Acceleration sensors

With SIL2/PLd relay output for limit monitoring

Analog / CANopen®

GAM900S

GAM900S

Features

- **Acceleration sensor for safety applications**
- **Safety limit monitoring with relay output according to SIL2/PLd**
- **Output of acceleration via analog / CANopen®**
- **Redundant 3 axes detection, MEMS based**
- **Measuring range ±2 g**
- **Connection: connector M12**
- **Offshore capability (plastic housing)**

Technical data - electrical ratings

Voltage supply	10...30 VDC
Reverse polarity protection	Yes
Consumption w/o load	≤200 mA (24 VDC)
Initializing time	≤2000 ms after power on
Interfaces	CANopen®, Analog 4...20 mA (0...10 V optional)
Frequency bands	4 (configurable)
Measuring range	±2 g
Resolution	<4 mg
Accuracy 3σ (with band pass filtering)	=60 mg (in the range of ±1000 mg) =15 mg (in the range of ±250 mg)
Interference immunity	DIN EN 61000-6-2 EN 61326-3-1
Emitted interference	DIN EN 61000-6-4
Status indicator	DUO-LED integrated in housing
Approvals	UL approval / E63076, PLd according to EN ISO 13849-1:2008+AC:2009 SIL CL2 according to EN 62061:2005 +AC:2010 +A1:2013 SIL2 according to IEC 61508-1..7:2010, Certified by TÜV Rheinland

Technical data - mechanical design

Dimensions W x H x L	55 x 30 x 90 mm
Protection DIN EN 60529	IP 67
Materials	GAM900S-M: Aluminium GAM900S-P: Glass-fiber reinforced plastic
Operating temperature	-40...+75 °C
Resistance	DIN EN 60068-2-6 Vibration 20 g, 60-2000 Hz DIN EN 60068-2-27 Shock 100 g, 6 ms
Weight approx.	200 g (plastic), 250 g (aluminium)
Connection	Connector M12

Safety-relevant key characteristics

Performance Level (ISO 13849)	PLd
Category (ISO 13849)	3
$MTTF_d$ (ISO 13849)	393 years
DC_{avg} (ISO 13849)	86 %
TM (service life, ISO 13849)	20 years
Safety Integrity Level (IEC 61508 / EN 62061)	SIL2 / SIL CL2
PFH_D (IEC 61508 / EN 62061)	2,5 E-09 1/h
PFD_{avg} (IEC 61508)	2,1 E-04
Error reaction time	<50 ms

GAM900S

Part number

GAM900S - 12-pin

GAM900S-		3	2G	.			.ACB	...	

Option terminal assignment (at connection -2)
- No options
/3500 Voltage supply and redundant safety relay at connector 2
/3501 Safety relay parallel at connector 1 and 2
/3502 Voltage supply at connector 2

Relay trigger threshold
... Encoding value 05...99 at choice
Trigger threshold = encoding value x 10 mg
(e.g. 80 mg = 08 x 10 mg)
Encoding value 00: at ≥2 different switching threshold

Voltage supply / interface
CC 10...30 VDC / CANopen® and analog (4...20 mA)
VC 10...30 VDC / CANopen® and analog (0...+10 V)*

Connection / Output
J 1 x M12 connector, 12-pin / 1 x relay
2 2 x M12 connector, 12-pin / 4 x relay

Measuring range
2G ±2 g

Number of axes
3 Three axes

Housing material
M Aluminium
P Glass-fiber reinforced plastic

* On request

Accessories

Connectors and cables

11142900	Female connector M12, 12-pin, 1 m cable (Z 201.M01)
11138627	Female connector M12, 12-pin, 5 m cable (Z 201.M05)
11142902	Female connector M12, 12-pin, 10 m cable (Z 201.M10)

Note: Accessories are not SIL2 approved. The user has to ensure the secure transfer and analysis of the signal.

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Part number

GAM900S - 5-pin

GAM900S-	M	3	2G	.	B	0C	.ACB	...

Relay trigger threshold
... Encoding value 05...99 at choice
Trigger threshold = encoding value x 10 mg
(e.g. 80 mg = 08 x 10 mg)
Encoding value 00: at ≥2 different switching threshold

Voltage supply / interface
0C 10...30 VDC / CANopen®

Connection / Output
B 2 x M12 connector, 5-pin (male and female) / Safety relay parallel at connector 1 and 2

Measuring range
2G ±2 g

Number of axes
3 Three axes

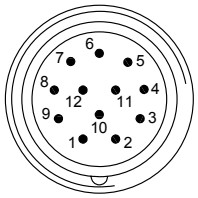
Housing material
M Aluminium

GAM900S

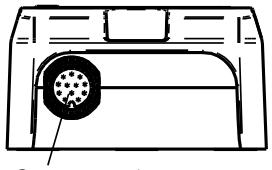
Terminal assignment

Standard / no option, connector M12, 12-pin

Connector 1



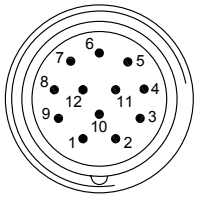
Pin	Description
1	GND
2	Test input
3	UB
4	Analog Ground
5	Analog output X
6	Analog output Y
7	Relay 1 / Safety contact NO*
8	CAN Ground
9	Relay 1 / Safety contact CO*
10	n.c.
11	CAN Low
12	CAN High



Connector 1

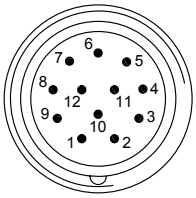
Standard / no option, connector 2 x M12, 12-pin

Connector 1

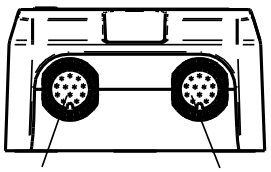


Pin	Description
1	GND
2	Test input
3	UB
4	Analog Ground
5	Analog output X
6	Analog output Y
7	Relay 1 / Safety contact NO*
8	CAN Ground
9	Relay 1 / Safety contact CO*
10	Relay 1 / Contact NC*
11	CAN Low
12	CAN High

Connector 2



Pin	Description
1	Relay 2 / Contact CO*
2	Relay 3 / Contact NO*
3	Relay 3 / Contact CO*
4	Relay 3 / Contact NC*
5	Relay 4 / Contact NO*
6	Relay 4 / Contact CO*
7	Relay 4 / Contact NC*
8	CAN Ground
9	Relay 2 / Contact NO*
10	Relay 2 / Contact NC*
11	CAN Low
12	CAN High



Connector 1 Connector 2

* Customer-specific relay configuration on request

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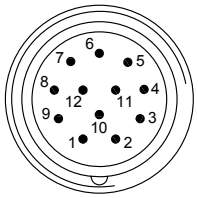
Terminal assignment

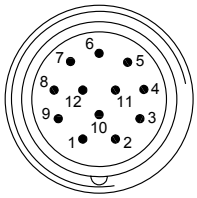
Option -3500, connector 2 x M12, 12-pin / Voltage supply and redundant safety relay at connector 2

Connector 1



Pin	Description
1	GND
2	Test input
3	UB
4	Analog ground
5	Analog output X
6	Analog output Y
7	Relay 1 / Safety contact NO*
8	CAN Ground
9	Relay 1 / Safety contact CO*
10	Relay 1 / Contact NC*
11	CAN Low
12	CAN High

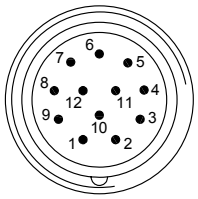
Connector 2



Pin	Description
1	Relay 2 / Contact CO*
2	Relay 1a / Safety contact NO
3	Relay 1a / Safety contact CO
4	Relay 1a / Contact NC
5	n.c.
6	GND
7	UB
8	CAN Ground
9	Relay 2 / Contact NO*
10	Relay 2 / Contact NC*
11	CAN Low
12	CAN High

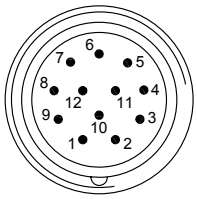
Option -3501, connector 2 x M12, 12-pin / Safety relay parallel at connector 1 and 2

Connector 1



Pin	Description
1	GND
2	Test input
3	UB
4	Analog ground
5	Analog output X
6	Analog output Y
7	Relay 1 / Safety contact NO*
8	CAN Ground
9	Relay 1 / Safety contact CO*
10	Relay 1 / Contact NC*
11	CAN Low
12	CAN High

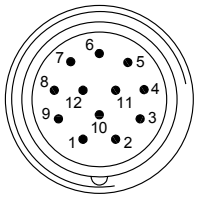
Connector 2



Pin	Description
1	Relay 2 / Contact CO*
2	Relay 1a / Safety contact NO
3	Relay 1a / Safety contact CO
4	Relay 1a / Contact NC
5	Relay 4 / Contact NO*
6	Relay 4 / Contact CO*
7	Relay 4 / Contact NC*
8	CAN Ground
9	Relay 2 / Contact NO*
10	Relay 2 / Contact NC*
11	CAN Low
12	CAN High

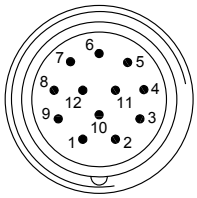
Option -3502, connector 2 x M12, 12-pin / Voltage supply at connector 2

Connector 1



Pin	Description
1	GND
2	Test input
3	UB
4	Analog ground
5	Analog output X
6	Analog output Y
7	Relay 1 / Safety contact NO*
8	CAN Ground
9	Relay 1 / Safety contact CO*
10	n.c.
11	CAN Low
12	CAN High

Connector 2



Pin	Description
1	Relay 2 / Contact CO*
2	Relay 3 / Contact NO*
3	Relay 3 / Contact CO*
4	Relay 3 / Contact NC*
5	n.c.
6	GND
7	UB
8	CAN Ground
9	Relay 2 / Contact NO*
10	Relay 2 / Contact NC*
11	CAN Low
12	CAN High

* Customer-specific relay configuration on request

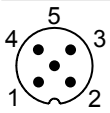
GAM900S

Terminal assignment

Standard / no option, connector 2 x M12, 5-pin (A-coded)

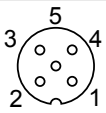
Male

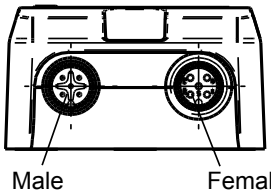
Pin	Description
1	Relay 1 / Safety contact CO*
2	Relay 1a / Safety contact CO
3	GND
4	Test-Input
5	UB



Female

Pin	Description
1	Relay 1 / Safety contact NO*
2	Relay 1a / Safety contact NO
3	CAN GND
4	CAN High
5	CAN Low





* Customer-specific relay configuration on request

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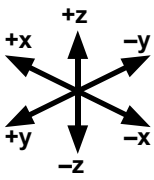
Configuration profile

Band	Analog 1 CANopen 1	Analog 2 CANopen 2	CANopen 3	CANopen 4
Direction	X	Y	Z	|X,Y|
Range Analog	±0.5 g	±0.5 g	–	–
Range CANopen	±2 g	±2 g	±2 g	±2 g
Resolution Analog	0.244 mg	0.244 mg	–	–
Resolution CANopen	1 mg	1 mg	1 mg	1 mg
Filter type	Bandpass	Bandpass	Bandpass	Bandpass
Filter order	4	4	4	4
Bandwidth	0.05...25 Hz	0.05...25 Hz	0.05...25 Hz	0.05...25 Hz
Relay ID	2	2	–	1 (safety)
Relay attack value	see part no.	see part no.	–	see part no.
Relay attack time	0 s	0 s	–	0 s
Relay decay value	100 %	100 %	–	100 %
Relay decay time	1 s	1 s	–	1 s

Different configurations on request.

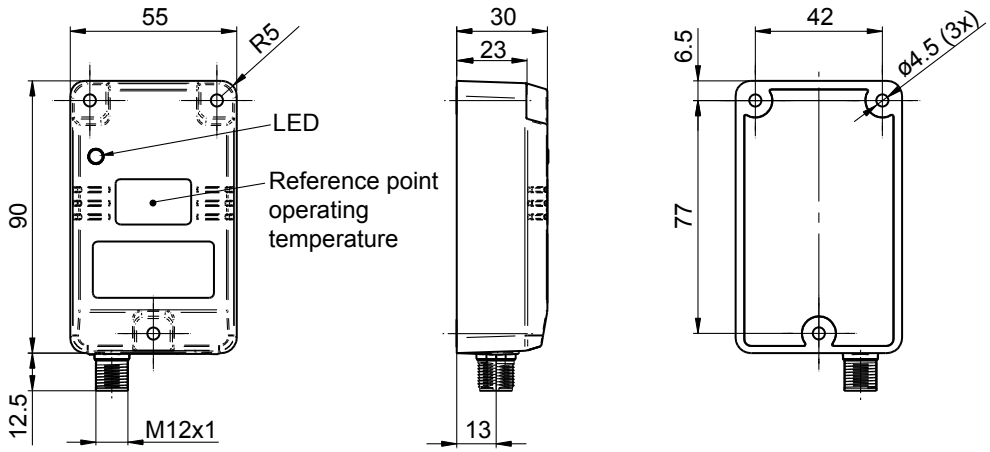
Installation position



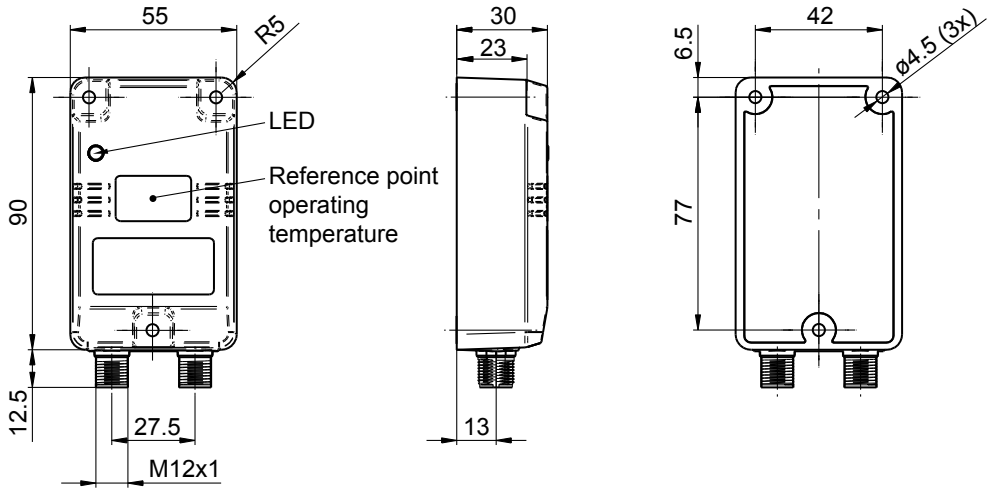
GAM900S

Dimensions

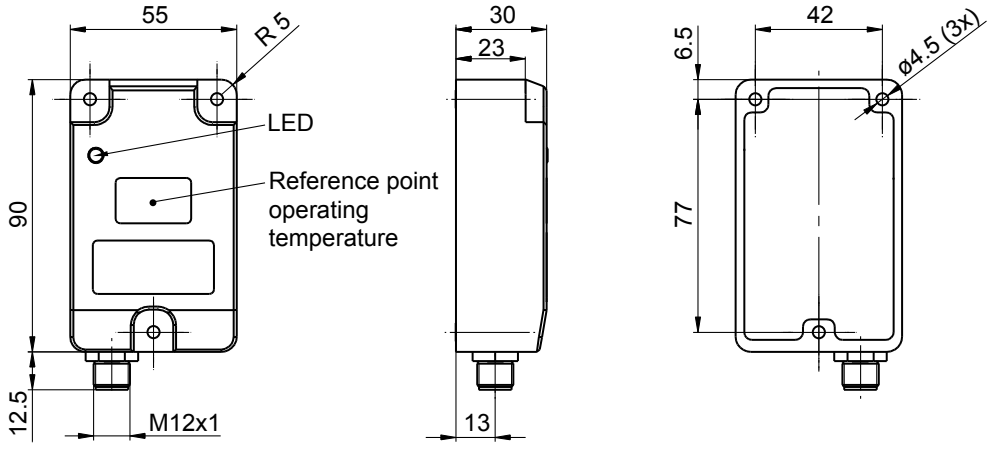
GAM900S - plastic housing, 1x connector M12



GAM900S - plastic housing, 2x connector M12



GAM900S - aluminium housing, 1x connector M12



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Dimensions

GAM900S - aluminium housing, 2x connector M12