

# Tilt Sensors

## Dual Axis Incliner based on MEMS Technology



### KEY FEATURES

- ▶ Reliable and wear-free MEMS technology
- ▶ Inclination range:  $\pm 25^\circ$ ,  $\pm 45^\circ$  or  $\pm 90^\circ$
- ▶ 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  $-40^\circ\text{C}$  to  $+85^\circ\text{C}$

### DESCRIPTION

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

Different outputs 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.

### 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 trackers angle
- ▶ Wind turbines rotor angle
- ▶ Construction, mining and agriculture machines

### SPECIFICATIONS

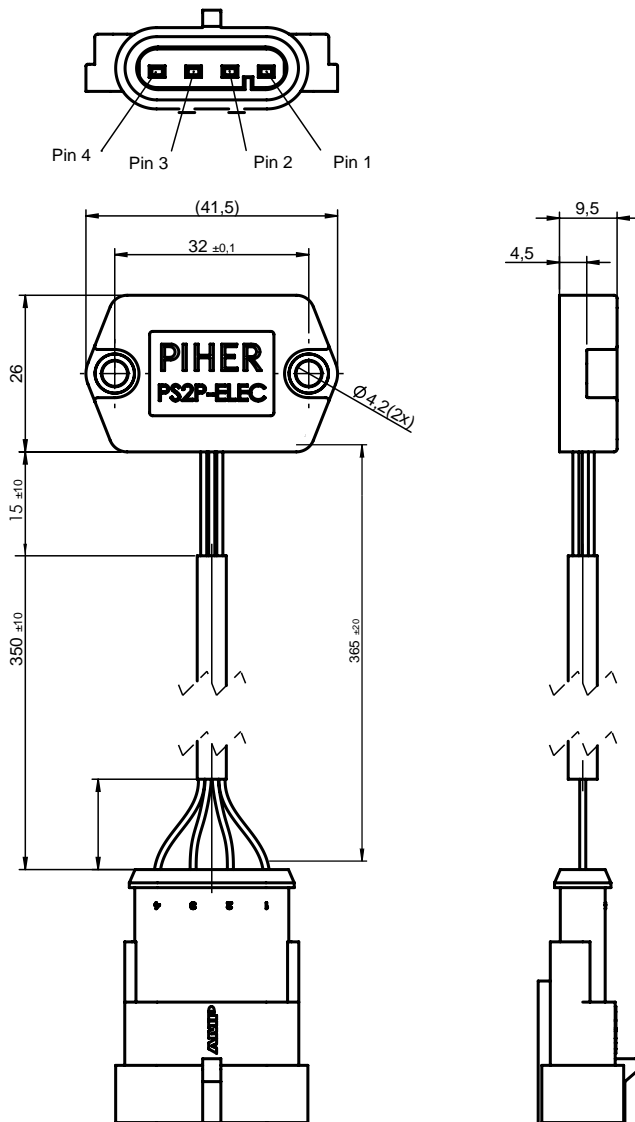
Parameter	Unit	Min.	Typ.	Max.
Supply voltage	V	8	12	36
Supply current	mA	8	12	20
Output voltage	V	0,5		4,5
Offset voltage	V		2,5	
Refresh rate	Hz		100	
Operating temperature	$^\circ\text{C}$	-40		+85
Typical error (at $25^\circ\text{C}$ ; $V_{cc} = 12\text{V}$ )	$^\circ$	-0,5		+0,5
Mounting torque	Nm			3

Other specification on request

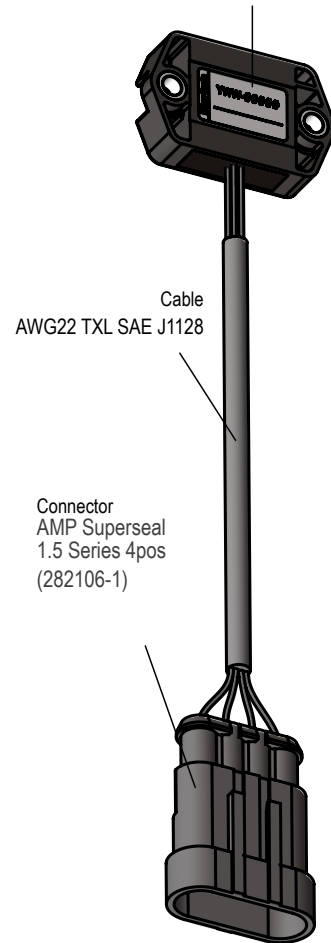
# Tilt Sensors

## Dual Axis Inclinometer based on MEMS Technology

### DIMENSIONS - VERSION WITH CONNECTOR [MM]



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



### CONNECTOR SCHEME

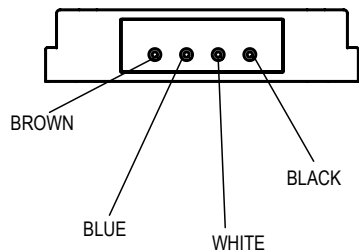
PIN	Function	Description
1	Vcc	8 to 36 VDC supply input (+)
2	GND	Ground
3	Output 1	0.5 to 4.5 V, Y axis output / CAN -H
4	Output 2	0.5 to 4.5 V, X axis output / CAN -L



# Tilt Sensors

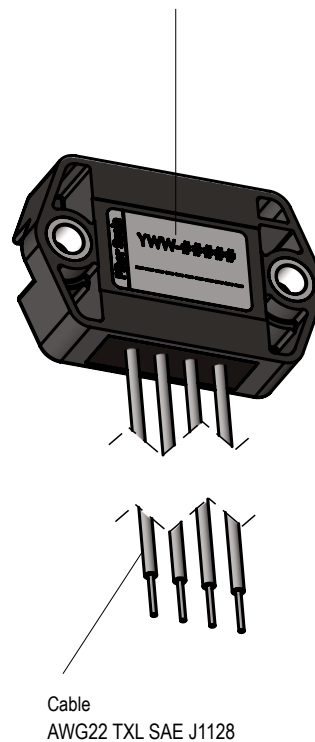
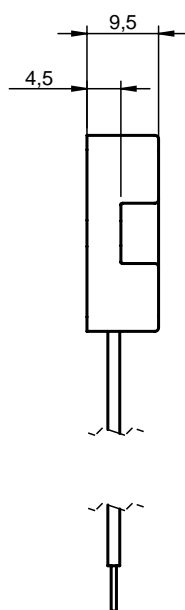
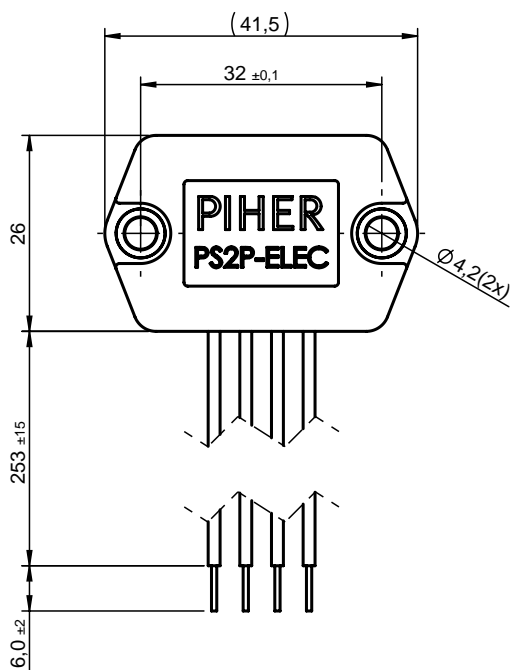
## Dual Axis Inclinometer based on MEMS Technology

### DIMENSIONS (MM)



#### Trazability 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: TSDA-A-IR025-HM-W

TSDA	-	-	-	-	-
Series	Output*	Inclination range	Mounting	Connection	
	A = analog J = CAN J1939 O = CAN Open	IR025 = ±25° IR045 = ±45° IR090 = ±90°	HM = horizontal mount VM = vertical mount	W = wire C = connector	

\* CAN versions: see the protocol code in the product specification sheet in the [product's website](#). Check availability for other specifications.

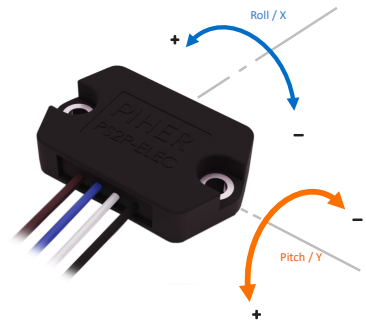
check inventory

# Tilt Sensors

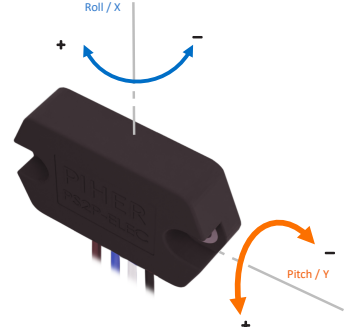
## Dual Axis Inclinometer based on MEMS Technology

### FUNCTION OVERVIEW / ANALOG

#### Horizontal Mount

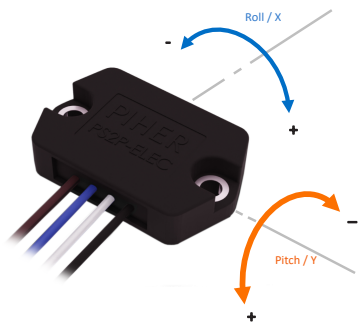


#### Vertical Mount

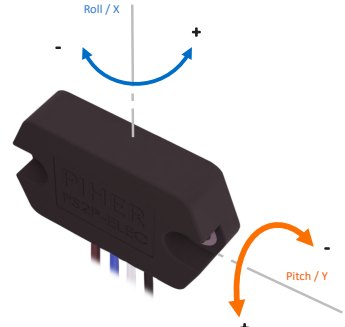


### FUNCTION OVERVIEW / CAN

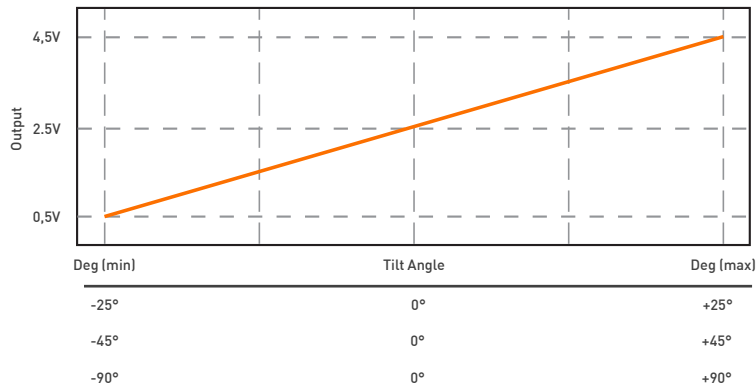
#### Horizontal Mount



#### Vertical Mount



### ANALOG OUTPUT



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



Please always use the latest updated datasheets published on our website [www.piher.net](http://www.piher.net)

#### Disclaimer:

The product information in this catalog is for reference purposes. Please consult for the most up to date and accurate design information. Piher Sensors & Controls S.A., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Piher"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product described herein. Piher disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Piher's terms and conditions of sale, including but not limited to the warranty expressed therein, which apply to these products. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Piher. The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Piher products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Piher for any damages arising or resulting from such use or sale. Please contact authorized Piher personnel to obtain written terms and conditions regarding products designed for such applications. Product names and markings noted herein may be trademarks of their respective owners. Information contained in and/or attached to this catalogue may be subject to export control regulations of the European Community, USA, or other countries. Each recipient of this document is responsible to ensure that usage and/or transfer of any information contained in this document complies with all relevant export control regulations. If you are in any doubt about the export control restrictions that apply to this information, please contact the sender immediately. For any Piher Exports, Note: All products / technologies are EAR99 Classified commodities. Exports from the United States are in accordance with the Export Administration Regulations. Diversion contrary to US law is prohibited.

### CONTACT

**Piher Sensing Systems**  
Polígono Industrial Municipal  
Vial T2, Nº22  
31500 Tudela, Spain

[sales@piher.net](mailto:sales@piher.net)

+34 948 820 450

#### NEED QUICK HELP?

Our AI Virtual Assistant is available 24/7 to provide instant support—visit [chat.piher.info](http://chat.piher.info) now!



Rev.190225 © Piher Sensors & Controls S.A.