



MAXIMUM PERFORMANCE IN SERIES

OUR INCLINATION SENSOR PROGRAM

is characterized by high-precision measuring systems, which are also designed redundantly for safety-relevant applications and can compensate for shock loads with additional Gyro Sensors - Made in Germany.



HART protocol

time on request.

also possible for small quantities at any



INCLINATION SENSORS 🖶 with **MEMS**-**Measuring System**

PE-MEMS-X-MU-i-GS60L PE-MEMS-X-MU-i-GS60

PE-MEMS-X-CAN-GS70

PE-MEMS-XY-i-GS60L

PE-MEMS-XY-MU-GS60

PE-MEMS-XY-CAN-GS70

PE-MEMS-XY-21-GS85

 $\overline{\ominus}$ COMPATIBLE **Analogue & Digital**











SINGLE AXIS SENSOR

PE-MEMS-X-MU-i-GS60L

TILT ANGLE 0-360°

Inclination Sensor with analogue output

The electronic inclination sensor PE-MEMS-X-i-GS60L is equipped with a MEMS acceleration sensor and has an analogue current interface for 4-20~mA.

The device is suitable as a single-axis sensor for an inclination measuring range of up to 0-360° and is factory-adjusted to the user's inclination range.

With an angular accuracy of \pm 0.25°, the sensor is a cost-effective alternative to the Premium series.

- · Low-cost inclination sensor in a plastic housing
- Compact design
- IP code of housing up to IP67









TECHNICAL DATA

Housing size	60 x 50 mm
Housing material	plastic
Housing high	35 mm
IP code of housing up to	IP67
Signal recording	acceleration sensor
Tilt angle max.	0-360°
Angular accuracy	± 0.25°
Temperature range	- 30 °C up to +70 °C
Temperature coefficient	0.15° / 10 K
Shock	50 g, 6 ms

Vibration	5-200 Hz, 4 g
Immunity standard	EN 61 000-6-2
Emission standard	EN 61 000-6-4
Resolution	3000 Digits / 16 mA
Supply	9-36 V DC
Electronics	single
Signal output	4-20 mA
Maximum load current	each 500 Ω
Current consumption	< 65 mA
Connection	M12-plug



C € – conform



PREMIUM-SERIES SINGLE AXIS SENSOR

PE-MEMS-X-MU-GS60

TILT ANGLE 0-360°

Electronic Inclination Sensor with analogue output

The premium series electronic inclination sensor PE-MEMS-X-MU-GS60 is equipped with a high-precision MEMS acceleration sensor and has an analogue interface for 4-20 mA or 0-10 V output signals. The device is suitable as a single-axis sensor for an inclination measurement range of up to 0-360°. In the version with a membrane keyboard, the user can set the output signal to a new measuring range at any time. Measured value acquisition and signal output are redundant for safety-related applications.

The sensor is also optionally available with DNV approval or with two additional preset switching contacts

- Single-axis sensor with programming foil
- Robust aluminum housing with protection class up to IP68
- **Optionally with 2 additional switching contacts**



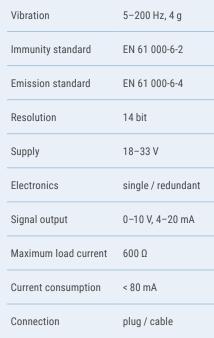






TECHNICAL DATA













PREMIUM-SERIES SINGLE AXIS SENSOR

PE-MEMS-X-CAN-GS70

TILT ANGLE 0-360°

Electronic Inclination Sensor with CAN bus output

The premium inclination sensor PE-MEMS-X-CAN-GS70 is equipped with a high-precision MEMS acceleration sensor and has a digital CAN bus interface.

The signal output is optionally via the standard CANopen or CANopen safety protocol. The sensor is therefore suitable for single-axis tilt detection from 0-360° with an accuracy of up to 0.05°. For safety-related applications, the measured value acquisition is redundant.

- · Redundant data acquisition for safety-related applications PLd / SIL2
- Angular accuracy up to 0.05°
- Robust aluminum housing with protection class up to IP68











Housing size	70 x 70 mm
Housing material	aluminum
Housing high	30 mm
IP code of housing up to	IP68
Signal recording	acceleration sensor
Tilt angle max.	0°-360°
Angular accuracy	0.05°-0.3°
Temperature range	-30 °C up to +70 °C

Shock	50 g, 6 ms
Vibration	5-200 Hz, 4 g
Immunity standard	EN 61 000-6-2
Emission standard	EN 61 000-6-4
Resolution	0.01° / Digit
Supply	9-33 V
Electronics	single / redundant
Signal output	CANopen, CANopen-safety
Current consumption	< 80 mA
Connection	plug / cable



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Temperature coefficient 0.05° / 10 K





BASIC-SERIES

DUAL AXIS SENSOR

PE-MEMS-XY-i-GS60L

TILT ANGLE ± 60°

Electronic Inclination Sensor with analogue output

The electronic Inclination Sensor PE-MEMS-XY-i-GS60L is equipped with a MEMS acceleration sensor and has an analogue current interface for 4-20mA.

The device is suitable as a two-axis sensor for an inclination measurement from 0 to \pm 60° and is factory-adjusted to the user's inclination range.

With an angular accuracy of ± 0.25°, the sensor is a cost-effective alternative to the Premium series.

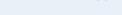
- · Low-cost inclination sensor in a plastic housing
- Compact design
- IP code of housing up to IP67

TECHNICAL DATA

Housing size	60 x 50 mm	Vibration	5-200 Hz, 4 g
Housing material	plastic	Immunity standard	EN 61 000-6-2
Housing high	35 mm	Emission standard	EN 61 000-6-4
IP code of housing up to	IP67	Resolution	3000 Digits / 16 mA
Signal recording	acceleration sensor	Supply	9-36 V
Tilt angle max.	± 60°	Electronics	single
Angular accuracy	± 0.25°	Signal output	4-20 mA
Temperature range	-30 °C up to +70 °C	Maximum load current	each 500 Ω
Temperature coefficient	0.15° / 10 K	Current consumption	< 65 mA
Shock	50 g, 6 ms	Connection	M12-plug



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PREMIUM-SERIES

DUAL AXIS SENSOR

PE-MEMS-XY-MU-GS60

TILT ANGLE ± 60°

Electronic Inclination Sensor with analogue output

The premium series electronic inclination sensor PE-MEMS-XY-MU-GS60 is equipped with a high-precision MEMS acceleration sensor and has an analogue interface for 4–20 mA or 0–10 V output signals. The device is suitable as a two-axis sensor for inclination detection from 0 to $\pm\,60^\circ$. In the version with a membrane keyboard, the user can adjust the output signal to a new measuring range at any time. Measured value acquisition and signal output are redundant for safety-related applications.









- Dual-axis sensor with analogue interface
- Robust aluminum housing with protection class up to IP68
- · Optionally with 4 additional switching contacts

TECHNICAL DATA

Housing size	60 x 60 mm
Housing material	aluminum
Housing high	30 mm
IP code of housing up to	IP68
Signal recording	acceleration sensor
Tilt angle max.	± 60°
Angular accuracy	± 0.2°
Temperature range	-30°C up to +70°C
Temperature coefficient	0.05° / 10 K

Vibration	5-200 Hz, 4 g
Immunity standard	EN 61 000-6-2
Emission standard	EN 61 000-6-4
Resolution	0.01°
Supply	18-33 V DC
Flectronics	
Licetionics	single / redundant
Signal output	4-20 mA, 0-10 V DC
	4-20 mA, 0-10 V DC
Signal output	4-20 mA, 0-10 V DC



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DUAL AXIS SENSOR

PE-MEMS-XY-CAN-GS70

TILT ANGLE ± 60°



Electronic Inclination Sensor with CAN bus output

The premium inclination sensor of the PE-MEMS-XY-CAN-GS70 is equipped with a high-precision MEMS acceleration sensor and has a digital CAN bus interface.

The signal output is either via standard CANopen or CANopen safety protocol.

The sensor is suitable for two-axis inclination detection from 0 to \pm 60° with an accuracy of up to 0.05°.

For safety-related applications, the measured value acquisition is redundant.

- Redundant measuring system for safety-related applications
- Angular accuracy up to 0.01°
- Robust aluminum housing with protection class up to IP68

TECHNICAL DATA

Housing size	70 x 70 mm
Housing material	aluminum
Housing high	30 mm
IP code of housing up to	IP68
Signal recording	acceleration sensor
Tilt angle max.	± 60°
Angular accuracy	0.01°-0.3°
Temperature range	-30 °C up to +70 °C
Temperature coefficient	0.05° / 10 K

Shock	50 g, 6 ms
Vibration	10-1000 Hz
Immunity standard	EN 61 000-6-2
Emission standard	EN 61 000-6-4
Resolution	14 bit
Supply	9-33 V
Electronics	single / redundant
Signal output	CANopen, CANopen-safety
Current consumption	< 120 mA
Connection	plug / cable



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PREMIUM-SERIES

DUAL AXIS SENSOR

PE-MEMS-XY-2i-GS85

TILT ANGLE ± 60°

Electronic Inclination Sensor with analogue output and angle bubble

The premium series electronic inclination sensor PE-MEMS-XY-2i-GS85 is equipped with a MEMS-Accelerometer and has an analog 4-20 mA current interface. The measured value acquisition and signal output is redundant. The device is suitable as a two-axis sensor for an inclination measuring range of 0 to \pm 60° and is factory-calibrated to the user's inclination range. In addition, the sensor has an angle bubble attached to the upper part of the housing for optical detection of the tilt position.

- · Redundant signal acquisition and output
- Inclination sensor with additional angle bubble
- Robust aluminum housing with protection class up to IP69K

TECHNICAL DATA

Housing size	85 x 85 mm
Housing material	aluminum
Housing high	30 mm
IP code of housing up to	IP69K
Signal recording	acceleration sensor
Tilt angle max.	± 60°
Tilt angle max. Angular accuracy	± 60° 0.1°-1°
Angular accuracy	0.1°-1° -40 °C up to +70 °C

Vibration	5-200 Hz, 4 g
Immunity standard	EN 61 000-6-2
Emission standard	EN 61 000-6-4
Resolution	14 bit
Supply	10-33 V
Electronics	singel / redundant
Signal output	2 x 4-20 mA each axis
Maximum load current	250 Ω (10-17 V), 500 Ω (18-33 V DV)
Current consumption	< 140 mA
Connection	cable



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PE-MEMS-X-CAN-G-GS70 PE-MEMS-XY-CAN-G-GS70



SIL IEC 61508



PREMIUM-SERIES DUAL AXIS SENSOR

PE-MEMS-X-CAN-G-GS70 TILT ANGLE ± 60°

Electronic Inclination Sensor with additional Gyro Sensor

The inclination sensor of PE-MEMS-X-CAN-G-GS70 series is equipped with a high-precision MEMS acceleration sensor and has a digital CAN bus interface. The signal output is either via standard CANopen or CANopen safety protocol. The sensor is therefore suitable for single-axis inclination detection from 0-360° with an accuracy up to 0.01°. For safety-related applications, the measurement value is recorded redundantly. In addition, the device has a gyro sensor to compensate shock loads.

- Inclination sensor with additional gyro sensor for shock compensation
- Redundant measuring system for safety-related applications
- Robust aluminum housing with protection class up to IP68









TECHNICAL DATA

Housing size	70 x 70 mm
Housing material	aluminum
Housing high	30 mm
IP code of housing up to	IP68
Signal recording	acceleration and gyro sensor
Tilt angle max.	0°-360°
Angular accuracy	acceleration sensor: 0.08°-0.2°, gyro sensor: < ± 0.5°
Temperature range	- 30 °C up to + 70 °C
Temperature coefficient	between 0.03° / 10 K and 0.1° / 10 K

Shock	50 g, 6 ms
Vibration	10−1000 Hz, 4 g
Immunity standard	EN 61 000-6-2
Emission standard	EN 61 000-6-4
Resolution	14 bit
Supply	9-33 V
Electronics	single / redundant
Signal output	CANopen, CANopen-safety
Current consumption	< 120 mA
Connection	plug / cable



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DUAL AXIS SENSOR

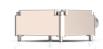
PE-MEMS-XY-CAN-G-GS70

TILT ANGLE 0-360°









Electronic Inclination Sensor with additional Gyro Sensor

The inclination sensor of PE-MEMS-XY-CAN-G-GS70 series is equipped with a high-precision MEMS acceleration sensor and has a digital CAN bus interface. The signal output is either via standard CANopen or CANopen safety protocol. The sensor is suitable for two-axis inclination detection from $0-\pm 60^{\circ}$ with an accuracy up to 0.01°. For safety-related applications, the measurement value is recorded redundantly. In addition, the device has a gyro sensor to compensate shock loads.

- Inclination sensor with additional gyro sensor for shock compensation
- Redundant measuring system for safety-related applications
- Robust aluminum housing with protection class up to IP68

TECHNICAL DATA

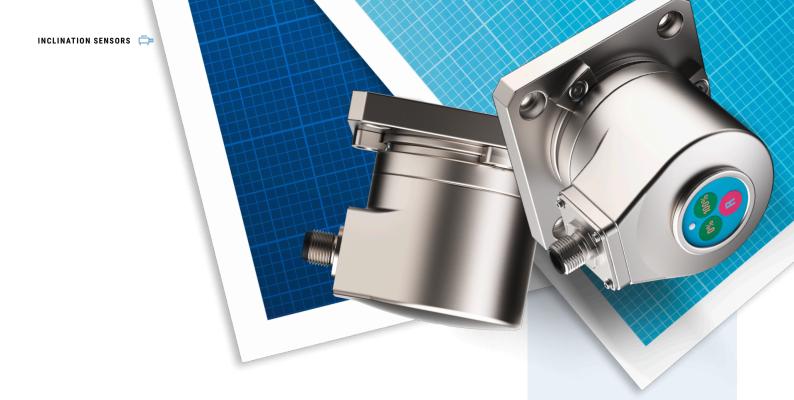
Housing size	70 x 70 mm	Shock	50 g, 6 ms				
Housing material	aluminum	Vibration	10-1000 Hz				
Housing high	30 mm	Immunity standard	EN 61 000-6-2				
IP code of housing up to	IP68	Emission standard	EN 61 000-6-4				
Signal recording	acceleration and gyro sensor	Resolution	14 bit				
Tilt angle max.	± 60°	Supply	9-33 V				
Angular accuracy 0.08°-0.2°,	acceleration sensor:	Electronics	single / redundant				
	gyro sensor: < ± 0.5°	Signal output	CANopen, CANopen-safety				
Temperature range	- 30 °C up to +70 °C	Current consumption	< 120 mA				
Temperature coefficient	0.05° / 10 K	Connection	plug / cable				



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with Pendulum and Magnetic Measuring System



PE-MH1023-MU
PE-MH1023-CAN
PE-MH-II-MU-I-GS63-IECEX











PREMIUM-SERIES SINGLE AXIS SENSOR PE-MH1023-MU

TILT ANGLE 0-360°

Inclination Sensor with Pendulum System and Hall Sensor

The electronic inclination sensor of the premium series PE-MH1023-MU has a magnetic measuring system and is equipped with an analogue interface for 4-20 mA or 0-10 V output signals.

The sensor is deflected via a mechanical pendulum system that is dampened against vibrations by means of an oil filling. The device is suitable as a single-axis sensor for an inclination measurement range of up to $0-360^{\circ}$. In the version with a membrane keyboard, the user can adjust the output signal to a new measuring range at any time.

· Pendulum system, oil-damped

- Tilt angle 0°-360°
- · Current output adjustable via keyboard

CE-	konform





TECHNICAL DATA

Housing diameter	60 mm	Vibration	0-100 Hz, 4 g			
Housing material	aluminum optional anodized	Immunity standard	EN 61 000-6-2			
Housing high	60 mm	Emission standard	EN 61 000-6-4			
IP code of housing up to	IP68	Resolution	14 bit			
Signal recording	pendulum system	Supply	9 / 18-33 V			
Tilt angle max.	0°-360°	Electronics	single / redundant			
Angular accuracy	± 0.2°	Signal output	4-20 mA / 0-10 V			
Temperature range	- 30 °C up to +70 °C	Maximum load current	600 Ω / min. 10 kΩ			
Temperature coefficient	0.1° / 10 K	Current consumption	< 80 mA			
Shock	5 g, 6 ms	Connection	plug / cable			

available in following

VERSIONS



P	Type designation	Signal ouput
	PE-MH1023-MU-i	4-20 mA
	PE-MH1023-MU-u	0-10 V
	PE-MH1023-MU-HART	4-20 mA, 2-wire technology, Hart protocol

PREMIUM-SERIES SINGLE AXIS SENSOR

PE-MH1023-CAN

TILT ANGLE 0-360°

Inclination Sensor with Pendulum System and Hall Sensor

The electronic inclination sensor of the premium series PE-MH1023-CAN has a magnetic measuring system and is equipped with a CAN bus interface. The sensor is deflected via a mechanical pendulum system that is dampened against vibrations by means of an oil filling.

The device is suitable as a single-axis sensor for an inclination measurement range of up to $0-360^{\circ}$.

- · Pendulum system, oil-damped
- Angle measurement from 0°-360°
- · Redundant measuring system optionally available









TECHNICAL DATA

Housing diameter	60 mm
Housing material	aluminum optional anodized
Housing high	60 mm
IP code of housing up to	IP68
Signal recording	pendulum system
Tilt angle max.	0°-360°
Angular accuracy	± 0.2°
Temperature range	- 30 °C up to +70 °C

Shock	5 g, 6 ms / 50 g, 6 ms
Vibration	0-100 Hz, 4 g / 5-200 Hz, 4 g
Immunity standard	EN 61 000-6-2
Emission standard	EN 61 000-6-4
Resolution	0.1°
Supply	9-33 V
Electronics	single / redundant
Signal output	CANopen
Current consumption	< 80 mA
Connection	plug / cable



You can find all data sheets on www.fsg-sensors.de.

Temperature coefficient 0.1° / 10 K





PREMIUM-SERIES SINGLE AXIS SENSOR PE-MH-II-MU-i-GS63-IECEx

TILT ANGLE 0-360°

Robust Inclination Sensor with safetyrelevant equipment for potentially explosive areas

The electronic inclination sensor of the premium series PE-MH-II-MU-i-GS63-IECEx has a redundant magnetic measuring system whith a current interface of 4-20 mA in 2-wire technology.

With its IECEx approval and SIL2 functionality, the encoder is primarily intended for safety-related applications in potentially explosive areas.

The robust stainless steel housing is designed for particularly demanding environmental conditions and against temporary submersion.

- · Pendulum system, oil-damped
- Tilt angle 0°-360°
- · Robust stainless steel housing

TECHNICAL DATA













Housing diameter	63 mm	Vibration	5-150 Hz, 2 g
Housing material	stainless steel	Immunity standard	EN 61 000-6-2
Housing high	60 mm	Emission standard	EN 61 000-6-4
IP code of housing up to	IP67	Resolution	14 bit
Signal recording	pendulum system	Supply	9-26 V DC
Tilt angle max.	0°-360°	Electronics	redundant
Angular accuracy	± 0,2°	Signal output	4-20 mA
Temperature range	- 20 °C up to +60 °C	Maximum load current	500 Ω
Temperature coefficient	<0,03° / K	Current consumption	max. 20 mA
Shock	25 g, 6 ms	Connection	cable



INCLINATION SENSORS

FSG Inclination Sensors for you at a glance.

For further specifications in comparison, please feel free to contact us.

		Housing Si	n rees	Model	*	e axis se	aris ser	soi s	S& GYI	sensor	ant out the	de outp	it out	A IECE	, er ,
	Type designation	Hongin	Deg. bro.	Model	Sint	Dual	MEN	MEN	Hall	City	Volt	CWW	ATE	SIL	PL
	PE-MEMS-X-MU-i-GS60L	60 x 50	IP67		•		•			•					
	PE-MEMS-XY-MU-GS60	60 x 60	up to IP68		•		•			•	•			•	•
11	PE-MEMS-XCAN-GS70	70 x 70	up to IP68		•		•					•		•	
-	PE-MEMS-XY-i-GS60L	60 x 50	IP67			•	•			•					
	PE-MEMS-XY-MU-GS60	60 x 60	up to IP68			•	•			•	•			•	
	PE-MEMS-XY-2i-GS85	85 x 85	up to IP69K			•	•			•				•	
	PE-MEMS-XY-CAN-GS70	70 x 70	up to IP68			•	•					•		•	
1	PE-MEMS-X-CAN-G-GS70	70 x 70	IP68			•		•				•		•	
	PE-MEMS-XY-CAN-G-GS70	70 x 70	IP68			•		•				•		•	
	PE-MH-1023-MU	Ø 60	IP68	PE-MH-1023-MU-i	•				•	•					
		Ø 60	IP68	PE-MH-1023-MU-u	•				•		•				:
		Ø 60	IP68	PE-MH-1023-MU-HART	•				•	•					
	PE-MH-1023-CAN	Ø 60	IP68		•				•			•			
of the second	PE-MH-II-MU-i-GS63-IECEx	Ø 63	IP67		•				•	•			•	•	

OUR PRODUCT PORTFOLIO KNOWS NO LIMITS, ONLY POSSIBILITIES.

AS VERSATILE AS YOUR REQUIREMENTS - OUR PRODUCT PORTFOLIO

Do you have any questions about our extensive product portfolio or are you looking for a solution for a special application?

No problem – all our product groups can be easily combined with each other and together with our technical support we will develop the optimal solution specifically for your application.

info@fsg-sensors.de





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When it comes to quality, there are no compromises for FSG - regardless of when and where our devices are in use worldwide. Maximum reliability and seamless readiness for action are our top priority. We will develop and manufacture all of our products for a long sensor life for every condition. All series devices go through an extensive 100% test in in-house laboratories and test stands. In this way we always have full control over the quality process. Our new developments pass a detailed type approval test and are certified by external institutes.

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It is therefore important to us to work with our customers to develop solutions for their individual needs, regardless of which industry they come from. As a result, FSG has been able to develop trust and expertise in all key industries over the decades. Thanks to unconventional approaches, we have often been able to set standards that many industrial sectors cannot be imagined without to this day. Today our components are trademarks for quality and innovation in many branches of industry.



THE RIGHT SOLUTION FOR EVERY INDUSTRY.







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