

# TLP300

## INCLINATION SENSOR

Gyro-compensated Inclination Sensor in MEMS Technology



DATASHEET - Rev.3- 18012018



### CHARACTERISTICS

- MEMS technology
- High protection level IP67 and wide temperature range from -40°C ... +85°C
- Stable accuracy over whole temperature range
- Resolution up to 0,01°
- Single axis 0° to 360°
- Double axes  $\pm 1^\circ$  to  $\pm 60^\circ$



### ADVANTAGES

- Instantaneous Gyro-compensated measure
- Excellent accuracy
- Reliability and long service life for outdoor applications
- Very compact dimensions
- High shock/vibration resistance



**IP67**  
High protection level



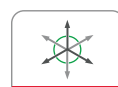
Shock/vibration resistant



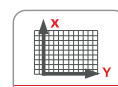
Reverse polarity protection



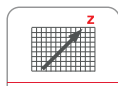
**-40...+85**  
Wide range temperature



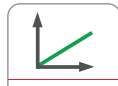
**MEMS**  
MEMS sensors technology



**X, Y**  
Horizontal version



**Z**  
Vertical version



**Analog**  
Analog output



**RoHS compliant**  
Directive 2011/65/EU



**CE**  
EU conformity

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### PRODUCT DESCRIPTION

TLP300 is available with one or two measurement axes. The inclinometer working principle is based on a micro machined silicon capacitive transducer (developed with MEMS technology).

Utilizing gyro-compensated MEMS technology, the sensor position signal is instantaneous with no delays and has a static excellent linearity.

TLP300 is suited for applications (cranes, aerial platforms, drilling machines and excavators) in harsh environments which are exposed to motion, shock and vibration, especially for mobile machines.



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### PRODUCT CODE

TLP300.	2.	_.	_ _ _.	_.	_ _.	S	← ORDER CODE
	a	b	c	d	e	f	

<b>a</b>	Power supply
<b>2</b>	◀ = 9 ... 30 V DC

<b>c</b>	Range
<b>XXX</b>	◀ = FS angle deg for single axis*
<b>XXX</b>	◀ = ± angle deg. for double axes**

<b>e</b>	Type of connection
<b>1</b>	◀ = Male connector M12x5, PUR cable 30cm
<b>2</b>	◀ = Male flange connector 1xM12, 5-pin

<b>b</b>	Measurement direction
<b>O</b>	◀ = Dual axes
<b>V</b>	◀ = Single axis

<b>d</b>	Output
<b>2</b>	◀ = 0,5 ... 4,5 V DC
<b>3</b>	◀ = 0 ... 5 V DC
<b>4</b>	◀ = 0 ... 10 V DC
<b>7</b>	◀ = 4 ... 20 mA

<b>f</b>	Version output
<b>S</b>	◀ = Single

\* = value of 360 means range 0° to 360°

\*\* = value of 010 means range ±10°

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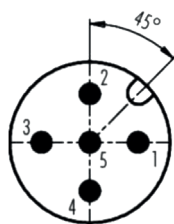
### TECHNICAL SPECIFICATION

Measuring range	$\pm 1^\circ$ to $\pm 60^\circ$ for horizontal version 0° to 360° for vertical version
Accuracy (+25 °C)	$< \pm 0,5^\circ$
Resolution	0.01°
Temp. range compensation	-10° ... +60° (custom on request)
Temperature coefficient	0,008 °/°C
Protection	IP67
Temperature range	-40°C ... +85°C [-40°F ... +185°F]
Material housing	PA6 + GF30%
Initialing time	<0,3 s after power on
Weight	approx. 100 g [3.53 oz]
Shock resistance	acc. to EN 60068-2-27 30 G, 11 ms
Vibration resistance	acc. to EN 60068-2-6 10 ... 500 Hz

### ELECTRICAL CHARACTERISTICS

Power supply	9 ... 30 V DC (STD)
Reverse polarity protection	YES
Electromagnetic compatibility	acc. to EN 61326-1, EN 61326-3-1
CE compliant	acc. to EMC guideline 2014/30/EU RoHS guideline 2011/65/EU

### ANALOG ELECTRICAL CONNECTION M12 X 5 PINS



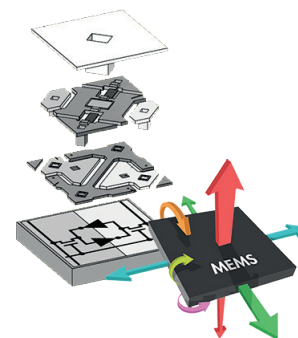
Pinout

	Single axis	Dual axes
1	+Vin	+Vin
2	n.c.	V / I out Y
3	GND	GND
4	V / I out Z	V / I out X
5	zero input	zero input

### OPERATING PRINCIPLE

#### Operating principle

MEMS (acronym for Micro Electro Mechanical Systems) technology enables both electronic circuits and opto-mechanical devices to incorporate on the same silicon substrate, using manufacturing technologies similar to those used for the implementation of integrated circuits.



# TLP300

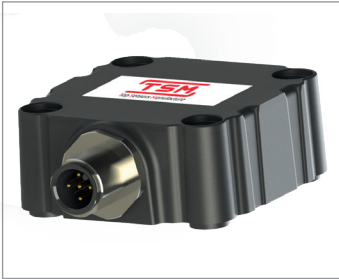
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### DIRECTION AXES

## Dual axes



### TSM dual axes TLP300 inclination sensor

The 2-dimensional inclination sensor must be mounted with the base plate in horizontal position, i.e. parallel to the horizontal line.

The sensor can be inclined both towards the X and Y axis at the same time.

For each axis a separate measured value is provided.

+X



-X



+Y



-Y



## Single axis



### TSM single axis TLP300 inclination sensor

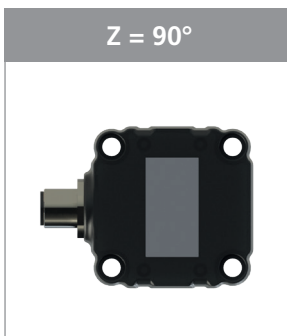
The 1-dimensional inclination sensor must be installed with its Z-axis in line with the force of gravity, as illustrated below.

The 1-dimensional sensor default position is 0° as shown in the following illustration.

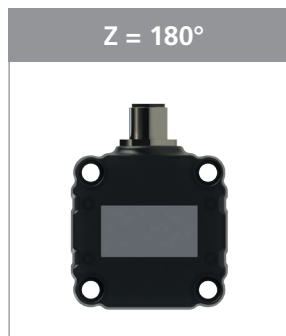
Z = 0°



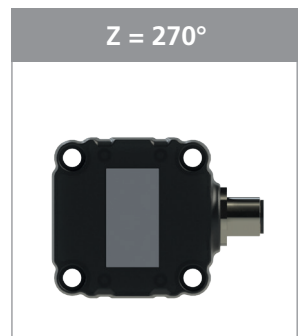
Z = 90°



Z = 180°



Z = 270°



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### DIMENSIONS [mm]

