MTS2002 Inclinometer
User Manual

June 28, 2017
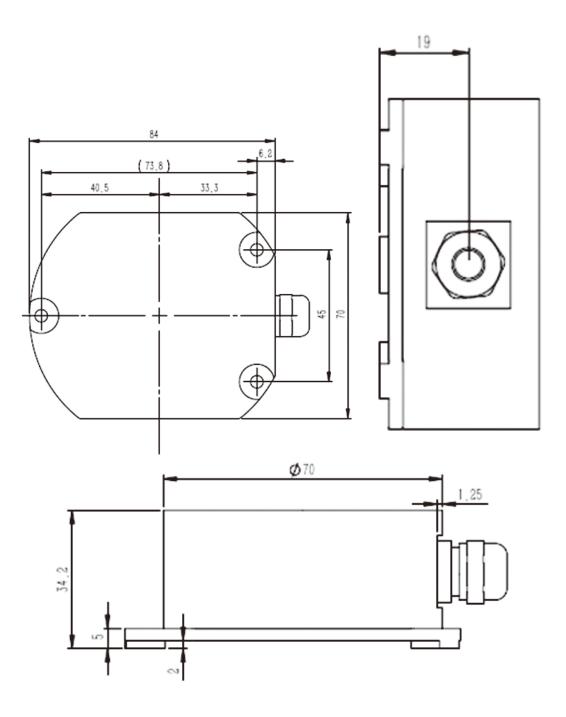
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1. Dimensions(unit: mm)

2. Definition of cable

The definition of sensor cable is shown as bellow.

Red	Black	White	Blue	Green	Yellow
VDD	GND	Rx+	Rx-	Tx-	Tx+

3. Power supply

Working Voltage: (9~35) V DC.

4. Temperature

Working temperature: (-40~70)　℃;

Storage Temperature:(-55～85)　℃.

5. Parameter

Measurement range: ±05°;

Response frequence: 25Hz;

Scale factor: 0.001°/LSB.

6. Data Format

The interface of MTS2002 is a standard RS-422 port. The baud rate is 9600bps; the number of data is eight bit, and it is one stop bit and no parity.

Ten bytes form a frame.The first byte is 0XFF. The second and third bytes are angle data of X-axis and in two's complement format. The forth and fifth bytes are angle data of Y-axis and in two's complement format. The sixth and seventh bytes are temperature data of X-axis. The

eighth and ninth bytes are temperature data of Y-axis. And the last byte is the sum of previous eight bytes (byte 2 ~ byte 9). The definition of frame is shown as bellow.

Byte	Definition
1	Start of frame and always is 0XFF
2	High byte of angle data of X-axis
3	low byte of angle data of X-axis
4	High byte of angle data of Y-axis
5	low byte of angle data of Y-axis
6	High byte of temperature data of X-axis
7	low byte of temperature data of X-axis
8	High byte of temperature data of Y-axis
9	low byte of temperature data of Y-axis
10	Sum of bytes from byte 2 to byte 9

Note：

1) The scale factor of angle data is 0.001°/LSB. When the angle of X-axis (Y-axis) is calculated, the byte 2 and byte 3 (byte 4 and byte 5) should be formed one word firstly. This word is in two's complement format, the MSB of which is the sign bit. And then this word should be changed to decimal digit. The angle of X-axis (Y-axis) is the product of this decimal digit and 0.001.

2) The scale factor of temperature data is 10LSB/$^\circ C$. When the temperature of X-axis (Y-axis) is calculated, the byte 6 and byte 7 (byte 8 and byte 9) should be formed one word firstly, and then changed to decimal digit. The temperature of X-axis (Y-axis) = decimal digit/10-273.

7. Command format

The MTS2002 can be achieved different functions according to different commands. The definition of command is shown as bellow.

Command	Definition
'R' or 'r'	When this character is received, the product will be reset.
'G' or 'g'	When this character is received, the current angle data will be sent once.
'C' or 'c'	When this character is received, the angle data will be sent continuously.
'S'or 's'	When this character is received, the sending angle data will be stopped.
'H' or 'h'	When this character is received, the current angle will be set to zero, which will be kept until power off or reset command is received.

Example：

For example, the data as follow is received.

byte	1	2	3	4	5	6	7	8	9	10
Data received (hex)	FF	27	10	D8	F0	0B	B8	0B	B0	F4
Definition	Start of frame	Angle data of X-axis		Angle data of Y-axis		Temperature data of X-axis		Temperature data of Y-axis		Sum of bytes from byte 2 to byte 9

The angle data of X-axis is 0x2710, which is 10000dec. The angle of X-axis is 10.000° which is the product of 10000 dec and 0.001.

The angle data of Y-axis is 0xD8F0, which is -10000dec. The angle of Y-axis is

-10.000° which is the product of -10000 dec and 0.001.

The temperature data of X-axis is 0x0BB8, which is 3000dec. Temperature of X-axis = 3000dec/10 -273 = 27.0   ℃.

The temperature data of Y-axis is 0x0BB0, which is 2992dec. Temperature of Y-axis = 2992dec/10 -273 = 26.2   ℃.