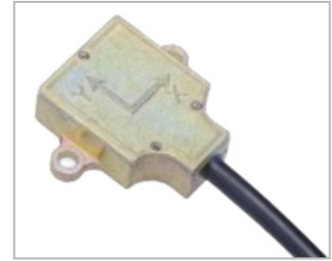




Description

The LCH-360 is a low cost single axis inclinometer sensor with a 360° measuring range, a resolution of 0.1° and an accuracy of $\pm 0.5^\circ$. There are two versions, one with a half duplex RS485 interface and the other with a full duplex RS232 interface. It can be programmed to give ASCII or Hex output, with different baud rates and to reset the absolute zero position. All of the settings are stored even after power down. Details of the RS232 and RS485 interface can be found below.



RS232 and RS485 Interface

The half duplex RS485 interface allows commands to be sent to and data received from the device over a single pair of balanced data lines. When the device is not transmitting, it will receive data on the same pair of cables with the A and B connections. The hardware will control the flow of data, so no special software timing is required to achieve this type of communication. The full duplex RS232 has separate connections for transmit (Tx) and receive (Rx). The output by default transmits the angle data continuously in ASCII format at 9600bps. Using the commands below these defaults can be changed, and these settings are stored after the device is powered off.

- Baud Rate : 9600
- Parity : None
- Start Bit : 1
- Data Bits : 8
- Stop Bits : 1

Command	Function	Response
\$	Puts device into command mode. During continuous transmission mode, this is necessary to halt the continuous mode so the device can receive other commands.	X=088.7<CR><LF> (Single set of angle data)
COMOFF	Switches on single step output mode. In this mode the device will transmit a single reading in response to a SENDDD command. After switching to this mode, the power needs to be reset for it to take effect.	F
COMONN	Switches on continuous output mode. In this mode the reading will be output continuously every 0.25 seconds. After switching to this mode, the power needs to be reset for it to take effect.. This is the default mode when the product leaves the factory.	N
SENDDD	If the device is in single output mode, this will cause the device to transmit a single reading.	X=088.7<CR><LF> (Single set of angle data)
&ZEROP	Sets the current inclinometer position as zero. All subsequent readings will be the angle relative to this position. The zero position is stored even after power off.	S<LF>R<LF>
COMHOF	Switches to ASCII output format. This is the default mode. See page 2 for more details	F
COMHON	Switches to Hex output format, see page 2 for more details	N
BAUD00	Switches baud rate to 9600. This is the default mode when the product leaves the factory.	S
BAUD01	Switches baud rate to 19200	S
BAUD02	Switches baud rate to 4800	S

To Switch to Single Output Mode

- Send \$ command – responds with single reading in the format : X=088.7<CR><LF>
- Send COMOFF – responds with F, and then streams a continuous output.
- Power off and then power on for new setting to take effect
- Receives a single reading at power on
- Send SENDDD command to receive single readings

To Switch Back To Continuous Output Mode

- Send COMONN – responds with N and then a single output
- Power off and then power on for new setting to take effect
- At power on streams continuous readings.

To Set Zero (from Continuous Output Mode)

- Send \$ command – responds with single reading in the format : X=088.7<CR><LF>
- Then send &ZEROP – returns with S<LF>R<LF>
- Streams continuous readings at new zero position

To Set Zero (from Single Output Mode)

- Send &ZEROP – returns with S<LF>R<LF>
- Send SENDDD command to receive single readings at new zero position

To Change Baud Rate to 19200bps

- If device is in continuous output mode then need to send \$ first to halt continuous mode – responds with single reading in the format : X=088.7<CR><LF>
- Then send BAUD01 – responds with an S
- Power off and then power on for new setting to take effect
- When in continuous mode, readings will streams continuously still every 0.25s at 19200 baud

To Switch Output to Hex Format

- If device is in continuous output mode then need to send \$ first to halt continuous mode – responds with single reading in the format : X=088.7<CR><LF>
- Then send COMHON – returns with N followed by a single reading (in single step mode) or continuous readings (in continuous mode)
- Readings will now be transmitted in Hex format (see page 2)

To Switch Output back to ASCII Format

- If device is in continuous output mode then need to send \$ first to halt continuous mode – responds with single reading in the format : X=088.7<CR><LF>
- Then send COMHOF – returns with F followed by a single reading (in single step mode) or continuous readings
- Readings will now be transmitted in ASCII format (see page 2)



Output Formats

ASCII Output Format (Default) : (9 Bytes)

Byte No.	1	2	3	4	5	6	7	8	9
Byte Count	1	1			5			1	1
O/P	X	=	0	8	8	.	7	CR	LF

When the data is transmitted in ASCII format, 9 bytes are sent for each reading. The string is terminated with a <CR> (ASCII code 13) and <LF> (ASCII code 10). It is transmitted as a continuous string at the preset BAUD rate (9600bps default)

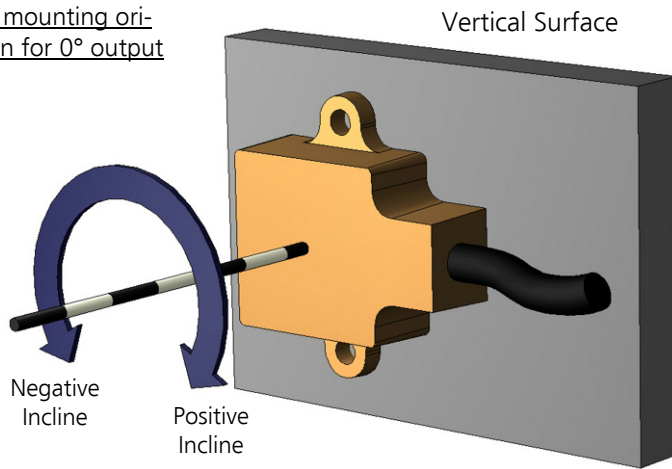
HEX Output Format : (3 Bytes)

Byte No.	1	2	3
Description	MSB	LSB	Line Feed
O/P	X angle data		<LF>

When the data is transmitted in HEX format, a 2 byte word is sent followed by a <LF>. This 16 bit number represents the angle value x 10. For example an angle of 273.6 would be represented as 2736 (273.6 x 10) which has a Hex value of 0x0A0B. The first byte transmitted is the MSB, in this case 0x0A and the second byte is the LSB.

Sensor Mounting Orientation and Wiring Information

Sensor mounting orientation for 0° output



Wire Colour	LCH-360-232 RS232 Version	LCH-360-485 RS485 Version
Red	+5Vdc	+5Vdc
Black	GND	GND
Blue	Receive (Rx)	485B
Yellow	Transmit (Tx)	485A

Housing Dimensions

