

INC5502D Inclination sensor

RS485

Current

Voltage



The INC5502D is a robust inclination sensor for precise single- and dual-axis angle measurement in industrial and mobile applications.

This sensor's dynamically stabilized sensorFUSION filter combines accelerometer and gyroscope technology to deliver stable output signals with virtually no delay, even under vibration, shock, or dynamic movement. For quasistatic and static applications, selectable low-pass filtering is also available.

Depending on the configuration, the sensor can output longitudinal and lateral Euler angles, tilt x/y values, acceleration, and angular velocity signals. With interface options including CANopen, SAE J1939, RS485, analog current, and analog voltage, the INC5502D can be integrated flexibly into a wide range of machine and control environments. Its compact housing with a protection class of IP67 is designed for harsh operating conditions. The configuration can be adapted to the application using numerous parameter settings and the sensorTOOL software.

Applications

- Precise alignment and positioning of machine components
- Angle measurement in dynamic systems subject to vibration, shock, and motion
- Orientation monitoring in mobile machinery and automation systems
- Integration into machine control systems via CANopen, SAE J1939, RS485, or analog interfaces

Product benefits

- Stable and reliable output signals even under vibration and dynamic movement
- Suitable for use in both static and dynamic inclination measurement
- Robust, compact housing for demanding environments

Features

- 1-axis or 2-axis inclination measurement with selectable Euler angle or tilt output
- Dynamic sensorFUSION filtering for stable signals during movement, plus selectable low-pass filtering
- Configurable output signals including roll, pitch, tilt x/y, acceleration x/y/z, and angular velocity x/y/z



Technical data

Parameter	INC5502D CO/J1939	INC5502D I	INC5502D U	Unit
Number of measuring axes	1 or 2			
Measuring range (Euler angle)	Longitudinal (Roll): $\pm 180^\circ$ (switchable to $0^\circ \dots 360^\circ$); Lateral (Pitch): $\pm 85^\circ$ (switchable to $95^\circ \dots 265^\circ$); (sign reversible, axis orientation selectable)			
Measuring range (position angle)	Tilt x and Tilt y: $\pm 90^\circ$ (sign reversible, axis orientation selectable)			
Resolution	0.01			°
Repeatability	$\leq \pm 0.05$			°
System accuracy ¹	static $\pm 0.15^\circ$ ($\leq \pm 30^\circ$), $\pm 0.25^\circ$ (> $\pm 30^\circ$), dynamic up to $\pm 0.3^\circ$ typ. $\pm 0.5^\circ$	static $\pm 0.2^\circ$ ($\leq \pm 30^\circ$), $\pm 0.25^\circ$ (> $\pm 30^\circ$), dynamic typ. $\pm 0.5^\circ$	static $\pm 0.2^\circ$ ($\leq \pm 30^\circ$), $\pm 0.25^\circ$ (> $\pm 30^\circ$), dynamic typ. $\pm 0.5^\circ$	°
Measuring rate	200			Hz
Temperature stability ²	± 0.008			°/K
Supply voltage	9 ... 32			VDC
Max. current consumption	110	50	50	mA
Digital interface ³	CANopen, SAE J1939	RS485, Ethernet, EtherCAT, PROFINET, Ethernet/IP	RS485, Ethernet, EtherCAT, PROFINET, Ethernet/IP	
Analog output	n/a	4 ... 20 mA (max. 300 Ω)	0 ... 10 V / 0.5 ... 4.5 V	



Technical data

Parameter	INC5502D CO/J1939	INC5502D I	INC5502D U	Unit
Connection ⁴	1 or 2 x 5-pin M12 plug connectors (plug socket, daisy-chained)	1 x 8-pin M12 plug connector	1 x 8-pin M12 plug connector	
Mounting	Mounting holes Ø 4			mm

1) All specifications are typical for 25 °C, unless otherwise stated

2) Typically in the temperature range -40...+85 °C

3) Ethernet, EtherCAT, PROFINET and Ethernet/IP require connection via interface module

4) Further connection options on request (e.g. integrated cable, German plug)

Environmental data

Parameter	INC5502D CO/J1939	INC5502D I	INC5502D U	Unit
Temperature range (operating)	-40 ... +85			°C
Temperature range (storage)	-40 ... +85			°C
Shock	1500 g / 0.5 ms in 3 axes (half-sine)			
Protection class	IP67 (plugged)			
Material	Glass fiber reinforced polyamide (housing) PUR (potting)			
Weight	≈ 120			g
Control and indicator elements	bicolor LED for status			

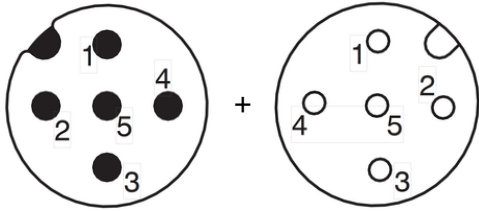
Special features

Special features include adjustable filters, sensorFUSION, and a low-pass filter. On request, predefined application-specific configuration files can be provided. Individual parameter sets can also be configured for series applications. Additional measurement parameters (raw values) can be output: acceleration along the x, y, and z axes with a measuring range of ±2 g, and angular velocity along the x, y, and z axes with a measuring range of ±500°/s.



Mechanical drawings

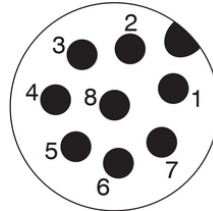
CAN-Bus Pinout



5-pin housing connector View on pin side A-coded + 5-pin housing connector View on socket side A-coded

- Pin 1 - Shield (CAN_SHLD)
- Pin 2 - Supply voltage (9 ... 32 VDC) V+
- Pin 3 - GND / 0 V / V-
- Pin 4 - CAN_H bus cable CAN_H
- Pin 5 - CAN_L bus cable CAN_L

Analog Pinout

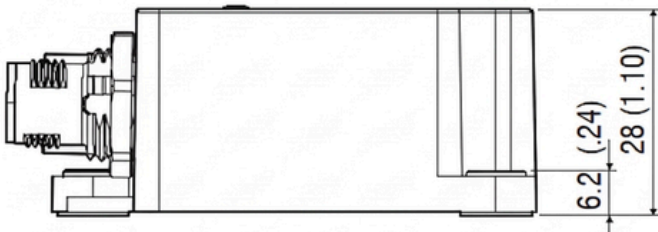


8-pin housing plug M12 View of pin side A-coded

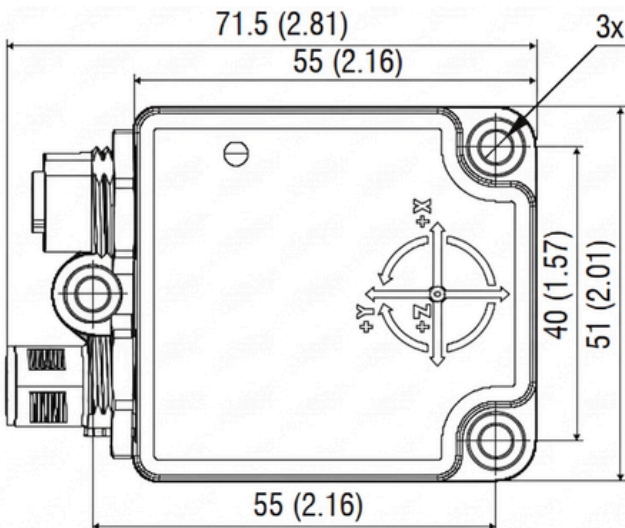
- Pin 1 - X-axis inclination (4 ... 20 mA/0.5 ... 4.5 V/0 ... 10 V)
- Pin 2 - Signal GND
- Pin 3 - Y-axis inclination (4 ... 20 mA/0.5 ... 4.5 V/0 ... 10 V)
- Pin 4 - RS485 bus line (RS485+)
- Pin 5 - Teach-in (9 ... 32 VDC, ≥ 300 ms IN)
- Pin 6 - GND / 0 V / V- (V-)
- Pin 7 - RS485 bus line (RS485-)
- Pin 8 - Supply voltage 9 ... 32 VDC (V+)

Dimensional Drawing INC5502D-360/90-P-OS

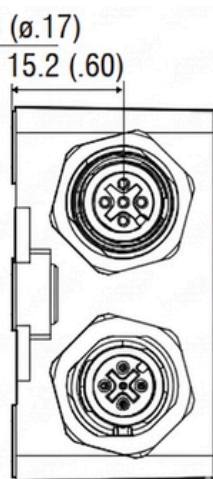
Side



Top



Side



All geometrical dimensions in mm

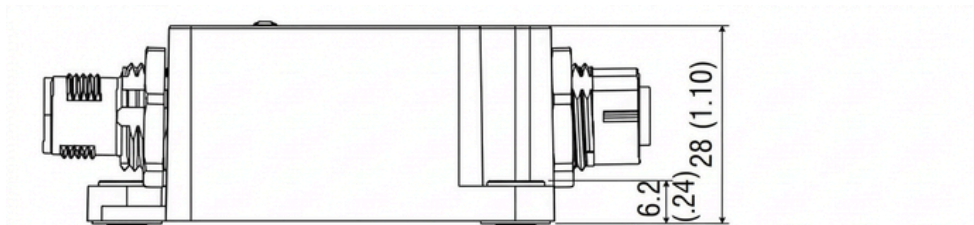


PRODUCT DATA SHEET
Inclination sensors / INC5502D



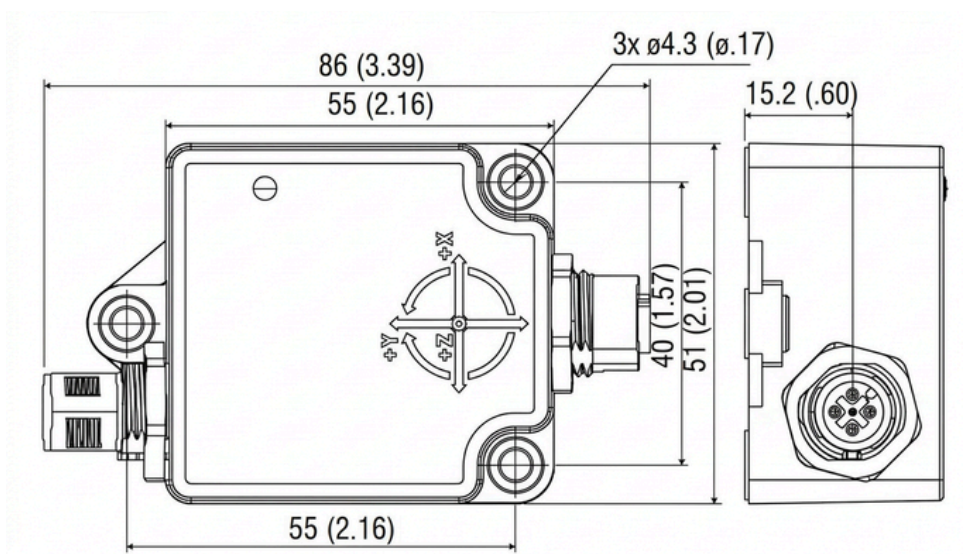
Dimensional Drawing INC5502D-360/90-P-DS-CO

Side



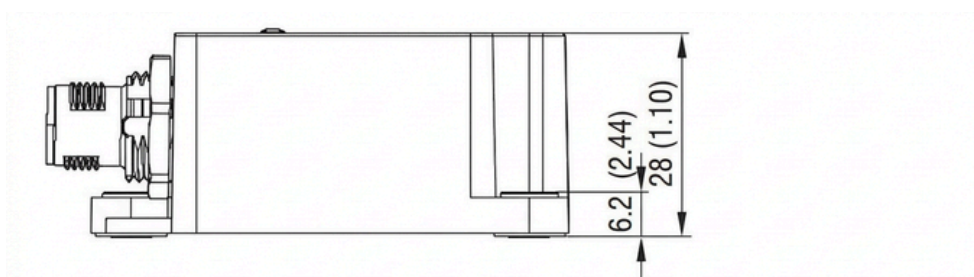
Top

Side



Dimensional Drawing INC5502D-360/90-P-S-CO

Side



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