

# SENSOR SOLUTIONS for agricultural technology

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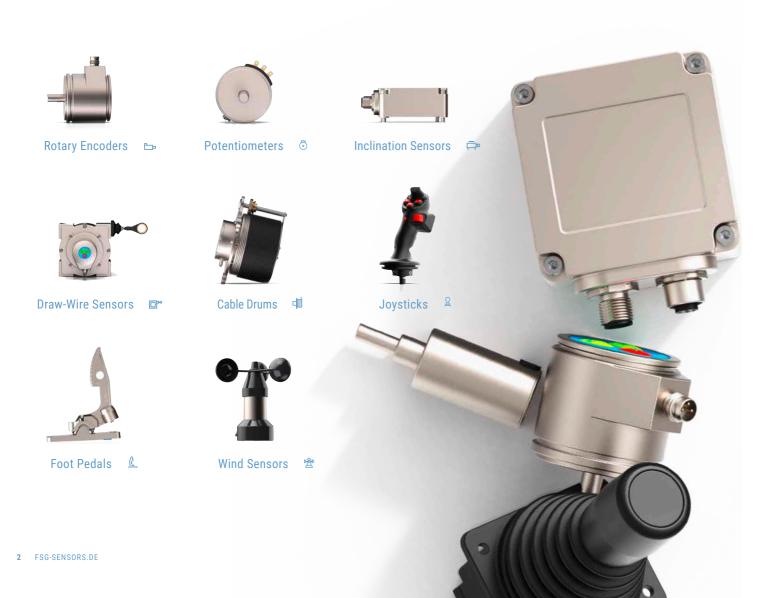


# OUR PRODUCT PORTFOLIO KNOWS NO LIMITS, ONLY POSSIBILITIES.

**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

#### INDUSTRY SOLUTIONS

# ANYONE DEVELOPING FOR THE INDUSTRY MUST LEARN FROM THE INDUSTRY.

Every industrial sector has its own language and its own requirements, so there is no one-size-fits-all solution. 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.



Energy

Rails

Automation

Agricultural

Mining



Logistics



Transport



Offshore



A small selection of our Industry opportunities

We feel at home in every industry.

Therefore, we can answer any question about our products and together we will find solutions to your ideas. Contact us!

info@fsg-sensors.de

# **ROTARY ENCODERS**

FSG rotary encoders make a significant contribution to the automation of workflows in agricultural engineering by enabling the conversion of mechanical rotational movements into electrical signals, which are essential for precise control and monitoring of agricultural machinery.

With diverse product lines, analog or digital signal outputs, and redundant measuring systems, they provide flexible solutions for all application areas. Due to high safety standards and decades of experience in the development of custom sensors, FSG rotary encoders are a reliable choice for advanced control options of agricultural equipment.

- Housing diameter: 22 mm-100 mm
- Housing: Anodized aluminum / Stainless steel
- IP protection: up to IP69k
- Connector or cable connection



**MH1023** 

Robust all-rounder

encoder series

Diameter: 60 mm

Singleturn / Multiturn

#### **ROTARY ENCODER Series**

Available with the following signal outputs: 4-20 mA / 0,5 V-4,5 V / 0-10 V CAN / CANopen / CANopen-safety J1939



Redundant miniature encoder series Diameter: 22.2 mm Singleturn

MH1023-MU-Ex

Diameter: 60 mm

Singleturn / Multiturn

explosion-proof applications

Robust all-rounder encoder series for



Programmable encoder series the compact class Diameter: 36.5 mm Singleturn / Multiturn



Inexpensive safety encoder series Diameter: 59.5 mm Singleturn

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MH-II-GS60



drive shaft

Singleturn

Diameter: 13 mm

23x

56

**ROTARY ENCODER** special versions

#### MH670-MU-i Magnetic rotary encoder in 2-wire technology Diameter: 70 mm Singleturn



MH-680 III-MU-i

Triple rotary encoder with additional angle display via scale and pointer Diameter: 85 mm Singleturn

Multiturn





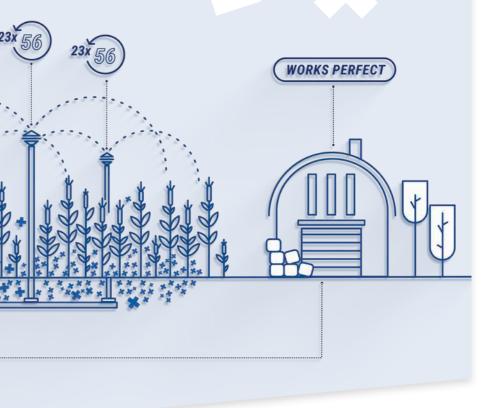


#### Diameter: 50.8 mm Singleturn

in the compact class

Redundant rotary encoder series

**MH620** 





#### **MH-II-CAN-MEMS-GS60**

Compact safety rotary encoder with additional inclination measurement Diameter: 65 mm

Singleturn / Multiturn



MH14-12-CAN-GS125 Robust multiturn slewing ring encoder Diameter: 125 mm

#### **ROTARY ENCODER** freely programmable

NEU

#### MH609-P Diameter: 22.2 mm



#### **Special features:**

- · Miniature rotary encoder (analog) with redundant Hall sensor
- Detectable angle ranges 0-360°
- Rotation angle freely programmable by the user up to 360°
- Ideal for position detection in joysticks, command transmitters or travel switches
- Interface for signal output either 4-20 mA, 0.5-4.5 V or CANopen
- The compact dimensions enable installation in the tightest of spaces

# POTENTIOMETERS

FSG potentiometers are indispensable sensors in agricultural engineering for optimizing workflows by converting mechanical changes into electrical signals required for the regulation and control of machine applications.

Through precise capture of angular positions or length changes, they enable improved control over agricultural equipment. In controlling agricultural machinery, they contribute to precision and open up possibilities for more efficient operational processes.

- Wire winding / conductive plastic element
- Angle limitation or spinning
- Multiple versions possible
- Any angle range up to a maximum of 360°

#### **POTENTIOMETERS WITH** WIRE WINDING in FSG design

 $\bigcirc \circ$ 

#### Other special features:

PW0045v

56,785°

OC

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- Any angle range up to a maximum of 360° - Resistance value up to max. 500  $k\Omega$
- Precision wire-wound potentiometer Diameter: 45 mm

**PW45** 

Nr. 1910

0

Clamp or central fastening

Special circuits available



Precision potentiometer in flat design Diameter: 55 mm

## Cost-effective precision potentiometer

### POTENTIOMETER WITH

- Resistance value up to 10  $k\Omega$



Miniature potentiometer with conductive plastic resistor Diameter: 22.2 mm Synchro size 9

# Diameter: 45 mm

### **CONDUCTIVE PLASTIC in synchro design**

#### Other special features:

- Angle range up to max. 355°
- Clamp fastening via synchro flange



### **PK620**

PK611-15d

Precision potentiometer with conductive plastic Diameter: 50.8 mm Synchro size 20

#### POTENTIOMETER WITH WIRE WINDING in synchro design

#### Other special features:

- Any angle range up to a maximum of 360°
- Resistance value up to max. 20  $k\Omega$
- · Special circuits available
- · Clamp or central fastening



Precision wire-wound potentiometer Diameter: 28 mm Synchro size 11



PW609dv Precision wire-wound potentiometer Diameter: 22.2 mm Synchro size 9



**PW613** Precision wire-wound potentiometer Diameter: 36,5 mm Synchro size 13



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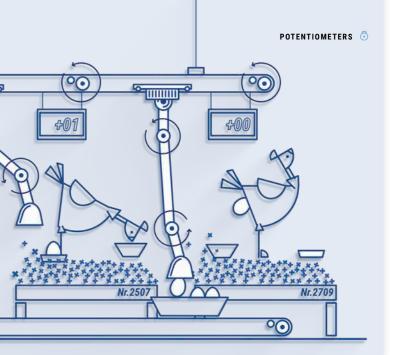
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Precision wire-wound potentiometer Diameter: 50.8 mm Synchro size 20



Robust precision wire-wound potentiometer Diameter: 60 mm Synchro size 23







**PW45W** 

3-10 turn precision potentiometer Diameter: 45 mm



**PW70** Precision wire-wound potentiometer Diameter: 70 mm





**PK613** 

Precision potentiometer with conductive plastic Diameter: 36.5 mm Synchro size 13



#### PK1023d

**Robust precision potentiometer** Diameter: 60 mm Synchro size 23

# INCLINATION SENSORS

FSG incline sensors impress with diverse signal outputs, functional safety, and contactless measurement data capture. Versions with additional gyro sensors allow accurate inclination detection even during dynamic movements of agricultural machines and vehicles.

FSG sensors contribute to the enhancement of safety and effectiveness in agricultural work processes.

- Non-contact measurement recording
- Measuring systems: Hall, MEMS, Gyro
- Redundant signal acquisition
- Signal adjustment by user



#### **INCLINATION SENSORS with MEMS measuring system**

With the following signal outputs available: 4-20 mA / 0,5 V-4,5 V / 0-10 V

CAN / CANopen / CANopen-safety J1939

#### Other special features:

- Analog & digital additional shock compensation
- through gyro sensors • Functional safety:





**PE-MEMS-X-MU-GS60 PREMIUM-Series** Tilt angle: 0-360° Single axis sensor



#### **PE-MEMS-X-CAN-GS70 PREMIUM-Series** Tilt angle: 0-360° Single axis sensor

**PE-MEMS-XY-MU-GS60** 

**PREMIUM-Series** 

Dual axis sensors

Tilt angle: ±60°



PE-MEMS-XY-CAN-GS70 **PREMIUM-Series** Tilt angle: ±60° Dual axis sensors

PE-MEMS-XY-2i-GS85

**PREMIUM-Series** 

Dual axis sensors

Tilt angle: ±60°



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#### PE-MEMS-X-i-GS60L **BASIC-Series** Tilt angle: 0-360° Single axis sensor



#### **PE-MEMS-XY-i-GS60L BASIC-Series** Tilt angle: ±60°

# Dual axis sensors

### Available with the following signal outputs: 4-10 V, 4-20 mA CAN / CANopen / CANopen-safety J1939

#### Other special features:

- Magnetic measuring system
- Analog & digital
- · Vibration compensation through oil damping
- Functional safety: Ex / IEXEx / SIL / PL



#### **PE-MH1023-MU**

### **PREMIUM-Series**

# **PE-MEMS-X-CAN-G-GS70**

#### Other special features:

· Shock compensation through gyro sensors

with MEMS + Gyro measuring system

· Functional safety: SIL / PL

CAN / CANopen / CANopen-safety

**INCLINATION SENSORS** 

Available with the following signal outputs:

#### PREMIUM-Series Tilt angle: 0-360° Dual axis sensors

,19.63°

0

## **INCLINATION SENSORS**

33.02°

### with pendulum and magnetic measuring system



Tilt angle: 0-360° Single axis sensor







#### **PE-MEMS-XY-CAN-G-GS70**

**PREMIUM-Series** Tilt angle: ±60° Dual axis sensors



PE-MH1023-CAN **PREMIUM-Series** Tilt angle: 0-360° Single axis sensor



PE-MH1023-II-MU-i-IECEx

**PREMIUM-Series** Tilt angle: 0-360° Single axis sensor

# DRAW-WIRE SENSORS

For length measurements in agricultural machines or vehicles, FSG cable-pull sensors are of great importance. With their robust construction, single-layer cable winding, and stable spring retraction, they meet all the requirements for reliable and long-lasting data acquisition.

With measuring ranges from 0–100 mm up to 30 m, their usage enables precise measurement and ensures higher work efficiency and improved safety in all agricultural operations.

- Robust construction for extreme environments
- High accuracy using threaded spindle



#### **DRAW-WIRE SENSORS PREMIUM-Series**

Available with the following signal outputs:

4-20 mA / 0-10 V CAN / CANopen / CANopen-safety J1939

#### Other special features:

- High operational reliability and measuring accuracy
- Extensive accessories
- V4A version available
- Winding takes place in a single layer • Robust, highly flexible steel cables
- Drum with threaded spindle
- for measuring lengths up to 60 m





SL3000-GS130 PREMIUM-Series Measuring length: up to 30 m



SL3000-GS190 **PREMIUM-Series** 

# Measuring length: up to 60 m

#### **DRAW-WIRE SENSORS Special-Version / Heavy Duty**

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SL0-GS125 Special-Version Measuring length: up to 10 m



Measuring length: up to 4 m



#### SL004-GS-170 Special-Version Measuring length: up to 12 m



## HEAVY DUTY





**DRAW-WIRE SENSORS BASIC-Series** 

SL001250-GS55 **BASIC-Series** Measuring length: up to 1,25 m



SL3000-GS80

**PREMIUM-Series** 

SL003000-GS80 **BASIC-Series** Measuring length: up to 3 m



SL005000-GS130 **BASIC-Series** Measuring length: up to 5 m

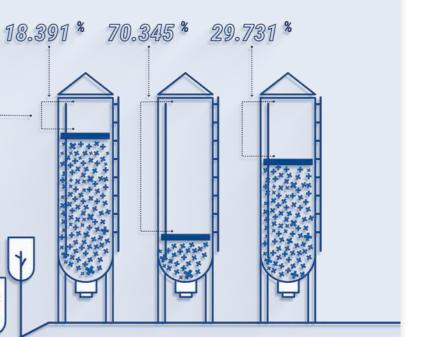


SL0010-GS190 **BASIC-Series** Measuring length: up to 10 m





Measuring length: up to 20 m



#### **DRAW-WIRE SENSOR Robust and flexible**

#### SLOOR-GS80

Measuring length: **up to 3 m** 



#### Special features:

- thicker measuring rope (0.81mm instead of 0.55mm for BASIC-Series) • 50% higher retraction force (compared to BASIC-Series) Robust metal housing
- · Variable construction concept Rope exit possible from both sides of the housing (realization of right or left version)
- · Flexible mounting of standard encoders possible
- · variable mounting by additional pulleys horizontal / vertical

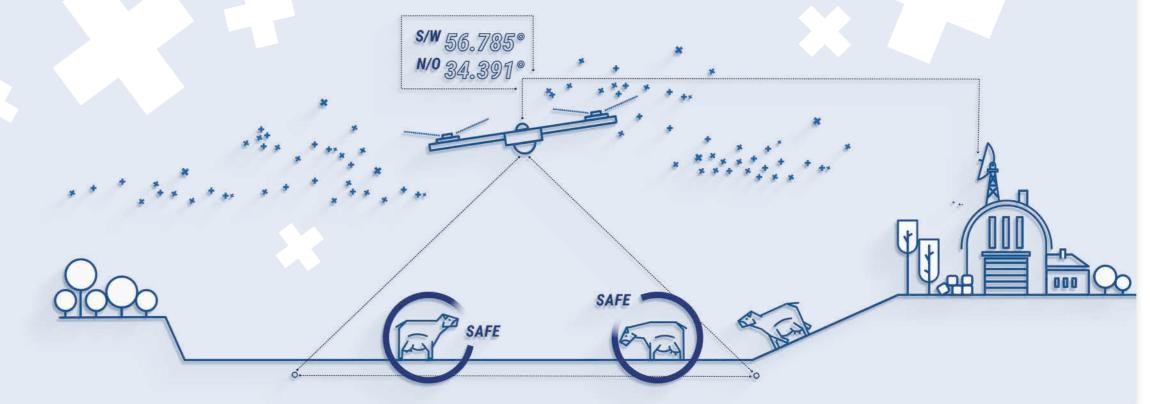
# JOYSTICKS

Joysticks can be used for controlling, for instance, lifting and tilting functions on combine harvesters or the positioning of ploughs and seeding machines in the tractor and harvesting machinery sector.

Wear-free, contactless inductive or magnetic systems are employed as measuring systems.

They are available as single, dual, or three-axis transducers with spring return to center position and with additional pressure points. Moreover, joysticks with force-feedback function provide the machine operator with tactile feedback.





#### **COMPACT-SERIES**



ST-MH-II-y-GS38 Actuating direction: y-Axis Signal output: 2x 0.5-4,5 V (ratiometric)

**STEERING JOYSTICK** 



ST-MH-II-xy-GS40 Actuating direction: x/y-Axis Signal output: 2x 0.5-4.5 V (ratiometric) 2x 4-20 mA





Actuating direction: x/y/z-Axis Signal output: 3x 0.5-4.5 V (ratiometric)



ST-MH-xy-GS60 Actuating direction: x/y-Axis Signal output: 4-20 mA

### NEW

### LPR-2515

The new steering joystick - more comfortable, compact and intuitive than any steering wheel.

- · Perfect operator ergonomics ensure longer operations
- · Less movement required for operation saves time and energy
- · Force feedback functionality supports intuitive control

#### JOYSTICKS (SELECT)

The FSG joysticks are available with the following signal outputs: 4-20 mA / 0-10 V CANopen / CANopen-safety J13397 / Profinet

### ST-W-xy-GS78 • Deflection angle: ±20° (x/y)

• Housing size: Ø 78 mm

• Weight: 2.000 g

#### **MULTIFUNCTION HANDLES**

- Ergonomically optimized · Control panels in the handle head
- top and/or front • Equipment freely configurable

Due to standardized fastening elements, the multifunction handles are suitable for mounting on any commercially available joystick.



#### ST2025-LCD

- with LCD display and signal ring
- · optional with touch function Vibrator
- ve in the handle or deadman button in the front handle Vibrator

**ST2000** 





#### ST-MHT-GS85



- Deflection angle: ±15,3° (x/y)
- Housing size: Ø 85 mm
- Installation depth: approx. 65 mm
- Weight: 1.600 g

#### ST2020

- as right or left version • optionally with mini joystick • Capacitive sensor in the handle
- for left and right handers · Deadman function: capaciti-





#### **ST2010**

- · as right or left version
- · dead man's button in the front of the handle
- Vibrator

#### **ST2005**

#### Ball handle

- · with 4 buttons and vibrator
- Protection against dust and liquid by bellows

# FOOT PEDALS

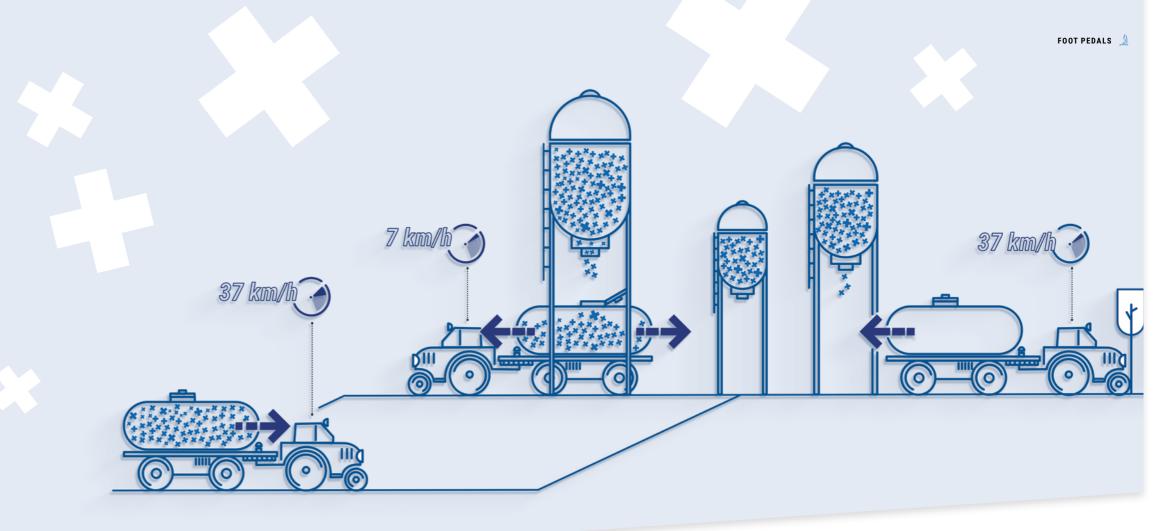
FSG foot pedal transducers are characterized by a modular, extremely robust, and notably flat design.

For analog or digital signal output, wear-free magnetic measuring systems are utilized, which are redundantly designed for safety-critical applications.

Thus, FSG foot pedals are particularly suitable for use in agricultural machinery and vehicles.

- Robust metal housing with high IP protection rating
- Flat design for low installation depth
- Redundant measuring system, suitable for safety-relevant applications





#### **SINGLE PEDALS**

Our FSG foot pedals are available with the following signal outputs: 4-20 mA / 0-10 V CAN / CANopen / CANopen-safety J1939



#### FS-P-L Pedal angle: 18° Actuating force: 20-42 N Housing protection: IP67



FS-P Pedal angle: 20° Actuating force: 15-45 N Housing protection: IP67



#### FS-S Pedal angle: 12°

Actuating force: 20-34 N Housing protection: IP67

**ROCKER PEDALS** 



FS-W Pedal angle: ±16° Actuating force: 18-47 N Housing protection: IP67



FS-W1 Pedal angle: ±16° Actuating force: 22-41 N Housing protection: IP67

#### **ACCELERATOR PEDALS**



FS-G (KD) Pedal angle: 20° Actuating force: 11-29 N Housing protection: IP67



FS-G-ZF Pedal angle: 20° Actuating force: 50-160 N Housing protection: IP67

# WIND SENSORS

FSG anemometers serve for the capture and monitoring of wind speed and direction.

In robust versions with central mounting or pendulum setup, they are utilized for the optimization and control of agricultural activities, assistance in plant protection measures, and as an essential component of modern agricultural weather stations. If needed, they can be used with integrated obstacle lighting.

- Protection class: IP65 (with vertical orientation)
- Measuring system magnetic, contactless
- central mounting / pendulum design

**OPTIONAL** 

- Explosion protection ATEX / IECEx
- Measuring range up to 50 m/s
- Seawater protection coating
- Reed contact
- Calibration certificate



#### WIND SENSORS



AN-60-Z-MH Version Central mounting

Signal outputs: 4-20 mA

2-3-Conductor tech. 0-10 V CAN-Bus Profinet



#### AN-60-P-MH Pendulum version Signal outputs: 4-20 mA 2-3-Conductor tech.

0-10 V CAN-Bus Profinet



WR-Z-MH Version Central mounting

Signal outputs: 4-20 mA 2-3-Conductor tech. 0-10 V

CAN-Bus

Profinet



WR-P-MH Pendulum version

Signal outputs: 4-20 mA 2-3-Conductor tech. 0-10 V CAN-Bus Profinet

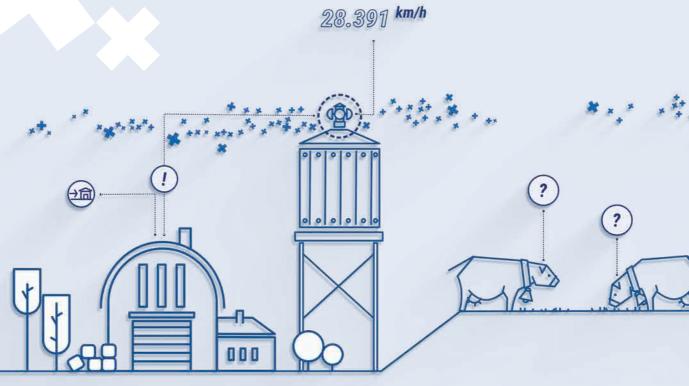


- WIND SENSORS with integrated light signals
- Optimum measurement results due to lack of wind shading
- · Reduced maintenance costs and installation time
- · Accurate positioning ensures reduced light pollution

#### AN-60-HF

Wind sensors With integrated obstruction light

Illuminant:	2x LED-Array
Minimum light intensity:	10 cd (red) /32 cd (red)
Power consumption:	5.6 W without heating
Lifetime (LM80 (17 k) :	> 36.000 h (LED)
Special feature: Corrections of the vertical position after	
vibrations are made by means of pendulum	





#### AN-60-GF

#### Wind sensors with integrated hazard light

Illuminant:	3x 2 LED-Array
Minimum light intensity:	2000 cd
Power consumption:	30 W
Lifetime (LM80 (17 k):	> 100.000 h (LED)
Special feature: Reliable 100% vertical position due to	
new motorized leveling	

OUALITY & RELIABILITY

# WE LEAVE NOTHING TO CHANCE.

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.



With us you are always on the safe side through:





## OUR DAY-TO-DAY BUSINESS: MAKING A DIFFERENCE. **OUR FIVEFOLD PROMISE OF PERFORMANCE**

90% depth of production, 100% passion સ્થિ



Due to 90% vertical integration, we can customize our products 100% to your needs.

Germany

Every day, over 470 employees ensure that you are satisfied and that "Made in Germany" continues to stand for quality.



18 FSG-SENSORS.DE

#### Our standard: customization

**@** –

FSG products are not only excellent, they are always perfectly designed and customized for your requirements.

#### 75 years of innovation is tradition

### 5

We will develop measurement sensors that are reliable and perfectly matched to their intended use. Our solutions often become industry innovations and have been for 75 years.

#### Always where our customers are

FSG is represented internationally and we guarantee you the best support, no matter when and where you need us.



#### **Our competence – for your satisfaction.**

Together we will find the sensor solution that is specially tailored to your needs.

I look forward to your ideas and visions.

S. KÖNIG SALES MANAGER

info@fsg-sensors.de





## MANUFACTURING & PRODUCTION

Nowadays, there is a constant demand by customers for more complex solutions of automation problems which have to go into serial production at short notice. With CAD workstations in the development department and drafting offices and with CNC machines in use in steel construction, production, and in assembly, we have established the necessary conditions for rapid product realization ready to go into serial production. Each step of production is watched and controlled by our own quality management according to the guidelines of DIN EN ISO 9001:2015.





## **SCIENTIFIC &** RESEARCH

Having its focus of development at the heart of Berlin, FSG has two additional locations in Königs Wusterhausen near Berlin. Specific customer requirements and requests are realized at all sites. Forward-looking tendencies and developments were analysed and regarding their feasibility be examined and tested.

# **TEST LAB &** QUALITY MANAGEMENT

Our development, test and EMC departments are equipped with state of the art computer-aided technical equipment and facilities. Related and required functional tests can be carried out practise-orientated and tests to ensure compliance with EMC goals be simulated. Automated test stations are used to control and record the guaranteed functional characteristics of every single device before delivery.

In the process we never lose sight of customer requirements as well as statutory standards and safety guidelines. The results of each final inspection are saved and archived electronically.





**DISTRIBUTION NETWORK** 

## DISTRIBUTION MEANS TRUST. THAT'S WHY WE ONLY TRUST THE BEST.

Through the international orientation of our company and the consistent expansion of new sales structures and opportunities, we offer our global customers a presence close to the market of specialists for measurement and sensor technology from FSG Fernsteuergeräte.

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#### OUR LOCATIONS

# **EVERYTHING A QUESTION** OF THE LOCATION

Our employees are the DNA of our success. Spread over 4 locations, they are responsible for FSG developing individual and professional solutions and products for its customers. To ensure that this path to success is not interrupted, we promote our employees and invest heavily in our machinery. This is the only way to guarantee that we will still be where we are today - always at the top.

#### YOU CAN FIND US AT THE **FOLLOWING LOCATIONS**

#### BERLIN

#### Headquarters

- founded in 1946
- approx. 3,500 m<sup>2</sup> production area
- approx. 200 employees
- · Management and sales,
- · design and development,
- · production and assembly

#### ZERNSDORF/ BRANDENBURG

#### production and training center

- founded in 2017
- approx. 4.300 m<sup>2</sup> production area
- approx. 90 employees
- Training center
- Production

#### IMPRINT

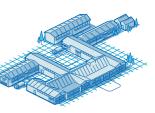
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#### **KABLOW**/ BRANDENBURG

Development, production and assembly founded in 1992

- approx. 5.000 m<sup>2</sup> production area
- approx. 150 employees
- · development, construction and assembly



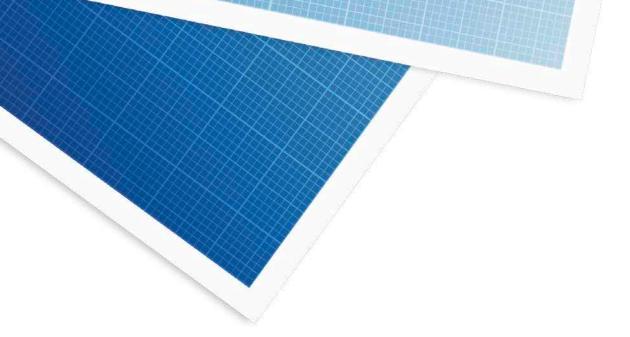
#### **HEPPENHEIM**/ HESSEN

Fertigung und Montage

- founded in 1961
- approx. 2.500 m<sup>2</sup> production area
- approx. 40 employees
- production and assembly

#### Guarantee

The contents were created with the greatest possible care. However, FERNSTEUERGERÄTE Kurt Oelsch GmbH does not guarantee the accuracy, completeness and timeliness of the content provided.







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