

LP3300 Compass

Product features

- 3 3-axis magneto-resistance sensor to measure magnetic space , 2-axis tilt compensation
- 4 High speed and high accuracy of A/D convert , 100 u Gauss measured magnetic accuracy;
- 5 Build-in temperature compensation , cut down the temperature drift between magnetic declination and pointing angle to the most;
- 6 Build-in micro-processor calculates the angle between sensor and the north magnetic field ,then RS322 data format output;
- 7 Simple and effective user adjusting dictate;
- 8 Self-correcting function of pointing to zero;
- 9 Waterproof shell ,no magnetism;
- 10 Working temperature ranges from subzero 40 °C to +85°C , conserved temperature ranges from -55°C to +100°C;



Product description

The build-in 3-axis magnetic sensor and 2-axis tilt sensor .the output direction is the projective angle to both compass(to the north) on level and magnetism(to the north) on the earth .Because of the compensation to both pitch and roll , with these two conditions , the influence by pith and roll is small .

The compass mainly focuses on the design to satellite antenna positioning, it has the features of very low temperature lose, good repeat-use capacity, very less influence and so on. In practical use , the accuracy of inclinometer can meets the demand of C wave or KU wave which both are the satellite antenna positioning accuracy(within 2 d-meter).

Compass is the sensor for measuring magnetic field, but to the interference of both outside magnetic field and the Earth magnetic field, the compass can not perfectly distinguish those two magnetic fields. The key to guarantee accuracy of using compass is to provide it with less interference environment , meanwhile , letting up the lining and turning acceleration of the compass is another key to guarantee the accuracy;

Application

- ◆Car-carried electronic compass with fixed-point and two-way satellite communication facility;
- ◆Vessel-carried electronic compass with moving satellite television

receivable antenna positioning;

◆Car-carried electronic compass with moving satellite television receivable antenna positioning;

◆Car-carried electronic compass with oriented wireless facility;

◆Car-carried compass with radar antenna positioning;

Type of products (see table1):

Type	Interface	Input voltage	Temperature range	Temperature compensation	Remarks
LP3300-232EBOT	RS232	8V-15V	-40℃—85℃	Yes	Housed, waterproof IP55, L:100 W:70 H:40
LP3300-485-EBOT	RS485	8V-15V	-40℃—85℃	Yes	Housed, waterproof IP55, L:100 W:70 H:40
LP3300-422-EBOT	RS422	8V-15V	-40℃—85℃	Yes	Housed, waterproof IP55, L:100 W:70 H:40
LP3301-232EBBT	RS232	8V-15V	-40℃—85℃	Yes	Circuit board only, L:55 W:40
LP3301-232EABT	RS232	5V	-40℃—85℃	Yes	Circuit board only, L:55 W:40

Table 1

Techno-index

Note: Hereinafter testing data belongs to compass LP3300-232

1. Main common-mode tilt index(guide line) (Circumstance temperature=25℃, Power supply=+12V, Response speed=7Hz),See table 2

Index	Min	Typical	Max	Units
Measuring range		Two-axis±60		°
Resolution		±0.1		°
Accuracy (0°)		<±0.1	<±0.2	°
Accuracy (<±15°)		<±0.1	<±0.2	°
Accuracy (<±30°)		<±0.15	<±0.3	°
Accuracy (<±60°)		<±0.3	<±0.5	°
Non-linearity	0.2	<0.5	<1	%
Repeatability		±0.2		°
Temperature drift		0.004		°/℃

Table 2

2. The main index of directional orientation in general (Circumstance Temperature=25°C, Power supply=+12V, Response speed =7Hz) ,See table 3

Index	Min	Typ	Max	Unit
Resolution		±0.2		°
Measuring accuracy		±0.5	±1	°
Accuracy (tilt20 °)	1	2	3	°
Accuracy (tilt30 °)	1.5	2.5	3.5	°
Non-linearity		0.5	0.8	%
Repeatability		±0.4°		°
Temperature drift		0.015	0.03	°/°C

Table 3

3. Other index (Measuring temperature=20°C) ,See table 4

	Min	Normal	Max	Unit
Operating voltage	8	12	15	V
Operating current	50	55	60	mA
Operating temperature	-40		+80	°C
Storage temperature	-55		+100	°C
The most disturbing magnetic field			20	Gauss
Measurement range of magnetic field		0.6	3	Gauss
Interface data format	9600, n, 8, 1			BPS*
Enclosure dimensions	Aluminum enclosure. L100, W76 H40			mm
Waterproof level	IP55			

Table 4

4. Utmost operating index, See table 5

	Min	Max	Unit
Power supply(voltage)	+7	+18	V
Operating temperature	-50	+85	°C

Table 5

Note: Long time utmost operating can cause inaccuracy to data or permanent

damage to the product

5. The range of interface's output voltage is according to the techno-index of SP232 (See table 6):

	Min	Typ	Limit	Unit
TXD	±5	±7	±15	°
RXD	±5	±7	±15	°
GND	0	0	0	°

Table 6

6. Sketch map of accuracy range and operating current range, (See figure 1 and 2)

1) Sketch map of accuracy range:

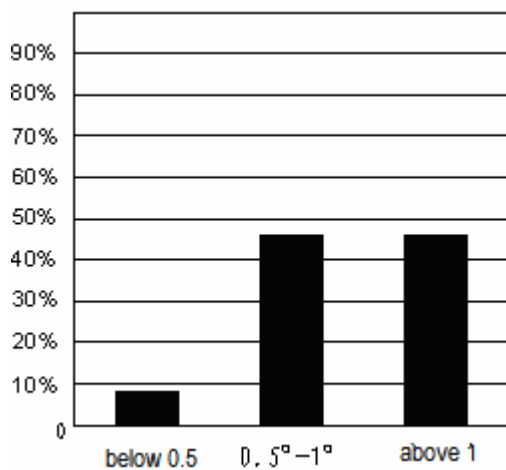


Figure1- Accuracy range

2) Sketch map of operating current:

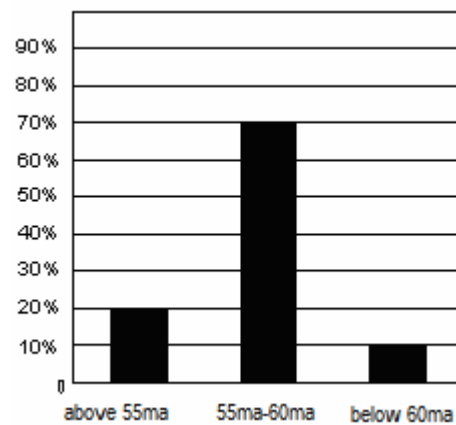


Figure2- Operating current range

LP3300 Output signal format:

LP3300 outputs RS-232format data, format“9600, n, 8, 1”. Every frame outputs 20 bytes HEX。Data format are as follows (See table 7):

Byte position	Data type	Data content
Byte 1	Single byte HEX	“0xaa”Head
Byte 2	Single byte HEX	If the responding result of compass' command is the same with command bytes means the compass has carried out the command, if the compass responds “0xee” means no reaction
Byte 3, 4	Reserved	
Byte 5, 6	Reserved	
Byte 7, 8	Dual byte integer(with	The way to convert the included

	symbol)	angle of pith and the level is as follow, $\text{integer}/1000/3.14159*180$
Byte 9, 10	Dual byte integer(with symbol)	The way to convert the included angle of roll and the level is as follow, $/1000/3.14159*180$
Byte 11, 12	Dual byte integer(with symbol)	Magnetic field intensity(X-axis)
Byte 13, 14	Dual byte integer(with symbol)	Magnetic field intensity(Y-axis)
Byte 15, 16	Dual byte integer(with symbol)	Magnetic field intensity(Z-axis)
Byte 17, 18	Dual byte integer(no symbol)	The way to convert the compass and the magnetic declination is as follow, : $\text{Interger}/100$
Byte 19	Reserved	
Byte 20	Single byte	Accumulation of all the data above

Table 7

Table of commands and details:

1. Table of commands (See table 8):

Serial number	Command byte	Signification	Remarks
1	0x01	Response speed setup, 3Hz (Default operating speed of compass)	No reservation for speed setup if the power shuts down.
2	0x02	Response speed setting, 4.5Hz	
3	0x03	Response speed setup, 7Hz	
4	0x04	Response speed setup, 10Hz	
5	0x05	Response speed setup, 12Hz	
6	0xf5	Calibration of horizontal turning	All commands are factory calibrated. After long-time using , the accuracy might reduce, but the user can refer to the instruction book to calibrate again
7	0xf6	Calibration of side turning	
8	0xf7	save data After turning the compass	
9	0xf8	Stop turning then calibrate	
10	0xe0	Max.value of X-angle	
11	0xe1	Min.value of X-angle	
12	0xe2	Max.value of Y-angle	
13	0xe3	Min.value of Y-angle	
14	0xe4	Record the angel range	
15	0xfa	Zero-angle calibration 1	

16	0xfb	Zero-angle calibration 2	
17	0xfc	Record zero-angle	
18	0xd0	Begin turning then calibrate	User's calibrating command
19	0xd1	Stop turning then calibrate	
20	0xa5	Allow to calibrate zero-directional	Setup zero direction of compass can eliminate the error of magnetic declination
21	0xe5	Revision of north magnetic field	
22	0xe8	Eliminate the revision of north magnetic field	

Table 8

2. Command details

Compass LP3300 provides 14 order for user. after receive the order, LP3300 show the implement state at the 2nd byte of data frames. If the responding result of compass' command is the same with command bytes, which means the compass has carried out the command, if the compass responds "0xee" means no reaction

1) Response speed setup:

Command byte, 0x01, 0x02, 0x03, 0x04, 0x05. Adjust the compass response speed. In the output of single and continuous mode can be efficient

Command byte and output speed are as follows (See table 9):

Command byte	0x01	0x02	0x03	0x04	0x05
Output speed	3Hz	4.5Hz	7Hz	10Hz	12Hz

Table 9

2) Compass turning calibration: Command byte: 0xd0, 0xd1

Send command byte "0xd0" then slowly turning the compass over 360 °. For guarantee the accuracy, the compass' tilt range should be under 20 °. At last, send command byte "0xd1" to record the calibrating result.

3) Compass pointing setting: Command byte: 0xa5, 0xe5, 0xe8

Send command byte "0xa5" then come to the state of setup, and send command byte "0xe8" to eliminate the primary directional setup. Resend the command byte "0xa5", after then send "0xe5" to setup the current direction as zero.

4) Angle(zero-point) setup: Command byte: 0xfa, 0xfb, 0xfc

Place the compass above a plane, Give 0xfa order, turn the compass upside down , send 0xfc order, then record the angle(zero-point).

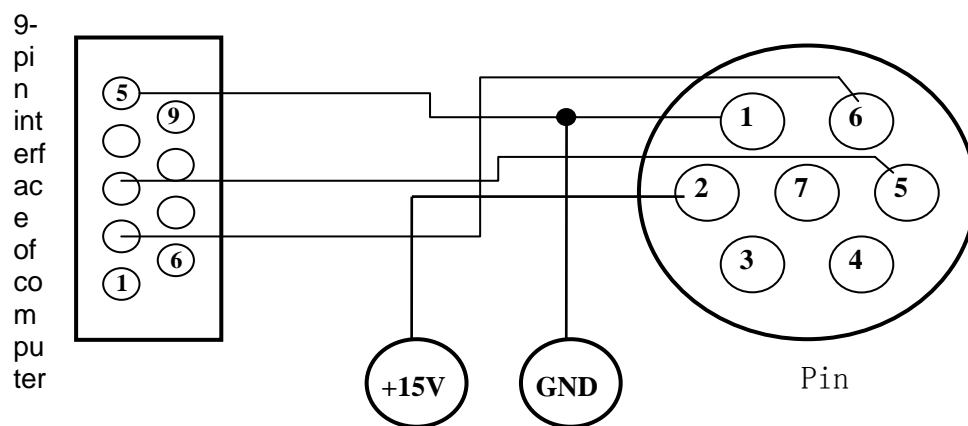
Connection and enclosure dimensions

Note: Waterproof level of XS12J7C K7ABR55 7 is above IP55

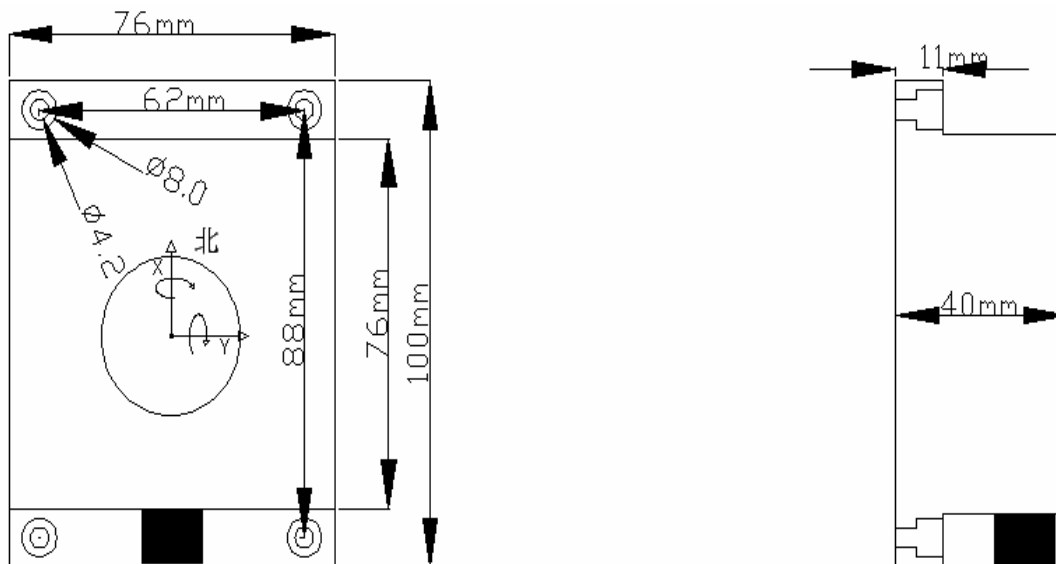
1. Connection (See table 10):

Pin No.	Color of lines	Name	Remarks
1	Black	GND	Input power supply
2	Pink	+15V	Input power supply(anode)
3		NC	Free
4		NC	Free
5	Blue	RXI	Interface signal input
6	Yellow	TXO	Interface signal output
7	Green	F	Free

Table 10



2. Enclosure Dimensions: (Unit: mm)



TEL: +86 010 68212593

FAX: +86 010 68212593

WEB:www.compass-tilt.com

E-Mail : bj_xpn@263.net

ADD.: Room207, West Building No.11, WanShouLu WestStree, HaiDian DistrictBeijing, 100036, P. R. China. POST CODE:100036

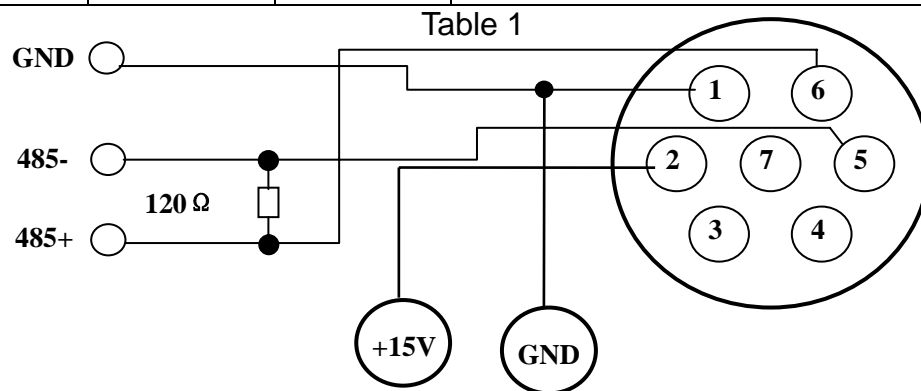
Appendix:

1. LP3300-485-EBOT Electrical outlet connection: (See table 1)

Note: Inside X12J7C K7ABR55 7 waterproof electrical outlet

Enclosure dimensions is the same with LP3300-232-EBOT

Pin No.	Line color	Name	Remarks
1	Black	GND	Input power supply point
2	Pink	+15V	Input power supply(anode)
3		NC	Free
4		NC	Free
5	Blue	B	
6	Yellow	A	
7	Green	F	Free

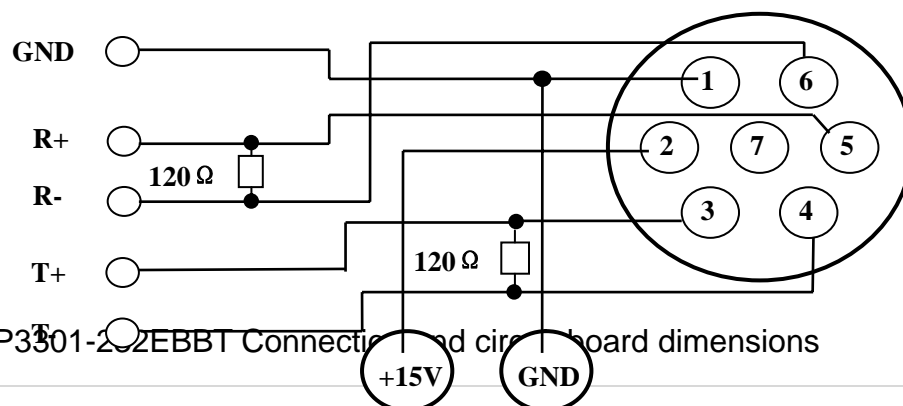


2. LP3300-422-EBOT Electrical outlet connection definition: (See table 2)

Note: Enclosure dimensions are the same with LP3300-232-EBOT. Inside X12J7C K7ABR55 7 waterproof electrical outlet.

Pin No.	Name	Remarks
1	GND	Input power supply point
2	+15V	Input power supply(anode)
3	Y	T+
4	Z	T-
5	B	R+
6	A	R-
7	NC	Free

Table 2

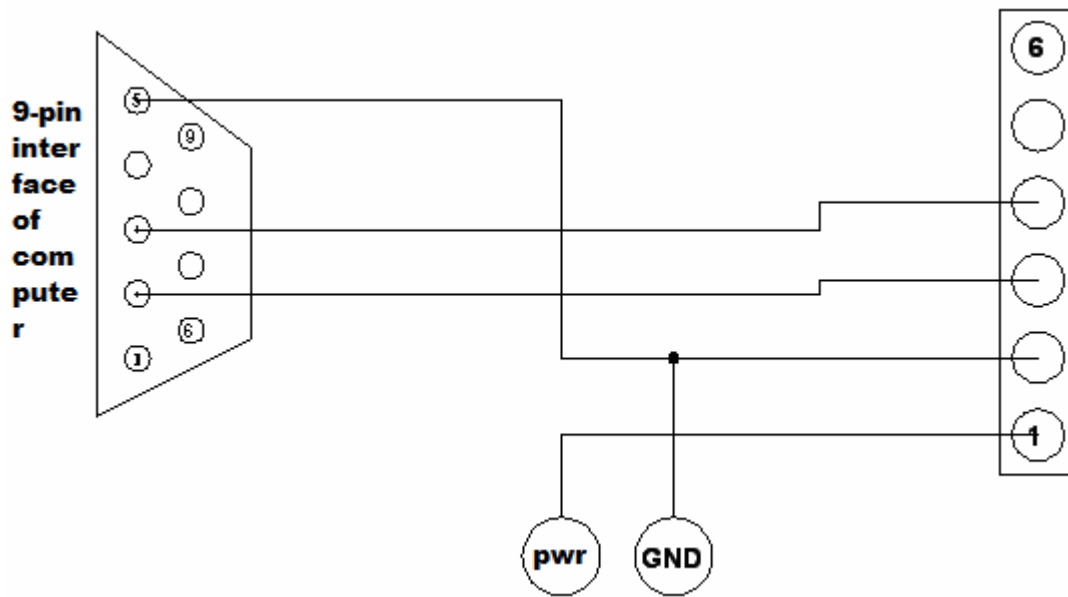


3. LP3301-232-EBBT Connector and circuit board dimensions

1) Connection

Pin No.	Name	Remarks
1	+5V	LP3301-232EABT
	+12V	LP3301-232EBBT
2	GND	Input power supply point
3	TXD	Interface signal output
4	RXI	Interface signal input
5	F	Free
6	GND	Signal

Table 3



2) Dimensions of circuit board: (Unit: mm)

