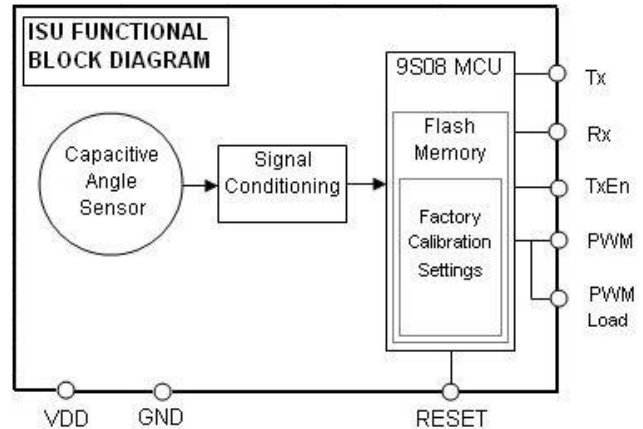


Features

- Full 360 degree range
- Three versions with maximum accuracy of +/- 0.05° and maximum resolution of 0.00549°
- Operating temperature range of -30°C to +55°C
- Low temperature coefficient
- Superior stability compared to low-g accelerometer solutions.



General Description

The ISU series of Single-Axis Digital Inclinometers from STT are self-contained, ready-to-use circuit modules which provide real-time digital measurements of angular displacement through a full 360 degree range. The ruggedized, non-contact capacitive sensor is combined with precision measurement circuitry to provide a cost-effective combination of accuracy, range, and operating temperature in an easy to use footprint. The units can be used in a wide variety of applications, accept a standard



5 Volt DC supply, and provide both RS-232 and Pulse Width Modulated (PWM) outputs.

The ISU is a compact, conformal coated circuit board module which is available in three different accuracy ranges. All of the modules feature a wide operating temperature range of -30 to +55°C and a storage temperature range of -55 to +65°C.

Programmable options include power auto-shutoff and 4-bit addressability allowing up to six ISUs to be 'party-lined' together for applications requiring multiple sensors.

Additional information about interfacing to the ISU inclinometer module is available in Application Note *AN-201: Interfacing to an ISU Digital Inclinometer Module*, available on the web or from STT upon request.

Electrical Specifications

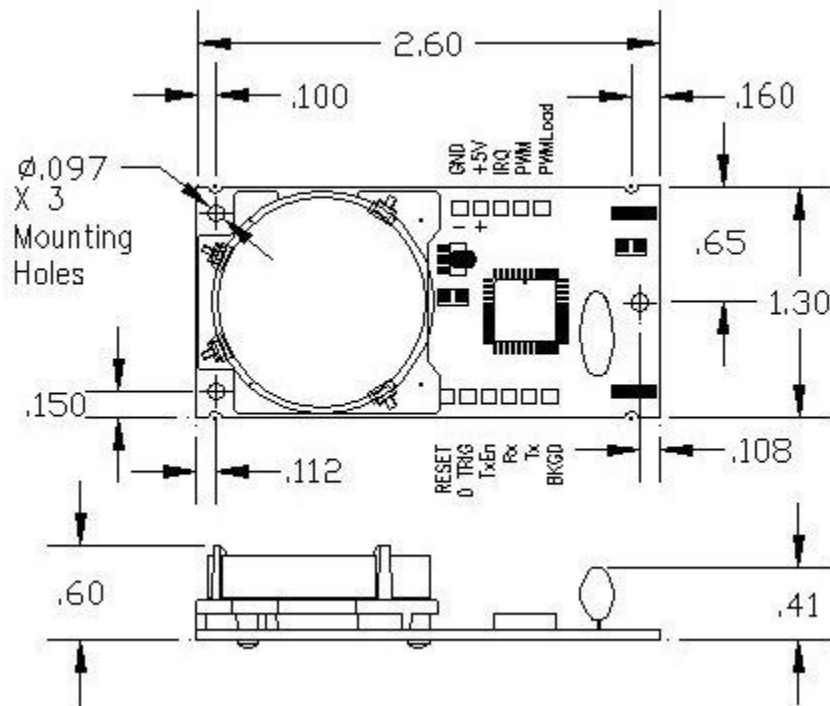
Parameter	ISU-S Std Accuracy	ISU-H High Accuracy	ISU-L Low Accuracy
Range	Full 360°		
Accuracy			
0° +/- 10°	+/- 0.1°	+/- 0.05°	+/- 0.2°
90° +/- 10°	+/- 0.1°	+/- 0.05°	+/- 0.2°
Other angles	+/- 0.2°	+/- 0.2°	+/- 0.4°
Resolution			
RS-232 Output	0.00549° Binary, 0.01° Ascii		
PWM Output	0.09°		
Temperature Coefficient			
At 0° or 90° +/- 1°	0.006° per °C		
Other angles	0.012° per °C		
Repeatability	+/- 0.1°	+/- 0.05°	+/- 0.2°
Hysteresis ²	0.10°	0.10°	0.2°
Noise	+/- 0.2°	+/- 0.01°	+/- 0.04°
Time Constant	0.4 seconds typical		
Frequency Response	0.4 Hz, typical (-3dB)		
Angle Output Rate	Every 8/15 second (533msec)		
Power Input			
Voltage	5.0 Volts, DC		
Current, Operating	2 mA		
Current, Sleeping	10 uA		
Serial Port			
Protocol	RS-232 (Except for Voltage Levels)		
Voltage	5 Volts		
Band Rate	9600 Baud		
Output Impedance	10KΩ		
PWM Output			
Voltage	5 Volts		
Frequency	30 Hz, Free Running		
Pulse Width	Varies 49.4usec per degree of angular displacement		

Notes:

- 1) Specifications subject to change without notice. Specifications are at 77°F (25°C) unless otherwise stated.
- 2) Average over 360 degrees

Physical Specifications

Parameter	
Weight	0.8oz (23 grams)
Temperature Range	
Operating	22 to +131°F (-30 to +55°C)
Storage	-67 to +149°F (-55 to +65°C)
Humidity Sensitivity	Conformal Coated



Notes:

- 1) BKGD (Background) pin is for SmartTool internal programming only. Customer use of this pin may damage the ISU.
- 2) Customer may utilize either the existing PWM output directly driven by the MCU, or new optional PWM_{Load}, which is the same source but with SMBT3906 transistor driven output.
- 3) Legacy half moon shaped indents remain for customer's existing mounting technique.
- 4) Three new mounting through holes offered as optional mounting method.

New Features

With the obsolescence of the Freescale HC05 microprocessor, SmartTool has redesigned the ISU to utilize the latest offering from Freescale, the MC9S08AC16CFGE microprocessor.

- The 9S08 based ISU maintains the same high quality, accuracy and reliability which customers have come to expect from SmartTool products.
- The dimensional footprint has been maintained to allow customers to continue to use existing cabling and mounting techniques. Three new mounting holes have been added as an optional and more convenient mounting method.
- The 9S08 based ISU utilizes Flash memory which allows SmartTool to respond nimbly and quickly to customer requests, unlike the obsolete HC05 which was a one time programmable device where changes to code could take up to nine months.
- An optional PWM_{Load} output is offered. This output shares an MCU output with the existing PWM output. Where the PWM output is driven directly from the MCU, the PWM_{Load} output picks off this same output and passes through an SMBT3906 PNP transistor, to offer some additional protection. The customer may use either output. Other than the transistor the outputs are the same.

The existing pin out is maintained. There is one additional pin in each row.

Row	Pin	Existing HC05	New 9S08
Top Row 5 pins	1 – closest to sensor	5V Ground	5V Ground
Top Row 5 pins	2	5V +	5V +
Top Row 5 pins	3	IRQ	IRQ
Top Row 5 pins	4	PWM	PWM
Top Row 5 pins	New pin 5	Not available	PWM Load – Same as PWM except the PWM signal is fed through a SMBT3906 PNP transistor. Not for use if using PWM. Customer can only use one at a time, either PWM or PWM Load
Bottom Row 6 Pins	1 – closest to sensor	RESET	RESET
Bottom Row 6 Pins	2	0 Trig	0 Trig
Bottom Row 6 Pins	3	TxEn	TxEn
Bottom Row 6 Pins	4	Rx	Rx
Bottom Row 6 Pins	4	Tx	Tx
Bottom Row 6 Pins	New pin 6	Not available	Not for customer use. This is for SmartTool factory programming use only.

Ordering Information

Description	Model #	Order Part Number
Standard Accuracy Version	ISU-S	90104001
High Accuracy Version	ISU-H	90104020
Low Accuracy	ISU-L	90104019
Standard Accuracy Re-direction	ISU-SR	90104060

Please contact us below for pricing and availability.

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