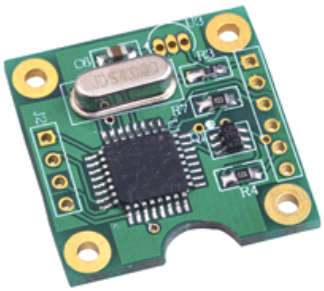
ZCT245AN-TTL 2-axis Tilt Sensor



General Description

ZCT245AN-TTL is a low cost 2-axis tilt sensor developed and produced by our company. Its measuring range is ± 45 degrees(range can be extended to 60 degrees). It can communicate with PC via TTL half-duplex way. It has zero setting function and response frequency adjustment function as well as optional Baud rate.

Marked when ordering: Normal Type

Ordering Information: ZCT245AN-TTL Normal Type

Features

- Small size and light weight.
- Stable and reliable performance.
- Anti-seismic.
- Trend of the tilt displayed by positive and minus sign.
- Cost effective and ease of integration.
- Support multi output signal.
- Support different operating voltage
- Additional display meter is available.

Applications

- Angle measuring， leveling adjustment， zero setting.
- Medical appliance.
- Mining machine and petroleum drilling equipment.
- Aloft work platform monitoring.
- Automobile facia.
- Tilt switch（seven on/off signals）
- Security control，monitoring，alarm system.
- Angular measurement of arm ， dam ， construction，bridge.
- Aligning control，bending control.

Specifications

Parameter	Value	Unit	Remark
Measuring Range	±45	degree	
Resolution	0.1	degree	
Repeatability	0.3	degree	@25℃
Accuracy（±45°）	<0.5RMS	degree	@25℃
Temperature Drift	0.8（max）	℃	-40～+85℃
Response Frequency	2～15	Hz	FILT command to set, 5HZ default.
Operating Voltage	5	V（dc）	Stability±0.5V
Operating Current	< 20	mA	
Operating Temperature	－40～＋85	℃	
Size	46*41*13	（mm）	

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ASCII Format

One set of data has 16bytes.

Byte1：X

Byte2：＋/-

Byte3：X-axis tens digit of angle value

Byte4：X-axis units digit of angle value

Byte5：point“.”

Byte6：one digit after the decimal point of X-axis angle value.

Byte7：20

Byte8：20

Byte9：Y

Byte10：＋/-

Byte11：Y-axis tens digit of angle value

Byte12：Y-axis units digit of angle

Byte13：point “.”

Byte14：one digit after the decimal point of Y-axis angle value.

Byte15：0d

Byte16：0a

Format ：

ITEAM	SIGNED	DATA	STOP
X/Y	+/-	**.*	enter/new line

For example：

If current x-axis angle value is +23.6 degrees and Y-axis is -0.1 degrees， it displays as follows

X＋23.6

Y－01.0

Note ： 88.8 is displayed when over range

Single byte transmission format: 1 start bit, 8 data bits, 1 stop bit.

Hex Format

bit15：1：X-axis 0：Y-axis

bit14：1：negative 0：positive

bit13－bit0：angle value×10

Eg. the current angle of X-axis is +23.6degrees：0x 8000 ＋（23.6×10=0236, its hex format is 0x00EC） and module output 0x 80EC

In hex a set of data consists of 5bytes, in which two bytes for X-axis, two bytes for Y-axis and OA for marks byte.

User Instructions

User can amend related parameter via command.

Note ：

- Output version of software to pc first After power-on： ZCTD version number
- Default mode is single-step mode.

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Command word:

"FILT"** ——output frequency setting; "**" is available value "04—30". Default value 10. Output frequency of two axis =50÷"**". (ROM data)

"***9600B**" —— Baud rate is 9600; (ROM data)

"***1920B**" —— Baud rate is 19200; (ROM data)

"***4800B**" —— Baud rate is 4800; (ROM data)

"**&Z**" ——consider current position as relative zero degree and store relative data in ROM. It outputs relatively and output "set zero" after accepting command: (ROM data)

"&**R**" ——relative and absolute angle output. Output "R" after accept command; This command is controlled by switch (output absolutely after reset)

"***HE**" ——communication mode in Hex format, output "hex" after accept command; (This mode would be lost after reset)

"***AS**" ——enter ASC11 communication mode, output "asii" after accept command; (System default mode)

"**@??**" ——set data sets of single output, "??" is from 01 to 99; (ROM data)

"***P**" ——execute single output. While send once then execute once output.

"***n**" ——continuous output mode.

Setting Communication Mode

1 Angle output mode

Default mode is single angle output after powered on. Module enter command mode after PC sends "$"command. If want to return to angle output mode, please send "@P" command then system will shift to angle output mode.

2 Command mode

Under this mode, module is in waiting position. It will return one data after command accepted from PC. Note:

1)when module enter command mode, it will not sample angular information itself. Information stored in memory is the last valid information sampled by the module before entering command mode;

2) Please distinguish upper/lower case of command character accepted by the module

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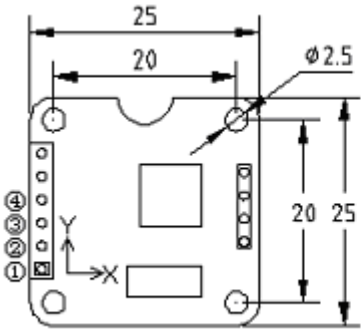
Installing Size and Connection Definition

In order to get max title variety range module should be installed into horizontal level.

1 ZCT245AN-TTL shape and installing size and down-lead definition.

a: size and connection definition

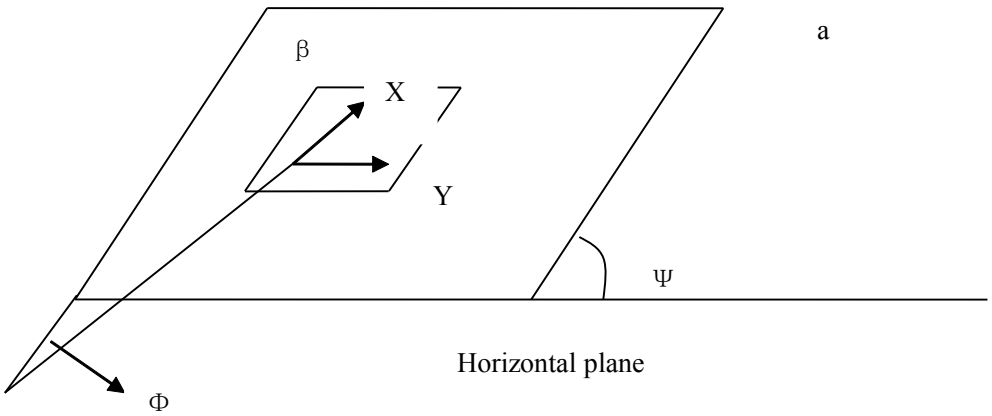


Connection Definition:

① ----- +5V
② ----- GND
③ ----- RX(TTL)
④ ----- TX(TTL)

Notice:

1 **Surveying Axis:** When surveying moving direction of plane surveyed must be parallel with surveying axis and included angle is not allowed. As follows: Use x-axis survey angle Ψ between plane β and horizon. Because Φ exists, there will be some gap between the output angle and the true angle Ψ.



So it's necessary to note the relations between the both sides when installing and using.

2 Installation Error

Tilt module has performed horizontal calibration when using. After purchasing clients don't use the datum plane of the module but use another datum plane. So there is an installation error between module and datum plane. That is why he plane surveyed may be not horizontal while the module reports no tilt when clients using.

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First advice：

Simple and convenient way is to find a plane and make the plane surveyed parallel with the plane. Then find a level instrument with high precision and execute leveling calibration with the whole system by clearing command.

Second advice:

Without leveling rod we can find out level error as follows:

First find out level offset:

1 First to find out the datum plane then fix it on a firm and steady platform without concave and distortion.

2 Suppose one value surveyed as “a” when it is stable，then remove the system ，rotate it 180 degrees and then fix it on the platform, now it reads a value “b”.

3 Now the zero offset is 1/2（｜a｜－｜b｜）.

Eg： X-axis a＝－4；b＝2 ,now the level offset is －1.

4 Find out the level offset on the other axis using the same method.

Eg： level offset for Y-axis is 2

5 When you find out the both zero offset of the two axes please adjust the equalizer under the platform until system output an angle value equal to the level offset got above. Eg：（－1，2）。

6 Now send zero clearing command and module will clear the two axes automatically， this time horizontal level is superposition with the absolute horizontal level.

It is necessary to execute clearing the module for veracity after a long term usage.

Specifications subject to change without notice!

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