

General Description

OIAC300 inclinometers are available in two-axes or single-axis version. Two-axes versions can measure tilt angles up to ± 60 degrees in the pitch and roll axis. Single-axis versions can measure tilt angles up to 360 degrees. Modbus interface is compliant to standard V1.02 with protocol Modbus RTU V1.1b3 and allow the user to program its device directly, simply using the Modbus network master device.

The compact sturdy anodized metal enclosure can withstand shocks and vibrations, while the filling resin makes OIAC300 inclinometers waterproof and dustproof. The internal protection circuitry increase robustness to over-voltages, outputs lines overloads and wrong cabling.

The MEMS transducer raw signals are filtered, conditioned, and elaborated with algorithms aimed for good noise rejection and measure stability. The digital filter can be adjusted via Modbus interface to adapt the sensor's response time to the application requirements.

OIAC300 inclinometers can be requested with different options in connectors, cable length, redundancy, or customer-specific device configurations.

For very high accuracy demanding applications, temperature-compensated variants can be requested.

Applications

Solar power plants
 Industrial plants
 Industrial automation
 Levelling control

Pin Functions

OIAC300 inclinometers are available with different cable and connector options. Redundant versions are available only with cable. For more details, see pinout information on page number 3.

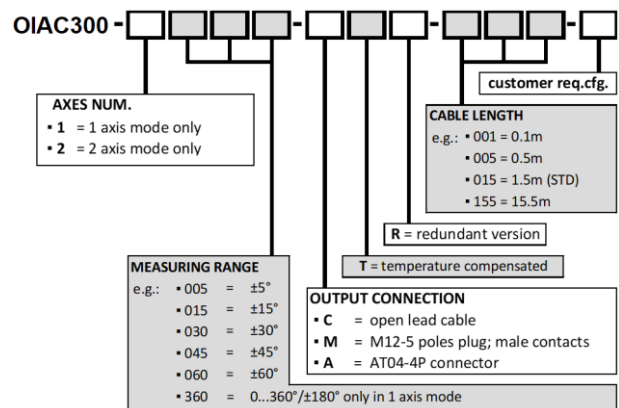


Images are for illustration purpose only and may not represent exactly the product in all the details

Features

- Rugged device: full metal case filled with protective resin
- Operating temperature -40°C to $+85^{\circ}\text{C}$
- Simple architecture and low price
- High accuracy
- Very High MTTF
- Flexible and user configurable
- Cable with shield for noisy environment

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 (DC voltage)	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 unless otherwise noted.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{CC}	Supply Voltage Range	-40 < T _A < +80	10	24	30	V
I _{CC}	Current consumption	average value non-redundant version, reading every 250ms		6.50		mA
Rg ₁	Range of measurement	Single-Axis Versions 0-360° format Single-Axis Versions ±180° format	0 ±10		360 ±180	deg
Rg ₂	Range of measurement	Dual-Axes Versions	±5	±30	±60	deg
Res	Angle Resolution			0.01		deg
A	Accuracy	Rg ₁ =±180°; Rg ₂ <+/-30°		±0.1	±0.5	deg
X _A	Cross Axis Error			±1.0		% FS
D _T	Temperature drift			± 0.01		deg/°C

MODBUS INTERFACE CHARACTERISTICS

Symbol	Parameter		Unit
INT	Interface	Modbus V1.02	
PRT	Protocol	Modbus V1.1b3	
BR	Baud Rate	2400...38400 software configurable	bit/s
SB	Start Bit	1	bit
DB	Data Bits	8	bit
PA	Parity	None, Even, Odd software configurable	
ST	Stop Bits	1 or 2 software configurable depending on PA	bit
NAD	Node Address	1...247 software configurable	
TER	Termination Resistor	not integrated use external line termination	

RELIABILITY PARAMETERS

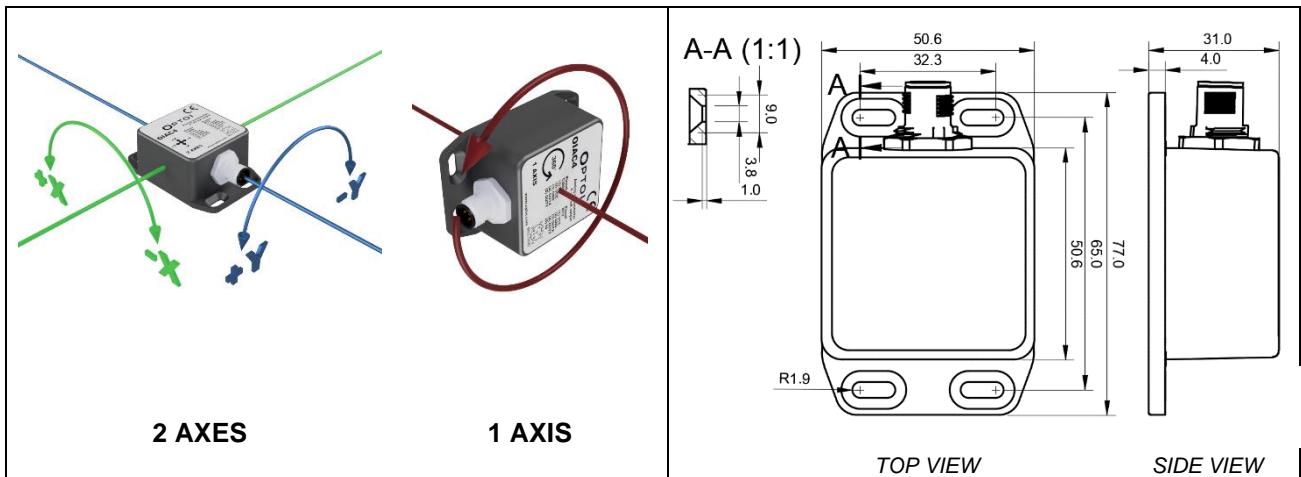
All MTTF calculations are made according to Siemens SN 29500.

Symbol	Parameter	Conditions	Value	Unit
MTTF	Mean time to failure	Environment GM; T _A = 40°C; V _{CC} = 12V	490	years
		Environment GM; T _A = 40°C; V _{CC} = 24V	430	
DC	Diagnostic coverage		None	-
S	Structure		Not redundant	-

For redundant versions, the reliability parameters will be calculated, according to the desired configuration.

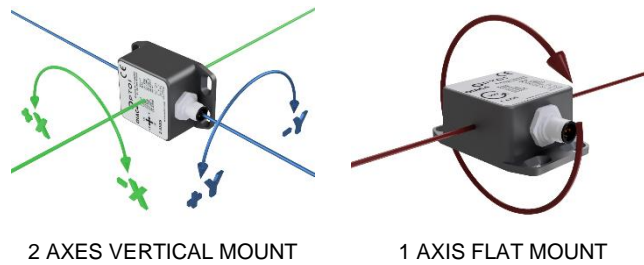
MECHANICAL CHARACTERISTICS AND DIMENSIONS

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
W	Width			50.6		mm
L	Length			77.0		mm
H	Height			31.0		mm
Wt	Weight	non-redundant; M12 connector additional cable	150	180 40	220	g g/m
C _L	Cable standard length			1.5		m
C _∅	Cable outer diameter			4.5		mm
C _s	Cable connection styles	non redundant (4 cond.cable + shield) redundant (8 cond.cable + shield)				



Flat and Vertical Mounting Version

To reduce the mounting complexity and match space and position constraints for sensor installation, the single-axis flat-mount version and the dual-axis vertical mount OIAC5 versions are available.



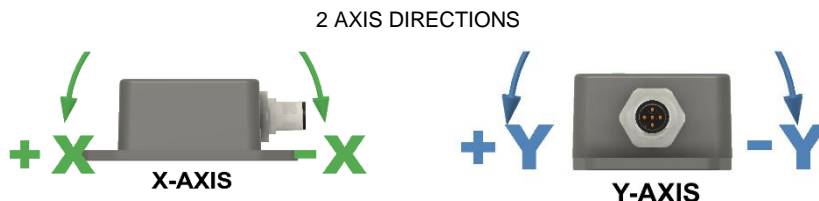
Mounting

- 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.



- 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

CABLE VERSION OIAC300-AYYY-C

No	Name	Color	Function
1	D1 – [A] – RS485+	YELLOW	Transceiver terminal 1, V1 Voltage (V1 > V0 for binary 1 [OFF] state)
2	D0 – [B] – RS485-	BROWN	Transceiver terminal 0, V0 Voltage (V0 > V1 for binary 0 [ON] state)
3	COMMON	GREEN	Signal and Power Supply Common
4	VP	WHITE	Positive 10...30 V D.C. Power Supply
5	SHIELD	-	Cable Shield (connect to ground)

M12-5 POLES MALE PLUG CONNECTOR VERSION: OIAC300-AYYY-M *

No	Name	Color	Function
1	Not Used		
2	VP		Positive 10...30 V D.C. Power Supply
3	COMMON		Signal and Power Supply Common
4	D1 – [A] – RS485+		Transceiver terminal 1, V1 Voltage (V1 > V0 for binary 1 [OFF] state)
5	D0 – [B] – RS485-		Transceiver terminal 0, V0 Voltage (V0 > V1 for binary 0 [ON] state)

FRONT VIEW

REDUNDANT VERSION M12-8 POLES MALE PLUG CONNECTOR VERSION: OIAC300-AYYY-B(T)R

No	Name	Color	Function
1	VP1		CH1 Positive 10...30 V D.C. Power Supply
2	VP2		CH2 Positive 10...30 V D.C. Power Supply
3	COMMON1		CH1 Signal and Power Supply Common
4	D1-1 – [A] – RS485+		CH1 Transceiver terminal 1, V1 Voltage (V1 > V0 for binary 1 [OFF] state)
5	D0-1 – [B] – RS485-		CH1 Transceiver A terminal 0, V0 Voltage (V0 > V1 for binary 0 [ON] state)
6	D1-2 – [A] – RS485+		CH2 Transceiver terminal 1, V1 Voltage (V1 > V0 for binary 1 [OFF] state)
7	COMMON_2		CH2 Transceiver A terminal 0, V0 Voltage (V0 > V1 for binary 0 [ON] state)
8	D0-2 – [B] – RS485-		CH2 Positive 10...30 V D.C. Power Supply

FRONT VIEW

* Different pinout or cable plus M12 connector variants are available on request.

REDUNDANT VERSION CABLE OIAC300-AYYY-C(T)R

No	Name	Color	Function
1	D1-1 – [A] – RS485+	YELLOW	CH1 Transceiver terminal 1, V1 Voltage (V1 > V0 for binary 1 [OFF] state)
2	D0-1 – [B] – RS485-	BROWN	CH1 Transceiver terminal 0, V0 Voltage (V0 > V1 for binary 0 [ON] state)
3	COMMON-1	GREEN	CH1 Signal and Power Supply Common
4	VP-1	WHITE	CH1 Positive 10...30 V D.C. Power Supply
6	D1_B – [A] – RS485+	PINK	CH2 Transceiver terminal 1, V1 Voltage (V1 > V0 for binary 1 [OFF] state)
7	D0_B – [B] – RS485-	BLUE	CH2 Transceiver terminal 0, V0 Voltage (V0 > V1 for binary 0 [ON] state)
8	COMMON_B	BLACK	CH2 Signal and Power Supply Common
9	VP_B	RED	CH2 Positive 10...30 V D.C. Power Supply

Electrical Connections

MODBUS GENERAL WIRING SCHEME

