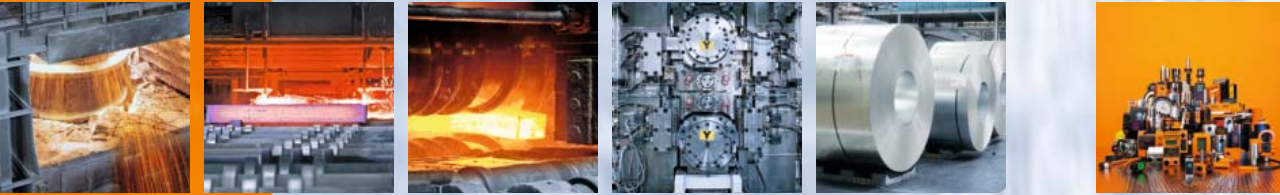


ifm electronic



# Automation Technology for the Steel Industry *Catalogue 2015/2016*

[www.ifm.com/gb/steel](http://www.ifm.com/gb/steel)

ifm – close to you!

## Modern production lines in steelmaking ensure economic success



The steel industry is among the largest and best-established economic sectors worldwide. It has always been an important driving force of the economy. Its products are indispensable for other industries such as automotive and construction. Quality, reliability and economic efficiency in the production of steel products can only be ensured by means of automated manufacturing facilities. A central objective of ifm is to increase reliability and operational availability of production lines. In addition to the proven sensor technology, new areas of application such as condition-based maintenance or monitoring of consumables in plants are constantly opened up. In the future, too, ifm will remain a reliable and innovative partner for the steel industry.

ifm – close to you





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## The company in your vicinity.



### State-of-the-art communication.

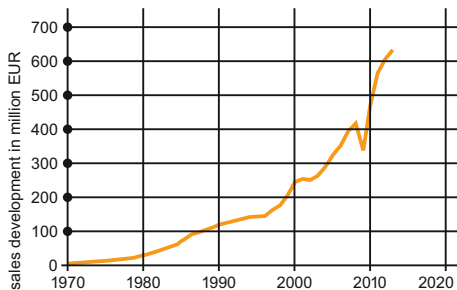
With the right address – [www.ifm.com](http://www.ifm.com) – only a mouse click separates you from the world of automation technology. See the power of our products in interactive representations. Gain an impression with 3-dimensional views of our units. Download CAD drawings for direct integration in your applications. Or order online in ifm's e-shop – fast, convenient and reliable.

### We are there for you.

Close contact with our customers is part of our success. Therefore we have consistently developed our sales network right from the start. Today the ifm group of companies is represented in more than 70 countries – close to you! With application advice and service at the heart of our operation. For the introduction of new products and technologies we support you with workshops and seminars in our training centres or in your plant.

### Security by success.

Since its foundation in 1969 ifm has constantly grown, now having more than 5200 employees worldwide, and achieved a turnover of more than EUR 663 million in 2014. This success gives you the security of having a reliable partner for the implementation of your automation projects. Comprehensive service and a warranty of 5 years on standard units are just two examples of this reliability.



Turnover development since 1970.



**Not only components.**

ifm stands for a large range of different sensors and systems for automation. Our range of more than 7,800 articles guarantees flexibility and compatibility. So there is always a reliable solution for your automation projects – from the individual sensor with practical accessories to the complete system.

**Availability guaranteed.**

Your deadlines matter to us. That is why we are constantly optimising our production processes in order to be able to quickly and flexibly produce large quantities at a constantly high quality – and to continue to shorten delivery times. Your order is dispatched via our centralised logistics centre reliably and on time.

**Quality as part of our philosophy.**

The quality standard of our products is an integral part of our company philosophy. And we guarantee it! So we provide you, the users, with a maximum degree of security: By means of our own production technology, ifm film technology, as well as by means of extensive quality assurance measures such as 100 % final testing. By quality we understand, for example, ecologically conscious production – Made in Germany!



*The development of innovative products is one of our core competences. From high-quality standard solutions to products specially tailored to the requirements of the individual industries – from mobile machines to the food industry.*

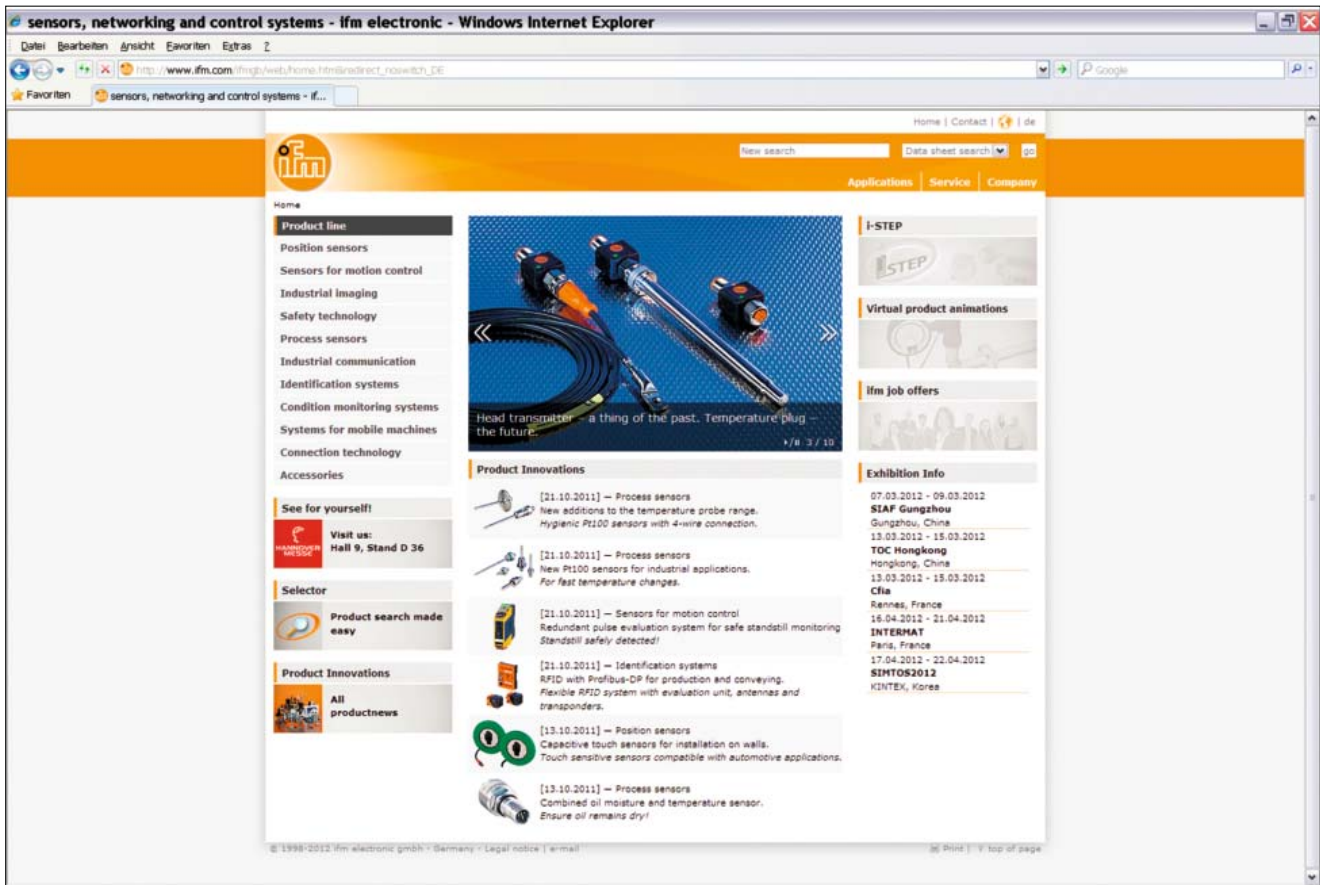


■ branch office  
 ▨ trade partner



# www.ifm.com

## Information around the clock and around the globe in 23 languages on the internet.



### • Information

- product innovations
- company news
- exhibition info
- locations
- jobs

### • Documentation

- data sheets
- operating instructions
- manuals
- approvals
- CAD data

### • Communication\*

- request for documents
- recall service
- live advice
- newsletter

### • Selection

- interactive product selection aids
- configuration tools
- data sheet direct

### • Animation

- virtual product animations
- flash movies (video sequences)

### • Application

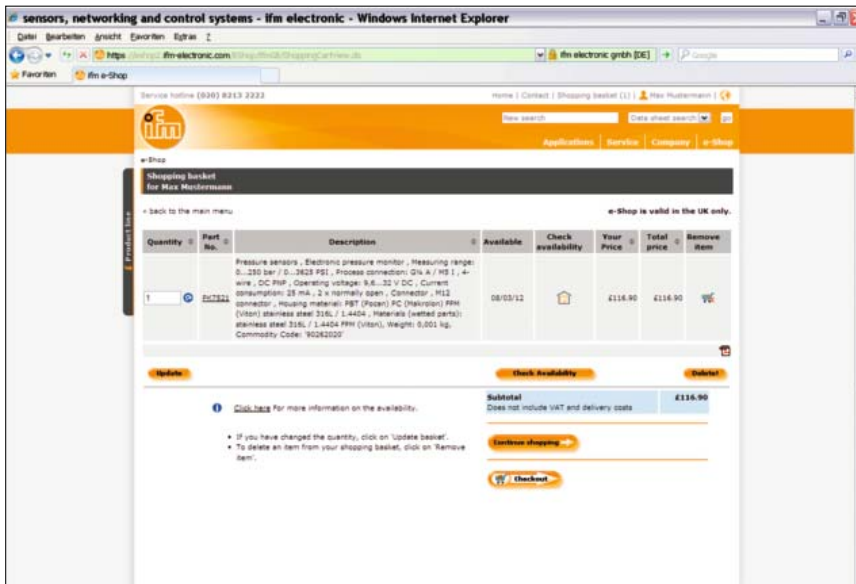
- applications
- product recommendations
- calculation aids

### • Transaction\*

- e-shop processing
- e-procurement catalogues

\*Some offered information is available country-specific

# Convenient order processing via the e-shop\*\* on the internet.



Secured authentication

Customer-related price indication

Real time availability check

Personal product favourites

Online parcel tracking

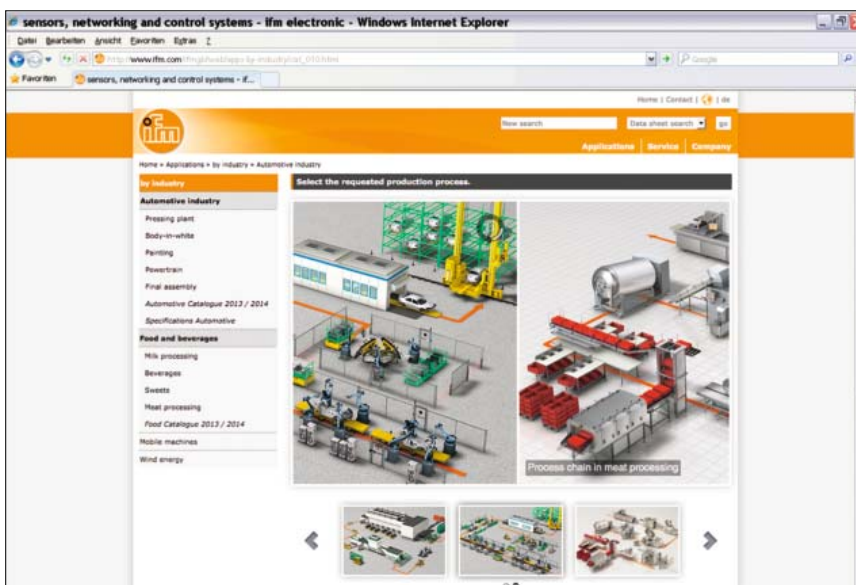
Individual order history

Convenient quick input form

Simple order processing

Management of shipping addresses

Confirmations by e-mail



ifm application database

ifm's automation technology is used to for applications in many different types of plant in almost all industries. Learn how ifm can improve your production.

Application examples can be found on our website at:

[www.ifm.com/gb/applications](http://www.ifm.com/gb/applications)

\*\* Already available in many countries.

3A



3A Sanitary Standards, Inc. (3-A SSI) is an independent, not-for-profit corporation dedicated to advancing hygienic equipment design for the food, beverage, and pharmaceutical industries.

AS-i



Actuator-Sensor Interface. Bus system for the first binary field level.

ATEX



Atmosphère Explosible. ATEX comprises the directives of the European Union in the field of explosion protection. On the one hand there is the 94/9/EC ATEX product directive and on the other hand the 1999/92/EC ATEX operation directive.

CCC



CCC (China Compulsory Certification) is a compulsory Chinese certification for certain products put on the market in China. Which products are concerned is specified in a catalogue created by the Chinese authorities.

cCSAus



Testing of a product by CSA according to the safety standards applicable in Canada and the USA.

CE



Conformité Européenne. By affixing the CE marking to a product, the manufacturer declares that it meets EU safety, health and environmental requirements.

cRUus



Testing of components by UL according to the safety standards applicable in Canada and the USA. Components can be used when the "condition of acceptability" is complied with for the final product.

CSA



Canadian Standards Association. A non-governmental Canadian organisation that sets standards and tests and certifies products for their reliability. By now it is active worldwide.

cULus



Testing of components by UL according to the safety standards applicable in Canada and the USA.

DIBt (WHG)



Deutsches Institut für Bautechnik (Federal Water Act). The Federal Water Act (WHG) is the essential part of the German law relating to water. It contains provisions for the protection and use of surface water and ground water and also regulations about the expansion of waters, water planning and flood protection.



DKD



The Deutscher Kalibrierdienst (DKD) is an association of calibration laboratories of industrial firms, research institutes, technical authorities, inspection and testing institutes. The DKD calibration certificates prove traceability to national standards as required in ISO 9000 and ISO / IEC 17025. They also serve as a metrological basis for the control of measurement and test equipment within the framework of quality management.

e1



Approval by the Kraftfahrt-Bundesamt (German Federal Motor Transport Authority). The e1 type approval by the German Federal Motor Transport Authority certifies that the units comply with the automotive standards. Units with this marking are allowed to be mounted on vehicles without expiry of their operating permit.

EG 1935/2004

The Regulation EC 1935/2004 has been taken into account for process sensors from ifm which are intended for use in contact with food. You can obtain a list of the corresponding products and detailed information on request.

EHEDG



European Hygienic Engineering & Design Group. European supervisory authority for food and drugs. This authority grants approvals for products and materials used in the food and pharmaceutical industries.

FDA



Food and Drug Administration. US-American supervisory authority for food and drugs. This authority grants approvals for products and materials used in the food and pharmaceutical industries.

FM



Factory Mutual Research. A US-based insurance company that specializes in loss prevention services in the property insurance market sector. They provide material research, material testing and certifications in the field of fire and explosion protection.

PROFIBUS



Process Field Bus. Fieldbus system for important data quantities. It is available in several versions such as Profibus FMS, DP or PA. Profibus DP can be used over longer distances, e.g. as fieldbus for AS-i.

TÜV

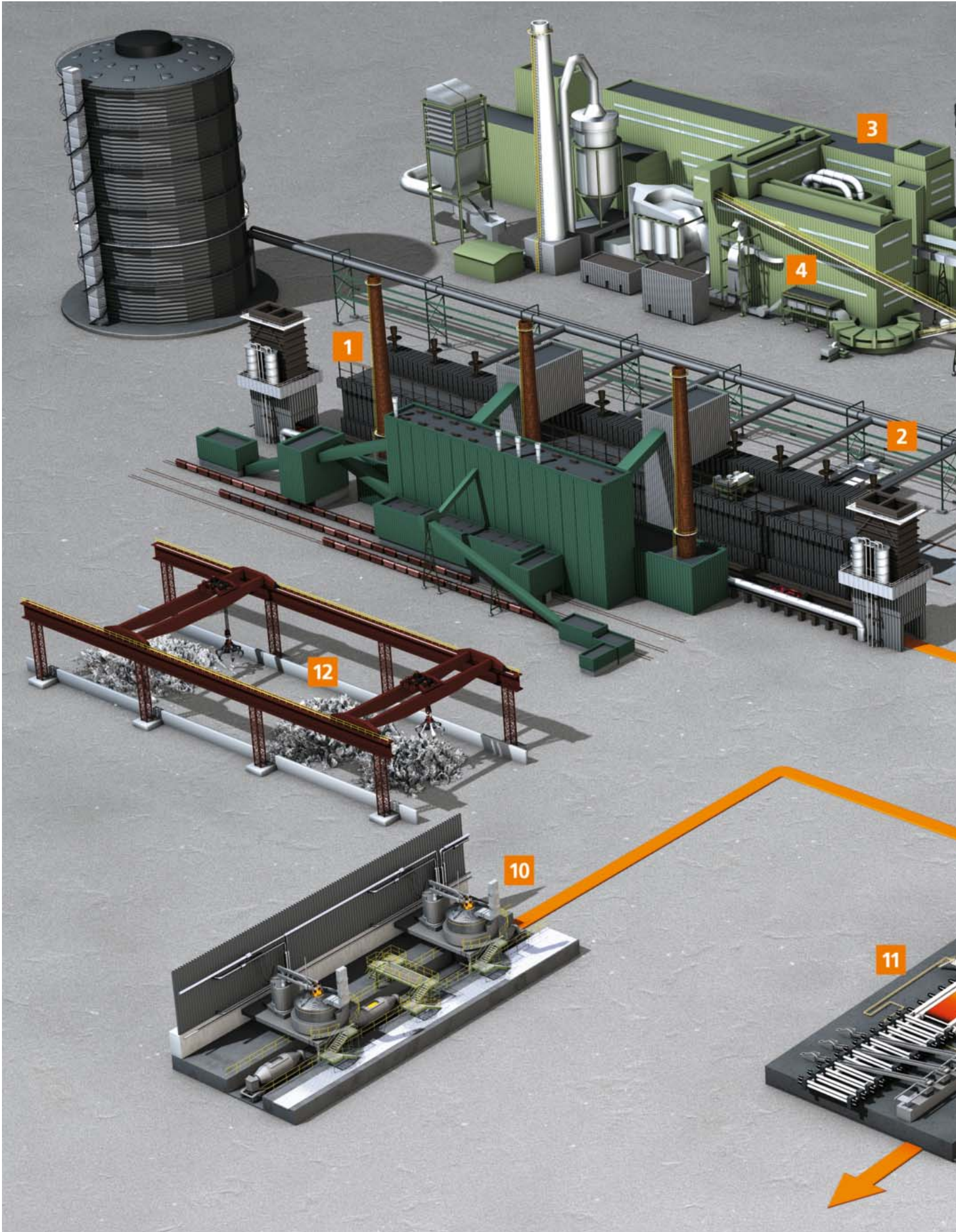


Technischer Überwachungs Verein (technical inspection association). The German TÜV is a private-sector body carrying out technical safety tests that are stipulated by government laws or instructions.

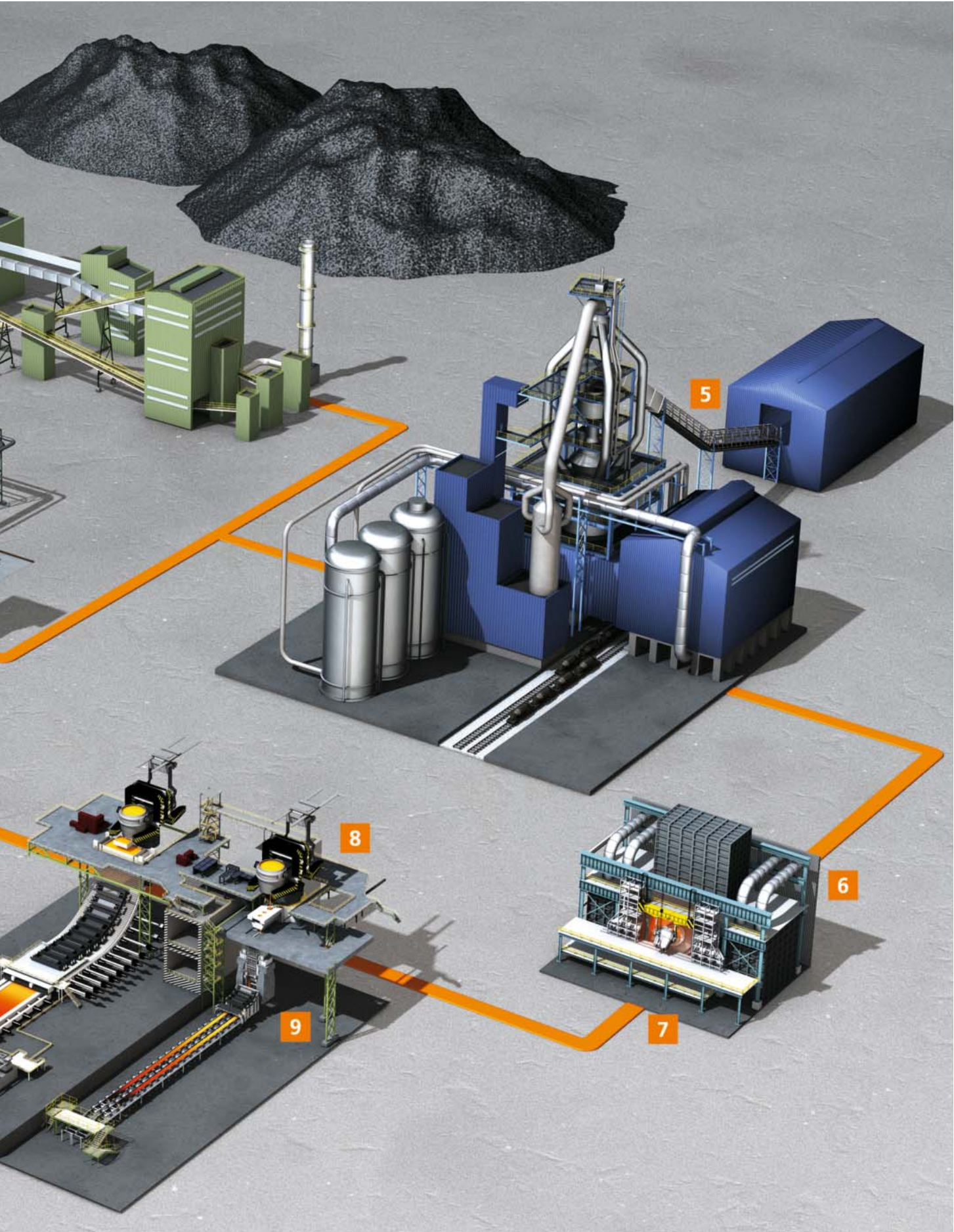
UL



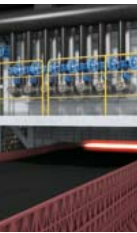











Underwriters Laboratories. An organisation founded in the USA for testing and certifying products and their safety.







Machine	Application	Product group	From page
<b>1 Coke plant</b>			
	Position detection of a furnace door	Cylinder sensors	113
	Position detection of a filling machine	Inductive sensors	77
	Monitoring of conveyors	Pulse evaluation systems	147
<b>2 Hydraulic power pack of a pusher</b>			
	Pressure monitoring in hydraulic power packs	Pressure sensors	157
	Level monitoring in hydraulic power packs	Level sensors	187
	Temperature measurement in hydraulic power packs	Temperature sensors	195
	Vibration monitoring	Vibration monitoring systems	237
<b>3 Sintering plant</b>			
	Gas supply	Pressure sensors	157
	Tracking of material	Temperature sensors	195
	Hatch monitoring at silos	Inductive sensors	77
	Pressure monitoring at the air inlet	Pressure sensors	157
<b>4 Conveying systems</b>			
	Decentralised speed monitoring	Pulse evaluation systems	147
	Safety switches in AS-i Safety at Work	AS-Interface Safety at Work	229
	Integration of mechanical switches into AS-i systems	AS-Interface Safety at Work	229
<b>5 Cooling water supply at a blast furnace</b>			
	Pump monitoring	Pressure sensors	157
	Monitoring of the cooling circuits	Flow sensors / flow meters	175
	Water pressure monitoring	Pressure sensors	157
	Monitoring of cooling water	Temperature sensors	195
<b>6 Converter supply</b>			
	Pressure monitoring in hydraulic power packs	Pressure sensors	157
	Temperature measurement in hydraulic power packs	Temperature sensors	195
	Level monitoring in hydraulic power packs	Level sensors	187
	Vibration monitoring	Vibration monitoring systems	237

Machine	Application	Product group	From page
<b>7 Material supply at a converter</b>			
	Slide monitoring at silos	Cylinder sensors	113
	Hatch monitoring at silos	Inductive sensors	77
	Level monitoring at silos	Capacitive sensors	105
<b>8 Central compressed air supply</b>			
	Pressure monitoring at a compressed air reservoir	Pressure sensors	157
	Energy efficiency measurement of the compressed air	Flow sensors / flow meters	175
	Monitoring at an air dryer	Level sensors	187
	Pressure monitoring at the distributor	Pressure sensors	157
<b>9 Continuous casting plant</b>			
	Slag detection at a shroud tube manipulator	Vibration monitoring systems	237
	Monitoring of the cooling circuits	Flow sensors / flow meters	175
	Tracking of material	Temperature sensors	195
	Vibration monitoring	Vibration monitoring systems	237
<b>10 Cooling at an electric arc furnace</b>			
	Volumetric flow monitoring in cooling circuits	Flow sensors / flow meters	175
	Temperature monitoring in cooling circuits	Temperature sensors	195
	Pressure measurement on pumps	Pressure sensors	157
<b>11 Flame cutters</b>			
	Position detection	Inductive sensors	77
	Gas pressure monitoring	Pressure sensors	157
	Gas supply	Inductive sensors	77
	Consumption measurement of technical gases	Flow sensors / flow meters	175
<b>12 Crane installations</b>			
	Collision protection	Inductive sensors	77
	Reliable area surveillance	Inductive sensors	77
	End position monitoring	Inductive sensors	77
	Bearing monitoring	Vibration monitoring systems	237



## Modern production plants in steelmaking ensure economic success.



Today's steel industry with its modern blast furnaces for pig iron production and the different converter methods can make products with a consistently high quality at low cost. Because there is a high degree of plant automation the reliability of the components is a critical factor for the economic efficiency of the companies. Here, sensors play a special role. Whereas in the past they were only used for process control they today provide additional information about the plant condition. Required maintenance and repair can be planned and prepared precisely. ifm sensors with diagnostic functions are used for condition-based maintenance and contribute to cost reduction. Sensors from ifm help increase the reliability and uptime of the installations.


## Hydraulic power pack in coke machines



### Monitoring of the system pressure with a multi-colour display

Thanks to the multi-colour display of the electronic pressure sensor the user can quickly and easily see whether the hydraulic power pack generates the required pressure.

#### Pressure sensors - further products from page 157


Type	Process connection	Display	Measuring range	Poverload	Pbursting	U <sub>b</sub> DC	Order no.
	G ¼ female	Display unit	0...25 [bar]	max. [bar]	min. [bar]	18...30 [V]	PN7093




### Monitoring of power packs

LK and TR series sensors detect the level and the temperature in hydraulic power packs.

#### LK level sensors - further products from page 187

Type	Probe length	Active zone	Inactive zone	U <sub>b</sub>	Medium temperature water	Medium temperature oil	I <sub>load</sub>	Order no.
	[mm]	[mm]	[mm]	[V]	[°C]	[°C]	[mA]	
	472	390	53 / 30	18...30	0...35 (LK1023 + E43101: 0...60)	0...70	200	LK1023

#### Evaluation units for temperature sensors - further products from page 195

Type	Measuring range	Process connection	Display	U <sub>b</sub>	Current consumption	I <sub>load</sub>	Order no.
	[°C]		LED	[V]	[mA]	[mA]	
	-40...300	G ½ male	Display unit	18...32	50	250	TR7432


**Oil cooler in a coke machine**



**Fan monitoring on oil coolers**

The oil is cooled to a defined value. The VKV vibration monitor to DIN ISO 10816 detects any damage to the rotating parts in the fan system.

Vibration sensor for bearing monitoring · further products from page 237

Type	Description	Order no.
	Vibration monitor · Connection via M12 connector · Vibration monitor to DIN ISO 10816 · Measuring range RMS: 0...25 mm/s · Switching outputs: normally closed and analogue 4...20 mA · Housing materials: PBT / PC / FPM / stainless steel 316L / 1.4404	<b>VKV021</b>


**Degassing dampers of the coke oven batteries**



**Position detection of a degassing damper**

During the coking process when coke is produced from bituminous coal the degassing damper is always in a defined condition. Magnetic sensors are used for damper monitoring.

Magnetic sensors to determine the position on cylinders · further products from page 111

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f [Hz]	I <sub>load</sub> [mA]	Order no.
	M18 / L = 60	70	High-grade st. steel	10...30	IP 65 / IP 67	5000	200	<b>MGS204</b>


## Gas supply in a sintering plant



### Gas supply in the sintering process

The sinter material is heated during the sintering process and sucked onto a grate using negative pressure. To ensure a steady feed of the tanks the gas pressure is monitored using electronic pressure sensors.

#### Pressure sensors for gas monitoring · further products from page 157

Type	Process connection	Display	Measuring range	P <sub>overload</sub>	P <sub>bursting</sub>	U <sub>b</sub> DC	Order no.
		LED	[bar]	max. [bar]	min. [bar]	[V]	
	G ¼ female	Display unit	-1...10	75	150	18...32	PN2024


## Decentralised monitoring of conveyors



### Protection of conveyor belts

The safety relay detects via sensors whether the conveyor belt is centred and no e-stop function was triggered.

#### Evaluation relay for safety technology · further products from page 155

Type	U <sub>b</sub>	In-puts	Input function	Setting range	Setting range	Out-puts analogue	Out-puts relays	Out-puts transist.	Order no.
	[V]			[puls. / min.]	[Hz]				
	24 DC	1	PNP	–	0.2 / 0.5 / 1.0 / 2.0	–	2	1	DA1015
	24 DC	1	PNP	–	0.2 / 0.5 / 1.0 / 2.0	–	2	1	DA1025



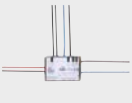
## Safety switches in AS-i Safety at Work



### Integration of safety switches into AS-i Safety at Work by means of PCBs

Thanks to safe AS-i PCBs conventional rope switches can be integrated into AS-i Safety networks. Thus, the functionality of the switches combines with the easy installation of AS-i.

AS-i safety PCB · further products from page 229

Type	Inputs / outputs	Description	Order no.
	2 safe inputs / 1 unsafe LED output	AS-i safety PCB · Complies with the requirements: · IEC 61508: SIL 3	<b>E70155</b>


## Integration of mechanical switches into AS-i systems



### Integration of belt drift switches into AS-i networks using PCBs

Thanks to AS-i PCBs belt drift switches on conveyor belts can be integrated into AS-i networks. Thus, the functionality of the switches combines with the easy installation of AS-i.

AS-i PCB · further products from page 229

Type	Inputs / outputs	Description	Order no.
	4 inputs / 4 outputs	Active AS-i module · AS-i slave with extended addressing mode · Only for operation with AS-i masters with the profile M4 · 12 x 0.2 m · housing: PC potted	<b>AC2750</b>




## Pump monitoring at a blast furnace



### Pump protection on heavy duty pumps

With regulated heavy duty pumps cavitation may occur if the pump duty is too high. Special pressure sensors detect the cavitation and down-regulate the pump duty.

Pressure sensors for monitoring the pump motor · further products from page 157

Type	Process connection	Display	Measuring range	P <sub>overload</sub>	P <sub>bursting</sub>	U <sub>b</sub> DC	Order no.
		LED	[bar]	max. [bar]	min. [bar]	[V]	
	Aseptoflex	Display unit	-1...25	100	350	18...32	PIM093


## Monitoring the cooling circuits at a blast furnace



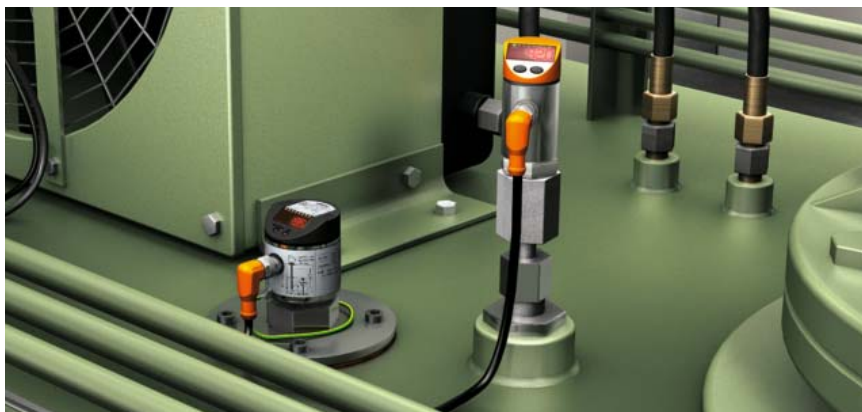
### Safe operation in blast furnaces

Blast furnaces have several cooling circuits. In order to ensure a reliable operation of the blast furnaces these cooling circuits are monitored using electronic flow sensors.

Flow sensors for monitoring cooling circuits · further products from page 175

Type	Setting range liquids / gases	Material sensor tip	Medium temperature	Pressure rating	Response time	U <sub>b</sub>	Order no.
	[cm/s]		[°C]	[bar]	[s]	[V]	
	3...300 / 200...3000	stainless steel 316L / 1.4404	-25...80	30	1...10	19...36	SI5000


## Hydraulic power packs in secondary metallurgy




## Hydraulic power packs in steelworks

LK and TR series sensors detect the level and the temperature in hydraulic power packs.

## LK level sensors · further products from page 187

Type	Probe length [mm]	Active zone [mm]	Inactive zone [mm]	U <sub>b</sub> [V]	Medium temperature water [°C] (LK1023 + E43101: 0...60)	Medium temperature oil [°C]	I <sub>load</sub> [mA]	Order no.
	472	390	53 / 30	18...30	0...35 (LK1023 + E43101: 0...60)	0...70	200	LK1023

## Evaluation units for temperature sensors · further products from page 195

Type	Measuring range [°C]	Process connection	Display LED	U <sub>b</sub> [V]	Current consumption [mA]	I <sub>load</sub> [mA]	Order no.
	-40...300	G ½ male	Display unit	18...32	50	250	TR7432


## Hatch monitoring at silos



## Hatch control in steel production

In secondary metallurgy metals such as nickel, cobalt or molybdenum are added to the primary steel. This material comes onto the conveyor belts through hatches. Inductive sensors monitor these hatches.

## Inductive sensors for position control · further products from page 77

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f [Hz]	I <sub>load</sub> [mA]	Order no.
	M18 / L = 46	8 f	Brass	10...30	IP 67	300	100	IG5200

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## Level monitoring at silos



### Level detection at a silo

Capacitive sensors on the silos detect whether sufficient material is available for the metallurgical processes.

Capacitive sensors for level detection · further products from page 105

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f [Hz]	I <sub>load</sub> [mA]	Order no.
	M18 / L = 110	8 nf	PBT	10...36	IP 65	50	250	KG5041

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## Slide monitoring at silos



### Pneumatic slides

The silos can be completely closed using pneumatically actuated slides. The slides are monitored using magnetic sensors from ifm.

Cylinder sensors for monitoring hydraulic and pneumatic cylinders · further products from page 111

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f [Hz]	I <sub>load</sub> [mA]	Order no.
	25 x 5 x 6.5	f	PA (polyamide)	10...30	IP 65 / IP 67	10000	100	MK5101

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## Slag detection at a shroud tube manipulator



### Vibration analysis at a shroud tube manipulator

Only molten steel is allowed to flow through the shroud tube into the ladle. Thanks to vibration analysis at the shroud tube manipulator it can be detected whether slag has already flown into the tube of the manipulator.

Vibration monitoring systems · further products from page 237

Type	Description	Order no.
	Accelerometer · for connection to external diagnostic electronics type VSE · Connector · housing: stainless steel 316L / 1.4404	VSA101


## Central compressed air supply



### Pressure monitoring at a pressure accumulator

In the central compressed air monitoring system compressed air is temporarily stored in a tank. Electronic pressure sensors monitor the pressure which can be read out easily thanks to the analogue display.

Pressure sensors for monitoring the system pressure · further products from page 157

Type	Process connection	Display	Measuring range	P <sub>overload</sub>	P <sub>bursting</sub>	U <sub>b</sub> DC	Order no.
		LED	[bar]	max. [bar]	min. [bar]	[V]	
	G ½	Display unit	-1...25	100	300	18...32	PG2453





## Energy efficiency with compressed air



### Detection of compressed air in main supply lines

Here, compressed air meters from ifm detect consumption in the pressure systems. Leakage can also be detected.

Compressed air meters for consumption measurement and leakage detection · further products from page 175

Type	Process connection	Setting range [Nm <sup>3</sup> /h]	Pressure rating [bar]	Response time [s]	U <sub>b</sub> [V]	Order no.
	R2 (DN50)	5...700	16	< 0.1	18...30	SD2000
	R1½ (DN40)	3.5...410.0	16	< 0.1	18...30	SD9000


## Monitoring at an air dryer



### Dry compressed air for pneumatic consumers

Humidity in compressed air can damage pneumatic consumers in the long run. Therefore compressed air is dried after it has been generated. ifm's humidity sensor is used to monitor the relative humidity of compressed air.

Oil humidity sensor · further products from page 187

Type	Process connection	Pressure rating [bar]	Protection	Medium temperature oil [°C]	Ambient temperature [°C]	Order no.
	G ¾	10	IP 67	-20...100	-20...85	LDH100



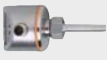
## Flow rate in cooling circuits at an electric arc furnace



## Monitoring of cooling circuits for flow rate at an electric arc furnace

Electric furnaces have cooling circuits in the outer walls and in the lid. In order to ensure a reliable operation of the blast furnaces these cooling circuits are monitored using electronic flow sensors.

## Flow sensors for monitoring cooling circuits - further products from page 175

Type	Setting range liquids / gases [cm/s]	Material sensor tip	Medium temperature [°C]	Pressure rating [bar]	Response time [s]	U <sub>b</sub> [V]	Order no.
	3...300 / 200...3000	stainless steel 316L / 1.4404	-25...80	30	1...10	19...36	SI5000


## Temperature in cooling circuits at an electric arc furnace




## Monitoring of cooling circuits for temperature at an electric arc furnace

To ensure cooling of the electric furnace the temperature of the water is monitored in the various cooling circuits.

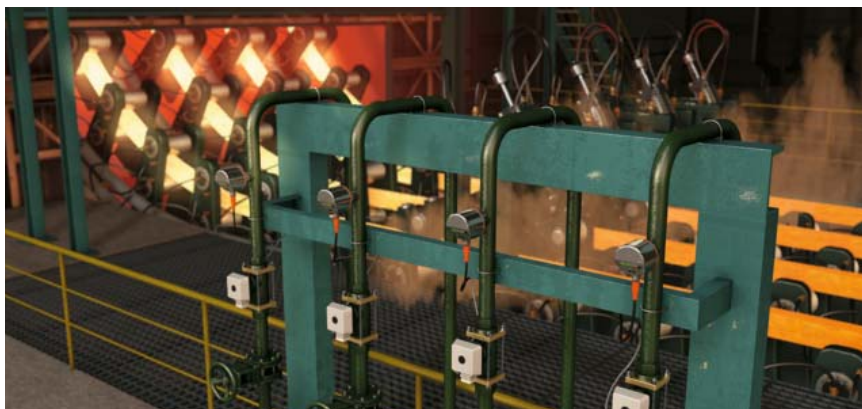
## Evaluation units for temperature sensors - further products from page 195

Type	Measuring range [°C]	Process connection	Display	U <sub>b</sub> [V]	Current consumption [mA]	I <sub>load</sub> [mA]	Order no.
	-40...300	G ½ male	LED	18...32	50	250	TR2432

## Evaluation units for temperature sensors - further products from page 195

Type	Measuring range [°C]	Diameter [mm]	Installation length [mm]	Sensor element	Dynamic response T05 / T09 [s]	Order no.
	-40...150	10	160	1 x Pt 1000	1 / 3	TT1050


## Cooling in continuous casting plants



### Spray cooling in continuous casting plants

After the steel has been poured into the mould in the continuous casting plant it must be cooled. This is done by means of an air / water mixture. Flow sensors monitor the supplied quantity of water.

Flow sensors · further products from page 175

Type	Setting range liquids / gases [cm/s]	Material sensor tip	Medium temperature [°C]	Pressure rating [bar]	Response time [s]	U <sub>b</sub> [V]	Order no.
	3...300 / 200...3000	3...100 / 200...800	-25...80	300	1...2 / 1...10	18...36	SI5010

## Positioning at a flame cutter



### High-temperature applications up to 180 °C

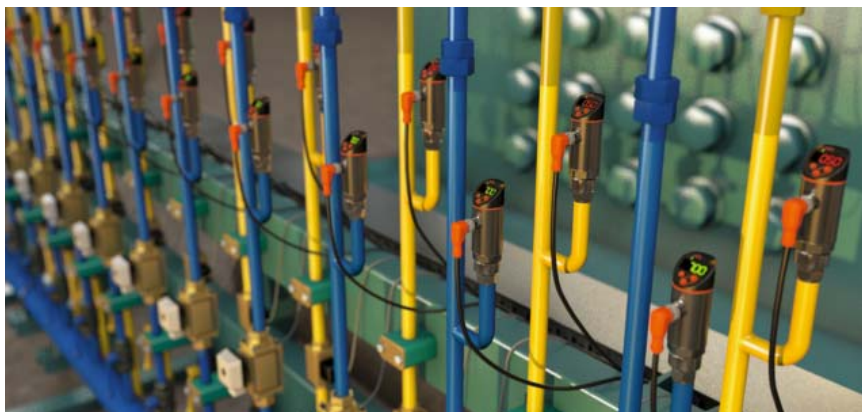
At the end of the process the slabs or billets cast in the continuous casting plant are cut to the requested length using a flame cutter. Positioning is monitored using inductive sensors.

Inductive sensors for position feedback · further products from page 77

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f [Hz]	I <sub>load</sub> [mA]	Order no.
	M18 / L = 70	5 f	stainless steel	10...35	IP 65	400	150	IG6614

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## Gas pressure monitoring in flame cutters



### Industrial gas monitoring

At the end of the continuous casting plant the flame cutters are supplied with natural gas and oxygen. To ensure process reliability of the installation the supply of the industrial gases is monitored using electronic pressure sensors.

Pressure sensors for gas monitoring · further products from page 157

Type	Process connection	Display	Measuring range	P <sub>overload</sub>	P <sub>bursting</sub>	U <sub>b</sub> DC	Order no.
		LED	[bar]	max. [bar]	min. [bar]	[V]	
	G ¼ female	Switching status	0...10	50	150	18...30	PN7024


## Gas supply in flame cutters



### Monitoring of valve actuators


The supply of the flame cutters with industrial gases can be interrupted by means of valve actuators. This is, for example, necessary during maintenance. These actuators are monitored using inductive dual sensors.

Inductive dual sensors for position feedback on pneumatic valve actuators · further products from page 215

Type	Dimensions	Sensing range	Material	U <sub>b</sub>	Protection	f AC / DC	I <sub>load</sub> AC / DC	Order no.
	[mm]	[mm]		[V]		[Hz]	[mA]	
	40 x 26 x 26	4 nf	PBT	10...36	IP 67	1300	250	IN5225

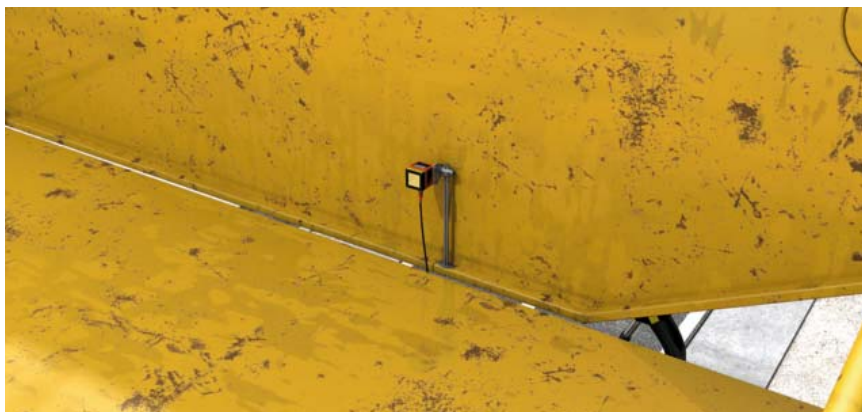
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Accessories · further products from page 255

Type	Description	Order no.
	Target puck · Ø 102 mm · Housing materials: Target puck: PA 6 / screws: V2A	E17328




## Collision avoidance in crane installations




### Several cranes on a crane bridge

Two or more cranes on a crane bridge pose the risk of collision. A laser distance sensor is used to measure the distance between the cranes. If the distance is too short, the crane travel is stopped.

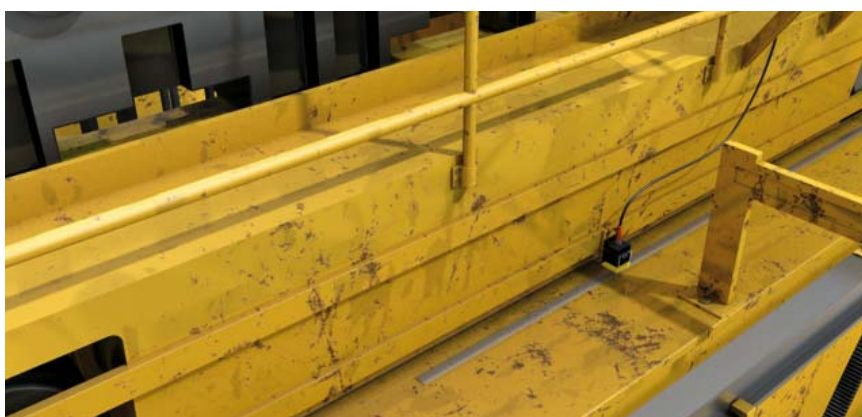
### PMDLine photoelectric sensors with time of flight measurement · further products from page 131

Type	Operating principle	Range	Sampling rate [Hz]	Spot Ø at max. range [mm]	U <sub>b</sub> [V]	Order no.
	Photoelectric distance sensor	1...100 m	1...25	< 200 x 200	18...30	<b>O1D209</b>

### Accessories · further products from page 255

Type	Description	Order no.
	Prismatic reflector · 226 x 262 mm · rectangular · Housing materials: plastics	<b>E21159</b>


## Reliable area monitoring at crane installations



### Limitation of the trolley travel on crane installations

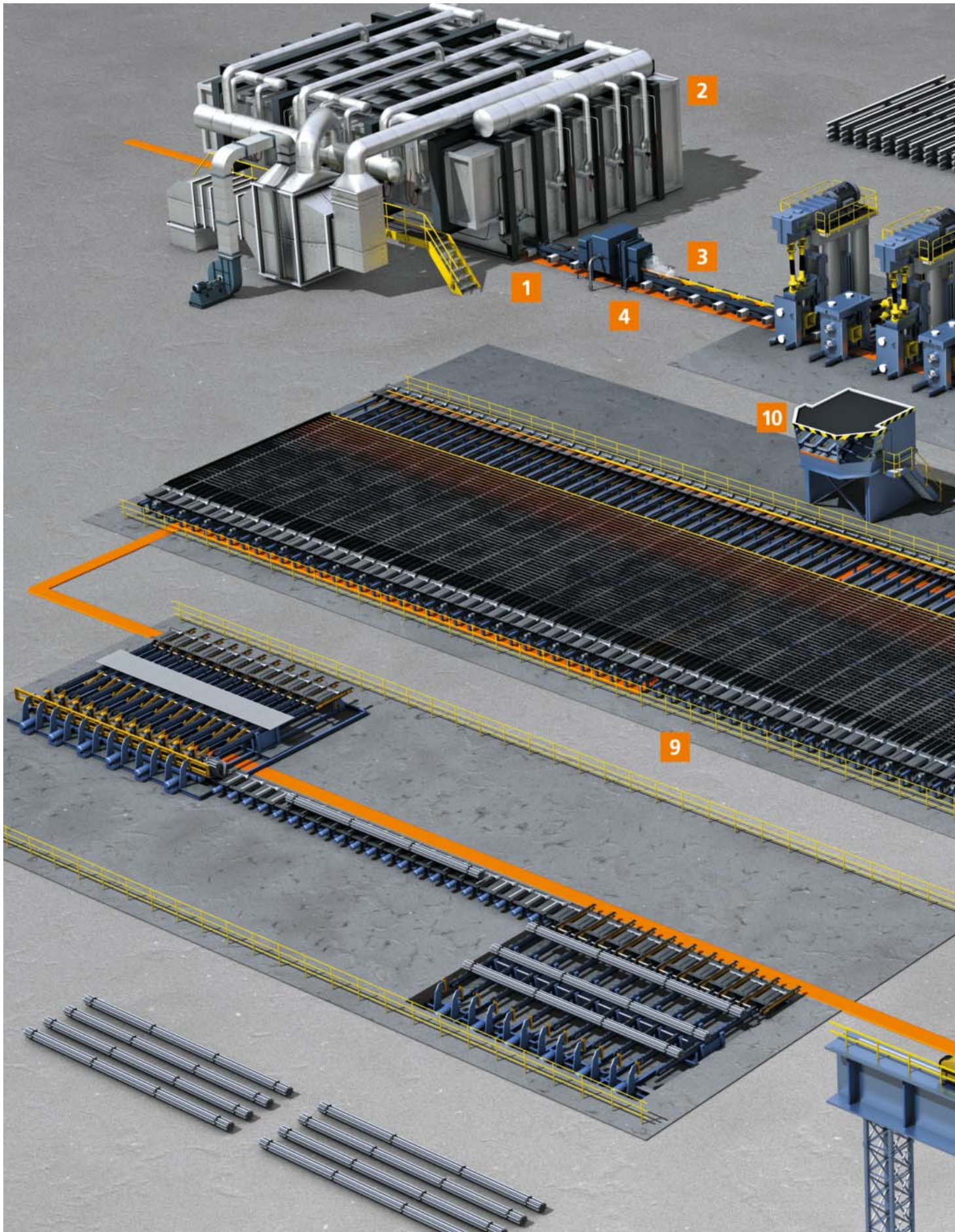
By means of a fail-safe inductive sensor and a metal rail the trolley travel of cranes can be limited.

### Fail-safe inductive sensors · further products from page 151

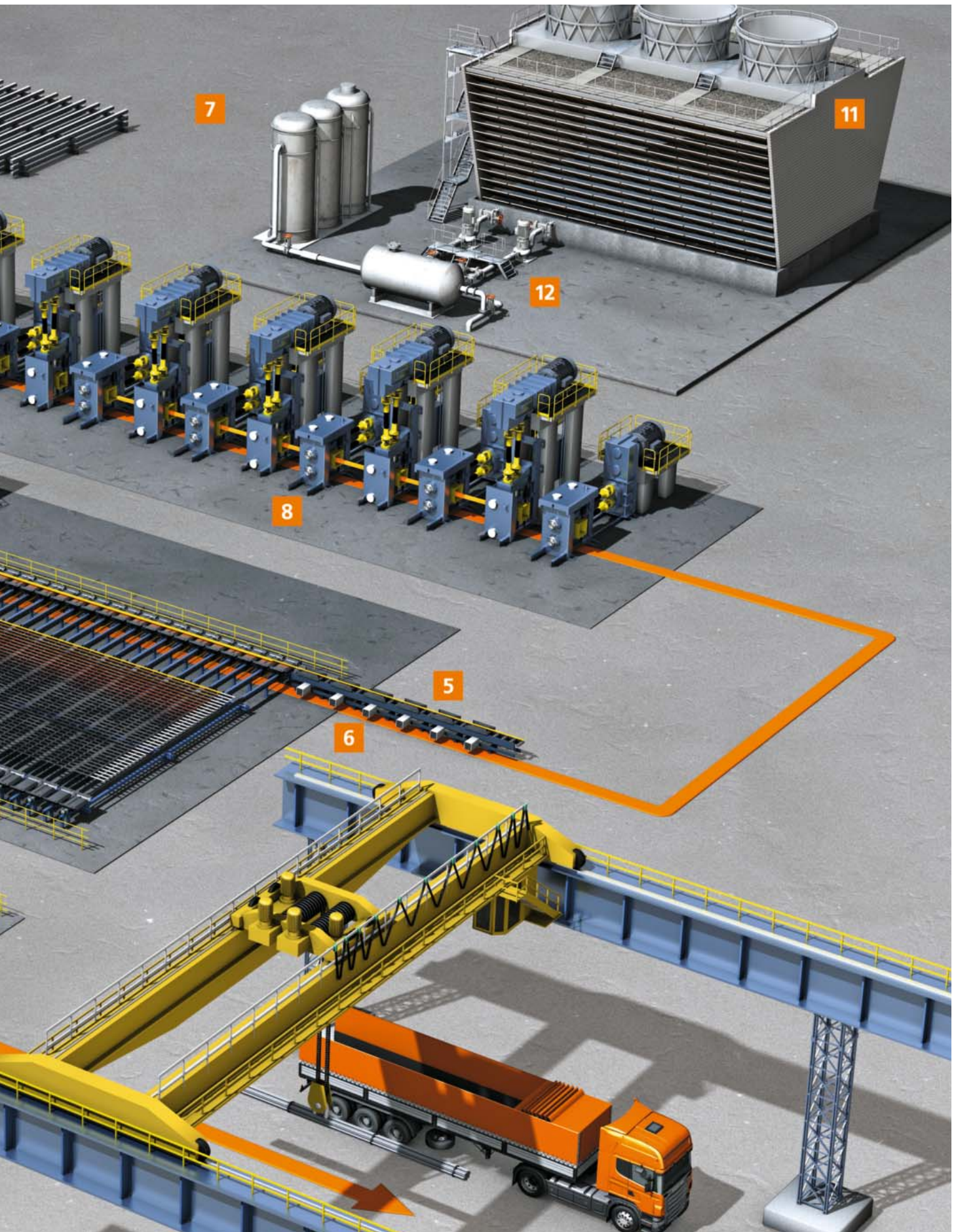
Type	Length [mm]	Enable zone [mm]	Housing material	U <sub>b</sub> DC [V]	Protection	Response time in case of a safety request / enable time [ms]	Order no.
	66	10...15 nf	PPE	24	IP 65 / IP 67	≤ 50 / ≤ 200	<b>GM701S</b>

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Machine	Application	Product group	From page
<b>1 Positioning on the heating furnace</b>			
	Monitoring the material at the inlet side of the furnace	Laser sensors / distance measurement sensors	131
	Monitoring the material at the outlet side of the furnace	Temperature sensors	195
	Position detection of a furnace door	Inductive sensors	77
<b>2 Cooling circuits on furnaces</b>			
	Flow monitoring	Flow sensors / flow meters	175
	Temperature monitoring	Temperature sensors	195
	Pressure monitoring	Pressure sensors	157
	Connection of sensors	Sockets	247
<b>3 High-pressure pump in descaling lines</b>			
	Pressure monitoring	Pressure sensors	157
	Position detection of shut-off valves	Inductive sensors	77
	Temperature monitoring	Temperature sensors	195
	Bearing monitoring	Vibration monitoring systems	237
<b>4 Tracking of material in descaling lines</b>			
	Position detection of nozzles	Laser sensors / distance measurement sensors	131
	Monitoring of material	Temperature sensors	195
	Position detection on doors	Inductive sensors	77
	Level monitoring	Level sensors	187
<b>5 Decentralised monitoring in large installations</b>			
	Voltage supply in the field	Power supplies	263
	Speed measurement	Pulse evaluation systems	147
	Vibration monitoring	Vibration monitoring systems	237
	Pulse generator	Inductive sensors	77
<b>6 Speed monitoring at conveyors</b>			
	Rotational speed monitoring	Pulse evaluation systems	147
	Rotational speed monitoring	Encoders	143
	Connection of sensors	Sockets	247



Machine	Application	Product group	From page
<b>7 Compressed air supply</b>			
	Pressure monitoring	Pressure sensors	157
	Measurement of compressed air consumption	Flow sensors / flow meters	175
	Monitoring of remaining humidity	Systems for oil quality monitoring	245
	Pressure indication in the installation	Pressure sensors	157
<b>8 Drive monitoring on the rollers</b>			
	Temperature monitoring	Temperature sensors	195
	Condition monitoring of drives	Vibration monitoring systems	237
	Rotational speed monitoring	Pulse evaluation systems	147
<b>9 Cooling bed</b>			
	Tracking of material	Inductive sensors	77
	Monitoring of material	Laser sensors / distance measurement sensors	131
	Protection of sensors	Sockets	247
	Condition monitoring of drives	Vibration monitoring systems	237
<b>10 Hydraulic aggregates</b>			
	Pressure monitoring	Pressure sensors	157
	Temperature monitoring	Temperature sensors	195
	Level monitoring	Level sensors	187
	Oil condition monitoring	Systems for oil quality monitoring	245
<b>11 Fans in cooling towers</b>			
	Vibration monitoring	Vibration monitoring systems	237
	Temperature monitoring	Temperature sensors	195
	Rotational speed monitoring	Pulse evaluation systems	147
<b>12 Cooling towers</b>			
	Pressure monitoring	Pressure sensors	157
	Flow monitoring	Flow sensors / flow meters	175
	Level monitoring	Level sensors	187
	Vibration monitoring	Vibration monitoring systems	237

## ifm sensors carry out their tasks even in tough environments



In a hot rolling mill slabs, blooms or billets produced in steelworks are processed further. To do so, they are heated up to a temperature above the recrystallisation temperature. Depending on the starting material, long steel products (such as wires, rails or beams) or wide flat steel products (e.g. sheet metal) are made in hot rolling mills. These semi-finished products are then processed further in subsequent processes. As a result of the high temperatures and harsh environmental conditions the sensors used must meet higher demands than in other industries. Robust sensors with extended temperature range from ifm reliably detect the relevant parameters even in these harsher conditions. Here, ifm sensors help to ensure high plant uptime in the event of extreme environmental influences.




## Monitoring the material at the inlet side of the furnace




## Detecting the position of the billets at the inlet side of the furnace

The door at the inlet side of the furnace is closed when the billet is completely inside the furnace. The position of the billet is detected using a laser distance measurement sensor.

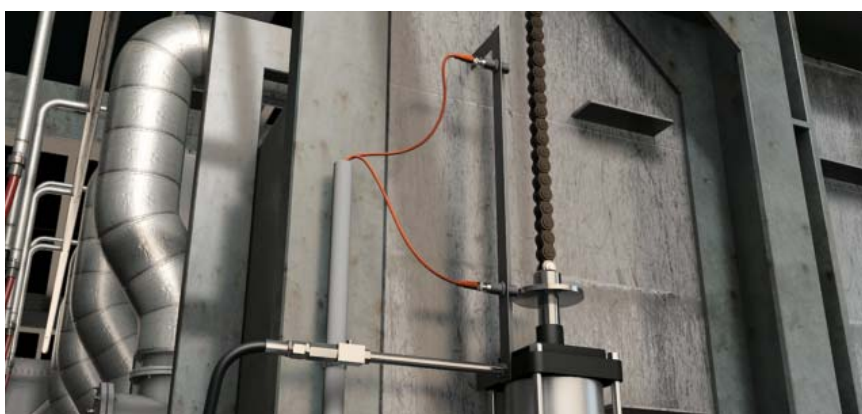
## PMDLine photoelectric sensors with time of flight measurement · further products from page 131

Type	Operating principle	Range	Sampling rate [Hz]	Spot Ø at max. range [mm]	U <sub>b</sub> [V]	Order no.
	Photoelectric distance sensor	0.2...10 m	1...50	< 15 x 15	18...30	<b>O1D100</b>

## Protective housing for distance measurement sensors · further products from page 131

Type	Description	Order no.
	Cooling box · Protective housing with an active cooling system for the O1D design · for type O1D · Housing materials: housing: aluminium transparent anodised / cover: aluminium black anodised / bezel: aluminium black anodised / window: float glass / cable gland: Brass nickel-plated / nozzle: Brass nickel-plated / sealing: FPM	<b>E21248</b>

## Monitoring of the furnace door



## Monitoring the door at the outlet side of the furnace

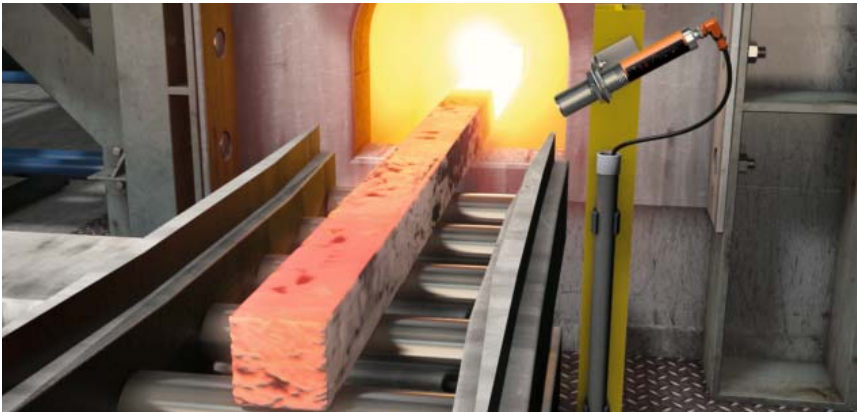
Via a cylinder the door is moved at the outlet side of the furnace. This happens indirectly via a chain. The position of the door is monitored using high-temperature inductive sensors.

## Inductive sensors for determining position · further products from page 77

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f [Hz]	I <sub>load</sub> [mA]	Order no.
	M18 / L = 70	5 f	stainless steel	10...35	IP 65	400	150	<b>IG6614</b>

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Monitoring the material at the outlet side of the furnace



**Detecting hot billets at the outlet side of the furnace**

After a hot billet has moved out of the furnace the door must be closed again. An infrared sensor detects that the billet is no longer in the door area.

Infrared temperature sensors for the detection of material · further products from page 195

Type	Temperature range [°C]	Wave length range [µm]	Material lens	Response time [ms]	Order no.
	250...1250	1.0...1.7	tempered optical glass	≤ 2	TW7001


Measurement of the cooling water volume




**Monitoring of the cooling circuits**

Cooling circuits must be operated with a defined quantity of water. This is monitored using flow sensors. They ensure that the quantity is not too small.

Flow sensors for monitoring cooling circuits · further products from page 175

Type	Setting range liquids / gases [cm/s]	Material sensor tip	Medium temperature [°C]	Pressure rating [bar]	Response time [s]	U <sub>b</sub> [V]	Order no.
	8...600	stainless steel 316L / 1.4404	-10...70	16	< 0.35	18...32	SM2000

Connectors · further products from page 247

Type	Description	Order no.
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · For welding applications · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVW002


## Pressure monitoring of the lubrication



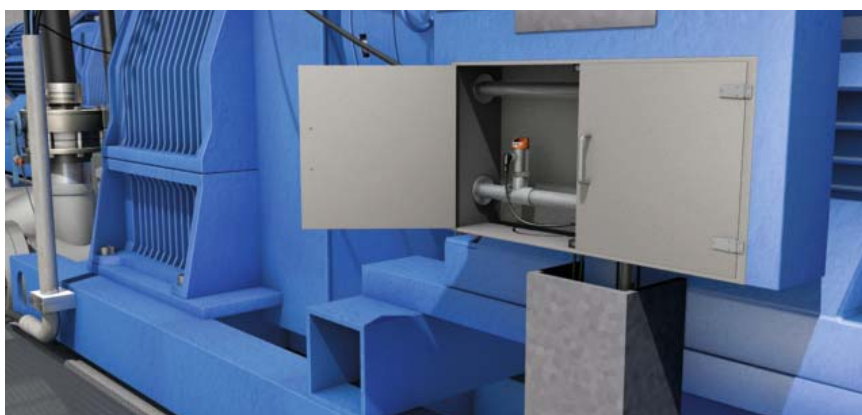
### Pressure monitoring at the lubrication of the high-pressure pumps

The high-pressure pumps of the descaling lines are continuously lubricated by means of a separate oil circuit. The pressure in this circuit is continuously monitored.

#### Pressure monitoring in descaling lines · further products from page 157

Type	Process connection	Display	Measuring range	P <sub>overload</sub>	P <sub>bursting</sub>	U <sub>b</sub> DC	Order no.
		LED	[bar]	max. [bar]	min. [bar]	[V]	
	G ¼ female	Display unit	0...25	150	350	18...30	PN7093


## Temperature monitoring of the lubrication




### Temperature monitoring at the lubrication of the high-pressure pumps

The lubricity of oils depends on the oil temperature. The temperature of the oil circuit is monitored using temperature sensors (TS) and displayed by the temperature monitor (TR).

#### Temperature monitoring in descaling lines · further products from page 195

Type	Measuring range	Diameter	Cable material	Sensor element	Dynamic response T05 / T09	Order no.
	[°C]	[mm]			[s]	
	-40...90	Ø 10	PUR cable	1 x Pt 100	6 / 25	TS5089

#### Evaluation units for temperature sensors · further products from page 195

Type	Measuring range	Process connection	Display	U <sub>b</sub>	Current consumption	I <sub>load</sub>	Order no.
	[°C]		LED	[V]	[mA]	[mA]	
	-40...300	G ½ male	Display unit	18...32	50	250	TR2432


## Monitoring of shut-off valves



### Effective pump protection

The shut-off valves in the intake of the high-pressure pumps of the descaling line are manually operated. An inductive sensor detects the valve position and prevents unintentional switch-on of the high-pressure pump in the event of a closed intake.

Inductive sensors for determining position · further products from page 77

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f [Hz]	I <sub>load</sub> [mA]	Order no.
	M30 / L = 60	22 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	100	100	IIS227

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## Detection of material at the descaling line



### Control of the water jet in the descaling line

An infrared temperature sensor is used to detect the hot billet before the descaling line. The water supply to the nozzles is opened via a switching signal.

Infrared temperature sensors for the detection of material · further products from page 195

Type	Temperature range [°C]	Wave length range [μm]	Material lens	Response time [ms]	Order no.
	250...1250	1.0...1.7	tempered optical glass	≤ 2	TW7001




## Speed monitoring at conveyors



## Transport of rolled bars or rods

The compact speed monitor detects pulses on the drive shaft of the roller conveyor. The monitor is an inductive sensor with integrated speed evaluation.

Compact speed monitor for pulse detection · further products from page 145

Type	Dimensions [mm]	Sensing range [mm]	Electrical design	U <sub>b</sub> [V]	Setting range [puls. / min.]	Start-up delay [s]	Order no.
	M30 / L = 82	10 f	DC PNP	10...36 DC	5...300	15	DI5009

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## Decentralised speed monitoring



## Detecting speed, standstill and acceptable range

The speed monitor evaluates the signals from one or several inductive sensors. It has one switch point for monitoring underspeed / overspeed and one for monitoring the acceptable range.

Speed monitor for pulse evaluation · further products from page 145

Type	U <sub>b</sub> [V]	In-puts	Input function	Setting range [puls. / min.]	Setting range [Hz]	Out-puts analogue	Out-puts relays	Out-puts transist.	Order no.
	110...240 AC (50...60 Hz) / 27 DC (typ. 24 DC)	2	PNP / NPN / Namur	1...60000	0.1...1000	–	2	2	DD2505


Pulse pick-ups for speed monitoring



Control of the roller conveyor

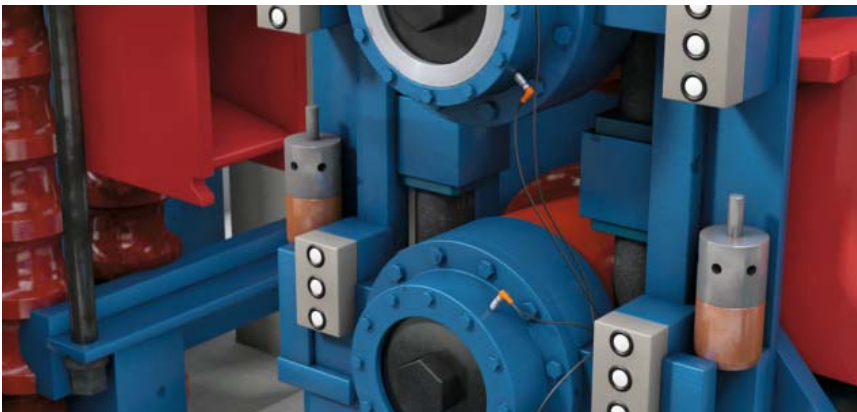
The speed of all drives of the roller conveyor is synchronised and controlled. An inductive sensor detects the switching cam mounted on the shaft, generating the pulses for a downstream speed monitoring.

Inductive sensor as pulse pick-up · further products from page 77

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f [Hz]	I <sub>load</sub> [mA]	Order no.
	M18 / L = 60	8 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	400	100	IGS232

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Vibration sensors on bearings




Monitoring bearings in the hot rolling area

Vibration sensors monitor the bearings of the roller stands. The sensor measures the rms vibration velocity and transmits the value as current signal to the process control system.

Vibration monitoring systems · further products from page 237

Type	Description	Order no.
	Accelerometer · for connection to external diagnostic electronics type VSE · Connector · housing: stainless steel 316L / 1.4404	VSA001

Connectors · further products from page 247

Type	Description	Order no.
	Jumper · straight / straight · Free from silicone · Free from halogen · Gold-plated contacts · For welding applications · 1 m · Housing materials: housing: TPU orange / sealing: FKM	EVW024


## Temperature monitoring of bearings




### Temperature measurement of bearings

Besides vibration, the housing temperature of a bearing in the hot rolling area is indicative of the machine condition. A bolt-on sensor (TS) detects the temperature which is processed and displayed in the evaluation unit (TR).

#### Temperature sensors · further products from page 195

Type	Measuring range [°C]	Diameter [mm]	Cable material	Sensor element	Dynamic response T05 / T09 [s]	Order no.
	-25...90	12 x 8.7 x 51	PUR cable	1 x Pt 100	9 / 15	TS2229

#### Evaluation units for temperature sensors · further products from page 195

Type	Measuring range [°C]	Process connection	Display LED	U <sub>b</sub> [V]	Current consumption [mA]	I <sub>load</sub> [mA]	Order no.
	-40...300	G ½ male	Display unit	18...32	50	250	TR7432


## Monitoring the remaining humidity in compressed air



### Monitoring the compressed air drying

After compression in the compressor the compressed air cools down. The steam condensed in this process is removed using a downstream dryer. The humidity sensor measures the relative humidity and temperature of the compressed air and provides these as analogue values.

#### Oil humidity sensor · further products from page 187

Type	Process connection	Pressure rating [bar]	Protection	Medium temperature oil [°C]	Ambient temperature [°C]	Order no.
	G ¾	10	IP 67	-20...100	-20...85	LDH100


Compressed air measurement at the compressed air distribution



Detection of compressed air in main supply lines

Here, compressed air meters detect the volume flow both in the normal pressure (6 bar) and high-pressure system (12 bar). So both consumption and leakage are detected.

Compressed air meters for consumption measurement and leakage detection · further products from page 175

Type	Process connection	Setting range [Nm <sup>3</sup> /h]	Pressure rating [bar]	Response time [s]	U <sub>b</sub> [V]	Order no.
	R2 (DN50)	5...700	16	< 0.1	18...30	SD2000


Pneumatics




Monitoring the maintenance unit

Here, pressure sensors with the easy-turn operating concept monitor the correct operating pressure in the compressed air supply. The innovative SD compressed air meter determines consumption.

Pressure sensors · further products from page 157

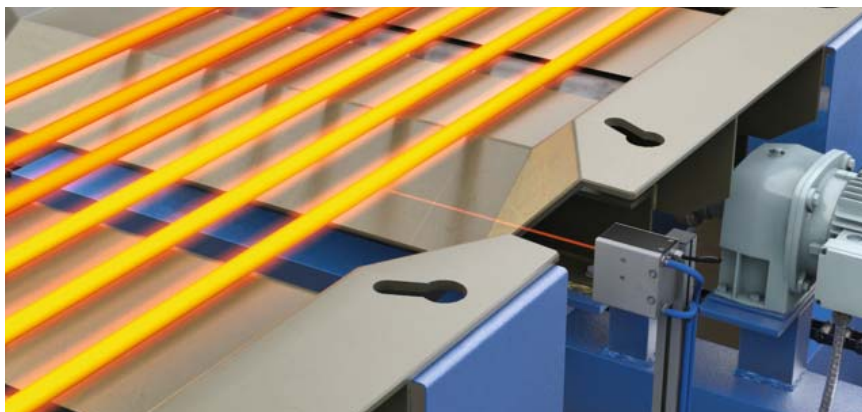
Type	Process connection	Display LED	Measuring range [bar]	P <sub>overload</sub> max. [bar]	P <sub>bursting</sub> min. [bar]	U <sub>b</sub> DC [V]	Order no.
	G¼ male / M5 female	Operation	0...10	25	300	9.6...32	PK6524

Compressed air meter for the measurement of compressed air consumption · further products from page 175

Type	Process connection	Setting range [Nm <sup>3</sup> /h]	Pressure rating [bar]	Response time [s]	U <sub>b</sub> [V]	Order no.
	R½ (DN15)	0.6...75.0	16	< 0.1	18...30	SD6000




## Protection of sensors


**Protection at a high ambient temperature**

At ambient temperatures up to 180 °C the electronics of the laser distance measurement sensors is protected from overheating using a cooling box. In addition, it ensures a reliable mechanical protection for photoelectric sensors.

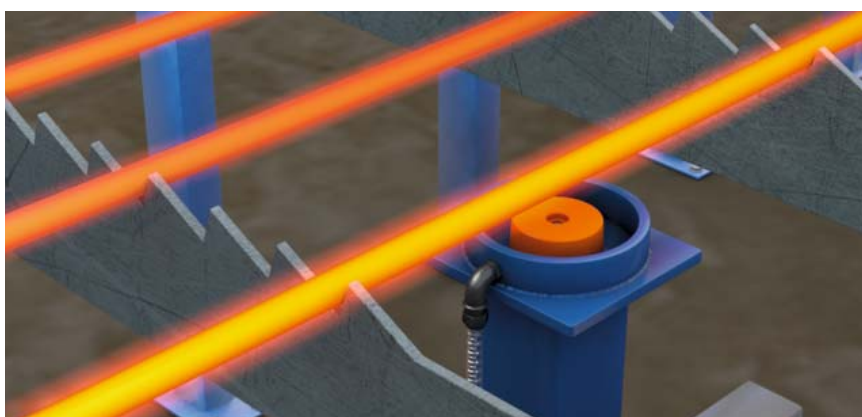
## Protective housing for distance measurement sensors · further products from page 131

Type	Description	Order no.
	Cooling box · Protective housing with an active cooling system for the O1D design · for type O1D · Housing materials: housing: aluminium transparent anodised / cover: aluminium black anodised / bezel: aluminium black anodised / window: float glass / cable gland: Brass nickel-plated / nozzle: Brass nickel-plated / sealing: FPM	E21248

## PMDLine photoelectric sensors with time of flight measurement · further products from page 131


Type	Operating principle	Range	Sampling rate [Hz]	Spot Ø at max. range [mm]	U <sub>b</sub> [V]	Order no.
	Photoelectric distance sensor	0.2...10 m	1...50	< 15 x 15	18...30	O1D100

## Tracking of material in the cooling bed

**Long distance to hot steel**

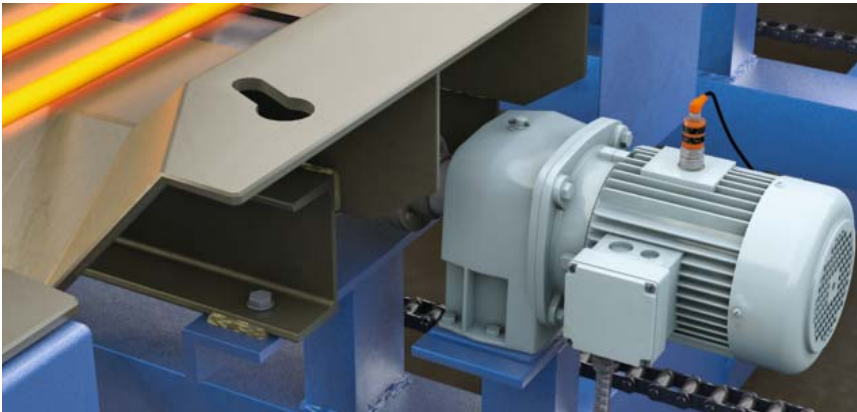
In cooling beds inductive sensors, among others, are used to detect the produced material. The sensors have sensing ranges up to 120 mm to ensure a long distance to the material.

## Inductive sensors with long sensing ranges · further products from page 77

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f [Hz]	I <sub>load</sub> [mA]	Order no.
	Ø 100	70 nf	PBT	10...36	IP 65	5	250	I17001

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Vibration monitoring at the cooling bed



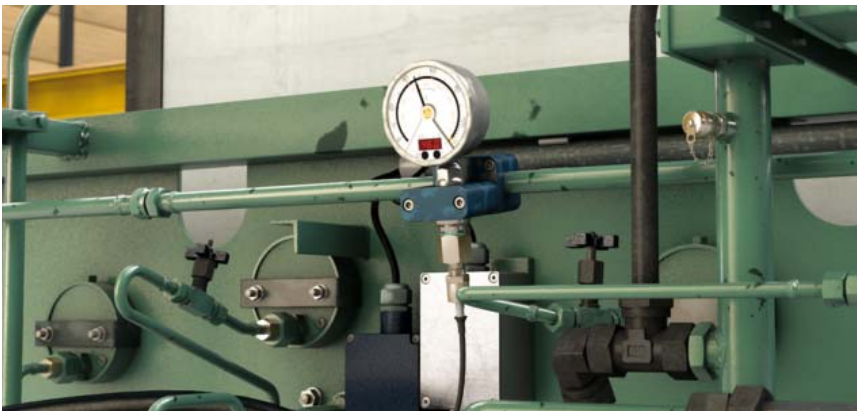
**Avoiding machine damage**

Vibration monitors monitor the drives of the roller conveyor. The sensor measures the rms vibration velocity and transmits the value as current signal to the process control system.

Vibration sensors for bearing monitoring in drives · further products from page 237

Type	Description	Order no.
	Vibration monitor · Connection via M12 connector · Vibration monitor to DIN ISO 10816 · Measuring range RMS: 0...25 mm/s · Switching outputs: normally closed and analogue 4...20 mA · Housing materials: PBT / PC / FPM / stainless steel 316L / 1.4404	VKV021


Pressure monitoring in hydraulic power packs



**Electronic contact manometer in hydraulics**

The system pressure at the hydraulic power pack must be monitored continuously. The electronic contact manometer combines an easy-to-read analogue display with the advantages of an electronic pressure sensor.

Pressure sensors for monitoring the system pressure · further products from page 157


Type	Process connection	Display	Measuring range	Poverload	Pbursting	U <sub>b</sub> DC	Order no.
		LED	[bar]	max. [bar]	min. [bar]	[V]	
	G ½	Display unit	-1...25	100	300	18...32	PG2453

## Oil temperature at the gear of the fan

**Differential temperature measurement**

The difference between the start and end temperature of the oil is indicative of the gear condition. A defined preset value must not be exceeded. Temperature sensors detect the oil temperatures reliably and precisely.

## Temperature sensors · further products from page 195


Type	Factory setting [°C / °F]	Process connection	Installation length [mm]	U <sub>b</sub> [V]	Dynamic response T05 / T09 [s]	Order no.
	-50...150 / -	G ½	30	18...32	1 / 3	TA2405

## Vibration sensors at the fan

**Monitoring fans for imbalance**

Vibration sensors monitor the gear at a fan of the cooling tower. When a limit value to be set is exceeded a switching contact is triggered.

## Vibration sensor for bearing monitoring · further products from page 237

Type	Description	Order no.
	Vibration monitor · Connection via M12 connector · Vibration monitor to DIN ISO 10816 · Measuring range RMS: 0...25 mm/s · Switching outputs: normally closed and analogue 4...20 mA · Housing materials: PBT / PC / FPM / stainless steel 316L / 1.4404	VKV021


## Vibration monitoring at pumps



### Condition monitoring at pumps

Vibration sensors detect the vibration generated by pumps. This allows condition-based maintenance. The sensor is specifically used for measured data acquisition for the VSE type diagnostic electronics.

Vibration monitoring systems · further products from page 237

Type	Description	Order no.
	Accelerometer · for connection to external diagnostic electronics type VSE · Connector · housing: stainless steel 316L / 1.4404	VSA001


## Drive monitoring at pumps



### Diagnostic electronics for pump sensors

The diagnostic electronics enables to simultaneously analyse the measured signals of up to four vibration sensors. To do so, up to eight digital and two analogue sensors can be connected, monitoring the complete pump station.

Vibration monitoring systems · further products from page 237

Type	Description	Order no.
	Diagnostics electronics for vibration sensors type VSA / VSP · 4 sensor inputs 0...10 mA or IEPE · TCP/IP Ethernet interface · Frequency-selective machine monitoring of up to 4 measuring points · Integrated history memory with real-time clock · Counter function · Combicon connection · PA	VSE100



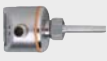
## Monitoring the cooling water at cooling towers




## Cooling water supply in the steelworks

To ensure that enough cooling water is available in the production process both flow rate and pressure of the water are detected.

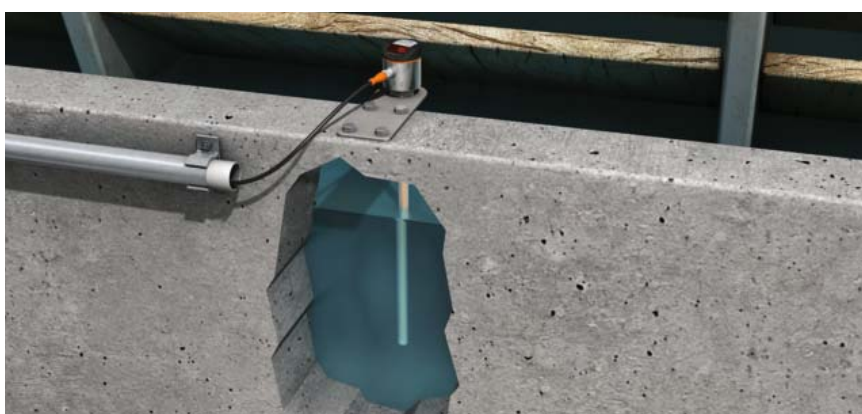
## Flow sensors for monitoring cooling circuits - further products from page 175

Type	Setting range liquids / gases [cm/s]	Material sensor tip	Medium temperature [°C]	Pressure rating [bar]	Response time [s]	U <sub>b</sub> [V]	Order no.
	3...300 / 200...3000	stainless steel 316L / 1.4404	-25...80	30	1...10	19...36	SI5000

## Pressure sensors for monitoring the system pressure - further products from page 157

Type	Process connection	Display LED	Measuring range [bar]	Poverload max. [bar]	Pbursting min. [bar]	U <sub>b</sub> DC [V]	Order no.
	G ½	Display unit	-1...10	50	150	18...32	PG2454


## Level monitoring in the cooling tower

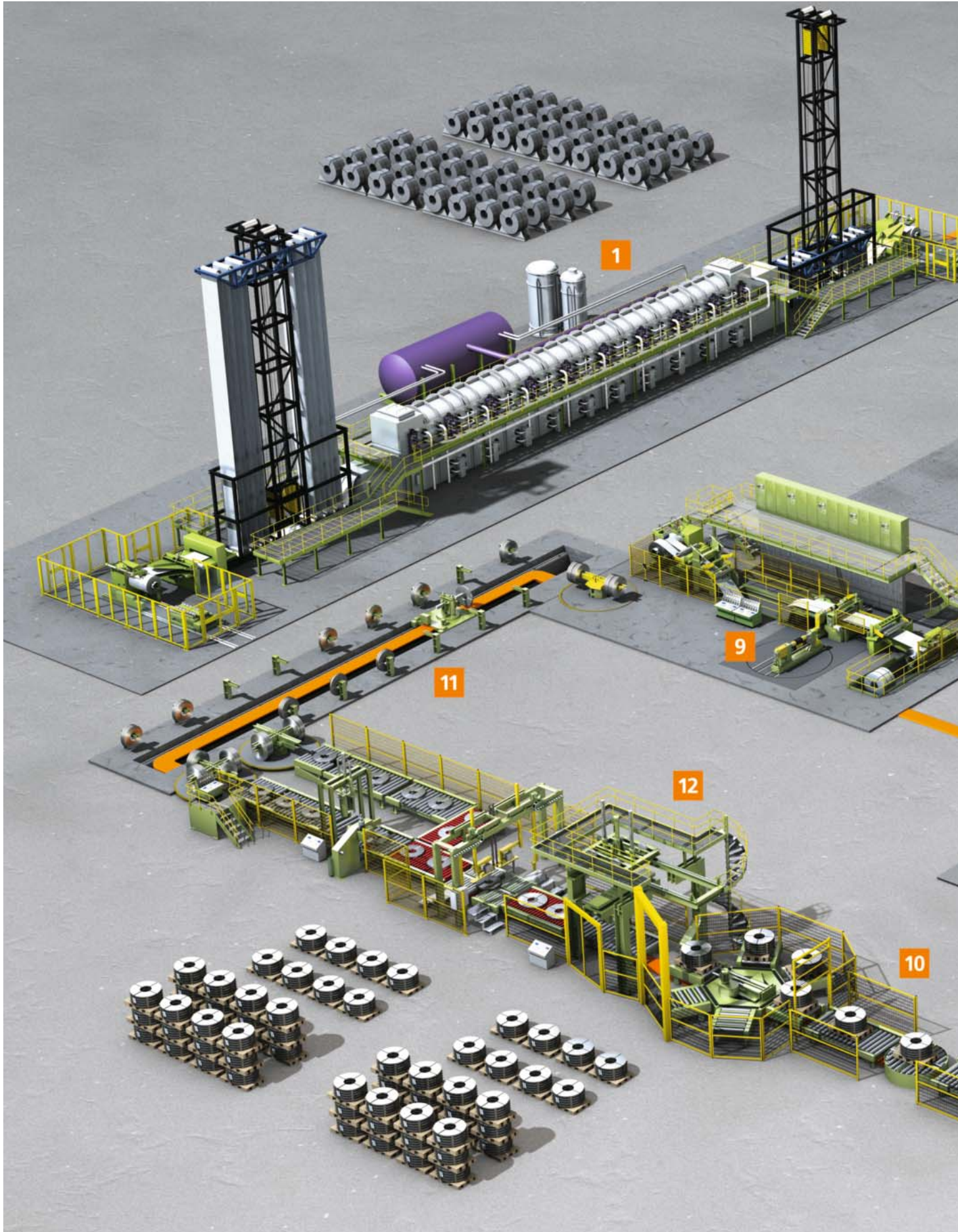


## Optimum level in the basin of the cooling tower

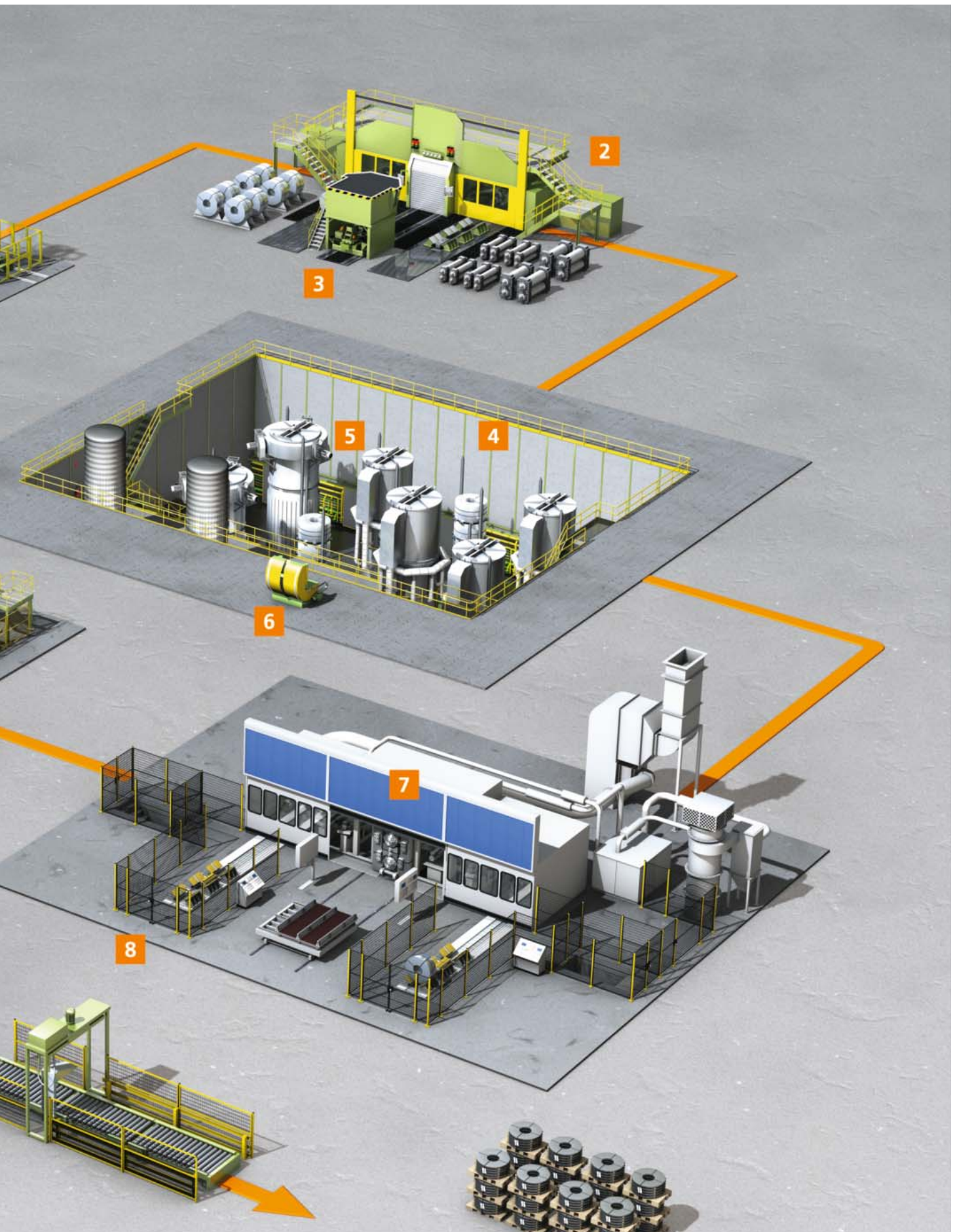
Cooling water circuits are supplied with water from the basin of the cooling tower. The heated water is pumped back with fresh water replacing the losses. The optimum level is ensured by a level sensor.

## Level sensors - further products from page 175

Type	Probe length [mm]	Active zone [mm]	Inactive zone [mm]	U <sub>b</sub> [V]	Medium temperature water [°C]	Medium temperature oil [°C]	I <sub>load</sub> [mA]	Order no.
	728	585	102 / 40	18...30	0...35 (LK3124 + E43102: 0...55)	0...70	200	LK3124











Machine	Application	Product group	From page
<b>1 Suction in the pickling line</b>			
	Speed measurement	Pulse evaluation systems	147
	Vibration monitoring	Vibration monitoring systems	237
	Airflow monitoring	Flow sensors / flow meters	175
<b>2 Roller stand drive</b>			
	Vibration monitoring	Vibration monitoring systems	237
	Temperature measurement	Temperature sensors	195
	Voltage supply	Power supplies	263
	Speed measurement	Pulse evaluation systems	147
<b>3 Roller replacement cars</b>			
	Hydraulic system pressure detection	Pressure sensors	157
	Level monitoring in hydraulic power packs	Level sensors	187
	Temperature measurement in hydraulic power packs	Temperature sensors	195
	Position detection of replacement cars	Inductive sensors	77
<b>4 Annealing furnace</b>			
	Pressure monitoring protective gas	Pressure sensors	157
	Detection of equipment parts	Inductive sensors	77
	Monitoring of cooling water	Flow sensors / flow meters	175
	Vibration monitoring	Vibration monitoring systems	237
<b>5 Annealing furnace supply unit</b>			
	Pressure monitoring protective gas	Pressure sensors	157
	Monitoring of quarter-turn actuators	Inductive sensors	77
	Monitoring of cooling water	Flow sensors / flow meters	175
	Pressure monitoring of natural gas	Pressure sensors	157
<b>6 Upender</b>			
	End position monitoring	Inductive sensors	77
	Position detection of fixing bolts	Inductive sensors	77
	Position detection of coil	Photoelectric sensors for general applications	117

Machine	Application	Product group	From page
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## 7 Position monitoring in roller stand

	Position detection of transfer table	Cylinder sensors	113
	Detecting the stop	Inductive sensors	77
	Photoelectric detection of unwinding coil	Laser sensors / distance measurement sensors	131
	Position detection of lifting carriage	Inductive sensors	77


## 8 Access control / securing the area

	Monitoring of high-speed doors	Inductive sensors	77
	Door protection	AS-Interface Safety at Work	229
	Safety monitoring	Safety light curtains	153


## 9 Slitting line

	Position detection of shear stand	Inductive sensors	77
	Photoelectric detection of sag	Laser sensors / distance measurement sensors	131
	Belt centring control	Flow sensors / flow meters	175
	Cutting of sheets	Encoders	143


## 10 Roller conveyor systems

	Tracking of material	Photoelectric sensors for general applications	117
	Speed measurement	Pulse evaluation systems	147
	Safety monitoring	Safety light curtains	153
	Position detection of rotary table	Inductive sensors	77

## 11 Temporary coil store

	Occupation of storage location	Photoelectric sensors for general applications	117
	Position check of positioning carriage	Inductive sensors	77
	Hydraulic system pressure detection	Pressure sensors	157
	Temperature measurement	Temperature sensors	195

## 12 Packaging machine

	Centring of coils	Inductive sensors	77
	Detection of material on the electromagnet	Inductive sensors	77
	Tracking of material	Photoelectric sensors for general applications	117
	Safety monitoring	Safety light curtains	153

## Reliable sensors increase plant uptime



In the cold rolling mill sheets are usually supplied as coils and then reduced to the requested thickness by rolling the material. The starting material, usually hot-rolled wide strip, is first descaled and then the cross-section is reduced by the rolling process. When the sheet has achieved its final thickness, it is cut to the requested width and then packed and dispatched. Markets are, among others, the automotive industry / suppliers, pipe manufacturers and the electrical white goods.

The demand on reliability and machine uptime is extremely high in usually very rough environmental conditions (aggressive chemicals in pickling lines, shocks and vibrations in rolling and shearing lines). Reliable and robust sensors from ifm meet these high demands effectively, securing sustained success.




## Suction in the pickling line – fan monitoring

**Speed detection on fans**

The compact DI speed monitor detects pulses on the fan drive shaft.

## Compact speed monitor for pulse detection · further products from page 145

Type	Dimensions [mm]	Sensing range [mm]	Electrical design	U <sub>b</sub> [V]	Setting range [puls. / min.]	Start-up delay [s]	Order no.
	M30 / L = 82	10 f	DC PNP	10...36 DC	5...300	15	DI5009

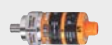
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## Suction in the pickling line – bearing monitoring

**Monitoring of shaft bearings**

The compact VKV vibration sensor monitors the vibration on the bearing of a drive shaft. Too high a vibration can be detected early, avoiding machine damage.

## Vibration sensors for bearing monitoring in drives · further products from page 237

Type	Description	Order no.
	Vibration monitor · Connection via M12 connector · Vibration monitor to DIN ISO 10816 · Measuring range RMS: 0...25 mm/s · Switching outputs: normally closed and analogue 4...20 mA · Housing materials: PBT / PC / FPM / stainless steel 316L / 1.4404	VKV021


Vibration monitoring on the roller drive



Condition monitoring of drives

VSA series sensors record the vibration levels of the drives, enabling condition-oriented maintenance.

Vibration monitoring systems · further products from page 237

Type	Description	Order no.
	Accelerometer · for connection to external diagnostic electronics type VSE · Connector · housing: stainless steel 316L / 1.4404	VSA001


Drive monitoring in a rolling installation




Evaluation of the drive monitoring on the roller drive

The vibration data provided by the VSA sensors is automatically evaluated in the VSE diagnostic electronics. The current equipment condition can be transferred directly to higher-level systems.

Vibration monitoring systems · further products from page 237

Type	Description	Order no.
	Diagnostics electronics for vibration sensors type VSA / VSP · 4 sensor inputs 0...10 mA or IEP/IE · TCP/IP Ethernet interface · Frequency-selective machine monitoring of up to 4 measuring points · Integrated history memory with real-time clock · Counter function · Combi-con connection · PA	VSE100

Speed monitor for drive monitoring · further products from page 147

Type	U <sub>b</sub> [V]	In-puts	Input function	Setting range [puls. / min.]	Setting range [Hz]	Out-puts analogue	Out-puts relays	Out-puts transist.	Order no.
	110...240 AC (50...60 Hz) / 27 DC (typ. 24 DC)	2	PNP / NPN / Namur	1...60000	0.1...1000	–	2	2	DD2505


## Monitoring of a hydraulic power pack in roller replacement cars




## Pressure and temperature monitoring in hydraulic power packs

PN and TN type sensors detect the pressure and temperature of the hydraulic oil.

## Pressure sensors - further products from page 157

Type	Process connection	Display	Measuring range	Poverload	Pbursting	U <sub>b</sub> DC	Order no.
		LED	[bar]	max. [bar]	min. [bar]	[V]	
	G¼ male / M5 female	Display unit	0...25	150	350	18...30	PN7593

## Temperature sensors - further products from page 195

Type	Measuring range	Process connection	Installation length	U <sub>b</sub>	Dynamic response T05 / T09	Order no.
	[°C / °F]		[mm]	[V]	[s]	
	-40...150 / -40...302	M18 x 1.5	45	18...32	1 / 3	TN7531


## Filter monitoring in a hydraulic system



## Detection of filter blockage

Pressure sensors monitor the status of an oil filter in a hydraulic power pack. If the filter is blocked, a signal is sent to the controller.

## Pressure sensors - further products from page 157

Type	Process connection	Display	Measuring range	Poverload	Pbursting	U <sub>b</sub> DC	Order no.
		LED	[bar]	max. [bar]	min. [bar]	[V]	
	G ¼ A	-	0...25	60	600	8.5...36	PT3553



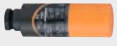
## Positioning of the roller replacement car



### End position monitoring on the roller replacement car

For an exact positioning of the rails on which the working rollers are pushed into the roller stand the end positions of the tool table are monitored using an inductive sensor.

#### Inductive sensors for tool table positioning · further products from page 77

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f [Hz]	I <sub>load</sub> [mA]	Order no.
	Ø 34 / L = 98	20 nf	PBT	10...36	IP 65	350	250	IB5063

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## End position monitoring on the upender



### Positioning the upender using inductive sensors


For feeding the annealing furnaces the coils are tilted by 90°. This is done using an upender. It is controlled by a coolant-resistant sensor.

#### Inductive sensors for positioning the upender · further products from page 77

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f [Hz]	I <sub>load</sub> [mA]	Order no.
	M12 / L = 45	4 f	Brass	10...30	IP 68	700	100	IFC200

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#### Connectors · further products from page 247

Type	Description	Order no.
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · For welding applications · M12 connector · 5 m · Housing materials: housing: TPU black transparent / sealing: FKM	EVW008

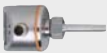
## Monitoring of the cooling water for annealing furnaces



## Flow rate measurement during the cooling process of the annealing furnaces

To ensure the operational reliability of annealing furnaces it is necessary to cool certain equipment parts (e.g. the base). The minimum quantity of cooling water is monitored using a flow sensor.

## Flow sensors for monitoring cooling circuits · further products from page 175

Type	Setting range liquids / gases [cm/s]	Material sensor tip	Medium temperature [°C]	Pressure rating [bar]	Response time [s]	U <sub>b</sub> [V]	Order no.
	3...300 / 200...3000	stainless steel 316L / 1.4404	-25...80	30	1...10	19...36	SI5000


## Protective gas supply for an annealing furnace



## Monitoring industrial gases in an annealing furnace

Annealing furnaces operate in a protective gas atmosphere. Using pressure sensors the pressure of industrial gases is monitored.

## Pressure sensors for gas monitoring · further products from page 157

Type	Process connection	Display	Measuring range [bar]	P <sub>overload</sub> max. [bar]	P <sub>bursting</sub> min. [bar]	U <sub>b</sub> DC [V]	Order no.
	G ½	Display unit	-1...10	50	150	18...32	PG2454


## Control of the gas supply for an annealing furnace



### Controlling the industrial gases for an annealing furnace


The supply of the annealing furnace with protective gas for the protective covers or with natural gas for the burners is controlled using valve actuators. These are monitored by means of inductive sensors.

#### Inductive dual sensors for position feedback on pneumatic valve actuators · further products from page 77

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f AC / DC [Hz]	I <sub>load</sub> AC / DC [mA]	Order no.
	40 x 26 x 26	4 nf	PBT	10...36	IP 67	1300	250	IN5225

f = flush / nf = non flush

#### Accessories · further products from page 255

Type	Description	Order no.
	Target puck · Ø 102 mm · Housing materials: Target puck: PA 6 / screws: V2A	E17328


## Detection of equipment parts of an annealing furnace



### Distinction of various equipment parts

On the base of an annealing furnace either the furnace or a cooling cover is in operation. Depending on the cover used the base is supplied with cooling water or gas. For differentiation inductive sensors are used.

#### Inductive sensors for equipment control · further products from page 77

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f [Hz]	I <sub>load</sub> [mA]	Order no.
	M30 / L = 50	15 f	Brass	10...36	IP 67	100	100	IIS204

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## Positioning of the transfer table




## Position detection of the transfer table

Introducing a strip of the coil into a rolling installation is done automatically. By means of transfer tables the strip is positioned correctly. Cylinder sensors monitor the position of the tables.

Cylinder sensors for monitoring hydraulic and pneumatic cylinders · further products from page 113

Type	Dimensions [mm]	Material	U <sub>b</sub> [V]	f [Hz]	Protection	I <sub>load</sub> [mA]	T <sub>a</sub> [°C]	Order no.
	25 x 5 x 6.5	PA (polyamide)	10...30	10000	IP 65 / IP 67	100	-25...85	<b>MK5100</b>

Accessories · further products from page 255

Type	Description	Order no.
	Adapter for tie rod / integrated profile cylinders · for types MKT (T-slot cylinder sensors) · Clamping range 9...15 mm · Housing materials: aluminium / screw: stainless steel	<b>E11799</b>


## Locking of the rollers



## Securing the rollers during the rolling process

Before sheets are rolled it must be ensured that the rollers are correctly positioned and mechanically locked. This is monitored using inductive sensors.

Inductive sensors for monitoring the locking of rollers · further products from page 77

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f [Hz]	I <sub>load</sub> [mA]	Order no.
	M18 / L = 46	8 f	Brass	10...30	IP 67	300	100	<b>IGS200</b>

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## Monitoring of high-speed doors



### Door monitoring

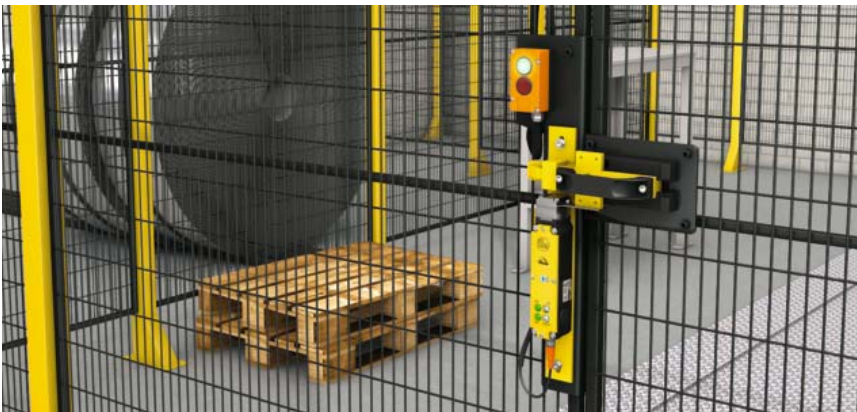
Category 4 and SIL 3 fail-safe inductive sensors directly detect the end stop of the high-speed door without contact and without requiring a special counter piece.

#### Fail-safe inductive sensors · further products from page 151

Type	Length [mm]	Enable zone [mm]	Housing material	U <sub>b</sub> DC [V]	Protection	Response time in case of a safety request / enable time [ms]	Order no.
	66	10...15 nf	PPE	24	IP 65 / IP 67	≤ 50 / ≤ 200	GM7015

f = flush / nf = non flush


## Safety during equipment operation




### Protection of hazardous areas against unwanted access

While a rolling installation is in operation some hazardous areas, e.g. areas with rotating equipment parts, must not be accessed. This is avoided by protective screens and door switches with guard locking.

#### Door switch with guard locking · further products from page 229

Type	Description	Order no.
	Safety switch with guard locking · Normally closed principle · Rotatable actuating head made of metal · Mechanical release on the front · Supply via AS-i / solenoid supply ext. from 24 V DC · M12 connector · Housing materials: thermoplastic reinforced glass-fibre	AC9015

#### Accessories · further products from page 255

Type	Description	Order no.
	Actuator S standard straight · With rubber bush, overtravel 5 mm · Suitable for a maximum pull force of 2500 N for the door switches AC9015 - AC904S	E7903S

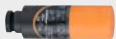
## Positioning of the shear stand



## Position monitoring on the rotary plate of the shear stands

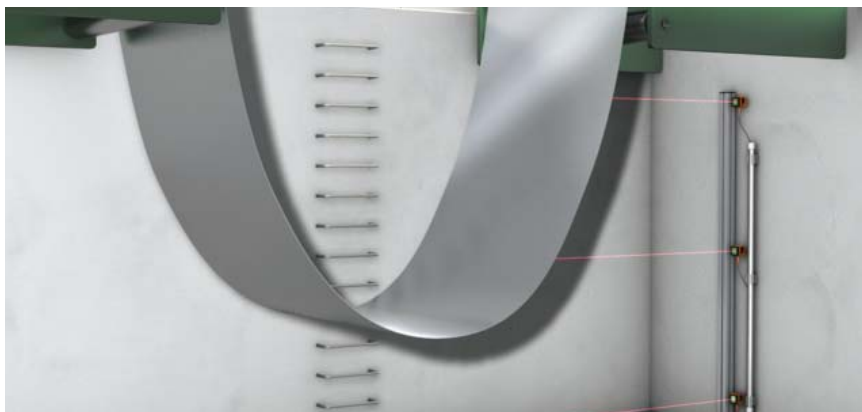
By means of a rotary plate two shear stands are exchanged. To avoid rotation of the plate if a shear stand is not correctly positioned an inductive sensor detects the stand position.

## Inductive sensors for positioning equipment parts · further products from page 77

Type	Dimensions [mm]	Sensing range [mm]	Material	$U_b$ [V]	Protection	f [Hz]	$I_{load}$ [mA]	Order no.
	Ø 34 / L = 98	20 nf	PBT	10...36	IP 65	350	250	IB5063

f = flush / nf = non flush


## Loop pit



## Sag control with PMD time of flight sensors

The O1D PMD sensors monitor the correct running of the steel strip and coil unwinding. Once a defined circumference has been reached, the coil changeover starts automatically.

## PMD distance sensors with time of flight measurement · further products from page 131

Type	Operating principle	Range	Sampling rate [Hz]	Spot Ø at max. range [mm]	$U_b$ [V]	Order no.
	Photoelectric distance sensor	0.2...10 m	1...50	< 15 x 15	18...30	O1D100



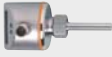
## Monitoring of belt centring control



### Travel speed limitation of the positioning cylinder

Coils must move straight into the installations. To ensure this the whole coiler is hydraulically moved transversely to the direction of movement. A flow sensor monitors the limitation of the travel speed.

Flow sensors · further products from page 175

Type	Setting range liquids / gases [cm/s]	Material sensor tip	Medium temperature [°C]	Pressure rating [bar]	Response time [s]	U <sub>b</sub> [V]	Order no.
	3...300 / 200...3000	3...100 / 200...800	-25...80	300	1...2 / 1...10	18...36	SI5010


## Cutting straightened sheets to length



### Straightened strip is cut to length as needed

After processing the sheets blanks are cut to the dimensions as requested by customers. Encoders ensure that the lengths are precisely measured.

Multiturn encoder for linear measurement · further products from page 143

Type	Resolution	U <sub>b</sub> [V]	f [kHz]	I <sub>load</sub> [mA]	Shaft [mm]	Ambient temperature [°C]	Cable entry	Order no.
	4096	4.5...30	–	–	6	-40...85	axial	RM8001


## Monitoring a roller conveyor for occupied sections



## Automation of the conveyors

The roller conveyors are split up into individual sections. To ensure that no coil is moved into a section which is already occupied photoelectric sensors with polarisation filter detect the material on the conveyor.

## Photoelectric sensors for conveyor control · further products from page 117

Type	Operating principle	Range	Type of light	Spot Ø at max. range [mm]	Output H = light-on D = dark-on	Order no.
	Polarisation filter	0.075...10 m	Red	250	H/D PNP	O5P500


## Coil transport




## Coil transport on roller conveyors

The O5S (transmitter) / O5E (receiver) through-beam sensors detect the coils on the roller conveyors. This ensures a correct transport to the packaging lines.

## Photoelectric sensors for determining position · further products from page 117

Type	Operating principle	Range	Type of light	Spot Ø at max. range [mm]	Output H = light-on D = dark-on	Order no.
	Transmitter	25 m	Red	625	–	O5S500
	Receiver	25 m	Red	–	H/D PNP	O5E500

## Safety light curtains for access prevention · further products from page 153

Type	Sensor length [mm]	Resolution / detection capacity [mm]	Protected area height [mm]	Protected area width [m]	Response time [ms]	U <sub>B</sub> [V]	Order no.
	813	90	760	0...4 / 3...12	4.5	24	OY105S


### Temporary coil store – packaging line



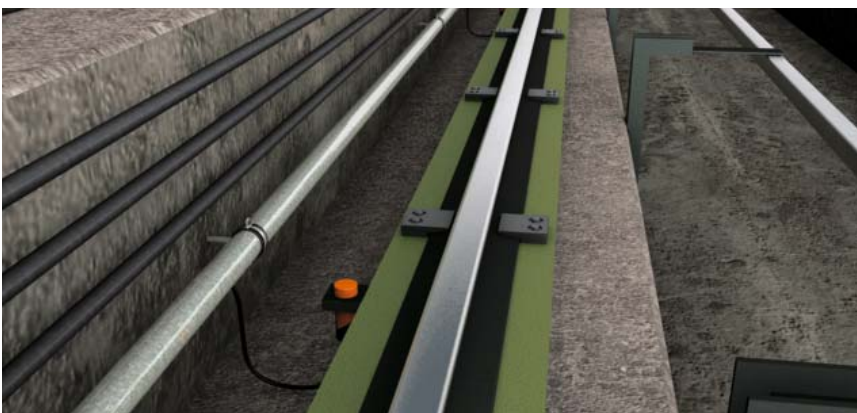
#### Temporary store for coils from the shears to the packaging line

If it is not possible to directly transport the cut strip from the shears to the packaging line, it is stored temporarily. The OG diffuse reflection sensor precisely detects whether the store is occupied.

Photoelectric sensors for monitoring storage locations · further products from page 117

Type	Operating principle	Range	Type of light	Spot Ø at max. range [mm]	Output H = light-on D = dark-on	Order no.
	Background suppression	15...300 mm	Red	25	H/D PNP	<b>OGH500</b>


### Temporary coil store – transport cars



#### Transport car positioning

Coils are transported from the temporary store to the upenders of the packaging lines. For exact positioning inductive sensors with a long sensing range are used.

Inductive sensors for determining position · further products from page 77

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f [Hz]	I <sub>load</sub> [mA]	Order no.
	Ø 34 / L = 98	20 nf	PBT	10...55	IP 65	300	300	<b>IB5124</b>

f = flush / nf = non flush




## Coil centring in the packaging line



## Centring of coils before packing them on pallets

If coils are dispatched on pallets, they must be positioned in the centre. Centring is done before lifting them from the roller conveyor onto the pallet. An inductive sensor is used to detect the material.

## Inductive sensors for detecting the material · further products from page 77

Type	Dimensions [mm]	Sensing range [mm]	Material	$U_b$ [V]	Protection	f [Hz]	$I_{load}$ [mA]	Order no.
	40 x 40 x 54	20 f	PA (polyamide)	10...36	IP 67	100	200	IM5115

f = flush / nf = non flush

## Connectors · further products from page 247

Type	Description	Order no.
	Socket · angled · Free from silicone · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: PVC orange / sealing: EPDM	EVT004

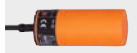
## Detection of material under an electromagnet



## Control of the electromagnet

The centred coils are lifted onto the pallets using an electromagnet. The plunger moved by the coil is detected using an inductive sensor. This ensures that material is under the electromagnet.

## Inductive sensor for electromagnet monitoring · further products from page 77

Type	Dimensions [mm]	Sensing range [mm]	Material	$U_b$ [V]	Protection	f [Hz]	$I_{load}$ [mA]	Order no.
	Ø 34 / L = 82	20 nf	PBT	10...36	IP 67	60	250	IB5096

f = flush / nf = non flush

## List of articles

Order no.	Approvals	Catalogue page	Order no.	Approvals	Catalogue page
AC0035	CE, CUL	229	AC5003	CUL	225, 231
AC0045	CE, CUL	229	AC5010	CUL	225
AC0075	CE, CUL	231	AC5011	CUL	225
AC0095	CE, CRUUS	231	AC5031		225
AC0105	CE, CUL	231	AC5055	CE, CUL	231
AC0305	CE, CUL	231	AC5065	CE, CUL	231
AC0325	CE, CUL	229	AC5200	CE, CUL	227
AC0415	CE, CUL	229	AC5204	CE, CUL	227
AC1154	CE	221, 223	AC5208	CE, CUL	227
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AC2256	CE, CRUUS	221	DI0002	CE	145
AC2257	CE, CRUUS	221	DI5001	CE	145
AC2258	CE, CRUUS	221	DI5003	CE	145
AC2259	CE, CRUUS	221	DI5004	CE	145
AC2264	CE, CRUUS	221	DI5007	CE	145
AC2267	CE, CRUUS	221	DI5009	CE	145
AC2410	CE, CUL	223	DI6001	CE, CUL	145
AC2411	CE, CUL	223	DN1030	CE, CRUUS, CUL	263
AC2412	CE, CUL	223	DN1031	CE, CRUUS, CUL	263
AC2417	CE, CUL	223	DN4011	CE, CRUUS, CUL	263
AC2457	CE, CUL	223	DN4012	CE, CRUUS, CUL	263
AC2459	CE, CUL	223	DN4013	CE, CRUUS, CUL	263
AC2516	CE, CUL	225	DN4014	CE, CRUUS, CUL	263
AC2517	CE, CUL	225	DN4032	CE, CRUUS, CUL	263
AC2518	CE, CUL	225	DN4033	CE, CRUUS, CUL	263
AC2519	CE, CUL	225	DN4034	CE, CRUUS, CUL	263
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AC2750	CE, CRUUS	235	E10016		255
AC2751	CE, CRUUS	235	E10017		195, 205
AC2752	CE, CRUUS	235	E10076		255
AC2753	CE, CRUUS	235	E10077		141, 195
AC5000	CUL	225	E10136		252

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TA2135	CE, CUL	207	VNB001	CE, CUL	243
TA2145	CE, CUL	207	VSA001	CE, CUL	237, 239
TA2405	CE, CUL	207	VSA002	CE, CUL	237, 239
TA2415	CE, CUL	207	VSA004	CE, CUL	237, 239
TA2435	CE, CUL	207	VSA005	CE, CUL	237, 239
TA2445	CE, CUL	207	VSE002	CE, CUL	237, 239
TA3130	CE, CUL	207	VSE100	CE, CUL	237, 239
TA3131	CE, CUL	207	VTV122	CE, CUL	241
TA3333	CE, CUL	207	ZGS210		139
TA3337	CE, CUL	207			
TK6130	CE, CUL	209			
TK6330	CE, CUL	209			
TK7130	CE, CUL	209			
TK7330	CE, CUL	209			





More than just sensors: The ifm group of companies offers a wide range of solutions for the steel industry. On the following pages you will find an overview of all the products summarised into categories. In addition to the system descriptions we will also show you the most important features of the products. For more information please visit us online at [www.ifm.com](http://www.ifm.com)

<b>Position sensors</b>	76 - 141
<i>Inductive sensors</i>	76 - 103
<i>Capacitive sensors</i>	104 - 109
<i>Magnetic sensors</i>	110 - 111
<i>Cylinder sensors</i>	112 - 115
<i>Photoelectric sensors for general applications</i>	116 - 129
<i>Laser sensors / distance measurement sensors</i>	130 - 141
<b>Sensors for motion control</b>	142 - 147
<i>Encoders</i>	142 - 143
<i>Speed sensors</i>	144 - 145
<i>Pulse evaluation systems</i>	146 - 147
<b>Industrial imaging</b>	148 - 149
<i>Vision sensors</i>	148 - 149
<b>Safety technology</b>	150 - 155
<i>Fail-safe inductive sensors</i>	150 - 151
<i>Safety light curtains</i>	152 - 153
<i>Safety relays</i>	154 - 155
<b>Process sensors</b>	156 - 215
<i>Pressure sensors</i>	156 - 173
<i>Flow sensors / flow meters</i>	174 - 185
<i>Level sensors</i>	186 - 193
<i>Temperature sensors</i>	194 - 211
<i>Signal evaluation systems</i>	212 - 213
<i>Feedback systems for valves and valve actuators</i>	214 - 215
<b>Industrial communication</b>	216 - 235
<i>AS-Interface controllers / gateways</i>	216 - 217
<i>AS-Interface power supplies / earth fault monitors</i>	218 - 219
<i>AS-Interface I/O modules</i>	220 - 227
<i>AS-Interface Safety at Work</i>	228 - 235
<b>Condition monitoring systems</b>	236 - 245
<i>Vibration monitoring systems</i>	236 - 243
<i>Systems for oil quality monitoring</i>	244 - 245
<b>Connection technology</b>	246 - 253
<i>Sockets</i>	246 - 253
<b>Accessories</b>	254 - 261
<i>Accessories</i>	254 - 261
<b>Power supplies</b>	262 - 263
<i>Power supplies</i>	262 - 263

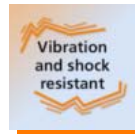




## Inductive M12 sensors with long sensing ranges with plug



- Large temperature range of -40...85 °C for greater flexibility
- Protection rating IP 65 to IP 69K for increased machine uptime
- Reliable detection due to improved sensor tolerances
- Reduced stock-keeping – one sensor for many applications



### New standard

This newly developed generation of inductive sensors is the first to present one sensor that can be used for three different applications. Whether in factory automation, in applications with coolants and lubricants or in mobile applications – the new ifm technology platform distinguishes itself with universal and permanent usability while guaranteeing high performance, temperature stability and higher sensing ranges.

### Resistant and reliable

A large temperature range of -40...85 °C and protection ratings IP 65, IP 66, IP 67, IP 68 and IP 69K guarantee maximum reliability. This new generation meets the user's increased machine uptime requirements while offering a reliable switching function that assures the avoidance of standstills. All in all, a universal sensor for permanent use.







Long sensing ranges allow versatile use.





## Sensors with increased sensing range for industrial applications

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f [Hz]	I <sub>load</sub> [mA]	Order no.
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### M12 connector · Output function · 3-wire · DC PNP

	M12 / L = 45	4 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	700	100	IFS244
	M12 / L = 45	7 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	700	100	IFS245
	M12 / L = 60	4 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	700	100	IFS240
	M12 / L = 60	7 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	700	100	IFS241

### M12 connector · Output function · 3-wire · DC NPN



	M12 / L = 45	4 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	700	100	IFS246
	M12 / L = 45	7 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	700	100	IFS247
	M12 / L = 60	4 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	700	100	IFS242
	M12 / L = 60	7 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	700	100	IFS243

f = flush / nf = non flush

## Connectors

Type	Description	Order no.
------	-------------	-----------

### Socket M12, 5/4-pole, 4-wire

	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC005
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC002



## Inductive M18 sensors with long sensing ranges with plug



- Large temperature range of -40...85 °C for greater flexibility
- Protection rating IP 65 to IP 69K for increased machine uptime
- Reliable detection due to improved sensor tolerances
- Reduced stock-keeping – one sensor for many applications



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### Resistant and reliable

A large temperature range of -40...85 °C and protection ratings IP 65, IP 66, IP 67, IP 68 and IP 69K guarantee maximum reliability. This new generation meets the user's increased machine uptime requirements while offering a reliable switching function that assures the avoidance of standstills. All in all, a universal sensor for permanent use.





Long sensing ranges allow versatile use.

### Sensors with increased sensing range for industrial applications

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f [Hz]	I <sub>load</sub> [mA]	Order no.
<b>M12 connector · Output function  · 3-wire · DC PNP</b>								
	M18 / L = 45	8 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	400	100	<b>IGS236</b>
	M18 / L = 45	12 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	300	100	<b>IGS237</b>
	M18 / L = 60	8 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	400	100	<b>IGS232</b>
	M18 / L = 60	12 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	300	100	<b>IGS233</b>
<b>M12 connector · Output function  · 3-wire · DC NPN</b>								
	M18 / L = 45	8 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	400	100	<b>IGS238</b>
	M18 / L = 45	12 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	300	100	<b>IGS239</b>
	M18 / L = 60	8 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	400	100	<b>IGS234</b>
	M18 / L = 60	12 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	300	100	<b>IGS235</b>

f = flush / nf = non flush

### Connectors

Type	Description	Order no.
<b>Socket M12, 5/4-pole, 4-wire</b>		
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVC005</b>
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVC002</b>





## Inductive M30 sensors with long sensing ranges with plug



- Large temperature range of -40...85 °C for greater flexibility
- Protection rating IP 65 to IP 69K for increased machine uptime
- Reliable detection due to improved sensor tolerances
- Reduced stock-keeping – one sensor for many applications



### New standard

This newly developed generation of inductive sensors is the first to present one sensor that can be used for three different applications. Whether in factory automation, in applications with coolants and lubricants or in mobile applications – the new ifm technology platform distinguishes itself with universal and permanent usability while guaranteeing high performance, temperature stability and higher sensing ranges.

### Resistant and reliable

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Long sensing ranges allow versatile use.

### Sensors with increased sensing range for industrial applications

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f [Hz]	I <sub>load</sub> [mA]	Order no.
<b>M12 connector · Output function  · 3-wire · DC PNP</b>								
	M30 / L = 50	15 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	100	100	IIS230
	M30 / L = 50	22 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	100	100	IIS231
	M30 / L = 60	15 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	100	100	IIS226
	M30 / L = 60	22 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	100	100	IIS227
<b>M12 connector · Output function  · 3-wire · DC NPN</b>								
	M30 / L = 50	15 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	100	100	IIS232
	M30 / L = 50	22 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	100	100	IIS233
	M30 / L = 60	15 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	100	100	IIS228
	M30 / L = 60	22 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	100	100	IIS229

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### Connectors

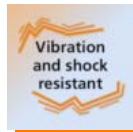
Type	Description	Order no.
<b>Socket M12, 5/4-pole, 4-wire</b>		
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC005
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC002



## Inductive M12 sensors with long sensing ranges with cable



- Large temperature range of -40...85 °C for greater flexibility
- Protection rating IP 65 to IP 69K for increased machine uptime
- Reliable detection due to improved sensor tolerances
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### New standard

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Long sensing ranges allow versatile use.

## Sensors with increased sensing range for industrial applications

Type	Dimensions [mm]	Sensing range [mm]	Material	$U_b$ [V]	Protection	f [Hz]	$I_{load}$ [mA]	Order no.
<b>Cable 2 m · Output function  · 3-wire · DC PNP</b>								
	M12 / L = 40	4 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	700	100	<b>IFS256</b>
	M12 / L = 40	7 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	700	100	<b>IFS257</b>
	M12 / L = 60	4 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	700	100	<b>IFS252</b>
	M12 / L = 60	7 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	700	100	<b>IFS253</b>
<b>Cable 2 m · Output function  · 3-wire · DC NPN</b>								
	M12 / L = 40	4 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	700	100	<b>IFS258</b>
	M12 / L = 40	7 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	700	100	<b>IFS259</b>
	M12 / L = 60	4 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	700	100	<b>IFS254</b>
	M12 / L = 60	7 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	700	100	<b>IFS255</b>
<b>Cable 2 m · Output function  · 2-wire · AC</b>								
	M12 / L = 71	4 nf	Brass	20...250	IP 67	25	250	<b>IF0007*</b>
	M12 / L = 71.5	4 nf	PBT	20...250	IP 67	25	250	<b>IF0003*</b>

f = flush / nf = non flush

**\* Note for AC and AC/DC units**

 Miniature fuse to IEC60127-2 sheet 1,  $\leq 2$  A (fast acting) Recommendation: check the unit for reliable function after a short circuit.





## Inductive M18 sensors with long sensing ranges with cable



- Large temperature range of -40...85 °C for greater flexibility
- Protection rating IP 65 to IP 69K for increased machine uptime
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### New standard

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**Sensors with increased sensing range for industrial applications**

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f [Hz]	I <sub>load</sub> [mA]	Order no.
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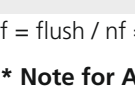
**Cable 2 m · Output function  · 3-wire · DC PNP**

	M18 / L = 40	8 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	400	100	<b>IGS248</b>
	M18 / L = 40	12 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	300	100	<b>IGS249</b>
	M18 / L = 60	8 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	400	100	<b>IGS244</b>
	M18 / L = 60	12 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	300	100	<b>IGS245</b>

**Cable 2 m · Output function  · 3-wire · DC NPN**

	M18 / L = 40	8 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	400	100	<b>IGS250</b>
	M18 / L = 40	12 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	300	100	<b>IGS251</b>
	M18 / L = 60	8 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	400	100	<b>IGS246</b>
	M18 / L = 60	12 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	300	100	<b>IGS247</b>

**Cable 2 m · Output function  · 2-wire · AC/DC**

	M18 / L = 80	5 f	PBT	20...250	IP 67	25 / 50	350 / 100	<b>IG0005*</b>
	M18 / L = 80	8 nf	PBT	20...250	IP 67	25 / 50	350 / 100	<b>IG0006*</b>
	M18 / L = 80	5 f	Brass	20...250	IP 67	25 / 50	350 / 100	<b>IG0011*</b>
	M18 / L = 80	8 nf	Brass	20...250	IP 67	25 / 50	350 / 100	<b>IG0012*</b>

f = flush / nf = non flush

**\* Note for AC and AC/DC units**

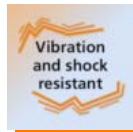
Miniature fuse to IEC60127-2 sheet 1, ≤ 2 A (fast acting) Recommendation: check the unit for reliable function after a short circuit.



## Inductive M30 sensors with long sensing ranges with cable



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Long sensing ranges allow versatile use.




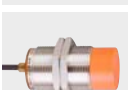
Sensors with increased sensing range for industrial applications

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f [Hz]	I <sub>load</sub> [mA]	Order no.
------	--------------------	-----------------------	----------	-----------------------	------------	-----------	---------------------------	-----------

Cable 2 m · Output function  · 3-wire · DC PNP

	M30 / L = 45	15 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	100	100	IIS242
	M30 / L = 45	22 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	100	100	IIS243
	M30 / L = 60	15 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	100	100	IIS238
	M30 / L = 60	22 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	100	100	IIS239

Cable 2 m · Output function  · 3-wire · DC NPN

	M30 / L = 45	15 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	100	100	IIS244
	M30 / L = 45	22 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	100	100	IIS245
	M30 / L = 60	15 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	100	100	IIS240
	M30 / L = 60	22 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	100	100	IIS241

f = flush / nf = non flush





# Inductive M30 sensors Dual voltage



- High shock and vibration resistance
- Different housing lengths for almost every application
- Safe and quick mounting due to robust and reinforced housing
- All sensors have corrosion-resistant M12 connectors
- Laser type label for permanent identification of the unit



### Long sensing range

The increased sensing range is ensured across the whole temperature range, giving better protection against failure due to mechanical damage. With M18 connection the sensors allow to reach sensing ranges up to 8 or 12 mm. In practice this corresponds to a value which is up to twice as high compared to standard sensors.

### Plug-and-socket connection

The connection is made via a robust M12 connector with integrated, clearly visible 4-port LED for indication of the switching status.

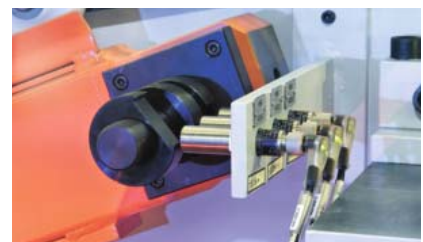
### Short length

The housing length of the two short designs is only 46 mm (flush) and 51 mm (non flush). The units can thus also be used where available space is extremely limited.




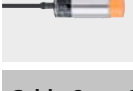




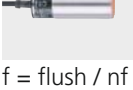
### Future-proof details

ifm sensors have been designed for a service life of many years. This is also reflected by the details.

For example the captive laser type label means the units can still be clearly identified after years of use.



## Sensors with increased sensing range for industrial applications

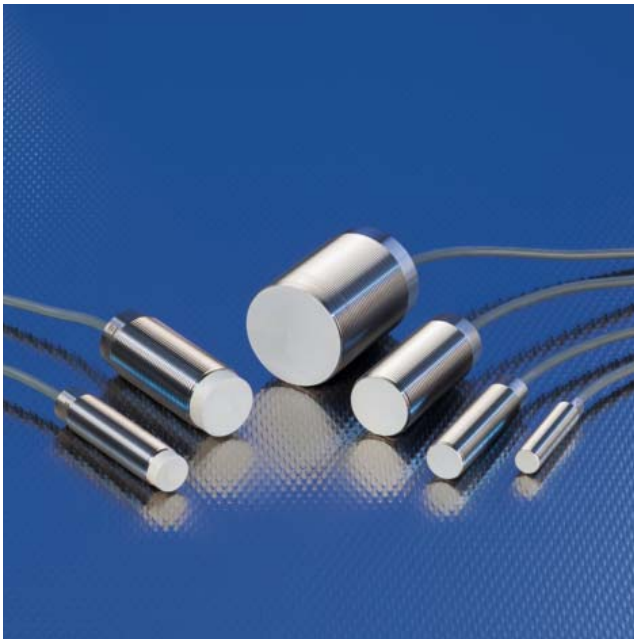
Type	Dimensions [mm]	Sensing range [mm]	Material	$U_b$ [V]	Protection	f [Hz]	$I_{load}$ [mA]	Order no.
<b>Cable 2 m · Output function  · 2-wire · AC/DC</b>								
	M30 / L = 81	10 f	PBT	20...250	IP 67	25 / 50	350 / 100	<b>II0005*</b>
	M30 / L = 81	15 nf	PBT	20...250	IP 67	25 / 50	350 / 100	<b>II0006*</b>
	M30 / L = 81	10 f	Brass	20...250	IP 67	25 / 50	350 / 100	<b>II0011*</b>
	M30 / L = 81	15 nf	Brass	20...250	IP 67	25 / 50	350 / 100	<b>II0012*</b>
<b>Cable 6 m · Output function  · 2-wire · AC/DC</b>								
	M30 / L = 81	15 nf	PBT	20...250	IP 67	25 / 50	350 / 100	<b>II0036*</b>
<b>Cable 2 m · Output function  · 2-wire · AC/DC</b>								
	M30 / L = 81	15 nf	Brass	20...250	IP 67	25 / 50	350 / 100	<b>II0097*</b>
	M30 / L = 81	10 f	Brass	20...250	IP 67	25 / 50	350 / 100	<b>II0096*</b>

f = flush / nf = non flush

**\* Note for AC and AC/DC units**Miniature fuse to IEC60127-2 sheet 1,  $\leq 2$  A (fast acting) Recommendation: check the unit for reliable function after a short circuit.



## Inductive sensors for high-temperature applications



- Ideal for applications in the steel or glass industries
- Very compact, since sensor and evaluation electronics are housed in one unit
- Great flexibility thanks to M12, M18, M30 and M50 housings
- Stainless steel housing for greater mechanical resistance
- With 5 m silicone cable, terminals can be outside the critical area



### For tough environments

The new high-temperature inductive sensors are specially designed for the steel and glass industries, but they are also suited for other hot environments and applications, such as industrial furnaces, burners and incinerators.








### Robust and reliable

Standard sensors are not suited for temperatures above 100 °C. Electronic components and tin solder would be damaged. Thanks to the special mechanical construction and the use of select materials and electronic components, these sensors are perfectly suited for temperatures up to 180 °C. With its compact and sturdy design, the new series offers maximum long-term stability and reliability even under the most challenging operating conditions.



High-temperature inductive sensors for position detection on conveyors in steelworks.

### Sensors for high-temperature applications

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f [Hz]	I <sub>load</sub> [mA]	Order no.
<b>Cable 5 m · Output function  · 3-wire · DC PNP</b>								
	M12 / L = 56	3 f	stainless steel	10...35	IP 65	500	120	<b>IF6074</b>
	M18 / L = 70	5 f	stainless steel	10...35	IP 65	400	150	<b>IG6614</b>
	M18 / L = 77	8 nf	stainless steel	10...35	IP 65	400	150	<b>IG6119</b>
	M30 / L = 70	10 f	High-grade st. steel	10...35	IP 65	200	150	<b>II5961</b>
	M30 / L = 79	15 nf	stainless steel	10...35	IP 65	200	150	<b>II5930</b>
	M50 / L = 70	20 f	stainless steel	10...35	IP 65	100	150	<b>I95045</b>

f = flush / nf = non flush

### Connectors

Type	Description	Order no.
<b>Angle bracket</b>		
	Angle bracket · for type M12 · Housing materials: stainless steel	<b>E10735</b>
	Angle bracket · for type M18 · Housing materials: stainless steel	<b>E10736</b>
	Angle bracket · for type M30 · Housing materials: stainless steel	<b>E10737</b>

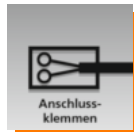




## Inductive sensors for use in pickling lines



- Ideal for applications in pickling lines
- Smooth sleeve to protect against deposits
- PTB housing resistant to pickling solutions
- Terminal chamber or cable connection



### Chemically resistant surface

These inductive sensors are ideal for use in environments with aggressive chemicals, for example in pickling lines. For the one-piece housing the sleeve and the sensing face are made of chemically resistant PTB. The smooth sleeve lets weld spatter on the sensor roll off.

### Robust



A number of tests, e.g. vibration test, shock test and impact test, qualify the sensors for robust use. Thanks to the high temperature range up to 85 °C even critical applications can be solved.



## Sensors for industrial applications

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f AC / DC [Hz]	I <sub>load</sub> AC / DC [mA]	Order no.
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### Cable 2 m · Output function · 2-wire · AC/DC

	Ø 20 / L = 77	10 nf	PBT	20...250	IP 67	25 / 70	350 / 100	IA0004*
	Ø 34 / L = 82	20 nf	PBT	20...250	IP 67	25 / 50	350 / 100	IB0004*
	Ø 34 / L = 82	30 nf	PBT	20...250	IP 67	25 / 50	350 / 100	IB0026*


### Cable 6 m · Output function · 2-wire · AC/DC

	Ø 20 / L = 77	10 nf	PBT	20...250	IP 67	25 / 70	350 / 100	IA0017*
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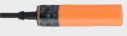

### Terminals · Output function / · 2-wire · DC PNP/NPN

	Ø 20 / L = 92	10 nf	PBT	10...55	IP 65	300	300	IA5122
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### Cable 2 m · Output function · 2-wire · AC/DC

	Ø 34 / L = 82	20 nf	PBT	20...250	IP 67	25 / 50	350 / 100	IB0017*
	Ø 34 / L = 82	30 nf	PBT	20...250	IP 67	25 / 50	350 / 100	IB0027*

### Cable 2 m · Output function · 3-wire · DC PNP

	Ø 20 / L = 77	10 nf	PBT	10...36	IP 67	300	250	IA5082
	Ø 34 / L = 82	20 nf	PBT	10...36	IP 67	60	250	IB5096

### Terminals · Output function / · 3-wire · DC PNP

	Ø 34 / L = 98	20 nf	PBT	10...36	IP 65	350	250	IB5063
	Ø 34 / L = 98	30 nf	PBT	10...36	IP 65	350	200	IB5133

f = flush / nf = non flush

#### \* Note for AC and AC/DC units

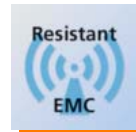
Miniature fuse to IEC60127-2 sheet 1, ≤ 2 A (fast acting) Recommendation: check the unit for reliable function after a short circuit.



## Electromagnetic field immune inductive sensors with $K = 1$



- Housing: rectangular, the sensing face can be rotated to 5 different positions
- Electromagnetic field immune: suitable for all AC / DC and medium frequency welding systems
- Increased sensing range for higher uptime
- Resistant to weld slag due to Duroplast cover and PTFE coating



### Electromagnetic-field immune, resistant to weld slag

Due to the special coil structure the proximity sensors are insensitive to interfering magnetic fields which occur during the welding process. This makes them an optimum choice for use in welding equipment. The sensing face is made of a thermoset and the surface of the metal housing is PTFE-coated so that no weld slag adheres to the housing.

### Correction factor = 1







No matter whether steel, aluminium, copper or other non-ferrous metals: the "K=1" sensors have the same sensing range on all metals, i.e. the correction factor is constantly one.

### Increased sensing range

The increased sensing range is ensured over the whole temperature range. This provides better protection against failures due to mechanical damage. Compared to standard sensors it corresponds to a value which in practice is up to twice as high.





## Sensors for industrial applications, rectangular housings

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f [Hz]	I <sub>load</sub> [mA]	Order no.
<b>M12 connector · Output function  · 3-wire · DC PNP</b>								
	40 x 40 x 54	20 f	PA (polyamide)	10...36	IP 67	200	200	<b>IM5128</b>
	40 x 40 x 54	35 nf	PA (polyamide)	10...36	IP 67	200	200	<b>IM5130</b>
	40 x 40 x 54	40 nf	PA (polyamide)	10...36	IP 67	200	200	<b>IM5131</b>
	40 x 40 x 54	20 f	PA (polyamide)	10...36	IP 67	200	200	<b>IM5119</b>
	40 x 40 x 54	35 nf	PA (polyamide)	10...36	IP 67	200	200	<b>IM5120</b>
	40 x 40 x 54	40 nf	PA (polyamide)	10...36	IP 67	200	200	<b>IM5129</b>
<b>M12 connector · Output function  · 4-wire · DC PNP</b>								
	40 x 40 x 54	20 f	PA (polyamide)	10...36	IP 67	200	200	<b>IM5132</b>
	40 x 40 x 54	35 nf	PA (polyamide)	10...36	IP 67	200	200	<b>IM5133</b>
	40 x 40 x 54	40 nf	PA (polyamide)	10...36	IP 67 / IP 69K	200	200	<b>IM5135</b>
	40 x 40 x 54	20 f	PA (polyamide)	10...36	IP 67	200	200	<b>IM5124</b>
	40 x 40 x 54	35 nf	PA (polyamide)	10...36	IP 67	200	200	<b>IM5125</b>
	40 x 40 x 54	40 nf	PA (polyamide)	10...36	IP 67	200	200	<b>IM5126</b>

f = flush / nf = non flush

## Connectors

Type	Description	Order no.
<b>Socket M12, 5/4-pole, 4-wire</b>		
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · For welding applications · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVW002</b>
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · For welding applications · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVW005</b>

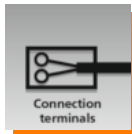




## Inductive sensors for conveying



- Very long sensing ranges up to 60 mm
- Different sizes for demanding applications
- M12 connector easy to mount and maintain
- Versions in 3-wire and 4-wire technology
- Type IM: sensing face in 5 positions freely selectable, clearly visible corner LEDs



### Applications

The inductive rectangular sensors are particularly suited for use in conveying.

#### Type IM

The two clearly visible LEDs of the inductive rectangular sensor IM (40 x 40 mm) can be seen even under adverse installation conditions.

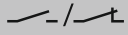

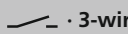


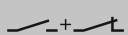

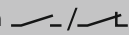
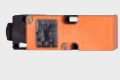


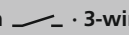

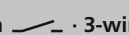

By loosening the adjusting screw, the sensing face can be rotated to 5 different positions and thus be optimally adapted to your applications.

#### Long sensing ranges

The high sensing ranges are guaranteed over the complete temperature range. They provide sufficient protection against mechanical damage ensuring higher machine uptime.



Sensors for industrial applications, rectangular housings

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f [Hz]	I <sub>load</sub> [mA]	Order no.
<b>M12 connector · Output function  · 3-wire · DC PNP</b>								
	105 x 80 x 40	60 nf	PPE	10...36	IP 67	100	250	<b>ID5046</b>
<b>M12 connector · Output function  · 3-wire · DC PNP</b>								
	40 x 40 x 54	20 f	PA (polyamide)	10...36	IP 67	100	200	<b>IM5115</b>
	40 x 40 x 54	35 nf	PA (polyamide)	10...36	IP 67	80	200	<b>IM5116</b>
	40 x 40 x 54	40 nf	PA (polyamide)	10...36	IP 67	60	200	<b>IM5117</b>
	92 x 80 x 40	50 f	PPE	10...36	IP 67	70	250	<b>ID5055</b>
<b>M12 connector · Output function  · 4-wire · DC PNP</b>								
	40 x 40 x 54	20 f	PA (polyamide)	10...36	IP 67	100	200	<b>IM5123</b>
	40 x 40 x 54	35 nf	PA (polyamide)	10...36	IP 67	80	200	<b>IM5134</b>
	40 x 40 x 54	40 nf	PA (polyamide)	10...36	IP 67	60	200	<b>IM5136</b>
<b>Terminals · Output function  · 3-wire · DC PNP</b>								
	40 x 40 x 120	15 f	PPE	10...36	IP 65	350	250	<b>IM5020</b>
	40 x 40 x 120	20 nf	PPE	10...36	IP 65	350	250	<b>IM5019</b>
	90 x 60 x 40	40 nf	PPE	10...36	IP 65	15	250	<b>IC5005</b>
	105 x 80 x 40	60 nf	PPE	10...36	IP 65	100	250	<b>ID5005</b>
<b>Cable 2 m · Output function  · 3-wire · DC PNP</b>								
	120 x 80 x 30	50 nf	PPE	10...36	IP 67	100	250	<b>ID5026</b>
<b>Cable 6 m · Output function  · 3-wire · DC PNP</b>								
	120 x 80 x 30	50 nf	PPE	10...36	IP 67	100	250	<b>ID5033</b>

f = flush / nf = non flush



## Inductive dual-voltage sensors for conveying



- 2-wire units with combined AC/DC output stage
- Very long sensing range up to 60 mm
- Different sizes for demanding applications
- Easy-to-use and easy-to-maintain M12 connector or terminal chamber
- 2-wire technology



### Dual-voltage sensors

The sensors have two separate output stages: a DC output stage with transistor (DC, PNP switching) and an AC output stage with thyristor (AC, non polarised).





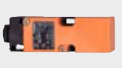





Depending on the voltage applied, the sensor decides which output (AC or DC) switches.

### Long sensing ranges

The long sensing ranges of 20 mm (flush) as well as 35, 40, 50 and 60 mm (non flush) are ensured over the whole temperature range. They provide sufficient protection against mechanical damage, ensuring higher machine uptime.



Sensors for industrial applications, rectangular housings

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f AC / DC [Hz]	I <sub>load</sub> AC / DC [mA]	Order no.
<b>Terminals · Output function</b>  /  · 2-wire · AC/DC								
	90 x 60 x 40	40 nf	PPE	20...250	IP 65	10	350 / 100	<b>IC0003*</b>
	105 x 80 x 40	60 nf	modified PPE	20...250	IP 65	4	350 / 100	<b>ID0013*</b>
	40 x 40 x 120	20 nf	PPE	20...250	IP 65	20 / 55	350 / 100	<b>IM0010*</b>
	40 x 40 x 120	15 f	PPE	20...250	IP 65	20 / 55	350 / 100	<b>IM0011*</b>
<b>M12 connector · Output function</b>  · 2-wire · AC/DC								
	40 x 40 x 66	35 nf	PPE	20...250	IP 67	20 / 50	350 / 100	<b>IM0053*</b>
	40 x 40 x 66	20 f	PPE	20...250	IP 67	25 / 140	350 / 100	<b>IM0054*</b>
<b>Cable 2 m · Output function</b>  · 2-wire · AC/DC								
	120 x 80 x 30	50 nf	modified PPE	20...250	IP 65	25 / 35	350 / 100	<b>ID0014*</b>
<b>Cable 6 m · Output function</b>  · 3-wire · DC PNP								
	120 x 80 x 30	50 nf	PPE	10...36	IP 67	100	250	<b>ID5033</b>

f = flush / nf = non flush

**\* Note for AC and AC/DC units**

Miniature fuse to IEC60127-2 sheet 1, ≤ 2 A (fast acting) Recommendation: check the unit for reliable function after a short circuit.





## Inductive sensors with ranges up to 120 mm



- Sensing area up to 100 mm or 164 mm diameter
- For applications in metal production and handling
- Tried and tested in steel applications worldwide
- Potentiometer adjustment
- DC or AC versions for worldwide use



### Position detection in steelworks

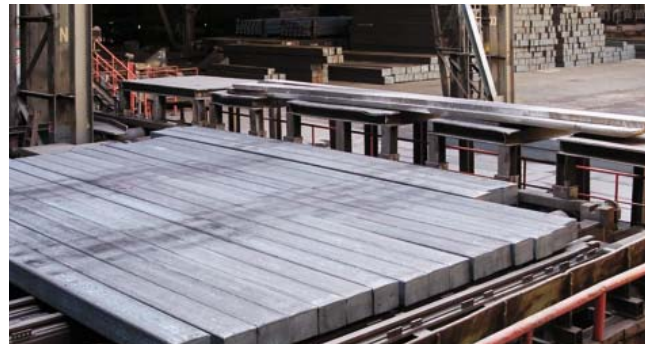
In steelworks positions of slabs, blooms or billets are detected at many places, e.g. on conveyor lines to the furnace inlet, at the cooling bed or at the individual processing stations.

The I1 and I2 type inductive sensors are also ideal for applications in steel production such as shearing, cutting or rolling.

### Long sensing range

The large diameters of 100 mm or 164 mm result in particularly long sensing ranges. Another advantage is that even workpieces or workpiece carriers which are not precisely guided are still detected.

If the sensing range is too long, so that the sensor detects machine parts in the background, it can be reduced via potentiometer.








Inductive sensors used on semi-finished product transfer to the reheat furnace.

Sensors with increased sensing range for industrial applications

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f [Hz]	I <sub>load</sub> [mA]	Order no.
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Cable 2 m · Output function  · 2-wire · AC

	Ø 100	70 nf	PBT	90...250	IP 65	5	250	I12001*
	Ø 100	70 nf	PBT	90...250	IP 65	5	250	I12003*
	Ø 164	120 nf	PBT	90...250	IP 65	3	250	I22001*
	Ø 164	120 nf	PBT	90...250	IP 65	3	250	I22003*

7/8" connector · Output function  · 2-wire · AC

	Ø 164	120 nf	PBT	90...250	IP 65	3	250	I22006*
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Cable 2 m · Output function  · 3-wire · DC PNP

	Ø 100	70 nf	PBT	10...36	IP 65	5	250	I17001
	Ø 100	70 nf	PBT	10...36	IP 65	5	250	I17003
	Ø 164	120 nf	PBT	10...36	IP 65	3	250	I27001

f = flush / nf = non flush

\* Note for AC and AC/DC units

Miniature fuse to IEC60127-2 sheet 1, ≤ 2 A (fast acting) Recommendation: check the unit for reliable function after a short circuit.



## Inductive sensors in small rectangular design



- Ideal for applications where space is restricted
- Different sizes for special applications
- 2 different connection technologies: M8 connector and cable
- M8 connector for fast mounting
- Quick, easy and flexible mounting due to compact designs



### Small and compact

The small inductive sensors in rectangular design are particularly suited for use in applications where space is at a premium, as can typically be found in robotics, assembly and handling technology.










A typical application is, for example, the automatic strapping machine.

### Connection

The user can select between units with connection cables or versions with M8 connector on the unit. The latter allows particularly fast fitting of the sensor.



## Sensors for industrial applications, rectangular housings

Type	Dimensions [mm]	Sensing range [mm]	Material	$U_b$ [V]	Protection	f [Hz]	$I_{load}$ [mA]	Order no.
<b>Cable 2 m · Output function  · 3-wire · DC PNP</b>								
	28 x 10 x 16	2 f	PBT	10...36	IP 67	800	200	<b>IS5001</b>
	28 x 10 x 16	4 nf	PBT	10...36	IP 67	2000	250	<b>IS5070</b>
	40 x 8 x 8	2 f	Brass	10...36	IP 65	2000	250	<b>IL5002</b>
	40 x 12 x 26	2 f	PBT	10...36	IP 67	1400	250	<b>IN5121</b>
	40 x 12 x 26	4 nf	PBT	10...36	IP 67	1300	250	<b>IN5129</b>
<b>M8 connector · Output function  · 3-wire · DC PNP</b>								
	28 x 10 x 16	2 f	PBT	10...36	IP 67	800	200	<b>IS5035</b>
	28 x 10 x 16	4 nf	PBT	10...36	IP 67	2000	250	<b>IS5071</b>
	40 x 8 x 8	2 f	Brass	10...36	IP 65	2000	250	<b>IL5004</b>
	40 x 12 x 26	2 f	PBT	10...36	IP 67	1400	250	<b>IN5230</b>
	40 x 12 x 26	4 nf	PBT	10...36	IP 65	1300	250	<b>IN5212</b>

f = flush / nf = non flush





## Capacitive M18 Sensors



- Extended parameter setting using IO-Link
- Versatile data processing via IO-Link
- Plastic or metal housings for different applications
- Sensors for position and level detection
- Mounting accessories for installation on tanks or sight glasses (bypass)



### Capacitive sensors

Capacitive sensors are used for non-contact detection of any objects as well as for level monitoring.

Typical applications are in the wood, paper, glass, plastic, food and chemical industries.

### Operating principle

The capacitance between the active electrode of the sensor and the electrical earth potential is evaluated. An approaching object influences the oscillating field between these two capacitor plates and, consequently, the capacitance. This applies to metallic and non-metallic objects. The potentiometer or pushbutton allows the user to set the sensitivity.

### New characteristics via IO-Link

IO-Link allows direct detection of the process value or switch-on / switch-off delays of the output. Parameters are set via IO-Link interface.



## Sensors for distance and level measurement

Type	Dimensions [mm]	Sensing range [mm]	Material	$U_b$ [V]	Protection	f AC / DC [Hz]	$I_{load}$ AC / DC [mA]	Order no.
<b>Cable 2 m · Output function  · 2-wire · AC/DC</b>								
	M18 / L = 84	8 nf	PBT	20...250	IP 67	25 / 50	350 / 100	<b>KG0009*</b>
<b>Cable 2 m · Output function  · 2-wire · AC/DC</b>								
	M18 / L = 84	8 nf	PBT	20...250	IP 67	25 / 50	350 / 100	<b>KG0010*</b>
<b>Cable 2 m · Output function  /  · 3-wire · DC PNP</b>								
	M18 / L = 77	8 nf	PP	10...36	IP 65 / IP 67	10	200	<b>KG5069</b>
<b>M12 connector · Output function  · 3-wire · DC PNP</b>								
	M18 / L = 93.8	8 nf	PBT	10...36	IP 67	50	250	<b>KG5057</b>
<b>M12 connector · Output function  /  · 3-wire · DC PNP</b>								
	M18 / L = 87	8 nf	PBT	10...36	IP 65 / IP 67	10	200	<b>KG5071</b>
	M18 / L = 87	12 nf	PBT	10...36	IP 65 / IP 67	10	200	<b>KG5066</b>
<b>Terminals · Output function  /  · 2-wire · AC/DC</b>								
	M18 / L = 110	8 nf	PBT	20...250	IP 65	25 / 50	350 / 100	<b>KG0008*</b>

f = flush / nf = non flush

**\* Note for AC and AC/DC units**

Miniature fuse to IEC60127-2 sheet 1,  $\leq 2$  A (fast acting) Recommendation: check the unit for reliable function after a short circuit.



## Capacitive M30 Sensors



- Extended parameter setting using IO-Link
- Versatile data processing via IO-Link
- Plastic or metal housings for different applications
- Sensors for position and level detection
- Mounting accessories for installation on tanks or sight glasses (bypass)



### Capacitive sensors

Capacitive sensors are used for non-contact detection of any objects as well as for level monitoring.

Typical applications are in the wood, paper, glass, plastic, food and chemical industries.

### Operating principle

The capacitance between the active electrode of the sensor and the electrical earth potential is evaluated. An approaching object influences the oscillating field between these two capacitor plates and, consequently, the capacitance. This applies to metallic and non-metallic objects. The potentiometer or pushbutton allows the user to set the sensitivity.

### New characteristics via IO-Link

IO-Link allows direct detection of the process value or switch-on / switch-off delays of the output. Parameters are set via IO-Link interface.



## Sensors for distance and level measurement

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f AC / DC [Hz]	I <sub>load</sub> AC / DC [mA]	Order no.
<b>Cable 2 m · Output function  · 2-wire · AC/DC</b>								
	M30 / L = 81	15 nf	PBT	20...250	IP 65	25 / 40	250	<b>KI0016*</b>
<b>Cable 2 m · Output function  · 3-wire · DC PNP</b>								
	M30 / L = 81	15 nf	PBT	10...36	IP 65	40	250	<b>KI5002</b>
<b>connector (DIN EN 175301-803) · Output function  · 3-wire · DC PNP</b>								
	M30 / L = 92	15 nf	PBT	10...36	IP 65	40	250	<b>KI5038</b>
<b>M12 connector · Output function  · 3-wire · DC PNP</b>								
	M30 / L = 90	8 f	High-grade st. steel	10...36	IP 65 / IP 67	10	100	<b>KI5085</b>
	M30 / L = 90	15 nf	High-grade st. steel	10...36	IP 65 / IP 67	10	100	<b>KI5087</b>
	M30 / L = 90	20 nf	PBT	10...36	IP 65 / IP 67	10	200	<b>KI5083</b>
<b>M12 connector · Output function  · 4-wire · DC PNP</b>								
	M30 / L = 116	nf	PPS	10...30	IP 67	10	200	<b>KN5121</b>
<b>Terminals · Output function  · 2-wire · AC/DC</b>								
	M30 / L = 125	15 nf	PBT	20...250	IP 65	25 / 40	250	<b>KI0024*</b>

f = flush / nf = non flush

**\* Note for AC and AC/DC units**

Miniature fuse to IEC60127-2 sheet 1, ≤ 2 A (fast acting) Recommendation: check the unit for reliable function after a short circuit.





## Capacitive sensors for flush installation



- Easy adjustment by pressing a pushbutton
- Automatic detection of PNP or NPN output loads
- NO/NC selectable
- Clearly visible indication of the switching status
- Easy mounting via fixing straps



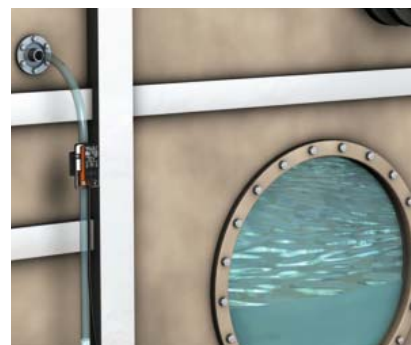
### Application

Capacitive sensors detect bulk materials or liquids through non-metallic materials. The capacitive sensors of the KQ series can either be fixed on a flat surface or on tubes using mounting brackets and cable ties.

Using optional accessories the sensors can be integrated into a wide range of applications in a flexible and time-saving way.

### Set-up

The new operating concept enables setting and adjustment of the output function by pressing just one pushbutton. The automatic detection of the load simplifies the connection to common controllers.

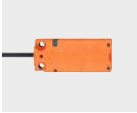



Easy mounting of the sensors to detect the desired level.



## Sensors with IO-Link

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f [Hz]	I <sub>load</sub> [mA]	Order no.
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 Cable 2 m · Output function  /  · DC PNP

	20 x 7 x 48	12 nf	PBT	10...30	IP 65 / IP 67	10	100	KQ5100
	20 x 14 x 48	12 nf	PBT	10...30	IP 65 / IP 67	10	100	KQ6002

 Cable with connector 0.04 m · Output function  /  · DC PNP

	20 x 7 x 48	12 nf	PBT	10...30	IP 65 / IP 67	10	100	KQ5102
	20 x 14 x 48	12 nf	PBT	10...30	IP 65 / IP 67	10	100	KQ6004

 Cable with connector 0.1 m · Output function  /  · DC PNP


	20 x 7 x 48	12 nf	PBT	10...30	IP 65 / IP 67	10	100	KQ5101
	20 x 14 x 48	12 nf	PBT	10...30	IP 65 / IP 67	10	100	KQ6005

f = flush / nf = non flush


## Accessories

Type	Description	Order no.
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## Mounting adapter for free-standing mounting

	Mounting adapter for free-standing mounting · for type KQ5, KQ6 · Housing materials: adapter: PBT / inserts: Brass / screw: steel galvanised	E12153
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## Mounting adapter

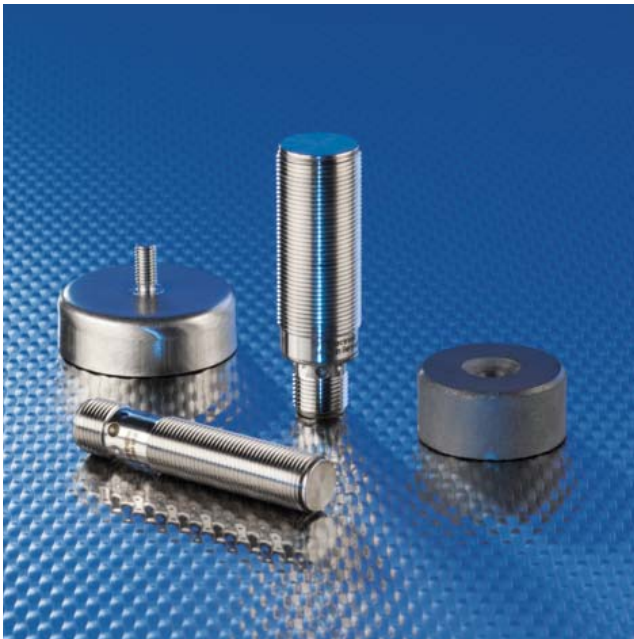
	Mounting adapter · Pipe and tube installation KQ5 / KQ6 with cable ties · Fixing of the types KQ5 and KQ6 to pipes and tubes · Housing materials: Mounting adapter: PA 12 black	E12163
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## Fixing strap

	Fixing strap · Length: 760 mm · for capacitive level sensors · for type KNQ, KQ5, KQ6 · Housing materials: PA	E10880
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# Magnetic sensors



- Long sensing ranges also through non-magnetisable metals
- No mutual interference of the sensors
- Temperature-stable and reproducible switch point
- Full-metal housing: Impact, shock and vibration-resistant



## Demanding applications

Due to their operating principle, magnetic sensors can detect special targets (permanent magnets) through all non-magnetisable materials and thus be mounted behind covers made of stainless steel, non-ferrous metal, plastics, wood or glass which ensures inexpensive and fast mounting. There is no need for bore holes or flush installation.

## Long sensing range

Magnetic sensors have a similar operating principle as inductive sensors. They detect damping magnets without contact. Due to this operating principle an extremely high sensing range can also be achieved with smaller types.

## High switching frequency

ifm sensors reach a switching frequency of more than 5,000 Hz. This high switching frequency applies to the whole temperature range.

## Mechanically demanding applications

Thanks to the tolerant response behaviour, reliable switch-point detection is also ensured with high mechanical tolerances.




Magnetic sensors provide long sensing ranges.

## Sensors for industrial applications

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f [Hz]	I <sub>load</sub> [mA]	Order no.
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Cable 2 m · Output function  · 3-wire · DC PNP

	M12 / L = 50	60	High-grade st. steel	10...30	IP 67	5000	200	MFS201
	M18 / L = 50	70	stainless steel	10...30	IP 67	5000	200	MGS201
	28 x 10 x 16	60	PBT	10...30	IP 67	5000	200	MS5011

M8 connector · Output function  · 3-wire · DC PNP

	28 x 10 x 16	60	PBT	10...30	IP 67	5000	200	MS5010
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M12 connector · Output function  · 3-wire · DC PNP

	M12 / L = 60	60	High-grade st. steel	10...30	IP 67	5000	200	MFS200
	M18 / L = 60	70	stainless steel	10...30	IP 67	5000	200	MGS200

## Sensors for hygienic and wet areas

Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f [Hz]	I <sub>load</sub> [mA]	Order no.
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M12 connector · Output function  · 3-wire · DC PNP

	M12 / L = 60	60	High-grade st. steel	10...30	IP 68 / IP 69K	5000	200	MFT200
	M18 / L = 60	70	High-grade st. steel	10...30	IP 68 / IP 69K	5000	200	MGT200
	M18 / L = 60	100	High-grade st. steel	10...30	IP 68 / IP 69K	–	200	MGT201





## T-slot cylinder sensors



- Self-locking fixture for quick mounting and easy adjustment
- Convenient: Easy fit 'drop from the top' into a T-slot
- Unit versions available with connection cable and M8 or M12 cable plug
- Moulded cable ensuring very good strain relief
- Ingress protection in all applications due to the high protection rating



### Quick adjustment and easy mounting

The cylinder sensor can be easily inserted from above into the T-slot where it clicks home due to the innovative clamping mechanism. For easy switch point positioning the sensor can be moved in the slot until it is fixed definitely using the slotted / hexagonal socket screw.

### Robust design and good fixing








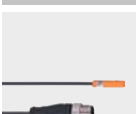
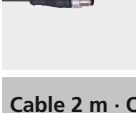
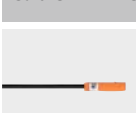







Since the sensor is completely surrounded by the slot there is no room for mechanical damage. The fixing at the end of the sensor reduces leverage and provides better protection against inadvertent tear-out or switch point change.

### Different versions for your application

The sensor is suited for the common T-slot cylinders. Tailor-made accessories enable mounting on different cylinder types such as trapezoidal slot, tie-rod, clean-line or integrated profile cylinders.



## T-slot sensors for industrial applications

Type	Dimensions [mm]	Material	U <sub>b</sub> [V]	f [Hz]	Protection	I <sub>load</sub> [mA]	T <sub>a</sub> [°C]	Order no.
<b>Cable 0.3 m · with M8 connector (snap-fit) · Output function  · 3-wire · DC PNP</b>								
	25 x 5 x 6.5	PA (polyamide)	10...30	10000	IP 65 / IP 67	100	-25...85	<b>MK5101</b>
	25 x 5 x 6.5	PA (polyamide)	10...30	10000	IP 65 / IP 67	100	-25...85	<b>MK5192</b>
	25 x 5 x 6.5	PA (polyamide)	10...30	10000	IP 65 / IP 67	200	-25...85	<b>MK5106</b>
<b>Cable 0.3 m · with M8 connector · Output function  · 3-wire · DC PNP</b>								
	25 x 5 x 6.5	PA (polyamide)	10...30	10000	IP 65 / IP 67	100	-25...85	<b>MK5102</b>
<b>Cable 0.3 m · with M12 connector · Output function  · 3-wire · DC PNP</b>								
	25 x 5 x 6.5	PA (polyamide)	10...30	10000	IP 65 / IP 67	100	-25...85	<b>MK5196</b>
	25 x 5 x 6.5	PA (polyamide)	10...30	10000	IP 65 / IP 67	100	-25...85	<b>MK5107</b>
	25 x 5 x 6.5	PA (polyamide)	10...30	10000	IP 65 / IP 67	200	-25...85	<b>MK5108</b>
<b>Cable 2 m · Output function  · 2-wire · DC PNP/NPN</b>								
	25 x 5 x 6.5	PA (polyamide)	10...30	4000	IP 65 / IP 67	100	-25...85	<b>MK5103</b>
<b>Cable 2 m · Output function  · 3-wire · DC PNP</b>								
	25 x 5 x 6.5	PA (polyamide)	10...30	10000	IP 65 / IP 67	200	-25...85	<b>MK5115</b>
	25 x 5 x 6.5	PA (polyamide)	10...30	10000	IP 65 / IP 67	100	-25...85	<b>MK5100</b>
<b>Cable 6 m · Output function  · 3-wire · DC PNP</b>								
	25 x 5 x 6.5	PA (polyamide)	10...30	10000	IP 65 / IP 67	200	-25...85	<b>MK5117</b>



## Extremely short C-slot cylinder sensors



- Self-clamping fixture for easy adjustment and quick mounting
- Convenient: Easy fit 'drop from the top' into a C-slot
- Unit versions available with connection cable and cable plug
- Moulded cable ensuring very good strain relief
- Suitable for the most common C-slots



### Quick adjustment and easy mounting

The cylinder switch is suited for small parallel grippers and short-stroke cylinders with C-slot. Due to the height of only 5 mm it can be flush-mounted in the most common C-slots from above and is largely protected against damage.

A 17.5 mm short version is available for miniature grippers. The sensor is inserted into the slot where it is held in position by a clamping mechanism. The moulded cable at the end of the cylinder switch provides excellent strain relief.


### Long life


Non-contact sensors virtually work without wear and often achieve a longer life than Reed switches. This saves expensive repair and downtimes.




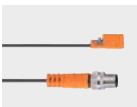
## Non flush C-slot sensors for industrial applications

Type	Dimensions [mm]	Material	U <sub>b</sub> [V]	f [Hz]	Protection	I <sub>load</sub> [mA]	T <sub>a</sub> [°C]	Order no.
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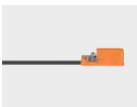
Cable 0.3 m · with M8 connector (snap-fit) · Output function  · 3-wire · DC PNP

	17.5 x 2.8 x 7.7	PA (polyamide)	10...30	10000	IP 65 / IP 67	100	-25...85	MK5301
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Cable 0.3 m · with M8 connector · Output function  · 3-wire · DC PNP

	17.5 x 2.8 x 7.7	PA (polyamide)	10...30	10000	IP 65 / IP 67	100	-25...85	MK5302
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Cable 2 m · Output function  · 3-wire · DC PNP


	17.5 x 2.8 x 7.7	PA (polyamide)	10...30	10000	IP 65 / IP 67	100	-25...85	MK5300
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## Flush C-slot sensors for industrial applications


Type	Dimensions [mm]	Material	U <sub>b</sub> [V]	f [Hz]	Protection	I <sub>load</sub> [mA]	T <sub>a</sub> [°C]	Order no.
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Cable 2 m · Output function  · 3-wire · DC PNP

	25.8 x 2.8 x 5	PA (polyamide)	10...30	10000	IP 65 / IP 67	100	-25...85	MK5312
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Cable 0.3 m · with M8 connector (snap-fit) · Output function  · 3-wire · DC PNP

	25.8 x 2.8 x 5	PA (polyamide)	10...30	10000	IP 65 / IP 67	100	-25...85	MK5310
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Cable 0.3 m · with M8 connector · Output function  · 3-wire · DC PNP

	25.8 x 2.8 x 5	PA (polyamide)	10...30	10000	IP 65 / IP 67	100	-25...85	MK5311
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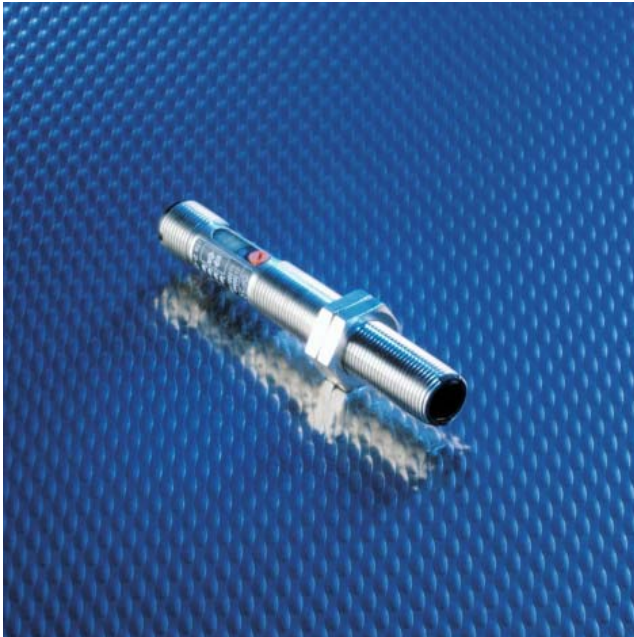
Cable 0.3 m · with M12 connector · Output function  · 3-wire · DC PNP

	25.8 x 2.8 x 5	PA (polyamide)	10...30	10000	IP 65 / IP 67	100	-25...85	MK5314
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## Photoelectric M12 sensors – robust and universal



- Available as through-beam, retro-reflective and diffuse reflection sensor
- Metal housing for robust applications
- Adjustable ranges
- LED display to check operation, switching status and function
- Wide range of system components for easy and secure mounting



### Photocell in M12 housing

The robust metal housing as well as the common M12 threaded design also allow use in a rough industrial environment. In addition, the M12 photocell features easy fixing, alignment and handling.

### Function check output

In case of a short-circuit of the switching output, faulty object detection (maladjustment, soiling of the lenses) or an internal failure, the function check output is set. The LEDs on the sensor indicate the type of failure.





### Setting sensitivity

The setting sensitivity allows easy and precise adjustment using the potentiometer.








Safe detection of transported parts on a conveyor belt.

## Cylindrical OF housing (M12) BasicLine

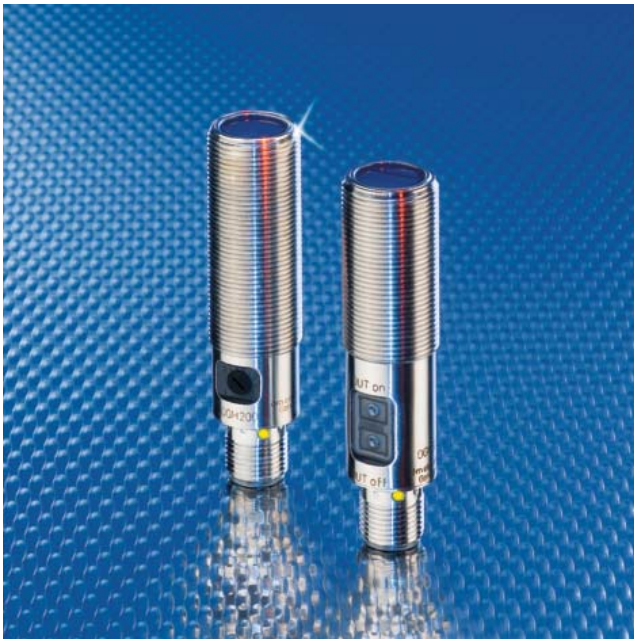
Type	Operating principle	Range	Type of light	Spot Ø at max. range [mm]	Output H = light-on D = dark-on	Order no.
<b>Diffuse reflection sensor · M12 connector · 10...36 DC · metal · IP65</b>						
	Diffuse reflection sensor	1...200 mm	Infrared	92	H/D PNP	<b>OF5012</b>
	Diffuse reflection sensor	1...400 mm	Infrared	185	H/D PNP	<b>OF5027</b>
<b>Retro-reflective sensor · M12 connector · 10...36 DC · metal · IP65</b>						
	Retro-reflective sensor	0.05...2 m	Infrared	140	H/D PNP	<b>OF5016</b>
	Polarisation filter	0.2...0.8 m	Red	70	H/D PNP	<b>OF5025</b>
<b>Through-beam sensor · M12 connector · 10...36 DC · metal · IP65</b>						
	Transmitter	4 m	Infrared	700	–	<b>OF5021</b>
	Receiver	4 m	Infrared	–	H/D PNP	<b>OF5022</b>

## Accessories

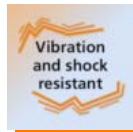
Type	Description	Order no.
	Prismatic reflector · Ø 80 mm · round · For red light and infrared light retro-reflective sensors · Housing materials: plastics	<b>E20005</b>
	Prismatic reflector · 45 x 28 mm · rectangular · For red light and infrared light retro-reflective sensors · Housing materials: plastics	<b>E20452</b>
	Mounting set · Ø 12.2 mm · Clamp mounting · free-standing M8 · for type OF, IF · Housing materials: fixture: stainless steel 316Ti / 1.4571 / clamp: diecast zinc	<b>E20860</b>
	Mounting set · Ø 12.2 mm · Clamp mounting · free-standing M8 · for type OF, IF · Housing materials: fixture: stainless steel 316Ti / 1.4571 / clamp: diecast zinc	<b>E20856</b>
	clamp · Ø 14 mm; M12 · free-standing M12 · Housing materials: clamp: diecast zinc	<b>E20796</b>



# Photoelectric M18 sensors – robust and universal



- Long ranges
- Robust high-grade stainless steel housing for harsh environments
- Available as through-beam, retro-reflective and diffuse reflection sensor
- Diffuse reflection sensor with adjustable background suppression
- Universal mounting using system components and mounting accessories



### All-round photocell

High-quality technology, extraordinary features and an outstanding price / performance ratio make this sensor suitable for almost all industrial areas. The robust high-grade stainless steel housing and the common M18 threaded type also allow use in a rough industrial environment.




### Variants

For use in standard applications through-beam and retro-reflective sensors with polarisation filter without setting options are available. The diffuse reflection sensors with background suppression can be easily and precisely adapted to your application using the potentiometer.








A safe solution in every application.


## Cylindrical housing OG (M18) BasicLine

Type	Operating principle	Range	Type of light	Spot Ø at max. range [mm]	Output H = light-on D = dark-on	Order no.
<b>Diffuse reflection sensor · M12 connector · 10...36 DC · high-grade stainless steel · IP65</b>						
	Diffuse reflection sensor	2...600 mm	Red	50	H PNP	<b>OGT200</b>
	Background suppression	15...250 mm	Red	21	H PNP	<b>OGH200</b>
<b>Retro-reflective sensor · M12 connector · 10...36 DC · high-grade stainless steel · IP67</b>						
	Polarisation filter	0.03...4 m	Red	160	D PNP	<b>OGP200</b>
	Polarisation filter	0.03...4 m	Red	160	H PNP	<b>OGP201</b>
<b>Through-beam sensor · M12 connector · 10...36 DC · high-grade stainless steel · IP67</b>						
	Transmitter	20 m	Red	800	–	<b>OGS200</b>
	Receiver	20 m	Red	–	D PNP	<b>OGE200</b>
	Receiver	20 m	Red	–	H PNP	<b>OGE201</b>

## Accessories

Type	Description	Order no.
	Prismatic reflector · Ø 80 mm · round · For red light and infrared light retro-reflective sensors · Housing materials: plastics	<b>E20005</b>
	Prismatic reflector · 45 x 28 mm · rectangular · For red light and infrared light retro-reflective sensors · Housing materials: plastics	<b>E20452</b>
	Mounting set · Ø 18.5 mm · Clamp mounting · Free-standing M10 · for type OG, IG, KG · Housing materials: clamp: diecast zinc / fixture: steel	<b>E20718</b>
	Mounting set · Ø 18.5 mm · Clamp mounting · Free-standing M10 · for type OG, IG, KG · Housing materials: clamp: diecast zinc / fixture: steel	<b>E20719</b>
	Mounting set · Ø 18.5 mm · Clamp mounting · rod mounting Ø 12 mm · for type OG, IG, KG · Housing materials: clamp: diecast zinc / fixture: steel	<b>E20720</b>

## Connectors

Type	Description	Order no.
<b>Socket M12, 5/4-pole, 4-wire</b>		
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVC005</b>





## High-performance M18 photocell



- Extremely long ranges
- Robust high-grade stainless steel housing for harsh environments
- Available as through-beam, retro-reflective and diffuse reflection sensor
- Teach mode for simple and precise adjustment to the application
- Universal mounting using system components and mounting accessories



### High-performance photocell





High-quality technology, extraordinary features and an outstanding price / performance ratio make this sensor suitable for all industrial areas. The extremely long ranges allow use in many applications.

### Highest precision and simple handling


The innovative teach mode allows optimum setting of the sensors in no time. This is high-tech for the high demands of industry on robustness and precision – implemented in a user-friendly and low-cost version with excellent performance.



## Cylindrical housing OG (M18) PerformanceLine

Type	Operating principle	Range	Type of light	Spot Ø at max. range [mm]	Output H = light-on D = dark-on	Order no.
<b>Diffuse reflection sensor · M12 connector · 10...36 DC · high-grade stainless steel · IP67</b>						
	Diffuse reflection sensor	2...800 mm	Red	66	H/D PNP	<b>OGT500</b>
	Background suppression	15...300 mm	Red	25	H/D PNP	<b>OGH500</b>
<b>Retro-reflective sensor · M12 connector · 10...36 DC · high-grade stainless steel · IP67</b>						
	Polarisation filter	0.03...5 m	Red	200	H/D PNP	<b>OGP500</b>
<b>Through-beam sensor · M12 connector · 10...36 DC · high-grade stainless steel · IP67</b>						
	Transmitter	25 m	Red	1000	–	<b>OGS500</b>
	Receiver	25 m	Red	–	H/D PNP	<b>OGE500</b>

## Accessories

Type	Description	Order no.
	Prismatic reflector · Ø 80 mm · round · For red light and infrared light retro-reflective sensors · Housing materials: plastics	<b>E20005</b>
	Prismatic reflector · 45 x 28 mm · rectangular · For red light and infrared light retro-reflective sensors · Housing materials: plastics	<b>E20452</b>
	Mounting set · Ø 18.5 mm · Clamp mounting · Free-standing M10 · for type OG, IG, KG · Housing materials: clamp: diecast zinc / fixture: steel	<b>E20718</b>
	Mounting set · Ø 18.5 mm · Clamp mounting · Free-standing M10 · for type OG, IG, KG · Housing materials: clamp: diecast zinc / fixture: steel	<b>E20719</b>
	Mounting set · Ø 18.5 mm · Clamp mounting · rod mounting Ø 12 mm · for type OG, IG, KG · Housing materials: clamp: diecast zinc / fixture: steel	<b>E20720</b>



## Photoelectric sensor in metal housing with M18 thread



- Small, compact and robust: a high performance sensor
- Excellent quality at an attractive price
- Through-beam and retro-reflective sensors and diffuse reflection sensors with background suppression
- Easy teach mode for fast set-up
- Universal mounting and large selection of fixing accessories



### New design: OG-Cube

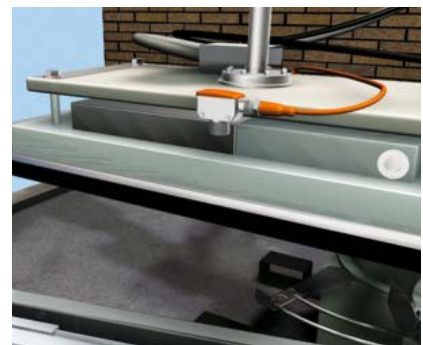
This sensor was developed for use in harsh industrial environments. The tried-and-tested technology of the well-known OG series is now integrated in a stable, rectangular metal housing.

### Long ranges, small design

The photoelectric sensors are distinguished by long ranges of 4 m for retro-reflective sensors and 200 mm for diffuse reflection sensors. Together with the small housing design both features provide more flexibility for the construction of plant and machinery.

### Time-savings during installation and set-up

The teach mode and the extensive range of fixing components ensure fast and cost-saving installation.




Compact design for applications in harsh environments.


## Rectangular housing OG (M18)

Type	Operating principle	Range	Type of light	Spot Ø at max. range [mm]	Output H = light-on D = dark-on	Order no.
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### Diffuse reflection sensor · M12 connector · 10...30 DC · metal · IP67

	Background suppression	200 mm	Red	13	H PNP	<b>OGH281</b>
	Background suppression	15...200 mm	Red	13	H/D PNP	<b>OGH580</b>




### Retro-reflective sensor · M12 connector · 10...30 DC · metal · IP67

	Polarisation filter	0.1...4 m	Red	160	D PNP	<b>OGP280</b>
	Polarisation filter	0.1...4 m	Red	160	H PNP	<b>OGP281</b>

### Through-beam sensor · M12 connector · 10...30 DC · metal · IP67

	Transmitter	20 m	Red	800	–	<b>OGS280</b>
	Receiver	20 m	Red	–	D PNP	<b>OGE280</b>
	Receiver	20 m	Red	–	H PNP	<b>OGE281</b>

## Accessories

Type	Description	Order no.
	Prismatic reflector · Ø 80 mm · round · For red light and infrared light retro-reflective sensors · Housing materials: plastics	<b>E20005</b>
	Prismatic reflector · 45 x 28 mm · rectangular · For red light and infrared light retro-reflective sensors · Housing materials: plastics	<b>E20452</b>
	Mounting set · Ø 18.5 mm · Clamp mounting · rod mounting Ø 12 mm · for type OG, IG, KG · Housing materials: clamp: diecast zinc / fixture: steel	<b>E20720</b>





## O5 photocells for conveying



- Extremely long ranges
- Reliable background suppression
- Easy setting of "ON" and "OFF" state by pushbuttons
- Versions with fixed setting or with potentiometer available
- Universal mounting using system components and mounting accessories



### All-round photocell

High-quality technology, extraordinary features and an outstanding price / performance ratio allow use of this sensor in almost all industrial areas. Easy installation is ensured by a clever mounting concept, with special fixtures as well as an adapter plate. The plug can be rotated by 270° so that it can be aligned in any direction.

### Versions without setting options

For use in standard applications.

### Versions with potentiometer




For easy setting and simple applications.

### Versions with teach function




This innovative setting method makes complicated programming unnecessary. The unit features one button each for setting a precise on and off state.



## Rectangular housing O5 BasicLine

Type	Operating principle	Range	Type of light	Spot Ø at max. range [mm]	Output H = light-on D = dark-on	Order no.
<b>Diffuse reflection sensor · M12 connector · 10...36 DC · plastics · IP65</b>						
	Background suppression	50...1400 mm	Red	50	H PNP	<b>O5H200</b>
<b>Retro-reflective sensor · M12 connector · 10...36 DC · plastics · IP67</b>						
	Polarisation filter	0.1...7 m	Red	175	D PNP	<b>O5P200</b>
<b>Through-beam sensor · M12 connector · 10...36 DC · plastics · IP67</b>						
	Transmitter	20 m	Red	500	–	<b>O5S200</b>
	Receiver	20 m	Red	–	D PNP	<b>O5E200</b>

## Rectangular housing O5 PerformanceLine

Type	Operating principle	Range	Type of light	Spot Ø at max. range [mm]	Output H = light-on D = dark-on	Order no.
<b>Diffuse reflection sensor · M12 connector · 10...36 DC · plastics · IP67</b>						
	Background suppression	50...1800 mm	Red	50	H/D PNP	<b>O5H500</b>
<b>Retro-reflective sensor · M12 connector · 10...36 DC · plastics · IP67</b>						
	Polarisation filter	0.075...10 m	Red	250	H/D PNP	<b>O5P500</b>
<b>Through-beam sensor · M12 connector · 10...36 DC · plastics · IP67</b>						
	Transmitter	25 m	Red	625	–	<b>O5S500</b>
	Receiver	25 m	Red	–	H/D PNP	<b>O5E500</b>

## Accessories

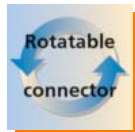
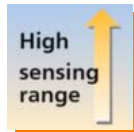
Type	Description	Order no.
	Mounting set · Clamp mounting · With protective cover · Free-standing M10 · for type O5 · Housing materials: stainless steel 316Ti / 1.4571 / clamp: diecast zinc	<b>E21084</b>
	Angle bracket · for type O5 · Housing materials: stainless steel 316Ti / 1.4571	<b>E21085</b>



## O4 photoelectric sensors with long ranges



- Background suppressed, through-beam and polarised sensors
- Variants: fixed ranges, potentiometer or pushbuttons
- Quality at an attractive price
- Universal mounting
- Optimised mounting accessories for time-saving fixing



### Different industries

This all-round photoelectric sensor with its long range is the best choice for use in the wood, paper and automotive industries, transport and conveying as well as in steel processing.

### Variants

This photoelectric sensor is available in the following designs: BasicLine: variants with fixed range or setting via a scaled 240° potentiometer, PerformanceLine: setting is done via pushbuttons.

### Mounting accessories

The optional stainless steel bracket gives the best protection. The wide selection of mounting accessories enables simple, flexible and time-saving installation.




## Rectangular housing O4 PerformanceLine

Type	Operating principle	Range	Type of light	Spot Ø at max. range [mm]	Output H = light-on D = dark-on	Order no.
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### Diffuse reflection sensor · M12 connector · 10...36 DC · plastics · IP67

	Background suppression	100...2600 mm	Red	50	H/D PNP	<b>O4H500</b>
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### Retro-reflective sensor · M12 connector · 10...36 DC · plastics · IP67

	Polarisation filter	0.3...22 m	Red	660	H/D PNP	<b>O4P500</b>
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### Through-beam sensor · M12 connector · 10...36 DC · plastics · IP67

	Transmitter	80 m	Red	2400	–	<b>O4S500</b>
	Receiver	80 m	Red	–	H/D PNP	<b>O4E500</b>

## Accessories

Type	Description	Order no.
	Prismatic reflector · Ø 80 mm · round · For red light and infrared light retro-reflective sensors · Housing materials: plastics	<b>E20005</b>
	Prismatic reflector · 45 x 28 mm · rectangular · For red light and infrared light retro-reflective sensors · Housing materials: plastics	<b>E20452</b>
	Mounting set · O4 · Clamp mounting · With protective cover · for type O4 · Housing materials: stainless steel 316L / 1.4404 / clamp: diecast zinc	<b>E21119</b>
	Mounting set · O4 · Clamp mounting · for type O4 · Housing materials: stainless steel 316L / 1.4404 / clamp: diecast zinc	<b>E21118</b>
	Angle bracket · O4 · for type O4 · Housing materials: stainless steel 316L / 1.4404	<b>E21117</b>

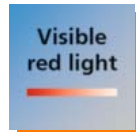




## Photoelectric sensors O6 in a plastic housing



- Diffuse reflection sensors with reliable background suppression
- Intuitive setting via potentiometer and rotary switch (light / dark selection)
- Well-defined light spot for precise object detection, no scattered light
- Also available as through-beam or retro-reflective system
- Versions with M8 connector, M12 pigtail or PUR connection cable



### Best optical performance

The diffuse reflection sensors provide reliable background suppression, even in case of highly reflective backgrounds such as moving machine parts. The clearly defined consistent light spot ensures precise object detection. There is no scattered light which could interfere with other photoelectric sensors in close vicinity.

### Ideal for universal applications

For connection the user can choose between potted cable, M12 pigtail or M8 metal connector on the housing.


The O6 range features a potentiometer for intuitive setting, and the light-on or dark-on mode is selected via rotary switch. The diffuse reflection, through-beam and retro-reflective sensors are distinguished by an excellent price / performance ratio. An extensive range of accessories completes the ifm range.




## Quaderbauform O6 im Kunststoffgehäuse

Type	Operating principle	Range	Type of light	Spot Ø at max. range [mm]	Output H = light-on D = dark-on	Order no.
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### Diffuse reflection sensor · M8 connector · 10...30 DC · plastics · IP65 / IP67

	Background suppression	2...200 mm	Red	8	H/D PNP	<b>O6H202</b>
	Background suppression	2...200 mm	Red	8	H/D PNP	<b>O6H203</b>
	Diffuse reflection sensor	5...500 mm	Red	15	H/D PNP	<b>O6T202</b>
	Diffuse reflection sensor	5...500 mm	Red	15	H/D PNP	<b>O6T203</b>



### Retro-reflective sensor · M8 connector · 10...30 DC · plastics · IP65 / IP67

	Polarisation filter	0.05...5 m	Red	150	H/D PNP	<b>O6P202</b>
	Polarisation filter	0.05...5 m	Red	150	H/D PNP	<b>O6P203</b>

### Through-beam sensor · M8 connector · 10...30 DC · plastics · IP65 / IP67

	Receiver	10 m	Red	–	H/D PNP	<b>O6E202</b>
	Receiver	10 m	Red	–	H/D PNP	<b>O6E203</b>


## Accessories

Type	Description	Order no.
	Swivel-mount clip · for type OJ · Housing materials: diecast zinc	<b>E20974</b>
	Angle bracket · for type OJ · Housing materials: high-grade stainless steel	<b>E20984</b>

## Connectors

Type	Description	Order no.
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### Socket M8, 4-pole, 4-wire

	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M8 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVC154</b>
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## M18 laser sensors for highest precision for small objects



- Reliable detection even of tiny objects up to 1.5 mm
- Quality and precision at an unbeatable price
- Visible laser light spot for a simple sensor alignment
- Setting process saves time and cost during set-up
- Precise background suppression for a reliable function



### Highly precise laser sensors

Even tiny objects are reliably detected thanks to the laser technology. The sensor set-up is very user-friendly: the visible laser spot and the new teach method enable optimum sensor setting in no time. Using the new OG type laser sensors price is no longer an issue.

### Variants

This series covers powerful through-beam systems, retro-reflective sensors with polarisation filter and diffuse reflection sensors with background suppression for demanding applications frequently found in assembly and handling technology. All sensors have a robust stainless steel housing.




The precise laser beam allows the detection of objects even through tiny openings.


## Cylindrical OG housing (M18) Laser PerformanceLine, laser class 1

Type	Operating principle	Range	Type of light	Spot Ø at max. range [mm]	Output H = light-on D = dark-on	Order no.
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### Diffuse reflection sensor · M12 connector · 10...36 DC · high-grade stainless steel · IP65 / IP67

	Background suppression	20...200 mm	Red	1.2	H/D PNP	<b>OGH700</b>
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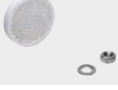


### Retro-reflective sensor · M12 connector · 10...36 DC · high-grade stainless steel · IP65 / IP67

	Polarisation filter	0.2...15 m	Red	78	H/D PNP	<b>OGP700</b>
	Polarisation filter	0.2...2 m	Red	5	H/D PNP	<b>OGP701</b>

### Through-beam sensor · M12 connector · 10...36 DC · high-grade stainless steel · IP65 / IP67

	Transmitter	60 m	Red	312	–	<b>OGS700</b>
	Transmitter	2 m	Red	5	–	<b>OGS701</b>
	Receiver	60 m	Red	–	H/D PNP	<b>OGE700</b>
	Receiver	2 m	Red	–	H/D PNP	<b>OGE701</b>

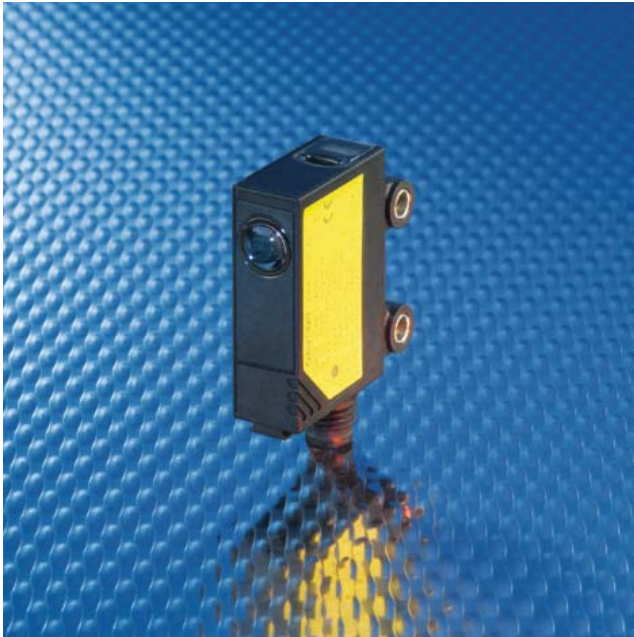
## Accessories

Type	Description	Order no.
	Prismatic reflector · 48 x 48 mm · rectangular · for retro-reflective laser sensors and glass and film detection · Housing materials: plastics	<b>E20722</b>
	Prismatic reflector · 30 x 20 mm · rectangular · for retro-reflective laser sensors · Housing materials: front plate: PMMA / base: ABS	<b>E20994</b>
	Prismatic reflector · Ø 10 mm · round · fixing by screw · M3 · for retro-reflective laser sensors · Housing materials: screw: stainless steel 316 / 1.4401 / spring washer: stainless steel 316 / 1.4401 / nut: stainless steel 316 / 1.4401 / front plate: PMMA / base: ABS	<b>E20990</b>
	Prismatic reflector · Ø 19 mm · round · fixing by screw · M3 · for retro-reflective laser sensors · Housing materials: screw: stainless steel 316 / 1.4401 / spring washer: stainless steel 316 / 1.4401 / nut: stainless steel 316 / 1.4401 / front plate: PMMA / base: ABS	<b>E20993</b>
	Mounting set · Ø 18.5 mm · Clamp mounting · Free-standing M10 · for type OG, IG, KG · Housing materials: clamp: diecast zinc / fixture: steel	<b>E20718</b>
	Mounting set · Ø 18.5 mm · Clamp mounting · Free-standing M10 · for type OG, IG, KG · Housing materials: clamp: diecast zinc / fixture: steel	<b>E20719</b>





## OJ – photoelectric laser sensors for assembly and handling technology



- High precision: Even tiny objects up to 0.8 mm can be detected reliably
- High switching frequency up to 2000 Hz for fast processes
- Front or side lens with various fixing options
- Mounting via snap-in technology or fixing holes



### Applications

Whenever there is little space for sensors or when small parts are to be detected, the small photoelectric sensors of the OJ series are the ideal problem solvers. Typical applications are assembly and handling technology.

#### High precision and laser protection class 1

The sensors even detect tiny objects up to a diameter of only 0.8 mm. A laser of protection class 1 (EN 60825) now offers more application opportunities for this highly-precise, small and tried-and-tested sensor.

#### Excellent price / performance ratio

Using the new OJ type laser sensors the decision for laser units is no longer an issue.

#### Easy alignment and mounting

The laser light spot visible on the object simplifies the alignment of the sensors which are also installed in a very short time by means of the extensive fixing components.





Laser protection class 1 requires no additional protective measures for the operators.



### Rectangular housing OJ Laser PerformanceLine, lateral sensing face, laser class 1

Type	Operating principle	Range	Type of light	Spot Ø at max. range [mm]	Output H = light-on D = dark-on	Order no.
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#### Diffuse reflection sensor · M8 connector · 10...30 DC · plastics · IP67

	Background suppression	7...150 mm	Red	0.8	H/D PNP	<b>OJ5058</b>
	Background suppression	15...200 mm	Red	2x1	H/D PNP	<b>OJ5054</b>
	Background suppression	7...150 mm	Red	0.8	H/D PNP	<b>OJ5158</b>
	Background suppression	15...200 mm	Red	2x1	H/D PNP	<b>OJ5154</b>

#### Retro-reflective sensor · M8 connector · 10...30 DC · plastics · IP67

	Polarisation filter	8 m	Red	< 12	H/D PNP	<b>OJ5036</b>
	Polarisation filter	8 m	Red	< 12	H/D PNP	<b>OJ5136</b>



#### Through-beam sensor · M8 connector · 10...30 DC · plastics · IP67

	Transmitter	1 m	Red	< 4	–	<b>OJ5041</b>
	Transmitter	1 m	Red	< 4	–	<b>OJ5141</b>

### Rectangular housing OJ Laser PerformanceLine, front sensing face, laser class 1

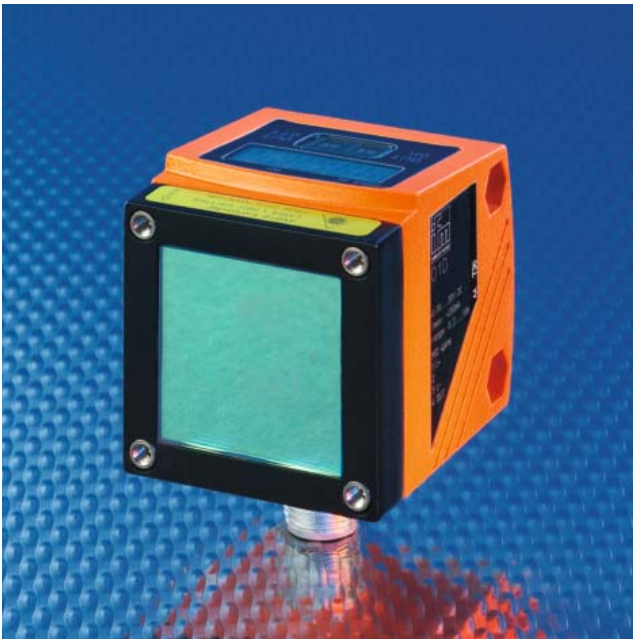
Type	Operating principle	Range	Type of light	Spot Ø at max. range [mm]	Output H = light-on D = dark-on	Order no.
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#### Retro-reflective sensor · M8 connector · 10...30 DC · plastics · IP67

	Polarisation filter	8 m	Red	< 12	H/D PNP	<b>OJ5014</b>
	Polarisation filter	8 m	Red	< 12	H/D PNP	<b>OJ5114</b>



## Extremely compact laser, distance and level sensor



- Photoelectric distance detection with a range of up to 10 m, with reflector up to 75 m
- 2 switching outputs; one output can be configured as analogue output
- Scalable detection range and window function
- Can be used in applications needing background suppression
- Big 4-digit alphanumeric display for measured values



### Detection of objects with long ranges

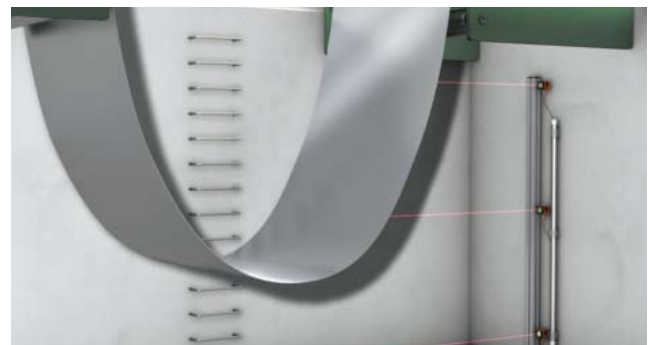
The O1D laser sensor provides non-contact distance measurement up to 10 metres. The O1D106 measures long distances of up to 75 m using a reflector. The O1D300 level sensor detects bulk material and opaque liquids without contact.

### Compact and flexible


The outputs can be programmed for two switch points or one switch point and one analogue output. The display can also provide the measured values in inches, millimetres or metres. The O1D102 has been specially designed for the detection of black metallic lacquers.

### Combined advantages


Photoelectric systems with background suppression and ultrasonic sensors are inexpensive alternatives for distance measurement, however their ranges are shorter. Traditional time-of-flight systems offer an improved level of performance but are much higher in cost. The O1D combines the advantages of these systems at an attractive price.




### Rectangular housing O1 for optical distance measurement, laser class 2

Type	Operating principle	Range	Sampling rate [Hz]	Spot Ø at max. range [mm]	U <sub>b</sub> [V]	Order no.
<b>Photoelectric distance sensor · M12 connector · 18...30 DC · metal · IP67</b>						
	Photoelectric distance sensor	0.2...10 m	1...50	< 15 x 15	18...30	<b>O1D100</b>
	Photoelectric distance sensor	0.2...3.5 m	1...50	< 6 x 6	18...30	<b>O1D102</b>
	Photoelectric distance sensor	0.2...10 m	1...33	< 15 x 15	18...30	<b>O1D105</b>
	Photoelectric distance sensor	1...75 m on reflector E21159	1...33	< 150 x 150	18...30	<b>O1D106</b>




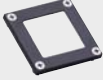
### Rectangular housing O1 for optical distance measurement, laser class 1

Type	Operating principle	Range	Sampling rate [Hz]	Spot Ø at max. range [mm]	U <sub>b</sub> [V]	Order no.
<b>Photoelectric distance sensor · M12 connector · 18...30 DC · metal · IP67</b>						
	Photoelectric distance sensor	0.3...6 m	1...33	< 8 x 8	18...30	<b>O1D155</b>

### Rectangular housing O1 Laser PerformanceLine with background suppression, laser class 2

Type	Operating principle	Range	Type of light	Spot Ø at max. range [mm]	Output H = light-on D = dark-on	Order no.
<b>Photoelectric distance sensor · M12 connector · 10...30 DC · metal · IP67</b>						
	Background suppression	0.2...10 m	–	< 15 x 15	normally open / closed programmablePNP	<b>O1D101</b>

### Accessories O1 housing

Type	Description	Order no.
	Mounting set · Clamp mounting · rod mounting Ø 12 mm · for type O1D · Housing materials: fixture: stainless steel / clamp: stainless steel / screws: stainless steel / nut: high-grade stainless steel	<b>E2D101</b>
	Mounting set · E2D101 + E20938 + E20951	<b>E21079</b>
	Angle bracket · O1D, O4 · for type O1D, O4 · Housing materials: stainless steel 316L / 1.4404	<b>E21120</b>
	Protective cover · O1D · Housing materials: bezel: ZnAl4Cu1 finish black / window: glass transparent and colourless / sealing: FPM 75+/-5 Shore A black / screws: stainless steel	<b>E21171</b>





## Cooling and protection box for distance sensors of the O1D series



- Use for ambient temperatures up to 180 °C
- Robust metal housing with integrated cooling circuit
- Water or air cooling possible
- Standardised tube connections with 3/8"



### Use in hot environments

In case of ambient temperatures up to 180 °C, powerful electronics should be cooled to protect them from overheating. Using the cooling box, the distance sensor O1D with PMD technology can now also prove its performance in hot applications such as in the steel industry.


### Cooling and protection

After connection to a cooling circuit via the standardised 3/8" tube connections, the temperature on the inside of the cooling box can be cooled down to an "electronics-friendly" temperature. If you screw off the tube connections, the box can be used as pure protection box for very harsh operating conditions.



Position detection of steel slabs in a rolling mill.


## Cooling box

Type	Description	Order no.
	Cooling box · Protective housing with an active cooling system for the O1D design · for type O1D · Housing materials: housing: aluminium transparent anodised / cover: aluminium black anodised / bezel: aluminium black anodised / window: float glass / cable gland: Brass nickel-plated / nozzle: Brass nickel-plated / sealing: FPM	E21248


## Accessories

Type	Description	Order no.
	Mounting set · O3D · Clamp mounting · rod mounting $\varnothing$ 14 mm · Housing materials: fixture: stainless steel / clamp: stainless steel	E3D103
	Mounting rod · $\varnothing$ 14 / M12 · Length: 130 mm · straight · Housing materials: stainless steel 316Ti / 1.4571	E20939
	Mounting rod · $\varnothing$ 14 · Length: 200 mm · straight · Housing materials: stainless steel 316Ti / 1.4571	E21228
	Mounting rod · $\varnothing$ 14 · Length: 300 mm · straight · Housing materials: stainless steel 316Ti / 1.4571	E21229
	Mounting rod · $\varnothing$ 14 · Length: 500 mm · straight · Housing materials: stainless steel 316Ti / 1.4571	E21232

## Connectors

Type	Description	Order no.
<b>Wirable socket M12, 4-pole</b>		
	Wirable socket · angled · Free from silicone · Free from halogen · wirable · Gold-plated contacts · M12 connector · Housing materials: PA	E11509

## Cable

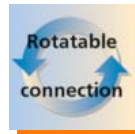
	Cable · 10 m	E12274
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## O5D – first standard photocell with time of flight measurement (PMD)



- Reliable background suppression and colour-independent detection
- Precise time of flight measurement in housing sizes of standard photoelectric sensors
- Shiny surfaces are detected reliably (e.g. stainless steel)
- Any sensor position, even an oblique angle to the object
- Switch point setting to the nearest centimetre via "+/-" buttons and display



### Time of flight measurement as standard sensor

The O5D with time of flight measurement (PMD = Photonic Mixer Device) combines the following advantages: long range, reliable background suppression, visible red light and high excess gain. In the same price range as standard sensors, it is a clever alternative.

### Easy handling

The switch point is set easily to the nearest centimetre via "+/-" buttons and display or alternative via IO-Link, which also allows read-out of the actual value.

### Any surface and any mounting position

Shiny, matt, dark or light objects of any colour: the O5D features reliable background suppression. The unit allows any angle of incidence and thus any mounting position. This simplifies installation and saves costs.



Time of flight measurement at the price of a standard sensor.

## Rectangular housing O5 for optical distance measurement, laser class 2

Type	Operating principle	Range	Sampling rate [Hz]	Spot Ø at max. range [mm]	U <sub>b</sub> [V]	Order no.
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Photoelectric distance sensor · M12 connector · 10...30 DC · metal · IP65 / IP67 · Display unit: cm

	Background suppression	0.03...2 m	33	< 5	10...30	<b>O5D100</b>
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Photoelectric distance sensor · M12 connector · 10...30 DC · metal · IP65 / IP67 · Display unit: inch

	Background suppression	0.03...2 m	33	< 5	10...30	<b>O5D101</b>
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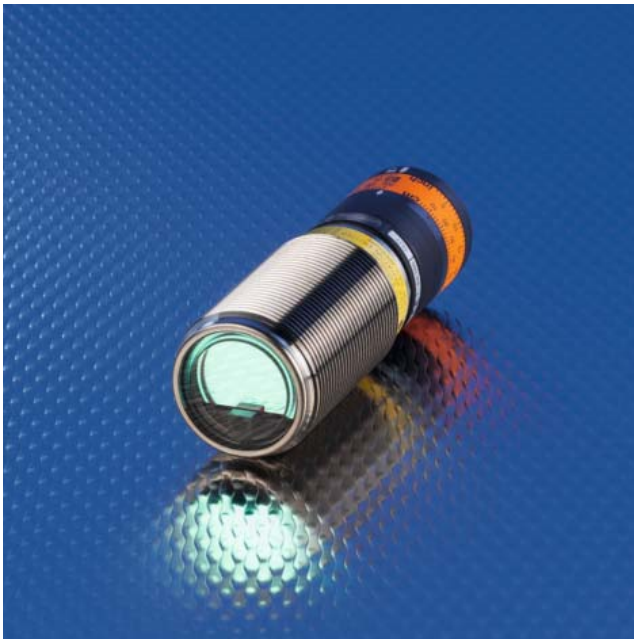
## Accessories O5 housing

Type	Description	Order no.
	Mounting set · Clamp mounting · With protective cover · Free-standing M10 · for type O5 · Housing materials: stainless steel 316Ti / 1.4571 / clamp: diecast zinc	<b>E21084</b>
	Angle bracket · for type O5 · Housing materials: stainless steel 316Ti / 1.4571	<b>E21087</b>
	Mounting set · Clamp mounting · Free-standing M10 · for type O5 · Housing materials: stainless steel 316Ti / 1.4571 / clamp: diecast zinc	<b>E21083</b>
	Angle bracket · for type O5 · Housing materials: stainless steel 316Ti / 1.4571	<b>E21085</b>
	Memory plug · Parameter memory for IO-Link sensors · Storage capacity: 2 Kbytes · Housing materials: PA PACM 12 / PET / sealing: FPM / nut: stainless steel 316L / 1.4404 / connector: TPU	<b>E30398</b>
	IO-Link interface · for parameter setting and analysis of units · Supported communication protocols: IO-Link (4800 and 38400 bits/s) EPS protocol (19200 bits/s) · for operation with FDT framework software "ifm Container" or software "LINERECORDER SENSOR"	<b>E30396</b>
	LINERECORDER SENSOR · Software for parameter setting and set-up of IO-Link sensors · Recording and distribution of parameter sets (duplication) · Capture and evaluation of sensor values over a longer period of time · Resetting of sensor parameters to factory setting · Use via USB connection cable E30396 or E30390 (drivers are contained in the corresponding software package)	<b>ZGS210</b>





## OID with easy-turn concept – photoelectric sensor with time of flight measurement (PMD)



- Reliable background suppression and colour-independent detection
- Simple switch point setting by rotatable setting ring (lock function)
- Shiny surfaces are detected reliably (e.g. stainless steel)
- Any sensor position, even an oblique angle to the object
- IO-Link integrated, e.g. for reading the actual value



### Time of flight measurement for standard sensors

The OID with time of flight measurement (PMD = photonic mixer device) combines the following advantages: long ranges, reliable background suppression, visible red light and high excess gain. In the same price range as standard sensors, it is a clever alternative.

### Easy handling


The switch point can be set easily by turning the setting ring (easy turn). A scale shows the distance set. The switch point can thus be set before installation.

### Any surface and any mounting position










Shiny, matt, dark or light objects of any colour: the OID features reliable background suppression. The unit allows any angle of incidence and thus flexible mounting positions. This simplifies installation and saves costs.



### OID design (M30) with PMD time-of-flight principle

Type	Operating principle	Range	Type of light	Spot Ø at max. range [mm]	Output H = light-on D = dark-on	Order no.
	Background suppression	0.03...2 m	Red	< 5	2 switching outputs normally open / closed complementary PNP	<b>OID200</b>
	Background suppression	0.03...2 m	Red	< 5	2 switching outputs normally open / closed complementary PNP	<b>OID201</b>

### Accessories OI design (M30)

Type	Description	Order no.
	Angle bracket · for type M30 · Housing materials: stainless steel	<b>E10737</b>
	Mounting clamp · Ø 30 mm · with end stop · for type M30 · Housing materials: PC	<b>E11049</b>
	Mounting clamp · Ø 34 mm - Ø 30 mm · with reducing bush · for type M30 · Housing materials: PBT	<b>E10077</b>
	Mounting set · Ø 30.2 mm · Clamp mounting · aluminium profile · for type II, KI, OID, OI · Housing materials: fixture: stainless steel 316Ti / 1.4571 / clamp: diecast zinc / Cube: diecast zinc	<b>E20875</b>
	Mounting set · Ø 30.2 mm · Clamp mounting · free-standing M12 · for type OI, II, KI · Housing materials: fixture: stainless steel 316Ti / 1.4571 / clamp: diecast zinc	<b>E20873</b>
	Mounting set · Ø 30.2 mm · Clamp mounting · free-standing M12 · for type OI, II, KI · Housing materials: fixture: stainless steel 316Ti / 1.4571 / clamp: stainless steel	<b>E20874</b>
	Memory plug · Parameter memory for IO-Link sensors · Storage capacity: 2 Kbytes · Housing materials: PA PACM 12 / PET / sealing: FPM / nut: stainless steel 316L / 1.4404 / connector: TPU	<b>E30398</b>
	IO-Link interface · for parameter setting and analysis of units · Supported communication protocols: IO-Link (4800 and 38400 bits/s) EPS protocol (19200 bits/s) · for operation with FDT framework software "ifm Container" or software "LINERECORDER SENSOR"	<b>E30396</b>
	mounting rod · Ø 12 / M10 · Length: 130 mm · straight · Housing materials: stainless steel 316Ti / 1.4571	<b>E20938</b>



## Magnetic multiturn encoder



- Single and multiturn encoders
- Easy wiring and programming
- Solid and hollow shafts
- Optional stainless steel version
- Profibus DPV1/2, Profinet and CANopen interface EtherNet/IP, DeviceNet or Modbus



### More functions at a favourable price

The new photoelectric absolute encoders with SSI interface detect position, angle, speed and distance in automated plant and machinery.

They complement the ifm product family and do not only offer extended functionality and additional interfaces but also a convincing price / performance ratio. They are also available in stainless steel versions.

### Easy implementation

These single and multiturn encoders are available with solid or hollow shaft. The additional interfaces and the removable bus connection cap ensure easy wiring and programming.




All common bus interfaces such as Profibus DPV1/2, Profinet and CANopen interface, EtherNet/IP, DeviceNet or Modbus are provided.





## Absolute multiturn encoders (Profibus)

Type	Resolution	U <sub>b</sub> [V]	f [kHz]	I <sub>load</sub> [mA]	Shaft [mm]	Ambient temperature [°C]	Cable entry	Order no.
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## Terminals · Output function Profibus data interface

	13 bits	10...30	–	–	10	-40...85	–	RN3001
	25 bits	10...30	–	–	10	-40...85	–	RM3007
	25 bits	10...30	–	–	12	-40...85	–	RM3008


## Terminals · Output function CANopen interface

	13 bits	10...30	–	–	10	-40...85	–	RN7012
	25 bits	10...30	–	–	10	-40...85	–	RM7012

## Cable 2 m · Output function SSI data interface

	4096	4.5...30	–	–	12	-40...85	axial	RM8003
	4096	4.5...30	–	–	10	-40...85	axial	RM8002


## M12 connector · Output function ProfiNet IO data interface

	25 bits	10...30	–	–	10	-40...85	–	RM3011
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## Accessories

Type	Description	Order no.
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## Flexible coupling with adjusting screw connection [SV]

	Flexible coupling with adjusting screw connection [SV] · Ø 10 mm / Ø 10 mm · Housing materials: aluminium	E60022
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## Measuring wheel

	Measuring wheel · Ø 159.16 mm / Ø 10 mm · rubber · Housing materials: wheel: aluminium / tread: PU	E60076
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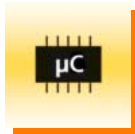




## Compact speed monitors – Evaluation system with integrated sensor



- 2-in-1: speed sensor and evaluation in one compact housing
- Space-saving design
- Easy to fit
- Easy parameter setting by potentiometer or pushbutton



### Inductive sensor with integrated speed evaluation

In many industrial applications drives need to be monitored for rotational speed or standstill. The compact DI series speed monitor offers a specially low-cost and reliable solution. In principle it is an inductive sensor with integrated speed evaluation.





Advantage: the condition information of the drive is directly transferred to the control system. The nominal speed is easily set by potentiometer or pushbutton.

### Variants

ifm electronic offers the right unit for each application. The user can choose between M18 and M30 types with either M12 connector or cable. There are 2-wire and 3-wire units with either NC or NO function.





## Speed monitor with integrated sensor

Type	U <sub>b</sub> [V]	In-puts	Input function	Setting range [puls. / min.]	Setting range [Hz]	Out-puts analogue	Out-puts relays	Out-puts transist.	Order no.
<b>M30 x 1.5 · output is switched during the start-up delay and if (f actual) is greater than (f preset)</b>									
	20...250 AC/DC	1	PNP / NPN / Namur	5...300	–	1	2	2	DI0001*
	20...250 AC/DC	1	PNP / NPN / Namur	50...3000	–	1	2	2	DI0002*
	10...36 DC	1	PNP / NPN / Namur	5...300	–	1	2	2	DI5001
	10...36 DC	1	PNP / NPN / Namur	30...3000	–	1	2	2	DI5003
	10...36 DC	1	PNP / NPN / Namur	5...300	–	1	2	2	DI5009
	10...36 DC	1	PNP / NPN / Namur	5...300	–	1	2	2	DI5007
	10...36 DC	1	PNP / NPN / Namur	5...300	–	1	2	2	DI5004
	10...36 DC	1	PNP / NPN / Namur	5...300	–	1	2	2	DI5004
<b>M18 x 1 · output is switched during the start-up delay and if (f actual) is greater than (f preset)</b>									
	10...36 DC	1	PNP / NPN / Namur	3...6000	–	1	2	2	DI6001

## \* Note for AC and AC/DC units

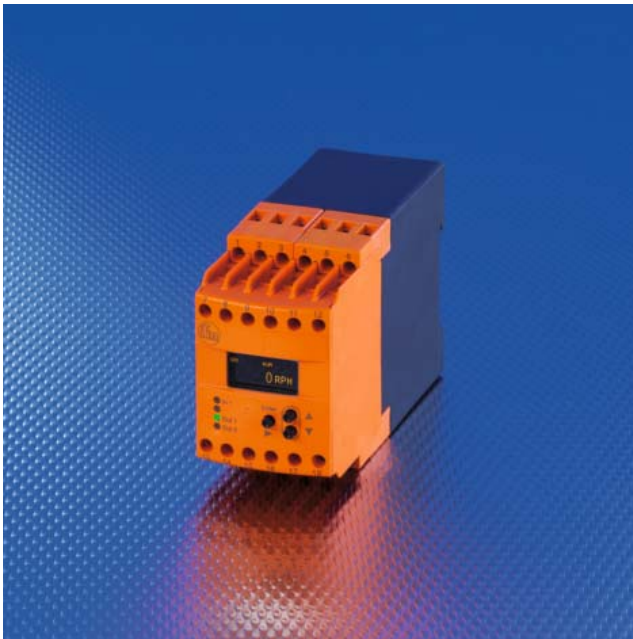
Miniature fuse to IEC60127-2 sheet 1, ≤ 2 A (fast acting) Recommendation: check the unit for reliable function after a short circuit.

## Connectors

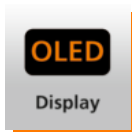
Type	Description	Order no.
<b>Socket M12, 5/4-pole, 4-wire</b>		
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC004
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC005
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC001
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC002



## Speed monitors



- Monitoring of two limit values with separate output relays
- High input frequency of up to 60,000 pulses / minute
- Configurable functions, speed-proportional analogue output
- Clearly readable, luminous OLED display
- Extended operating temperature range down to -40 °C



### Versatile speed monitoring

The speed monitors calculate the rotational speed by evaluating pulses. The transistor and relay outputs switch when adjustable limit values are exceeded or not reached. This allows, for example, reliable overspeed and standstill detection.

### Versions

The speed monitors DD2503 and DD2603 monitor the rotational speed of one channel with two separately adjustable limit values. A separate output is assigned to each limit value.

The speed monitors DD2505 and DD2605 monitor two separate input channels, each having one switch point.

### Convenient

The high-contrast luminous OLED display and the menu-guided parameter setting are designed for maximum user-friendliness.



## Universal speed monitors

Type	U <sub>b</sub> [V]	In-puts	Input function	Setting range [puls. / min.]	Setting range [Hz]	Out-puts analogue	Out-puts relays	Out-puts transist.	Order no.
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### FR-1 · 2 switch points for monitoring overspeed/underspeed and acceptable range



110...240 AC (50...60 Hz) / 27 DC (typ. 24 DC)	1	PNP / NPN / Namur	1...60000	0.1...1000	1	2	2	DD2503
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### FR-1N · 2 switch points for monitoring overspeed/underspeed and acceptable range



110...240 AC (50...60 Hz) / 27 DC (typ. 24 DC)	1	Namur 8.2 V	1...60000	0.1...1000	1	2	2	DD2603
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## Dual speed monitors

Type	U <sub>b</sub> [V]	In-puts	Input function	Setting range [puls. / min.]	Setting range [Hz]	Out-puts analogue	Out-puts relays	Out-puts transist.	Order no.
------	-----------------------	---------	----------------	---------------------------------	-----------------------	-------------------	-----------------	--------------------	-----------

### FR-2 · 1 switch point each for monitoring overspeed/underspeed and acceptable range



110...240 AC (50...60 Hz) / 27 DC (typ. 24 DC)	1	PNP / NPN / Namur	1...60000	0.1...1000	1	2	2	DD2505
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### FR-2N · 1 switch point each for monitoring overspeed/underspeed and acceptable range



110...240 AC (50...60 Hz) / 27 DC (typ. 24 DC)	1	Namur 8.2 V	1...60000	0.1...1000	1	2	2	DD2605
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## Standard speed monitors

Type	U <sub>b</sub> [V]	In-puts	Input function	Setting range [puls. / min.]	Setting range [Hz]	Out-puts analogue	Out-puts relays	Out-puts transist.	Order no.
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### D100 · F1-F4, with 4-step slide switch

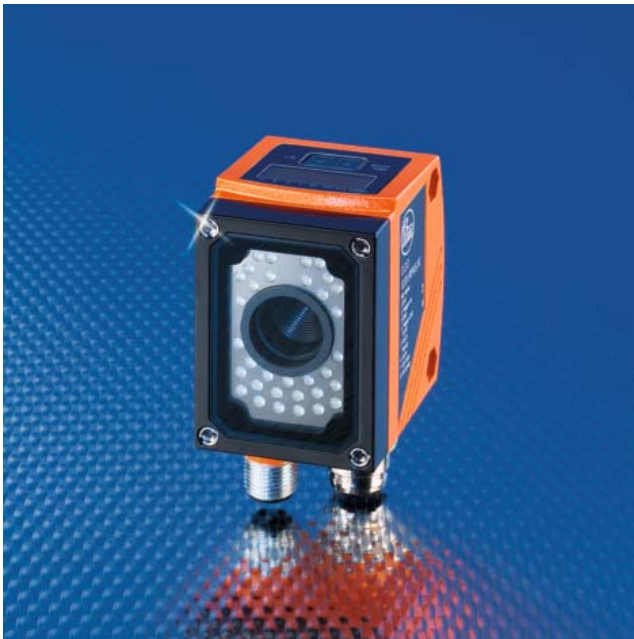


230 AC (50...60 Hz) / 24 DC	1	PNP / NPN / Namur	5...5000	–	1	2	2	DD0001
110...240 AC/DC (50...60 Hz) / 27 DC (typ. 24 DC)	1	PNP / NPN / Namur	5...5000	–	1	2	2	DD0116





# Object recognition for assembly, production and quality control



- 2D vision sensor for object recognition
- Robust, industrially compatible housing with integrated lighting
- Easy parameter setting
- Integrated Ethernet process interface with position indication
- 128 MB RAM: teaching of 32 applications with up to 24 models each possible



## Contour sensor for production control

The sensor uses orientation-independent contour verification. The application possibilities range from presence, position and orientation monitoring via sorting and counting tasks to quality control.

Lighting and evaluation unit are integrated in a robust, industrially compatible IP 67 housing for the use in the temperature range -10...60 °C. Extra-slim backlights are available for transmitted light applications.



### Operating concept

With an intuitive step-by-step interface and good / bad parts the user can simply create a model of the object to be recognised. The recognition software compares the object with the stored ideal, regardless of orientation, and transmits the results (good or bad, position, orientation) to the higher-level PLC. The sensor can manage up to 32 separate tasks with a maximum of 24 models each.









Sensors support the user with quality assurance.


## Sensors for object recognition

Type	Operating principle	Max. field of view size [mm]	Resolution [mm]	Detection rate [Hz]	Type of light	Ambient temperature [°C]	Order no.
<b>Type O2D2 · M12 plug, 8 poles M12 socket, 4 poles · metal · DC</b>							
	CMOS image sensor B/W, VGA resolution 640 x 480	640 x 480	0.1	10	Infrared	-10...60	<b>O2D220</b>
	CMOS image sensor B/W, VGA resolution 640 x 480	1320 x 945	0.3	10	Infrared	-10...60	<b>O2D222</b>
	CMOS image sensor B/W, VGA resolution 640 x 480	400 x 300	0.08	10	Infrared	-10...60	<b>O2D224</b>

## Fixing components for vision sensors

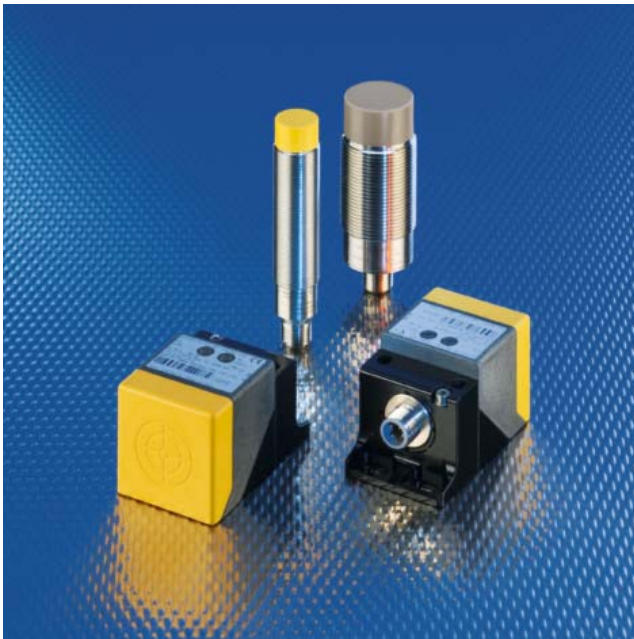
Type	Description	Order no.
	Mounting set · O2D, O2M, O2I, O2V · Clamp mounting · rod mounting Ø 12 mm · Housing materials: fixture: stainless steel / clamp: stainless steel	<b>E2D110</b>
	Mounting set · O2D, O2M, O2I, O2V · Clamp mounting · rod mounting Ø 14 mm · Housing materials: fixture: stainless steel / clamp: stainless steel	<b>E2D112</b>
	Operating software · O2D	<b>E2D200</b>
	Glass protective pane · O2D / O2I · Housing materials: housing: diecast zinc black / lens: float glass	<b>E21168</b>
	Jumper · straight / straight · Ethernet · Gold-plated contacts · 5 m · Housing materials: TPU	<b>E21139</b>
	Touch Panel PC · 12.1" colour display · Intel Atom CPU 1.6 GHz · 2 GByte RAM · Windows Embedded Standard 7 SP1 (32 bits)	<b>E2D400</b>
	Plastic diffuser · O2D / O2I · Housing materials: housing: diecast zinc black / lens: PMMA	<b>E21165</b>

## Connectors

Type	Description	Order no.
<b>Socket M12, 8/7-pole, 8-wire</b>		
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 2 m · Housing materials: PUR	<b>E11231</b>
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: PUR	<b>E11232</b>



# Fail-safe inductive sensors for direct metal detection



- Suitable for operator and machine safety
- Safe functioning without magnetic target or coded actuator
- Reliable end position monitoring on moving machine parts
- Connection of the sensors to safety PLCs, bus systems and logic modules
- Easy series connection of the sensors, with the possibility of combination with mechanical switches



## Safe position detection



A special counterpart such as a magnet or coded target is no longer necessary for the function of the fail-safe sensor. The fail-safe inductive sensor detects metals such as stainless steel or mild steel. It operates with an enable zone which is monitored for target position and dwell time. An adjustment mode facilitates mounting. The fail-safe sensor increases the uptime and safety of your installation and can be connected to approved evaluation units without cross-fault monitoring. Wear-free operation guarantees low maintenance costs of your installation. Faults such as coil break or coil short circuit are diagnosed and the sensor passes into the defined safe state. Even a cross fault between the supply voltage and one of the two outputs does not affect the safety function of the sensor.

## Applications

- reliable positioning on rotary indexing tables and machine tools
- reliable triggering of slow travel or switching off in end positions for presses, gantry robots and actuators
- reliable area monitoring for robots








## Inductive sensors for safety-related applications, 2 x OSSD, SIL 3, PL e

Type	Length [mm]	Enable zone [mm]	Housing material	U <sub>b</sub> DC [V]	Protection	Response time in case of a safety request / enable time [ms]	Order no.
<b>M12 connector</b>							
	66	10...15 nf	PPE	24	IP 65 / IP 67	≤ 50 / ≤ 200	<b>GM7015</b>
	66	4...20 nf	PPE	24	IP 65 / IP 67	≤ 50 / ≤ 200	<b>GM705S</b>
	39	6...12 nf	High-grade st. steel	24	IP 68 / IP 69K	≤ 50 / ≤ 200	<b>GI7015</b>

f = flush / nf = non flush

## Inductive sensors for safety-related applications, 2 x OSSD, SIL 2, PL d

Type	Length [mm]	Enable zone [mm]	Housing material	U <sub>b</sub> DC [V]	Protection	Response time in case of a safety request / enable time [ms]	Order no.
<b>M12 connector</b>							
	35	1...8 nf	High-grade st. steel	24	IP 65 / IP 67	≤ 1 / ≤ 1	<b>GG711S</b>
	44.5	1...5 f	Brass	24	IP 65 / IP 67	≤ 1 / ≤ 1	<b>GG712S</b>
	45	0.5...4 nf	High-grade st. steel	24	IP 65 / IP 67	≤ 1 / ≤ 1	<b>GF711S</b>
	45	1...10 f	High-grade st. steel	24	IP 65 / IP 67	≤ 10 / ≤ 1	<b>GI712S</b>
	53	> 10 f	Brass	24	IP 65 / IP 67	≤ 5 / ≤ 5	<b>GG851S</b>

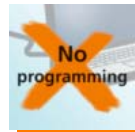
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## Safety light curtains Body protection type 4 / SIL 3



- Type 4 safety light curtains to IEC 61496
- Now with SIL 3 to IEC 61508 and PL to ISO 13849
- Compact housing dimensions (28 x 30 mm)
- Protected area width selectable on the unit: 0...4 m or 3...12 m
- Easy to connect via the tried-and-tested M12 connector (5 or 8-pin)



### Protection for the plant personnel

Wherever motion of machine parts presents a danger to people or goods, safety light curtains are used. When activated, this protective equipment deactivates the outputs, which immediately stops the machines.

Safety light curtains consist of an optical transmitter and receiving element. In the transmitter element there are several light emitters and an equal number of receivers in the receiving element. If one or several light beams are interrupted, the system deactivates the safe outputs.

### Certified safety

The safety light curtains have been developed according to current standards and have been certified by TÜV Süd. They meet the requirements to EN 61496, ESPE type 4 / SIL 3.

### Protection for body or parts of bodies

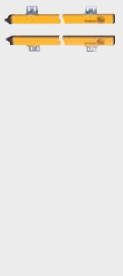
The protective function 'primary guarding body or parts of bodies' is guaranteed at a resolution of 50 or 90 mm.



Efficient safeguarding of hazardous areas.




**Safety light curtains type 4, SIL 3, PL e, resolution 50 mm, protected area width up to 12 m**

Type	Sensor length [mm]	Resolution / detection capacity [mm]	Protected area height [mm]	Protected area width [m]	Response time [ms]	U <sub>b</sub> [V]	Order no.
<b>M12 connector</b>							
	363	50	310	0...4 / 3...12	4	24	OY082S
	513	50	460	0...4 / 3...12	4.5	24	OY083S
	663	50	610	0...4 / 3...12	5.5	24	OY084S
	813	50	760	0...4 / 3...12	6.5	24	OY085S
	963	50	910	0...4 / 3...12	7.5	24	OY086S
	1113	50	1060	0...4 / 3...12	8.5	24	OY087S
	1263	50	1210	0...4 / 3...12	9	24	OY088S
	1413	50	1360	0...4 / 3...12	10	24	OY089S
	1563	50	1510	0...4 / 3...12	11	24	OY090S

**Safety light curtains type 4, SIL 3, PL e, resolution 90 mm, protected area width up to 12 m**

Type	Sensor length [mm]	Resolution / detection capacity [mm]	Protected area height [mm]	Protected area width [m]	Response time [ms]	U <sub>b</sub> [V]	Order no.
<b>M12 connector</b>							
	663	90	610	0...4 / 3...12	4	24	OY104S
	813	90	760	0...4 / 3...12	4.5	24	OY105S
	963	90	910	0...4 / 3...12	5	24	OY106S
	1113	90	1060	0...4 / 3...12	5.5	24	OY107S
	1263	90	1210	0...4 / 3...12	5.5	24	OY108S
	1413	90	1360	0...4 / 3...12	6	24	OY109S
	1563	90	1510	0...4 / 3...12	6.5	24	OY110S

**Safety relays for safety light curtains**

Type	U <sub>b</sub> [V]	Electrical design	ISO 13849-1: Category / performance level	IEC 61508: SIL	Order no.
	24	Relay	4 / e	3	G2001S



# Safety relays for the protection of operators and machinery



- Multifunctional with relay outputs or semiconductor outputs
- E-stop with cross-fault monitoring and optional simultaneity monitoring
- Connection of mechanical safety switches and fail-safe sensors
- Two-hand control to EN 574, type IIIC, mechanical or electronic
- Certified to IEC 61508, EN 954-1, ISO 13849-1, EN 574 type IIIC



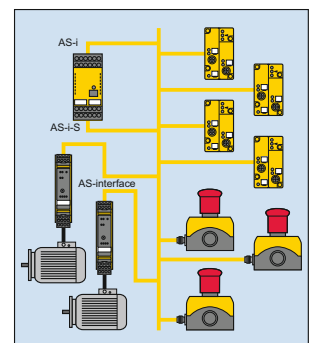
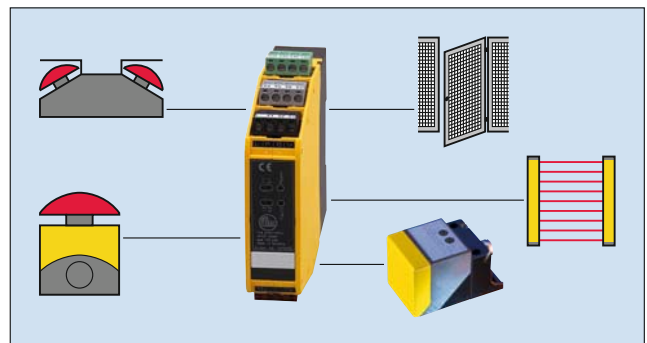
## Reliable switching

This safety relay can be used in a variety of ways. It performs monitoring tasks in safety applications in combination with different non-contact guards.



The evaluation of the signals from safety light barriers, safety light curtains, electronic fail-safe sensors or mechanical safety switches for protective guard contacts or electronic position sensors or mechanical position switches with or without cross-fault monitoring are only a few applications.

The safety relay has several multifunctional self-detecting and self-monitoring short-circuit protected inputs and outputs. The simultaneity monitoring of inputs and the functions "monitored" or "automatic start" can be set as an option.


The operation in two-hand control to EN 574 type IIIC in combination with electronic sensors or mechanical switches is another advantage of the safety relay.




### Safety relays with relay outputs for fail-safe sensors

Type	U <sub>b</sub> [V]	Electrical design	ISO 13849-1: Category / performance level	IEC 61508: SIL	Order no.
	24	Relay	4 / e	3	G1501S
	24	Relay	4 / e	3	G1502S

### Safety relays with solid state outputs for fail-safe sensors

Type	U <sub>b</sub> [V]	Electrical design	ISO 13849-1: Category / performance level	IEC 61508: SIL	Order no.
	24	Semi-conductor outputs	4 / e	3	G1503S


### Safety relays for safety light curtains

Type	U <sub>b</sub> [V]	Electrical design	ISO 13849-1: Category / performance level	IEC 61508: SIL	Order no.
	24	Relay	4 / e	3	G2001S

### Connectors

Type	Description	Order no.
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#### Socket M12, 5/4-pole, 4-wire

	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC004
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## Pressure sensor PN7 with two switching outputs and IO-Link 1.1



- Clearly indicate the acceptable ranges: programmable red / green display
- The process connection can be rotated for optimum alignment
- Fast switch point setting by using three pushbuttons
- Visualisation of the switching states by clearly visible LEDs
- Can still be identified after many years: captive laser labelling on stainless steel housing



### The overall package makes the difference

After 20 years of successful ifm pressure sensor history, the new generation of PN sensors was developed in close coordination with the users. Its modern and user-friendly design stands out. High overload protection, IP 67 and the captive laser labelling make the new PN sensors your perfect partner even in the most harsh environments.

### Everything at a glance

Although the housing size has remained unchanged, the display size has been increased once again and the two switching status LEDs on the sensor head can be clearly seen from all sides. The display can be switched from the indication of "red" to an alternating indication of "red - green". So, switching states can be highlighted or an independent colour window can be created.

### Flexible



Once fitted, rotate the sensor in any direction: The new PN allows free rotation as well as any mounting position using angle brackets as an accessory.





## Sensors with switching outputs and display with IO-Link

Type	Process connection	Display LED	Measuring range [bar]	Poverload max. [bar]	Pbursting min. [bar]	U <sub>b</sub> DC [V]	Order no.
<b>M12 connector · Output function 2 x normally open / closed programmable · DC PNP/NPN</b>							
	G ¼ female	Display unit	0...400	800	1700	18...30	PN7070
	G ¼ female	Display unit	0...250	500	1100	18...30	PN7071
	G ¼ female	Display unit	0...100	300	650	18...30	PN7092
	G ¼ female	Display unit	0...25	150	350	18...30	PN7093
	G ¼ female	Display unit	-1...10	75	150	18...30	PN7094
	G ¼ female	Display unit	0...2.5	20	50	18...30	PN7096
	G ¼ female	Display unit	-1...1	20	50	18...30	PN7099
	G¼ male / M5 female	Display unit	0...400	800	1700	18...30	PN7570
	G¼ male / M5 female	Display unit	0...250	500	1100	18...30	PN7571
	G¼ male / M5 female	Display unit	0...100	300	650	18...30	PN7592
	G¼ male / M5 female	Display unit	0...25	150	350	18...30	PN7593
	G¼ male / M5 female	Display unit	-1...10	75	150	18...30	PN7594
	G¼ male / M5 female	Display unit	0...2.5	20	50	18...30	PN7596
	G¼ male / M5 female	Display unit	-1...1	20	50	18...30	PN7599

## Accessories

Type	Description	Order no.
	IO-Link interface · for parameter setting and analysis of units · Supported communication protocols: IO-Link (4800 and 38400 bits/s) EPS protocol (19200 bits/s) · for operation with FDT framework software "ifm Container" or software "LINERECORDER SENSOR"	E30396
	Memory plug · Parameter memory for IO-Link sensors · Storage capacity: 2 Kbytes · Housing materials: PA PACM 12 / PET / sealing: FPM / nut: stainless steel 316L / 1.4404 / connector: TPU	E30398

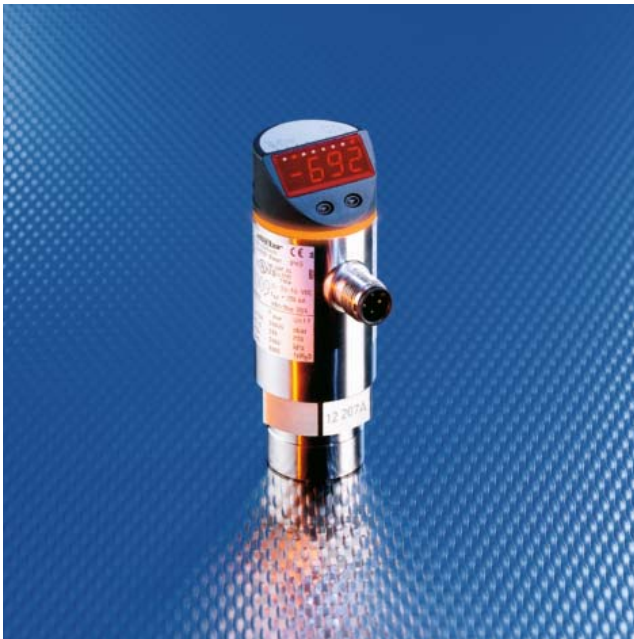
## Connectors

Type	Description	Order no.
<b>Socket M12, 5/4-pole, 4-wire</b>		
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC005
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC002





# Pressure sensor PN2 with analogue and switching outputs



- Analogue output scalable and selectable: 0...10 V / 4...20 mA
- Switching output function NO/NC programmable
- Switching output logic (NPN/PNP) selectable
- Country-specific pressure units
- Parameter setting, diagnosis and transmission of process values via IO-Link









### Robust measuring cell

Long-term stability and highly robust design ensure a trouble-free and reliable operation. The ceramic-capacitive measuring principle with a special support of the measuring diaphragm makes the sensors immune to overload operation and high pressure peaks.

### Adaptation to the controller

The analogue output of the sensor, which can be set to either 4 ... 20 mA or 0 ... 10 V, can be very easily adapted to match the actually required measuring range. Parameters ASP (analogue start point) and AEP (analogue end point) enable user-specific setting of the sensor's zero point and span.

### Worldwide use for reduced storage

For the pressure sensor PN2 the output logic (PNP or NPN) is just as selectable as the pressure units (bar/mbar, KPa/MPa, psi), allowing OEMs to use the same type of pressure sensor regardless of the country where the machine is to be installed.



### Pressure sensor PN2 with IO-Link

IO-Link is a simple, point-to-point communication protocol between an IO-Link enabled device (typically a sensor or actuator) and an IO-Link master. This technology has now been implemented in the pressure sensors of the PN2 series.



Using IO-Link, machine parameters can be transferred to higher control levels.

## Sensors with switching outputs and analogue outputs and display

Type	Process connection	Display	Measuring range	Poverload	Pbursting	U <sub>b</sub> DC	Order no.
		LED	[bar]	max. [bar]	min. [bar]	[V]	
<b>M12 connector · Output function 2 x normally open / closed programmable or 1 x normally open / closed programmable + 1 x analogue (4...20 mA / 0...10 V; scaleable 1:4) · DC PNP/NPN</b>							
	G ¼ female	Display unit	0...400	600	1000	18...32	PN2020
	G ¼ female	Display unit	0...250	400	850	18...32	PN2021
	G ¼ female	Display unit	0...100	300	650	18...32	PN2022
	G ¼ female	Display unit	-1...25	100	350	18...32	PN2023
	G ¼ female	Display unit	-1...10	75	150	18...32	PN2024
	G ¼ female	Display unit	-0.1253...2.5	20	50	18...32	PN2026
	G ¼ female	Display unit	-0.05...1	10	30	18...32	PN2027
	G ¼ female	Display unit	-0.0125...0.25	10	30	18...32	PN2028
	G ¼ female	Display unit	-1...1	20	50	18...32	PN2009
	¼" NPT	Display unit	0...400	600	1000	18...32	PN2220
	¼" NPT	Display unit	0...250	400	850	18...32	PN2221
	¼" NPT	Display unit	0...100	300	650	18...32	PN2222
	¼" NPT	Display unit	-1...25	100	350	18...32	PN2223
	¼" NPT	Display unit	-1...10	75	150	18...32	PN2224
	¼" NPT	Display unit	-0.125...2.5	20	50	18...32	PN2226
	¼" NPT	Display unit	-0.04...1	10	30	18...32	PN2227
	¼" NPT	Display unit	-0.0125...0.25	10	30	18...32	PN2228
	¼" NPT	Display unit	-1...1	20	50	18...32	PN2209

## Adapters

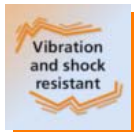
Type	Description	Order no.
	Adapter · G ¼ - G ½ · Housing materials: stainless steel / sealing: FPM	E30000
	Adapter · G ¼ - G ¼ · Housing materials: stainless steel / FPM	E30007



# Fully electronic contact manometer



- Optimum readability and electronic pointer display mean reliable operation
- Rotatable display with LED bar graph for switch point indication
- Output functions programmable via LED display and optical touch fields
- G 1/2 manometer connection
- Pressure range up to 400 bar



## Electronic "contact manometer" PG


In many industrial areas mechanical contact manometers are often used because of their highly visible display.

The electronic "contact manometer" of the series PG combines the high visibility of a manometer display with the advantages of an electronic pressure sensor, for example the programmable switching and analogue output (scalable), the high overload protection as well as the integrated temperature compensation.

The LED bar graph shows set and reset points, trends and the limits of dynamic pressure fluctuations, if any. The pointer is controlled via a stepping motor as it has been tried and tested many times in cars (tachometer). When disconnected, the pointer is not visible.



## Electronic contact manometers with switching output and analogue output

Type	Process connection	Display	Measuring range	Poverload	Pbursting	U <sub>b</sub> DC	Order no.
		LED	[bar]	max. [bar]	min. [bar]	[V]	
<b>M12 connector · Output function 1 x normally open / closed programmable + 1 x analogue (4...20 / 20...4 mA, scalable) · DC PNP/NPN</b>							
	G ½	Display unit	0...400	800	1200	18...32	<b>PG2450</b>
	G ½	Display unit	0...250	600	1000	18...32	<b>PG2451</b>
	G ½	Display unit	0...100	300	700	18...32	<b>PG2452</b>
	G ½	Display unit	-1...25	100	300	18...32	<b>PG2453</b>
	G ½	Display unit	-1...10	50	150	18...32	<b>PG2454</b>
	G ½	Display unit	-1...4	30	100	18...32	<b>PG2455</b>
	G ½	Display unit	-0.125...2.5	20	50	18...32	<b>PG2456</b>
	G ½	Display unit	-0.0125...0.25	10	30	18...32	<b>PG2458</b>
	G ½	Display unit	-0.005...0.1	4	30	18...32	<b>PG2489</b>

## Connectors

Type	Description	Order no.
<b>Socket M12, 5/4-pole, 4-wire</b>		
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVC004</b>
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVC005</b>



## Submersible pressure transmitter PS for hydrostatic level measurement



- Pressure compensation via internally vented cable
- Longitudinal water resistance – no water penetration if the cable is damaged
- Integrated overvoltage protection (lightning protection)
- 2-wire, 4...20 mA analogue output
- Good overall accuracy and long-term stability



### Applications

The submersible pressure transmitters of the PS3 series are used for level measurement in containers, tanks, wells, streaming waters, drill holes and wastewater plants. The accuracy of 0.5 % and the long-term stability of 0.2 % per year contribute to the operational reliability of the transmitter.

### Advantages

The analogue output signal and the use of two-wire technology allow easy integration in the applications and adaptation to the existing controller.


The submersible pressure transmitter can be optimally adapted to the measuring point using the optional accessories.







Level measurement in a water treatment plant



## Sensors for hydrostatic level monitoring

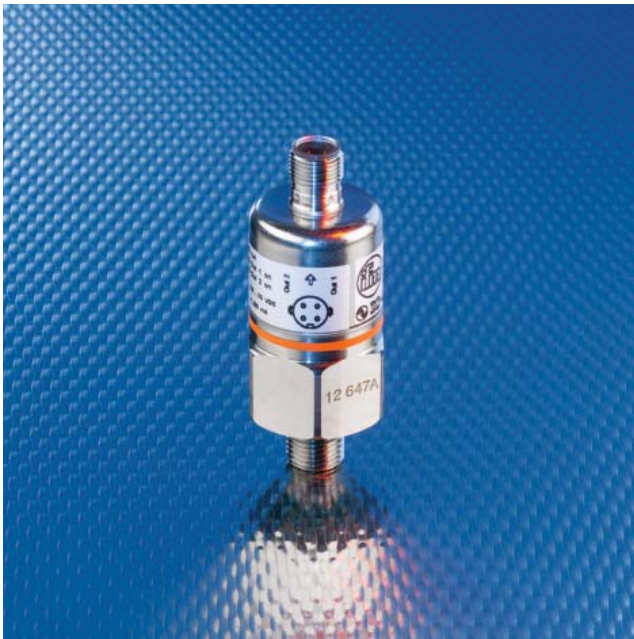
Type	Measuring range [bar]	Cable length / material	P <sub>overload</sub> max. [bar]	P <sub>bursting</sub> min. [bar]	U <sub>b</sub> DC [V]	Order no.
<b>Output function 4...20 mA analogue</b>						
	0...0.25	5 m PUR cable	2	2.4	10...30	<b>PS3208</b>
	0...0.6	10 m PUR cable	4	4.8	10...30	<b>PS3407</b>
	0...1	15 m PUR cable	5	6	10...30	<b>PS3417</b>

## Accessories

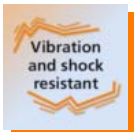
Type	Description	Order no.
	Cable clamp fastener · for submersible pressure transmitter PS3 · Housing materials: steel / plastics	<b>E30399</b>
	Filter element · for submersible pressure transmitter PS3 · for fixing on the capillary tube	<b>E30400</b>
	Splitter box · with ventilation and terminal block · for submersible pressure transmitter PS3 · Housing materials: plastics	<b>E30401</b>
	Additional weight · for submersible pressure transmitter PS3 · Housing materials: stainless steel 316Ti / 1.4571	<b>E30402</b>



## Compact PP pressure sensor



- Dual independent switching outputs or switching and diagnostic outputs
- Extremely robust and reliable
- Communication via IO-Link interface
- Long-term stability and overload protection due to the ceramic-capacitive measuring principle
- Versions with pressure ranges between -1...400 bar



Vibration and shock resistant



IP 67



Stainless steel

### Precise and long-term stable measuring cell

The PP type pressure sensors are distinguished by a high total accuracy of 0.5 %, a compact housing and a switch point accuracy of 0.5 %.

The tried-and tested pressure sensing principle using a ceramic-capacitive measuring cell ensures reliable and long-term stable measured values in hydraulic applications.

The compact housing design allows easy installation of the units in narrow applications that are difficult to access.

### Communication via IO-Link


IO-Link is a point-to-point communication protocol between a sensor / actuator and an IO-Link master. Advantages: Process data, parameters and diagnostic information of the sensor can be transmitted via the standard connection cable. When IO-Link is not in use, the sensor works in a conventional manner with two switching outputs.




## PP sensors with two switching outputs

Type	Process connection	Display	Measuring range	Poverload	Pbursting	U <sub>b</sub> DC	Order no.
		LED	[bar]	max. [bar]	min. [bar]	[V]	

M12 connector · Output function 2 x normally open / closed programmable or 1 x normally open / closed programmable + 1 x normally closed (diagnostic function) · DC PNP

	G¼ male / M5 female	Operation	0...400	600	1000	9.6...36	PP7550
	G¼ male / M5 female	Operation	0...250	400	850	9.6...36	PP7551
	G¼ male / M5 female	Operation	0...100	300	650	9.6...36	PP7552
	G¼ male / M5 female	Operation	0...25	150	350	9.6...36	PP7553
	G¼ male / M5 female	Operation	-1...10	75	150	9.6...36	PP7554

## Accessories

Type	Description	Order no.
	Programming/ display unit · for EPS and IO-Link sensors · Connector · Housing materials: stainless steel 316L / 1.4404 / PC copolymer / PBT / FPM	PP2001

## Connectors

Type	Description	Order no.
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC001
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC002



## Pressure sensor PK with easy-turn operating concept



- Simple switch point setting via two setting rings with optimum readability
- Robust stainless steel measuring cell
- Mechanical locking prevents inadvertent switch point manipulation
- High bursting pressure range for gaseous and liquid media
- Ideal use in accumulator charging circuits, hydraulic and pneumatic applications



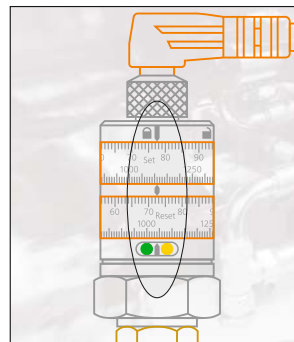
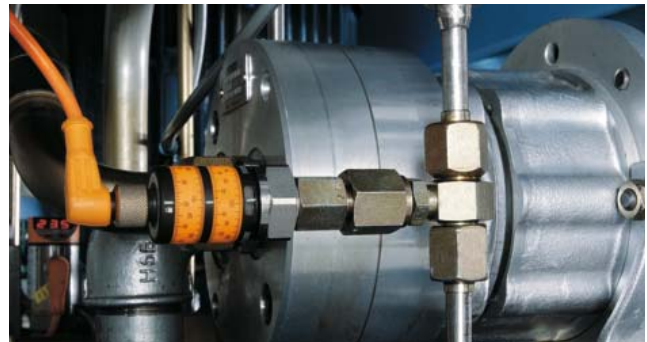
### The easy operating concept

The ease of handling is fascinating: Due to the radial setting rings with a unit scale for optimum readability every user can adjust the set point and reset point quickly and precisely even without system pressure being applied.


Thanks to mechanical locking unintentional manipulation is excluded. Two clearly visible LEDs indicating the switching status and operating status provide the required transparency.

### Versatile use



The robust pressure sensor can be used in nearly all industrial applications, not only in standard hydraulic and pneumatic applications but also at gas pressures up to 400 bar. The maximum robustness of the stainless steel measuring cell ensures high long-term stability and wear-free operation over millions of pressure cycles.





## PK sensors with mechanical setting and switching outputs

Type	Process connection	Display	Measuring range	Poverload	Pbursting	U <sub>b</sub> DC	Order no.
		LED	[bar]	max. [bar]	min. [bar]	[V]	
<b>M12 connector · Output function normally open / closed complementary · DC PNP</b>							
	¼" NPT male / M5 female	Operation	0...400	600	1600	9.6...32	<b>PK6220</b>
	¼" NPT male / M5 female	Operation	0...100	200	1000	9.6...32	<b>PK6222</b>
	¼" NPT male / M5 female	Operation	0...10	25	300	9.6...32	<b>PK6224</b>
	G¼ male / M5 female	Operation	0...400	600	1600	9.6...32	<b>PK6520</b>
	G¼ male / M5 female	Operation	0...250	400	1000	9.6...32	<b>PK6521</b>
	G¼ male / M5 female	Operation	0...100	200	1000	9.6...32	<b>PK6522</b>
	G¼ male / M5 female	Operation	0...25	60	500	9.6...32	<b>PK6523</b>
	G¼ male / M5 female	Operation	0...10	25	300	9.6...32	<b>PK6524</b>

## Accessories

Type	Description	Order no.
	Damping screw · for pressure sensors with M5 internal thread	<b>E30057</b>
	Protective cover · with lead seal option · for pressure sensors type PK · for temperature sensors type TK · for vibration sensors type VK · Housing materials: PP transparent	<b>E30094</b>

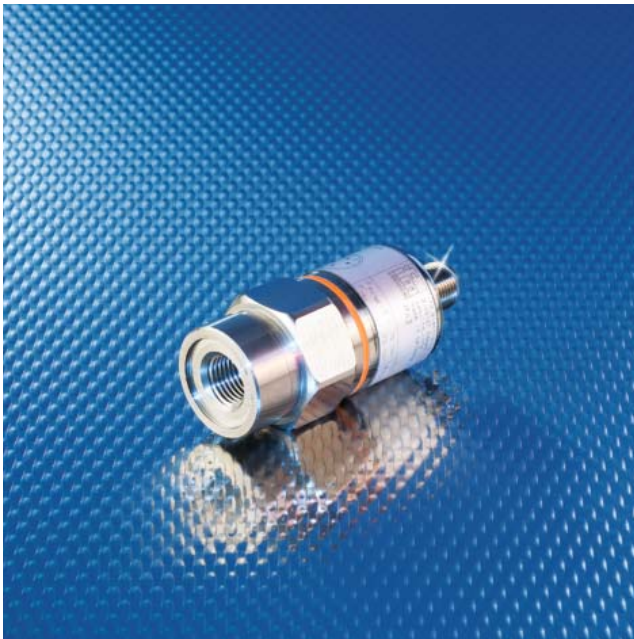
## Connectors

Type	Description	Order no.
<b>Socket M12, 5/4-pole, 4-wire</b>		
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVC005</b>
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVC002</b>

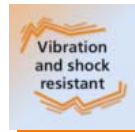
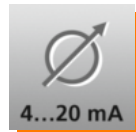




## Compact pressure transmitter PA with analogue current output



- 0.5 % overall accuracy
- Versions with 4...20 mA analogue output
- Long-term stability and overload protection due to the ceramic-capacitive measuring principle
- Excellent price / performance ratio
- Different versions with pressure ranges between -1...600 bar



### Precise and compact

The pressure transmitter family PA is distinguished by a high total accuracy of 0.5 % and a compact housing. The tried-and-tested pressure sensing principle using a ceramic-capacitive measuring cell ensures reliable and long-term stable analogue values in mobile and stationary hydraulic applications.

The compact housing design allows easy installation of the units in narrow applications that are difficult to access.


### Long-term stability

The maximum robustness and long life ensure trouble-free and reliable operation of the pressure transmitters. The ceramic-capacitive measuring principle with a special support of the measuring diaphragm makes the pressure transmitters immune to overload operation and high pressure peaks.




Long-term stable analogue values ensure reliable monitoring of hydraulic power packs.



## PA sensors for industrial applications with analogue outputs

Type	Process connection	Display LED	Measuring range [bar]	Poverload max. [bar]	Pbursting min. [bar]	U <sub>b</sub> DC [V]	Order no.
<b>M12 connector · Output function 4...20 mA · DC</b>							
	G ¼ female	–	0...400	600	1000	9.6...32	PA3020
	G ¼ female	–	0...250	400	850	9.6...32	PA3021
	G ¼ female	–	0...100	300	650	9.6...32	PA3022
	G ¼ female	–	0...25	150	350	9.6...32	PA3023
	G ¼ female	–	0...10	75	150	9.6...32	PA3024
	¼" NPT	–	0...400	600	1000	9.6...32	PA3220
	¼" NPT	–	0...250	600	1000	9.6...32	PA3221
	¼" NPT	–	0...100	300	650	9.6...32	PA3222
	¼" NPT	–	0...25	150	350	9.6...32	PA3223
	¼" NPT	–	0...10	75	150	9.6...32	PA3224

## Adapters

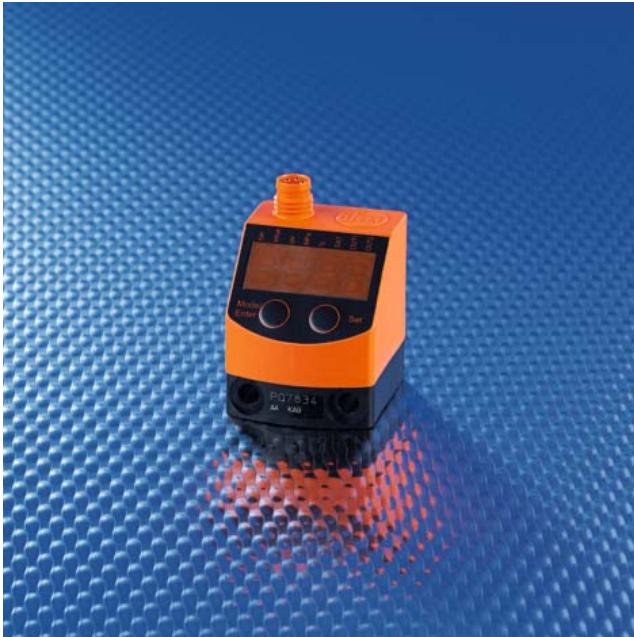
Type	Description	Order no.
	Adapter · G ¼ - G ½ · Housing materials: stainless steel / sealing: FPM	E30000
	Adapter · G ¼ - G ¼ · Housing materials: stainless steel / FPM	E30007

## Connectors

Type	Description	Order no.
<b>Socket M12, 5/4-pole, 4-wire</b>		
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC005
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC002



## Compact pressure sensor for pneumatics



- Slanted display for good readability and handling
- Two-colour display for indication of the switching status
- Easy installation using integrated mounting holes and accessories
- Two programmable switching outputs or a switching output and a diagnostic output
- Pressure range -1...1 or -1...10 bar

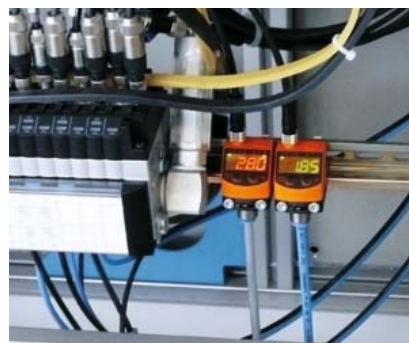


### Pressure sensor PQ for pneumatic applications

The pressure sensors of the PQ series are based on a piezo-resistive measuring element, feature an extremely compact housing and can be used in a wide range of applications. The units precisely measure the pressure in the negative pressure and overpressure range in pneumatic applications. The silicon measuring cell is insensitive to liquids (e.g. condensed water) and deposits that might occur in the system. Also, it guarantees high overload protection and an accuracy of  $< \pm 0.5\%$ .

### Mounting options

The sensor can be fixed to flat surfaces and profiles using the two M4 drill holes on the front. It can be fixed to a DIN rail using the robust DIN rail clip, which is secured against inadvertent movement. The sensor is screwed to the clip. Installation with an optional double nipple with 1/8" thread is even easier. Using this nipple, the sensor can be fixed to the pipe or air-ducting plate and aligned quickly and easily.




Thanks to the two colours of the display the indicated values can be interpreted easily.


## Sensors for pneumatic applications

Type	Process connection	Display LED	Measuring range [bar]	Poverload max. [bar]	Pbursting min. [bar]	U <sub>b</sub> DC [V]	Order no.
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M8 connector · Output function 2 x normally open / closed programmable or 1 x normally open / closed programmable + 1 x normally closed (diagnostic function) · DC PNP

	G 1/8 female	Display unit	-1...10	20	30	18...32	PQ7834
	G 1/8 female	Display unit	-1...1	20	30	18...32	PQ7809

M8 connector · Output function 1 x NO / NC programmable + 1 x current output · DC PNP

	G 1/8 female / M5 female	Display unit	-1...1	20	30	18...32	PQ3809
	G 1/8 female / M5 female	Display unit	-1...10	20	30	18...32	PQ3834

## Accessories

Type	Description	Order no.
	DIN rail clip · Housing materials: stainless steel	E37340
	Adapter · R1/8 - R1/8 · rotatable · Housing materials: Brass nickel-plated	E37350

## Connectors

Type	Description	Order no.
<b>Socket M8, 4-pole, 4-wire</b>		
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M8 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC150
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M8 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC151
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M8 connector · 10 m · Housing materials: housing: TPU orange / sealing: FKM	EVC152
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M8 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC153
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M8 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC154
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M8 connector · 10 m · Housing materials: housing: TPU orange / sealing: FKM	EVC155

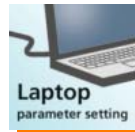
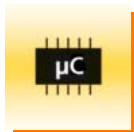
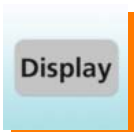




# Flush pressure sensors for hydrostatic level measurement



- Continuous level and point level measurement with analogue / switching output
- Irrespective of conductivity and dielectrics of the medium
- High precision and absolute long-term stability due to ceramic measuring cell
- Flush process connection
- Process connection G 1 male



## Level detection

For hydrostatic level detection of liquids in tanks and vessels, special requirements are made on the measuring device and process connection. Apart from high accuracy and long-term stability, the sensor must meet the highest hygienic requirements. The pressure sensors of the PF, PI, PL and PG series meet these requirements to a particular degree.

## Advantages


ifm pressure sensors feature a ceramic measuring cell which is largely resistant to aggressive media and abrasion, allowing use in a wide range of applications.

Flush mount installation in the tank or vessel wall ensures reliable cleaning and sterilisation in the process. The housing is potted, so offering optimum protection against humidity and chemicals.






## Full metal sensors for industrial applications

Type	Process connection	Display	Measuring range	Poverload	Pbursting	U <sub>b</sub> DC	Order no.
		LED	[bar]	max. [bar]	min. [bar]	[V]	
<b>M12 connector · Output function 1 x normally open / normally closed programmable + 1 x normally open / normally closed programmable or 1 x analogue (4...20 / 20...4 mA, scalable) · 2 wires DC / 3 wires DC PNP/NPN</b>							
	Sealing cone G1 male	Display unit	-1...4	30	100	20...32	<b>PI2895*</b>
	Sealing cone G1 male	Display unit	-0.124...2.5	20	50	20...32	<b>PI2896*</b>
	Sealing cone G1 male	Display unit	-0.05...1	10	30	20...32	<b>PI2897*</b>
	Sealing cone G1 male	Display unit	-0.0124...0.25	10	30	20...32	<b>PI2898*</b>

Attention: The unit must only be installed in a process connection for G1 sealing cone! The G1A sealing cone of the unit is only suited for adapters with metal end stop!

## Electronic contact manometers with switching output and analogue output

Type	Process connection	Display	Measuring range	Poverload	Pbursting	U <sub>b</sub> DC	Order no.
		LED	[bar]	max. [bar]	min. [bar]	[V]	
<b>M12 connector · Output function 1 x normally open / closed programmable + 1 x analogue (4...20 / 20...4 mA, scalable) · DC PNP/NPN</b>							
	Sealing cone G1 male	Display unit	-1...10	50	150	18...32	<b>PG2894*</b>
	Sealing cone G1 male	Display unit	-0.05...1	10	30	18...32	<b>PG2897*</b>
	Sealing cone G1 male	Display unit	-0.0124...0.25	10	30	18...32	<b>PG2898*</b>

Attention: The unit must only be installed in a process connection for G1 sealing cone! The G1A sealing cone of the unit is only suited for adapters with metal end stop!



## Flow sensor in robust stainless steel housing



- Increased repeatability across the extended measuring range
- Simplified setting mode for quick set-up
- Variable process connection using adapters
- Reliable monitoring of gases and liquids
- Electronic locking of the set values



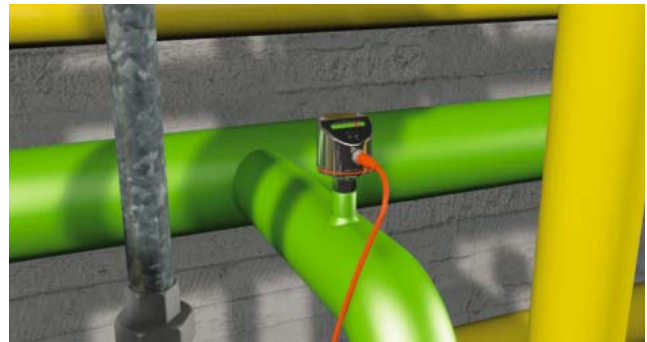
### Simple, fast and flexible installation

The flow sensors of the SI5 series can be integrated into almost every application by means of a wide selection of process adapters. The robust stainless steel housing provides high reliability even in cases of harsh environmental conditions.




The unit is unaffected by the orientation of the sensing face with respect to the direction of flow, providing increased flexibility of installation.

### Easy handling and high functionality

A pushbutton is used for flow range and switch point setting. Current flow and switch point are indicated with the local multi-coloured LEDs. Electronic locking of the settings and factory reset of the parameters provide additional safety.




### Compact housings for adapters for flow monitoring

Type	Setting range liquids / gases [cm/s]	Material sensor tip	Medium temperature [°C]	Pressure rating [bar]	Response time [s]	U <sub>b</sub> [V]	Order no.
<b>M12 connector</b>							
	3...300 / 200...3000	stainless steel 316L / 1.4404	-25...80	30	1...10	19...36	SI5000
	3...300 / 200...3000	stainless steel 316L / 1.4404	-25...80	300	1...10	19...36	SI5002
	3...300 / -	stainless steel 316L / 1.4404	-25...80	300	1...10	19...36	SI5004
	3...300 / 200...3000	stainless steel 316L / 1.4404	-25...80	300	1...2 / 1...10	18...36	SI5010
<b>1/2" UNF-Connector</b>							
	3...300 / 200...3000	stainless steel 316L / 1.4404	-25...80	300	1...10	85...265	SI5006*





**\* Note for AC and AC/DC units**

Miniature fuse to IEC60127-2 sheet 1, ≤ 5 A (fast acting) Recommendation: check the unit for reliable function after a short circuit.

### Compact designs for adapter with flow and temperature monitoring

Type	Setting range liquids / gases [cm/s]	Material sensor tip	Medium temperature [°C]	Pressure rating [bar]	Response time [s]	U <sub>b</sub> [V]	Order no.
<b>M12 connector</b>							
	3...300 / 200...3000	stainless steel 316L / 1.4404	-25...80	300	1...10	19...36	SI5007

### Adapters

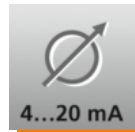
Type	Description	Order no.
	Adapter · M18 x 1.5 - G 1/2 · Insertion depth of the probe of SID, SFD, TN: · 21 mm · Housing materials: stainless steel 316L / 1.4404	E40096
	Adapter · M18 x 1.5 - G 1/2 · Insertion depth of the probe of SID, SFD, TN: · 21 mm · Housing materials: brass	E40097
	Adapter · M18 x 1.5 - G 1/4 · Insertion depth of the probe of SID, SFD, TN: · 13.5 mm · Housing materials: stainless steel 316L / 1.4404	E40099
	Adapter · M18 x 1.5 - 1/2" NPT · Insertion depth of the probe of SID, SFD, TN: · 23 mm · Housing materials: stainless steel 316L / 1.4404	E40107



## Magnetic-inductive inline flow meter



- With volumetric flow quantity, total quantity and temperature indication
- High accuracy, repeatability and measurement dynamics
- Suitable for conductive media from  $20 \mu\text{S}/\text{cm}$ , flow rate up to 100 l/min
- Binary, analogue and pulse outputs for signal processing
- Different process connections using adapters



### Measuring principle

The flow meter is based on Faraday's principle of induction. The conductive medium flowing through a pipe in a magnetic field generates a voltage which is proportional to the flow velocity or volumetric flow quantity.

### Device function




This voltage is tapped via electrodes and converted in the evaluation electronics. Analogue, binary and pulse outputs offer various possibilities to process the measured data. Due to the flexible programming via pushbuttons the flow meter can be adapted to different conditions. It is installed using an adapter. The unit features a high protection rating and a robust, compact housing.






**Magnetic-inductive flow meters with integrated temperature measurement (sealing material FKM)**

Type	Process connection	Measuring range [l/min]	Medium temperature [°C]	Pressure rating [bar]	Response time [s]	U <sub>b</sub> [V]	Order no.
------	--------------------	----------------------------	----------------------------	--------------------------	----------------------	-----------------------	-----------

Output function OUT1: normally open / closed programmable or pulse OUT2: normally open / closed programmable or analogue (4...20 mA / 0...10 V, scaleable)

	G½	0.25...25.00	-10...70	16	< 0.150	19...30	<b>SM6000</b>
	G¾	0.5...50.0	-10...70	16	< 0.150	19...30	<b>SM7000</b>
	G1	0.7...100.0	-10...70	16	< 0.150	19...30	<b>SM8000</b>

Output function 2 x analogue (4...20 mA scaleable)

	G½	0.1...25.00	-10...70	16	< 0.150	20...30	<b>SM6004</b>
	G¾	0.2...50.0	-10...70	16	< 0.150	20...30	<b>SM7004</b>
	G1	0.2...100.0	-10...70	16	< 0.150	20...30	<b>SM8004</b>

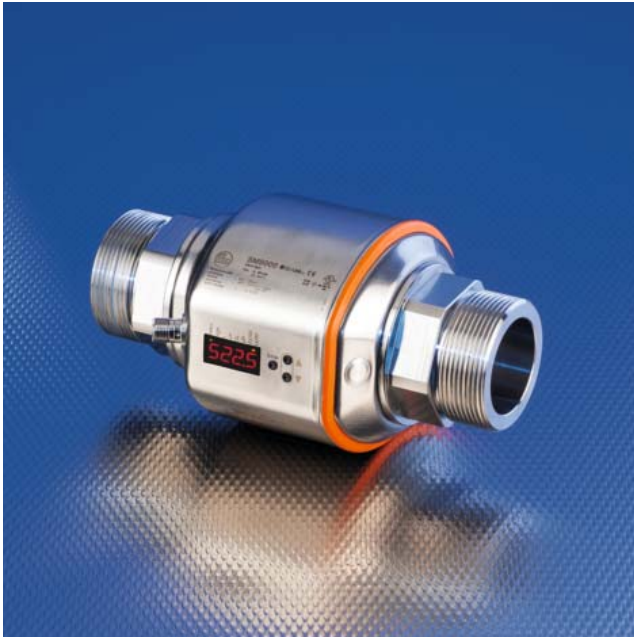
**Adapters**

Type	Description	Order no.
	Adapter · G ½ - G ½ · for flow monitor type SM6 · Housing materials: stainless steel 316L / 1.4404	<b>E40213</b>
	Adapter · G ¾ - G ¾ · for flow monitor type SM7 / SU7 · Housing materials: stainless steel 316L / 1.4404	<b>E40216</b>
	Adapter · G 1 - G 1 · for flow monitor type SM8 / SU8 · Housing materials: stainless steel 316L / 1.4404	<b>E40217</b>





## Magnetic-inductive inline flow meter for large volumetric flow quantities



- Suited for liquids with a conductivity from 20  $\mu\text{S}/\text{cm}$
- Variable use for different flow directions
- With integrated empty pipe detection and simulation mode
- Also available with EPDM seal for drinking water applications
- With indication of volumetric flow quantity, total quantity and temperature



### Compact and low cost

ifm makes it possible: efm mid – a volumetric flow sensor up to 600 l/min, with electronics and evaluation unit in one of the most compact housings. It is not only more compact but also less expensive than comparable sensors.

### Three functions

The user monitors the volumetric flow quantity, the total quantity as well as the temperature with only one unit.

### Easy handling

During set-up, the efm mid scores with easy, intuitive handling via three buttons directly on the unit. This allows direct use of the sensor in the field.

### Data processing


Analogue, binary and pulse and frequency outputs offer various options to process the measured data.




**Magnetic-inductive flow meters with integrated temperature monitoring (sealing material EPDM) KTW / W270 approval**

Type	Process connection	Measuring range [l/min]	Medium temperature [°C]	Pressure rating [bar]	Response time [s]	U <sub>b</sub> [V]	Order no.
------	--------------------	----------------------------	----------------------------	--------------------------	----------------------	-----------------------	-----------




Output function OUT1: normally open / normally closed programmable or pulse or frequency or empty pipe detection or IO-Link  
 OUT2: normally open / normally closed programmable or analogue (4...20 mA; 0...10 V, scalable) or empty pipe detection

	G2 flat seal	6.5...300	-10...70	16	< 0.35	18...32	SM9000
	G2 flat seal	8...600	-10...70	16	< 0.35	18...32	SM2000
	G2 flat seal	8...600	-10...70	16	< 0.35	18...32	SM2100

Output function OUT1: analogue (4...20 mA) or IO-Link OUT2: Analogue (4...20 mA)

	G2 flat seal	5...300	-10...70 / 14...158	16	< 0.35	18...32	SM9004
	G2 flat seal	5...600	-10...70 / 14...158	16	< 0.35	18...32	SM2004

**Accessories**

Type	Description	Order no.
	Adapter · 1½" NPT · for flow sensors type SM2, SM9 · Housing materials: stainless steel 316Ti / 1.4571	E40229
	Adapter · G 1½ · for flow sensors type SM2, SM9 · Housing materials: stainless steel 316Ti / 1.4571	E40230
	Adapter · 2" NPT · for flow sensors type SM2, SM9 · Housing materials: stainless steel 316Ti / 1.4571	E40228
	Adapter · R 2" A · for flow sensors type SM2, SM9 · Housing materials: stainless steel 316Ti / 1.4571	E40231
	IO-Link interface · for parameter setting and analysis of units · Supported communication protocols: IO-Link (4800 and 38400 bits/s) EPS protocol (19200 bits/s) · for operation with FDT framework software "ifm Container" or software "LINERECORDER SENSOR"	E30396

**Connectors**

Type	Description	Order no.
<b>Socket M12, 5/4-pole, 4-wire</b>		
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC002
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC005



# Ultrasonic flow meter in robust inline design



- With volumetric flow quantity, total quantity and medium temperature display
- Suited for water up to a flow rate of 100 litres per minute
- Binary, analogue and pulse outputs for signal processing
- High measurement dynamics and resolution due to the transit time difference principle
- 4-digit alphanumeric display, LEDs for indication of units and switch points



## Measuring principle

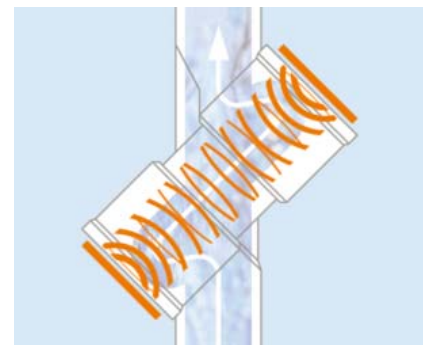
The SU type ultrasonic flow meter operates on the transit time difference principle. Two sound transducers are positioned in a defined pipe length. These sound transducers alternately emit sound pulses. The pulse trains emitted with the flow in the pipe length are transported faster to the receiver by the flowing medium. From this transit time difference results the current volumetric flow quantity.

## High functionality

In addition to volumetric flow monitoring the SU also monitors the temperature of the medium. It is displayed on the unit and provided for signal processing. Therefore, the system is particularly suited for monitoring cooling circuits.

## Sensor functions



Analogue, binary and pulse outputs offer various possibilities to process sensor data. Furthermore, a volumetric flow quantity, total quantity and medium temperature display is integrated.






### Ultrasonic flow meters for liquids (water, glycol solutions, oils)

Type	Process connection	Measuring range [l/min]	Medium temperature [°C]	Pressure rating [bar]	Response time [s]	U <sub>b</sub> [V]	Order no.
------	--------------------	----------------------------	----------------------------	--------------------------	----------------------	-----------------------	-----------

M12 connector · Output function 2 x normally open / closed programmable · DC PNP

	G $\frac{3}{4}$	0.1...50.0	-10...80	16	< 0.250	19...30	SU7200
	G1	0.2...100.0	-10...80	16	< 0.250	19...30	SU8200






M12 connector · Output function OUT1: normally open / closed programmable or pulse OUT2: normally open / closed programmable or analogue (4...20 mA / 0...10 V, scaleable) · DC PNP/NPN

	G $\frac{3}{4}$	0.1...50.0	-10...80	16	< 0.250	19...30	SU7000
	G1	0.2...100.0	-10...80	16	< 0.250	19...30	SU8000
	G1 $\frac{1}{4}$	0.4...200.0	-10...80	16	< 0.250	19...30	SU9000

M12 connector · Output function 2 x analogue (4...20 mA scalable) · DC

	G1 $\frac{1}{4}$	0.0...200.0	-10...80	16	< 0.250	19...30	SU9004
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### Adapters

Type	Description	Order no.
	Adapter · G $\frac{3}{4}$ - $\frac{1}{2}$ " NPT · for flow monitor type SM7 / SU7 · Housing materials: stainless steel 316L / 1.4404	E40191
	Adapter · G $\frac{3}{4}$ - R $\frac{1}{2}$ · for flow monitor type SM7 / SU7 · Housing materials: stainless steel 316L / 1.4404	E40178
	Adapter · G 1 - $\frac{3}{4}$ " NPT · for flow monitor type SM8 / SU8 · Housing materials: stainless steel 316L / 1.4404	E40193
	Adapter · G 1 - R $\frac{3}{4}$ · for flow monitor type SM8 / SU8 · Housing materials: stainless steel 316L / 1.4404	E40180
	Adapter · G 1 $\frac{1}{4}$ - R 1 · for flow monitor type SU9 · Housing materials: stainless steel 316L / 1.4404	E40205



## Robust mechatronic flow sensor



- Volumetric flow quantities: 15 l/min, 25 l/min, 50 l/min, 100 l/min, 200 l/min
- Fast response time  $\leq 10$  ms
- Easy handling:  
Switch points can be (pre)set continuously
- Variable R or G process connection
- Pressure ranges up to 25 bar, medium temperature up to 180 °C



### Mechatronic flow sensor

The flow sensor works to the principle of spring-supported piston: The piston, located in the valve seat in the housing, is lifted by the flowing medium against the spring resistance.

For binary signal output the piston position is detected by an inductive sensor. Analogue sensors however detect the position by means of a magnetic-field sensor.

The spring resistance forces the piston to return to its original position with decreasing flow. This ensures position-independent installation of the flow sensor preventing backflow.







The switch points can be easily set and fixed via a setting screw. The robust mechanical design ensures use in harsh environments. The units are maintenance-free.




Mechatronic sensor in the coolant circuit of an induction furnace.



## Mechatronic flow sensors for liquids

Type	Process connection	Measuring range [l/min]	Medium temperature [°C]	Pressure rating [bar]	Response time [s]	U <sub>b</sub> [V]	Order no.
M12 connector · Output function  · DC PNP							
	Rp 3/4	1...15	0...85	25	< 0.01	24	SBY332
	Rp 1/2	2...20	0...85	25	< 0.01	24	SBY323
	Rp 3/4	1...25	0...85	25	< 0.01	24	SBY333
	Rp 3/4	2...50	0...85	25	< 0.01	24	SBY334
	Rp 1	5...100	0...85	25	< 0.01	24	SBY346
	Rp 1 1/2	20...200	0...85	25	< 0.01	24	SBY357

## Mechatronic flow sensors for high temperatures

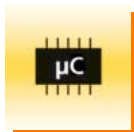
Type	Process connection	Measuring range [l/min]	Medium temperature [°C]	Pressure rating [bar]	Response time [s]	U <sub>b</sub> [V]	Order no.
Cable with connector 0.3 m · Output function analogue · DC							
	Rp 3/4	0.3...25	10...180	15	< 0.01	24	SBT633



## Compressed air meters with display and totaliser function



- For compressed air in industrial use as well as argon (Ar), carbon dioxide (CO<sub>2</sub>), nitrogen (N<sub>2</sub>)
- Large measuring range up to 700 Nm<sup>3</sup>/h, detection of very small leaks
- Fast response time and high response sensitivity
- With volumetric flow quantity, total quantity and temperature indication
- Analogue, switching and pulse outputs for signal processing



### Calorimetric measuring principle

The compressed air meter detects the standard volume flow directly (according to ISO 2533). This makes corrections, in case of temperature or pressure fluctuations, unnecessary. The high measurement dynamics of the system enables the reliable detection of even minute quantities, e.g. leakage. High accuracy and repeatability are ensured by the integration of the sensor's measuring elements into a defined pipe length.

### All information at hand






The integral 4-digit LED display plus the status LEDs allow information to be available at the point of monitoring. Whether peak consumption, present or accumulated consumption: Set switching or alarm values can be programmed and read simply by pressing a pushbutton. All settings can be protected using the electronic lock function.

### Signal processing



Switching outputs, analogue outputs and pulse outputs are available for signal processing. Parameters are set in the user menu.



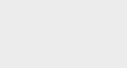

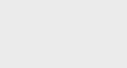
### Compressed air meters

Type	Process connection	Setting range [Nm <sup>3</sup> /h]	Pressure rating [bar]	Response time [s]	U <sub>b</sub> [V]	Order no.
<b>Output function OUT1: normally open / closed programmable or pulse OUT2: normally open / closed programmable or analogue (4...20 mA scaleable)</b>						
	G ¼ (DN8)	0.12...15.00	16	< 0.1	18...30	SD5000
	R½ (DN15)	0.6...75.0	16	< 0.1	18...30	SD6000
	R1 (DN25)	1.8...225.0	16	< 0.1	18...30	SD8000
	R1½ (DN40)	3.5...410.0	16	< 0.1	18...30	SD9000
	R2 (DN50)	5...700	16	< 0.1	18...30	SD2000

### Compressed air meter for special gases

Type	Process connection	Setting range [Nm <sup>3</sup> /h]	Medium temperature [°C]	Pressure rating [bar]	Response time [s]	U <sub>b</sub> [V]	Order no.
<b>Output function OUT1: normally open / closed programmable or pulse OUT2: normally open / closed programmable or analogue (4...20 mA scaleable)</b>							
	G ¼ (DN8)	Ar: 0.08...24.54 / CO <sub>2</sub> : 0.047 (0.04)...14.38 / N <sub>2</sub> : 0.05 (0.06)...14.94	0...60	16	< 0.1	18...30	SD5100
	R½ (DN15)	Ar: 0.39 (0.4)...118.2 / CO <sub>2</sub> : 0.24 (0.2)...71.7 / N <sub>2</sub> : 0.24 (0.2)...73.0	0...60	16	< 0.1	18...30	SD6100

### Connectors

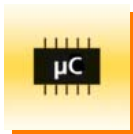
Type	Description	Order no.
<b>Socket M12, 5/4-pole, 4-wire</b>		
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC004
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC005
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 10 m · Housing materials: housing: TPU orange / sealing: FKM	EVC006



## Electronic point level sensors for liquid media



- Easy pushbutton adjustment in the application
- Overflow protection or normally closed / normally open programmable
- Clearly visible switching status indication
- Extended setting range for increased application reliability
- Modular mounting concept for flexible use



### Application

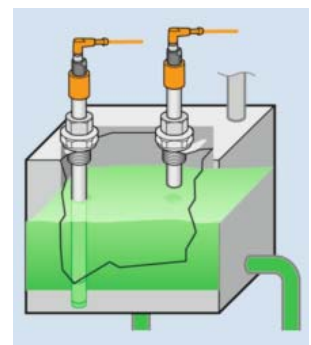
The point level sensors have been optimised for use in hydraulic oils and coolants. They are used to monitor the minimum level, leakage or overflow of tanks. The extended setting range increases the application reliability.

### Easy set-up

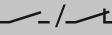

The new operating concept enables setting and adjustment of the output function by pressing just one pushbutton. Deposits can be suppressed during operation without carrying out a complete new adjustment.

### Reliable



The LI21 series is approved to the German Federal Water Act (WHG) section 19. For the LI51 series the output function (normally open / normally closed) is programmable.







### Point level sensors for oils and lubricants

Type	Probe length [mm]	Output	U <sub>b</sub> [V]	Medium temperature water [°C]	Medium temperature oil [°C]	I <sub>load</sub> [mA]	Order no.
M12 connector · Output function  · DC PNP							
	132	normally open / closed programmable	10...36	0...35 (LI5141 + E43103: 0...65)	0...65	200	LI5141
	273	normally open / closed programmable	10...36	0...35 (LI5142 + E43100: 0...65)	0...65	200	LI5142
	481	normally open / closed programmable	10...36	0...35 (LI5143 + E43101: 0...60)	0...65	200	LI5143
	737	normally open / closed programmable	10...36	0...35 (LI5144 + E43102: 0...55)	0...65	200	LI5144

### Point level sensors for oils and coolants, approval to the German Federal Water Act (WHG), section 19

Type	Probe length [mm]	Output	U <sub>b</sub> [V]	Medium temperature water [°C]	Medium temperature oil [°C]	I <sub>load</sub> [mA]	Order no.
M12 connector · Output function  · DC PNP							
	132	Normally closed	10...36	0...35	0...65	200	LI2141
	273	Normally closed	10...36	0...35	0...65	200	LI2142
	481	Normally closed	10...36	0...35	0...65	200	LI2143

### Accessories

Type	Description	Order no.
	Mounting adapter · G ¾ D16 · for capacitive level sensors LK, LI, LT, LL · Housing materials: flange: stainless steel / nut: stainless steel / Spacer: Brass / rubber ring: FPM / sealing: Tesnit	E43003
	Mounting adapter · G 1 D16 · for capacitive level sensors LK, LI, LT, LL · Housing materials: flange: stainless steel / nut: stainless steel / Spacer: Brass / rubber ring: FPM / sealing: Tesnit	E43004
	Flange plate · 73-90 D16 · for capacitive level sensors LK, LI, LT, LL · according to DIN 24557 · Housing materials: aluminium anodised / nut: stainless steel / Spacer: Brass / rubber ring: FPM / sealing: NBR	E43001
	Flange plate · 65-80 D16 · for capacitive level sensors LK, LI, LT, LL · Housing materials: flange: aluminium anodised / nut: stainless steel / Spacer: Brass / rubber ring: FPM	E43006





## Electronic point level sensors LMT



- Flexible installation independent of the orientation
- Shock and vibration resistant in a robust stainless steel housing
- Factory set for simple "plug & play"
- Differentiation of media by switch point setting
- Hygienic design with maintenance-free sealing concept



### Level under control

The LMT family reliably monitors the level in storage tanks or protects pumps against running dry. The different lengths and process connections allow application-specific and orientation-independent installation.

### Versatile sensor for all media

The LMT can be set to almost any liquid or viscous media and bulk materials.

The distinction of two media is possible due to the two switching outputs which can be set independently. The parameters can be set via IO-Link and USB interface accessory E30396.





### Food-grade

The sensor with its high-quality housing materials such as high-grade stainless steel (316L / 1.4404) and PEEK meets all requirements for hygienic areas. This includes approvals such as EHEDG, 3A and also FDA.







The LMT point level sensor protects the pump from running dry.

## Point level sensors

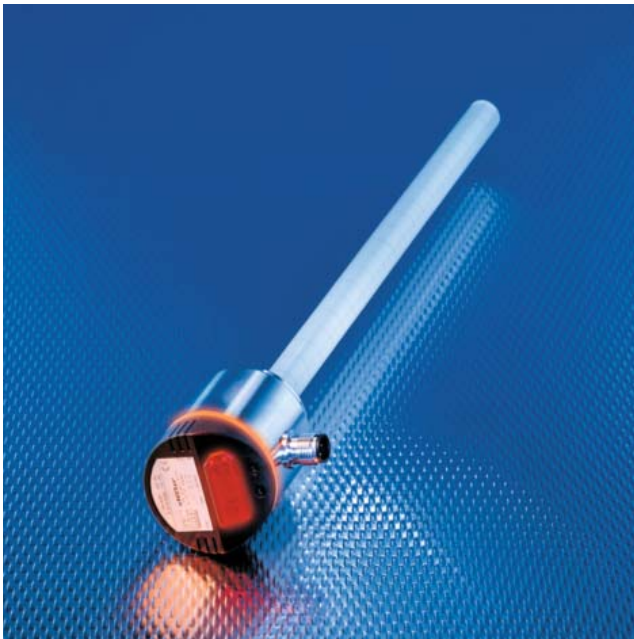
Type	Process connection	Process pressure max. [bar]	Application	Protection	Order no.
<b>M12 connector · Output function 2 x normally open / closed programmable · DC PNP/NPN</b>					
	G ½ male	-1...40	liquid, viscous and powdery media	IP 68 / IP 69K	<b>LMT121</b>
	G ½ male	-1...40	liquid, viscous and powdery media	IP 68 / IP 69K	<b>LMT102</b>
	G ½ male	-1...40	liquid, viscous and powdery media	IP 68 / IP 69K	<b>LMT104</b>
	G ½ male	-1...40	liquid, viscous and powdery media	IP 68 / IP 69K	<b>LMT105</b>
<b>M12 connector · Output function normally open / closed complementary · DC PNP</b>					
	G ½ male	-1...16	water, water-based media	IP 68 / IP 69K	<b>LMT100</b>
	G ½ male	-1...16	oils, grease	IP 68 / IP 69K	<b>LMT110</b>

## Accessories

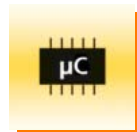
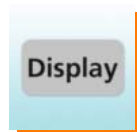
Type	Description	Order no.
	Welding adapter · G ½ - Ø 30 mm · for tanks · Housing materials: stainless steel 316L / 1.4435	<b>E43300</b>
	Welding adapter · G ½ - Ø 29 mm · for pipes · Housing materials: stainless steel 316L / 1.4435	<b>E43301</b>
	Adapter · G ¾ · Housing materials: stainless steel 316L / 1.4435	<b>E43302</b>
	Adapter · G 1 · Housing materials: stainless steel 316L / 1.4435	<b>E43303</b>
	IO-Link interface · for parameter setting and analysis of units · Supported communication protocols: IO-Link (4800 and 38400 bits/s) EPS protocol (19200 bits/s) · for operation with FDT framework software "ifm Container" or software "LINERECORDER SENSOR"	<b>E30396</b>



## Level sensors for oils, coolants and cleaning agents



- Variants with different outputs
- Easy to use via user menu
- Direct indication of the current level by LED display
- Freely programmable set and reset points with window function
- Probe lengths of 264, 472 and 728 mm

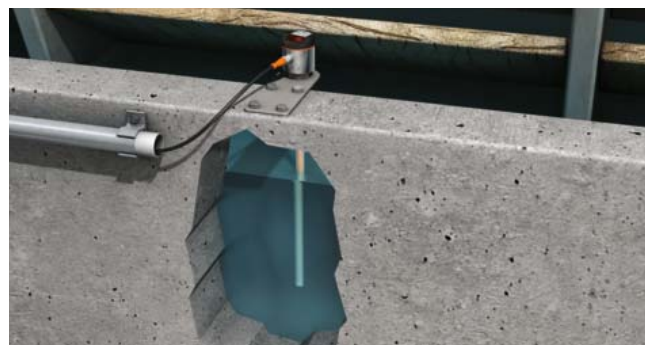


### Level monitoring in machine building

LK type level sensors are suitable for a continuous detection of levels in all kinds of vessels such as coolant pumping stations and hydraulic tanks. Setting to the medium to be measured is done quickly and conveniently via the easy-to-use menu. Versatile mounting accessories enable installation in different processes, the insertion depth can be adjusted with respect to the application.




Levels can be conveniently controlled within the set limits using the operating switching output. The integrated LED display allows direct readout of the present level.

In addition, critical process states such as overflow of the vessel can be directly monitored using the overflow switch point. For safety reasons this output is completely independent of the level measurement. Now only one unit is needed instead of individual units for level measurement and point level detection. This creates savings from reduced mounting, purchasing and maintenance costs.







The current level can be read out directly at the sensor.

## Electronic level sensors for oils and coolants

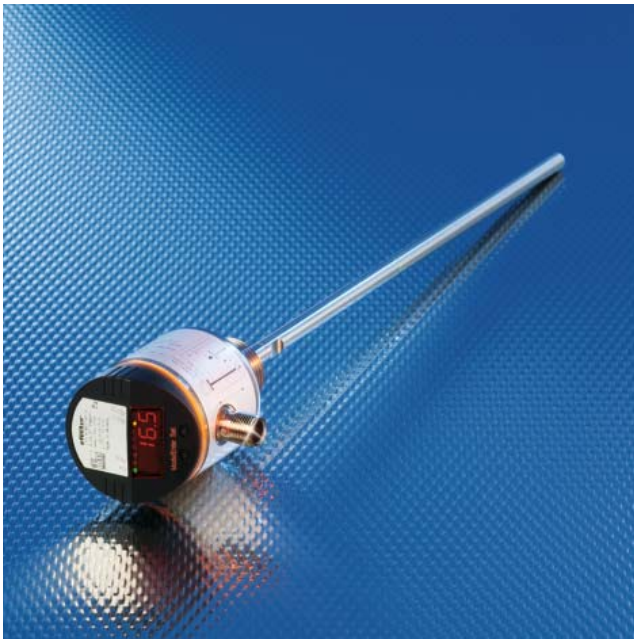
Type	Probe length [mm]	Active zone [mm]	Inactive zone [mm]	U <sub>b</sub> [V]	Medium temperature water [°C]	Medium temperature oil [°C]	I <sub>load</sub> [mA]	Order no.
<b>M12 connector (according to EN 61076-2-101) · Output function 1 x analogue 4...20 mA / 0...10 V (OUT2); 1 x normally open / closed programmable (OUT-OP) · DC PNP</b>								
	264	195	53 / 15	18...30	0...35 (LK3122 + E43100: 0...65)	0...70	200	LK3122
	472	390	53 / 30	18...30	0...35 (LK3123 + E43101: 0...60)	0...70	200	LK3123
	728	585	102 / 40	18...30	0...35 (LK3124 + E43102: 0...55)	0...70	200	LK3124
<b>M12 connector (according to EN 61076-2-101) · Output function 2 x normally open / closed programmable · DC PNP</b>								
	264	195	53 / 15	18...30	0...35 (LK1022 + E43100: 0...65)	0...70	200	LK1022
	472	390	53 / 30	18...30	0...35 (LK1023 + E43101: 0...60)	0...70	200	LK1023
	728	585	102 / 40	18...30	0...35 (LK1024 + E43102: 0...55)	0...70	200	LK1024
<b>M12 connector (according to EN 61076-2-101) · Output function 3 x normally open / closed programmable (OUT1...OUT3); 1 x normally open / closed programmable (OUT-OP) · DC PNP</b>								
	264	195	53 / 15	18...30	0...35 (LK8122 + E43100: 0...65)	0...70	200	LK8122
	472	390	53 / 30	18...30	0...35 (LK8123 + E43101: 0...60)	0...70	200	LK8123
	728	585	102 / 40	18...30	0...35 (LK8124 + E43102: 0...55)	0...70	200	LK8124

## Accessories

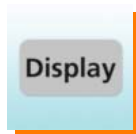
Type	Description	Order no.
	Mounting adapter · G ¾ D16 · for capacitive level sensors LK, LI, LT, LL · Housing materials: flange: stainless steel / nut: stainless steel / Spacer: Brass / rubber ring: FPM / sealing: Tesnit	E43003
	Mounting adapter · G 1 D16 · for capacitive level sensors LK, LI, LT, LL · Housing materials: flange: stainless steel / nut: stainless steel / Spacer: Brass / rubber ring: FPM / sealing: Tesnit	E43004
	Flange plate · 73-90 D16 · for capacitive level sensors LK, LI, LT, LL · according to DIN 24557 · Housing materials: aluminium anodised / nut: stainless steel / Spacer: Brass / rubber ring: FPM / sealing: NBR	E43001
	Flange plate · 65-80 D16 · for capacitive level sensors LK, LI, LT, LL · Housing materials: flange: aluminium anodised / nut: stainless steel / Spacer: Brass / rubber ring: FPM	E43006
	Protective cover · for LK / LL / LR / LT sensors · Housing materials: PP	E43910



## Level sensors based on guided wave radar



- Variants with different outputs
- Easy to use via user menu
- Direct indication of the current level by LED display
- Sensor lengths up to 160 cm
- The probe can be cut to length, if needed



### Continuous level monitoring

Type LR level sensors operate on the basis of guided wave radar and are suited for continuous level monitoring in water-based media such as coolants and cleaning liquids.

### Installation

The sensor is directly installed in the tank using a process connection or flange. If necessary, the probe can be easily shortened and adapted to the tank by the user.

### Setting

Setting of all parameters as well as programming of the switch points and indication of the current level are carried out via a 4-digit alphanumeric display.



The probe length can be individually adapted to the application.




## Variable level sensors, guided wave radar

Type	Process connection	Probe length [mm]	Active zone [mm]	Inactive zone [mm]	U <sub>b</sub> [V]	Medium temperature [°C]	I <sub>load</sub> [mA]	Order no.
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M12 connector (according to EN 61076-2-101) · Output function normally open / closed programmable; 4...20 mA or 0...10 V · DC PNP

	G ¾ male	–	L-40 (L-60)	30 / 10 (30)	18...30	0...80	200	LR3000
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M12 connector (according to EN 61076-2-101) · Output function 2 x normally open / closed programmable · DC PNP



	G ¾ male	–	L-40 (L-60)	30 / 10 (30)	18...30	0...80	200	LR7000
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M12 connector (according to EN 61076-2-101) · Output function 4 x normally open / closed programmable · DC PNP

	G ¾ male	–	L-40 (L-60)	30 / 10 (30)	18...30	0...80	200	LR8000
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## Accessories for level sensors LR

Type	Description	Order no.
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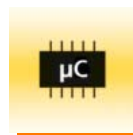
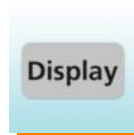
	Probe · Probe length: 240 mm · for level sensors LR · Housing materials: stainless steel 316L / 1.4404	E43203
	Probe · Probe length: 450 mm · for level sensors LR · Housing materials: stainless steel 316L / 1.4404	E43204
	Probe · Probe length: 700 mm · for level sensors LR · Housing materials: stainless steel 316L / 1.4404	E43205
	Probe · Probe length: 1000 mm · for level sensors LR · Housing materials: stainless steel 316L / 1.4404	E43207
	Probe · Probe length: 1200 mm · for level sensors LR · Housing materials: stainless steel 316L / 1.4404	E43208
	Probe · Probe length: 1600 mm · for level sensors LR · Housing materials: stainless steel 316L / 1.4404	E43210
	Probe · Probe length: 1400 mm · for level sensors LR · Housing materials: stainless steel 316L / 1.4404	E43209
	Probe · Probe length: 1600 mm · for level sensors LR · Housing materials: stainless steel 316L / 1.4404	E43210
	Flange plate · 73-90 / G ¾ · for level sensors LR · according to DIN 24557 · Housing materials: flange: stainless steel / sealing: NBR	E43201



## Temperature evaluation unit for Pt100 / Pt1000 elements



- Temperature evaluation range from -40...300 or -40...150 °C
- Variants with different outputs
- Easy handling via the user menu
- Local display of the current temperature values via the 10-segment display
- Automatic detection of the connected temperature sensor



### One unit – a wide range of options

The temperature amplifier, type TR is a universal control and display unit for the connection of platinum (Pt) temperature sensors. The evaluation unit automatically detects whether two-wire, three-wire or four-wire Pt100 or Pt1000 sensors are connected. In combination with the wide measuring range from -40 to 300 °C almost all temperature measuring and monitoring tasks can be solved.

### The combined solution

For a continuous temperature measurement the evaluation unit TR2432 has a high-resolution and scalable analogue output. The integrated display allows direct readout of the current process temperature at any time.


In addition, critical process states, e.g. reaching of minimum or maximum limit temperatures, can be directly monitored by means of the switching output. In addition, variants with two or four switching outputs are available.




### Control monitors for temperature sensors, IO-Link

Type	Measuring range [°C]	Process connection	Display LED	U <sub>b</sub> [V]	Current consumption [mA]	I <sub>load</sub> [mA]	Order no.
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M12 connector · Output function 1 x normally open / closed programmable + 1 x analogue (4...20 mA / 0...10 V, scalable) · DC PNP/NPN

	-40...300	G ½ male	Display unit	18...32	50	250	TR2432
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### M12 connector · Output function 2 x normally open / closed programmable · DC PNP/NPN

	-40...300	G ½ male	Display unit	18...32	50	250	TR7432
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### Control monitors for temperature sensors

Type	Measuring range [°C]	Process connection	Display LED	U <sub>b</sub> [V]	Current consumption [mA]	I <sub>load</sub> [mA]	Order no.
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### M12 connector · Output function 4 x normally open / closed programmable · DC PNP

	-40...150	G ½ male	Display unit	18...28	90	< 500	TR8430
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### Accessories

Type	Description	Order no.
	Mounting clamp · Ø 34 mm · Housing materials: PBT	E10017
	Mounting clamp · Ø 34 mm · Housing materials: PA	E10193
	Mounting set · for direct connection of temperature sensors TT to control monitors TR · Housing materials: stainless steel	E30017
	Mounting clamp · Ø 34 mm · Ø 30 mm · with reducing bush · for type M30 · Housing materials: PBT	E10077
	Protective cover · for fluid sensors with M12 connector · Housing materials: polyurethane	E30006



## Pt100 cable sensors with 4-wire connection



- 4-wire Pt100, 6 or 10 mm, PTFE cable with M12 connector
- Temperature sensors for installation in clamp fittings
- Temperature measurement from -50...250 °C
- Connection to the evaluation unit via M12 connector



### Temperature sensors for evaluation unit

Different requirements in a variety of applications demand temperature sensors which differ in the required accuracy, materials used and design. Furthermore the connection to existing evaluation units is as requested as the connection to PLCs or AS-i modules. The listed Pt100 temperature sensors can be directly connected to the ifm evaluation unit TR or the temperature plug TP. Connection is conveniently made via M12 connectors.

### The right sensor for every application

The sensors TS2056 and TS2256 can be used at temperatures much above 200 °C. In conjunction with the evaluation unit TR2432 they are a sensible combination for use in higher temperature areas.







### Cable sensors for standard applications

Type	Measuring range [°C]	Diameter [mm]	Cable material	Sensor element	Dynamic response T05 / T09 [s]	Order no.
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#### Cable with connector 2 m · stainless steel

	-25...90	12 x 8.7 x 51	PUR cable	1 x Pt 100	9 / 15	TS2229
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#### Cable with connector 2 m · high-grade stainless steel

	-40...90	Ø 10	PUR cable	1 x Pt 100	6 / 25	TS2089
	-40...90	Ø 6	PUR cable	1 x Pt 100	3 / 10	TS2289
	-50...250	Ø 10 / L = 42	PTFE cable	1 x Pt 100	12 / 39	TS2056
	-50...250	Ø 6 / L = 50	PTFE cable	1 x Pt 100	11 / 37	TS2256


#### Cable with connector 5 m · high-grade stainless steel

	-40...90	Ø 6	PUR cable	1 x Pt 100	3 / 10	TS5289
	-40...90	Ø 10	PUR cable	1 x Pt 100	6 / 25	TS5089

### Accessories for temperature sensors

Type	Description	Order no.
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#### M12 connector · Output function 4...20 mA analogue · DC

	Measured signal converter for temperature sensors · for Pt100 and Pt1000 measuring elements · Housing materials: PA PACM 12 / PET / sealing: FPM / nut: stainless steel 316L / 1.4404 / connector: TPU	TP3237
	Measured signal converter for temperature sensors · for Pt100 and Pt1000 measuring elements · Housing materials: PA PACM 12 / PET / sealing: FPM / nut: stainless steel 316L / 1.4404 / connector: TPU	TP3231





## Pt100 probe sensors with 4-wire connection



- Ideal response times of  $T_{05} = 1 \text{ s}$  and  $T_{09} = 3 \text{ s}$
- Precise temperature measurement using an integrated Pt100 sensor element
- Robust stainless steel housing with IP 68 and IP 69K protection ratings, 8 or 10 mm probe diameter
- Pressure resistance of 160 bar for different application areas
- Variable installation depth thanks to different probe lengths



### Long lasting precision

The TTxx81 type probe sensors ensure very precise temperature measurement using a Pt100 element of precision class A.

In addition, long life is guaranteed by the high protection ratings IP 68 / IP 69K and the stainless steel housing.

### Even faster response times

Using the latest technologies, the response time is extremely fast. This sensor is suited for all high-precision and rapid processes.


### A wide range of applications

The sensors are available in 8 and 10 mm diameters as well as in different lengths. So they can be integrated into almost any application using process adapters and standardised M12 connectors.








The listed Pt100 temperature sensors can be directly connected to the ifm evaluation unit TR or the temperature plug TP.



## Pt100 probe sensors for standard applications

Type	Measuring range [°C]	Diameter [mm]	Installation length [mm]	Sensor element	Dynamic response T05 / T09 [s]	Order no.
<b>M12 connector · high-grade stainless steel</b>						
	-40...150	10	160	1 x Pt 100	1 / 3	TT1081
	-40...150	10	260	1 x Pt 100	1 / 3	TT2081
	-40...150	10	360	1 x Pt 100	1 / 3	TT3081
	-40...150	10	560	1 x Pt 100	1 / 3	TT5081

## Accessories

Type	Description	Order no.
	Evaluation unit for temperature sensors · G ½ male · for Pt100 and Pt1000 measuring elements · Housing materials: stainless steel / EPDM/X / PC / PBT / FPM	TR2432
	Evaluation unit for temperature sensors · G ½ male · for Pt100 and Pt1000 measuring elements · Housing materials: stainless steel / stainless steel / EPDM/X / PC / PBT / FPM	TR7432
	Measured signal converter for temperature sensors · for Pt100 and Pt1000 measuring elements · Housing materials: PA PACM 12 / PET / sealing: FPM / nut: stainless steel 316L / 1.4404 / connector: TPU	TP3237
	Measured signal converter for temperature sensors · for Pt100 and Pt1000 measuring elements · Housing materials: PA PACM 12 / PET / sealing: FPM / nut: stainless steel 316L / 1.4404 / connector: TPU	TP3231
	Progressive ring fitting for temperature sensors · Ø 10 mm - G ½ · Housing materials: stainless steel 316Ti / 1.4571	E30016
	Progressive ring fitting for temperature sensors · Ø 10 mm - ½" NPT · Housing materials: stainless steel 316Ti / 1.4571	E30024
	Clamp fitting · Ø 6/8/10 mm - ½" NPT · for temperature sensors · Housing materials: stainless steel / FPM	E30025
	Mounting set · for direct connection of temperature sensors TT to control monitors TR · Housing materials: stainless steel	E30017



## Pt1000 probe sensors with 4-wire connection



- Ideal response times of  $T_{05} = 1 \text{ s}$  and  $T_{09} = 3 \text{ s}$
- Precise temperature measurement using an integrated Pt1000 sensor element
- Robust stainless steel housing with IP 68 and IP 69K protection ratings, 8 or 10 mm probe diameter
- Pressure resistance of 160 bar for different application areas
- Variable installation depth thanks to different probe lengths



### Long lasting precision

The TTxx50 type probe sensors ensure very precise temperature measurement using a Pt1000 element of precision class A.

In addition, long life is guaranteed by the high protection ratings IP 68 / IP 69K and the stainless steel housing.

### Even faster response times

Using the latest technologies, the response time is extremely fast. This sensor is suited for all high-precision and rapid processes.


### A wide range of applications

The sensors are available in 8 and 10 mm diameters as well as in different lengths. So they can be integrated into almost any application using process adapters and standardised M12 connectors.








The listed Pt1000 temperature sensors can be directly connected to the ifm evaluation unit TR or the temperature plug TP.



**Pt1000 probe sensors for standard applications**

Type	Measuring range [°C]	Diameter [mm]	Installation length [mm]	Sensor element	Dynamic response T05 / T09 [s]	Order no.
<b>M12 connector · high-grade stainless steel</b>						
	-40...150	10	160	1 x Pt 1000	1 / 3	<b>TT1050</b>
	-40...150	10	260	1 x Pt 1000	1 / 3	<b>TT2050</b>
	-40...150	10	360	1 x Pt 1000	1 / 3	<b>TT3050</b>
	-40...150	10	560	1 x Pt 1000	1 / 3	<b>TT5050</b>

**Accessories for temperature sensors**

Type	Description	Order no.
	Evaluation unit for temperature sensors · G ½ male · for Pt100 and Pt1000 measuring elements · Housing materials: stainless steel / EPDM/X / PC / PBT / FPM	<b>TR2432</b>
	Evaluation unit for temperature sensors · G ½ male · for Pt100 and Pt1000 measuring elements · Housing materials: stainless steel / stainless steel / EPDM/X / PC / PBT / FPM	<b>TR7432</b>
	Measured signal converter for temperature sensors · for Pt100 and Pt1000 measuring elements · Housing materials: PA PACM 12 / PET / sealing: FPM / nut: stainless steel 316L / 1.4404 / connector: TPU	<b>TP3237</b>
	Measured signal converter for temperature sensors · for Pt100 and Pt1000 measuring elements · Housing materials: PA PACM 12 / PET / sealing: FPM / nut: stainless steel 316L / 1.4404 / connector: TPU	<b>TP3231</b>
	Progressive ring fitting for temperature sensors · Ø 10 mm - G ½ · Housing materials: stainless steel 316Ti / 1.4571	<b>E30016</b>
	Progressive ring fitting for temperature sensors · Ø 10 mm - ½" NPT · Housing materials: stainless steel 316Ti / 1.4571	<b>E30024</b>
	Clamp fitting · Ø 6/8/10 mm - ½" NPT · for temperature sensors · Housing materials: stainless steel / FPM	<b>E30025</b>
	Mounting set · for direct connection of temperature sensors TT to control monitors TR · Housing materials: stainless steel	<b>E30017</b>

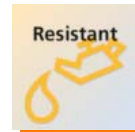
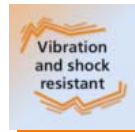




## TP temperature plug – modular transmitter



- Small, light housing with M12 connections
- Minimised installation and error sources
- Pt100 / Pt1000 evaluation from -50...300 °C scalable via IO-Link
- Status LED signals the operating status
- Full potting and ecolink M12 technology guarantee high vibration resistance



### Minimised installation and error sources

Using two standardised M12 connections, the installation complexity of the TP temperature plug is reduced to a minimum as compared to a common head / DIN rail transmitter. Furthermore, error sources such as cable clamps are eliminated.

### Versatile use

Thanks to 4-wire Pt100 / Pt1000 evaluation, the transmitter can also be connected to a Pt element using connection cables. Due to its small size, it is also suited for harsh applications, because it can be installed in a safe position. In addition the scalability of the TP between -50 and 300 °C, using the USB interface E30396 allows individual adaptation of the measuring range to almost any application.




Use of a modular TP transmitter instead of a common head / DIN rail transmitter.



## Modular temperature transmitters

Type	Factory setting [°C / °F]	Process connection	U <sub>b</sub> [V]	Ambient temperature [°C]	Measuring element	Order no.
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### M12 connector · Output function 4...20 mA analogue · DC

	0...100 / -	M12	20...32	-25...70	for Pt100 and Pt1000 measuring elements	TP3237
	-50...150 / -	M12	20...32	-25...70	for Pt100 and Pt1000 measuring elements	TP3231
	-50...300 / -	M12	20...32	-25...70	for Pt100 and Pt1000 measuring elements	TP3232
	-18...149 / 0...300	M12	20...32	-25...70	for Pt100 and Pt1000 measuring elements	TP3233

### M12 connector · Output function 0...10 V analogue · DC

	0...100 / -	M12	18...32	-25...70	for Pt100 and Pt1000 measuring elements	TP9237
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## Software

Type	Description	Order no.
	IO-Link interface · for parameter setting and analysis of units · Supported communication protocols: IO-Link (4800 and 38400 bits/s) EPS protocol (19200 bits/s) · for operation with FDT framework software "ifm Container" or software "LINERECORDER SENSOR"	E30396



## Connectors

Type	Description	Order no.
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### Socket M12, 5/4-pole, 4-wire

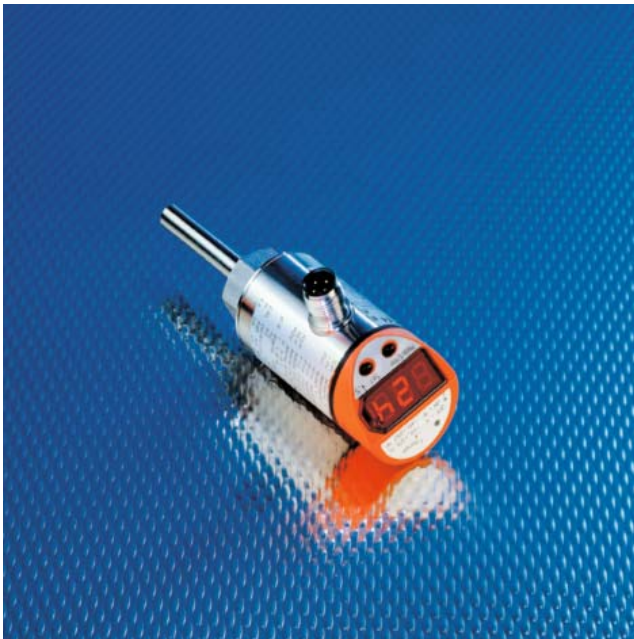
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC004
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC005

### Jumper M12 plug / M12 socket, 4/5-pole, 4-wire

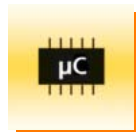
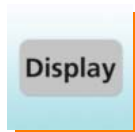
	Jumper · straight / straight · Free from silicone · Free from halogen · Gold-plated contacts · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC013
	Jumper · angled / angled · Free from silicone · Free from halogen · Gold-plated contacts · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC033
	Jumper · angled / angled · Free from silicone · Free from halogen · Gold-plated contacts · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC034



## Compact sensor with integrated temperature probe and display



- Analogue or switching output, PNP/NPN selectable
- Communication via IO-Link specification 1.0
- Temperature evaluation range of -40...150 °C
- Easy handling via setting menu
- Local display of the current temperature via 10-segment display



### Compact sensors – type TN

In many cases, an integrated display directly on the probe is requested. The compact TN type temperature sensors with an integrated temperature probe are distinguished by excellent response times, high pressure resistance and adaptive process connections. Analogue, switching and IO-Link signals are freely programmable between -40...150 °C.

#### The combined solution

For continuous temperature measurement, the temperature amplifier TN2531 has a high-resolution and scalable analogue output transmitting the measured values to a control system. The integrated display allows direct readout of the current process temperature at any time.

In addition, critical process states, e.g. reaching of minimum or maximum limit temperatures, can be directly monitored by means of the switching outputs.

#### Setting

Setting of all parameters as well as programming of the switch points and indication of the current temperature are carried out via a 4-digit alphanumeric display.




### Compact temperature sensors with display, IO-Link

Type	Measuring range [°C / °F]	Process connection	Installation length [mm]	U <sub>b</sub> [V]	Dynamic response T05 / T09 [s]	Order no.
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M12 connector · Output function 1 x normally open / closed programmable + 1 x analogue (4...20 mA / 0...10 V, scalable) · DC PNP/NPN

	-40...150 / -40...302	M18 x 1.5	45	18...32	1 / 3	TN2531
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M12 connector · Output function 2 x normally open / closed programmable · DC PNP/NPN

	-40...150 / -40...302	M18 x 1.5	45	18...32	1 / 3	TN7531
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### Accessories

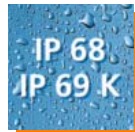
Type	Description	Order no.
	Mounting clamp · Ø 34 mm - Ø 30 mm · with reducing bush · for type M30 · Housing materials: PBT	E10077
	Mounting clamp · Ø 34 mm · Housing materials: PBT	E10017
	Mounting clamp · Ø 34 mm · Housing materials: PA	E10193
	Protective cover · for fluid sensors with M12 connector · Housing materials: polyurethane	E30006
	Adapter · M18 x 1.5 - G ½ · Insertion depth of the probe of SID, SFD, TN: · 21 mm · Housing materials: stainless steel 316L / 1.4404	E40096
	Adapter · M18 x 1.5 - G ½ · Insertion depth of the probe of SID, SFD, TN: · 21 mm · Housing materials: brass	E40097
	Adapter · M18 x 1.5 - M12 x 1 · Insertion depth of the probe of SID, SFD, TN: · 13.5 mm · Housing materials: stainless steel 316L / 1.4404	E40101
	Adapter · M18 x 1.5 - L18 · for mounting in T-pieces · Insertion depth of the probe of SID, SFD, TN: · 28.5 mm · Housing materials: nut: stainless steel 316Ti / 1.4571 / adapter: stainless steel 316L / 1.4404 / O-ring: FKM 16 x 1.5 gr 70° Shore A	E40104
	Welding adapter · M18 x 1.5 - Ø 24 mm · Insertion depth of the probe of SID, SFD, TN: · 15 mm · Housing materials: stainless steel 316L / 1.4404	E40124



## TA temperature transmitter with IO-Link 1.1



- Space-saving in all installation positions
- LED for visualisation of the operating status
- Fast response time: T05 / T09 = 1 s / 3 s
- Pressure resistant up to 400 bar
- Different installation lengths from 25...150 mm



### Versatile

The TA type temperature sensor is a universal transmitter with a 4...20 mA current output which can be scaled over the -50 to 150 °C measuring range. Scaling is done simply via the integrated IO-Link interface

### Flexible

The compact design, the integrated process connections and a multitude of probe lengths enable particularly simple installation.

### Transparent


An integrated LED clearly signals the readiness for operation.

### Fast and precise



A high level of accuracy is achieved using a class A accuracy Pt1000 sensor and factory calibration. In addition, ifm's tried and tested film technology ensures excellent dynamic response times. So this sensor is suited for all highly precise and rapid processes.





## Temperature transmitters with diagnostic output, IO-Link

Type	Measuring range [°C / °F]	Process connection	Installation length [mm]	U <sub>b</sub> [V]	Dynamic response T05 / T09 [s]	Order no.
<b>M12 connector · Output function 4...20 mA analogue · DC</b>						
	-50...150 / -58...302	G ¼ male	60	10...30	1 / 3	TA3131
	0...140 / 32...284	G ¼ male	60	10...30	1 / 3	TA3130
	-17.8...148.9 / 0...300	¼" NPT	60	10...30	1 / 3	TA3333
	0...100 / 32...212	¼" NPT	60	10...30	1 / 3	TA3337

## Temperaturtransmitter in Miniaturbauform, IO-Link

Type	Factory setting [°C / °F]	Process connection	Installation length [mm]	U <sub>b</sub> [V]	Dynamic response T05 / T09 [s]	Order no.
<b>M12 connector · Output function 4...20 mA analogue · DC</b>						
	-50...150 / -	G ½	30	18...32	1 / 3	TA2405
	-50...150 / -	G ½	50	18...32	1 / 3	TA2415
	-50...150 / -	G ½	100	18...32	1 / 3	TA2435
	-50...150 / -	G ½	150	18...32	1 / 3	TA2445
	-50...150 / -	G ¼	25	18...32	1 / 3	TA2105
	-50...150 / -	G ¼	50	18...32	1 / 3	TA2115
	-50...150 / -	G ¼	100	18...32	1 / 3	TA2135
	-50...150 / -	G ¼	150	18...32	1 / 3	TA2145

## Accessories

Type	Description	Order no.
	Adapter · G ¼ - G ½ · Housing materials: stainless steel 316Ti / 1.4571 / sealing: FPM	E30135
	Adapter · G ¼ - G ¼ · Housing materials: stainless steel 316L / 1.4404	E30107

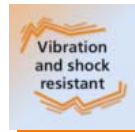
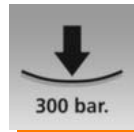




## Temperature sensors with easy-turn operating concept



- Simple switch point setting via two setting rings with optimum readability
- Excellent response time: T05 = 1 s and T09 = 3 s
- Mechanical locking prevents unintentional maladjustment
- Switch points freely adjustable from -25 to 140 °C
- Switching independent of operating temperatures



### Fit – set – that's it

The first switching temperature sensor with intuitive handling, combined with an excellent response time and a compact housing.

### Easy to fit

The easy handling via two radial setting rings on the sensor enables quick and precise setting of the switch points for the users, also without system temperature being applied. Thanks to mechanical locking unintentional manipulation is excluded. The protective cap, which can be obtained as an option, ensures protection against tampering.





Intuitive setting of target values.



### Compact temperature sensors

Type	Measuring range [°C / °F]	Process connection	Installation length [mm]	U <sub>b</sub> [V]	Dynamic response T05 / T09 [s]	Order no.
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#### M12 connector · Output function normally open / closed complementary · DC PNP

	-25...140 / -13...284	G ¼ male	39	9.6...32	1 / 3	TK6130
	-25...140 / -13...284	¼" NPT	39	9.6...32	1 / 3	TK6330


#### M12 connector · Output function / · DC PNP

	-25...140 / -13...284	G ¼ male	39	9.6...32	1 / 3	TK7130
	-25...140 / -13...284	¼" NPT	39	9.6...32	1 / 3	TK7330

#### M12 connector · Output function 1 x normally open / 1 x normally closed · DC PNP

	-25...140 / -13...284	G ½ male	267	9.6...32	1 / 3	TK7480
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### Accessories

Type	Description	Order no.
	Protective cover · with lead seal option · for pressure sensors type PK · for temperature sensors type TK · for vibration sensors type VK · Housing materials: PP transparent	E30094

### Connectors

Type	Description	Order no.
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#### Socket M12, 5/4-pole, 4-wire

	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC004
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC005



## TW infrared temperature sensors



- 4 to 20 mA and switching output, freely programmable
- Adjustable for different target materials
- Scratch-resistant precision lenses
- Easy handling via buttons and display
- Test function: activated on the sensor or remotely



### Non-contact temperature measurement

For the precise temperature measurement of particularly hot objects or objects which are difficult to access, e.g. in the steel, plastics or glass industries. The measured value is provided via the analogue output. In addition, a switching output is available.

### Robust and precise

All four variants feature a high-quality precision lens – the prerequisite for precise measurement. The lens withstands the rough environments for example in steelworks and reduces the influence of external light to a minimum.

### Easy setting and handling


To enable precise temperature measurement, the degree of emission can be quickly and easily set using the pushbuttons and display. The current temperature of the object to be measured is displayed during operation.







Temperatures must be precisely measured when pressing rails.





## Infrared temperature sensors

Type	Temperature range [°C]	Wave length range [µm]	Material lens	Response time [ms]	Order no.
------	---------------------------	---------------------------	---------------	-----------------------	-----------






M12 connector · Output function  · 2 switching outputs · DC PNP

	50...500	8...14	Infrared transparent crystal lens with anti-reflex coating	< 100	TW7000
	250...1250	1.0...1.7	tempered optical glass	≤ 2	TW7001
	350...1350	1.0...1.7	tempered optical glass	≤ 2	TW7011

M12 connector · Output function  · Switching output, Analogue output · DC PNP

	0...999.5	8...14	Infrared transparent crystal lens with anti-reflex coating	< 100	TW2000
	250...1600	1.0...1.7	tempered optical glass	< 2	TW2001
	300...1600	1.0...1.7	tempered optical glass	< 2	TW2011
	500...2500	0.78...1.06	tempered optical glass	< 2	TW2002

## Accessories

Type	Description	Order no.
	Measuring head · for infrared temperature sensors TWxx11, M30 design · for type TW · Housing materials: AlMg3 black anodised / stainless steel / lock nuts: stainless steel / O-ring: FPM	E35060
	Fibre optics with stainless steel sheathing · straight · Connection to infrared temperature sensors TWxx11 · ¼"-36UNS-2A · Housing materials: stainless steel, Fibre optic: Quartz/Quartz fibre (VIS/IR)	E35061
	Air purge · for infrared temperature sensors TWxxxx, M30 design · for type TW · Housing materials: stainless steel / Brass / sealing ring: aluminium	E35063
	Protective tube · for infrared temperature sensors TWxxxx, M30 design · for type TW · Housing materials: stainless steel	E35066
	Cooling jacket · for infrared temperature sensors TWxxxx, M30 design · for type TW · Housing materials: Brass / copper / steel galvanised	E35064



## Evaluation unit for flow sensors



- Integrated flow, temperature and wire-break monitoring
- Switch point, flow and temperature setting via potentiometer
- Multicolour LED bar graph display for quick setting
- Signal output via potential-free relay contacts, changeover contacts
- Connection options: insulation displacement terminal, screw terminal and cage clamp



### Evaluation unit for sensors

The evaluation unit ensures high functionality in a space-saving housing for control cabinet mounting. The connection options (Combicon) provide flexibility for different connection concepts. In addition to flow indication via the multicolour LED bar graph, the adjustable limit temperature of the medium as well as, for safety reasons, a wire break between the sensor and the evaluation unit are signalled via LEDs and a relay output. The operating elements are located on the front and can be set using a screw driver. The evaluation units are available in two versions (AC or DC) and form a system for flow monitoring together with the SF type flow sensors.

### Local evaluation unit SR5900

The evaluation unit SR5900 is used for connection of SF type flow sensors with different immersion depths. Standardised M12 connections are used for connecting the evaluation unit and sensor as well as for the supply. The evaluation and display unit SR5900 can be used in different applications, e.g. for various immersion depths and a wide range of aggressive liquids. Flow and switch point are indicated by LEDs directly on the unit.



The evaluation is carried out outside the measurement location.




## Control monitors for industrial applications

Type	U <sub>b</sub> / Tolerance [V] / [%]	Current consumpt. [mA]	Power consumpt. [VA]	Power-on delay time [s]	Output when flow is present	Output when temperature is exceeded	Output in case of wire break	Order no.
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## Combicon connector

	90...240 AC / -5/+10	–	4	10...80	relay energised	relay energised	relay de-energised	<b>SN0150*</b>
	24 DC / +10 / -20	90	–	10...80	relay energised	relay energised	relay de-energised	<b>SR0150*</b>

## M12 connector

	19...36 DC	70	–	10	no / nc programmable	–	–	<b>SR5900</b>
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## \* Note for AC and AC/DC units

Miniature fuse to IEC60127-2 sheet 1, ≤ 5 A (fast acting) Recommendation: check the unit for reliable function after a short circuit.

## Flow sensors for connection to a control monitor SR5900

Type	Setting range liquids / gases [cm/s]	Greatest sensitivity [cm/s]	Medium temperature [°C]	Response time [s]	Max. T <sub>0</sub> gradient [K/min]	Pressure rating [bar]	Order no.
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## M12 connector

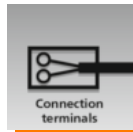
	3...300 / 200...3000	3...60 / 200...800	-25...80	1...10	300	300	<b>SF5200</b>
	3...300 / 200...3000	3...60 / 200...800	-25...80	1...10	300	30	<b>SF5201</b>
	3...300 / 200...3000	3...60 / 200...800	-25...80	1...10	300	100	<b>SF5700</b>
	3...300 / 200...3000	3...60 / 200...800	-25...80	1...10	300	100	<b>SF5701</b>
	3...300 / 200...3000	3...60 / 200...800	-25...80	1...10	300	100	<b>SF5702</b>
	3...300 / 200...3000	3...60 / 200...800	-25...80	1...10	300	100	<b>SF5703</b>
	3...300 / 200...3000	3...60 / 200...800	-25...80	1...10	300	100	<b>SF5704</b>



## Inductive dual sensors for valve actuators



- Quick and secure mounting using only three screws
- Units with M12 connector or terminal chamber
- Non-contact and self-cleaning system
- Resistant to mechanical stress such as vibration and shocks
- Large selection of switching cams



### Electronic valve position monitoring

In industrial processes where liquids, air or gases are used, valves are needed for dosing and control. Pneumatic valve actuators are normally used for mechanical positioning. The valve position must be monitored electronically.

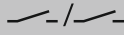
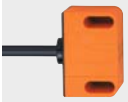
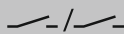

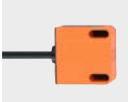
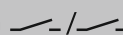


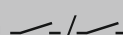
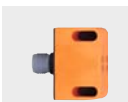
### Dual sensor for valve actuators

ifm offers a compact dual inductive sensor with two integral sensors for position feedback on valve actuators.

A round target, also called a 'puck', with two metal screws offset by 90° is mounted on the actuator shaft. The screws are located at a different height. A compact dual inductive sensor (type IND) with two integral sensors detects the upper or lower metal screw depending on the valve position and thus the two switch positions. This system operates reliably with no wear at all. It is virtually resistant to external influence and insensitive to mechanical stress such as vibration and shock.



## Sensors for industrial applications




Type	Dimensions [mm]	Sensing range [mm]	Material	U <sub>b</sub> [V]	Protection	f AC / DC [Hz]	I <sub>load</sub> AC / DC [mA]	Order no.
<b>Cable 2 m · Output function  · DC PNP/NPN</b>								
	40 x 26 x 26	4 nf	PBT	10...36	IP 67	1400	250	<b>IN5290</b>
<b>Cable 2 m · Output function  · AC/DC</b>								
	40 x 26 x 26	4 nf	PBT	20...140	IP 67	25	200	<b>IN0100*</b>
	40 x 26 x 40	4 nf	PBT	20...250	IP 67	25 / 50	350 / 100	<b>IN0110*</b>
<b>M12 connector · Output function  · DC PNP</b>								
	40 x 26 x 26	4 nf	PBT	10...36	IP 67	1300	250	<b>IN5225</b>
	40 x 26 x 47	4 nf	PBT	10...36	IP 67	1300	250	<b>IN5327</b>
<b>M12 connector · Output function  · DC PNP/NPN</b>								
	40 x 26 x 26	4 nf	PBT	10...36	IP 67	1300	250	<b>IN5224</b>

f = flush / nf = non flush

**\* Note for AC and AC/DC units**

Miniature fuse to IEC60127-2 sheet 1, ≤ 2 A (fast acting) Recommendation: check the unit for reliable function after a short circuit.

## Switching cams for sensors with quarter-turn actuators

Type	Description	Order no.
	Target puck · Ø 53 mm · Housing materials: Target puck: PBT / screws: high-grade stainless steel	<b>E17118</b>
	Target puck · Ø 65 mm · Housing materials: Target puck: PA 6 / screws: V2A	<b>E17327</b>
	Target puck · Ø 102 mm · Housing materials: Target puck: PA 6 / screws: V2A	<b>E17328</b>



## AS-i controller and gateways



- AS-i controller and gateways for DeviceNet, EtherNet/IP und ProfiNet
- User-friendly graphic display for setup and diagnostics
- Single and dual master
- CoDeSys programmable PLC to IEC 61131-3
- Extensive range of system components for AS-i available

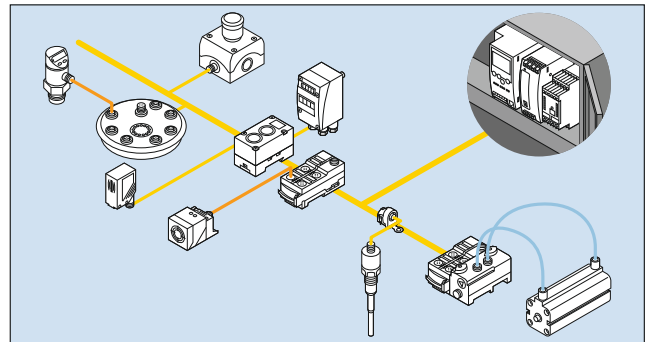


### AS-i controller

The controller assumes the most important function in each AS-Interface network and is responsible for the control of the complete communication. The controller, often also called master, controls the cyclic data exchange with the connected slaves, monitors the replies and transmits data to the higher-level controller.

### Gateways



AS-i gateways make a connection from AS-Interface to a higher-level bus system. Thus the advantages of both systems can be combined. The advantages of AS-i as the bus of the first automation level are its easy handling, fast data transmission, low costs and quick mounting technology. Several AS-i installation islands can be connected with a control room over long distances via fieldbus gateways. As the fieldbus is most of the time considerably slower, decentralised data pre-processing in the gateway is often required. Here ifm offers the AS-i controller family as gateways with integrated plc.



## Controllers / Gateways

Type	Number of AS-i masters	Description	Order no.
	1	SmartLink DP · AS-i gateway / Profibus DP · Full master functions · Graphic display · Housing materials: aluminium / steel sheet galvanised	AC1375
	2	AS-i DP gateway · Full master functions · Graphic display · Profibus DP interface · Housing materials: aluminium / steel sheet galvanised	AC1376
	1	AS-i Profibus gateway · AS-i master · Ethernet configuration interface with dynamic web interface for configuration and diagnosis including remote maintenance · Profibus DP (DPV0 + DPV1) · LCD colour display · Device supply either via 24 V or AS-i (AS-i bus 1) · Housing materials: aluminium powder-coated / steel sheet galvanised / Makrolon	AC1411
	2	AS-i Profibus gateway · AS-i master · Ethernet configuration interface with dynamic web interface for configuration and diagnosis including remote maintenance · Profibus DP (DPV0 + DPV1) · LCD colour display · Device supply either via 24 V or AS-i (AS-i bus 1) · Housing materials: aluminium powder-coated / steel sheet galvanised / Makrolon	AC1412
	1	AS-i EtherNet/IP gateway · AS-i master · Ethernet configuration interface with dynamic web interface for configuration and diagnosis including remote maintenance · LCD colour display · Device supply either via 24 V or AS-i (AS-i bus 1) · Housing materials: aluminium powder-coated / steel sheet galvanised / Makrolon	AC1421
	2	AS-i EtherNet/IP gateway · AS-i master · Ethernet configuration interface with dynamic web interface for configuration and diagnosis including remote maintenance · LCD colour display · Device supply either via 24 V or AS-i (AS-i bus 1) · Housing materials: aluminium powder-coated / steel sheet galvanised / Makrolon	AC1422
	1	AS-i Profinet gateway · AS-i master · Ethernet configuration interface with dynamic web interface for configuration and diagnosis including remote maintenance · Profinet RT device class B · LCD colour display · Device supply either via 24 V or AS-i (AS-i bus 1) · Housing materials: aluminium powder-coated / steel sheet galvanised / Makrolon	AC1401
	2	AS-i Profinet gateway · AS-i master · Ethernet configuration interface with dynamic web interface for configuration and diagnosis including remote maintenance · Profinet RT device class B · LCD colour display · Device supply either via 24 V or AS-i (AS-i bus 1) · Housing materials: aluminium powder-coated / steel sheet galvanised / Makrolon	AC1402

## Accessories

Type	Description	Order no.
	CodeSys license V3 · Single user licence	E71400
	AS-i data decoupling module · Combicon connection · Housing materials: Makrolon	AC1250

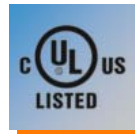




# AS-i switched-mode power supplies



- Regulated AS-i output voltage
- Power supply for AS-i networks
- Different power classes up to 8 A
- Robust connection terminals
- Design matching ifm controllers



## Stable AS-Interface systems

AS-i power supplies are the basis for the very high noise immunity of the AS-i system in industrial environments. The quality of the power supplies ensures reliable decoupling of the network from interference in the primary supply. Balancing of the AS-i voltage reduces the effects of electromagnetic influence to a minimum.

AS-i power supplies supply all participants connected to the yellow AS-i cable. These are usually slaves, connected sensors, intelligent actuators, the analogue part of the master, and the repeaters. They provide an increased voltage of approx. 30 V which is converted to the required 24 V voltage in the slaves.

In order to ensure decoupling between AS-i data and the supply only approved AS-i power supplies may be used. The transmitting current for the signal modulation is also generated in the AS-i power supply.

Common 24 V power supplies cannot be used instead of AS-i power supplies.






## Fully expanded AS-Interface

Using AS-i power supplies from ifm the AS-i networks can be set up reliably and economically in lengths of 100 to 1000 m when taking additional measures.



ifm provides a complete AS-i family of power supplies.

## AS-i power supplies

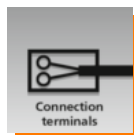
Type	Output current AS-i [A]	Description	Order no.
	2.8	Power supply · AS-i power supply 115/230 V AC · Integrated data decoupling · NEC Class II Power Source · steel sheet	<b>AC1256</b>
	4	Power supply · AS-i power supply 115/230 V AC · Integrated data decoupling · steel sheet	<b>AC1254</b>
	4	Power supply · DC convertor 24 V DC for AS-i system voltage · Integrated data decoupling · steel sheet	<b>AC1257</b>
	8	Power supply · Three-phase AS-i power supply 380...480 V AC · Integrated data decoupling · steel sheet	<b>AC1253</b>
	8	Power supply · AS-i power supply 115/230 V AC · Integrated data decoupling · steel sheet	<b>AC1258</b>



## I/O modules for control cabinets



- For use in control cabinet or splitter box applications
- Removable Combicon connectors simplify connection
- Low profile versions available for small enclosures
- Integrated addressing socket
- Robust and quick DIN rail mounting



### Space-saving modules for DIN rail mounting

Active AS-i modules are mounted on a DIN rail. They have been designed for control cabinet and splitter box applications. The 25 mm wide housing can contain up to 4 inputs and 4 outputs. Active AS-i modules include digital or analogue inputs / outputs. They can be used in control cabinets or local splitter boxes. The robust rail mounting ensures a secure mounting. For a fast exchange of the modules all connections are pluggable. All status LEDs can be clearly seen on the front panel.




Via the addressing socket on the front panel the module can be addressed before and after the installation. The supply voltage and the peripheral signals are connected at the top and at the bottom by means of plug-in Combicon connectors. These can be equipped either with screw terminals or cage clamps.



**I/O modules for control cabinets**

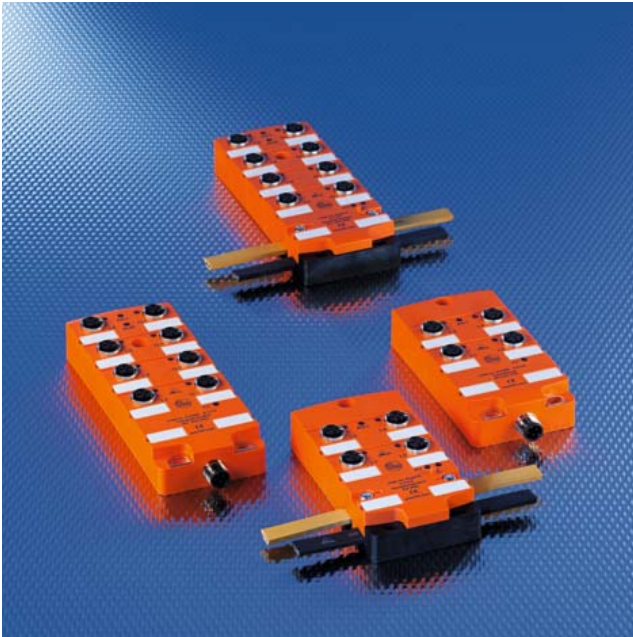
Type	Inputs / outputs	Description	Order no.
	4 inputs	Active AS-i module · String mounting possible · Addressing socket · Version 2.1 with extended addressing mode · Digital inputs · Combicon connection · PA	<b>AC2250</b>
	4 inputs / 3 outputs	Active AS-i module · String mounting possible · Addressing socket · Version 2.1 with extended addressing mode · Digital inputs and outputs · Combicon connection · PA	<b>AC2264</b>
	4 inputs / 4 outputs	Active AS-i module · String mounting possible · Addressing socket · Version 2.1 · Digital inputs and outputs · Combicon connection · PA	<b>AC2251</b>
	4 inputs 4...20 mA	Active AS-i module · AS-i profile S-7.3 · 4 analogue inputs 4...20 mA · Supply either from AS-i or an external 24 V source · For the connection of 2-wire, 3-wire or 4-wire sensors · Combicon connector for sensor connection · PA 6.6	<b>AC2216</b>
	4 inputs / 2 outputs / relay	Active AS-i module · String mounting possible · Addressing socket · Version 2.1 with extended addressing mode · Digital inputs · Combicon connection · PA	<b>AC2256</b>
	4 inputs / 4 outputs	Active AS-i module · String mounting possible · Addressing socket · External sensor supply PELV · Version 2.1 · Digital inputs and outputs · Combicon connection · PA	<b>AC2257</b>
	4 inputs / 4 outputs	Active AS-i module · String mounting possible · Addressing socket · External sensor supply PELV · Version 3.0 with extended addressing mode · Only for operation with AS-i masters with the profile M4 · Digital inputs and outputs · Combicon connection · PA	<b>AC2267</b>
	AS-i repeater	AS-i repeater · Extension of the AS-i network by another 100 m · One additional AS-i power supply necessary · Combicon connection · PA 6.6	<b>AC2225</b>
	4 inputs 0...10 V	Active AS-i module · AS-i profile S-7.3 · 4 analogue inputs 0...10 V · For the connection of 2-wire, 3-wire or 4-wire sensors · Combicon connector for sensor connection · PA 6.6	<b>AC2217</b>
	4 inputs / 4 outputs / relay	Active AS-i module · String mounting possible · Addressing socket · Version 2.1 · Combicon connection · PA 6.6	<b>AC2258</b>
	4 inputs / 4 outputs / relay	Active AS-i module · String mounting possible · Addressing socket · Input supply from external PELV voltage source · Version 2.1 · Combicon connection · PA 6.6	<b>AC2259</b>

**Accessories**

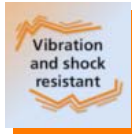
Type	Description	Order no.
	AS-i addressing unit · AS-i version 3.0 with extended addressing mode	<b>AC1154</b>
	Addressing cable · for AS-i slaves · 1.6 m	<b>E70213</b>
	Combicon connector · with screw terminals 4-pole · Housing materials: current carrying parts: copper alloy tin-plated	<b>E70230</b>



## CompactLine: AS-i modules for field applications



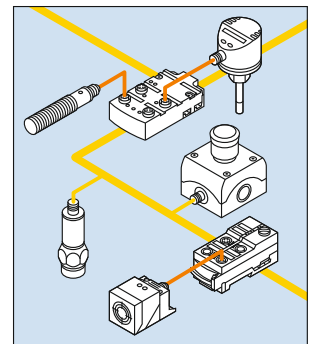
- Particularly shock and vibration resistant AS-i module
- A/B slave with four inputs and four outputs
- Digital input and output modules



### Unimpressed by shock and vibration



The digital modules from the CompactLine product family are extremely robust. This makes them ideal for direct field use. Furthermore, the full potting protects the components from harsh conditions. The asymmetrically acting vibration protection of the ecolink connection technology holds the coupling nut tight in its position.

This ensures ideal and permanent sealing between the module and connector.









**Field modules IP 67**

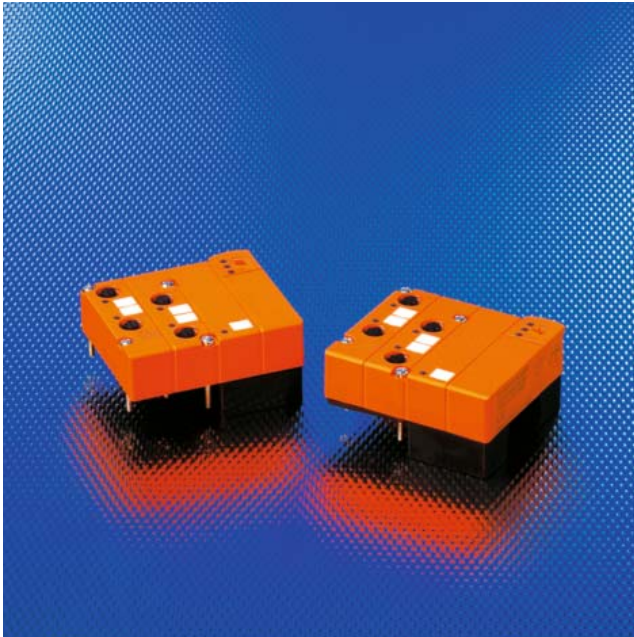
Type	Inputs / outputs	Description	Order no.
	4 inputs	Active CompactLine module · fully potted housing · IR addressing possible · Digital inputs · Sockets M12 x 1 · PA / socket: Brass nickel-plated / threaded inserts in the lower part: Brass nickel-plated / O-Ring : Viton / Piercing contacts: CuSn6 surface nickel and tin-plated	<b>AC2410</b>
	4 inputs	Active CompactLine module · IR addressing possible · Version 2.11 and 3.0 with extended addressing mode · Digital inputs · Sockets M12 x 1 · PA / socket: Brass nickel-plated / threaded inserts in the lower part: Brass nickel-plated / O-Ring : Viton / Piercing contacts: CuSn6 surface nickel and tin-plated	<b>AC2457</b>
	2 inputs / 2 outputs	Active CompactLine module · 60 x 118.2 x 27 · IR addressing possible · Digital inputs and outputs · Sockets M12 x 1 · PA / socket: Brass nickel-plated / threaded inserts in the lower part: Brass nickel-plated / O-Ring : Viton / Piercing contacts: CuSn6 surface nickel and tin-plated	<b>AC2411</b>
	4 outputs	Active CompactLine module · IR addressing possible · Digital outputs · Sockets M12 x 1 · PA / socket: Brass nickel-plated / threaded inserts in the lower part: Brass nickel-plated / O-Ring : Viton / Piercing contacts: CuSn6 surface nickel and tin-plated	<b>AC2417</b>
	4 inputs / 4 outputs	Active CompactLine module · IR addressing possible · Digital inputs and outputs · Sockets M12 x 1 · PA / socket: Brass nickel-plated / threaded inserts in the lower part: Brass nickel-plated / O-Ring : Viton / Piercing contacts: CuSn6 surface nickel and tin-plated	<b>AC2459</b>
	4 inputs / 4 outputs	Active CompactLine module · 60 x 152 x 27 · IR addressing possible · Digital inputs and outputs · Sockets M12 x 1 · PA / socket: Brass nickel-plated / threaded inserts in the lower part: Brass nickel-plated / O-Ring : Viton / Piercing contacts: CuSn6 surface nickel and tin-plated	<b>AC2412</b>

**Accessories**

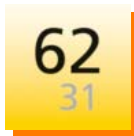
Type	Description	Order no.
	AS-i flat cable · Reverse polarity protection due to special shape · for use of insulation displacement technology · 100 m · EPDM, halogen-free · yellow	<b>E74000</b>
	AS-i flat cable · Reverse polarity protection due to special shape · for use of insulation displacement technology · 100 m · EPDM, halogen-free · black	<b>E74010</b>
	AS-i addressing unit · AS-i version 3.0 with extended addressing mode	<b>AC1154</b>
	Addressing cable · for the addressing of active AS-i compact modules	<b>E70423</b>



## AS-i ClassicLine analogue modules for field applications



- 4 analogue inputs, 4 analogue outputs or 4 Pt100 channels
- Supply of the connected sensors from AS-i or from an external 24 V source
- AS-i interface to the known FC/FC-E lower parts
- Device connection via M12 sockets
- High protection rating for direct field installation




### Simple connection

The ClassicLine analogue modules allow connection to a specification 2.1 master via simple "plug & play". The transmission of analogue values is possible without further software as all the necessary processing is integrated in the firmware of the master.







All analogue sensors with 0 / 4...20 mA and 0...10 V can be connected. For smaller sensors the current supply is directly taken from the yellow flat cable, for other sensors from the external 24 V source (black flat cable). The values for the temperature module are directly transferred in the physical unit "°C", so they are available without further conversion. The slaves are connected to AS-interface via the conventional flat cable lower parts (EMS) and feature protection rating IP 67. The cables of the sensors / actuators are connected via standard M12 sockets. LEDs indicate operating states and possible error messages.



### Field modules IP 67 AS-Interface

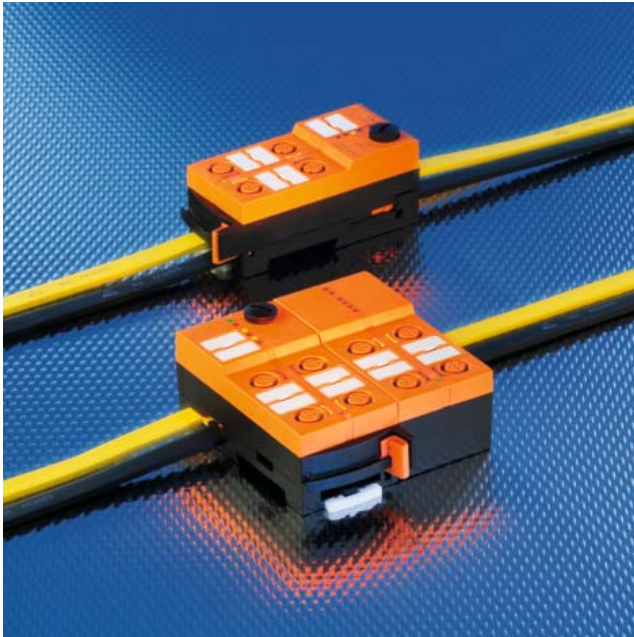
Type	Inputs / outputs	Description	Order no.
	4 inputs 4...20 mA	Active ClassicLine module · AS-i profile S-7.3 · 4 analogue inputs 4...20 mA · IR addressing possible · For the connection of 2-wire, 3-wire or 4-wire sensors · Sockets M12 x 1 · PBT	<b>AC2516</b>
	4 inputs 0...10 V	Active ClassicLine module · AS-i profile S-7.3 · 4 analogue inputs 0...10 V · IR addressing possible · For the connection of 2-wire, 3-wire or 4-wire sensors · Sockets M12 x 1 · PBT	<b>AC2517</b>
	4 outputs 0...20 mA	Active ClassicLine module · AS-i profile S-7.3 · IR addressing possible · 4 analogue outputs 0...20 mA · For the connection of 2-wire actuators · Sockets M12 x 1 · PBT	<b>AC2518</b>
	4 outputs 0...10 V	Active ClassicLine module · AS-i profile S-7.3 · 4 analogue outputs 0...10 V · IR addressing possible · For the connection of 2-wire actuators · Sockets M12 x 1 · PBT	<b>AC2519</b>
	4 inputs Pt100	Active ClassicLine module · 4 analogue inputs temperature Pt100 · AS-i profile S-7.3 · IR addressing possible · Sockets M12 x 1 · PBT	<b>AC2520</b>

### Accessories

Type	Description	Order no.
	Module lower part flat cable · Quick mounting technology for AS-i flat cable · Housing materials: PBT	<b>AC5000</b>
	FC-E coupling module · Quick mounting technology for AS-i flat cable · Housing materials: PBT	<b>AC5003</b>
	Module lower part flat cable · with addressing plug · Quick mounting technology for AS-i flat cable · Housing materials: PBT	<b>AC5010</b>
	FC-E coupling module · with addressing plug · Quick mounting technology for AS-i flat cable · Housing materials: PBT	<b>AC5011</b>
	Module lower part M20 · Screw terminal · Housing materials: PBT	<b>AC5031</b>
	AS-i addressing unit · AS-i version 3.0 with extended addressing mode	<b>AC1154</b>



## ClassicLine modules and AirBoxes



- Field modules with digital and analogue inputs / outputs, optional with IO-Link
- AirBoxes: AS-i pneumatic valves with quick mounting technology
- Flexible orientation of the flat cable in three directions.
- Innovative insulation displacement technology means no tools needed for connection
- Integrated addressing socket allows setup while connected

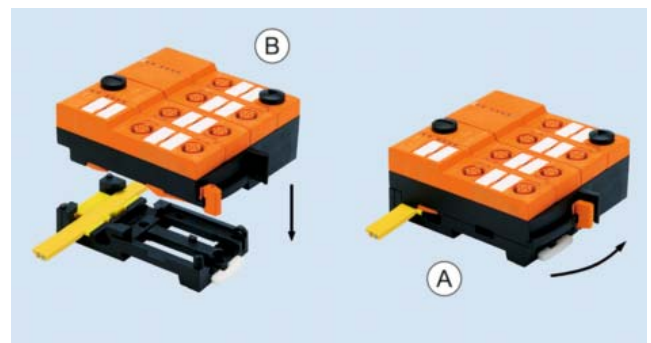


### Easy connection due to toolless mounting.

ClassicLine modules can be connected to the yellow AS-i flat cable without tools using insulation displacement technology. The integrated DIN rail mounting allows easy installation in the control cabinet.

The ClassicLine module can accept an AS-i flat cable in three different directions to provide flexible cable routing. The integrated addressing socket allows addressing while connected to the system. All connections are located on the front display. LEDs indicate signal status, operating voltage and possible periphery faults.

ClassicLine modules include the so-called "AirBoxes". These are pneumatic valves triggered via AS-i. In addition to pneumatic connections they also feature digital inputs and outputs for the connection of sensors and actuators.



Quick mounting thanks to insulation displacement technology: A sliding mechanism (A) quickly connects the module's upper and lower parts (B).

ClassicLine modules and AS-i air boxes

Type	Inputs / outputs	Description	Order no.
	4 inputs	Active ClassicLine module · Version 2.11 and 3.0 with extended addressing mode · Addressing socket · Three orientations of the flat cable are possible · Digital inputs · Sockets M12 x 1 · PA / Piercing contacts: CuSn6 surface nickel and tin-plated	AC5215
	2 outputs / 2 inputs	Active ClassicLine module · Version 2.11 and 3.0 with extended addressing mode · Addressing socket · Three orientations of the flat cable are possible · Digital outputs and inputs · Sockets M12 x 1 · PA / Piercing contacts: CuSn6 surface nickel and tin-plated	AC5214
	4 outputs	Active ClassicLine module · Addressing socket · Three orientations of the flat cable are possible · Digital outputs · Sockets M12 x 1 · PA / Piercing contacts: CuSn6 surface nickel and tin-plated	AC5208
	4-way splitter box	ClassicLine splitter box module · Three orientations of the flat cable are possible · AS-i and AUX splitter box for the connection of intelligent sensors/actuators · Sockets M12 x 1 · PA / Piercing contacts: CuSn6 surface nickel and tin-plated	AC5200
	4 inputs / 3 outputs	Active ClassicLine module · Addressing socket · Three orientations of the flat cable are possible · Version 2.11 and 3.0 with extended addressing mode · Digital inputs and outputs · Sockets M12 x 1 · PA / Piercing contacts: CuSn6 surface nickel and tin-plated	AC5204
	4 inputs / 4 outputs	Active ClassicLine module · Only for operation with AS-i masters with the profile M4 · Addressing socket · Three orientations of the flat cable are possible · Version 3.0 with extended addressing mode · Digital inputs and outputs · Sockets M12 x 1 · PA / Piercing contacts: CuSn6 surface nickel and tin-plated	AC5235
	2 inputs 4...20 mA	Active ClassicLine module · 2 analogue inputs 4...20 mA · For the connection of 2-wire and 3-wire sensors · Addressing socket · Three orientations of the flat cable are possible · PA / Piercing contacts: CuSn6 surface nickel and tin-plated	AC5222
	2 IO-Link ports	Active ClassicLine module · 2 IO-Link ports · For the connection of IO-Link sensors and actuators, binary sensors and binary actuators · Addressing socket · Three orientations of the flat cable are possible · Only for operation with AS-i masters with the profile M4 · PA / Piercing contacts: CuSn6 surface nickel and tin-plated	AC5225
	4 inputs / 1 output ; AirBox supply via AS-i	AS-i AirBox · 5/2-way slide valve free from overlapping · monostable · Three orientations of the flat cable are possible · AS-i flat cable connection · Version 2.11 and 3.0 with extended addressing mode · Addressing socket · PA / POM / Piercing contacts: CuSn6 surface nickel and tin-plated	AC5246
	4 inputs / 2 outputs; AirBox supply via AS-i	AS-i AirBox · 2 x 3/2-way slide valves free from overlapping · monostable · Three orientations of the flat cable are possible · AS-i flat cable connection · Version 2.11 and 3.0 with extended addressing mode · Addressing socket · PA / POM / Piercing contacts: CuSn6 surface nickel and tin-plated	AC5228
	4 inputs / 2 outputs; AirBox supply via AS-i	AS-i AirBox · 5/3-way slide valve free from overlapping · closed · Three orientations of the flat cable are possible · AS-i flat cable connection · Version 2.11 and 3.0 with extended addressing mode · Addressing socket · PA / POM / Piercing contacts: CuSn6 surface nickel and tin-plated	AC5270





## Safety at Work: AS-i safety monitors



- AND / OR operations, flip-flop function, timer functions
- Monitoring of up to 31 safe AS-i slaves in any groups
- Applications: door monitoring, light curtains, e-stop, two-hand control
- Up to two safe enable circuits for a wide range of applications



### The Safety at Work system

In principle, the AS-i safety technology consists of two components: of a safe input slave for connection of safety sensors and of the safety monitor as a monitoring element with positively-driven relays for the safe switch-off of the drives or actuators. All other AS-i components used are standard.

### Function



The AS-i safety monitor controls the code sequences to be transmitted in the AS-i network. In the case of message deviations or timeouts it ensures the safe state of the system. The safety monitors feature one or two independent output signal switching devices. Furthermore, versions with one or two redundant output switching elements are available.

Several safety monitors can be operated on an AS-i master per AS-i network. They can be connected to the AS-i system at any position. So grouping is possible to evaluate the safe AS-i slaves without problem. Known safety relay functions like "e-stop", "stop categories 0 or 1", "two-hand operation", "enable switch" can be implemented via the software. One AS-i safety monitor thus replaces many traditional safety relays.








Wherever a decentralised safety technology is important, AS-i safety monitors can be used.

## Safety at Work

Type	Description	Order no.
	AS-i safety monitor · Extended functionality · 1-channel · Configuration and setup by configuration software ASIMON · Screw terminal · polyamide black · Complies with the requirements: ISO 13849-1: PL e · IEC 61508: SIL 3	AC003S
	AS-i safety monitor · Extended functionality · 2-channel · Configuration and setup by configuration software ASIMON · Screw terminal · polyamide black · Complies with the requirements: ISO 13849-1: PL e · IEC 61508: SIL 3	AC004S
	AS-i safety monitor · Extended functionality and integrated safe slave for triggering a safe AS-i output · 2-channel · Configuration and setup by configuration software ASIMON V3.0 · Screw terminal · polyamide black · Complies with the requirements: ISO 13849-1: category 4 · ISO 13849-1: PL e · IEC 61508: SIL 3	AC032S
	AS-i safety monitor · 2 safe semi-conductor outputs · SIL 3 to EN 62061, IEC 61508 / SIL 3 and EN ISO 13849 - 1 / PL e · Chip card to save the configuration data · Configuration and setup by configuration software ASIMON V3 G2 · USB 2.0 interface · Chip card and Combicon screw terminals supplied with the device · Screw terminal	AC041S

## Accessories

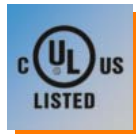
Type	Description	Order no.
	Software ASIMON V3 G2 · Configuration, set-up and diagnostics of the AS-i safety monitor · AC041S	E7050S
	USB interface cable for the connection of the safety monitor AC041S to the PC · cable length 1.8 m · 1.8 m	E7051S
	Safe contact expander without delay · 2 independent channels · 4 contact blocks (NO) per channel · 1 feedback circuit (NC) per channel · Mounting on DIN rail · Screw terminal	E7053S
	Connection cable PC / AS-i safety monitor · Parameter setting cable PC / AS-i safety monitor · Western connector RJ 45 8 poles / D-Sub socket 9 poles · 2.5 m	E7001S
	Combicon connector · with screw terminals 4-pole · Housing materials: current carrying parts: copper alloy tin-plated	E70230



# AS-i safety modules for control cabinet and field applications



- Safe digital inputs and non safe outputs
- Connection of safe mechanical contacts and safe 3-wire sensors
- Supply of the connected safety switches from AS-i
- Modules also available with quick mounting technology



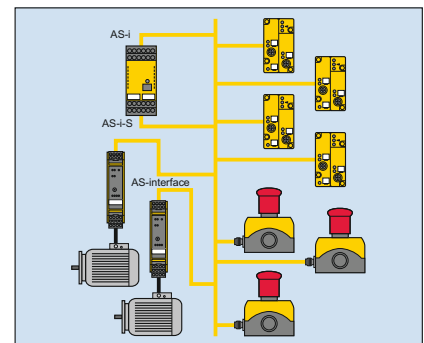
## The Safety at Work system

In principle, the AS-i safety technology consists of two components: of a safe input slave for connection of the safety devices and of the safety monitor as a monitoring element with positively-driven relays for the safe switch-off of the drives or actuators.

### Safe input module






Using the safe input module safety-related components such as mechanical safety switches or fail-safe inductive sensors without integrated AS-i interface can be connected to the AS-i system.

Evaluation to the Safety at Work protocol is carried out with one of the AS-i safety monitors. All kinds of mechanical safety switches with two positively-driven contacts and two independent switches with one contact each can be connected to the two inputs.







AS-i safety modules are suited wherever decentralised I/Os, modular design and simplicity of the system are important.

## Safety at Work

Type	Description	Order no.
	AS-i Safety at Work · Safe AS-i input module 2SI - 2LO · Addressing socket · Three orientations of the flat cable are possible · Sockets M12 x 1 · PA / Piercing contacts: CuSn6 surface nickel and tin-plated · Complies with the requirements: ISO 13849-1: category 4 · ISO 13849-1: PL e · IEC 62061: SILcl 3	AC5055
	AS-i Safety at Work · Safe AS-i input module 4SI / 2DO T / 2LO · Addressing socket · Three orientations of the flat cable are possible · Sockets M12 x 1 · PA / Piercing contacts: CuSn6 surface nickel and tin-plated · Complies with the requirements: ISO 13849-1: PL d · IEC 62061: SILcl 2	AC5065
	Safe active AS-i module · Performance Level e to EN ISO 13849-1 et IEC 61508 / SIL 3 for the connection of mechanical contacts · Combicon connection · PA · Complies with the requirements: ISO 13849-1: category 4 · ISO 13849-1: PL e · IEC 61508: SIL 3	AC0095
	Safe active AS-i output module · SIL 3 to EN 62061, IEC 61508 / SIL 3 and EN ISO 13849 - 1 / PL e · for the safe triggering of actuators · Combicon connection · PA · Complies with the requirements: ISO 13849-1: PL e · IEC 61508: SIL 3	AC0305
	Safe active AS-i module · Connection via M12x1 sockets or cage clamps · For connection of an electro-sensitive protective equipment (ESPE) type 4 to EN 61496-1 · PA 6 · Complies with the requirements: ISO 13849-1: category 4 · ISO 13849-1: PL e · IEC 61508: SIL 3	AC0075

## Accessories

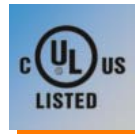
Type	Description	Order no.
	FC-E coupling module · Quick mounting technology for AS-i flat cable · Housing materials: PBT	AC5003
	AS-i addressing unit · AS-i version 3.0 with extended addressing mode	AC1154
	Addressing cable · for AS-i slaves · 1.6 m	E70213
	Illuminated E-STOP with integrated AS-i connection · fool-proof E-STOP to EN ISO 13850 · Pull to reset · AS-i interface via AS-i flat cable IP 67 · Housing materials: PC GF20 · Complies with the requirements: ISO 13849-1: category 4 · ISO 13849-1: PL e · IEC 61508: SIL 3	AC0105



## Safe AS-i door switches with guard locking and guard lock monitoring



- Normally closed or normally open operation
- Rotatable actuating head made of metal
- Mechanical release on the front
- Lean design (40 mm)
- Suited for applications up to PLd



### Safe AS-i door switches

The new safe AS-i door switches with guard locking have the function to keep moving protective equipment

such as protective grating, protective guard and other covers closed as long as a dangerous state is present.



The safe AS-i door switches are safety switches with separate actuators and guard locking which allow the user to implement interlocking devices according to EN 1088.







Door with safety switch and guard locking.



## Safety at Work

Type	Description	Order no.
	Safety switch with guard locking · Normally closed principle · Rotatable actuating head made of metal · Mechanical release on the front · Supply via AS-i / solenoid supply ext. from 24 V DC · M12 connector · thermoplastic reinforced glass-fibre	AC901S
	Safety switch with guard locking · Normally open principle · Rotatable actuating head made of metal · Mechanical release on the front · Supply via AS-i / solenoid supply ext. from 24 V DC · M12 connector · thermoplastic reinforced glass-fibre	AC902S
	Safety switch with guard locking · Normally closed principle · Rotatable actuating head made of metal · Mechanical release on the front · Supply via AS-i / solenoid supply from AS-i · M12 connector · thermoplastic reinforced glass-fibre	AC903S
	Safety switch with guard locking · Normally open principle · Rotatable actuating head made of metal · Mechanical release on the front · Supply via AS-i / solenoid supply from AS-i · M12 connector · thermoplastic reinforced glass-fibre	AC904S

## Accessories

Type	Description	Order no.
	Bolt for safety guards · for heavy doors · For right or left hinged doors without escape release · No additional door handle required · screw mounting onto common aluminium profiles and machine panels · Housing materials: diecast aluminium yellow	E7901S
	Bolt for safety guards · for heavy doors · For right or left hinged doors without escape release · No additional door handle required · screw mounting onto common aluminium profiles and machine panels · Housing materials: glass-fibre reinforced plastic yellow	E7902S
	Actuator S standard straight · With rubber bush, overtravel 5 mm · Suitable for a maximum pull force of 2500 N for the door switches AC901S - AC904S	E7903S
	Actuator S standard angled · With rubber bush, overtravel 5 mm · Suitable for a maximum pull force of 2500 N for the door switches AC901S - AC904S	E7904S
	Hinged actuator left / right · For left or right hinged doors, overtravel 5 mm	E7905S
	Hinged actuator top / bottom · For top and bottom hinged doors, overtravel 5 mm	E7906S



## AS-i PCBs



- Integration of mechanical switches into AS-i networks
- Connection of mechanical contacts and LED elements
- Variant with certification to EN 13849 / PL e and IEC 61508 / SIL3
- Integration of AS-i in rope and belt drift switches
- Data and energy via one cable



### Applications

The AS-i PCBs can be installed in any on-site housings, panels, control cabinets or in individual housings. Some of the PCBs are fully potted and have either connection wires or screw terminals.

Using these PCBs rope switches, belt drift switches and other switches can be integrated into AS-i systems. If needed, this can also be safety-related (Safety at Work).

### Safe operating principle





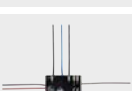
Example rope switch: It protects long conveyors and rotating machines in indoor and outdoor areas. Rope breakage, pulling at the tensioned rope or actuation of the e-stop trigger the switching function.

Belt drift switches can also be integrated. They protect conveyor belts from damage or destruction due to belt drift. In both applications the AS-i PCBs ensure simple and safe signal transmission.

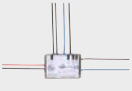


Installation in a rope switch and a belt drift switch

### AS-i PCB

Type	Inputs / outputs	Description	Order no.
	4 inputs / 4 outputs	Active AS-i module · AS-i slave with extended addressing mode · Only for operation with AS-i masters with the profile M4 · 12 x 0.2 m · housing: PC potted	<b>AC2750</b>
	4 inputs / 3 outputs	Active AS-i module · AS-i slave with extended addressing mode · 11 x 0.2 m · housing: PC potted	<b>AC2751</b>
	4 inputs / 4 outputs	Active AS-i module · AS-i slave with extended addressing mode · Only for operation with AS-i masters with the profile M4 · housing: PC potted	<b>AC2752</b>
	4 inputs / 3 outputs	Active AS-i module · AS-i slave with extended addressing mode · housing: PC potted	<b>AC2753</b>
	2 inputs / 1 LED output	Active AS-i module · Only suited for mechanical contacts · Wire length 0.1 m	<b>E70529</b>

### AS-i safety PCB

Type	Inputs / outputs	Description	Order no.
	2 safe inputs / 1 unsafe LED output	AS-i safety PCB · Complies with the requirements: · IEC 61508: SIL 3	<b>E70155</b>



## Vibration sensors for VSE diagnostic unit



- Permanent vibration monitoring
- Three designs
- Temperature range -30 to 125 °C
- Integrated self-test
- Wide frequency range up to 10 kHz



### Avoid machine damage

Vibration sensors monitor machines and plants and are designed for fixed mounting on a machine. The sensor measures the rms vibration velocity on a non-rotating component surface and is used for measured data acquisition, especially for the octavis diagnostic unit, type VSE.

#### Vibration sensor VSA001

The accelerometer VSA001 ensures the correct transmission of high-frequency vibration signals even over distances of up to 30 m. The compact and extremely robust design provides good long-term stability and independence of temperature even under adverse environmental conditions.

#### Vibration sensor VSA002

The special mechanical design as well as the integrated pigtail enable an almost flush integration in the machine surface. The vibration sensor type VSA002 permits vibration monitoring where the installation of a sensor has not been previously possible due to lack of space.





#### Vibration sensor VSA004 / VSA005

Thanks to the flat design of about 12 mm and the lateral entry of the shielded cable the unit can be installed in locations which are difficult to access.





Long-term stability, independence of temperature and noise immunity thanks to state-of-the-art silicon sensors.




### Vibration sensors for external diagnostic electronics type VSE

Type	Description	Order no.
	Accelerometer · for connection to external diagnostic electronics type VSE · Connector · Housing materials: housing: stainless steel 316L / 1.4404	VSA001
	Accelerometer · for connection to external diagnostic electronics type VSE · Cable with connector · 0.8 m · Housing materials: housing: stainless steel 316L / 1.4404	VSA002
	Accelerometer · for connection to external diagnostic electronics type VSE · Cable · 3 m · Housing materials: housing: stainless steel 316L / 1.4404	VSA004
	Accelerometer · for connection to external diagnostic electronics type VSE · Cable · 10 m · Housing materials: housing: stainless steel 316L / 1.4404	VSA005

### Diagnostic electronics – control cabinet modules for vibration diagnosis type VSE

Type	Description	Order no.
	Diagnostics electronics for vibration sensors type VSA / VSP · 4 sensor inputs 0...10 mA or IEPE · TCP/IP Ethernet interface · Frequency-selective machine monitoring of up to 4 measuring points · Integrated history memory with real-time clock · Counter function · Mounting on DIN rail · Combicon connection · Housing materials: PA	VSE002
	Diagnostics electronics for vibration sensors type VSA / VSP · 4 sensor inputs 0...10 mA or IEPE · TCP/IP Ethernet interface · Frequency-selective machine monitoring of up to 4 measuring points · Integrated history memory with real-time clock · Counter function · Mounting on DIN rail · Combicon connection · Housing materials: PA	VSE100

### Connectors

Type	Description	Order no.
<b>Socket M12, 5/4-pole, 4-wire</b>		
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC001
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC002
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 10 m · Housing materials: housing: TPU orange / sealing: FKM	EVC003

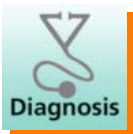




## Diagnostic unit for vibration sensors



- Low system costs for an optimised machine uptime
- Frequency-selective machine diagnosis of up to four measuring points
- Ethernet interface for integration into operational data logging systems
- Integrated history memory with real-time clock
- Correlation possible with two operating parameters (e.g. speed and power)



### Diagnostic unit VSE002

Using the diagnostic unit it is possible to continuously and simultaneously analyse and evaluate the measured signals of up to four vibration sensors with the octavis technology. Pre-alarm and alarm are electrically signalled via switching outputs. The trend can be electrically signalled via the analogue output. 2000 values can be stored in the diagnostic unit.



### Diagnostic unit VSE100

In addition to the standard alarm and analogue outputs VSE100 can signal up to eight other freely configurable I/O states of diagnosis objects. Also, the I/Os can be used as inputs, electronically trigger diagnosis (e.g. in a reference run of a machine tool spindle), collect switching states of other sensors and transmit them to the operational data logging system via the OPC standard. The integrated FIFO history memory can store 33,000 values with time stamp.





Using the Ethernet interface the decentralised diagnostic unit can also be integrated into higher-level systems. Due to the compatibility of the data (OPC) the diagnostic values can be easily integrated into all usual visualisation environments and can be made accessible to remote diagnosis within the framework of teleservice concepts.





### Diagnostic electronics – control cabinet modules for vibration diagnosis type VSE

Type	Description	Order no.
	Diagnostics electronics for vibration sensors type VSA / VSP · 4 sensor inputs 0...10 mA or IEPE · TCP/IP Ethernet interface · Frequency-selective machine monitoring of up to 4 measuring points · Integrated history memory with real-time clock · Counter function · Mounting on DIN rail · Combicon connection · Housing materials: PA	VSE002
	Diagnostics electronics for vibration sensors type VSA / VSP · 4 sensor inputs 0...10 mA or IEPE · TCP/IP Ethernet interface · Frequency-selective machine monitoring of up to 4 measuring points · Integrated history memory with real-time clock · Counter function · Mounting on DIN rail · Combicon connection · Housing materials: PA	VSE100

### Vibration sensors for external diagnostic electronics type VSE

Type	Description	Order no.
	Accelerometer · for connection to external diagnostic electronics type VSE · Connector · Housing materials: housing: stainless steel 316L / 1.4404	VSA001
	Accelerometer · for connection to external diagnostic electronics type VSE · Cable with connector · 0.8 m · Housing materials: housing: stainless steel 316L / 1.4404	VSA002
	Accelerometer · for connection to external diagnostic electronics type VSE · Cable · 3 m · Housing materials: housing: stainless steel 316L / 1.4404	VSA004
	Accelerometer · for connection to external diagnostic electronics type VSE · Cable · 10 m · Housing materials: housing: stainless steel 316L / 1.4404	VSA005

### Accessories VSE

Type	Description	Order no.
	Parameter setting software for VSExxx	VES003
	Jumper · straight / straight · Ethernet · Cross-over patch cable · 2 m · Housing materials: PUR	EC2080



## Vibration sensors and transmitters



- Permanent vibration monitoring to ISO 10816
- Transmitter signal 4...20 mA for direct display at the control desk
- LED display on the unit
- VK sensors combine switching function and transmitter in one unit



### Avoid machine damage

Vibration sensors type VT and VK monitor machines and plants to ISO 10816 and are designed for fixed mounting on a machine. The sensor measures the rms vibration velocity (true rms) on a non-rotating component surface. It transfers the characteristic value as current signal (4...20 mA) to the process control system.

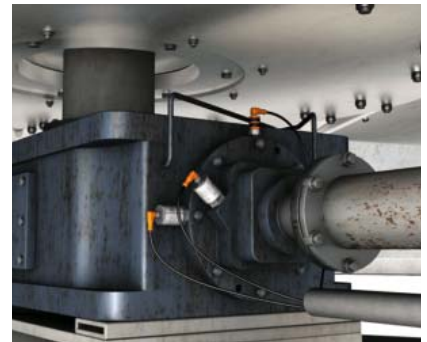
### Vibration monitor VK

Vibration sensors type VK additionally have a switching output. When an adjustable limit value is exceeded the device sets to alarm via a switching contact.

The easy set-up via two radial setting rings allows quick setting of the switch point and response delay. The protective cap, which can be obtained as an option, ensures protection against tampering.



### Set-up

The units are easy to set up without an additional parameter setting software.




Monitoring of the overall vibration of rotating parts (fans, centrifuges, etc.).


### Vibration sensors for vibration monitoring of machines and plants to ISO 10816

Type	Description	Order no.
	Vibration monitor · Connection via M12 connector · Vibration monitor to DIN ISO 10816 · Measuring range RMS: 0...25 mm/s · Switching outputs: normally closed and analogue 4...20 mA · Housing materials: PBT / PC / FPM / stainless steel 316L / 1.4404	VKV021
	Vibration sensor · Connection via M12 connector · Vibration monitor to DIN ISO 10816 · Measuring range RMS: 0...50 mm/s · Switching outputs: normally closed and analogue 4...20 mA · Housing materials: PBT / PC / FPM / stainless steel 316L / 1.4404	VKV022
	Vibration transmitter · Connection via M12 connector · Vibration transmitter to ISO 10816 · Measuring range RMS: 0...25 mm/s · Analogue output 4...20 mA · Housing materials: stainless steel 316L / 1.4404	VTV122

### Accessories VK

Type	Description	Order no.
	Protective cover · with lead seal option · for pressure sensors type PK · for temperature sensors type TK · for vibration sensors type VK · Housing materials: PP transparent	E30094

### Connectors

Type	Description	Order no.
<b>Socket M12, 5/4-pole, 4-wire</b>		
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC001
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC002
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 10 m · Housing materials: housing: TPU orange / sealing: FKM	EVC003



## Electronic vibration sensor with switching and analogue output



- Electronic vibration switch with analogue output
- Monitoring, display and recording of vibration values in one compact field unit
- Easy set-up and installation using push-buttons for parameter setting
- Dual measurement point capability, additional process value e.g. temperature
- On-board time stamped history function for data collecting and trending



### Compact vibration sensor

The VNB001 is the first member of a new series of compact vibration sensors. It is used for online monitoring of overall vibration of machines and equipment according to ISO 10816. This unit is distinguished by its simple set-up, requiring no PC software for parameter setting.


### Function

The unit is based on the proven, reliable efector octavis technology and can also be used for applications in the mobile sector. The sensor measures the average vibration velocity (mm/s or in/s). Measurement value and switchpoint conditions are visualised on the LED display. Critical machine conditions are signalled using either 2 switching outputs or alternatively 1 switching and 1 analogue output. Additionally the operator can use the analogue input to monitor a further process value e.g. temperature. Alternatively the unit can be powered using the integrated USB interface providing the option of using the VN as a hand-held device.










## Compact vibration sensors type VN

Type	Description	Order no.
	Vibration sensor to ISO 10816 · Parameter setting via pushbuttons · 3 Inputs / outputs total, configurable · Analogue input 4...20 mA · Measuring range 0...500 mm/s · Frequency range 2...1000 Hz · 4-digit alphanumeric display · Ambient temperature -30...60 °C · M12 connector · M8 connector · Operating voltage 9.6...30 V DC · IP 67	VNB001

## Accessories VN

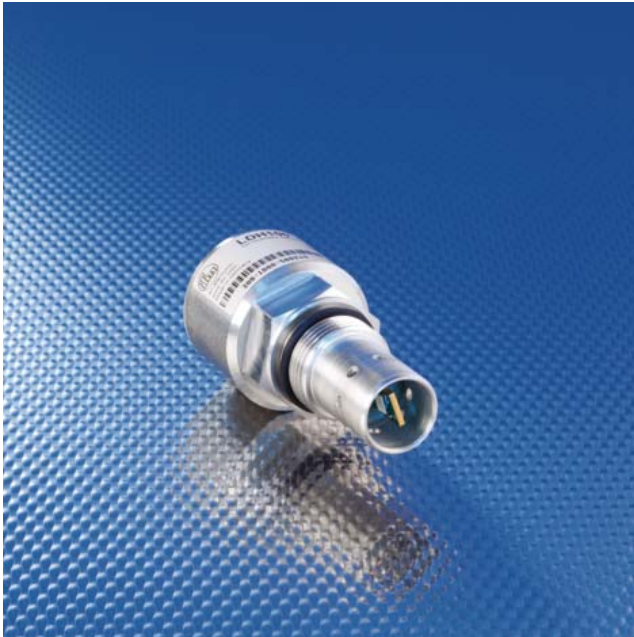
Type	Description	Order no.
	USB adapter cable · straight / straight · USB adapter cable and history tool for VNB001 · 5 m	E30136
	Adapter · UNF-M5 · Housing materials: stainless steel	E30137
	Power supply · 2 m · Housing materials: PPE	E30080

## Connectors

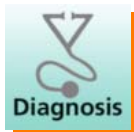
Type	Description	Order no.
<b>Socket M12, 5-pole, 5-wire</b>		
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC070
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC073
<b>Socket M12, 5/4-pole, 4-wire</b>		
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 10 m · Housing materials: housing: TPU orange / sealing: FKM	EVC003



## Combined oil moisture and temperature sensor



- Continuous condition monitoring of oils
- Two analogue outputs (4...20 mA) for relative moisture and temperature
- Wide input voltage range 9...33 V DC
- Medium temperature -20...100 °C
- Process connection G 3/4 for direct installation



### Application

Water is generally not wanted in hydraulic liquids and lubricants. High concentrations of water can seriously affect operation or even cause damage.

### Measuring principle

The sensor measures the relative moisture in the oil in the range of 0...100 % by means of a capacitive measuring element. At 0 % the oil is absolutely without any water content. At 100 %, however, the medium is completely saturated. No more water is dissolved and is then present as free water.

Besides the relative moisture the sensor also outputs the medium temperature as an analogue signal.




LDH100 – to ensure that oil remains dry!

## Oil humidity sensor


Type	Process connection	Pressure rating [bar]	Protection	Medium temperature oil [°C]	Ambient temperature [°C]	Order no.
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M12 connector · Output function 4...20 mA analogue

	G 3/4	10	IP 67	-20...100	-20...85	LDH100
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## Accessories for oil humidity sensor LDH



Type	Description	Order no.
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	Adapter block · D33 / G 3/4 · for oil humidity sensor LDH100 · Housing materials: aluminium	E43400
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## Connectors

Type	Description	Order no.
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Socket M12, 8/7-pole, 8-wire

	Socket · angled · M12 connector · 2 m · Housing materials: TPU	E80022
	Socket · straight · M12 connector · 2 m · Housing materials: TPU	E80021



# ecolink connection technology



- Connection technology meets the M8/M12 standard (EN 61076)
- Optimum sealing even when mounted without tools
- Mechanical end stop protects the O-ring against destruction
- Nut secured against shock and vibration due to saw tooth vibration protection
- LEDs clearly visible even in cases of high light exposure



## ecolink connection technology for demanding applications

Most applications require special solutions. Only high-quality materials, assured production processes and faultless assembly lead to success in the long run.

The innovative profiled sealing ring seals radially and axially, guaranteeing a high protection rating. No tools needed for installation and removal.

The asymmetrically acting vibration protection holds the nut tight in its position, guaranteeing optimum and permanent sealing.

High-quality materials especially suited to the application and intensive monitoring during and after production guarantee maximum quality standards.

EVW type sockets are designed for welding applications. They have a weld-slag resistant PUR cable, a nut with weld-slag resistant special coating, are suitable for drag chains and torsion resistant.

EVT type sockets are designed for wet areas and can be used at ambient temperatures up to 100 °C.








The secure connection even in difficult applications.

## M12 sockets for industrial applications

Type	Description	Order no.
<b>Socket M12, 5/4-pole, 4-wire</b>		
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVC001</b>
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVC002</b>
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 10 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVC003</b>
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 15 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVC082</b>
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 20 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVC083</b>
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 25 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVC084</b>
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVC004</b>
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVC005</b>
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 10 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVC006</b>
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 15 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVC086</b>
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 20 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVC087</b>
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 25 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVC088</b>
	Socket · straight · Free from silicone · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: PVC orange / sealing: EPDM	<b>EVT001</b>
	Socket · straight · Free from silicone · Gold-plated contacts · M12 connector · 10 m · Housing materials: housing: PVC orange / sealing: EPDM	<b>EVT002</b>
	Socket · straight · Free from silicone · Gold-plated contacts · M12 connector · 25 m · Housing materials: housing: PVC orange / sealing: EPDM	<b>EVT003</b>
	Socket · angled · Free from silicone · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: PVC orange / sealing: EPDM	<b>EVT004</b>






Type	Description	Order no.
<b>Socket M12, 5/4-pole, 4-wire</b>		
	Socket · angled · Free from silicone · Gold-plated contacts · M12 connector · 10 m · Housing materials: housing: PVC orange / sealing: EPDM	EVT005
	Socket · angled · Free from silicone · Gold-plated contacts · M12 connector · 25 m · Housing materials: housing: PVC orange / sealing: EPDM	EVT006
<b>Socket M12, 5/4-pole, 4-wire, LED, PNP</b>		
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 2 m · Housing materials: housing: TPU black transparent / sealing: FKM	EVC007
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU black transparent / sealing: FKM	EVC008
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 10 m · Housing materials: housing: TPU black transparent / sealing: FKM	EVC009
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 15 m · Housing materials: housing: TPU black transparent / sealing: FKM	EVC129
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 20 m · Housing materials: housing: TPU black transparent / sealing: FKM	EVC130
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 25 m · Housing materials: housing: TPU black transparent / sealing: FKM	EVC091
	Socket · angled · Free from silicone · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: PVC black transparent / sealing: EPDM	EVT007
	Socket · angled · Free from silicone · Gold-plated contacts · M12 connector · 10 m · Housing materials: housing: PVC black transparent / sealing: EPDM	EVT008
	Socket · angled · Free from silicone · Gold-plated contacts · M12 connector · 25 m · Housing materials: housing: PVC black transparent / sealing: EPDM	EVT009
<b>Socket M12, 5-pole, 5-wire</b>		
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC070
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC071
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 10 m · Housing materials: housing: TPU orange / sealing: FKM	EVC072
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC074
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 10 m · Housing materials: housing: TPU orange / sealing: FKM	EVC075

Type	Description	Order no.
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### Socket M12, 5-pole, 5-wire

	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 15 m · Housing materials: housing: TPU orange / sealing: FKM	EVC423
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## M8 sockets for industrial applications


Type	Description	Order no.
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### Socket M8, 3-pole, 3-wire

	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M8 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC141
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M8 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC142
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M8 connector · 10 m · Housing materials: housing: TPU orange / sealing: FKM	EVC143

	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M8 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC144
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M8 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC145
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M8 connector · 10 m · Housing materials: housing: TPU orange / sealing: FKM	EVC146

### Socket M8, 3-pole, 3-wire, LED, PNP

	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M8 connector · 2 m · Housing materials: housing: TPU black transparent / sealing: FKM	EVC147
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M8 connector · 5 m · Housing materials: housing: TPU black transparent / sealing: FKM	EVC148
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M8 connector · 10 m · Housing materials: housing: TPU black transparent / sealing: FKM	EVC149

### Socket M8, 4-pole, 4-wire

	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M8 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC150
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M8 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC151
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M8 connector · 10 m · Housing materials: housing: TPU orange / sealing: FKM	EVC152



**For industrial applications**

Type	Description	Order no.
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**Socket M8, 4-pole, 4-wire**

	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M8 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVC153</b>
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M8 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVC154</b>
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M8 connector · 10 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVC155</b>

**Socket M12, 8/7-pole, 8-wire**

	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 2 m · Housing materials: PUR	<b>E11231</b>
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: PUR	<b>E11232</b>
	Socket · angled · M12 connector · 5 m · Housing materials: TPU	<b>E12168</b>
	Socket · angled · M12 connector · 10 m · Housing materials: TPU	<b>E12169</b>
	Socket · straight · Free from halogen · M12 connector · 2 m · Housing materials: PUR	<b>E11950</b>
	Socket · straight · Free from halogen · M12 connector · 5 m · Housing materials: PUR	<b>E11807</b>
	Socket · straight · M12 connector · 5 m · Housing materials: TPU	<b>E12166</b>
	Socket · straight · M12 connector · 10 m · Housing materials: TPU	<b>E12167</b>

**M8 cable plugs for industrial applications**

Type	Description	Order no.
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**Cable plug M12, 4-pole, 4-wire**


	Cable plug · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 2 m · Housing materials: housing: TPU orange	<b>EVC076</b>
	Cable plug · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange	<b>EVC077</b>
	Cable plug · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 10 m · Housing materials: housing: TPU orange	<b>EVC078</b>

## Jumper cables











Type	Description	Order no.
<b>Jumper M12 plug / M12 socket, 4/5-pole, 4-wire</b>		
	Jumper · straight / angled · Free from silicone · Free from halogen · Gold-plated contacts · 0.3 m · Housing materials: housing: TPU orange / sealing: FKM	EVC015
	Jumper · straight / angled · Free from silicone · Free from halogen · Gold-plated contacts · 0.6 m · Housing materials: housing: TPU orange / sealing: FKM	EVC016
	Jumper · straight / angled · Free from silicone · Free from halogen · Gold-plated contacts · 1 m · Housing materials: housing: TPU orange / sealing: FKM	EVC017
	Jumper · straight / angled · Free from silicone · Free from halogen · Gold-plated contacts · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC018
	Jumper · straight / angled · Free from silicone · Free from halogen · Gold-plated contacts · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC019
	Jumper · straight / angled · Free from silicone · Free from halogen · Gold-plated contacts · 10 m · Housing materials: housing: TPU orange / sealing: FKM	EVC109
	Jumper · straight / straight · Free from silicone · Free from halogen · Gold-plated contacts · 0.3 m · Housing materials: housing: TPU orange / sealing: FKM	EVC010
	Jumper · straight / straight · Free from silicone · Free from halogen · Gold-plated contacts · 0.6 m · Housing materials: housing: TPU orange / sealing: FKM	EVC011
	Jumper · straight / straight · Free from silicone · Free from halogen · Gold-plated contacts · 1 m · Housing materials: housing: TPU orange / sealing: FKM	EVC012
	Jumper · straight / straight · Free from silicone · Free from halogen · Gold-plated contacts · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC013
	Jumper · straight / straight · Free from silicone · Free from halogen · Gold-plated contacts · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC014
	Jumper · straight / straight · Free from silicone · Free from halogen · Gold-plated contacts · 10 m · Housing materials: housing: TPU orange / sealing: FKM	EVC108
<b>Jumper M12 plug / M12 socket, 3/5-pole, 3-wire</b>		
	Jumper · straight / straight · Free from silicone · Free from halogen · Gold-plated contacts · 1 m · Housing materials: housing: TPU orange / sealing: FKM	EVC042
	Jumper · straight / straight · Free from silicone · Free from halogen · Gold-plated contacts · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC043
	Jumper · straight / straight · Free from silicone · Free from halogen · Gold-plated contacts · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC044








**For industrial applications**

Type	Description	Order no.
<b>Jumper M12 plug / M8 socket, 3-pole, 3-wire</b>		
	Jumper · straight / straight · Free from silicone · Free from halogen · Gold-plated contacts · 2 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVC218</b>
	Jumper · straight / straight · Free from silicone · Free from halogen · Gold-plated contacts · 5 m · Housing materials: housing: TPU orange / sealing: FKM	<b>EVC219</b>

## Connectors for robust applications

Type	Description	Order no.
<b>Wirable socket M12, 4-pole</b>		
	Wirable socket · straight · Free from silicone · Free from halogen · wirable · Gold-plated contacts · M12 connector · Housing materials: PA	<b>E11508</b>
	Wirable socket · straight · Free from silicone · Free from halogen · wirable · Gold-plated contacts · M12 connector · Housing materials: PA	<b>E11861</b>
	Wirable socket · angled · Free from silicone · Free from halogen · wirable · Gold-plated contacts · M12 connector · Housing materials: PA	<b>E11509</b>
	Wirable socket · angled · wirable · Free from silicone · Gold-plated contacts · M12 connector · Housing materials: PBT	<b>E11252</b>
	Wirable socket · angled · Free from silicone · Free from halogen · wirable · Gold-plated contacts · M12 connector · Housing materials: PA	<b>E11862</b>
<b>Wirable socket M12, 4-pole, LED, PNP</b>		
	Wirable socket · straight · wirable · M12 connector · Housing materials: PA	<b>E10136</b>
	Wirable socket · angled · Free from silicone · Free from halogen · wirable · Gold-plated contacts · M12 connector · Housing materials: PA	<b>E11510</b>
<b>Wirable socket M12, 5-pole</b>		
	Wirable socket · straight · Free from silicone · Free from halogen · wirable · Gold-plated contacts · M12 connector · Housing materials: PA	<b>E11511</b>
	Wirable socket · angled · Free from silicone · Free from halogen · wirable · Gold-plated contacts · M12 connector · Housing materials: PA	<b>E11512</b>
<b>Wirable plug M12, 4-pole</b>		
	Wirable plug · straight · Free from silicone · Free from halogen · wirable · Gold-plated contacts · M12 connector · Housing materials: PA	<b>E11504</b>



Type	Description	Order no.
<b>Wirable plug M12, 4-pole</b>		
	Wirable plug · straight · wirable · M12 connector · Housing materials: PA 6.6	<b>E11144</b>
	Wirable plug · angled · Free from silicone · Free from halogen · wirable · Gold-plated contacts · M12 connector · Housing materials: PA	<b>E11505</b>
<b>Wirable plug M12, 5-pole</b>		
	Wirable plug · straight · Free from silicone · Free from halogen · wirable · Gold-plated contacts · M12 connector · Housing materials: PA	<b>E11506</b>
	Wirable plug · angled · Free from silicone · Free from halogen · wirable · Gold-plated contacts · M12 connector · Housing materials: PA	<b>E11507</b>
<b>Adapter plug M12, 4-pole, 4-wire</b>		
	Adapter plug · straight · M20 - M12 · M12 connector · 0.12 m · Housing materials: Brass nickel-plated	<b>E11295</b>



## Basic mounting accessories, adjustable mounting systems



- Basic mounting accessories
- Adjustable mounting systems
- Accessories for photoelectric sensors
- Accessories for cylinder sensors
- Accessories for vision sensors

### Mounting accessories

The correct mounting of the sensor is decisive for the machine function. ifm offers a complete range of accessories for simple and secure mounting.

In addition to individual components such as angle brackets, nuts and mounting clamps, special mounting sets and adjustable mounting systems allow low-cost, fast and flexible mounting solutions.

### Accessories for photoelectric sensors

Especially for photoelectric sensors the quality of fastening and accessories used is of great importance for the reliability of the complete sensor system.










Here you find the suitable reflectors, angle brackets, mounting sets, diaphragms and lenses.

### Accessories for cylinder sensors

For cylinder sensors ifm provides tailor-made accessories for fastening the sensors to the different pneumatic cylinder types.










### Accessories for inductive sensors





Type	Description	Order no.
	Angle bracket · for type M12 · Housing materials: stainless steel	E10735
	Angle bracket · for type M18 · Housing materials: stainless steel	E10736
	Angle bracket · for type M30 · Housing materials: stainless steel	E10737
	Cable gland · M20 x 1.5 · for type INE, IVE, KVE · Housing materials: housing: polyamide black / sealing: neoprene	E11270
	Mounting sleeve · M16 x 1 - Ø 12 mm · 34 mm · with end stop · for type M12 · Housing materials: Brass nickel-plated	E10806
	Mounting sleeve · M24 x 1.5 - Ø 18 mm · 36 mm · with end stop · for type M18 · Housing materials: Brass nickel-plated	E10807
	Mounting sleeve · M16 x 1 - Ø 12 mm · with end stop · for type M12 · Housing materials: Brass nickel-plated	E11114
	Mounting sleeve · M22 x 1 - Ø 18 mm · with end stop · for type M18 · Housing materials: Brass white bronze coated	E11115
	Mounting clamp · Ø 20 mm · Housing materials: Mounting clamp: PBT / socket screw: steel galvanised	E10016
	Mounting clamp · Ø 12 mm · Housing materials: PBT	E10015
	Mounting clamp · Ø 20 mm - Ø 18 mm · with reducing bush · for type M18 · Housing materials: PBT	E10076
	Mounting clamp · Ø 34 mm · Housing materials: PBT	E10017
	Mounting clamp · Ø 34 mm - Ø 30 mm · with reducing bush · for type M30 · Housing materials: PBT	E10077
	Mounting clamp · Ø 12 mm · with end stop · For sensors with 45° chamfer · for type M12 · Housing materials: PC	E11994
	Mounting clamp · Ø 18 mm · with end stop · For sensors with 45° chamfer · for type M18 · Housing materials: PC	E11995
	Mounting clamp · Ø 30 mm · with end stop · For sensors with 45° chamfer · for type M30 · Housing materials: PC	E11996



## Accessories for cylinder sensors

Type	Description	Order no.
	Adapter for tie rod cylinders (or cylinders of the same dimensions) · for types MKT (T-slot cylinder sensors) · Clamping range 5...7 mm · Housing materials: aluminium / screw: stainless steel	E11912
	Adapter for tie rod / integrated profile cylinders · for types MKT (T-slot cylinder sensors) · Clamping range 5...11 mm · Housing materials: aluminium / screw: stainless steel	E11797
	Adapter for tie rod / integrated profile cylinders · for types MKT (T-slot cylinder sensors) · Clamping range 14...20 mm · Housing materials: aluminium / screw: stainless steel	E11801
	Adapter for tie rod / integrated profile cylinders · for types MKT (T-slot cylinder sensors) · Clamping range 9...15 mm · Housing materials: aluminium / screw: stainless steel	E11799
	Adapter for trapezoidal slot cylinders · for types MKT (T-slot cylinder sensors) · Housing materials: aluminium alloy / set screw: stainless steel	E11796
	Fixing strap for clean-line cylinders · Piston diameter 16...20 mm · for type MKT · Housing materials: adapter: PA / Fixing strap: stainless steel	E11817
	Fixing strap for clean-line cylinders · Piston diameter 25...32 mm · for type MKT · Housing materials: adapter: PA / Fixing strap: stainless steel	E11818
	Fixing strap for clean-line cylinders · Piston diameter 40 mm · for type MKT · Housing materials: adapter: PA / Fixing strap: stainless steel	E11819
	Fixing strap for clean-line cylinders · Piston diameter 20...25 mm · for type MKT · Housing materials: adapter: stainless steel / Fixing strap: stainless steel	E11976
	Fixing strap for clean-line cylinders · Piston diameter 32 mm · for type MKT · Housing materials: adapter: stainless steel / Fixing strap: stainless steel	E11977

## Accessories for photoelectric sensors



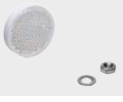






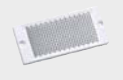

Type	Description	Order no.
	clamp · Ø 14 mm; M12 · free-standing M12 · Housing materials: clamp: diecast zinc	E20796
	Mounting set · Ø 18.5 mm · Clamp mounting · Free-standing M10 · for type OG, IG, KG · Housing materials: clamp: diecast zinc / fixture: steel	E20718
	Mounting set · Ø 18.5 mm · Clamp mounting · rod mounting Ø 12 mm · for type OG, IG, KG · Housing materials: clamp: diecast zinc / fixture: steel	E20720
	Mounting set · Ø 18.5 mm · Clamp mounting · Free-standing M10 · for type OG, IG, KG · Housing materials: clamp: diecast zinc / fixture: steel	E20719

Type	Description	Order no.
	Mounting set · O4 · Clamp mounting · With protective cover · for type O4 · Housing materials: stainless steel 316L / 1.4404 / clamp: diecast zinc	E21119
	Angle bracket · O1D, O4 · for type O1D, O4 · Housing materials: stainless steel 316L / 1.4404	E21120
	Angle bracket · for type O5 · Housing materials: stainless steel 316Ti / 1.4571	E21085
	Mounting set · O5 · Clamp mounting · Rod mounting Ø 30 mm · Housing materials: fixture: stainless steel 316Ti / 1.4571 / clamp: aluminium transparent anodised / screw: stainless steel / nut: high-grade stainless steel	E21128
	Mounting set · Clamp mounting · Free-standing M10 · for type O5 · Housing materials: stainless steel 316Ti / 1.4571 / clamp: diecast zinc	E21083
	Angle bracket · O5, O4 · for mounting O5, O4 sensors instead of OL sensors · Dovetail clamp · Housing materials: Dovetail clamp: AlMgSi0.5 / fixture: AlMg3	E21122
	Mounting set · Clamp mounting · With protective cover · Free-standing M10 · for type O5 · Housing materials: stainless steel 316Ti / 1.4571 / clamp: diecast zinc	E21084
	Angle bracket · for type O5 · Housing materials: stainless steel 316Ti / 1.4571	E21087
	Angle bracket · for type OJ · Housing materials: high-grade stainless steel	E20984
	mounting rod · Ø 12 / M10 · Length: 130 mm · straight · Housing materials: stainless steel 316Ti / 1.4571	E20938
	mounting rod · Ø 14 / M12 · Length: 130 mm · straight · Housing materials: stainless steel 316Ti / 1.4571	E20939
	Mounting set · Ø 18.5 mm · Clamp mounting · aluminium profile · for type OG, IG, KG · Housing materials: fixture: stainless steel 316Ti / 1.4571 / clamp: diecast zinc / Cube: diecast zinc	E20867
	Mounting set · Ø 30.2 mm · Clamp mounting · free-standing M12 · for type OI, II, KI · Housing materials: fixture: stainless steel 316Ti / 1.4571 / clamp: stainless steel	E20874
	Mounting set · Ø 30.2 mm · Clamp mounting · aluminium profile · for type II, KI, OI, OI · Housing materials: fixture: stainless steel 316Ti / 1.4571 / clamp: diecast zinc / Cube: diecast zinc	E20875
	Swivel-mount clip · for type OJ · Housing materials: diecast zinc	E20974
	Mounting set · OJ · for side lens · rod mounting Ø 10 mm · Housing materials: clamp: diecast zinc / fixture: stainless steel 316Ti / 1.4571	E21095
	Mounting set · for reflector · Ø 80 mm · Clamp mounting · free-standing M12 · Housing materials: fixture: stainless steel 316Ti / 1.4571 / clamp: diecast zinc	E20914



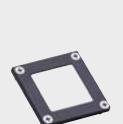










## For industrial applications






Type	Description	Order no.
	Reflective tape · TS-02 · 50 x 1000 mm · For red light and infrared light retro-reflective sensors · Housing materials: plastics / acrylic	E21015
	Prismatic reflector · Ø 10 mm · round · fixing by screw · M3 · for retro-reflective laser sensors · Housing materials: screw: stainless steel 316 / 1.4401 / spring washer: stainless steel 316 / 1.4401 / nut: stainless steel 316 / 1.4401 / front plate: PMMA / base: ABS	E20990
	Prismatic reflector · Ø 19 mm · round · fixing by screw · M3 · for retro-reflective laser sensors · Housing materials: screw: stainless steel 316 / 1.4401 / spring washer: stainless steel 316 / 1.4401 / nut: stainless steel 316 / 1.4401 / front plate: PMMA / base: ABS	E20993
	Prismatic reflector · 30 x 20 mm · rectangular · for retro-reflective laser sensors · Housing materials: front plate: PMMA / base: ABS	E20994
	Prismatic reflector · 45 x 28 mm · rectangular · For red light and infrared light retro-reflective sensors · Housing materials: plastics	E20452
	Prismatic reflector · 48 x 48 mm · rectangular · For red light and infrared light retro-reflective sensors · Housing materials: front plate: PMMA / base: ABS	E20744
	Prismatic reflector · Ø 50 mm · round · fixing by screw · For red light and infrared light retro-reflective sensors · Housing materials: plastics	E20956
	Prismatic reflector · 48 x 48 mm / 150 °C · rectangular · high temperature · For red light and infrared light retro-reflective sensors · open housing · back silvered · Housing materials: plastics / aluminium	E21065
	Prismatic reflector · Ø 80 mm · round · For red light and infrared light retro-reflective sensors · Housing materials: plastics	E20005
	Prismatic reflector · 93 x 45 mm · rectangular · For red light and infrared light retro-reflective sensors · Housing materials: plastics	E20453
	Prismatic reflector · 96 x 96 mm · rectangular · For red light and infrared light retro-reflective sensors · Housing materials: plastics	E20454

## Accessories for vision sensors



Type	Description	Order no.
	Fixture for mounting and fine adjustment of laser units · O1D · Clamp mounting · rod or free-standing depending on the clamp · Housing materials: fixture: aluminium transparent anodised / plastics: POM / screws: stainless steel	E1D100
	Mounting adapter · O1D · for optical distance sensors · Process connection · G1 male · for type O1D · Housing materials: flange: stainless steel 316L / 1.4404 / sealing: FKM / Protective cover: PMMA transparent / screws: high-grade stainless steel	E21224
	Protective cover · O1D · Housing materials: bezel: ZnAl4Cu1 finish black / window: PMMA transparent and colourless / sealing: FPM 75+/-5 Shore A black / screws: stainless steel	E21133
	Protective cover · O1D · Housing materials: bezel: ZnAl4Cu1 finish black / window: glass transparent and colourless / sealing: FPM 75+/-5 Shore A black / screws: stainless steel	E21171

Type	Description	Order no.
	Mounting set · Clamp mounting · rod mounting Ø 12 mm · for type O1D · Housing materials: fixture: stainless steel / clamp: stainless steel / screws: stainless steel / nut: high-grade stainless steel	E2D101
	Protective bracket · O1D · for type O1D · Housing materials: Angle bracket: stainless steel 316 / 1.4401 / screws: stainless steel / housing: polyamide	E21236
	Prismatic reflector · 226 x 262 mm · rectangular · Housing materials: plastics	E21159
	Mounting set · E2D101 + E20938 + E20951	E21079
	Glass protective pane · O2D / O2I · Housing materials: housing: diecast zinc black / lens: float glass	E21168
	Mounting set · O2D, O2M, O2I, O2V · Clamp mounting · rod mounting Ø 12 mm · Housing materials: fixture: stainless steel / clamp: stainless steel	E2D110

### Accessories for pressure sensors






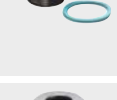

Type	Description	Order no.
	Adapter · G ¼ - G ½ · Housing materials: stainless steel / sealing: FPM	E30050
	Adapter · G ¼ - G ¼ · Housing materials: stainless steel / FPM	E30007
	Protective cover · for fluid sensors with M12 connector · Housing materials: polyurethane	E30006
	Protective cover · with lead seal option · for pressure sensors type PK · for temperature sensors type TK · for vibration sensors type VK · Housing materials: PP transparent	E30094
	Welding adapter · G 1 - Ø 50 mm · Housing materials: stainless steel 316L / 1.4404	E30013

### Accessories for level sensors

Type	Description	Order no.
	Adapter · ¾" NPT · Housing materials: stainless steel 316L / 1.4404	E43313
	Welding adapter · G ½ - Ø 30 mm · for tanks · Housing materials: stainless steel 316L / 1.4435	E43300









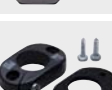










**For industrial applications**

Type	Description	Order no.
	Flange plate · 65-80 D16 · for capacitive level sensors LK, LI, LT, LL · Housing materials: flange: aluminium anodised / nut: stainless steel / Spacer: Brass / rubber ring: FPM	E43006
	Flange plate · 65-80 / G ¾ · for level sensors LR · Housing materials: flange: stainless steel	E43202
	Flange plate · 73-90 / G ¾ · for level sensors LR · according to DIN 24557 · Housing materials: flange: stainless steel / sealing: NBR	E43201
	Flange plate · 73-90 D16 · for capacitive level sensors LK, LI, LT, LL · according to DIN 24557 · Housing materials: aluminium anodised / nut: stainless steel / Spacer: Brass / rubber ring: FPM / sealing: NBR	E43001
	Mounting adapter · G 1 D16 · for capacitive level sensors LK, LI, LT, LL · Housing materials: flange: stainless steel / nut: stainless steel / Spacer: Brass / rubber ring: FPM / sealing: Tesnit	E43004
	Mounting adapter · G ¾ D16 · for capacitive level sensors LK, LI, LT, LL · Housing materials: flange: stainless steel / nut: stainless steel / Spacer: Brass / rubber ring: FPM / sealing: Tesnit	E43003
	Mounting adapter · ¾" NPT D16 · for capacitive level sensors LK, LI, LT, LL · Housing materials: flange: stainless steel / nut: stainless steel / Spacer: Brass / rubber ring: FPM	E43012

## Accessories for flow sensors

Type	Description	Order no.
	Adapter · M18 x 1.5 - G ¾ · Insertion depth of the probe of SID, SFD, TN: · 21 mm · Housing materials: stainless steel 316L / 1.4404	E40134
	Adapter · R 2" A · for flow sensors type SM2, SM9 · Housing materials: stainless steel 316Ti / 1.4571	E40231
	Adapter · G 1¼ - 1" NPT · for flow monitor type SU9 · Housing materials: stainless steel 316L / 1.4404	E40206
	Adapter · G 1¼ - R 1 · for flow monitor type SU9 · Housing materials: stainless steel 316L / 1.4404	E40205
	Adapter · G 1 - ¾" NPT · for flow monitor type SM8 / SU8 · Housing materials: stainless steel 316L / 1.4404	E40193
	Adapter · G 1 - R ¾ · for flow monitor type SM8 / SU8 · Housing materials: stainless steel 316L / 1.4404	E40180
	Adapter · G ¾ - ½" NPT · for flow monitor type SM7 / SU7 · Housing materials: stainless steel 316L / 1.4404	E40191
	Adapter · G ¾ I - R ½ · for flow monitor type SM7 / SU7 · Housing materials: Brass	E40151

Type	Description	Order no.
	Adapter · M18 x 1.5 - 1/2" NPT · Insertion depth of the probe of SID, SFD, TN: · 23 mm · Housing materials: stainless steel 316L / 1.4404	E40107
	Adapter · M18 x 1.5 - 1/4" NPT · Insertion depth of the probe of SID, SFD, TN: · 13.9 mm · Housing materials: stainless steel 316L / 1.4404	E40106
	Adapter · M18 x 1.5 - G 1/2 · Insertion depth of the probe of SID, SFD, TN: · 21 mm · Housing materials: brass	E40097
	Adapter · M18 x 1.5 - G 1/4 · Insertion depth of the probe of SID, SFD, TN: · 13.5 mm · Housing materials: brass	E40098
	Adapter · M18 x 1.5 - G 1/2 · Insertion depth of the probe of SID, SFD, TN: · 21 mm · Housing materials: stainless steel 316L / 1.4404	E40096
	Adapter · M18 x 1.5 - G 1/4 · Insertion depth of the probe of SID, SFD, TN: · 13.5 mm · Housing materials: stainless steel 316L / 1.4404	E40099
	Adapter · M18 x 1.5 - M12 x 1 · Insertion depth of the probe of SID, SFD, TN: · 13.5 mm · Housing materials: stainless steel 316L / 1.4404	E40101
	Adapter · M18 x 1.5 - L18 · for mounting in T-pieces · Insertion depth of the probe of SID, SFD, TN: · 28.5 mm · Housing materials: nut: stainless steel 316Ti / 1.4571 / adapter: stainless steel 316L / 1.4404 / O-ring: FKM 16 x 1.5 gr 70° Shore A	E40104
	Mounting clamp · Ø 23 mm · for air flow monitor SLG · Housing materials: PBT	E40048
	Protective cover · for flow sensors type SI5xxx, SI6xxx, SR59xx · Housing materials: PP uncoloured	E40203
	Adapter · G 1/2 - 1/2" NPT · for flow monitor type SM6 · flat seal · Housing materials: stainless steel 316Ti / 1.4571	E40200
	Adapter · G 1/2 - R 1/2 · for flow monitor type SM6 · flat seal · Housing materials: stainless steel 316Ti / 1.4571	E40199
	Adapter · G 1/2 - G 1/2 · for flow monitor type SM6 · Housing materials: stainless steel 316L / 1.4404	E40213
	Adapter · G 1 - G 1 · for flow monitor type SM8 / SU8 · Housing materials: stainless steel 316L / 1.4404	E40217
	Adapter · G 3/4 - G 3/4 · for flow monitor type SM7 / SU7 · Housing materials: stainless steel 316L / 1.4404	E40216
	Welding adapter · M18 x 1.5 - Ø 22 mm · Insertion depth of the probe of SID, SFD, TN: · 15 mm · Housing materials: steel bronzed	E40113
	Welding adapter · M18 x 1.5 - Ø 24 mm · Insertion depth of the probe of SID, SFD, TN: · 15 mm · Housing materials: stainless steel 316L / 1.4404	E40124



## 24 V power supplies



- Regulated, particularly space-saving design
- High efficiency, low heating of the control cabinet
- High power reserves
- Safe switch-off of circuit breakers in the event of a short circuit
- Low inrush current



### Primary switched-mode power supplies

Switched-mode power supplies are an economic solution to supply sensors, actuators and sensitive electronic components. They are distinguished by their compact, light weight, slim design ensuring reliable installation on the rail. A stable output voltage, under different loads and at fluctuating input voltages, ensures operational reliability and plant uptime.

Two LEDs and a DCok output indicate and signal operating states.








The units can be used worldwide due to their wide-range input and cULus approval.



ifm offers an extensive range of switched-mode power supplies.



## Switched-mode power supplies

Type	Current [A]	Output voltage [V]	Nominal voltage [V]	Mains buffering time [ms]	Efficiency typ. [%]	Order no.
	1.25	24...28	115 / 230 AC	–	84	<b>DN1030</b>
	2.5	24...28	115 / 230 AC	–	88	<b>DN1031</b>
	3.3	24...28 DC	115 / 230 AC	–	88	<b>DN4011</b>
	5	24...28 DC	115 / 230 AC	–	89.4	<b>DN4012</b>
	10	24...28 DC	115 / 230 AC	–	91	<b>DN4013</b>
	20	24...28 DC	115 / 230 AC	–	92.7	<b>DN4014</b>
	5	24...28 DC	2 x 400 AC	–	90.4	<b>DN4032</b>
	10	24...28 DC	3 x 400 AC	–	92.8	<b>DN4033</b>
	20	24...28 DC	3 x 400 AC	–	95	<b>DN4034</b>

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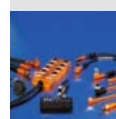
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