

General Description

OIACOR tilt switches are available in two-axes or single-axis version. Two-axes versions can operate up to ± 60 degrees in the pitch and roll axis. Single-axis versions can operate up to 360 degrees.

OIACOR are available with single or double output relays for axis. For applications where the value of the tilt angle matters, variants with additional voltage analog output 0,5-9,5V or current analog output 4...20mA are also available.

The compact sturdy anodized metal enclosure can withstand shocks and vibrations, while the filling resin makes OIACOR tilt switches waterproof and dustproof.

The MEMS transducer raw signals are filtered, conditioned, and elaborated with algorithms aimed for good noise rejection and measure stability. On request, the digital filter can be factory-adjusted for adapting the sensor's response time to customer needs.

The internal protection circuits make these tilt switch electrically robust to withstand overvoltage, outputs lines overload and cable inversions conditions.

OIACOR tilt switches can be requested with different options in connectors, cable length, redundancy, or customer-specific device configurations.

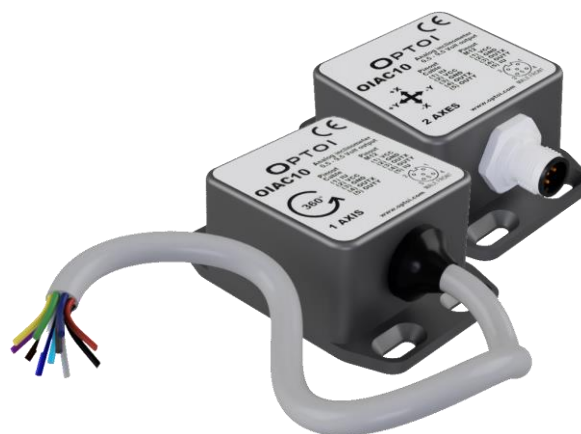
For very high accuracy demanding applications, temperature-compensated variants can be requested.

Applications

Mobile and fixed cranes
 Aerial platforms
 Telehandlers
 Drilling rigs
 Earth moving machines
 Agricultural machines
 Forestry machines
 Mowers inclination control
 Levelling control

Pin Functions

OIACOR tilt switches are available with different cable and connector options. For more details, see pinout information on page number 4.

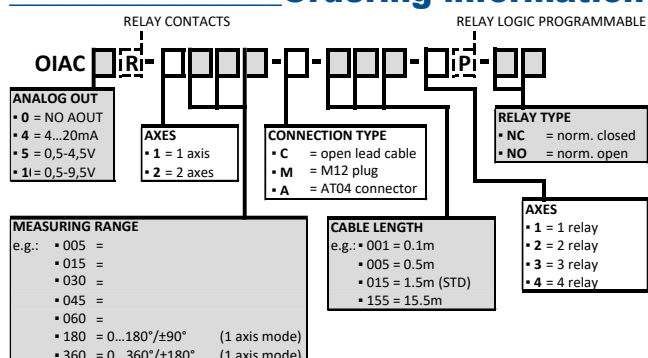


Images are for illustration purpose only and may not represent exactly the product in all the details

Features

- Rugged device: fully metal case filled with protective resin
- Medium accuracy (typ ± 0.10 deg)
- Very High MTTF @ 12V and 24V
- Single axis or dual axes version
- Different angle ranges
- Programmable thresholds
- Programmable hysteresis on thresholds
- Operating temperature -40°C to $+85^{\circ}\text{C}$
- IP67 protection grade
- Customizable on customer request

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)	12	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	12	24	30	V
I _{CC}	Current consumption	average value		7.5	12 ⁽¹⁾⁽²⁾	mA
Rg ₁	Range of measurement	Single-Axis Versions	±10	±180	±180	deg
Rg ₂	Range of measurement	Dual-Axes Versions	±5	±30	±60	deg
Resa	Angle Resolution				0.05	deg
A	Accuracy	Rg ₁ =±180°; Rg ₂ <+/-30°		±0.1	±0.25	deg
X _A	Cross Axis Error			±1.0		% FS
D _T	Temperature drift			± 0.01		deg/°C
Ths	Switch threshold values	Single-Axis Versions	- Rg ₁		+Rg ₁	deg
		Dual-Axes Versions	-Rg ₂		+Rg ₂	deg
Hst	Threshold's hysteresis values		0		±10 ⁽³⁾	deg
V _{sw}	Switch blocking voltage	peak value	0		60	Vp
I _{sw}	Switch load current	continuous; AC/DC		0,5 ⁽⁴⁾	1 ⁽⁴⁾	A
R _{on}	Switch ON resistance	I _{sw} = 1A		0,5	1	Ω
I _{sk}	OFF state leakage current	V _{sw} = 60Vp		1		μA
t _{sw}	Switching speed	V _{sw} = 10V; I _{sw} = 10mA		3		ms

⁽¹⁾ the maximum current consumption must be increased by 2mA for each additional output relay

⁽²⁾ the maximum current consumption must be increased by load current value if additional voltage output signal is present or by 22mA if additional current output signal is present

⁽³⁾ eg.: hysteresis value is added to positive thresholds value to compute the trip point; to return under the trip point, measured angle value must go below positive threshold value minus hysteresis. Hysteresis value is subtracted to negative thresholds value to compute the trip point; to return over the trip point, measured angle must go over the negative threshold plus values plus hysteresis

⁽⁴⁾ for AC current RMS current value must be considered

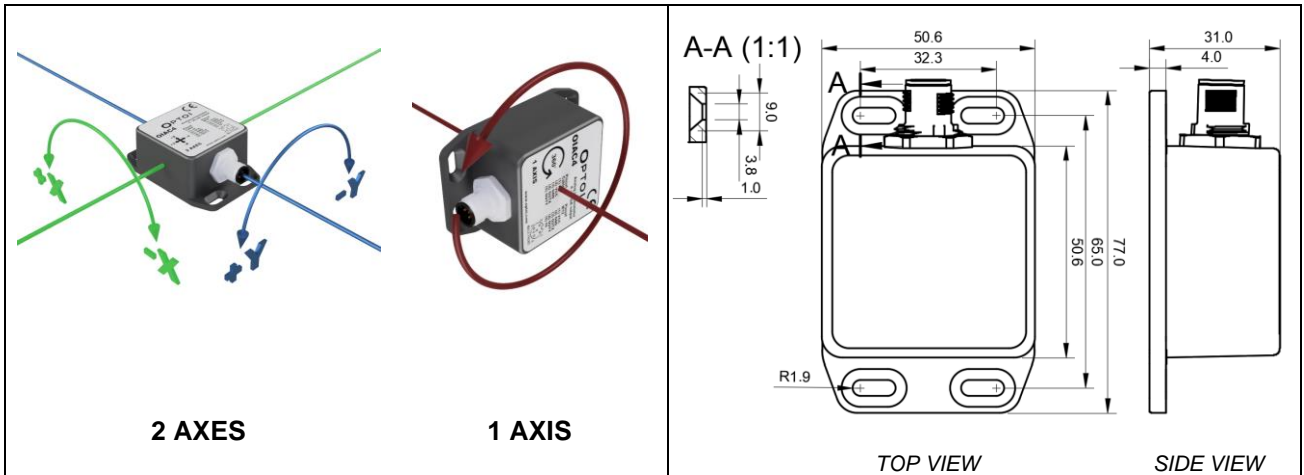
OUTPUT SWITCHES TYPES

Parameter	Conditions	
Switch type		normally close ⁽¹⁾ or normally open DPST
Switch Function	normally close ⁽¹⁾ switch	switch contacts shall open at trip point
	normally open switch	switch contacts shall close at trip point

⁽¹⁾ normally closed switch is obtained by a normally open switch maintained closed by the tilt switch processor unit. When the tilt switch power supply is turned off the switch opens. Also in case of severe damages to the tilt switches causes switch contacts to be always open.

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	M12 connector		200		g
C _L	Cable standard length			1.5		m
C _ø	Cable outer diameter			7	9.5	mm
C _s	Cable connection styles	dependendig on relays number and analog output lines		up to 14 conductors cable with 12 open lead conductors		



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, tilt switches isolation from vibration is required; if not the measured angles may be inexact.
- Strong accelerations applied to the tilt switches leads to inexact measure values.

Pin Functions

CABLE VERSION OIACZR-YYYY-C-LLL-NP

No	Color	Name	Function
1	BROWN	VCC	Positive Power Supply
2	BLACK	GND	Ground / 0V / V-
3	BLUE	REL1a	Switch Contact #1 pole a
4	GRAY	REL1b	Switch Contact #1 pole b
5	WHITE	REL2a	Switch Contact #2 pole a
6	PINK	REL2b	Switch Contact #2 pole b
7	BROWN-GREEN	REL3a	Switch Contact #3 pole a
8	WHITE-GREEN	REL3b	Switch Contact #3 pole b
9	RED-BLUE	REL4a	Switch Contact #4 pole a
10	GRAY-PINK	REL4b	Switch Contact #4 pole b
11	YELLOW	OUTX	X-axis output for 2 and 1-axis devices
12	PURPLE	OUTY	Y-axis output for 2 axes devices

Electrical Connections

CONNECTIONS

Connections shown in the following figure are for a single output relay with no additional analog output lines tilt switch sensor

