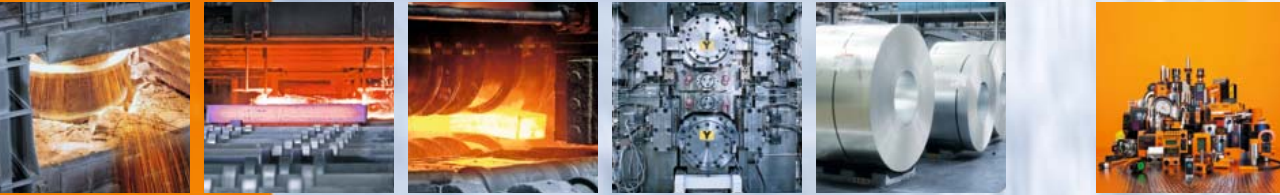


ifm electronic



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

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.

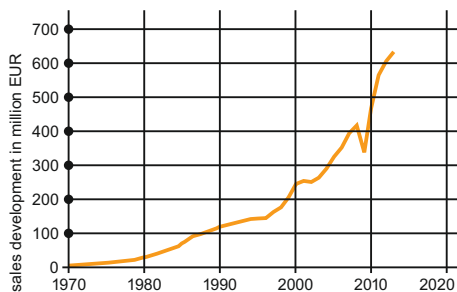
With the right address – www.ifm.com – only a mouse click separates you from the world of automation technology. See the power of our products in interactive representations. Gain an impression with 3-dimensional views of our units. Download CAD drawings for direct integration in your applications. Or 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.

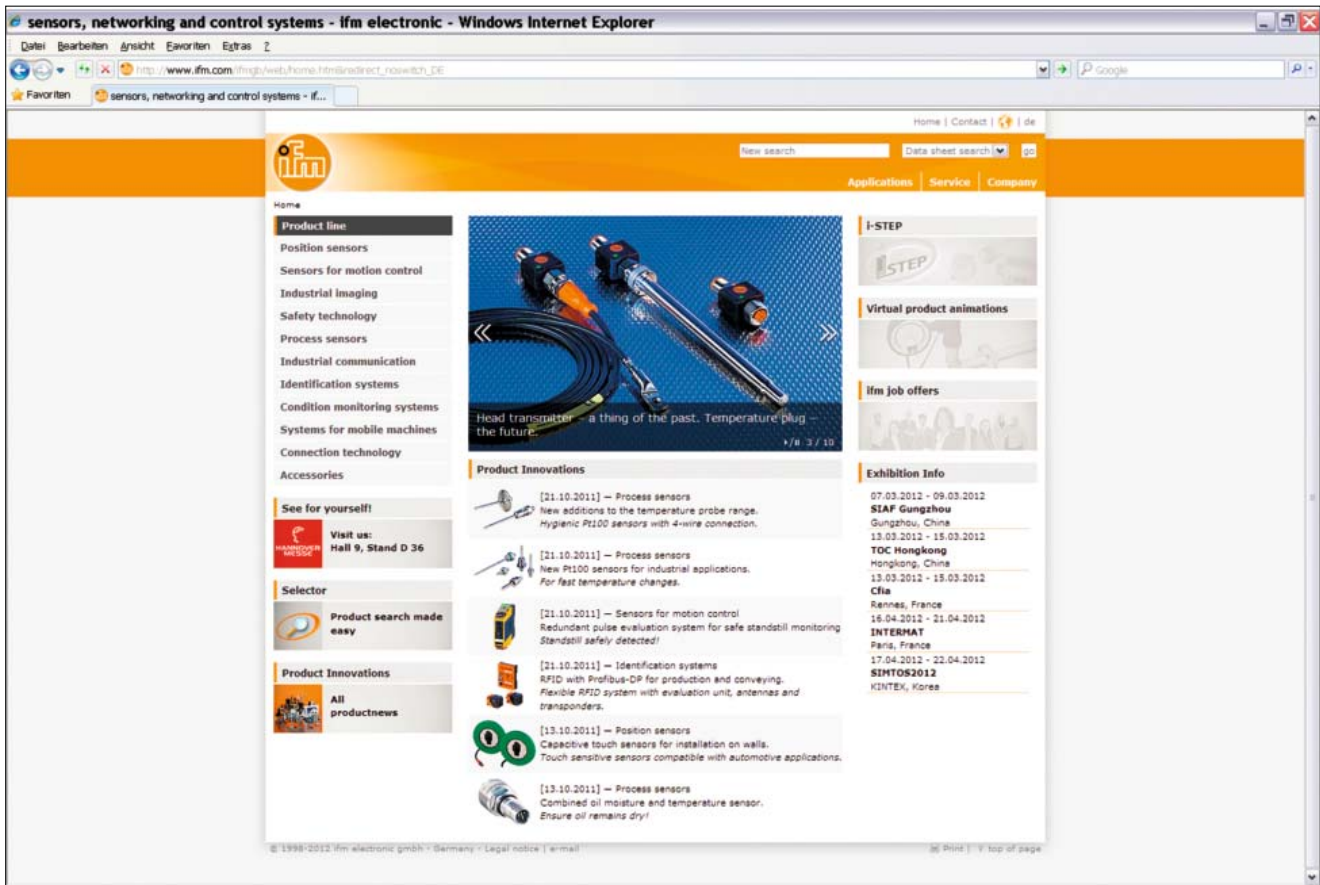
The quality standard of our products is an integral part of our company philosophy. And we guarantee it! So we provide you, the users, with a maximum degree of security: By means of our own production technology, ifm film technology, as well as by means of extensive quality assurance measures such as 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.

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

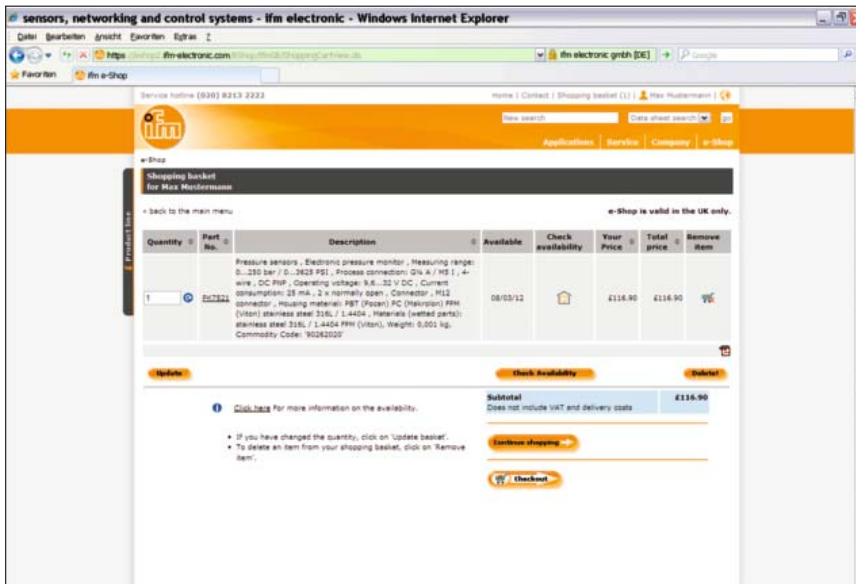
- applications
- product recommendations
- calculation aids

• 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

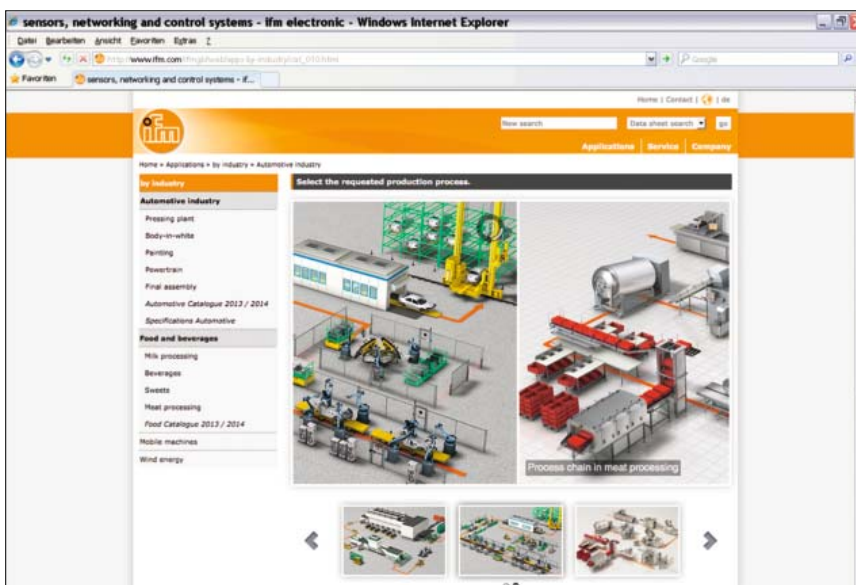
Individual order history

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

** 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

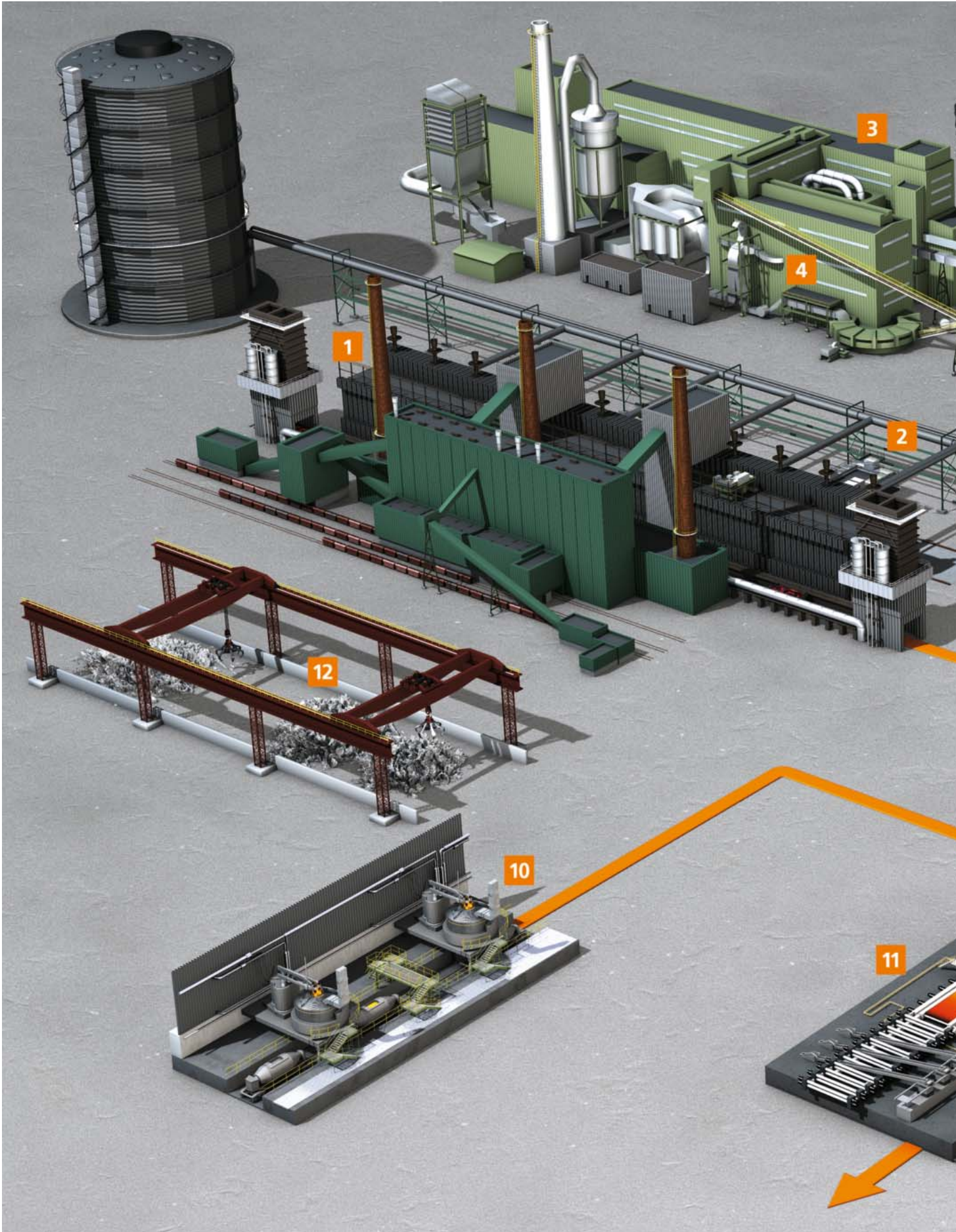


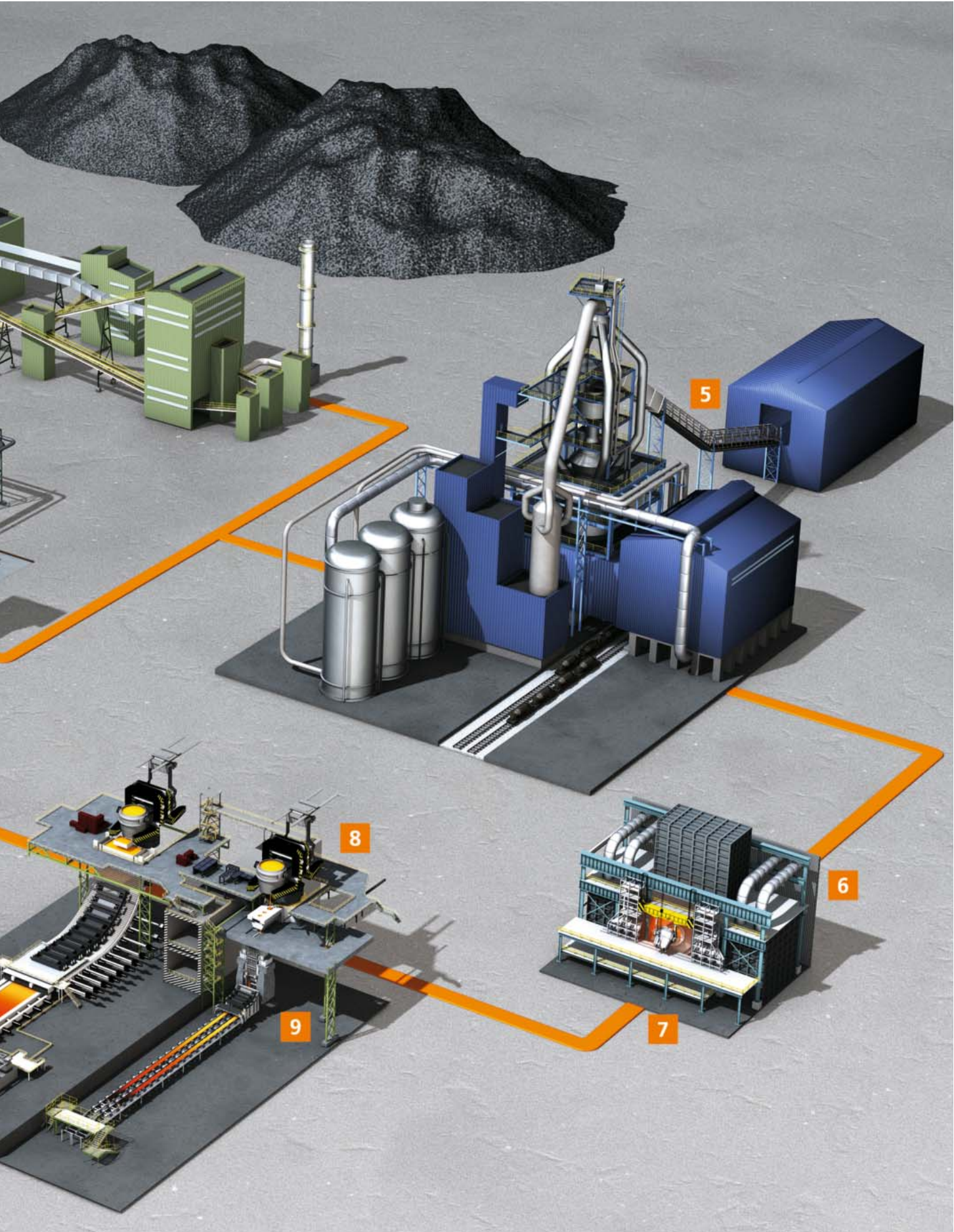
Technischer Überwachungs Verein (technical inspection association). The German TÜV is a private-sector body carrying out technical safety tests that are stipulated by government laws or instructions.


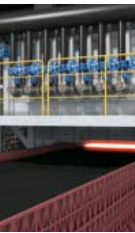



UL









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





Machine	Application	Product group	From page
1 Coke plant			
	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
2 Hydraulic power pack of a pusher			
	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
3 Sintering plant			
	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
4 Conveying systems			
	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
5 Cooling water supply at a blast furnace			
	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
6 Converter supply			
	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
7 Material supply at a converter			
	Slide monitoring at silos	Cylinder sensors	113
	Hatch monitoring at silos	Inductive sensors	77
	Level monitoring at silos	Capacitive sensors	105
8 Central compressed air supply			
	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
9 Continuous casting plant			
	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
10 Cooling at an electric arc furnace			
	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
11 Flame cutters			
	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
12 Crane installations			
	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 _b DC	Order no.
		LED	[bar]	max. [bar]	min. [bar]	[V]	
	G ¼ female	Display unit	0...25	150	350	18...30	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 _b	Medium temperature water	Medium temperature oil	I _{load}	Order no.
	[mm]	[mm]	[mm]	[V]	water [°C]	oil [°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 _b	Current consumption	I _{load}	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	VKV021

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_b [V]	Protection	f [Hz]	I_{load} [mA]	Order no.
	M18 / L = 60	70	High-grade st. steel	10...30	IP 65 / IP 67	5000	200	MGS204


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 _{overload}	P _{bursting}	U _b 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 _b	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

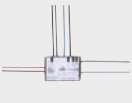
Safety switches in AS-i Safety at Work



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	E70155


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	AC2750


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 _{overload}	P _{bursting}	U _b 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 _b	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 _b [V]	Medium temperature water [°C]	Medium temperature oil [°C]	I _{load} [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 _b [V]	Current consumption [mA]	I _{load} [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 _b [V]	Protection	f [Hz]	I _{load} [mA]	Order no.
	M18 / L = 46	8 f	Brass	10...30	IP 67	300	100	IGS200

f = flush / nf = non flush

Product selectors and further information can be found at: www.ifm.com


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 _b [V]	Protection	f [Hz]	I _{load} [mA]	Order no.
	M18 / L = 110	8 nf	PBT	10...36	IP 65	50	250	KG5041

f = flush / nf = non flush


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 _b [V]	Protection	f [Hz]	I _{load} [mA]	Order no.
	25 x 5 x 6.5	f	PA (polyamide)	10...30	IP 65 / IP 67	10000	100	MK5101

f = flush / nf = non flush


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 _{overload}	P _{bursting}	U _b 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 ³ /h]	Pressure rating [bar]	Response time [s]	U _b [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



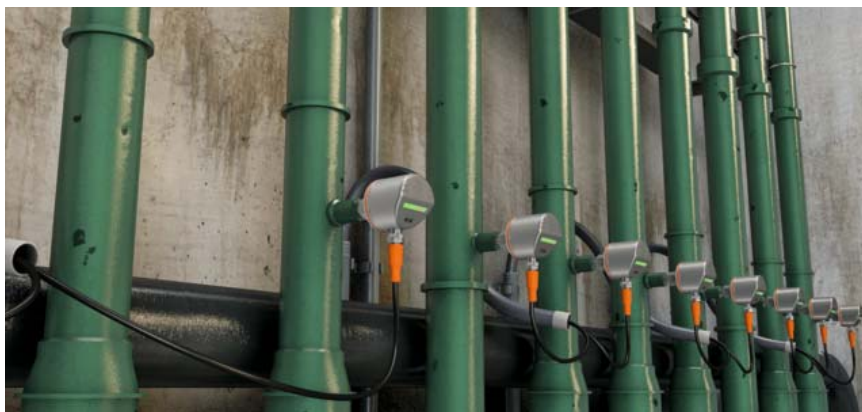
Dry compressed air for pneumatic consumers

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

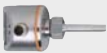
Flow rate in cooling circuits at an electric arc furnace



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 _b [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.

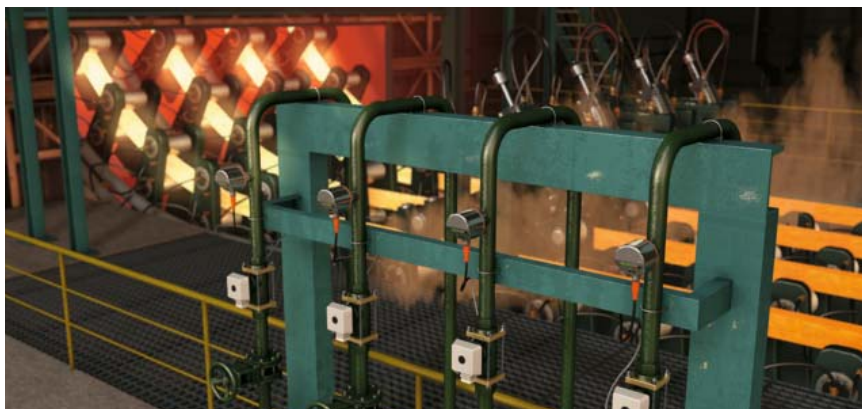
Evaluation units for temperature sensors - further products from page 195

Type	Measuring range [°C]	Process connection	Display	U _b [V]	Current consumption [mA]	I _{load} [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

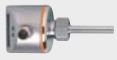
Cooling in continuous casting plants



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 _b [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

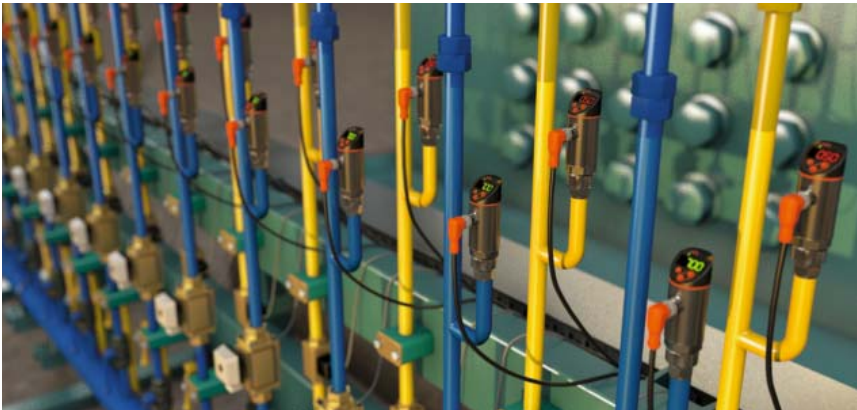
At the end of the process the slabs or billets cast in the continuous casting plant are cut to the requested length using a flame cutter. Positioning is monitored using inductive sensors.

Inductive sensors for position feedback · further products from page 77

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

f = flush / nf = non flush


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 _{overload}	P _{bursting}	U _b 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

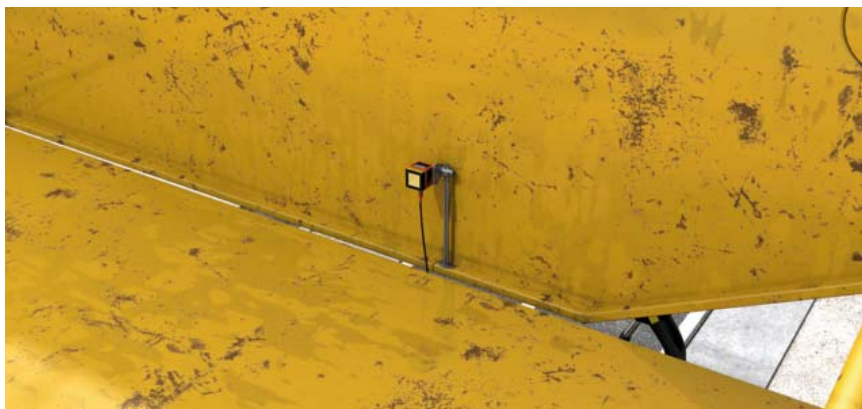
Type	Dimensions	Sensing range	Material	U _b	Protection	f AC / DC	I _{load} AC / DC	Order no.
	[mm]	[mm]		[V]		[Hz]	[mA]	
	40 x 26 x 26	4 nf	PBT	10...36	IP 67	1300	250	IN5225

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


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.

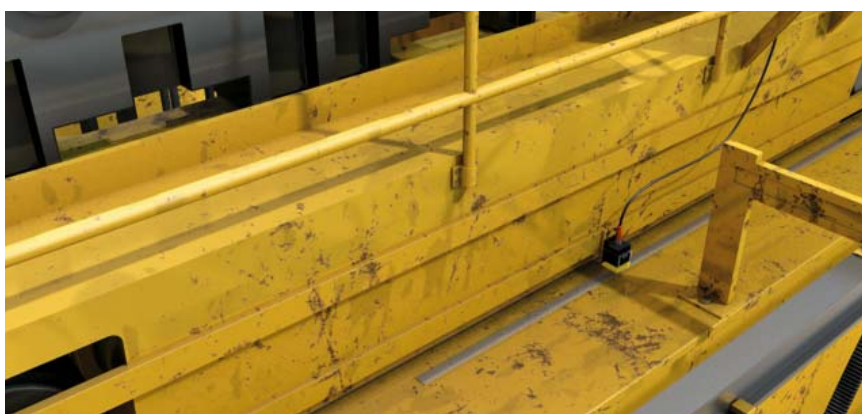
PMDLine photoelectric sensors with time of flight measurement · further products from page 131

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

Accessories · further products from page 255

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


Reliable area monitoring at crane installations



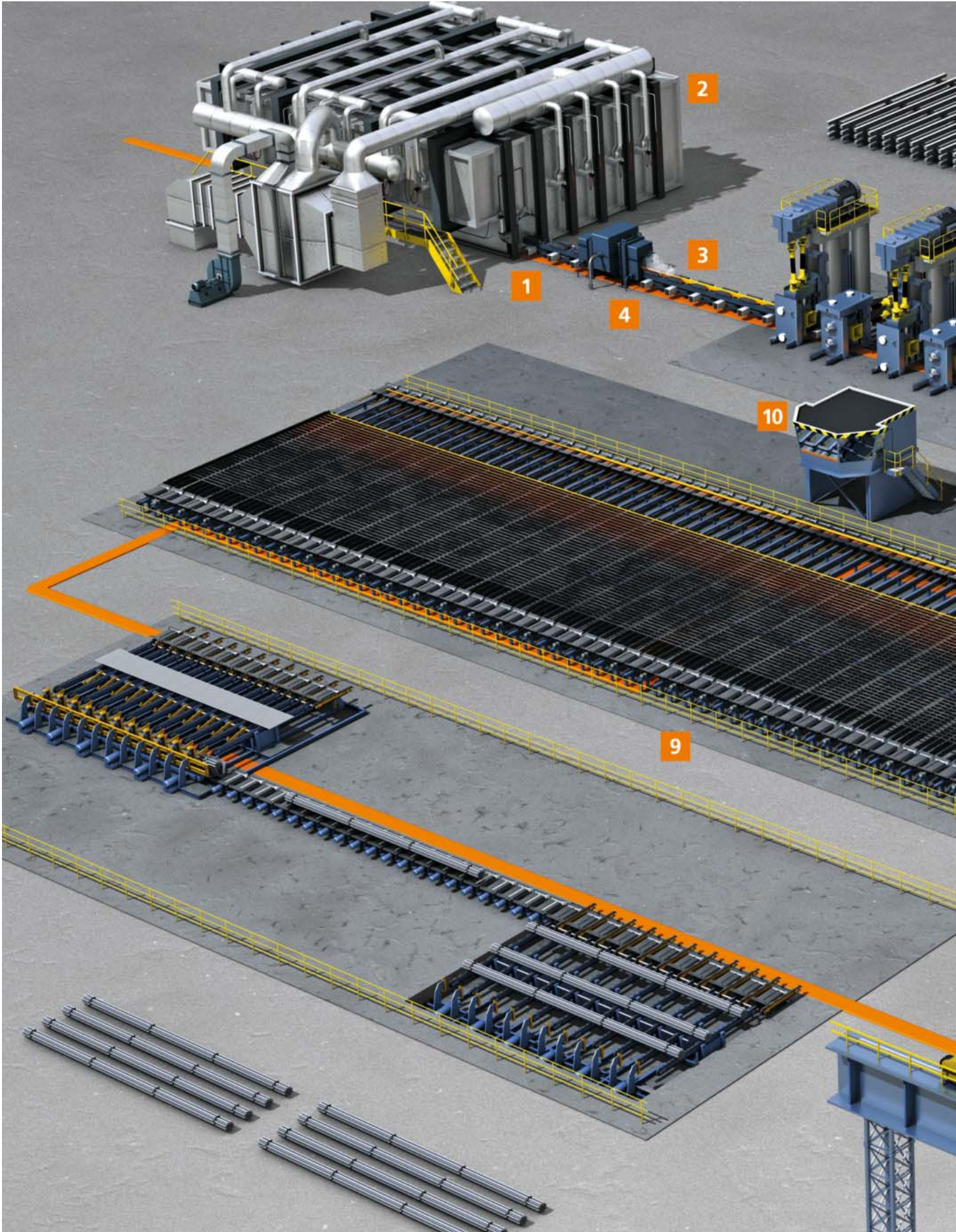
Limitation of the trolley travel on crane installations

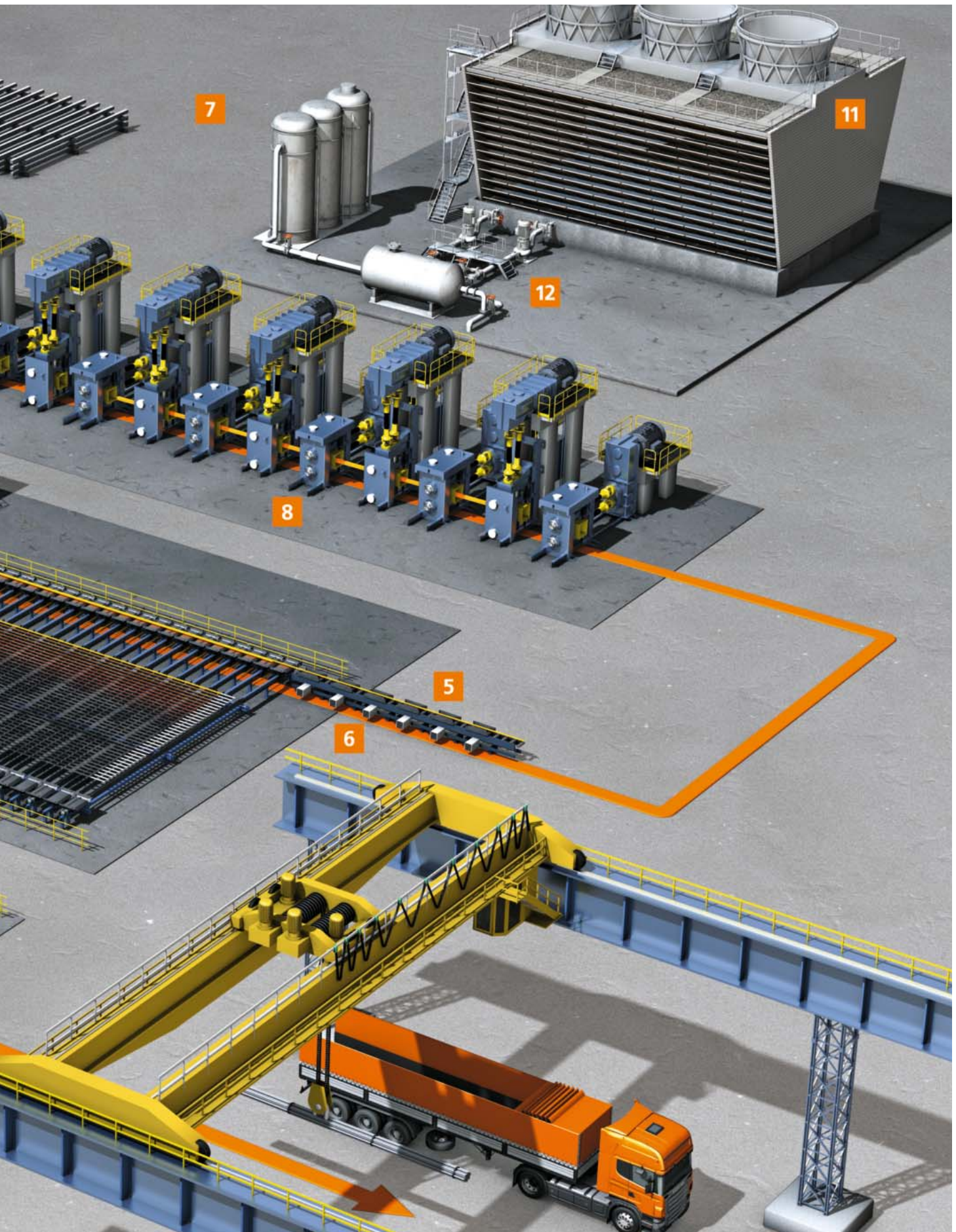
By means of a fail-safe inductive sensor and a metal rail the trolley travel of cranes can be limited.

Fail-safe inductive sensors · further products from page 151







Type	Length [mm]	Enable zone [mm]	Housing material	U _b 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	GM701S

f = flush / nf = non flush





Machine	Application	Product group	From page
1 Positioning on the heating furnace			
	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
2 Cooling circuits on furnaces			
	Flow monitoring	Flow sensors / flow meters	175
	Temperature monitoring	Temperature sensors	195
	Pressure monitoring	Pressure sensors	157
	Connection of sensors	Sockets	247
3 High-pressure pump in descaling lines			
	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
4 Tracking of material in descaling lines			
	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
5 Decentralised monitoring in large installations			
	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
6 Speed monitoring at conveyors			
	Rotational speed monitoring	Pulse evaluation systems	147
	Rotational speed monitoring	Encoders	143
	Connection of sensors	Sockets	247

Machine	Application	Product group	From page
7 Compressed air supply			
	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
8 Drive monitoring on the rollers			
	Temperature monitoring	Temperature sensors	195
	Condition monitoring of drives	Vibration monitoring systems	237
	Rotational speed monitoring	Pulse evaluation systems	147
9 Cooling bed			
	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
10 Hydraulic aggregates			
	Pressure monitoring	Pressure sensors	157
	Temperature monitoring	Temperature sensors	195
	Level monitoring	Level sensors	187
	Oil condition monitoring	Systems for oil quality monitoring	245
11 Fans in cooling towers			
	Vibration monitoring	Vibration monitoring systems	237
	Temperature monitoring	Temperature sensors	195
	Rotational speed monitoring	Pulse evaluation systems	147
12 Cooling towers			
	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.

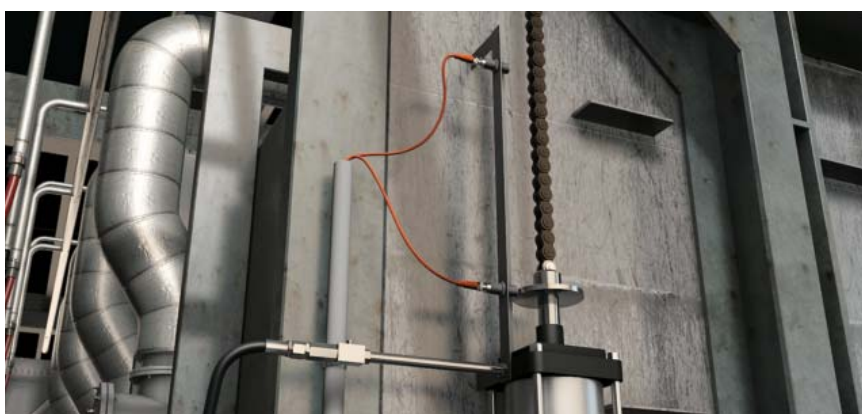
PMDLine photoelectric sensors with time of flight measurement · further products from page 131

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

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

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 _b [V]	Protection	f [Hz]	I _{load} [mA]	Order no.
	M18 / L = 70	5 f	stainless steel	10...35	IP 65	400	150	IG6614

f = flush / nf = non flush


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 _b [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



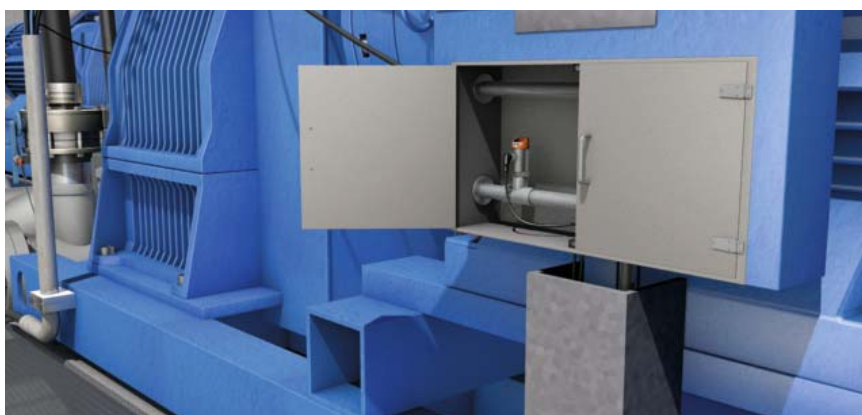
Pressure monitoring at the lubrication of the high-pressure pumps

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 _{overload}	P _{bursting}	U _b 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 _b	Current consumption	I _{load}	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 _b [V]	Protection	f [Hz]	I _{load} [mA]	Order no.
	M30 / L = 60	22 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	100	100	IIS227

f = flush / nf = non flush


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 _b [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 _b [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

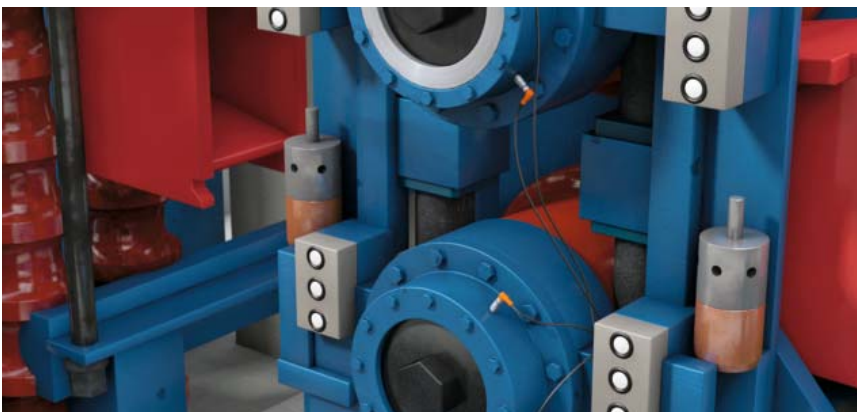
The speed of all drives of the roller conveyor is synchronised and controlled. An inductive sensor detects the switching cam mounted on the shaft, generating the pulses for a downstream speed monitoring.

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

Type	Dimensions [mm]	Sensing range [mm]	Material	U _b [V]	Protection	f [Hz]	I _{load} [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).

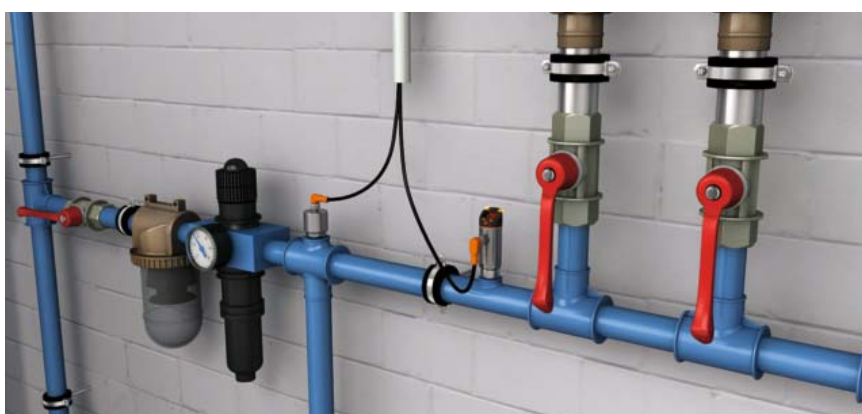
Temperature sensors · further products from page 195

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 _b [V]	Current consumption [mA]	I _{load} [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 ³ /h]	Pressure rating [bar]	Response time [s]	U _b [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.

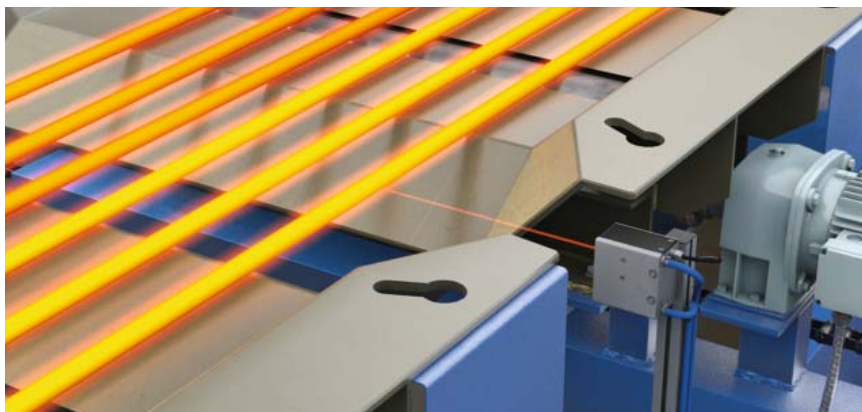
Pressure sensors · further products from page 157

Type	Process connection	Display LED	Measuring range [bar]	P _{overload} max. [bar]	P _{bursting} min. [bar]	U _b 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 ³ /h]	Pressure rating [bar]	Response time [s]	U _b [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.

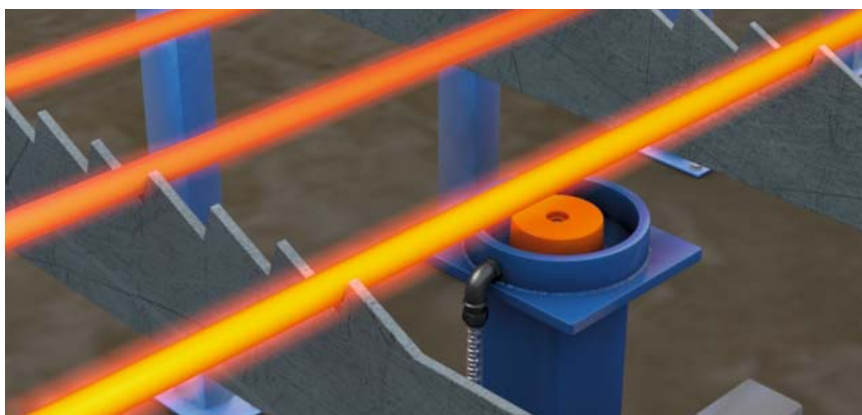
Protective housing for distance measurement sensors · further products from page 131

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 _b [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 _b [V]	Protection	f [Hz]	I _{load} [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



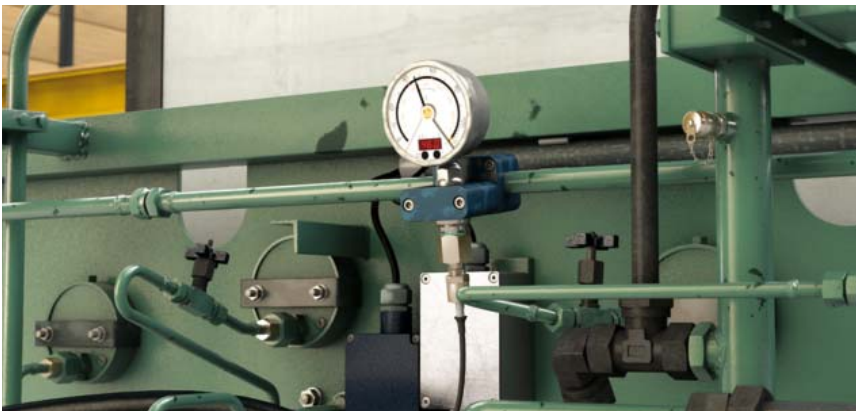
Avoiding machine damage

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 _b 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 _b [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

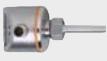
Monitoring the cooling water at cooling towers




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.

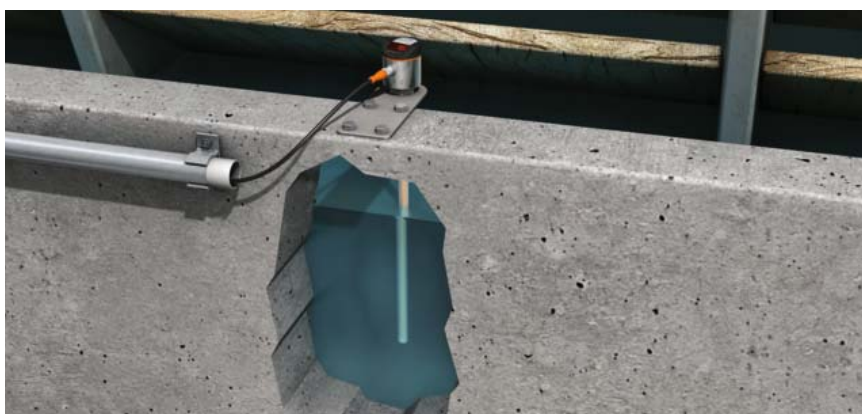
Flow sensors for monitoring cooling circuits - further products from page 175

Type	Setting range liquids / gases [cm/s]	Material sensor tip	Medium temperature [°C]	Pressure rating [bar]	Response time [s]	U _b [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 _b DC [V]	Order no.
	G ½	Display unit	-1...10	50	150	18...32	PG2454


Level monitoring in the cooling tower

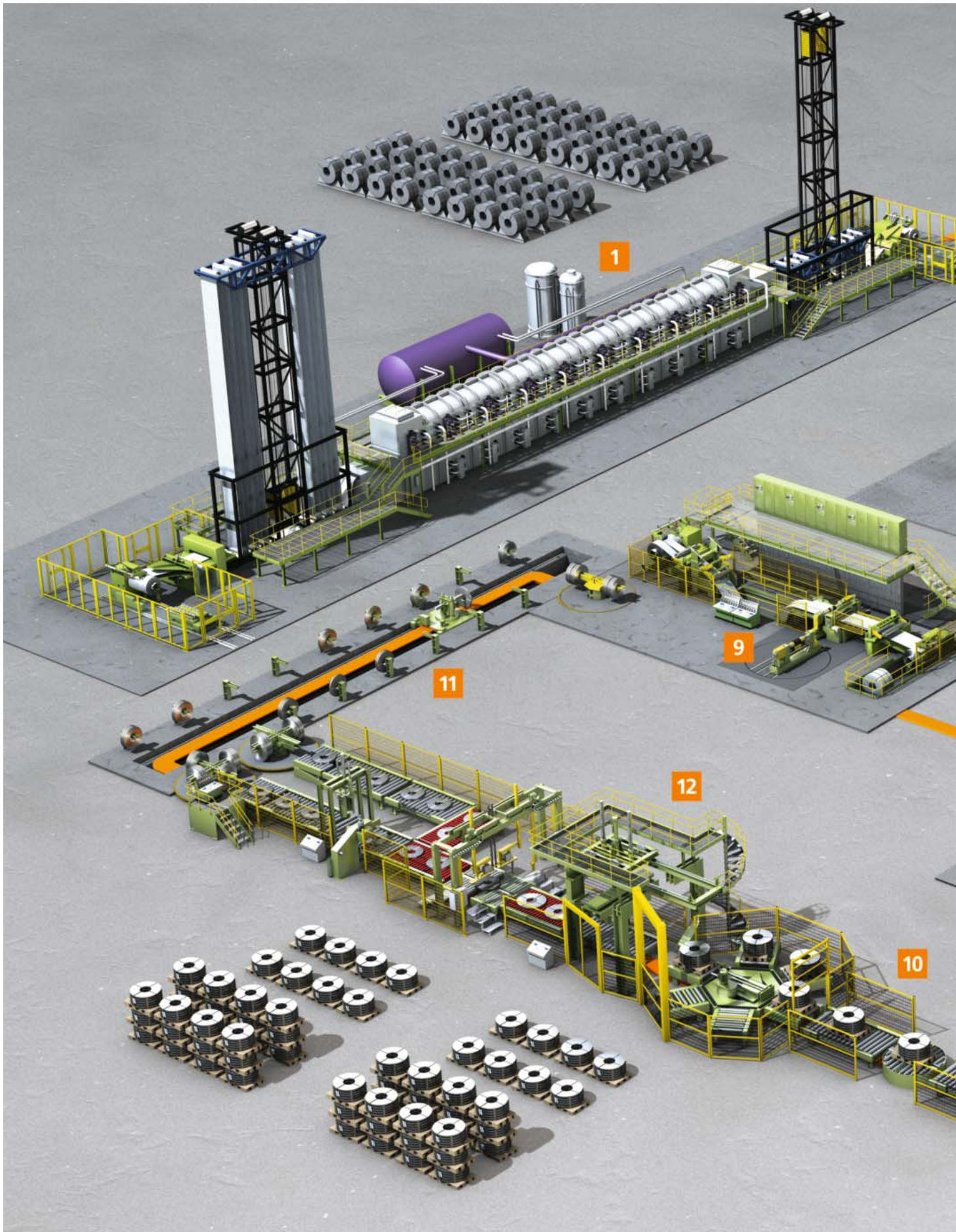


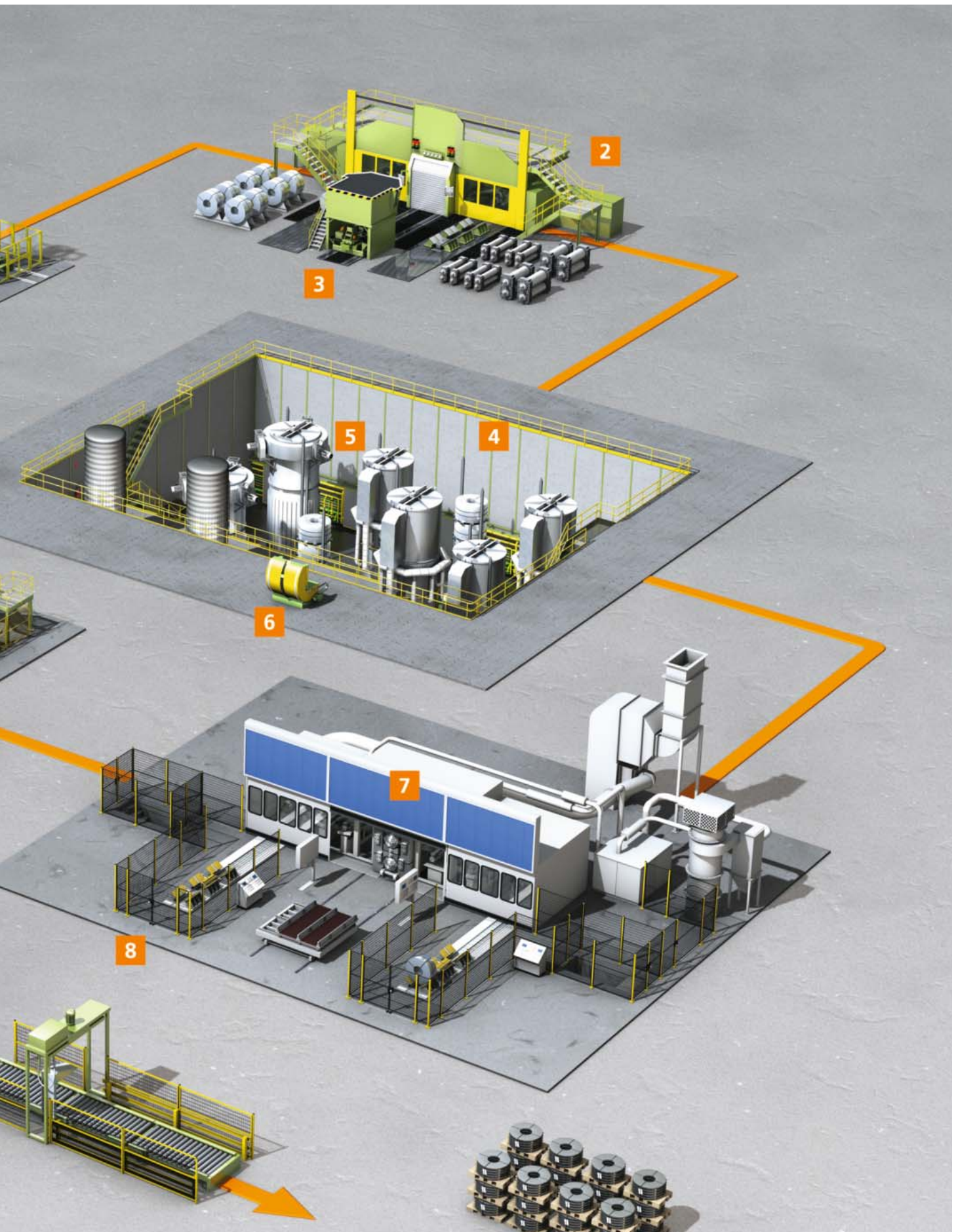
Optimum level in the basin of the cooling tower

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 _b [V]	Medium temperature water [°C]	Medium temperature oil [°C]	I _{load} [mA]	Order no.
	728	585	102 / 40	18...30	0...35 (LK3124 + E43102: 0...55)	0...70	200	LK3124

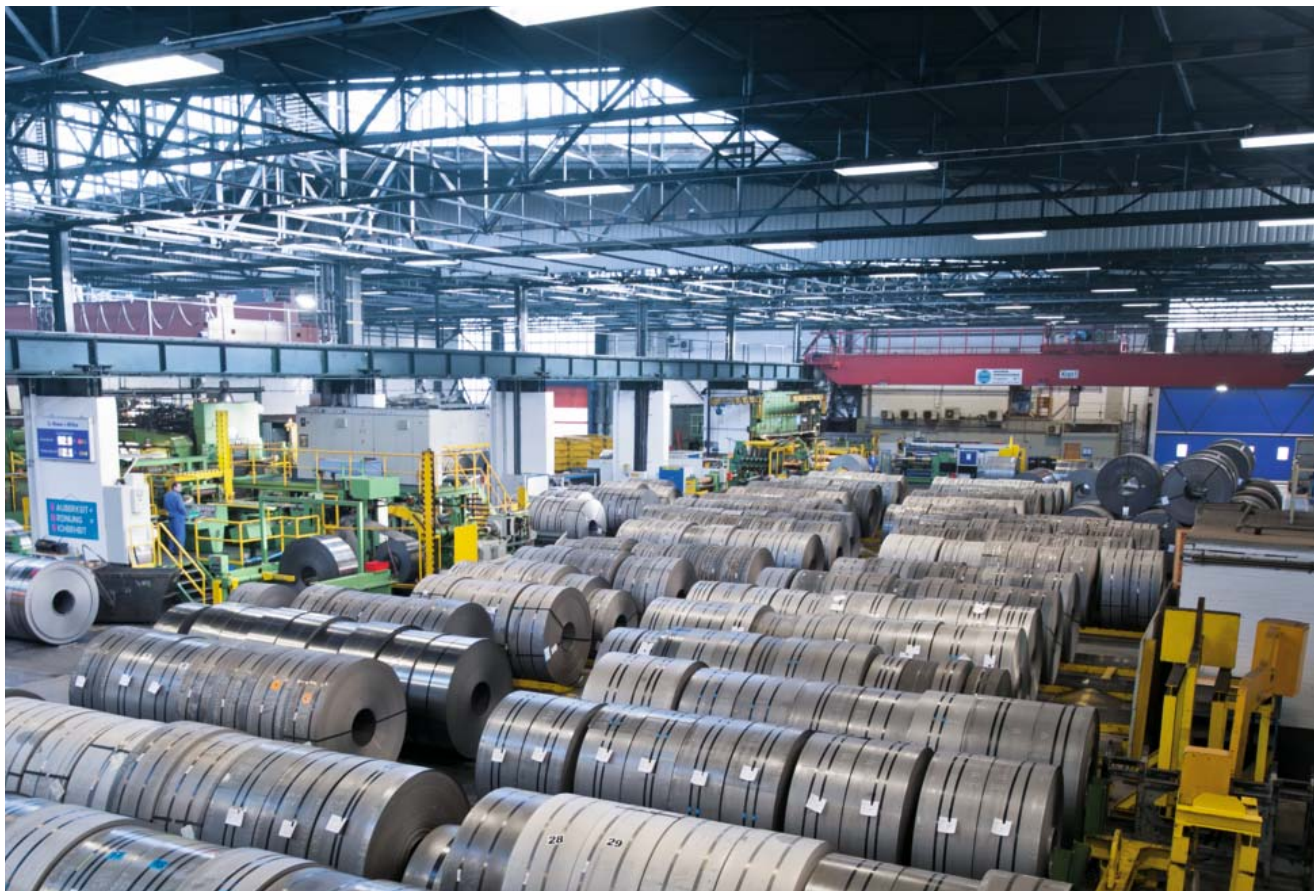




Machine	Application	Product group	From page
1 Suction in the pickling line			
	Speed measurement	Pulse evaluation systems	147
	Vibration monitoring	Vibration monitoring systems	237
	Airflow monitoring	Flow sensors / flow meters	175
2 Roller stand drive			
	Vibration monitoring	Vibration monitoring systems	237
	Temperature measurement	Temperature sensors	195
	Voltage supply	Power supplies	263
	Speed measurement	Pulse evaluation systems	147
3 Roller replacement cars			
	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
4 Annealing furnace			
	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
5 Annealing furnace supply unit			
	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
6 Upender			
	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
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 _b [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

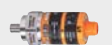
f = flush / nf = non flush

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 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

Speed monitor for drive monitoring · further products from page 147

Type	U _b [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 _b 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 _b	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 _b DC	Order no.
		LED	[bar]	max. [bar]	min. [bar]	[V]	
	G ¼ A	-	0...25	60	600	8.5...36	PT3553

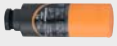
Positioning of the roller replacement car



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 _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


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 _b [V]	Protection	f [Hz]	I _{load} [mA]	Order no.
	M12 / L = 45	4 f	Brass	10...30	IP 68	700	100	IFC200

f = flush / nf = non flush

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

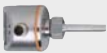
Monitoring of the cooling water for annealing furnaces



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 _b [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 _{overload} max. [bar]	P _{bursting} min. [bar]	U _b 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 _b [V]	Protection	f AC / DC [Hz]	I _{load} 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 _b [V]	Protection	f [Hz]	I _{load} [mA]	Order no.
	M30 / L = 50	15 f	Brass	10...36	IP 67	100	100	IIS204

f = flush / nf = non flush


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 _b [V]	f [Hz]	Protection	I _{load} [mA]	T _a [°C]	Order no.
	25 x 5 x 6.5	PA (polyamide)	10...30	10000	IP 65 / IP 67	100	-25...85	MK5100

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	E11799


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 _b [V]	Protection	f [Hz]	I _{load} [mA]	Order no.
	M18 / L = 46	8 f	Brass	10...30	IP 67	300	100	IGS200

f = flush / nf = non flush


Monitoring of high-speed doors



Door monitoring

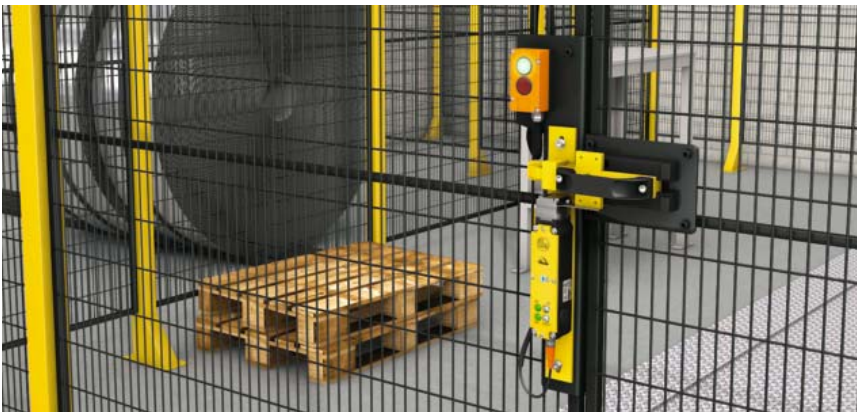
Category 4 and SIL 3 fail-safe inductive sensors directly detect the end stop of the high-speed door without contact and without requiring a special counter piece.

Fail-safe inductive sensors · further products from page 151

Type	Length [mm]	Enable zone [mm]	Housing material	U _b 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

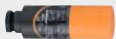
Positioning of the shear stand



Position monitoring on the rotary plate of the shear stands

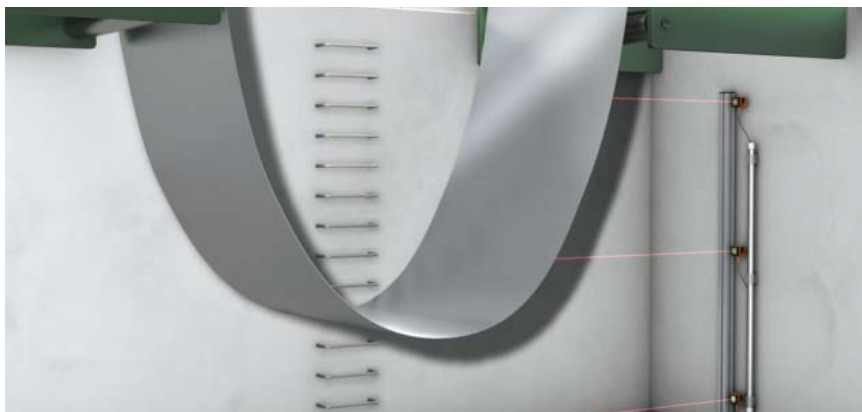
By means of a rotary plate two shear stands are exchanged. To avoid rotation of the plate if a shear stand is not correctly positioned an inductive sensor detects the stand position.

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

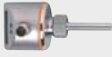
Monitoring of belt centring control



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 _b [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 _b [V]	f [kHz]	I _{load} [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 _B [V]	Order no.
	813	90	760	0...4 / 3...12	4.5	24	OY105S


Temporary coil store – packaging line



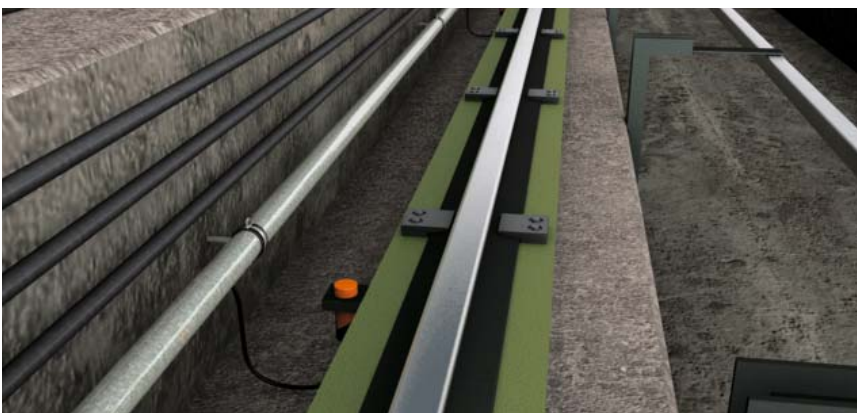
Temporary store for coils from the shears to the packaging line

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	OGH500


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 _b [V]	Protection	f [Hz]	I _{load} [mA]	Order no.
	Ø 34 / L = 98	20 nf	PBT	10...55	IP 65	300	300	IB5124

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.
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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.
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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.
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Ø 34 / L = 82

20 nf

PBT

10...36

IP 67

60

250

IB5096

f = flush / nf = non flush

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AC0105	CE, CUL	231	AC5055	CE, CUL	231
AC0305	CE, CUL	231	AC5065	CE, CUL	231
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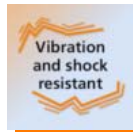
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Inductive M12 sensors with long sensing ranges with plug



- 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

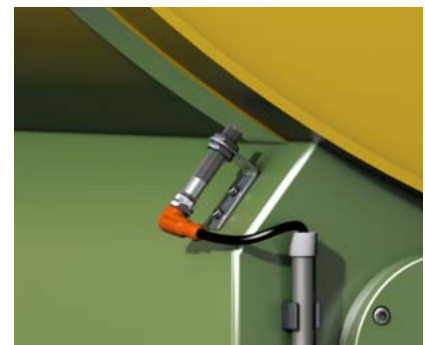


New standard

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 _b [V]	Protection	f [Hz]	I _{load} [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



New standard

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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 _b [V]	Protection	f [Hz]	I _{load} [mA]	Order no.
M12 connector · Output function  · 3-wire · DC PNP								
	M18 / L = 45	8 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	400	100	IGS236
	M18 / L = 45	12 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	300	100	IGS237
	M18 / L = 60	8 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	400	100	IGS232
	M18 / L = 60	12 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	300	100	IGS233
M12 connector · Output function  · 3-wire · DC NPN								
	M18 / L = 45	8 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	400	100	IGS238
	M18 / L = 45	12 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	300	100	IGS239
	M18 / L = 60	8 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	400	100	IGS234
	M18 / L = 60	12 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	300	100	IGS235

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Connectors

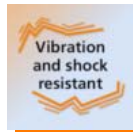
Type	Description	Order no.
Socket M12, 5/4-pole, 4-wire		
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC005
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts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



Inductive 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

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 _b [V]	Protection	f [Hz]	I _{load} [mA]	Order no.
M12 connector · Output function  · 3-wire · DC PNP								
	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
M12 connector · Output function  · 3-wire · DC NPN								
	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

f = flush / nf = non flush

Connectors

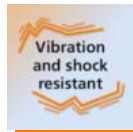
Type	Description	Order no.
Socket M12, 5/4-pole, 4-wire		
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC005
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts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



Inductive 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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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.

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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.
Cable 2 m · Output function  · 3-wire · DC PNP								
	M12 / L = 40	4 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	700	100	IFS256
	M12 / L = 40	7 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	700	100	IFS257
	M12 / L = 60	4 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	700	100	IFS252
	M12 / L = 60	7 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	700	100	IFS253
Cable 2 m · Output function  · 3-wire · DC NPN								
	M12 / L = 40	4 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	700	100	IFS258
	M12 / L = 40	7 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	700	100	IFS259
	M12 / L = 60	4 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	700	100	IFS254
	M12 / L = 60	7 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	700	100	IFS255
Cable 2 m · Output function  · 2-wire · AC								
	M12 / L = 71	4 nf	Brass	20...250	IP 67	25	250	IF0007*
	M12 / L = 71.5	4 nf	PBT	20...250	IP 67	25	250	IF0003*

f = flush / nf = non flush

* Note for AC and AC/DC units

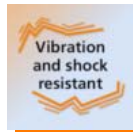
Miniature fuse to IEC60127-2 sheet 1, ≤ 2 A (fast acting) Recommendation: check the unit for reliable function after a short circuit.



Inductive 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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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.
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	IGS248
	M18 / L = 40	12 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	300	100	IGS249
	M18 / L = 60	8 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	400	100	IGS244
	M18 / L = 60	12 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	300	100	IGS245
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	IGS250
	M18 / L = 40	12 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	300	100	IGS251
	M18 / L = 60	8 f	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	400	100	IGS246
	M18 / L = 60	12 nf	Brass	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	300	100	IGS247
Cable 2 m · Output function  · 2-wire · AC/DC								
	M18 / L = 80	5 f	PBT	20...250	IP 67	25 / 50	350 / 100	IG0005*
	M18 / L = 80	8 nf	PBT	20...250	IP 67	25 / 50	350 / 100	IG0006*
	M18 / L = 80	5 f	Brass	20...250	IP 67	25 / 50	350 / 100	IG0011*
	M18 / L = 80	8 nf	Brass	20...250	IP 67	25 / 50	350 / 100	IG0012*

f = flush / nf = non flush

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

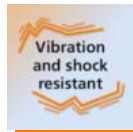
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Inductive M30 sensors with long sensing ranges with cable



- Large temperature range of -40...85 °C for greater flexibility
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Long sensing ranges allow versatile use.




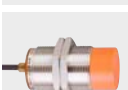
Sensors with increased sensing range for industrial applications

Type	Dimensions [mm]	Sensing range [mm]	Material	U _b [V]	Protection	f [Hz]	I _{load} [mA]	Order no.
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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.


Rectangular plastic housing in O6 design

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



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

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

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

	Receiver	10 m	Red	–	H/D PNP	O6E202
	Receiver	10 m	Red	–	H/D PNP	O6E203


Accessories

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

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	EVC154
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Sensors for pneumatic applications

Type	Process connection	Display LED	Measuring range [bar]	Poverload max. [bar]	Pbursting min. [bar]	U _b 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

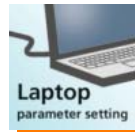
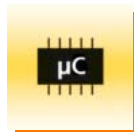
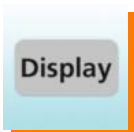
Type	Description	Order no.
Socket M8, 4-pole, 4-wire		
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M8 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC150
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · 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
	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 LED	Measuring range [bar]	Poverload max. [bar]	Pbursting min. [bar]	U _b DC [V]	Order no.
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							
	Sealing cone G1 male	Display unit	-1...4	30	100	20...32	PI2895*
	Sealing cone G1 male	Display unit	-0.124...2.5	20	50	20...32	PI2896*
	Sealing cone G1 male	Display unit	-0.05...1	10	30	20...32	PI2897*
	Sealing cone G1 male	Display unit	-0.0124...0.25	10	30	20...32	PI2898*

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

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



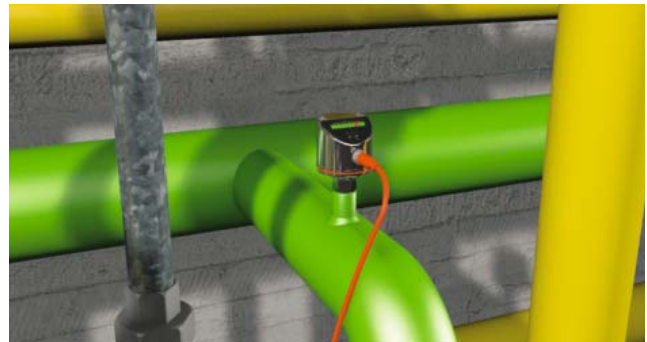
Simple, fast and flexible installation

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 _b [V]	Order no.
M12 connector							
	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
1/2" UNF-Connector							
	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 _b [V]	Order no.
M12 connector							
	3...300 / 200...3000	stainless steel 316L / 1.4404	-25...80	300	1...10	19...36	SI5007

Adapters

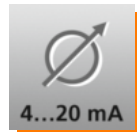
Type	Description	Order no.
	Adapter · M18 x 1.5 - G 1/2 · Insertion depth of the probe of SID, SFD, TN: · 21 mm · Housing materials: stainless steel 316L / 1.4404	E40096
	Adapter · M18 x 1.5 - G 1/2 · Insertion depth of the probe of SID, SFD, TN: · 21 mm · Housing materials: brass	E40097
	Adapter · M18 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 $20 \mu\text{S/cm}$, 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 _b [V]	Order no.
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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	SM6000
	G¾	0.5...50.0	-10...70	16	< 0.150	19...30	SM7000
	G1	0.7...100.0	-10...70	16	< 0.150	19...30	SM8000

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

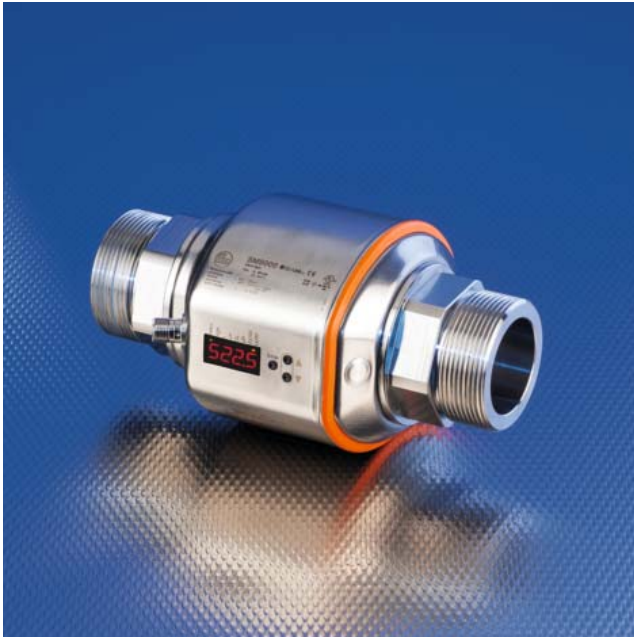
	G½	0.1...25.00	-10...70	16	< 0.150	20...30	SM6004
	G¾	0.2...50.0	-10...70	16	< 0.150	20...30	SM7004
	G1	0.2...100.0	-10...70	16	< 0.150	20...30	SM8004

Adapters

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



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 _b [V]	Order no.
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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

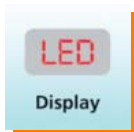
Type	Description	Order no.
Socket M12, 5/4-pole, 4-wire		
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC002
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts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

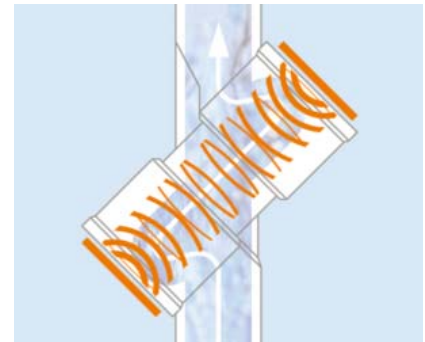
The SU type ultrasonic flow meter operates on the transit time difference principle. Two sound transducers are positioned in a defined pipe length. These sound transducers alternately emit sound pulses. The pulse trains emitted with the flow in the pipe length are transported faster to the receiver by 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 _b [V]	Order no.
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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 ≤ 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 _b [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

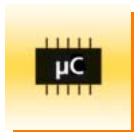
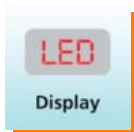
Type	Process connection	Measuring range [l/min]	Medium temperature [°C]	Pressure rating [bar]	Response time [s]	U _b [V]	Order no.
Cable with connector 0.3 m · Output function analogue · DC							
	Rp 3/4	0.3...25	10...180	15	< 0.01	24	SBT633



Compressed air meters with display and totaliser function



- For compressed air in industrial use as well as argon (Ar), carbon dioxide (CO₂), nitrogen (N₂)
- Large measuring range up to 700 Nm³/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.



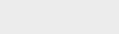

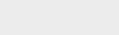
Compressed air meters

Type	Process connection	Setting range [Nm ³ /h]	Pressure rating [bar]	Response time [s]	U _b [V]	Order no.
Output function OUT1: normally open / closed programmable or pulse OUT2: normally open / closed programmable or analogue (4...20 mA scaleable)						
	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 ³ /h]	Medium temperature [°C]	Pressure rating [bar]	Response time [s]	U _b [V]	Order no.
Output function OUT1: normally open / closed programmable or pulse OUT2: normally open / closed programmable or analogue (4...20 mA scaleable)							
	G ¼ (DN8)	Ar: 0.08...24.54 / CO ₂ : 0.047 (0.04)...14.38 / N ₂ : 0.05 (0.06)...14.94	0...60	16	< 0.1	18...30	SD5100
	R½ (DN15)	Ar: 0.39 (0.4)...118.2 / CO ₂ : 0.24 (0.2)...71.7 / N ₂ : 0.24 (0.2)...73.0	0...60	16	< 0.1	18...30	SD6100

Connectors

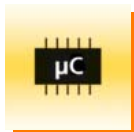
Type	Description	Order no.
Socket M12, 5/4-pole, 4-wire		
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC004
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts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

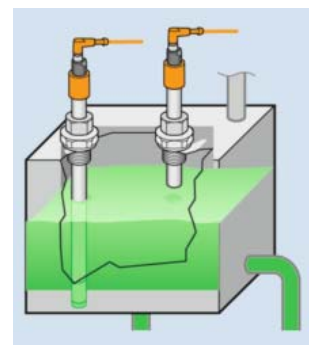
The point level sensors have been optimised for use in hydraulic oils and coolants. They are used to monitor the minimum level, leakage or overflow of tanks. The extended setting range increases the application reliability.

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 _b [V]	Medium temperature water [°C]	Medium temperature oil [°C]	I _{load} [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 _b [V]	Medium temperature water [°C]	Medium temperature oil [°C]	I _{load} [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

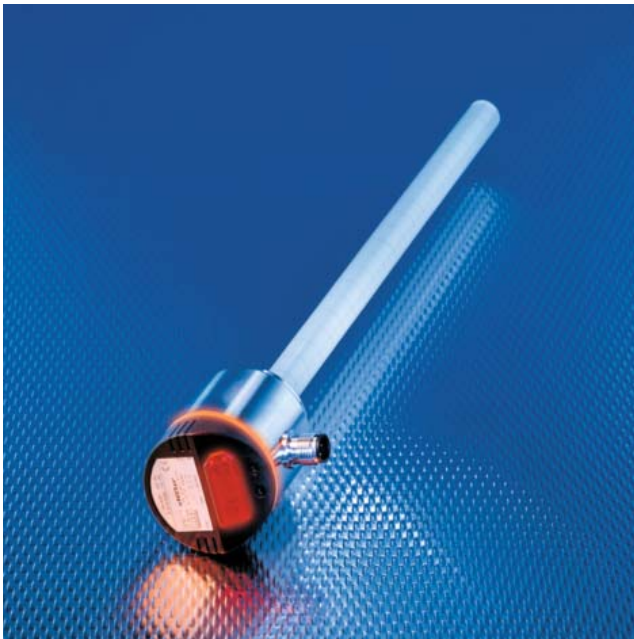
Type	Process connection	Process pressure max. [bar]	Application	Protection	Order no.
M12 connector · Output function 2 x normally open / closed programmable · DC PNP/NPN					
	G ½ male	-1...40	liquid, viscous and powdery media	IP 68 / IP 69K	LMT121
	G ½ male	-1...40	liquid, viscous and powdery media	IP 68 / IP 69K	LMT102
	G ½ male	-1...40	liquid, viscous and powdery media	IP 68 / IP 69K	LMT104
	G ½ male	-1...40	liquid, viscous and powdery media	IP 68 / IP 69K	LMT105
M12 connector · Output function normally open / closed complementary · DC PNP					
	G ½ male	-1...16	water, water-based media	IP 68 / IP 69K	LMT100
	G ½ male	-1...16	oils, grease	IP 68 / IP 69K	LMT110

Accessories

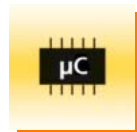
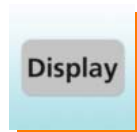
Type	Description	Order no.
	Welding adapter · G ½ - Ø 30 mm · for tanks · Housing materials: stainless steel 316L / 1.4435	E43300
	Welding adapter · G ½ - Ø 29 mm · for pipes · Housing materials: stainless steel 316L / 1.4435	E43301
	Adapter · G ¾ · Housing materials: stainless steel 316L / 1.4435	E43302
	Adapter · G 1 · Housing materials: stainless steel 316L / 1.4435	E43303
	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



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

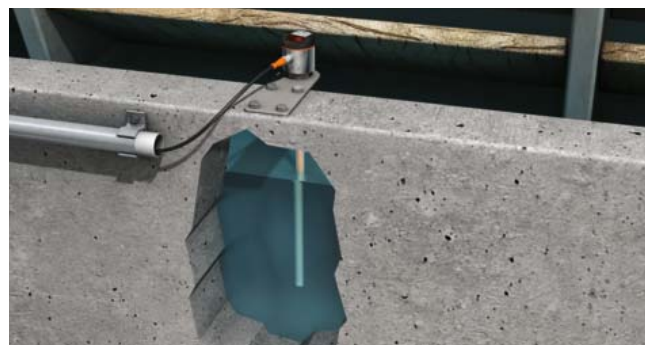


Level monitoring in machine building

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

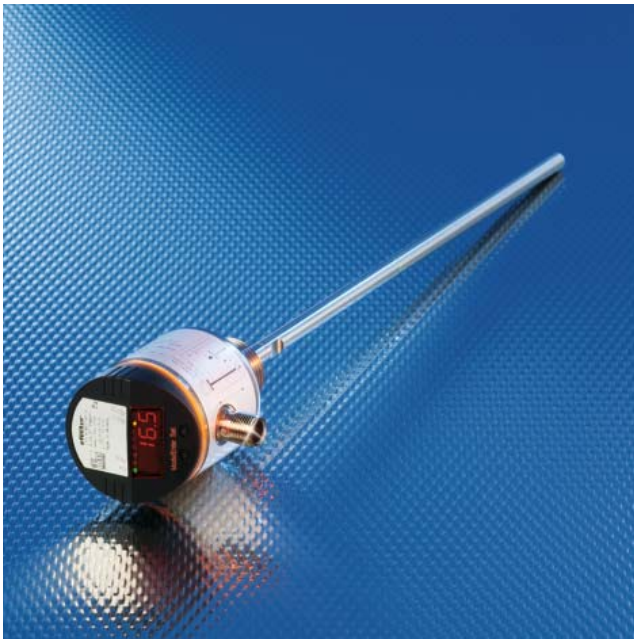
Type	Probe length [mm]	Active zone [mm]	Inactive zone [mm]	U _b [V]	Medium temperature water [°C]	Medium temperature oil [°C]	I _{load} [mA]	Order no.
M12 connector (according to EN 61076-2-101) · Output function 1 x analogue 4...20 mA / 0...10 V (OUT2); 1 x normally open / closed programmable (OUT-OP) · DC PNP								
	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
M12 connector (according to EN 61076-2-101) · Output function 2 x normally open / closed programmable · DC PNP								
	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
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								
	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

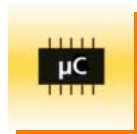
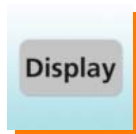
Type	Description	Order no.
	Mounting adapter · G ¾ D16 · for capacitive level sensors LK, LI, LT, LL · Housing materials: flange: stainless steel / nut: stainless steel / Spacer: Brass / rubber ring: FPM / sealing: Tesnit	E43003
	Mounting adapter · G 1 D16 · for capacitive level sensors LK, LI, LT, LL · 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 _b [V]	Medium temperature [°C]	I _{load} [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 3/4 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 3/4 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 3/4 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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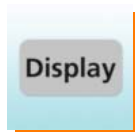
	Probe · Probe length: 240 mm · for level sensors LR · Housing materials: stainless steel 316L / 1.4404	E43203
	Probe · Probe length: 450 mm · for level sensors LR · Housing materials: stainless steel 316L / 1.4404	E43204
	Probe · Probe length: 700 mm · for level sensors LR · Housing materials: stainless 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 3/4 · 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 _b [V]	Current consumption [mA]	I _{load} [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 _b [V]	Current consumption [mA]	I _{load} [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.
M12 connector · high-grade stainless steel						
	-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.
M12 connector · high-grade stainless steel						
	-40...150	10	160	1 x Pt 1000	1 / 3	TT1050
	-40...150	10	260	1 x Pt 1000	1 / 3	TT2050
	-40...150	10	360	1 x Pt 1000	1 / 3	TT3050
	-40...150	10	560	1 x Pt 1000	1 / 3	TT5050

Accessories for temperature sensors

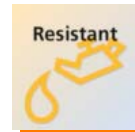
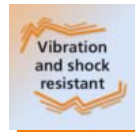
Type	Description	Order no.
	Evaluation unit for temperature sensors · G ½ male · for Pt100 and Pt1000 measuring elements · Housing materials: stainless steel / EPDM/X / PC / PBT / FPM	TR2432
	Evaluation unit for temperature sensors · G ½ male · for Pt100 and Pt1000 measuring elements · Housing materials: 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



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 _b [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

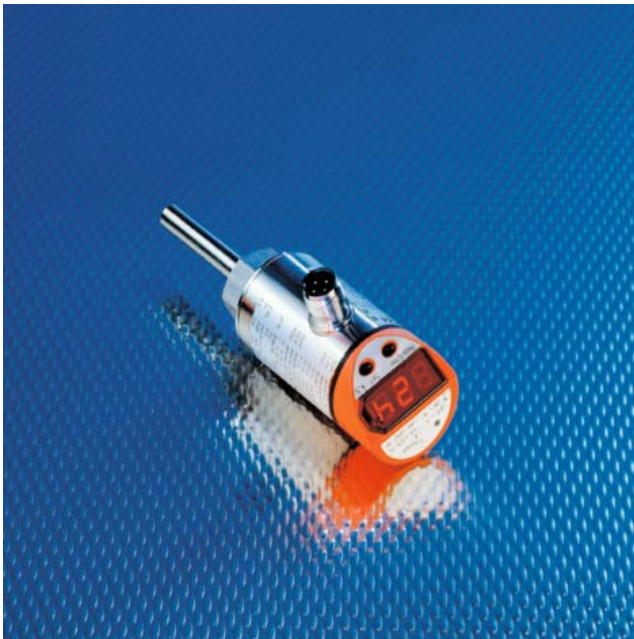
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC004
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC005

Jumper M12 plug / M12 socket, 4/5-pole, 4-wire

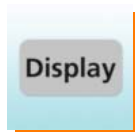
	Jumper · straight / straight · Free from silicone · Free from halogen · Gold-plated contacts · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC013
	Jumper · angled / angled · Free from silicone · Free from halogen · Gold-plated contacts · 2 m · Housing materials: housing: TPU orange / 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 _b [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

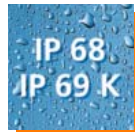
Type	Description	Order no.
	Mounting clamp · Ø 34 mm - Ø 30 mm · with reducing bush · for type M30 · Housing materials: PBT	E10077
	Mounting clamp · Ø 34 mm · Housing materials: PBT	E10017
	Mounting clamp · Ø 34 mm · Housing materials: PA	E10193
	Protective cover · for fluid sensors with M12 connector · 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 _b [V]	Dynamic response T05 / T09 [s]	Order no.
M12 connector · Output function 4...20 mA analogue · DC						
	-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

Temperature transmitter in compact housing, IO-Link

Type	Factory setting [°C / °F]	Process connection	Installation length [mm]	U _b [V]	Dynamic response T05 / T09 [s]	Order no.
M12 connector · Output function 4...20 mA analogue · DC						
	-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

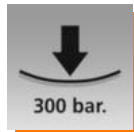
Type	Description	Order no.
	Adapter · G ¼ - G ½ · Housing materials: stainless steel 316Ti / 1.4571 / sealing: FPM	E30135
	Adapter · G ¼ - G ¼ · Housing materials: stainless steel 316L / 1.4404	E30107



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 _b [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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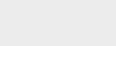
Accessories

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.
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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 _b / 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	SN0150*
	24 DC / +10 / -20	90	–	10...80	relay energised	relay energised	relay de-energised	SR0150*

M12 connector

	19...36 DC	70	–	10	no / nc programmable	–	–	SR5900
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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 ₀ gradient [K/min]	Pressure rating [bar]	Order no.
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M12 connector

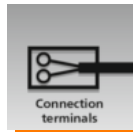
	3...300 / 200...3000	3...60 / 200...800	-25...80	1...10	300	300	SF5200
	3...300 / 200...3000	3...60 / 200...800	-25...80	1...10	300	30	SF5201
	3...300 / 200...3000	3...60 / 200...800	-25...80	1...10	300	100	SF5700
	3...300 / 200...3000	3...60 / 200...800	-25...80	1...10	300	100	SF5701
	3...300 / 200...3000	3...60 / 200...800	-25...80	1...10	300	100	SF5702
	3...300 / 200...3000	3...60 / 200...800	-25...80	1...10	300	100	SF5703
	3...300 / 200...3000	3...60 / 200...800	-25...80	1...10	300	100	SF5704



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.

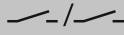
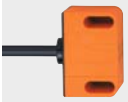
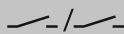

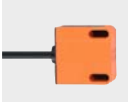
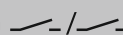


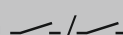
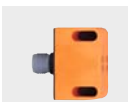
Dual sensor for valve actuators

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_b [V]	Protection	f AC / DC [Hz]	I_{load} AC / DC [mA]	Order no.
Cable 2 m · Output function  · DC PNP/NPN								
	40 x 26 x 26	4 nf	PBT	10...36	IP 67	1400	250	IN5290
Cable 2 m · Output function  · AC/DC								
	40 x 26 x 26	4 nf	PBT	20...140	IP 67	25	200	IN0100*
	40 x 26 x 40	4 nf	PBT	20...250	IP 67	25 / 50	350 / 100	IN0110*
M12 connector · Output function  · DC PNP								
	40 x 26 x 26	4 nf	PBT	10...36	IP 67	1300	250	IN5225
	40 x 26 x 47	4 nf	PBT	10...36	IP 67	1300	250	IN5327
M12 connector · Output function  · DC PNP/NPN								
	40 x 26 x 26	4 nf	PBT	10...36	IP 67	1300	250	IN5224

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 · \varnothing 53 mm · Housing materials: Target puck: PBT / screws: high-grade stainless steel	E17118
	Target puck · \varnothing 65 mm · Housing materials: Target puck: PA 6 / screws: V2A	E17327
	Target puck · \varnothing 102 mm · Housing materials: Target puck: PA 6 / screws: V2A	E17328



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

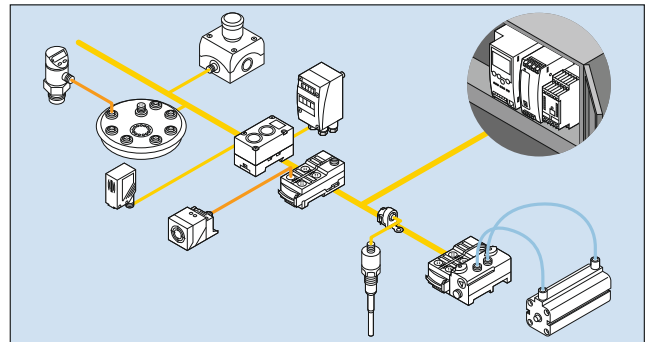


AS-i controller

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

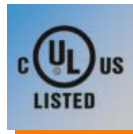
Type	Description	Order no.
	CodeSys license V3 · Single user licence	E71400
	AS-i data decoupling module · Combicon connection · Housing materials: Makrolon	AC1250



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

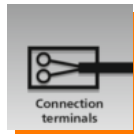
Type	Output current AS-i [A]	Description	Order no.
	2.8	Power supply · AS-i power supply 115/230 V AC · Integrated data decoupling · NEC Class II Power Source · steel sheet	AC1256
	4	Power supply · AS-i power supply 115/230 V AC · Integrated data decoupling · steel sheet	AC1254
	4	Power supply · DC convertor 24 V DC for AS-i system voltage · Integrated data decoupling · steel sheet	AC1257
	8	Power supply · Three-phase AS-i power supply 380...480 V AC · Integrated data decoupling · steel sheet	AC1253
	8	Power supply · AS-i power supply 115/230 V AC · Integrated data decoupling · steel sheet	AC1258



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

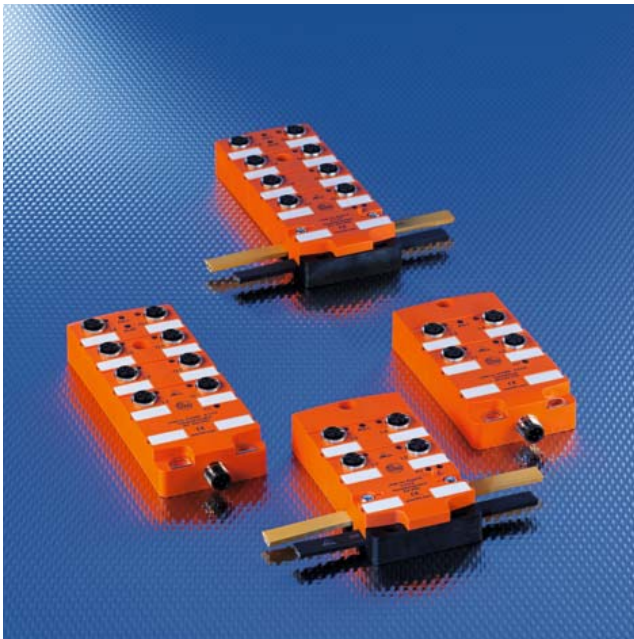
Type	Inputs / outputs	Description	Order no.
	4 inputs	Active AS-i module · String mounting possible · Addressing socket · Version 2.1 with extended addressing mode · Digital inputs · Combicon connection · PA	AC2250
	4 inputs / 3 outputs	Active AS-i module · String mounting possible · Addressing socket · Version 2.1 with extended addressing mode · Digital inputs and outputs · Combicon connection · PA	AC2264
	4 inputs / 4 outputs	Active AS-i module · String mounting possible · Addressing socket · Version 2.1 · Digital inputs and outputs · Combicon connection · PA	AC2251
	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	AC2216
	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	AC2256
	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	AC2257
	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	AC2267
	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	AC2225
	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	AC2217
	4 inputs / 4 outputs / relay	Active AS-i module · String mounting possible · Addressing socket · Version 2.1 · Combicon connection · PA 6.6	AC2258
	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	AC2259

Accessories

Type	Description	Order no.
	AS-i addressing unit · AS-i version 3.0 with extended addressing mode	AC1154
	Addressing cable · for AS-i slaves · 1.6 m	E70213
	Combicon connector · with screw terminals 4-pole · Housing materials: current carrying parts: copper alloy tin-plated	E70230



CompactLine: AS-i modules for field applications



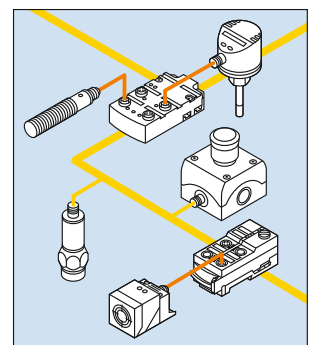
- Particularly shock and vibration resistant AS-i module
- A/B slave with four inputs and four outputs
- Digital input and output modules





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

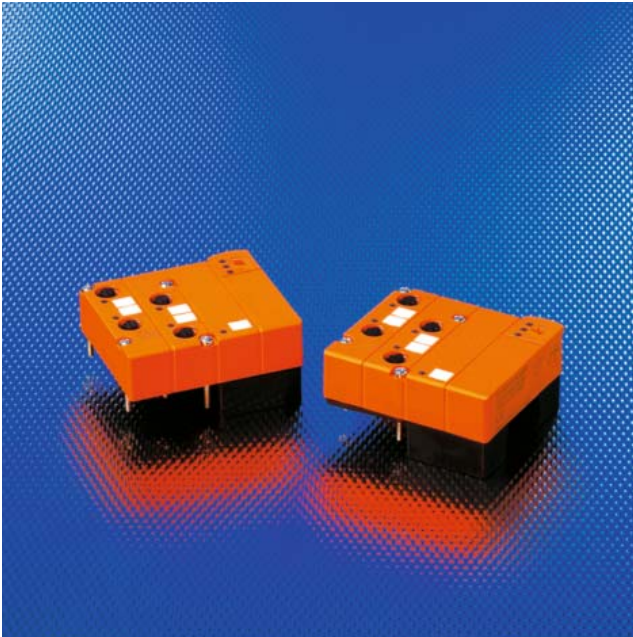
Type	Inputs / outputs	Description	Order no.
	4 inputs	Active CompactLine module · fully potted housing · IR addressing possible · Digital inputs · Sockets M12 x 1 · PA / socket: Brass nickel-plated / threaded inserts in the lower part: Brass nickel-plated / O-Ring : Viton / Piercing contacts: CuSn6 surface nickel and tin-plated	AC2410
	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	AC2457
	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	AC2411
	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	AC2417
	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	AC2459
	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	AC2412

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	E74000
	AS-i flat cable · Reverse polarity protection due to special shape · for use of insulation displacement technology · 100 m · EPDM, halogen-free · black	E74010
	AS-i addressing unit · AS-i version 3.0 with extended addressing mode	AC1154
	Addressing cable · for the addressing of active AS-i compact modules	E70423



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

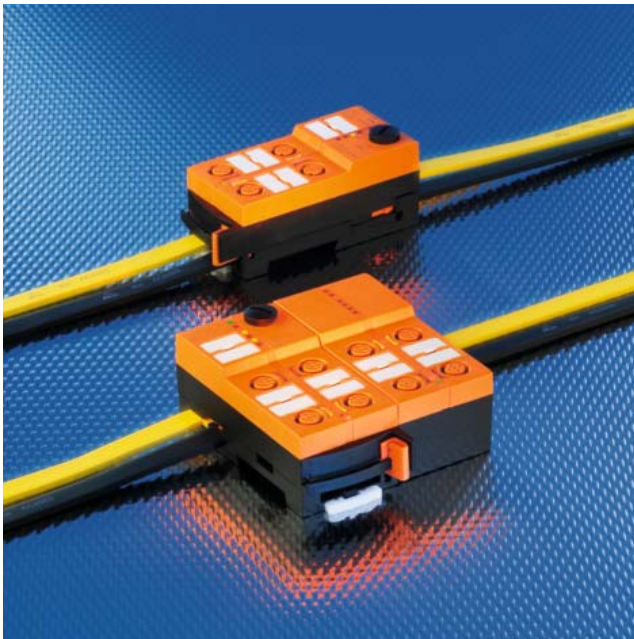
Type	Inputs / outputs	Description	Order no.
	4 inputs 4...20 mA	Active ClassicLine module · AS-i profile S-7.3 · 4 analogue inputs 4...20 mA · IR addressing possible · For the connection of 2-wire, 3-wire or 4-wire sensors · Sockets M12 x 1 · PBT	AC2516
	4 inputs 0...10 V	Active ClassicLine module · 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	AC2517
	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	AC2518
	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	AC2519
	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	AC2520

Accessories

Type	Description	Order no.
	Module lower part flat cable · Quick mounting technology for AS-i flat cable · Housing materials: PBT	AC5000
	FC-E coupling module · Quick mounting technology for AS-i flat cable · Housing materials: PBT	AC5003
	Module lower part flat cable · with addressing plug · Quick mounting technology for AS-i flat cable · Housing materials: PBT	AC5010
	FC-E coupling module · with addressing plug · Quick mounting technology for AS-i flat cable · Housing materials: PBT	AC5011
	Module lower part M20 · Screw terminal · Housing materials: PBT	AC5031
	AS-i addressing unit · AS-i version 3.0 with extended addressing mode	AC1154



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

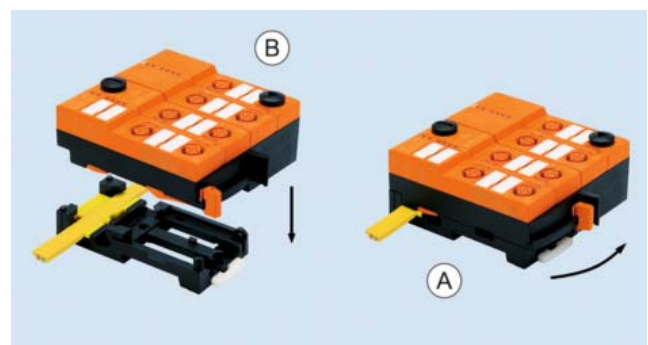


Easy connection due to toolless mounting.

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

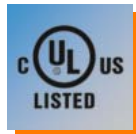
Type	Description	Order no.
	Software ASIMON V3 G2 · Configuration, set-up and diagnostics of the AS-i safety monitor · AC041S	E7050S
	USB interface cable for the connection of the safety monitor AC041S to the PC · cable length 1.8 m · 1.8 m	E7051S
	Safe contact expander without delay · 2 independent 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



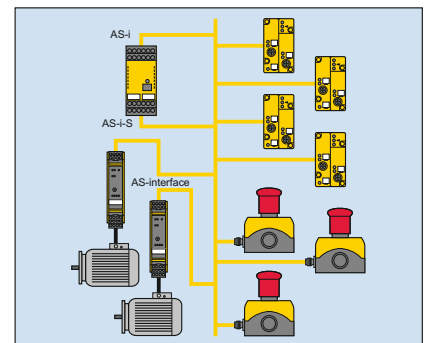
The Safety at Work system

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

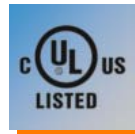
Type	Description	Order no.
	FC-E coupling module · Quick mounting technology for AS-i flat cable · Housing materials: PBT	AC5003
	AS-i addressing unit · AS-i version 3.0 with extended addressing mode	AC1154
	Addressing cable · for AS-i slaves · 1.6 m	E70213
	Illuminated E-STOP with integrated AS-i connection · 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





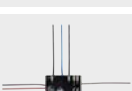
Example rope switch: It protects long conveyors and rotating machines in indoor and outdoor areas. Rope breakage, pulling at the tensioned rope or actuation of the e-stop trigger the switching function.

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.

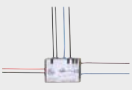


Installation in a rope switch and a belt drift switch

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	AC2750
	4 inputs / 3 outputs	Active AS-i module · AS-i slave with extended addressing mode · 11 x 0.2 m · housing: PC potted	AC2751
	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	AC2752
	4 inputs / 3 outputs	Active AS-i module · AS-i slave with extended addressing mode · housing: PC potted	AC2753
	2 inputs / 1 LED output	Active AS-i module · Only suited for mechanical contacts · Wire length 0.1 m	E70529

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	E70155



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

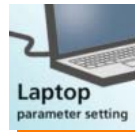
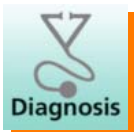
Type	Description	Order no.
Socket M12, 5/4-pole, 4-wire		
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC001
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts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

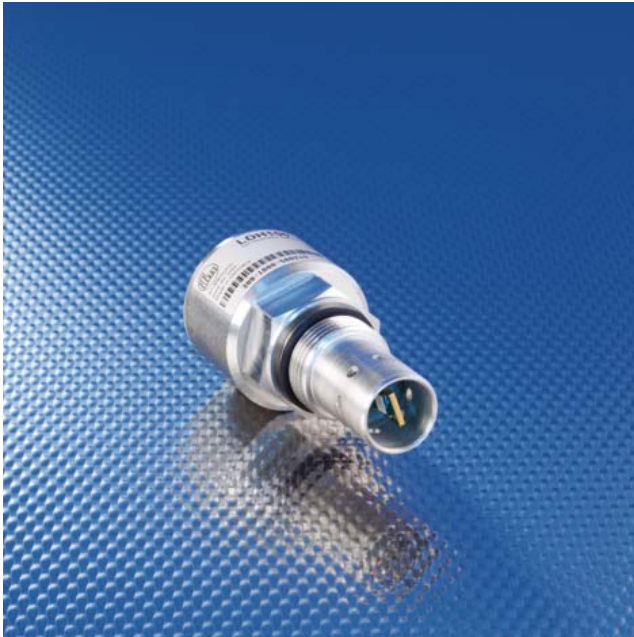
Type	Description	Order no.
	USB adapter cable · straight / straight · USB adapter cable and history tool for VNB001 · 5 m	E30136
	Adapter · UNF-M5 · Housing materials: stainless steel	E30137
	Power supply · 2 m · Housing materials: PPE	E30080

Connectors

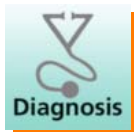
Type	Description	Order no.
Socket M12, 5-pole, 5-wire		
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC070
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC073
Socket M12, 5/4-pole, 4-wire		
	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.
Socket M12, 5/4-pole, 4-wire		
	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
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 15 m · Housing materials: housing: TPU orange / sealing: FKM	EVC082
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 20 m · Housing materials: housing: TPU orange / sealing: FKM	EVC083
	Socket · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 25 m · Housing materials: housing: TPU orange / sealing: FKM	EVC084
	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
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 15 m · Housing materials: housing: TPU orange / sealing: FKM	EVC086
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 20 m · Housing materials: housing: TPU orange / sealing: FKM	EVC087
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 25 m · Housing materials: housing: TPU orange / sealing: FKM	EVC088
	Socket · straight · Free from silicone · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: PVC orange / sealing: EPDM	EVT001
	Socket · straight · Free from silicone · Gold-plated contacts · M12 connector · 10 m · Housing materials: housing: PVC orange / sealing: EPDM	EVT002
	Socket · straight · Free from silicone · Gold-plated contacts · M12 connector · 25 m · Housing materials: housing: PVC orange / sealing: EPDM	EVT003
	Socket · angled · Free from silicone · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: PVC orange / sealing: EPDM	EVT004



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

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	E11231
	Socket · angled · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: PUR	E11232
	Socket · angled · M12 connector · 5 m · Housing materials: TPU	E12168
	Socket · angled · M12 connector · 10 m · Housing materials: TPU	E12169
	Socket · straight · Free from halogen · M12 connector · 2 m · Housing materials: PUR	E11950
	Socket · straight · Free from halogen · M12 connector · 5 m · Housing materials: PUR	E11807
	Socket · straight · M12 connector · 5 m · Housing materials: TPU	E12166
	Socket · straight · M12 connector · 10 m · Housing materials: TPU	E12167




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	EVC076
	Cable plug · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 5 m · Housing materials: housing: TPU orange	EVC077
	Cable plug · straight · Free from silicone · Free from halogen · Gold-plated contacts · M12 connector · 10 m · Housing materials: housing: TPU orange	EVC078

Jumper cables







Type	Description	Order no.
Jumper M12 plug / M12 socket, 4/5-pole, 4-wire		
	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
Jumper M12 plug / M12 socket, 3/5-pole, 3-wire		
	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.
Jumper M12 plug / M8 socket, 3-pole, 3-wire		
	Jumper · straight / straight · Free from silicone · Free from halogen · Gold-plated contacts · 2 m · Housing materials: housing: TPU orange / sealing: FKM	EVC218
	Jumper · straight / straight · Free from silicone · Free from halogen · Gold-plated contacts · 5 m · Housing materials: housing: TPU orange / sealing: FKM	EVC219

Connectors for robust applications

Type	Description	Order no.
Wirable socket M12, 4-pole		
	Wirable socket · straight · Free from silicone · Free from halogen · wirable · Gold-plated contacts · M12 connector · Housing materials: PA	E11508
	Wirable socket · straight · Free from silicone · Free from halogen · wirable · Gold-plated contacts · M12 connector · Housing materials: PA	E11861
	Wirable socket · angled · Free from silicone · Free from halogen · wirable · Gold-plated contacts · M12 connector · Housing materials: PA	E11509
	Wirable socket · angled · wirable · Free from silicone · Gold-plated contacts · M12 connector · Housing materials: PBT	E11252
	Wirable socket · angled · Free from silicone · Free from halogen · wirable · Gold-plated contacts · M12 connector · Housing materials: PA	E11862
Wirable socket M12, 4-pole, LED, PNP		
	Wirable socket · straight · wirable · M12 connector · Housing materials: PA	E10136
	Wirable socket · angled · Free from silicone · Free from halogen · wirable · Gold-plated contacts · M12 connector · Housing materials: PA	E11510
Wirable socket M12, 5-pole		
	Wirable socket · straight · Free from silicone · Free from halogen · wirable · Gold-plated contacts · M12 connector · Housing materials: PA	E11511
	Wirable socket · angled · Free from silicone · Free from halogen · wirable · Gold-plated contacts · M12 connector · Housing materials: PA	E11512
Wirable plug M12, 4-pole		
	Wirable plug · straight · Free from silicone · Free from halogen · wirable · Gold-plated contacts · M12 connector · Housing materials: PA	E11504

Type	Description	Order no.
Wirable plug M12, 4-pole		
	Wirable plug · straight · wirable · M12 connector · Housing materials: PA 6.6	E11144
	Wirable plug · angled · Free from silicone · Free from halogen · wirable · Gold-plated contacts · M12 connector · Housing materials: PA	E11505
Wirable plug M12, 5-pole		
	Wirable plug · straight · Free from silicone · Free from halogen · wirable · Gold-plated contacts · M12 connector · Housing materials: PA	E11506
	Wirable plug · angled · Free from silicone · Free from halogen · wirable · Gold-plated contacts · M12 connector · Housing materials: PA	E11507
Adapter plug M12, 4-pole, 4-wire		
	Adapter plug · straight · M20 - M12 · M12 connector · 0.12 m · Housing materials: Brass nickel-plated	E11295



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









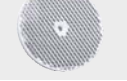


Accessories for photoelectric sensors

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



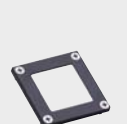
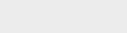
Type	Description	Order no.
	Mounting set · O4 · Clamp mounting · With protective cover · for type O4 · Housing materials: stainless steel 316L / 1.4404 / clamp: diecast zinc	E21119
	Angle bracket · O1D, O4 · for type O1D, O4 · Housing materials: stainless steel 316L / 1.4404	E21120
	Angle bracket · for 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









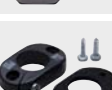










For industrial applications

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



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	2.5	24...28	115 / 230 AC	–	88	DN1031
	3.3	24...28 DC	115 / 230 AC	–	88	DN4011
	5	24...28 DC	115 / 230 AC	–	89.4	DN4012
	10	24...28 DC	115 / 230 AC	–	91	DN4013
	20	24...28 DC	115 / 230 AC	–	92.7	DN4014
	5	24...28 DC	2 x 400 AC	–	90.4	DN4032
	10	24...28 DC	3 x 400 AC	–	92.8	DN4033
	20	24...28 DC	3 x 400 AC	–	95	DN4034

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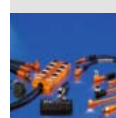
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