DUAL AXIS INCLINOMETER MODULE

SAS121T-D09

PRODUCT SPECIFICATION

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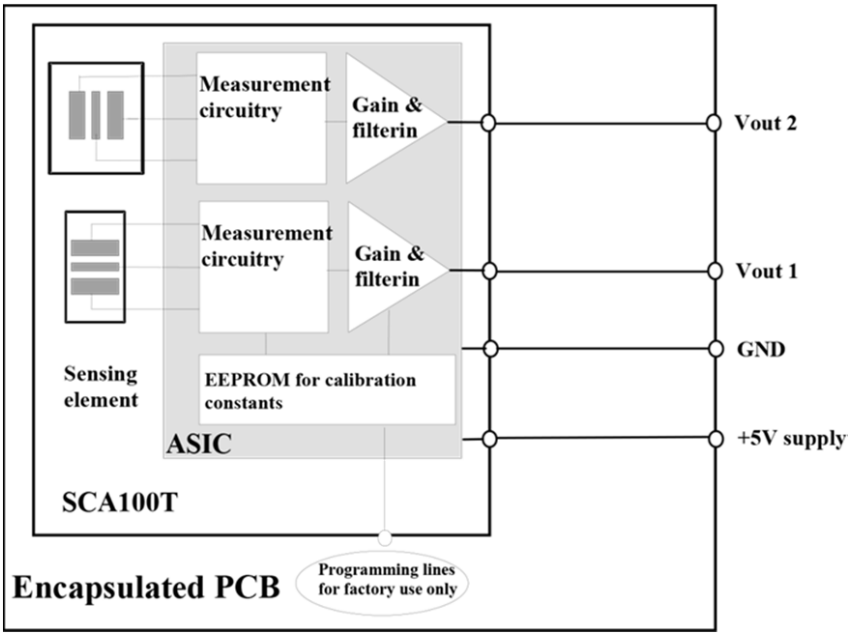
1. General description

This document describes an inclination module, suitable for various industrial applications. The sensor used inside is the muRata 3D-MEMS based inclinometer component. Output interface is analog voltage output.

1.1. Block diagram

Products are based on SCA100T components, mounted on PCB. Electronics is encapsulated in a robust metal housing, with pigtail.



1.2. Inclinometer Features

- Accurate ± 90° measurement, single or dual axis
- DC response with low sensing element frequency response
- Easy to use and design in
- High resolution analog output
- Wide temperature range

Benefits

- Excellent long term stability
- Sensing element controlled frequency
- Outstanding shock durability
- Harsh environment robustness

2. Electrical specifications

2.1. Absolute maximum ratings

Parameter	Comment	Min.	Typ	Max.	Units
Supply voltage		4,5	5	5,5	V
Reverse polarity protection				0,3	V
Current consumption			4	6	mA
Output load	resistive	10			kΩ
	capacitive			10	nF
Storage temp		-40		90	°C
Operating temp		-25		85	°C
Mechanical shock	1m drop on concrete		20 000		g

2.2. Electrical Specifications

T / Q [1]	Parameter	Condition	SAS121T-D09	Units
T	Measurement range [2]		± 90	°
T	Measurement axis	(see “Directions”)	X-Y	
T	Offset [5]	Output at 0°	2,5	V
T	Offset calibration error	Max. deviation	±1	°
Q	Offset temperature error	0...70°C (@0° pos.)	±0,3	°
		-25...85°C	±0,8	°
T	Sensitivity	@ 0° (offset position)	35 2	mV/° V/g
T	Sensitivity calibration accuracy		±1	%
Q	Sensitivity temperature error	0...70°C	-0,8...0,3	%
		-25...85°C	-1,5...0,5	%
Q	Angular nonlinearity Acceleration nonlinearity	Arcsine function of acc. Best fit FS straight line	N / A ±10	° mg
Q	Frequency response –3dB [3]		18 ±10	Hz
T	Cross-axis sensitivity [4]		4	%
Q	Short term stability	Drift after 2min warm-up	0,01	°
Q	Ageing (offset drift)	200 cycles @ 0...70°C	0,03	°

Supply voltage +5V and room temperature, unless otherwise specified

Note 1. T=Tested during production, Q = Parameter is qualified during product validation
Note 2. Measurement range is limited by sensitivity and offset
Note 3. Frequency response is determined by the sensing element’s internal gas damping. Output has true DC response
Note 4. Cross-axis sensitivity determines how much inclination perpendicular to the measurement axis couples to the output
Note 5. Position should be calibrated during/after mounting. See “Measurement directions”

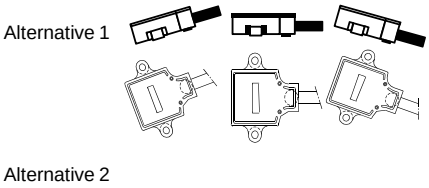
2.3. Electrical Connection

Highly flexible PUR cable, no connector

	Name	Function	Wire color
1	GND	Ground	white
2	V_{DD}	Power supply +5VDC input	brown
3	Out X	Output SCA121T, X-direction	green
4	Out Y	Output SCA121T, Y-direction	yellow

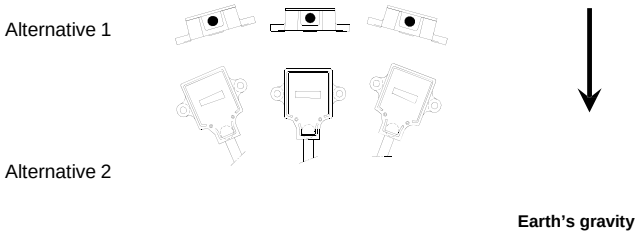
2.4. Measuring Directions

X-axis



Negative incl., Zero position, Positive incl.

Y-axis



Positive incl., Zero position, Negative incl.

Figure 1. Positions

3. Mechanical specification

Cable length:	1500 ± 20 mm
Cable type:	IGUS CHAINFLEX CF2.01.04, PUR grey
Cable diam.:	6 ± 0,2mm
Leads:	4 x 0,14mm^2
Total weight:	approx. = 0,07 kg
Protection class:	IP66
Metal part:	Zinc casting, trivalent passivation (RoHS compliant)

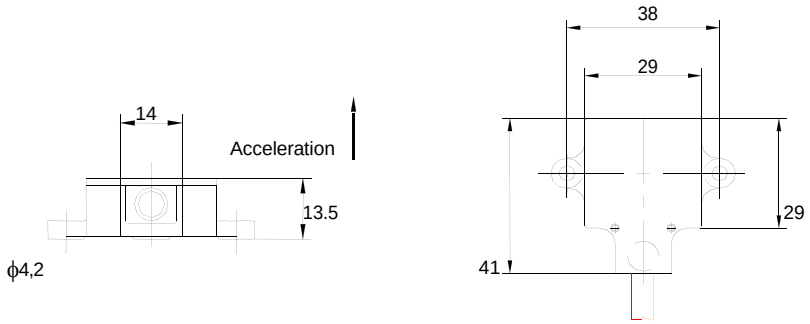


Figure 2

4. Mounting

The sensor module is mounted with 2 screws, dimension M4. Mounting torque 5 ± 1Nm.
Mounting alignment is critical as errors will decrease the sensor performance.

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