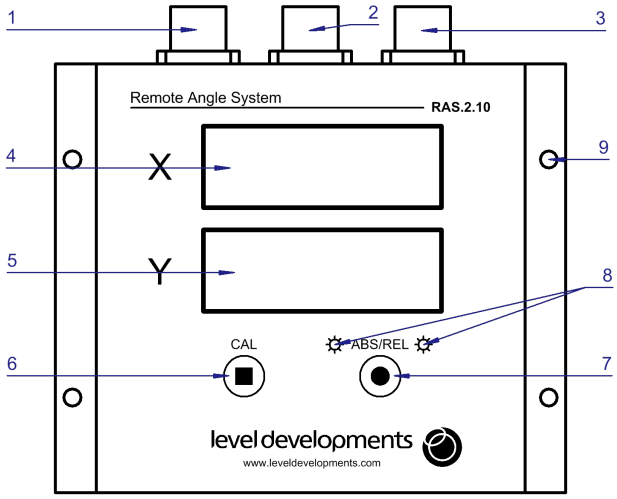
Introduction

The RAS-2-10 is a dual axis inclinometer sensor and a dual axis display unit. The sensor contains a high precision calibrated MEMS sensor and transmits an RS232 format output to the display unit. The display consists of two LED displays, one for each of the X and the Y axis. The two buttons, CAL and ABS/REL allow recalibration of the absolute zero, and switching between absolute and relative measurement mode respectively.

Features



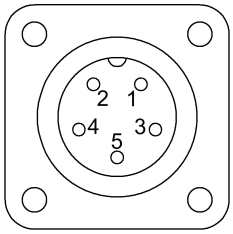
1. Connector for Power Supply (8-36Vdc)
2. Connector for RS232 output cable
3. Connector for inclinometer sensor unit
4. X Axis LED display (88.88)
5. Y Axis LED display (88.88)
6. Calibrate button for re-setting the absolute zero
7. Absolute / Relative button for switching between absolute and relative measurement mode.
8. Absolute / Relative LED indicators to show which mode is currently active
9. Ø5mm mounting holes

Connections

The unit is supplied with three cables, one to connect the sensor to the display, one to connect the display to the power supply and the other to connect the display to a PC or data-logger via the RS232 output.

Inclinometer Sensor Connection

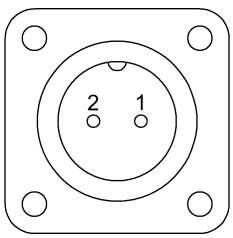
The sensor is connected to the display unit with a 6mm screened cable, terminated at each end with a 5 pin sealed locking connector. It is not important which end of the cable mates with the sensor and which mates with the display unit. These connection details are not normally required, as the cable is supplied ready to plug in and use



Pin no.	Sensor	Display
1	VCC	VCC
2	GND	GND
3	RxD	TxD
4	TxD	RxD
5	N/C	N/C

Power Supply Connection

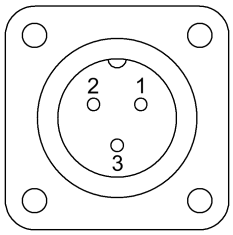
The power supply connection is made using the cable with a 2 pin connector. The connector mates with the display unit, and the other end with two bare wires connects to the power supply, red for the positive supply (8-36Vdc) and black for the ground (0v) supply.



Pin no.	Function	Wire Colour
1	VCC	Red
2	GND	Black

RS232 Connection

The RS232 cable has a 3 pin sealed connector on one end to mate with the display unit, and a 9 pin D connector on the other end for connection to a PC or data-logger. The RS232 output is transmit only, and transmits the angle data continuously. See page 2 for more details about the RS232 interface.



Display pin no.	Function	9 Pin D pin no.
1	Tx	2
2	GND	5
3	NC	-

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RS232 Interface

- Baud Rate : 9600 bps
- Parity : None
- Flow Control : None
- Data Bits : 8
- Stop Bits : 1

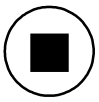
The RS232 interface transmits the angle data continuously in ASCII format at 9600bps. The format of the output string is shown below. When the inclinometer sensor is over-range in the positive direction (I.e the angle is greater than +9.99°) then the angle string transmitted for that particular axis is 'X+99.99'. When it is over-range in the negative direction the output is 'X-99.99'. During over-range measurements, the LED display shows 'ERR'.

ASCII Output Format (Default) : (16 Bytes)

Byte No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Byte Count	1	6						1	1	1	6						1	1
O/P	X	+	0	9	.	3	5	SP	SP	Y	-	0	0	.	8	4	CR	LF

Button Functions

CAL



The calibrate button allows the absolute zero point to be set. Ideally this is performed on a surface plate that is known to be level within 0.01°. It can however be calibrated on any flat surface that is level within a few degrees. After connecting and powering up the device, place the sensor on the surface. Press and hold the calibrate button on the display unit. After 3-4 seconds the LED display changes to *88* and then back to the normal reading. Release the CAL button. Then turn the sensor around on the surface by 180°, so it is sitting in exactly the same position, only rotated (in the yaw axis) by 180°. Press and hold the calibrate button on the display unit for another 3-4 seconds until the LED display changes to *88* and then back to the normal reading. Release the CAL button. The zero setting is now complete. This zero position will be stored as the absolute zero point even after the unit is powered off.

ABS/REL

This button switches the device between absolute and relative measurement modes. The two LED's either side of the button indicate in which mode the device is currently measuring. In absolute mode the angles are displayed with respect to a level reference plane. In relative mode the angles displayed are relative to the plane the sensor is in when the ABS/REL button is pressed. To switch mode it is necessary to press and hold the button for 3-4 seconds.

Inclinometer Sensor Measuring Axis Orientation