

Inclination



Acceleration



Tilt



Rotary



# Introduction

## DIS Sensors

For 30 years, DIS Sensors (a subsidiary of Roter Holding) has been the supplier of choice for high quality sensor technology. We develop, manufacture and supply sensors, control systems and electronics for applications of all kinds. Although our sensor range mainly focuses on the measurement of inclination, vibration and acceleration, DIS Sensors is also a leading supplier of rotary encoders.

### Standard or custom

This brochure presents an overview of our wide range of sensors, and primarily describes the standard products. However, because our sensors are all developed and produced in-house, we can also offer custom solutions for specific needs.

Because innovation is in our blood, and know-how in our genes. So it's no surprise to find high-quality components and solutions from DIS Sensors providing reliable measurement in machinery all over the world.

Moreover, the excellent relationships we have built up with selected partners enable us to deliver large series at a highly favourable price/quality ratio.

- ISO9001, TÜV, UL and RDW certification
- an R&D department with a total of 75 years' experience
- (pre-compliance) EMC measurements
- production department: surface mount and conventional assembly (single- and double-sided), wave and reflow soldering, electronics potting, small to medium-sized production runs (50 – 2,000 units/batch), full traceability
- testing department: functional tests, temperature and RH chamber, high precision calibration equipment
- headquarters in Soest (NL)
- regional office in Germany, and a network of experienced distribution partners

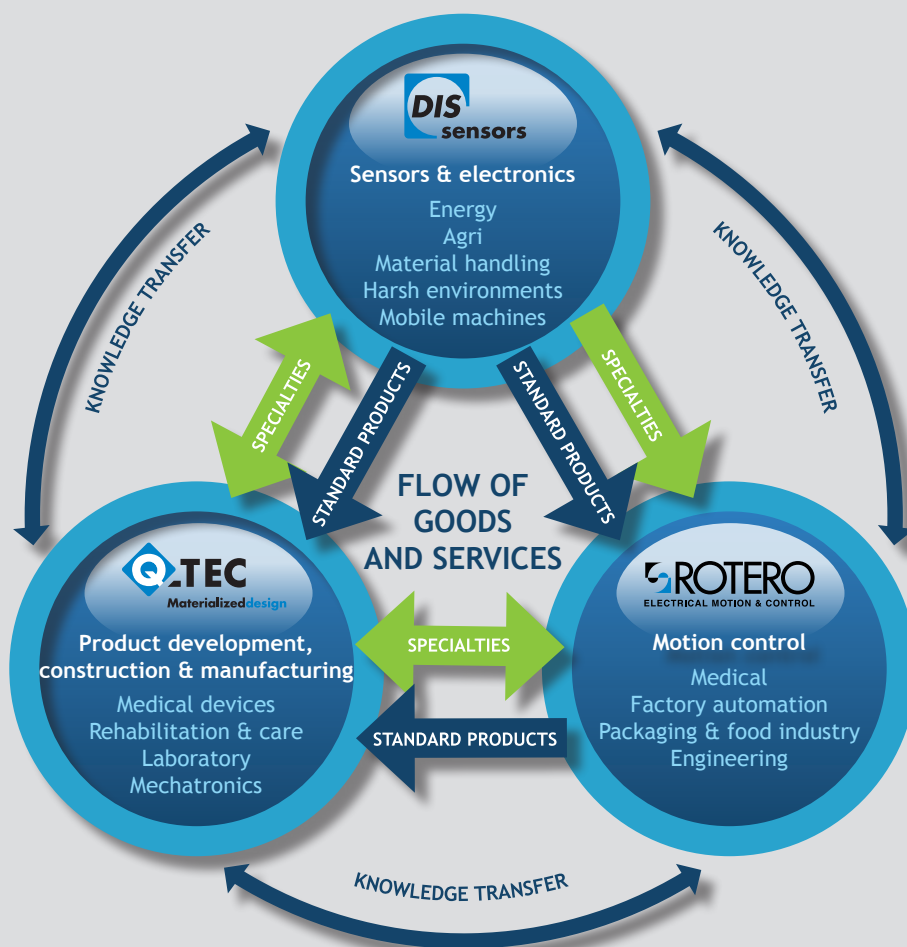
*DIS makes sense!*

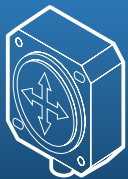
# Rotero Holding

DIS Sensors is a subsidiary of Rotero Holding. This holding company consists of 5 independent but fully complementary subsidiaries: DIS Sensors (bv and GmbH), Rotero (Holland bv & Belgium bvba) and Q-Tec bv.

- DIS Sensors is dedicated to the development, production and sale of sensors, control systems and electronics.
- Rotero Holland and Rotero Belgium specialize in motion control solutions, and also distribute the products of DIS Sensors in their national markets.
- Q-Tec is specialized in the development and production of mechatronic solutions for the health care and related sectors.

Although each business unit has its own market and customer base, they readily support one another with their expertise when necessary. Across Rotero Holding, a total of 50 highly enthusiastic and qualified persons work with just one goal in mind: *the best solution for the customer.*





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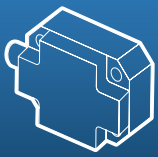
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## QG series

### Inclinometers

Inclinometers measure the angle with respect to the direction of the force of gravity in one or two axes. Inclinometers from the DIS Sensors QG series are based on robust MEMS technology, and their modular design makes it easy to optimize each sensor for a specific application. What's more, for certain models, the handy configurator enables the end customer to easily adjust the sensor according to preference.

#### Specifications:

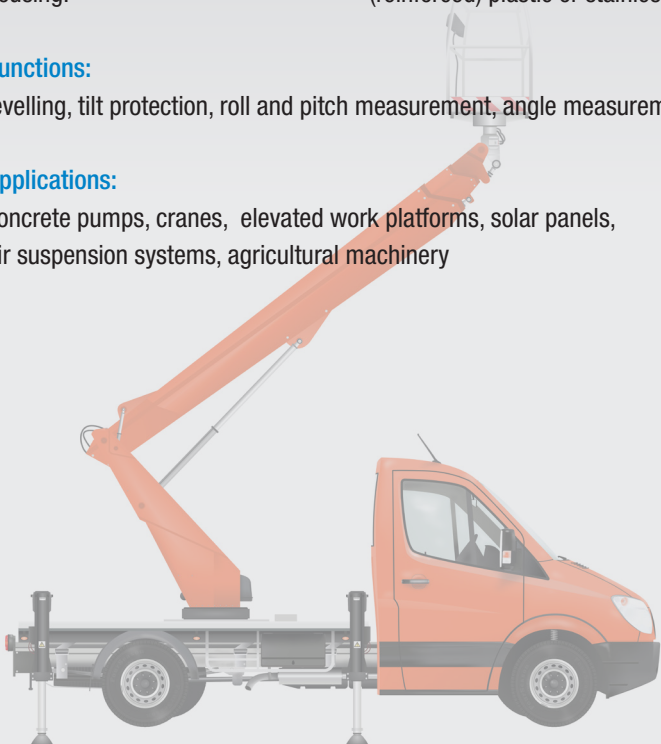
single axis measurement range:	$\pm 10^\circ$ ; $\pm 30^\circ$ ; $\pm 90^\circ$ ; 0 - 360°
double axis measurement range:	$\pm 10^\circ$ ; $\pm 30^\circ$ ; $\pm 90^\circ$
energy supply:	5 V dc or 10 - 30 V dc
analogue output:	0.5 - 4.5 V or 4 - 20 mA
digital output:	CANopen (Safety); RS232
level of protection:	IP67, IP68 or IP69K
precision:	depending on model and range: as high as $\pm 0.02^\circ$
programmable:	filtering, measuring range
zeroing possibility:	depends on model
functional safety:	SIL2/PLd (optional)
housing:	(reinforced) plastic or stainless steel

#### Functions:

levelling, tilt protection, roll and pitch measurement, angle measurement

#### Applications:

concrete pumps, cranes, elevated work platforms, solar panels, air suspension systems, agricultural machinery



### Application example

Boom lifts (or 'cherry pickers') come in all shapes and sizes, but they have one thing in common: every type must be equipped with an inclinometer. First, to verify that the machine is level before raising the boom; then to continuously check for potential instability during operations.

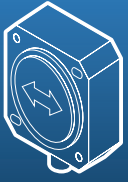
DIS Sensors offers a wide range of inclinometers for this application, including many with SIL2/PLd certificate.

#### CANopen safety sensor for safety applications

DIS Sensors offers various inclinometers and accelerometers that are certified compliant with SIL2 (IEC 62061) and PLd (as per EN ISO 13849).

This certification makes these sensors suitable for use in safety applications. The sensors are available in both the standard QG65 reinforced plastic housing and the QG76 stainless steel housing.





## QG series

### Acceleration sensors

The acceleration sensors of DIS Sensors measure acceleration in one, two or three axes. These sensors are based on robust MEMS technology and thanks to the modular design easy to adapt to specific requirements. Thanks to a higher bandwidth faster movements can be measured with very high accuracy.

#### Specifications:

measurement range:	$\pm 0.26$ to $\pm 18$ g (1 g = 9.81 m/s <sup>2</sup> )
frequency:	0 - 10/50/100/500/1.000/2.000 Hz
energy supply:	5 V dc or 10 - 30 V dc
analogue output:	0.5 - 4.5 V or 4 - 20 mA
digital output:	CANopen (Safety)
level of protection:	IP67, IP68 or IP69K
precision:	depending on model and range: as high as $\pm 0.003$ g
zeroing possibility:	depends on model
functional safety:	SIL2/PLd (optional)
housing:	(reinforced) plastic or stainless steel

#### Functions:

measurement of acceleration and vibration, active vibration damping, transport monitoring

#### Applications:

agricultural machinery, wind mills, containers



### Application example

Modern wind turbines are required by law to use accelerometers to monitor swaying of the mast due to wind and (offshore) wave action. When these sensors measure values that exceed a certain threshold, a signal is given to 'feather' the blades, putting the wind turbine into a safe state.

DIS Sensors provides added value to turbine producers in the area of customer-specific filtering and safety circuit interfacing.

#### CANopen safety sensor for safety applications

DIS Sensors offers various inclinometers and accelerometers that are certified compliant with SIL2 (IEC 62061) and PLd (as per EN ISO 13849).

This certification makes these sensors suitable for use in safety applications. The sensors are available in both the standard QG65 reinforced plastic housing and the QG76 stainless steel housing.



## QG series

### Tilt switches

A tilt switch is in fact an inclinometer (a sensor) with a switching output, and with gravity serving as a reference. The tilt switches from DIS Sensors are based on MEMS technology and intelligent microcontroller algorithms. As a result, single or twin axis switches can be implemented with any desired switching angle.

The standard enclosure for these sensors is a QG40 housing. The QG65 variant offers the possibility to incorporate tilt switches with even higher precision and temperature stability.

#### Specifications:

single axis measurement range:	up to 360°
double axis measurement range:	$\pm 1^\circ$ to $\pm 90^\circ$
energy supply:	5 V dc or 10 - 30 V dc
output:	single or dual NPN/PNP
level of protection:	IP67, IP68 or IP69K
precision:	depending on model and range: as high as $\pm 0.1^\circ$
programmable:	switching angle, on/off delays, filtering
housing:	(reinforced) plastic

#### Functions:

replacement for mercury switches, tilt and tip over protection

#### Applications:

elevated work platforms, agricultural machinery, forklift trucks, stackers



### Application example

The tilt of mobile machinery is usually monitored using inclinometers. An inclinometer designed as a tilt switch can trigger warning and/or alarm signals when one or more pre-programmed angles is exceeded for a certain period of time.

This is also a simple but effective way to prevent abuse of the machines in a rental fleet.





## QR series

### Rotary encoders

Our rotary encoders enable contactless measurement of an angular displacement from 0° to 360° without a mechanical stop. We offer three different types: QR30(N), QR40 and QR40EMN. In the QR30 and QR40EMN range, the magnet is mounted external to the sensor, enabling the customer to mount the magnet on the rotating shaft.

The maximum distance of 3 to 10 mm (depending on model and magnet) between the magnet and the sensor provides sufficient clearance for mechanical tolerances under extreme conditions. Various outputs are available with a 12-bit resolution and a high repeatability for a wide range of applications.

The QR40 series is supplied complete with output shaft. The bearing is equipped with a fibreglass plain bearing. The QR40 has a zero-input, enabling the device to be zero-calibrated after installation, and making the sensor mounting procedure non-critical.

#### Specifications:

	Absolute	Incremental
measurement range:	0 - 360° (subranges possible)	0 - 360°
energy supply:	5 V dc or 10 - 30 V dc	5 V dc or 10 - 30 V dc
output:	0 - 5 V or 4 - 20 mA, redundant, PWM	A/B pulse (32 - 1,024 ppr) push/pull
level of protection:	IP67 (QR40: IP66)	IP67
resolution:	0.09°	0.09°
housing:	plastic	plastic

#### Functions:

replacing potentiometers, measurement of angle, speed and direction

#### Applications:

agricultural machinery, excavators, mobile and fixed waste compactors, valve control, robotics



### Application example

The contactless incremental encoder is used to measure the direction and speed of rotation of a shaft.

This technology is used in many machines in which a linear displacement is achieved by means of a rotary motor. This sensor is often used as an alternative for two inductive limit switches or expensive optical encoders.

The contactless absolute encoder is used to measure the absolute angle of a rotating shaft that turns through an angle of less than 360°. Typical applications include steering systems, throttle levers and automatic doors.

This rotary encoder is therefore highly suitable for continuous feedback of the shaft position to the controller.





## Cables & accessories

### Cables

#### PVC Cable - 5-pole

M12 with open ended wires - female

Available sizes:

Size	Part number
1.5 m	11700
5 m	11701
10 m	11702
15 m	11703

#### PUR Cable - 5-pole

M12 with open ended wires - female

Available sizes:

Size	Part number
1.5 m	10654
5 m	10657
10 m	11704
15 m	11705

#### PUR Cable - 8-pole

M12 with open ended wires - female

Available sizes:

Size	Part number
1.5 m	11706
5 m	11707
10 m	11708
15 m	11709

#### PUR Cable (CAN) - 5-pole

M12 with open ended wires - female

Available sizes:

Size	Part number
1.5 m	11711
5 m	11712
10 m	11146
15 m	11713

#### USB to RS232 adapter Cable

D-SUB 9-pole male - USB 2.0

Available sizes:

Size	Part number
0.35 m	11809

Breakout cable for QG40N configurator 12345

### Connectors (without cable)

#### M12 connector

Available in:

Connector type	Part number
Male, 5-pole, metal	11848
Male, 5-pole, plastic	10219
Female, 5-pole, metal	11723
Female, 5-pole, plastic	11716
Male, 8-pole, plastic	11715
Female, 8-pole, plastic	

#### M12 t-connector

5 pole - 1 x male & 2 x female

11822

### CAN open accessories

M12 bus terminator

Terminator type	Part number
5 pole - male	10217
5 pole - female	10194

### External magnets & magnet holders

#### Magnet holder with N-mark - IP67

Magnet holder type	Part number
Stainless steel bolt (size M12 x 1.5 x 20 mm)	11594
Stainless steel bolt (size: M10 x 1 x 20 mm)	12170
Plastic disc (size: Ø30 x 8 mm)	11787

#### Magnet neodymium (rectangular) - with N-mark

Available sizes:

Magnet size	Part number
11.2 x 5.5 x 8 mm	11178
20 x 12 x 10 mm	11829

#### Magnet neodymium (circular) - 2-pole axial

Available sizes:

Magnet size	Part number
Ø 8 x 5 mm	11178
Ø 15 x 4 mm	11593

### Configurators

Configurator type	Part number
QG40N series configurator	12380
QG57/76 configurator	10855



## Our distributors

We work with an extensive network of reliable and skilled distributors. These selected distributors enable DIS Sensors to export every product in our entire range to more than 20 countries worldwide.

### EUROPE

#### Austria

**Variohm EuroSensor Ltd**  
Hans-Bunte-Strasse 8  
69123 Heidelberg

T: +49 (0)6221-772233  
E: heiko.wagner@variohm.com  
W: www.variohm.de

#### Belgium

**Rotero Belgium bvba**  
Wayenborgstraat 10  
2800 Mechelen

T: +32 (0)15-451840  
E: info@rotero.be  
W: www.rotero.com

#### Denmark

**OEM-KLITSO**  
Engholm Parkvej 4  
3450 Allerød

T: +45 (0)70-106400  
E: info@oemklitso.dk  
W: www.oemklitso.dk

#### Finland

**Klinger Finland Oy**  
Tinankuja 3  
02430 Masala  
T: +358 (0)10-4001012  
E: info@klinger.fi  
W: www.klinger.fi

#### France

**Vicatronic**  
3, route de Châteaumeillant  
18270 Culan  
T: +33 (0)2-48566335  
E: contact@vicatronic.fr  
W: www.vicatronic.fr

#### Germany

**Representative:**  
PLZ 16-33, 37-39, 48, 49, 59  
Leue Sensorics GmbH  
Schmiedkamp 22  
29358 Eicklingen

T: +49 (0)5149-92129  
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Variohm EuroSensor Ltd  
Hans-Bunte-Straße 27  
D-69123 Heidelberg

T: +49 (0)6221-772233  
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W: www.variohm.de

#### Italy

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Via Volta, 12D  
37026 Settimo di Pescantina (VR)

T: +39 (0)45-2220511  
E: info@btsensors.it  
W: www.btsensors.it

#### Norway

**Salitec AS**  
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1366 Lysaker

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E: mail@salitec.no  
W: www.salitec.no

#### Poland

**OEM Automatic SPz o.o.**  
Dzialkowa 121A  
02-234 Warszawa

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E: mariusz.szablowski@pl.oem.se  
W: www.oemautomatic.pl

#### Portugal & Spain

**EncoSolution S.L.**  
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08440 Cardedeu (Barcelona)

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E: info@enco-solution.com  
W: www.enco-solution.com

#### Sweden

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Nickelvagen 7, Länna  
14250 Skogås (Stockholm)

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#### Switzerland

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Birmannsgasse 8  
4055 Basel

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W: www.sibalco.ch

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5253 RA Nieuwkuijk

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E: info@sentech.nl  
W: www.sentech.nl

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**NAIMSAN MAK. ELK.**  
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Kuzguncuk-Istanbul

T: +90 (0)216-3340317  
E: naimsan@naimsan.com.tr  
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#### United Kingdom

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Malvern Hills Science Park  
Geraldine Road, Malvern  
Worcestershire, WR14 3SZ

T: +44 (0)1684-585148  
E: info@fortop.co.uk  
W: www.fortop.co.uk

## MIDDLE EAST

### Iran

#### **Peyman Electric Co**

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Booshehri Alley,  
Southern Lalehzar Street  
Tehran

T: +98 (0)21-33999193  
E: info@peymanelc.com  
W: www.peymanelc.com

### China

#### **Suzhou Controlway Electric Co., Ltd**

No. 58 Yangdong Road, Suzhou  
Industrial Park  
Jiangsu province  
215022 Suzhou

T: +86 (0)512-88998586  
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## ASIA

### India

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E: sales@ambetronics.com  
W: www.ambetronics.com

### Thailand & Vietnam

#### **PRC Technologies Ltd.**

328/65 Ladprao 87 Rd.  
Wangthonglang  
Bangkok 10310

T: +66 (0)2530-1714  
E: info@prctechnologies.co.th  
W: www.prctechnologies.co.th

## SOUTH AMERICA

### Argentina & Uruguay

#### **Actualred**

Zorrilla 1248  
60.000 Paysandú (UY)

T: +598 (0)472-41958  
E: penafede@actualred.com  
W: www.actualred.com

### Brasil

#### **LRI Automação - MATRIZ**

Rua Antônio Joaquim Mesquita,  
377 / 1 e 2 Andar  
91350-180 - Porto Alegre -RS

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W: www.lri.com.br

### Chili

#### **Getec**

Rondizzoni 1532  
CP 8360952  
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T: +56 (0)2-25548520  
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W: www.getec.cl

### Costa Rica

#### **GEN BUS S.A.**

Sta. Rosa de Santo Domingo  
Complejo de Bodegas del Sol,  
Bodega #22  
Heredia

T: +506 (0)2237-9518  
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W: www.genbuscr.com

## NORTH AMERICA

### USA | Canada | Mexico

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Chester Springs, PA 19425

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