$\text{Angle} = (\text{output voltage} - \text{Zero position voltage}) \div \text{Angle sensitivity}$$

$$\text{Angle sensitivity} = \text{output voltage range} \div \text{Angle measuring range}$$

E.g: LCA320T-30-V1 ($\pm 30^\circ$ Measuring range 0~5V output voltage range)

$$\text{Angle sensitivity} = 5 \div 60 = 0.83333 \text{ V}^\circ$$

Dimension

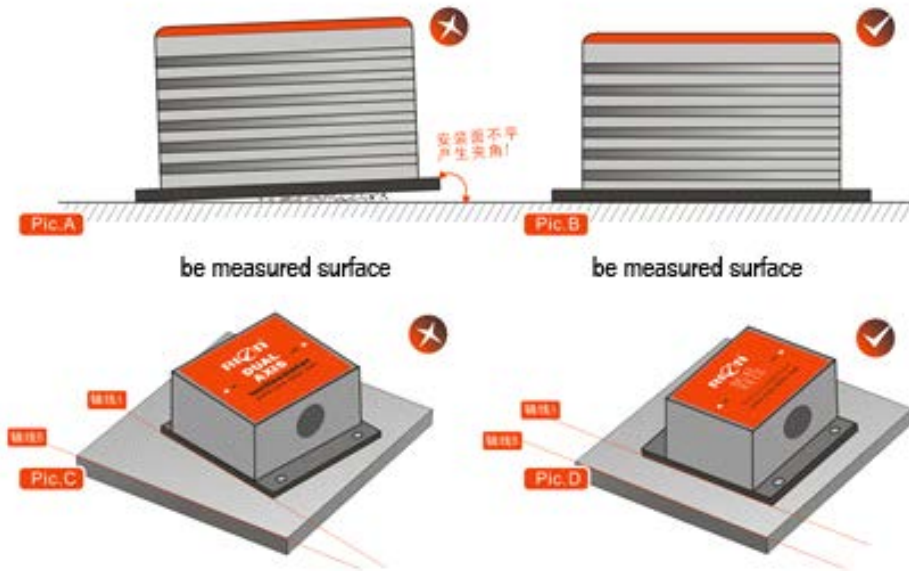


Size: L55mm×W37mm×H24mm

Production installation notes:

Please follow the correct way to install tilt sensor, incorrect installation can cause measurement errors, with particular attention to the "surface", "line"::

- 1) The Sensor mounting surface and the measured surface must be fixed closely, smoothly, stability, if mounting surface uneven likely to cause the sensor to measure the angle error. See Figure Pic.AB
- 2) The sensor axis and the measured axis must be parallel, the two axes do not produce the angle as much as possible. See Figure Pic.CD



Electrical Connection

Line color	BLACK	YELLOW	RED	GREEN
function	GND Power Negative	Out X- Output voltage	DC 9-36V	Out Y-Output voltage



※More products information, please refer to the company's Website : www.rion-tech.net



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