TLK100

TILT SWITCH

MEMS technology with High resolution

Top Sensors Manufacture

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 ± 1° to ± 60°
- Optional redundant output
- LED status

ADVANTAGES

- Simple selection and fast installation
- High accuracy at economic prices
- Reliability and long service life for outdoor applications
- Cost, space and installation work saving
- High shock resistance
- Different output types (relay, NPN and PNP).
- Customized solution on request

IP67 — High protection level

Shock/vibration resistant

Redundancy output

Reverse polarity protection

-40...+85 °C — Wide range temperature

MEMS — MEMS sensors technology

X , Y — Horizontal version

Z — Vertical version

Relay — Relay output

RoHS compliant — Directive 2011/65/EU

CE — EU conformity

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PRODUCT DESCRIPTION

TLK100 is a Tilt Switch designed for applications like on window cleaning platforms, aerial platforms, lifting platforms and firefighter ladders. Due to high protection class IP67, the sensor is perfectly suited for use under damp or polluted conditions.

The functioning principle is based on a micro-electromagnetic system (MEMS), whereby the sensor has a very compact and flat design and is therefore particularly well-suited for tight installation spaces.

PRODUCT CODE

T L K 1 0 0 . [a] 2 . [b] _ . [c] _ _ _ . [d] _ . [e] _ _ . [f] _

ORDER CODE

a	Power supply
2	= 9 ... 30 V DC

b	Measurement direction
O	= Dual axes
V	= Single axis (0° to 360°)
V1	= Single axis (± 180°)

c	Range
XXX	= FS angle deg for single axis*
XXX	= ± angle deg. for double axes**

d	Output
14	= x1 relay – N.C. (normally closed)
15	= x2 relay – N.C. (normally closed)
16	= x1 relay – N.O. (normally open)
17	= x2 relay – N.O. (normally open)
18	= x1 open collector NPN
19	= x2 open collector NPN
37	= x1 open collector PNP
38	= x2 open collector PNP

e	Type of connection
1	= Male connector M12x5, PUR cable 30cm
2	= Male flange connector M12, 5-pin
4	= Wire connector 5 poles 300 mm
10	= Male flange connector M12, 8-pin
11	= Wire connector 8 poles 300 mm

f	Version output
NP	= Not programmable
PP	= Programmable

f	Digital switching point
	ONLY FOR HORIZONTAL VERSION +X1: ……° +Y1: ……° +X2: ……° +Y2: ……° Example Digital switching points = +X1=2.1° +Y1=3.1° Order code: 02I1D03I1D Digital switching points = +X1=2.1° +Y1=3.1° +X2=5.2° +Y2=4.1° Order code: 02I1D03I1D-05I2D04I1D
	ONLY FOR VERTICAL VERSION +Z1: ……° +Z2: ……° +Z2: ……° Example Digital switching points = +Z1=90.5° Order code: 90I5D Digital switching points = +Z1=90.5° +Z2=100.2° Order code: 90I5D-100I2D

* = value of 360 means range 0° to 360°or ±180°
** = value of 010 means range ±10°

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DATASHEET - Rev.3 - 09012019

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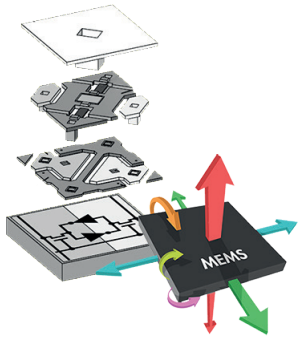
TECHNICAL SPECIFICATION

Measuring range	±1° to ±60° for horizontal version 0° to 360° or ±180° for vertical version
Linearity	< ±0,5 % FS
Resolution	0.01°
Temperature range	-40°C ... +85°C [-40°F ...+185°F]
Temperature drift	100 ppm/K
Protection	IP67
Temperature coefficient	0,008 °/°C
Switch-ON/OFF Delay time	0 s (Custom on request from 0 to 10 sec)
Hysteresis	1° (Custom on request)
Zero-point setting	Connect + and Zero contact for one second (Custom on request)
Material housing	PBT
Weight	approx. 225 g [7.93 oz] version with 1x M12, 5-pin flange connector
Shock resistance	acc. to EN 60068-2-27 30 G, 11 ms
Vibration resistance	acc. to EN 60068-2-6 10 G, 10 ... 500 Hz

OPERATING PRINCIPLE

Operating principle

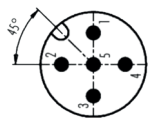
MEMS (acronym for Micro Electro Mechanical Systems) technology enables both electronic circuits and opto-mechanical devices to incorporate on the same silicon substrate, using manufacturing technologies similar to those used for the implementation of integrated circuits.



ELECTRICAL CHARACTERISTICS

Power supply	9 ... 30 V DC
Reverse polarity protection	YES
Max. switching voltage	220VDC, 250VAC
Rated current	2A Standard (optional 5A)
Switching power	60W, 62.5VA
Contact material	PdRu + Au Standard
Initial contact resistance	< 50 mΩ at 10 mA/30 mV
Electrical endurance	resistive, 30VDC / 1A - 30W min. 5x105 operations resistive, 30VDC / 2A - 60W min. 1x105 operations
Electromagnetic compatibility	acc. to EN 61000-6-2, EN 61000-6-4
CE compliant	acc. to EMC guideline 2014/30/EU RoHS guideline 2011/65/EU

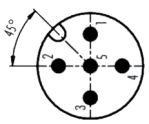
NPN / PNP ELECTRICAL CONNECTION M12 X 5 PINS



Pinout

	Flange connector	Wire connector
1	+Vin	WH
2	GND	YE
3	NPN / PNP 1	GY
4	NPN / PNP 2*	GN*
5	Serial program / Zero	BN

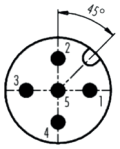
SINGLE RELAY ELECTRICAL CONNECTION M12 X 5 PINS



Pinout

	Flange connector	Wire connector
1	+Vin	WH
2	GND	YE
3	Relay 1 COM	GY
4	Relay 1 N.O. / N.C.	GN
5	Serial program / Zero	BN

REDUNDANT RELAY ELECTRICAL CONNECTION M12 X 5 PINS



Pinout

	Flange connector	Wire connector
1	+Vin	WH
2	GND	YE
3	Relay 1 COM	GY
4	Relay 1 N.O. / N.C.	GN
5	Relay 2 COM	BU
6	Relay 2 N.O. / N.C.	RD
7	Zero	PK
8	Serial program	BN

* = ONLY FOR 19, 38 OUTPUT IN OTHER CASES SHOULD NOT BE CONNECTED

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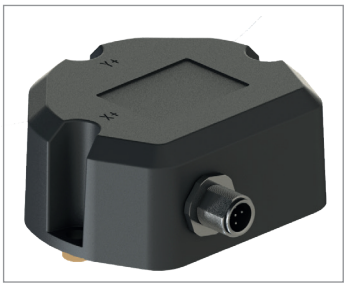
DIRECTION AXES

Dual axes



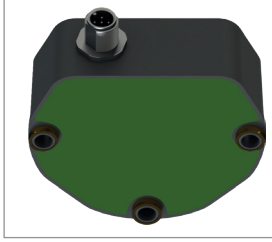
TSM dual axes TLK100 inclination sensor

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 TLK100 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 defaul t position is 0° as shown in the following illustration.

V (0...360°)

Z = 90°

Z = 270°

V1 (± 180°)

Z = -90°

Z = 90°

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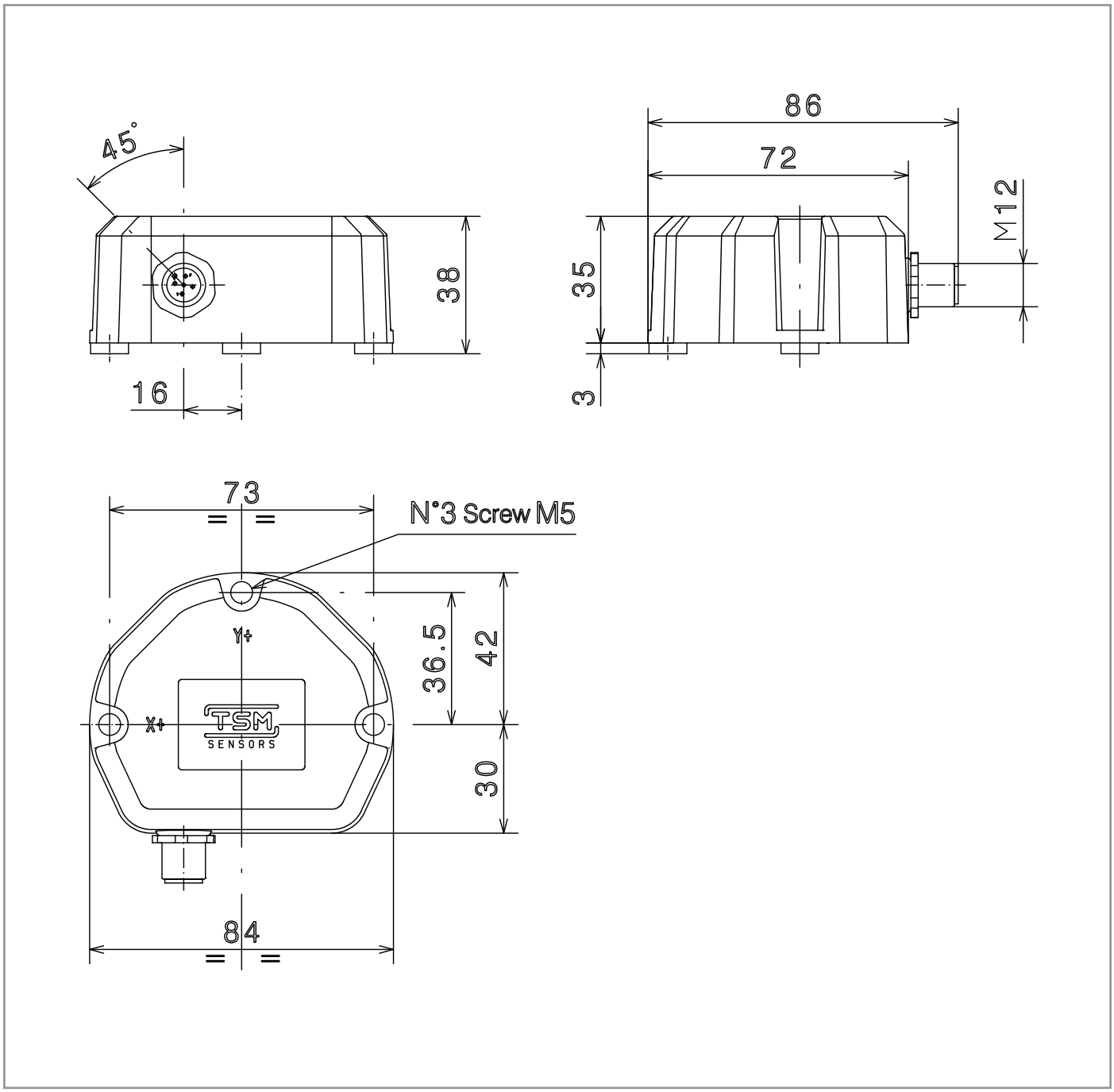
DIMENSIONS [mm]



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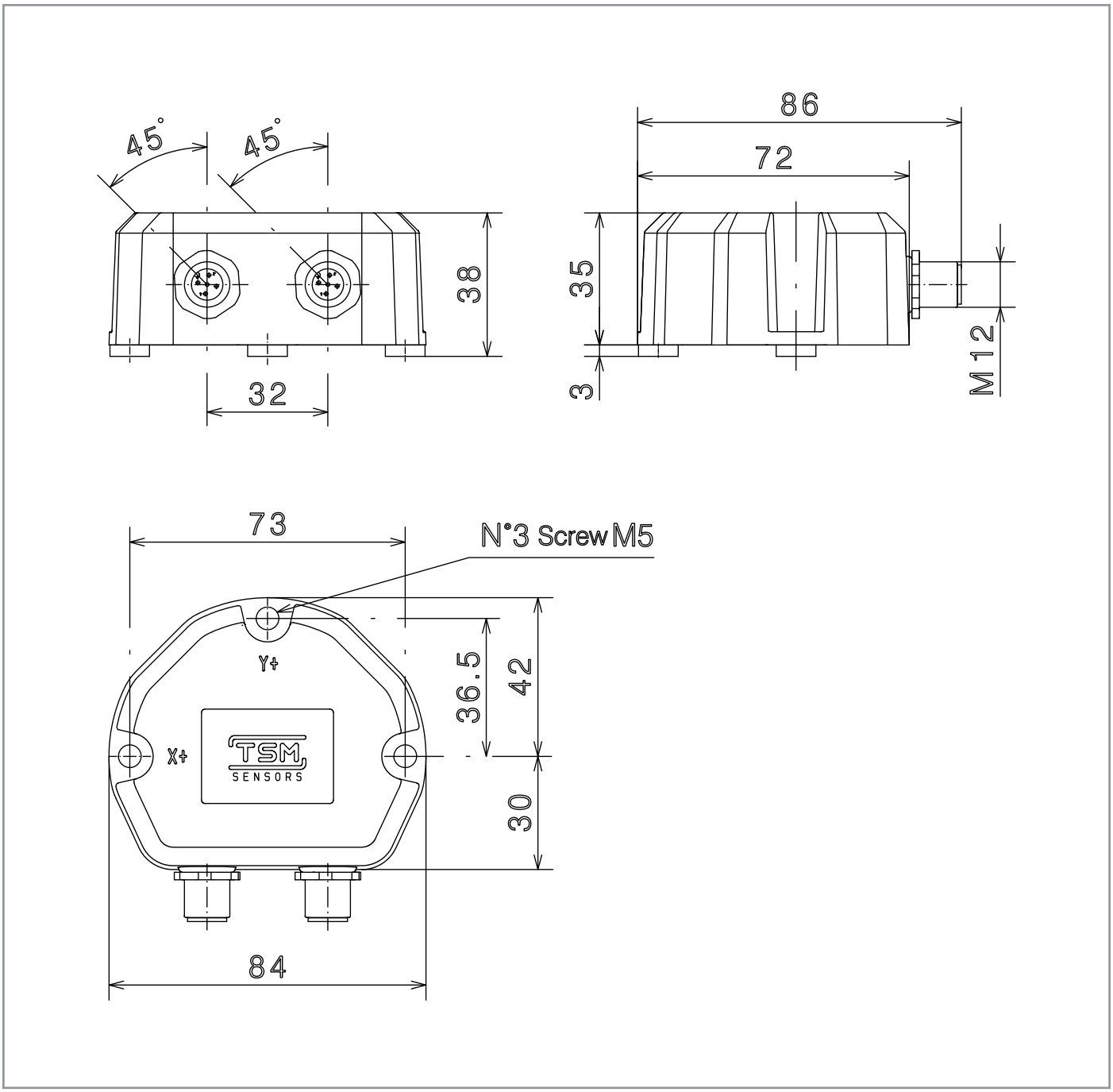
DIMENSIONS [mm]



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