

ZCT1360J-LBS-V-H6-77B Inclinometer Datasheet



1. Overview

Developed and produced by Shanghai Zhichuan, ZCT1360J-LBS-V-H6-77B is a single axis inclinometer with RS-485 interface. The measurement range of the inclinometer is 0~360° and the accuracy is 0.5°.

2. Advantages

- Full measurement range
- Highly cost-effective
- Easy to integrate
- Stable, reliable and durable
- Anti-shock and -vibration

3. Application

Solar tracker

4. Technical parameters (unless otherwise specified, the following are typical values at 25°C)

4.1. Electrical parameters

Item	Conditions	Min	Typical	Max	Unit
Power supply voltage	DC	8	12	30	V
Static working current	No load, horizontal state, VCC = 12V	18	24	30	mA

4.2. Performance parameters

Item	Conditions	Min	Typical	Max	Unit
Measurement range		0		360	°
Resolution ⁽¹⁾			0.1		°
Accuracy	RMS		±0.5		°

Zero point deviation	With housing			±0.5	°
Zero temperature drift	-40~+85℃		±0.03	±0.05	°/℃
Response time	Without filtering		0.1		s
Power on start time				1	s
Protection level	With housing		IP67		
Operating temperature range		-40		+85	℃
Cable length		0.9	1	1.1	m

Note 1: Resolution refers to the minimum change that the inclinometer can detect within the measurement range.

5. Communication protocol

5.1. Register definition

Baud rate = 9600bps, check bit = none, data bit = 8, stop bit = 1

Register address	Register name	Data type	Value range	Read or write	Default value
0000H	X-axis angle value HI	Custom	Range	R	-
0001H	X-axis angle value LO	Custom	Range	R	-
0006H	Set/cancel relative zero point	int16U	5A5AH	W	-
0007H	Local address	int16U	0000H ~ FFFFH	W	-
0008H	Baud rate	int16U	A0A0H ~ A2A2H	W	-

Note:

- R = read only; W = write only
- 03H for reading register, 06H for writing register and 42H for reading local address

5.2. Read angle command

Device address	Function code	Angle value register start address HI	Angle value register start address LO	Angle value register number HI	Angle value register number LO	CRC
1byte	0x03	1byte	1byte	1byte	1byte	2byte

Response:

Device address	Function code	Byte number of angle value	Hundreds digit of angle value	Tens & units digit of angle value	Tenths & hundredths digit of angle value	Reserved decimal places of angle value	CRC
1byte	0x03	1byte	1byte	1byte	1byte	1byte	2byte

For example,

Send command: 01 03 00 00 00 02 C4 0B

Response: 01 03 04 **01 23 3C** 00 CRC_LO CRC_HI

The returned angle is 135.6° (angle value = $[(1 * 100) + (2 * 16 + 3) + (3 * 16 + 12) / 100]$), where 01 is the inclinometer address, which can be determined by the level of the external signal line (TTL signal). When the signal line is at low level (grounded), the inclinometer will set the address to 0x01. When the signal line is at high level (suspended), the inclinometer will set the address to 0x02. When the inclinometer receives set address command (other than 0x00 or 0xFF), it will not detect the level of the signal line and will use the set address.

5.3. Set address command

Device address	Function code	Local address register address HI	Local address register address LO	Local address (set value)	Local address (set value)	CRC
1byte	0x06	1byte	1byte	1byte	1byte	2byte

Response:

Device address	Function code	Local address register address HI	Local address register address LO	Local address (set value)	Local address (set value)	CRC
1byte	0x06	1byte	1byte	1byte	1byte	2byte

For example,

Send command: 01 06 00 07 05 05 CRC_LO CRC_HI

Response: 01 06 00 07 05 05 CRC_LO CRC_HI

The command sets the address of the sensor to 0x05.

Note:

1) The set address will take effect after successful response and reboot.

2) If the address is set to 01~FE, the set address will be used. If the address is set to FF, the set address will not be used; instead, the input pin is enabled for setting the address, which will be 0x01 when the input pin is grounded or 0x02 when the input pin is suspended.

5.4. Read address command

Broadcast address	Function code	Local address register start address HI	Local address register start address LO	Local address register number HI	Local address register number LO	CRC
0x00	0x42	1byte	1byte	1byte	1byte	2byte

Response:

Device address	Function code	Byte number of local address value	Local address	Local address	CRC
1byte	0x42	1byte	1byte	1byte	2byte

For example,

Send command: 00 42 00 07 00 01 CRC_LO CRC_HI

Response: 01 42 02 01 01 CRC_LO CRC_HI

The returned inclinometer address is 0x01.

5.5. Set baud rate command

Device address	Function code	Baud rate register start address HI	Baud rate register start address LO	Baud rate code HI	Baud rate code LO	CRC
1byte	0x06	1byte	1byte	1byte	1byte	2byte

Response:

Device address	Function code	Baud rate register start address HI	Baud rate register start address LO	Baud rate code HI	Baud rate code LO	CRC
1byte	0x06	1byte	1byte	1byte	1byte	2byte

For example,

Send command: 01 06 00 08 A0 A0 CRC_LO CRC_HI

Response: 01 06 00 08 A0 A0 CRC_LO CRC_HI

This command sets the baud rate of the inclinometer to 4,800bps.

Note:

1) The baud rate will take effect after successful response and reboot.

2) Baud rate supported: A0-4,800, A1-9,600, A2-19,200.

5.6. Set/cancel relative zero point command

Device address	Function code	Set/cancel relative zero point register start address HI	Set/cancel relative zero point register start address LO	Set/cancel relative zero point command value HI	Set/cancel relative zero point command value LO	CRC
1byte	0x06	1byte	1byte	1byte	1byte	2byte

Response:

Device address	Function code	Set/cancel relative zero point register start address HI	Set/cancel relative zero point register start address LO	Set/cancel relative zero point command value HI	Set/cancel relative zero point command value LO	CRC
1byte	0x06	1byte	1byte	1byte	1byte	2byte

For example,

Send command: 01 06 00 06 5A 5A CRC_LO CRC_HI

Response: 01 06 00 06 5A 5A CRC_LO CRC_HI

5.7. Abnormal response

After complete information frame (function code, address and CRC) is well received, exception code

A5H will be returned if illegal register address or illegal number of registers is detected.

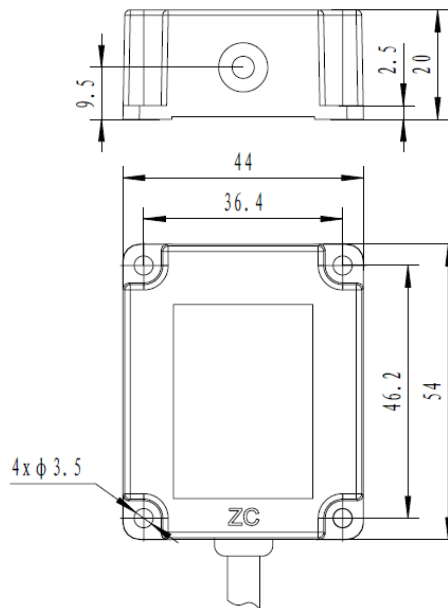
Address code	Error code	Exception code	CRC_LO	CRC_HI
01	0x80 function code	A5H		

6. Wiring and size

6.1. Wiring definition

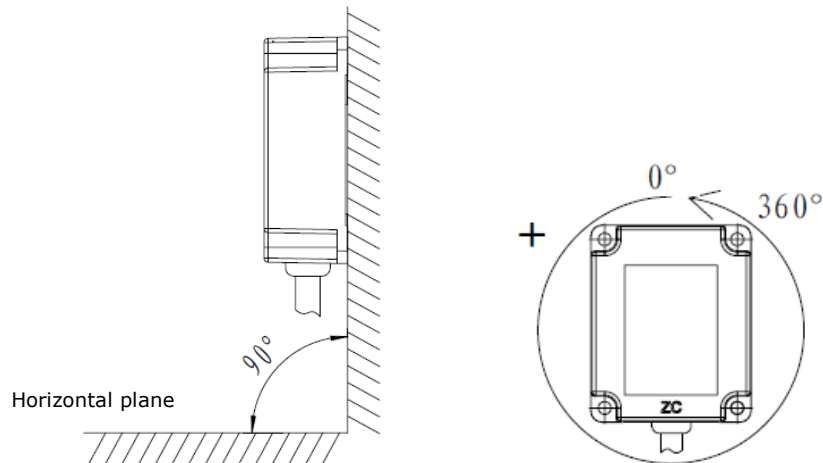
Definition	8~30VDC	485B	485A	GND	Input (address signal, TTL)
Wire color	red	gray	blue	black	brown

6.2. Housing size



7. Installation

The product should be installed according to below method.



8. Notice on order placing

Model: **ZCT1360J-LBS-V-H6-77B**

Default cable length: **1 meter**