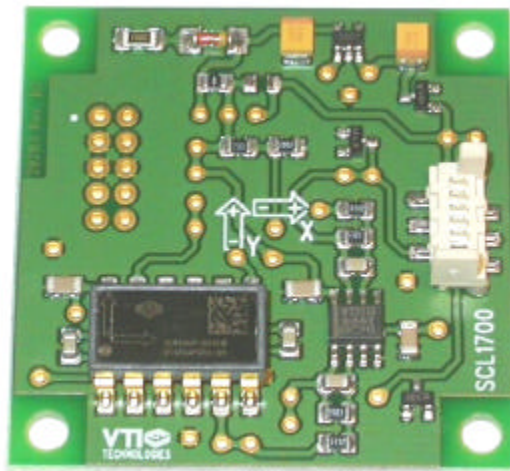


SCL1700-D11 PRODUCT SPECIFICATION

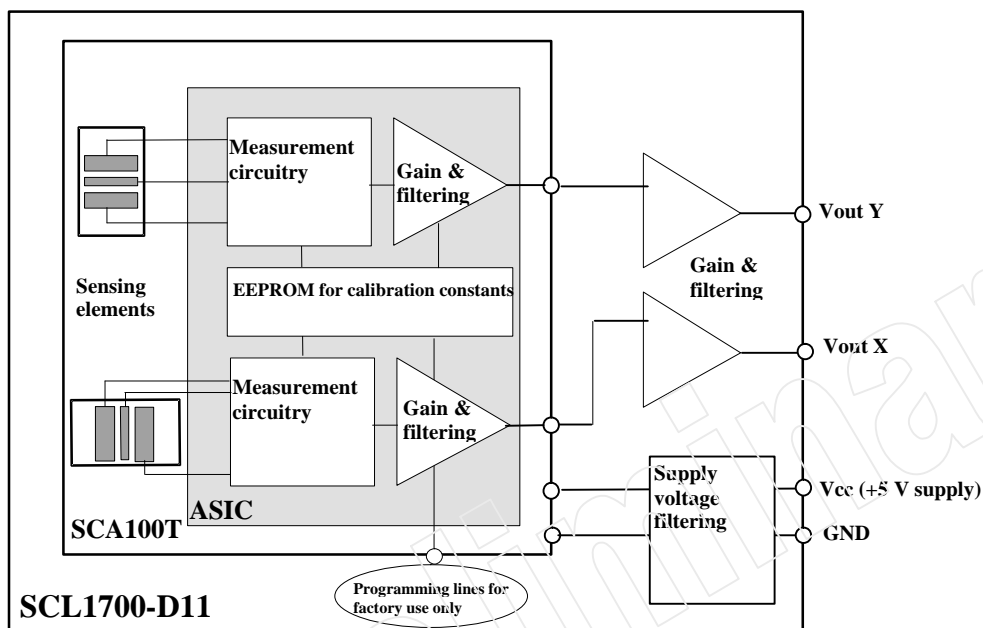


1 General description

This document describes an inclination module, suitable for various industrial applications. Inclinator is available in 2-axis configuration. The sensor used is a VTI standard inclinometer component SCA100T-D01. Output interface is analogue voltage.

1.1 Block diagram

Products are based on SCA100T-D01 components, mounted on PCB. Electronics are not encapsulated.



1.2 Inclinometer Features

- Measuring range: $\pm 10^\circ$
- Controlled frequency response
- Easy to use and design in
- High resolution analogue output
- Dual axis inclination measurement
- Advanced failure detection
- Wide supply voltage range

Benefits

- Excellent long term stability
- Outstanding shock durability
- Harsh environment robustness
- Fit, form and function compatible with commonly used 45 x 45mm dual axis inclination board

2 Electrical specifications

2.1 Electrical Connection

Connector: Molex, Picoflex PF-50, see picture 2.

Name	Function	Connector pin #
V _{CC}	Power supply	1
NC	Internally not connected	2
GND	Ground	3
Out X	Analogue X-direction output	4
Out Y	Analogue Y-direction output	5
NC	Internally not connected	6

2.2 Absolute maximum ratings

Parameter	Condition	Min.	Typ	Max.	Units
Supply voltage	(ratiometric output)	4.5	5.0	5.5	V
Current consumption	No load		4	6	mA
Output load	Resistive	30	50		kΩ
	Capacitive			20	nF
Storage temp		-40		125	°C
Operating temp		-25		85	°C
Mechanical shock	1m drop on concrete		20 000		g

2.3 Electrical Specification

Parameter	Condition	Min.	Typ	Max.	Units
Supply voltage		4.75	5.0	5.25	V
Measuring range ⁽¹⁾			± 10		°
Offset ^(2,3,4)	Output @ 0°		2.5 ± 0.02		V
Offset calibration point error ^(3,4,5)			± 0.1		°
Offset temperature error ^(3,4,5)	0°C...70°C		± 0.2		°
	-25°C...85°C		± 0.5		°
Sensitivity ^(3,4,7)	@ 0° (offset position)	198	200	202	mV/°
Sensitivity calibration error ^(3,4,8)				1%	%
Sensitivity temperature error ^(3,4,9)	0°C...70°C		± 0.5		%
	-25°C...85°C		± 1.0		%
Nonlinearity ⁽¹⁰⁾	Sine fitting		± 0.03		°
Ratiometric error ⁽¹¹⁾			±2		%
Frequency response -3dB	True DC response		3		Hz
Output noise DC...10 Hz	@ 0° (offset position)		< 0.001		°

Note 1. The measuring range is limited by sensitivity, offset and supply voltage rails of the device.

Note 2. Offset specified as $V_{\text{offset}} = V_{\text{out}}(@0^\circ)$ [V].

Note 3. +5.0V supply voltage used in calibration and testing.

Note 4. See proposed connection of SCL1700 in picture 2.

Note 5. Offset calibration error specified as $\text{Offset_Calib_error} = \arcsin(\text{Offset_Calib_error_in_g})$ [°],

$\text{Offset_Calib_error_in_g} = \{V_{\text{out}}(@0^\circ) - 2.5\text{ V}\} / V_{\text{sens}} [\text{g}]$, $V_{\text{sens}} = 11.46 \text{ V/g}$.

Note 6. Offset temperature error specified as $\text{Offset_Error_@_temp.} = \arcsin(\text{Offset_Error_@_temp_in_g})$ [°],

$\text{Offset_Error_@_temp_in_g} = \{V_{\text{out}} @ \text{temp.} - V_{\text{out}} @ \text{room temp.}\} / V_{\text{sens}} [\text{g}]$, $V_{\text{sens}} = 11.46 \text{ V/g}$.

Note 7. Sensitivity target in calibration 11.46 V/g (→ 200 mV/°)

Sensitivity specified as $V_{\text{sens}} = \{V_{\text{out}}(@+10^\circ) - V_{\text{out}}(@-10^\circ)\} / (2 \cdot \sin(10^\circ) \text{ g})$ [V/g].

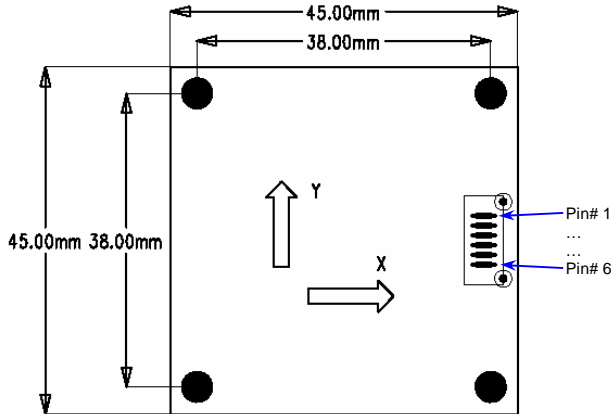
Note 8. Sensitivity calibration error specified as $\text{Sensitivity_calibr_error} = \{V_{\text{sens}} - V_{\text{sens_nom}}\} / V_{\text{sens_nom}} \times 100\%$ [%],
 $V_{\text{sens_nom}}$ = nominal sensitivity.

- Note 9. Sensitivity temperature error specified as

$$\text{Sensitivity_temp_error} = \frac{\{V_{\text{sens @ temp}} - V_{\text{sens @ room temp}}\} / V_{\text{sens @ room temp}}}{V_{\text{sens @ room temp}}} \times 100\% \text{ [%]}$$
- Note 10. From best fit sine function top output through: -10°, 0°, +10°.
- Note 11. Ratiometric error specified as:

$$RE = 100\% \times \left(1 - \frac{V_{\text{out}}(@ V_x) \times \frac{5.00V}{V_x}}{V_{\text{out}}(@ 5V)} \right)$$

3 Mechanical specification



- PCB Material: FR4
- PCB thickness: 1.6 mm
- Size: 45 mm × 45 mm
- Mounting holes: Ø 3.5 mm
- Height: max 10 mm
- Weight: < 10 g
- Connector: Molex, Picoflex PF-50, 1.27mm pitch, mates with Molex 90327

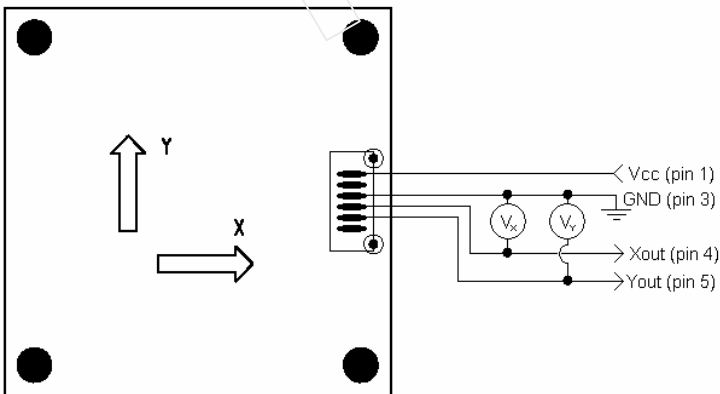
Picture 1. SCL1700-D11 mechanical dimensions.

4 Mounting

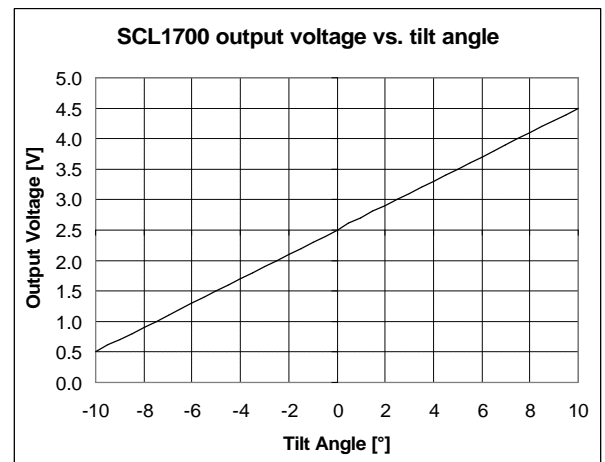
The sensor module is to be mounted with 4 screws, dimension M3.

5 Connection and output signal

Proposed connection in applications.



Picture 2. Proposed connection for SCL1700-D11.



Picture 3. SCL1700-D11 output signal.