

TSDA

Dual-Axis Inclinometer Based on MEMS Technology



The TS family of sensors is reliable, precise, and ideal for applications where fast response and high accuracy is needed. Based on moving-part-free MEMS technology, these inclinometers accurately measure inclination, tilt and angle in harsh operating conditions. With its ability to measure angles up to 360° with an accuracy of <math><0.5^\circ</math> over the full temperature range, it is perfect for use in heavy-duty applications such as load monitoring, leveling and angle monitoring.

Different output options and measurement ranges are configurable. Custom packaging is available on request.

The sensor can be ordered with an AMP Superseal 1.5 Series, 4-position housing with a built-in locking feature.

- ▶ Reliable and wear-free MEMS technology
- ▶ Inclination range: $\pm 25^\circ$, $\pm 45^\circ$ or $\pm 90^\circ$ ($\pm 180^\circ$ on request)
- ▶ Digital signal processing, filter algorithms
- ▶ Analog and CAN ISO11898 3V3 output
- ▶ Dual axis combined gyroscope and accelerometer
- ▶ Accuracy $<0.5^\circ$
- ▶ Fully sealed (IP69K) for use in harsh environments
- ▶ Operating temperature from -40°C to $+85^\circ\text{C}$

POTENTIAL APPLICATIONS

- ▶ Mobile and stationary cranes
- ▶ Lift platforms
- ▶ Autonomous Vehicles
- ▶ Conveyor systems
- ▶ Tip-over protection
- ▶ Bucket / chassis / boom angle
- ▶ Weighing systems
- ▶ Inclination-based engine management
- ▶ Solar tracker angle
- ▶ Wind turbine rotor angle
- ▶ Construction, mining, and agriculture machines

SPECIFICATIONS				
Parameter	Unit	Min.	Typ.	Max.
Supply voltage	V	8	12	36
Supply current	mA	15		45
Output voltage	V	0,5		4,5
Offset voltage	V		2,5	
Refresh rate	Hz		100	
Operating temperature	$^\circ\text{C}$	-40		+85
Typical error (at 25°C ; $V_{cc} = 12\text{V}$)	$^\circ$	-0,5		+0,5
Mounting torque	Nm			3

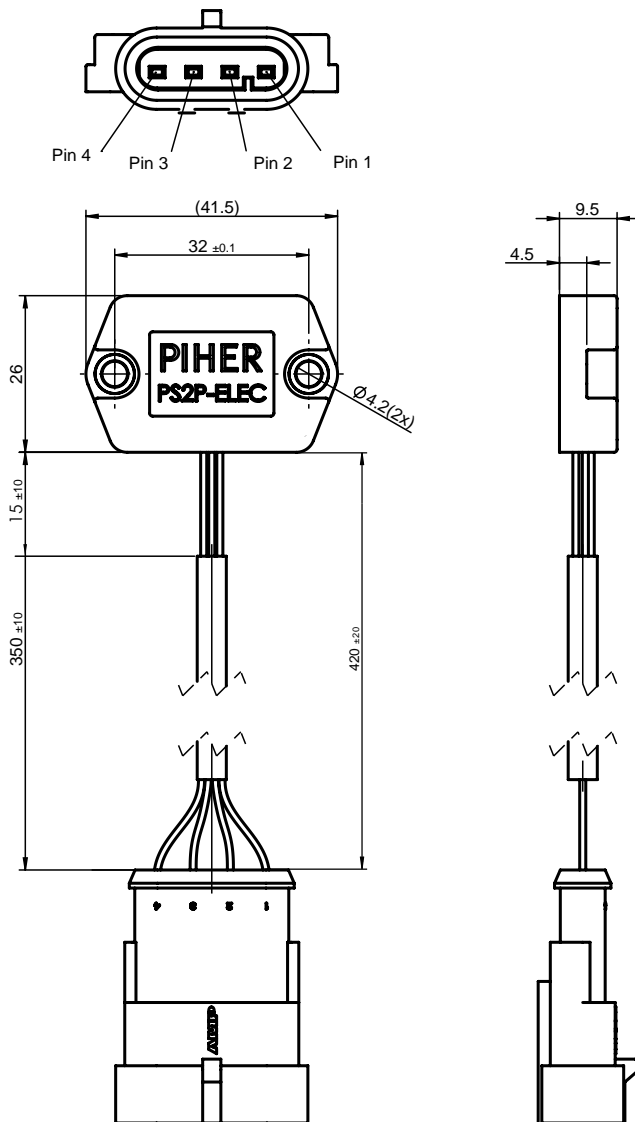
Other specifications available on request

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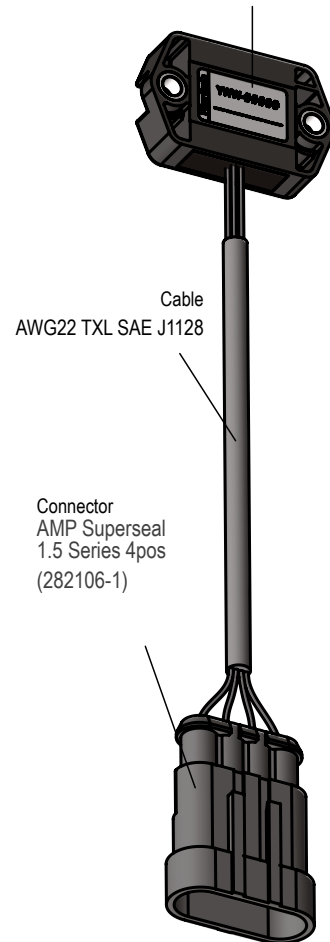
ENVIRONMENTAL SPECIFICATIONS		
Characteristic	Standard	Requirement / Level
Sealing	ISO 20653 / IEC 60529	IP69K and IP67, Mode 2 – Class A
Chemical resistance	BS7691 (1994) Section 6.7.1.2	Mode 1, Class B
Salt spray test	-40°C to +125°C	20 MHz - 2 GHz Level 100 V/m

EMI / EMC TESTING		
Characteristic	Standard	Requirement / Level
Radiated Immunity (ALSE)	ISO 11452-2:2019	Frequency range: 20 MHz – 2.7 GHz
Radiated Immunity (BCI)	ISO 11452-4:2020	Frequency range: 1 MHz – 400 MHz
Immunity of electrostatic discharges (ESD)	ISO 10605:2023	±8 kV contact, ±15 kV air
EMC Radiated Emissions	EN 55032:2016	30–230 MHz: ≤ 30 dB, 230–1000 MHz: ≤ 37 dB. Extension required: 150 kHz – 30 MHz according to CISPR 36 (agricultural applications)
Magnetic Immunity	EN 61000-4-8:2014	50 Hz, field strength: 30 A/m
EFT/Burst Immunity	EN 61000-4-4:2012	±1 kV
Conducted Immunity	EN 61000-4-6:2014	Frequency range: 150 kHz – 80 MHz, modulation: AM 1 kHz, 80% depth, test level: 10 V (VEMK)

DIMENSIONS - VERSION WITH CONNECTOR [MM]



"Traceability number"
 YWW####
 Y: Year ("O"=2024, "P"=2025,...)
 WW: Week
 ####: Sensor Number



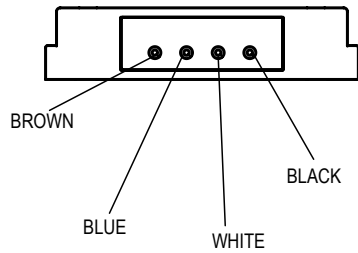
CONNECTOR SCHEME		
PIN	Function	Description
1	Vcc	8 to 36 VDC supply input (+)
2	GND	Ground
3	Output 1	0.5 to 4.5 V, Y-axis output / CAN -H
4	Output 2	0.5 to 4.5 V, X-axis output / CAN -L



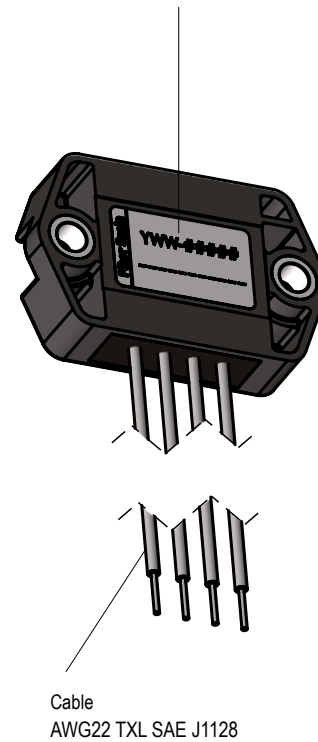
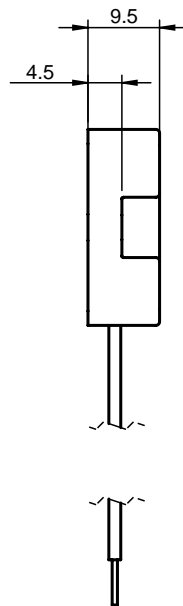
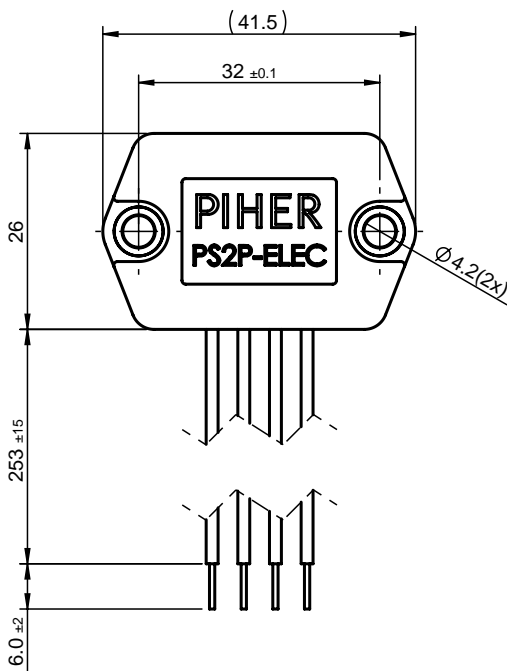
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DIMENSIONS (MM)



Traceability number
 YWW####
 Y: Year ("O"=2024,"P"=2025,...)
 WW: Week
 ####: Sensor Number



WIRING SCHEME		
Color	Function	Description
Brown	Vcc	8 to 36 VDC supply input (+)
Blue	GND	Ground
Black	Output 1	0.5 to 4.5 V, Y-axis output / CAN -H
White	Output 2	0.5 to 4.5 V, X-axis output / CAN -L



3D model download

HOW TO ORDER

Example: TSDAG2-A-IR025-HM-W

Series	Output ¹	Inclination range ²	Mounting ³	Connection
TSDA TSDAG2	A = analog J = CAN J1939 O = CAN Open	IR025 = ±25° IR045 = ±45° IR090 = ±90°	HM = horizontal mount	W = wire C = connector

1) CAN versions: refer to the protocol code in the product specification sheet available on the [product's website](#). Contact us to check availability for other specifications.

2) Inclination range limited to ±85° for CAN output versions

3) Vertical mounting (VM): check availability (only for TSDAG2).

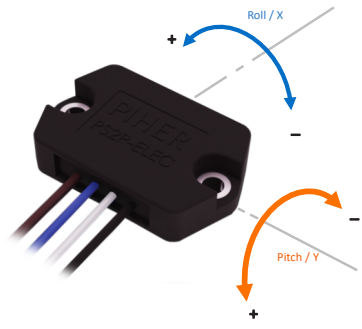
[Check inventory](#)

TSDA

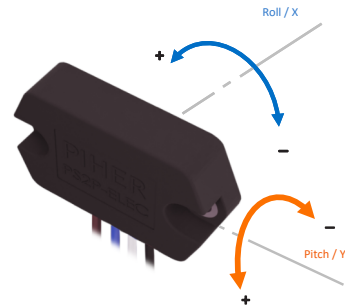
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FUNCTION OVERVIEW / ANALOG

Horizontal Mount

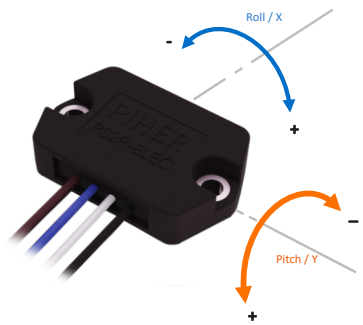


Vertical Mount

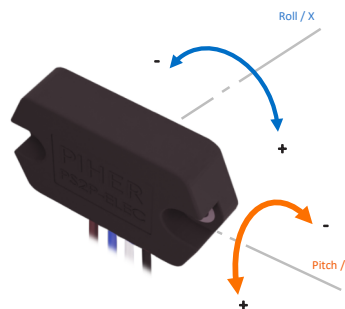


FUNCTION OVERVIEW / CAN

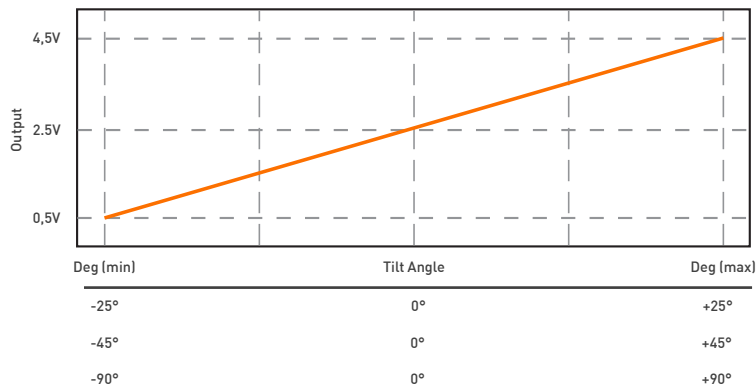
Horizontal Mount



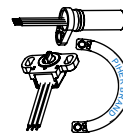
Vertical Mount



ANALOG OUTPUT



⚡ CAN protocol information is available in the [product's website](#).



ANNIVERSARY
1950/2025

CONTACT

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NEED QUICK HELP?

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