Inclination sensors
2-dimensional, measuring range up to ±90°
CANopen® / SAE J1939 / Analog

GIM500R - 2-dimensional

GIM500R with housing in aluminium

Technical data - electrical ratings

Voltage supply	8...36 VDC
Reverse polarity protection	Yes
Consumption w/o load	≤40 mA (24 VDC)
Initializing time	≤0.5 s after power on
Interfaces	CANopen®, SAE J1939, Analog (4...20 mA / 0.5...4.5 V / 0...5 V / 0...10 V)
Load resistor	≥1 kΩ / voltage output ≤800 Ω / current output
Measuring range	±10°/±30°/±45°/±60°/±90°
Resolution	0.1 ° CANopen® 0.01 ° SAE J1939 12 Bit Analog
Accuracy (+25 °C)	Typ. ±0.1°
Temperature coefficient	0.008 °/K
Cross-axis-sensitivity typ.	0.3 %
Repeatability	±0.1 ° (+25 °C)
Sensing rate	1600 Hz
Limit frequency	0.1...25 Hz, 2. order / low-pass filter (Default: 5 Hz)
Interference immunity	DIN EN 61000-6-2 ECE Reg. No. 10R04 ISO 7637-2 ISO 11452-2 / ISO 11452-5
Emitted interference	DIN EN 61000-6-4 ECE Reg. No. 10R04 ISO 7637-2 / EN 55025
Programmable parameters	Preset and offset Filter
Diagnostic function	Parameter error
Status indicator	DUO-LED integrated in housing
Approval	UL approval / E63076

Technical data - mechanical design

Dimensions W x H x L	48 x 24 x 52 mm
Protection DIN EN 60529	IP 66, IP 67, IP 68, IP 69K
Material	Housing: aluminium, coated
Corrosion protection	IEC 60068-2-52 Salt mist for ambient conditions C5-M (CX) according to ISO 12944-2
Operating temperature	-40...+85 °C (see general information)
Resistance	DIN EN 60068-2-6 Vibration 20 g, 60-2000 Hz DIN EN 60068-2-27 Shock 200 g, 6 ms
Weight approx.	95 g
Connection	Flange connector M12, 8-pin Flange connector M12, 5-pin Cable 1 m
Instruction	Use in safety functions exclusively based on Application Note and MTTFd reliability prediction (request separately).

Part number

GIM500R- M ☐ ☐ . ☐ ☐ .A ☐

Option
Without option
/4816   With integrated terminating resistor (CANopen, SAE J1939)
/4822   Output signal with out-of-range diagnostics (Analog)

Voltage supply / interface
C6   8...36 VDC / CANopen®
C9   8...36 VDC / SAE J1939
V4   8...36 VDC / Analog 0.5...4.5 V
V5   8...36 VDC / Analog 0...5 V
V1   8...36 VDC / Analog 0...10 V
C4   8...36 VDC / Analog 4...20 mA

Connection
K   Cable 1 m, Standard 4x2x0.14 mm²
     (Analog, CANopen®, SAE J1939)
A   Flange connector M12, 5-pin, male contacts
     (CANopen®, SAE J1939)
B   Flange connector 2xM12, 5-pin, male and female contacts
     (CANopen®, SAE J1939)
F   Flange connector M12, 8-pin, male contacts
     (Analog)

Measuring range
10   ±10° (Analog with zero setting)
30   ±30° (Analog with zero setting)
45   ±45° (Analog with zero setting)
60   ±60° (Analog with zero setting)
90   ±90° (Analog, CANopen®, SAE J1939)

Number of axes
2   2-dimensional, housing horizontal
V   2-dimensional, housing vertical

Housing
M   Metal

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Accessories

Connectors and cables

10127844	Connection cable 2 m shielded with female connector M12, 8-pin, straight (ESG 34FH0200G)
10129332	Connection cable 5 m shielded with female connector M12, 8-pin, straight (ESG 34FH0500G)
10129333	Connection cable 10 m shielded with female connector M12, 8-pin, straight (ESG 34FH1000G)

Mounting accessories

11120131	Mounting kit 3x M4 x 25 DIN912, A 4.3 DIN125
11189609	Mounting kit 3x M4 x 50 DIN912, A 4.3 DIN125, spacers

CANopen® features

Bus protocoll	CANopen®
Device profile	CANopen® - CiA DSP 301 V4.2 Inclinometer profile DS 410 V1.3 LSS service profile DS 305 V2.2
Default	Resolution 0.1° Baud rate 50 kbit/s Node ID 1

Zero setting

Set Teach input for >250 ms on HIGH level (≥0.7 * +Vs) conforms inclination 0°.
Zero setting affects both axes (X/Y).

General information

Self-heating correlated to installation and ambient conditions as well as to electronics and supply voltage must be considered for precise thermal dimensioning. The inclination sensor is supposed to self-heating to approximately 5 K when attached to a varnished ground metal. Operating the inclination sensor close to the maximum limits requires measuring the currently prevailing temperature at the housing.

Vibration with frequency in the range of 1600 Hz acting on the sensor leads to reduced measuring accuracy.

GIM500R - 2-dimensional

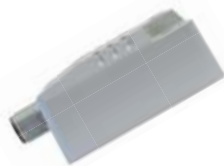**Installation position**

Horizontal installation

When installing the 2-dimensional inclination sensor with the housing in horizontal position, make sure the base plate is aligned parallel to the horizontal line.

The sensor can be inclined both towards the X and the Y axis. There is one measured value supplied for each axis. Sensor default is 2-dimensional measuring within the selected range, e.g. ±30°. Zero-crossing is exacty in the horizontal line.
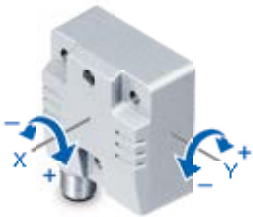
Y = 0º	y = -30º	x = 0º	x = +30º

Vertical installation

When installing the 2-dimensional inclination sensor with the housing in vertical position, make sure the base plate is aligned parallel to the vertical line. The sensor can be inclined both towards the X and the Y axis. There is one measured value supplied for each axis.

Sensor default is 2-dimensional measuring within the selected range, e.g. ±30°. Zero-crossing is exacty in the vertical line.

Y = 0º	y = -30º	x = 0º	x = +30º

Inclination sensors
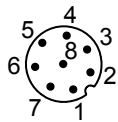
2-dimensional, measuring range up to ±90°

CANopen® / SAE J1939 / Analog

GIM500R - 2-dimensional

Terminal assignment

Analog – M12 flange connector, 8-pin

Pin	Assignment	Description
1	+Vs	Voltage supply
2	GND	Ground connection relating to +Vs
3	OUT_X	Output
4	OUT_Y	Output
5	Teach[1]	Teach-Input
6	d.u.	Do not use
7	d.u.	Do not use
8	A_GND	Ground connection relating to analog

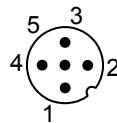M12 flange connector (male), A-coded

Analog – cable

Core color	Assignment	Description
White	+Vs	Voltage supply
Brown	GND	Ground connection relating to +Vs
Green	OUT_X	Output
Yellow	OUT_Y	Output
Grey	Teach[1]	Teach-Input
Pink	d.u.	Do not use
Blue	d.u.	Do not use
Red	A_GND	Ground connection relating to analog

1) Function zero setting
   See description zero setting
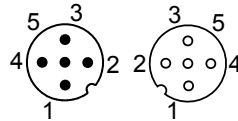
CANopen® / SAE J1939 – M12 flange connector, 5-pin

Pin	Assignment	Description
1	CAN_GND	Ground connection relating to CAN
2	+Vs	Voltage supply
3	GND	Ground connection relating to +Vs
4	CAN_H	CAN Bus Signal (dominant High)
5	CAN_L	CAN Bus Signal (dominant Low)

M12 flange connector (male), A-coded

CANopen® / SAE J1939 – 2xM12 flange connector, 5-pin

Pin	Assignment	Description
1	CAN_GND	Ground connection relating to CAN
2	+Vs	Voltage supply
3	GND	Ground connection relating to +Vs
4	CAN_H	CAN Bus Signal (dominant High)
5	CAN_L	CAN Bus Signal (dominant Low)

M12 flange connector (male / female), A-coded

Terminals of the same significance are internally connected and identical in their functions. Max. load on the internal terminal connections Vs-Vs and GND-GND is 1 A each.

CANopen® – Cable

Core color	Assignment	Description
White	+Vs	Voltage supply
Brown	GND	Ground connection relating to +Vs
Green	d.u.	–
Yellow	d.u.	–
Grey	d.u.	–
Pink	CAN_H	CAN Bus Signal (dominant High)
Blue	CAN_L	CAN Bus Signal (dominant Low)
Red	CAN_GND	Ground connection relating to CAN

GIM500R - 2-dimensional

Output signals

Analog output

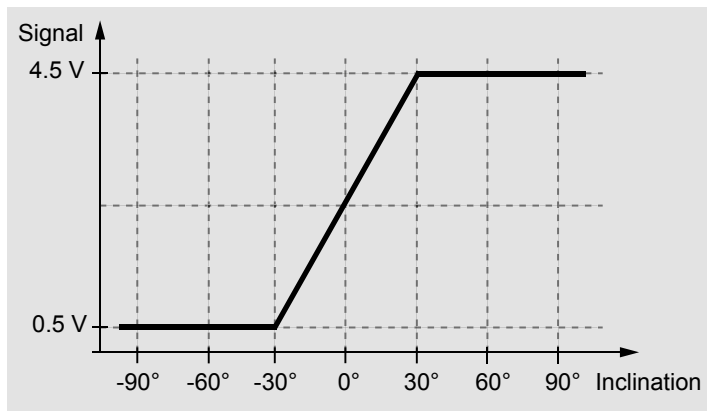**Mounting position Horizontal**

Mounting position Vertical
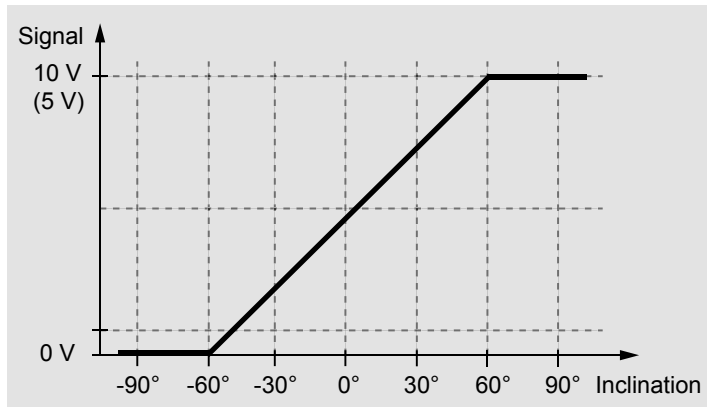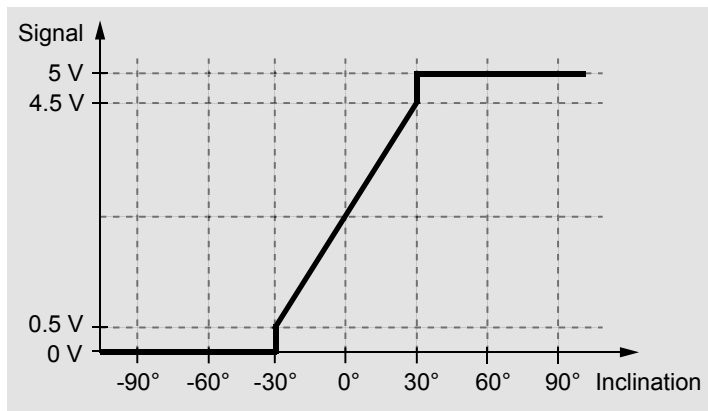
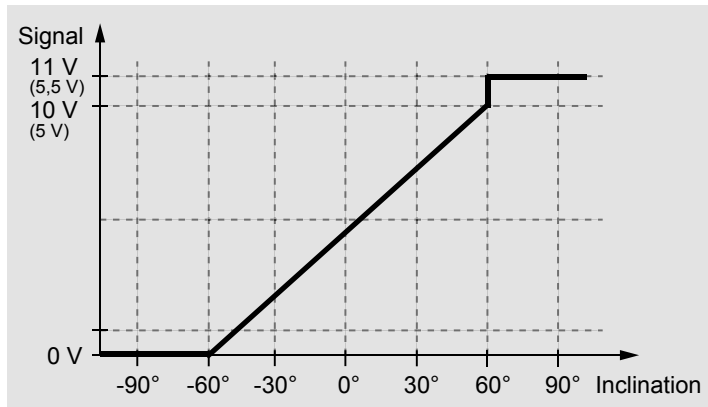### Measuring range ±30° / Mounting position horizontal

Inclination -30°	Inclination 0°	Inclination +30°
X		
Y		

Signal: 4.5 V, 0.5 V
Inclination: -90° -60° -30° 0° 30° 60° 90°

Measuring range ±60° / Mounting position vertical

Inclination -60°	Inclination 0°	Inclination +60°
X		
Y		

Signal: 10 V (5 V), 0 V
Inclination: -90° -60° -30° 0° 30° 60° 90°

Measuring range ±90° / Mounting position horizontal

| Inclination -90°	Inclination 0°	Inclination +90°
X		
Y		

Signal: 20 mA, 4 mA
Inclination: -90° -60° -30° 0° 30° 60° 90°

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Analog output with out-of-range diagnostic (Option: /4822)

Mounting position Horizontal	Mounting position Vertical

Measuring range ±30° / Mounting position horizontal

	Inclination -30°	Inclination 0°	Inclination +30°
X			
Y			

Measuring range ±60° / Mounting position vertical

	Inclination -60°	Inclination 0°	Inclination +60°
X			
Y			

Measuring range ±90° / Mounting position horizontal
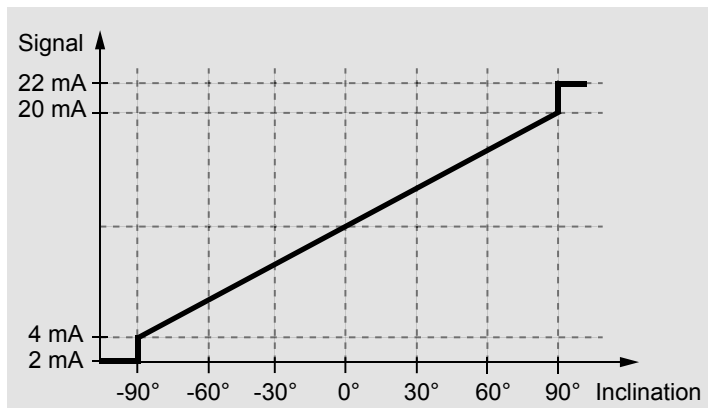
	Inclination -90°	Inclination 0°	Inclination +90°
X			
Y			

Dimensions

GIM500R - 1 x connector M12
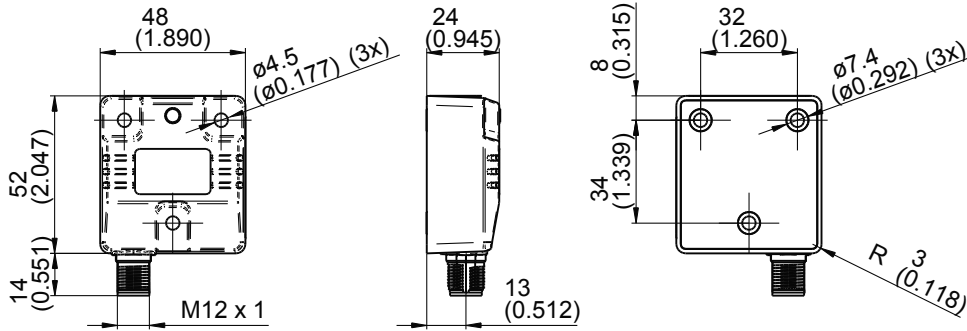
GIM500R - 2 x connector M12

GIM500R - cable