OIAC310

Redundant hybrid inclinometer

General Description

OIAC310 is a 1D or 2D redundant inclination sensor based on MEMS (Micro Electro Mechanical Systems) technology. The device senses pitch and roll planes up to max ±30 degrees. Output signals are both digital (Can Open) and analog signals 0,5-4,5V.

OIAC310 is a hybrid device, that has two different independent electronic boards inside: each board has different circuitry, different logic and different MEMS detectors. The first board has Can Open interface, the second board has analogue interface, voltage output. The power supply is kept separated also internally from analogue to digital parts. The main advantage of this hybrid box is on safety score, according to the standard ISO13849.

Besides that, the OIAC310 has two more big advantages: it is compact and rugged. The redundant device is enclosed in the same box of a single channel device, saving the space, but at the same time keeping the robustness: the metal enclosure and the internal resin protect electronic parts and connections against mechanical shocks, vibrations, thermal shocks, humidity and chemical agents.

OIAC310 is guaranteed in the full industrial temperature range [-40;+85]°C.

Applications

- **Stability control for agricultural machinery**
- **Stability control for construction machinery**
- **Mowers inclination control**
- **Leveling control**

Pin Functions

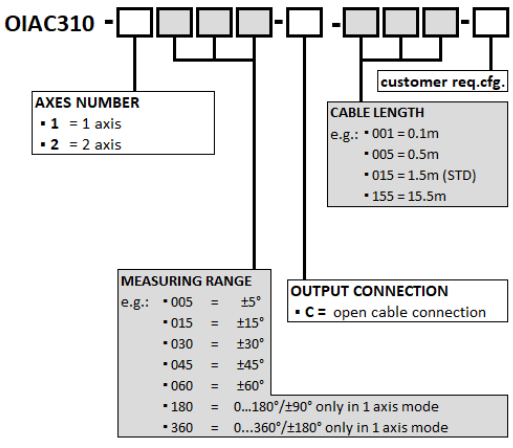
See pinout details at page 3

Images are for illustration purpose only and may not represent exactly the product in all its details.

Features

- **Redundant channel: analog and digital**
- **Small size**
- **Robust metal case protects from shocks and vibrations**
- **Rugged and protected against electrical disturbs and transients**
- **Filling resin protects against thermal shocks, moisture and harsh environments (IP67)**
- **Protected against reverse bias**

Ordering information



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Min	Max	Unit
T_S	Storage Temperature	-40	85	°C
T_A	Operating Temperature Range	-40	85	°C
V_{CC}	Supply Voltage Range	10	30	V

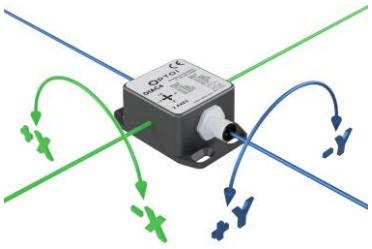
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

T_A = 25°C, range ±30deg unless otherwise noted.

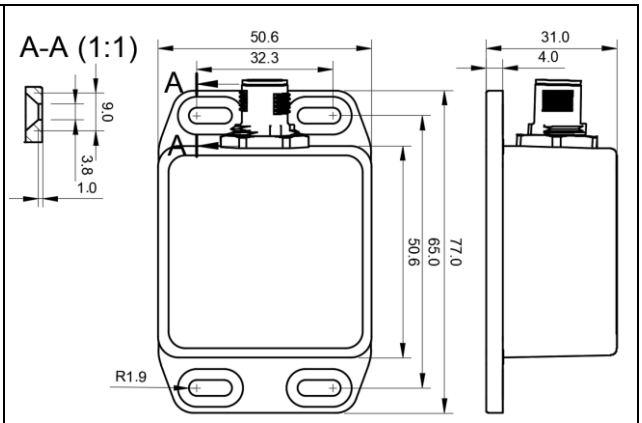
Symbol	Parameter	Conditions	Min	Typ/Def	Max	Unit
V_{CC}	Supply Voltage Range		10	12/24	30	V
I_{CC}	Current consumption channel 1 (CAN OPEN)	CAN OPEN		50		mA
	Current consumption channel 2 (ANALOG)§	ANALOG		10		mA
Rg_1	Range of measurement 2AX mode	CAN OPEN	±5	±60	±60	deg
Rg_2	Range of measurement 2AX mode	ANALOG	±5	±30	±60	deg
Rg_3	Range of measurement 1AX mode	CAN OPEN		±180		deg
Rg_4	Range of measurement 1AX mode	ANALOG		±180		deg
$Reso_1$	Resolution of the digital output	CAN OPEN		0.01		deg
$Reso_2$	Resolution of the analog output**	ANALOG		1.30		mV
Resa	Angle Resolution	CAN OPEN and ANALOG			0.05	deg
A	Accuracy	CAN OPEN and ANALOG		±0.1	±0.25	deg
X_A	Cross Axis Error	CAN OPEN and ANALOG		±0.1		% FS
D_T	Temperature drift	CAN OPEN and ANALOG		± 0.01		deg/°C
R_{L1}	Terminator resistors (beginning and end of bus)	CAN OPEN		120		Ω
R_{L2}	Load resistor	ANALOG	33	100	††	kΩ
SR	Sample Rate	CAN OPEN		550		S/s
BR	Baud Rate	CAN OPEN	10	500	1000	Kbit/s

MECHANICAL CHARACTERISTICS AND DIMENSIONS



2 AXES

1 AXIS



TOP VIEW *SIDE VIEW*

§ Device consumption current output excluded (add 20mA per channel max)

** *Considering 2D model range +/-30deg, 2.3uA is approx.0.0085deg, considering 1D model +/-180deg 2.3uA is approx. 0.05deg*

†† *See load resistance safe operating area*

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Wdt	Width		50	50,50	51	mm
Lgt	Length		76,50	77	77,50	mm
Hgt	Height		30,50	31	31,50	mm
Wgt	Weight			200		g
C	Connection	fully redundant versions		12 poles open lead 1.5m cable		-

Units = mm ; Mechanical tolerance=+/-0.2mm

Mounting

- The highest accuracy is achieved using 4 flat head countersunk screws with a maximum thread diameter of 4mm externally centered in the 4 slot-holes.
- For 1-axis models, the sensor's mounting surface must be vertical. The measured angle value increases with clockwise rotation. Zero position with left-oriented connector (top view).

1 AXIS ZERO POSITION AND DIRECTION

- For 2-axes models, the sensor's mounting surface must be flat and perfectly level.

2 AXIS DIRECTIONS

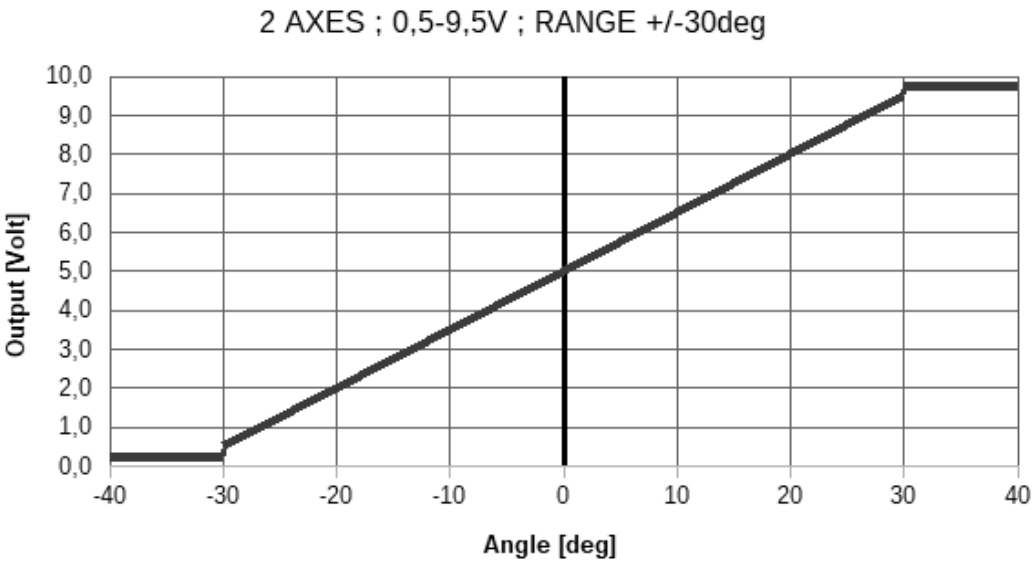
- For heavy vibrating applications, inclinometers isolation from vibration is required; if not the measured angles may be inexact.
- Strong accelerations applied to the inclinometers leads to inexact measure values.

Pin Functions

Redundant cable version, 2 axes devices, OIAC310-2030-C-150 (standard version)

No	Color	Name	Function
1	GREY	TX1	Factory use only (leave it open if present)
2	RED	VCC_2	Power Supply 2 (analog)
3	BLACK	GND_2	Ground 2 (analog)
4	PINK	$OUTX_2$	Analog output X
5	PURPLE	$OUTY_2$	Analog output Y (not present if 1D mode)
6	PINK/GREY	RX1	Factory use only (leave it open if present)
7	WHITE	VCC_1	Power Supply 1 (digital)
8	BLUE	GND_1	Ground 1 (digital)
9	BROWN	CAN_H	CAN line HIGH
10	GREEN	CAN_L	CAN line LOW
11	YELLOW	-	NOT USED/NOT PRESENT
12	RED/BLUE	-	NOT USED/NOT PRESENT

Output characteristics analog part



Electrical Connections