Baumer
Passion for Sensors

Inclination sensors

GIM140R - 2-dimensional, CANopen®

2-dimensional, measuring range up to ±60°

CANopen®

Overview

- Size 48 mm
- MEMS capacitive measuring principle
- Interface CANopen® / CANopen® redundant
- Protection up to IP 69K
- Corrosion protection CX (C5-M)
- E1 compliant design
- Load dump protection
- Connection cable and cable with M12
- Wire cross section 0.5 mm²
- Redundant version (2-channel architecture)

Technical data

Technical data - electrical ratings	
Voltage supply	8...36 VDC
Reverse polarity protection	Yes
Short-circuit proof	Yes (28 VDC or ground)
Consumption typ.	28 mA (24 VDC, w/o load) 56 mA (24 VDC, w/o load, redundant)
Initializing time	≤ 0,5 s after power on
Interface	CANopen®
Measuring range	±10°/±30°/±45°/±60°
Resolution	0,1 °
Accuracy (+25 °C)	Typ. ±0.2°
Temperature coefficient	0,01 °/K
Cross-axis-sensitivity typ.	0.3 %
Sensing method	MEMS technology
Repeatability	± 0,1 ° (+25 °C)
Sensing rate	1600 Hz (0.625 ms)
Limit frequency	0.1...25 Hz, 2. order / low-pass filter (Default: 2 Hz)
Output stages	CAN-Bus compatible ISO 11898
Load dump protection	ISO 16750-2 Test Level A, 12 V/24 V systems
Interference immunity	EN 61000-6-2 ECE Reg. No. 10R05 ISO 7637-2

Technical data - electrical ratings	
Emitted interference	EN 61000-6-3 ECE Reg. No. 10R05 ISO 7637-2
Programmable parameters	Preset and offset Filter

Technical data - mechanical design	
Dimensions W x H x L	48 x 14 x 45 mm
Protection EN 60529	IP 67 IP 69K
Material	Housing: aluminium, anodised
Corrosion protection	IEC 60068-2-52 Salt mist for ambient conditions CX (C5-M) according to ISO 12944-2
Operating temperature	-40...+85 °C (see general information)
Resistance	EN 60068-2-6 Vibration 20 g, 58-2000 Hz EN 60068-2-27 Shock 50 g, 6 ms
Temperature changes	EN 60068-2-14, -40…+85 °C, 5 cycles
Weight approx.	45 g
Connection	Cable 0.3 m, radial Cable 0.3 m with connector M12

Optional

- With integrated terminating resistor
- Connection with DEUTSCH or AMP connector on cable end

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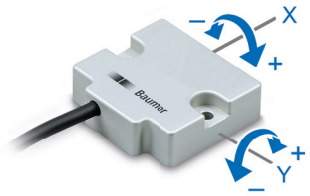
General information

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.

Installation position



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.

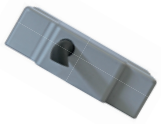
Default on delivery the inclination sensor will apply the selected sensing range to both axis, for example ±30° with the zero passage being precisely in the horizontal line.

Y = 0°

Y = -30°

X = 0°

X = +30°



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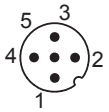
Terminal assignment

Cable with connector M12, 5-pin

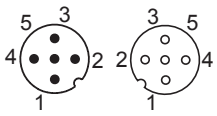
Pin	Assignment	Description
1	CAN_GND	Ground connection relating to CAN
2	+Vs	Voltage supply
3	GND	Ground connection relating to +Vs
4	CAN_H	CAN Bus Signal (dominant High)
5	CAN_L	CAN Bus Signal (dominant Low)



M12 flange connector (male), A-coded

Cable with connector 2xM12, 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

Cable

Core color	Assignment	Description
White	GND	Ground connection relating to +Vs
Brown	+Vs	Voltage supply
Green	CAN_H	CAN Bus Signal (dominant High)
Yellow	CAN_L	CAN Bus Signal (dominant Low)
Grey	CAN_GND	Ground connection relating to CAN
Cable data: 5 x 0.5 mm²		

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 0.5 A each.

CANopen® features

Bus protocoll	CANopen®
Device profile	CANopen® - CiA Communication profile DS 301 V4.2 Inclinometer profile DS 410 V1.3 Layer Setting Services (LSS) DSP 305 V3.0
Default	Resolution 0.1° Baud rate 250 kbit/s Node ID 1, Node ID 2 Timer driven 100 ms

Data transfer

PDO Mapping / ID 1 / PDO 1

LSB	MSB	LSB	MSB	LSB	MSB
Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5
Temperature		Inclination angle X = 0 ► ±10/±30/ ±45/±60 in steps of 0.1° Angle increasing in size and value		Inclination angle Y = 0 ► ±10/±30/ ±45/±60 in steps of 0.1° Angle increasing in size and value	

PDO Mapping / ID 2 / PDO 1

LSB	MSB	LSB	MSB	LSB	MSB
Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5
Temperature		Inclination angle X = 0 ► ±10/±30/ ±45/±60 in steps of 0.1° Angle increasing in size and value		Inclination angle Y = 0 ► ±10/±30/ ±45/±60 in steps of 0.1° Angle increasing in size and value	

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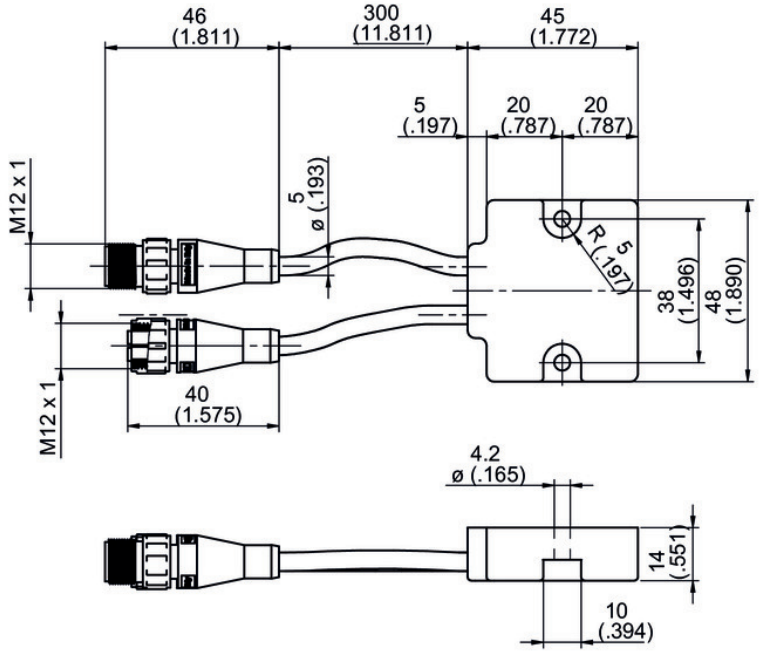
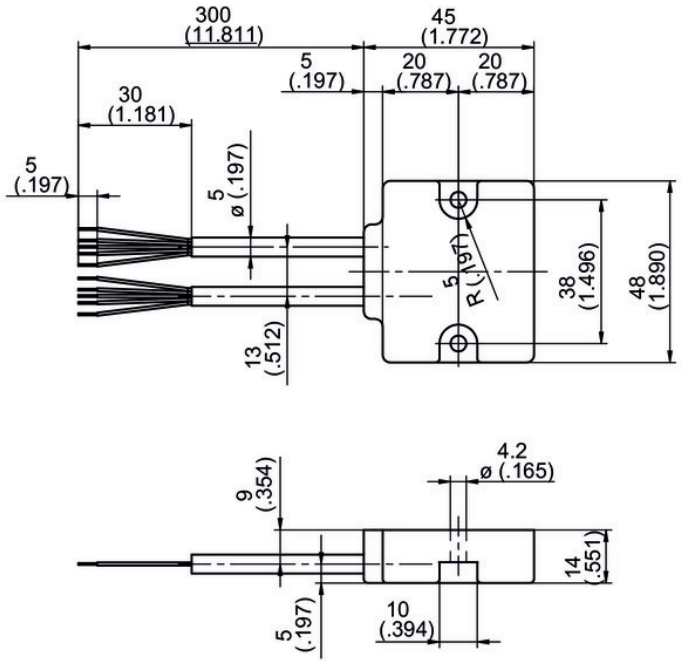
Dimensions



2x cable with connector M12



2x cable

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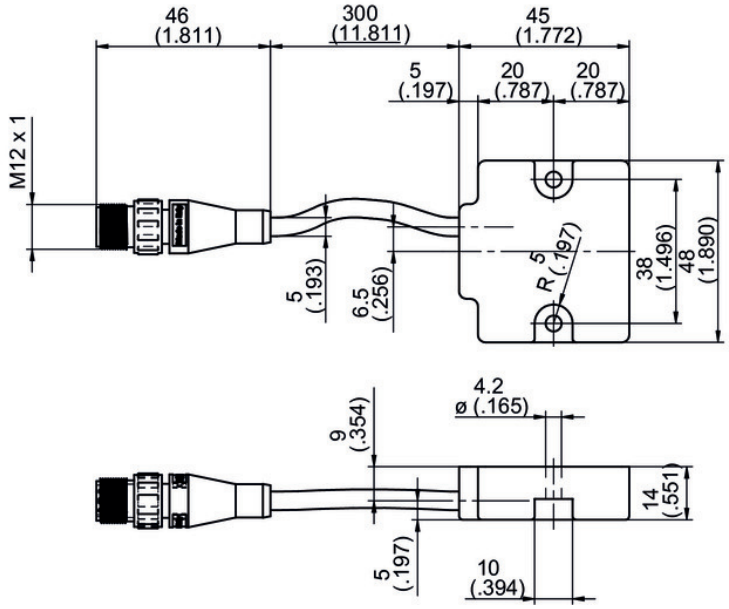
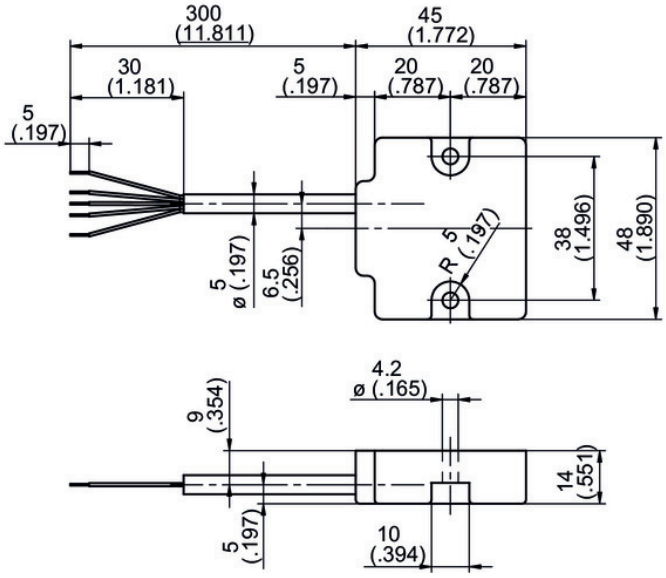
Dimensions



Cable with connector M12



Cable

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Ordering reference

	GIM140R	-	M	2	##	.	#	##	.	A	#####
Product											
	GIM140R										
Housing											
Metal			M								
Number of axes											
2-dimensional, housing horizontal				2							
Measuring range											
±10°					10						
±45°					45						
±30°					30						
±60°					60						
Connection											
Cable 0.3 m, Standard 5x0.5 mm²							M				
2x cable 0.3 m, Standard 5x0.5 mm²							N				
Cable 0.3 m with M12, 5-pin, male contacts							S				
2x cable 0.3 m with M12, 5-pin, male and female contacts							P				
Voltage supply / interface											
8...36 VDC / CANopen® (DS410)								C6			
8...36 VDC / CANopen® (DS410) redundant (2-channel design)								C8			
Operating temperature											
-40...+85 °C										A	
Option											
Without option											
With integrated terminating resistor											/4816

Accessories

Connectors and cables	
11046264	Female connector M12, 5-pin, straight, shielded, 2 m cable
11046266	Female connector M12, 5-pin, straight, shielded, 5 m cable