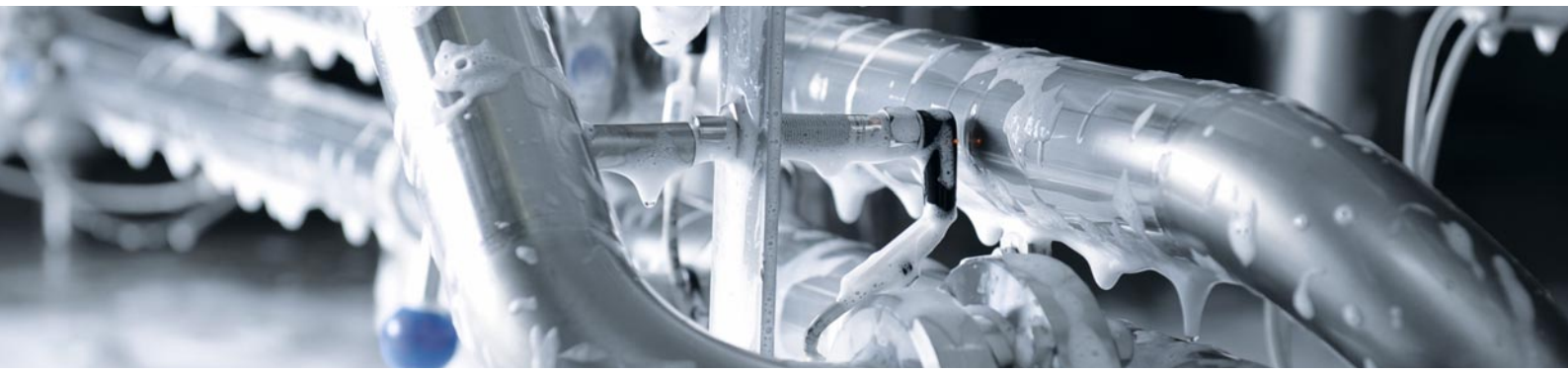
FOOD INDUSTRY

AUTOMATION TECHNOLOGY



ifm.com/gb/food

Clean solutions for your applications

FOOD INDUSTRY · Automation technology

With over 50 years of experience in sensors and control systems we know how to achieve maximum process reliability and plant uptime: our portfolio covers innovative, high-quality position sensors, level, temperature and pressure sensors as well as diagnostic systems with high temperature and cleaning resistance, which comply with the required standards and directives. In addition, connectors, also with the protection rating IP 68 / 69K.

In a total of 185 countries worldwide, ifm's customers are supported by independent sales companies or trade partners – according to the motto "ifm – close to you!"

5 YEARS Warranty on **ifm products**

This industry-specific catalogue is available for download on our website at:
ifm.com/gb/food

ifm – the company matching your requirements

close to you:
Our worldwide sales and service team is here to help you at any time.

Engineering "Made in Germany":
German engineering available worldwide.

Flexible:
Not only our service but our broad product portfolio perfectly suit the most varying requirements.

Innovative:
More than 1,000 patents and in 2020 about 90 patent applications.

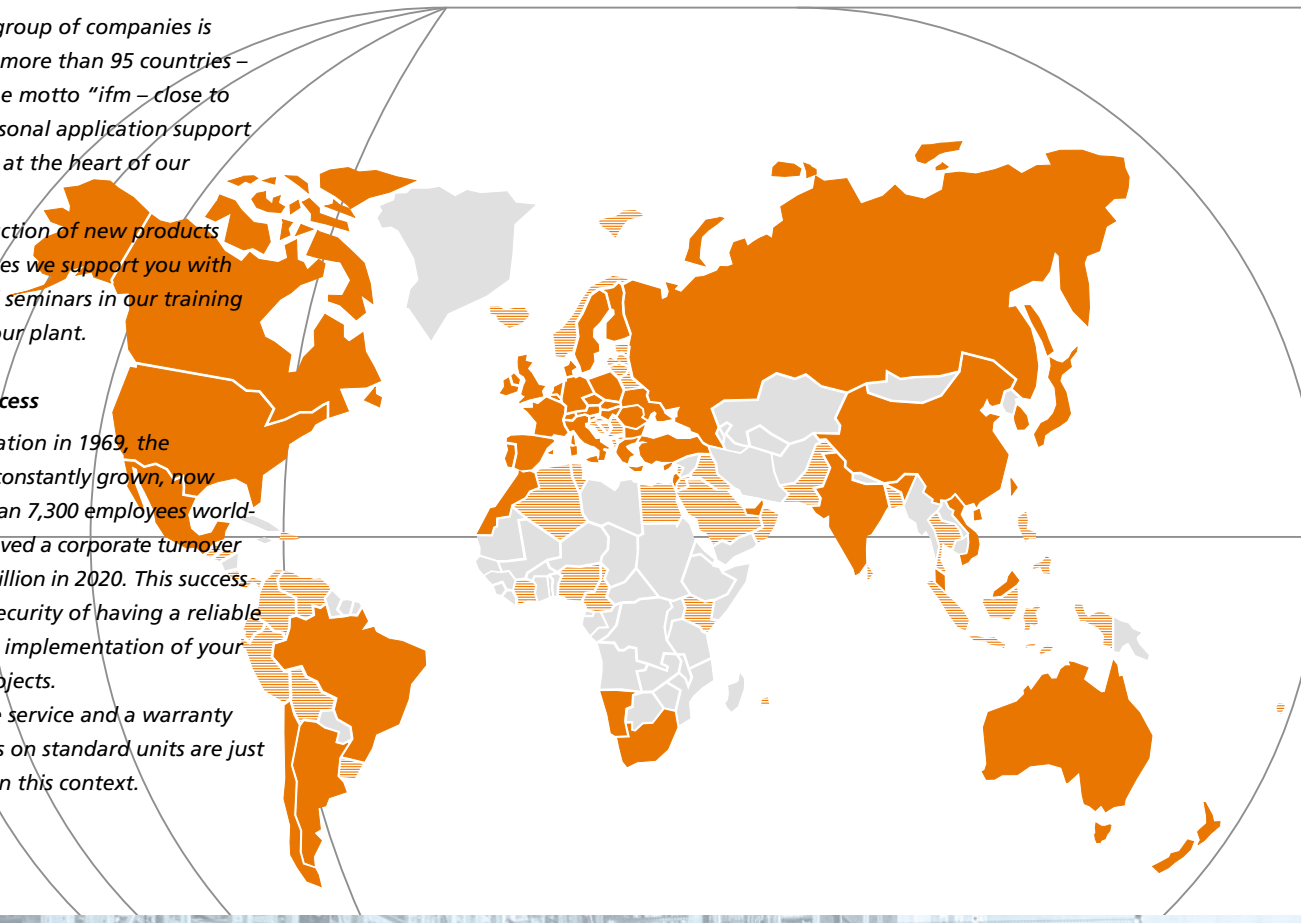
Reliable:
5-year warranty on ifm products.

System instead of just components
ifm provides you with a broad portfolio for flexible automation of your production.
Our range of more than 7,800 articles guarantees flexibility and compatibility.

Quality as part of our philosophy
Quality is an inherent part of our philosophy.
We use our customers' feedback to continuously improve the quality of our products.
Our sensors are tested with values far beyond the indicated limits using special procedures.

We are there for you

Close contact with our customers is part of our success. We have consistently developed our sales network right from the start.
Today the ifm group of companies is represented in more than 95 countries – according to the motto "ifm – close to you!" Your personal application support and service are 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, the ifm group has constantly grown, now having more than 7,300 employees worldwide, and achieved a corporate turnover of EUR 964,7 million in 2020. This success gives you the security of having a reliable partner for the implementation of your automation projects.
Comprehensive service and a warranty of up to 5 years on standard units are just two examples in this context.

Product availability

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.

See the current ifm company film to get to know us better:
ifm.com/gb/close-to-you

The ifm sales platform

Overview:

The ifm product range is clearly structured and the individual product platforms ensure quick orientation.

Selectors:

Choose between the most important technical data and you will get the product selection suitable for your requirements.

Compare:

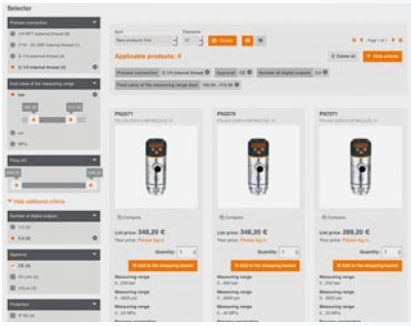
You can compare the technical data of up to 3 products. Differences are marked in colour.

Search and find:

Enter the search term in the full text search and get suggestions for products, topics and product groups.

Order:

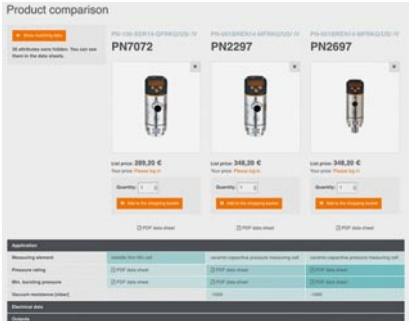
We provide a quick-order and csv import function for the shopping basket on the product pages.



More clarity

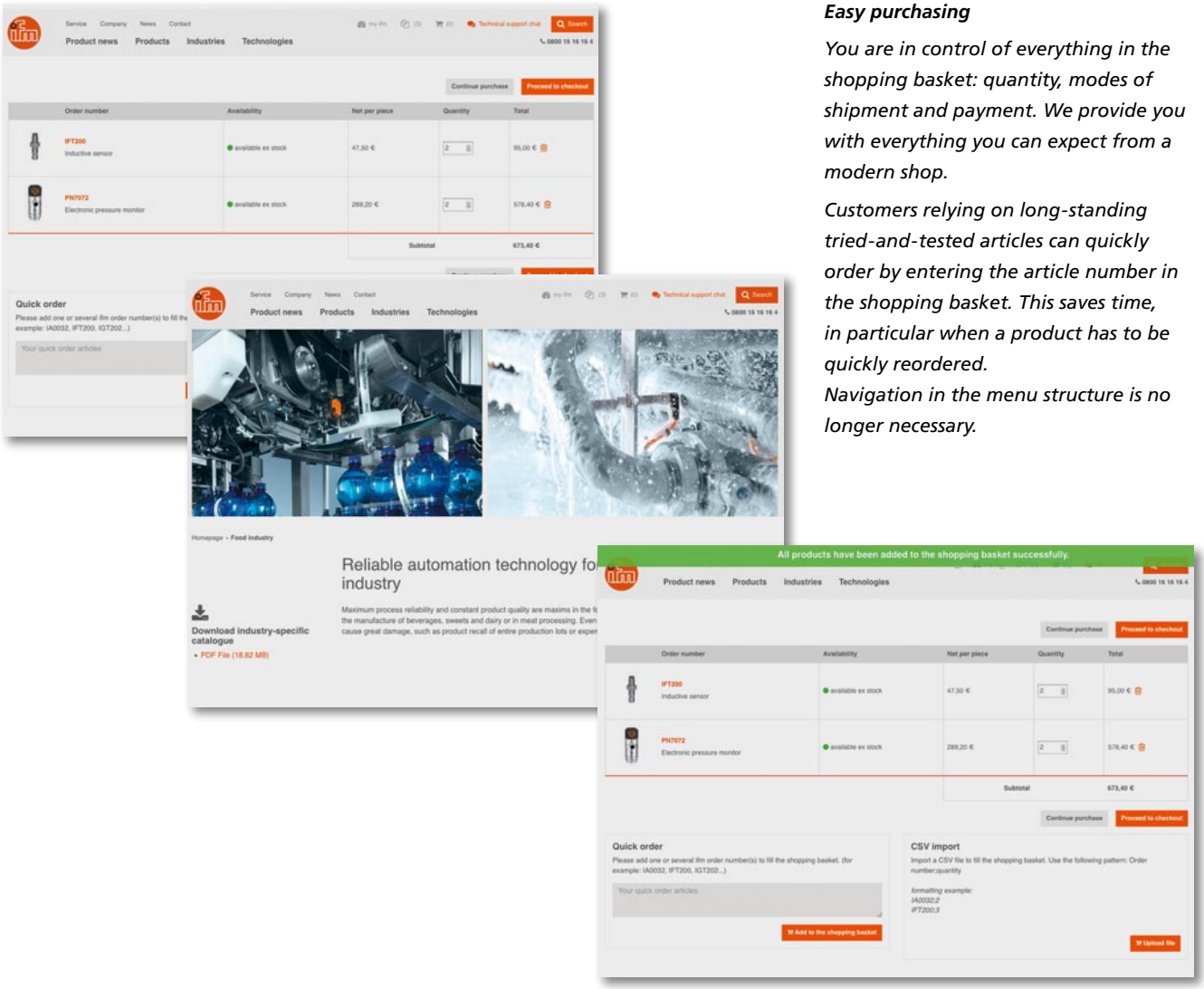
For each product group you can make a first selection via the platforms.

A clear visual language and explanatory texts give you a first impression of the products.



Compare products with each other

The selectors are the heart of the product search.
The displayed selection criteria are adapted to each product range and the technical features of the products.
The results can be displayed as tiles or lists.



Easy purchasing

You are in control of everything in the shopping basket: quantity, modes of shipment and payment. We provide you with everything you can expect from a modern shop.

Customers relying on long-standing tried-and-tested articles can quickly order by entering the article number in the shopping basket. This saves time, in particular when a product has to be quickly reordered.
Navigation in the menu structure is no longer necessary.

For all types of display

Whether PC, laptop, tablet or smartphone – the design of the sales platform adapts to any screen size thus increasing user-friendliness. This also makes it possible to buy products using mobile equipment such as a smartphone.

Try us.
Click here to directly get to our homepage:
ifm.com

Your start into the industrial revolution. IO-Link solutions from ifm.

Simple:
The sensor parameters can be set from the controller or the master. No crawling or climbing required to set the sensor.

Transparent:
Many sensors supply measured values to the switching signals via IO-Link. The goal is a constant product quality with less energy and raw material consumption.

Reliable:
Transmission that is prone to errors and conversion of analogue signals is replaced with digital measured value transmission.

Low-cost:
Process information, switching status, diagnostic functions are transmitted without loss via a single port to the controller. Expensive analogue signal processing is no longer needed.

Fascination **IO-Link**

In the past binary switches usually provided simple switching signals or analogue values. Today the data from intelligent sensors is the basis for the next industrial revolution.
Sensors that extract all the information from your machines and equipment using the key technology IO-Link.

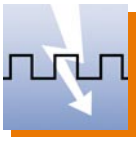
Leading manufacturers from the fields of sensors, actuators and control technology have developed IO-Link. Together they developed a standardised and field-bus independent interface for automation providing the user with a point-to-point connection without complex addressing.

Benefit from the appeal of IO-Link, talk to us and stay as productive and competitive for your manufacturing processes of tomorrow.

Head start with **IO**-Link

Use the advantages! Today IO-Link sensors from ifm give the user completely new options.

Additional sensor data, for example, is generated to achieve maximum efficiency and cost saving.
This allows process transparency from the machine to ERP to optimise your existing automation. Furthermore IO-Link has a lot more to offer:



No external influence of the signal

Data transfer is based on a 24 V signal. Screened cables and associated grounding are no longer necessary.

Tamper free

No wrong settings by operators.

No measured value losses

The entire measured value transmission is digital. Transmission that is prone to errors and conversion of analogue signals is replaced.

Identification

Only like for like replacement. No wrong sensors accepted.

Easy sensor replacement

All sensor parameters are stored in the master and transferred to the replaced unit.

Wire-break detection / diagnostics

Wire-break or short-circuit is immediately detected.

Point-to-point communication: more details in our IO-Link video:
io-link.ifm

Who says we can only do hardware?

moneo. The all-you-want software for industrial evolution.

One thing is clear: proper industrial digitisation begins with the sensor and extends into the IT structure. If you are already using IO-Link in your plant, you have taken the first important step towards more efficiency and less unplanned downtime. And you are ready for the second step. You are ready to get even more out of your plant with the help of simple and ingenious software.

Turning values into added value

With moneo, you can easily access the entire IO-Link network. And, thanks to the logical tree structure, you will have quick and efficient access to each individual sensor at any time. As soon as your IO-Link network is integrated into moneo, values will no longer be just separate pieces of information.
moneo makes values useful and transforms them into added value. You can, for example, combine the level values of all tanks into one overall stock figure. This overall stock figure can then be clearly displayed along with other relevant information in the cockpit.
This gives you a continuous overview of all the important values in your plant or process. If things become critical in your absence, for example because the level is running low or the vibration on a fan rotor is dangerously increasing, moneo wil immediately alert and inform you by e-mail. This allows you to schedule maintenance in good time or initiate manual refill processes to keep things moving. In short: moneo will optimise your processes and ensure that they will be trouble-free.

A new kind of flexibility thanks to moneo

As you have seen, moneo leaves nothing to be desired. It is a great piece of software to begin with, but its actual extent will always depend on your specific requirements. You can, for example, simply begin with parameter setting and the cockpit function for one part of your plant and explore the possibilities of real-time maintenance later, when you are ready for the next step.
To put it in a nutshell: moneo offers the flexibility to simply grow with your requirements. The days of unmanageable, oversized and confusing software are over. It is time for simplicity, user-friendliness and ingenuity. It is time for moneo!

|appliance

|starterkit

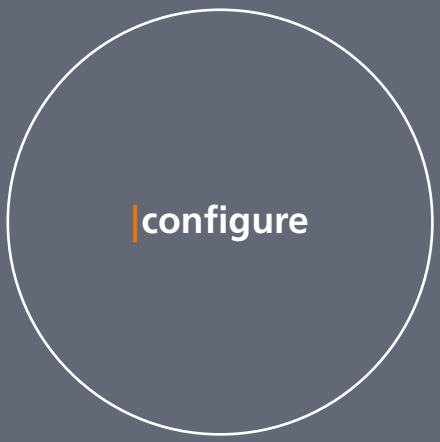
moneo|appliance is the hardware component that is precisely tailored to the requirements of the software and acts as a powerful, reliable node in the network infrastructure. It provides the software modules with the necessary computing power, stores and backs up data and serves as an interface for software updates and system maintenance. moneo|appliance can be used without high-level IT skills and can be integrated into the manufacturing environment, in the production network and in the computing centre.

moneo|starterkit brings condition monitoring for motors on fans, pumps and many other machines to a new level. The complete package based on well-coordinated hardware and software enables you to keep an eye on the condition of your system and to plan maintenance requirements in advance. And it's more user-friendly and convenient than ever.
In short: The moneo|starterkit is the perfect start into digital evolution.

www.moneo.ifm

moneo|OS

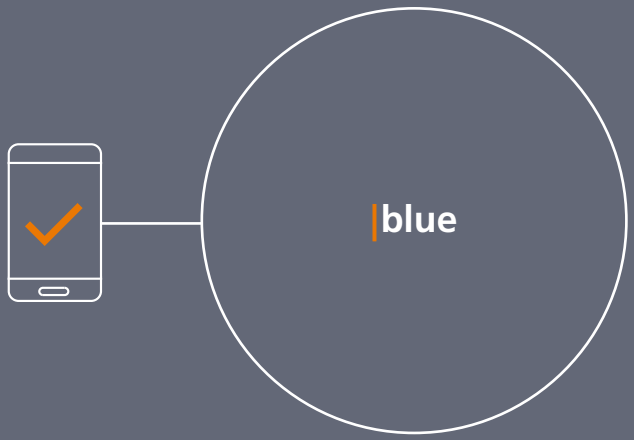
moneo|OS is the convenient software basis and management tool for all software products of the moneo IIoT toolkit. In moneo|OS, you can easily manage your moneo licences. In addition, the intelligent, easy-to-use data flow model enables you to combine individual pieces of sensor data into meaningful values. This makes it possible to quickly analyse and optimise your processes.



moneo|configure is the convenient management tool for your IO-Link network. Set the parameters of the IO-Link devices in your machines with just a few clicks. The visualisation in the cockpit facilitates both set-up and error diagnostics. The user-friendly parameter data set management contributes to speeding up new sensor integration.

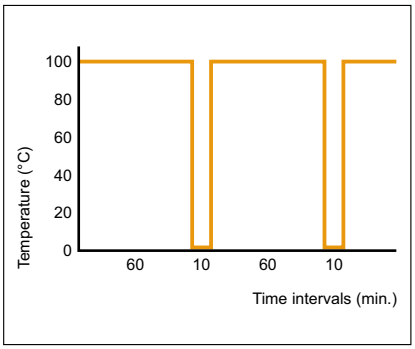
moneo|configure SA The management tool is also available as a stand-alone version for those who wish to configure parameters easily via IO-Link.

moneo|RTM The advantages of powerful and transparent condition monitoring with moneo|RTM are obvious: less downtime, more efficient maintenance planning and detailed data analysis. This is how efficient maintenance works with the objective to implement cost-optimised production processes.



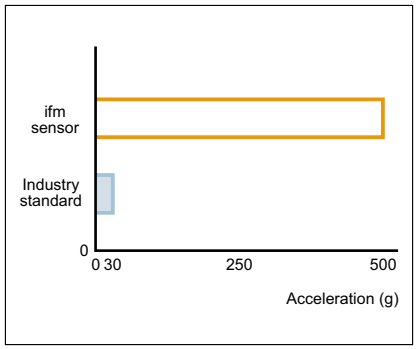
moneo|blue Quickly check sensor values while walking through the plant and simply adjust parameters on site. The free moneo|blue app makes this possible in combination with the Bluetooth Multi-Plug. Simply connect the plug to an IO-Link master and you will have access to the sensors connected to it. The app can, of course, also manage multiple plugs. It couldn't be any easier.

www.moneo.ifm



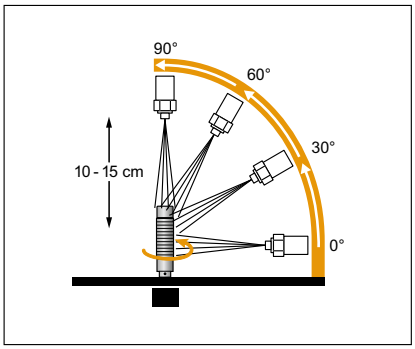
Thermal shock test

In pressure cleaning environments, proximity sensors are exposed to extreme temperature conditions. This is why ifm performs thermal shock tests on the sensors by cycling the temperature between 0 and 100 °C in short time intervals. After the test, the sensors' characteristics are tested to ensure high reliability.



Shock test

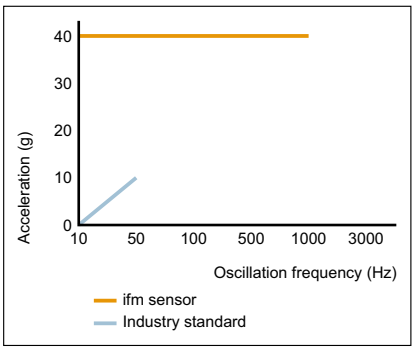
Sensors can be exposed to high levels of shock in industrial environments. This is why ifm sensors are tested at a shock level of 500 g. This test standard sets a new benchmark for inductive sensor product development.



IP 69K high-pressure cleaning test

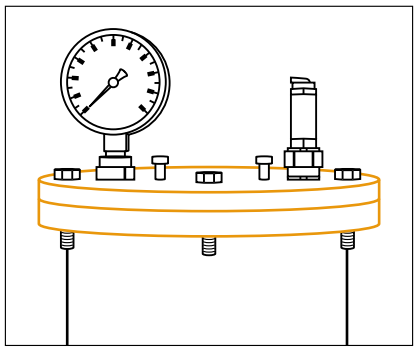
ifm inductive proximity sensors are tested in accordance with the IP 69K standard. The goal is to duplicate pressure cleaning conditions on a plant floor.

In the test fixture, the sensors are exposed to a 80 - 100 bar spray of water at a temperature of 80 °C. The duration of each cleaning cycle is 30 seconds. The test is performed at specified angles using a spray nozzle located at a distance of 10 - 15 cm from the sensor. ifm inductive sensors can withstand test conditions and are still operable providing 100 % of their sensing range.



Vibration test

A vibration test is performed on the sensors at a level of 40 g with the oscillation frequency spanned between 0 and 2,000 Hz. This test checks the integrity of the electronic circuit and the surface-mounted components. The vibration test is designed to far exceed manufacturing plant conditions on industrial automation machinery.



Steam boiler test

To simulate the aging process, the wash-down sensors are placed in a steam boiler.

For inductive sensors: the test simulates whether penetrating water molecules can disturb the sensor behaviour. This is recognisable by a change in the sensing range.

For photoelectric sensors: the test simulates whether water can penetrate into the sensor optics. Abrupt cooling in ice water will cause any moisture to fog up the lens on the inside.

Think globally, act locally

Our environmental management system defined as "think globally, act locally" is intended to help secure the future of our company and designed to improve environmental protection continuously. Therefore we certified our long-standing internal environmental management system at the German locations of ifm electronic gmbh, ifm efector gmbh and ifm flexpro gmbh to EMAS and ISO 14001 in spring 2020.

URKUNDE

EMAS
GEPRÜFTES UMWELTMANAGEMENT

ifm electronic gmbh & ifm efector gmbh
ifm-Straße 1
88069 Tettnang

ifm electronic gmbh
Friedrichstraße 1
45128 Essen
Barnlerstraße 55
45141 Essen

ifm flexpro gmbh
Am Welher 7
88142 Wasserburg

Register-Nr.: DE-165-00091

Erstregistrierung am 23. April 2020

Diese Urkunde ist gültig bis 23. April 2023

Diese Organisation wendet zur kontinuierlichen Verbesserung der Umweltleistung ein Umweltmanagementsystem nach der Verordnung (EG) Nr. 1221/2009 und EN ISO 14001:2015 (Abschnitt 4 bis 10) an, veröffentlicht regelmäßig eine Umwelterklärung, lässt das Umweltmanagementsystem und die Umwelterklärung von einem zugelassenen, unabhängigen Umweltgutachter begutachten, ist eingetragen im EMAS-Register (www.emas-register.de) und deshalb berechtigt das EMAS-Logo zu verwenden.

Weingarten, den 23. April 2020

Ralph Winterhalter
Vizepräsident

Prof. Dr.-Ing. Peter Jany
Hauptgeschäftsführer

Certificate

Within a certification audit the organization

ifm electronic GmbH

at the location

ifm-Straße 1, 88069 Tettnang

and further locations according to the appendix

has proved that an environmental management system was established and is successfully applied in accordance with the requirements of the international standard

ISO 14001

Issue of September 2015

for the following activity

Development, production and distribution of sensor technology, system communication, control technology for automation / circuitry and software

This certificate is valid from 24.4.2020 until 23.4.2023.

Berlin, 3 April 2020

Prof. Dr.-Ing. Jan Uwe Lieback
Environmental verifier DE-V-0026

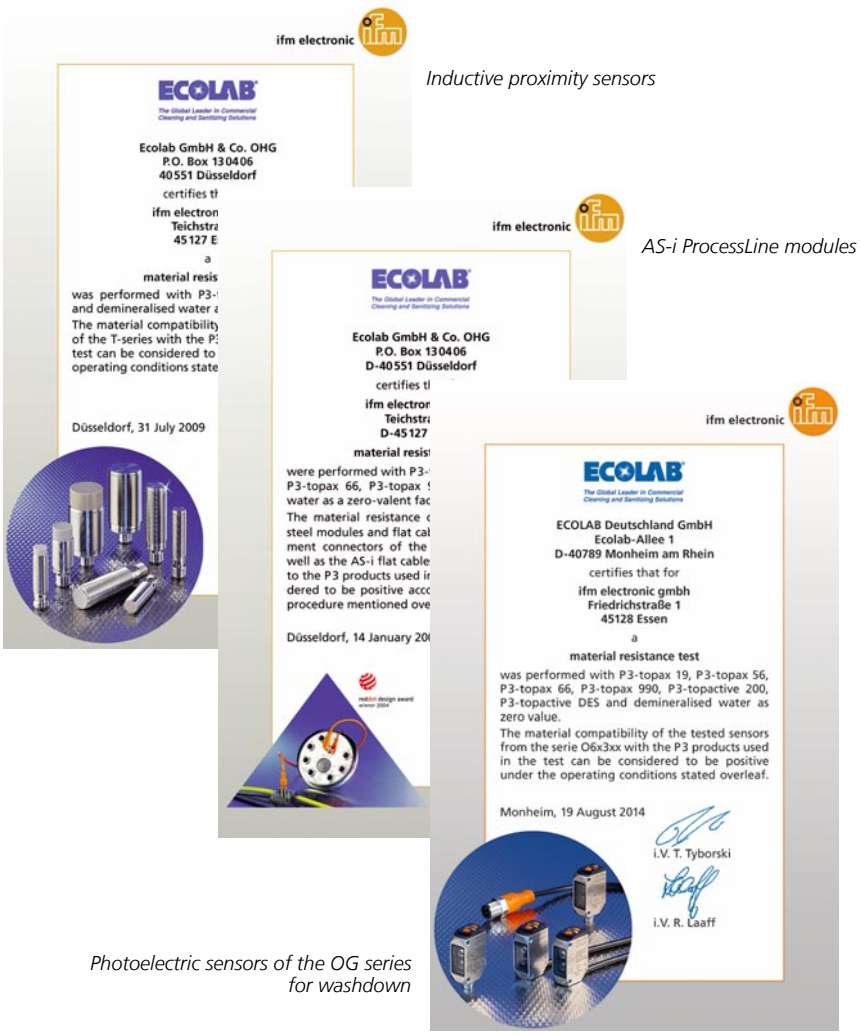
Ralf Steinborn
Environmental verifier DE-V-0314

No. U-20-23881-EN

GUTcert

afnor

Many ifm sensors are Ecolab certified



ifm electronic

ECOLAB

Ecolab GmbH & Co. OHG
P.O. Box 130406
40551 Düsseldorf

Düsseldorf, 31 July 2009

ECOLAB

Ecolab GmbH & Co. OHG
P.O. Box 130406
D-40551 Düsseldorf

ECOLAB

ECOLAB Deutschland GmbH
Ecolab-Allee 1
D-40789 Monheim am Rhein

certifies that for

ifm electronic gmbh
Friedrichstraße 1
45128 Essen

a

material resistance test

was performed with P3-topax 19, P3-topax 56, P3-topax 66, P3-topax 990, P3-topactive 200, P3-topactive DES and demineralised water as zero value.

The material compatibility of the tested sensors from the serie O6x3xx with the P3 products used in the test can be considered to be positive under the operating conditions stated overleaf.

Monheim, 19 August 2014

i.V. T. Tyborski

i.V. R. Laaff

Inductive proximity sensors

AS-i ProcessLine modules

Photoelectric sensors of the OG series for washdown

Ecolab certified

Ecolab® is a global leader in the development of premium cleaning, sanitizing and hygiene products for the food processing, beverage, dairy and pharmaceutical industries. The integrity and quality of ifm sensors, connectors and cables for use in washdown environments was tested in accordance with the demanding Ecolab standards.

Independent tests were performed by Ecolab on the inductive sensors, photoelectric sensors of the OG series for washdown and AS-i ProcessLine modules of ifm. Ecolab certified that ifm products resisted the cleaning chemicals used in the tests.

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

EC No.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.

Order no.	Approvals	Catalogue page
AC009S	CE, ASI, SIL 3, PL e	149
AC010S	CE, cULus, ASI, SIL 3, PL e	150
AC012S	CE, cULus, ASI, SIL 3, PL e	150
AC015S	CE, ASI, SIL 3	149
AC030S	CE, cULus, SIL 3, PL e	149
AC041S	CE, cULus	149
AC1154	CE	147
AC1253	CE, cULus, ASI	146
AC1256	CE, cULus, ASI	146
AC1401	CE, cULus, Profinet, EAC, ASI	145
AC1422	CE, cULus, EAC, ASI, EtherNet/IP	145
AC2316	CE, cULus, EAC, ASI	53
AC2386	CE, ASI	147
AC2410	CE, cULus, ASI	146
AC2417	CE, cULus, ASI	146
AC2900	CE, cULus, EAC	145
AC3200	CE, cULus, ASI, EAC	145
AC3216	CE, cULus, ASI	145
AC402S	CE, cULus, EAC, Profinet, ASI, SIL 3, PL e	149
AC422S	CE, cULus, ASI, EtherNet/IP, SIL 3, PL e	149
AC432S	CE, cULus, ASI, SIL 3, PL e	149
AC5005	CE, cULus	147
AC505S	CE, cULus, ASI, EAC, PL e	149
AC507S	CE, cULus, ASI, EAC, SIL 3, PL e	149
AC514A	CE, ATEX II 3D	145
AC5214	CE, cULus, EAC	146
AC5222	CE, cULus, EAC	146
AC522A	CE, ATEX II 3D	145
AC5243	CE, cULus, EAC	146
AC5246	CE, cULus, EAC	146
AC5270	CE, cULus, EAC	146
AC528A	CE, ATEX II 3D	145
AC570A	CE, ATEX II 3D	145
AC6000	CE	87
AC6001	CE	29
AC6002	CE	87
AC904S	CE, cULus, ASI	150
AIK001	CE	125
AIK050	CE, FCC	125
AIS910		125
AL1060	CE, EAC	59, 61, 69
AL1101	CE, cULus, Profinet, EAC	29
AL1102	CE, cULus, Profinet, EAC	87
AL1122	CE, cULus, EtherNet/IP, EAC	87
AL1300	CE, Profinet, cULus, EAC	87
AL1323	CE, cULus, EtherNet/IP, EAC	29
AL1332	CE, cULus, EAC	87
AL1402	Profinet, CE, UL, EAC	87
AL1422	CE, UL, EAC	87
AL1900	CE, Profinet, cULus, EAC	87

Order no.	Approvals	Catalogue page
AL1930	CE, cULus, EAC	87
AL2205	CE	29
AL2230	CE, cULus	29
AL2240	CE, cULus	29
AL2325	CE	87
AL2330	CE, cULus, EAC	88
AL2605	CE	88
ANT410	CE, cULus	121
ANT431	CE, cULus	121
ANT512	CE, cULus	121
DA102S	CE, cULus	154
DD110S	CE, cULus	154
DF2101	CE, cULus	30, 89
DF2210	CE, cULus	30, 89
DF2212	CE, cULus	30, 89
DF2214	CE, cULus	30
DF3100	CE	30
DN4011	CE, cULus	147
DN4034	CE, cULus	147
DP1213	cULus, CE, EAC	88
DP1223	CE, cULus	88
DP2200	CE, cULus, EAC	88
DTE100	CE, cULus, PI certified	121
DTI513	CE, cULus	121
DU110S	CE	154
DV1000	CE	89
DV1001	CE	89
DV1002	CE	89
DV1003	CE	89
DV1004	CE	89
DV1510	CE	89
DV2520	CE	90
E10730		93
E10734		35, 95
E10735		35, 95
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TT0291	cULus, EC1935/2004, EHEDG, FDA, FCM, EAC	65
TT2291	cULus, EC1935/2004, EHEDG, FDA, FCM, EAC	65
UGT509	CE, cULus, EAC	103
UGT510	CE, cULus, EAC	103
UGT512	CE, cULus, EAC	103
UGT513	CE, cULus, EAC	103
UGT580	CE, cULus, EAC	103
UGT584	CE, cULus, EAC	103
VES004		136
VKV021	CE, cULus, EAC	136
VSA001	CE, cULus, EAC	135
VSA005	CE, cULus, EAC	136
VSA006	CE, cULus, EAC	136
VSE003	CE, EAC, cULus	135
VSE101	CE, EAC, cULus	135
VSE150	CE, cULus, EAC, Profinet	135

Order no.	Approvals	Catalogue page
VSE151	CE, cULus, EAC, EtherNet/IP	135
VSE153	CE, cULus, EAC	135
VSE953	CE	135
VSM101	CE	135
VSP001	CE, EAC	135
VSP01A	CE, IECEx, ATEX II 1D, ATEX II 1G	136
VTV121	CE, cULus, EAC	136
VTV12A	CE, ATEX II 3D, ATEX II 3G	136
VVB001	CE, EAC, cULus	125, 136
VVB020	CE, EAC, cULus	136
ZB0051	CE, cULus	150
ZB0052	CE, cULus	150
ZB0057		150
ZB0061		150
ZB0062		150
ZC0020		133
ZC0075		133
ZZ1060		29, 55

(CCC) = CCC approval is not required

Process

Clean solutions for your food applications

We understand the strict hygiene requirements of the food processing industry. And we know how to develop automation components that remain unaffected by steam cleaners, cleaning agents, heat and cold. Combined with our connection solutions specially designed for the food industry, we offer you the all-round carefree package to protection class IP 69K for complete peace of mind.

This industry-specific catalogue is available for download on our website at:
ifm.com/gb/food

System architecture Process

Cloud
Datenbank
Analyse
Cockpit

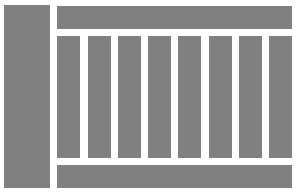
Edge gateways

IO-Link

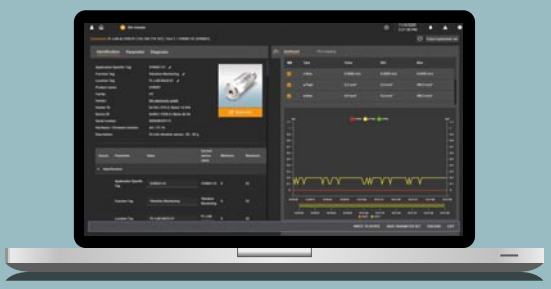
PLC
Control cabinet modules
Power supply
Field modules

PROFINET
EtherNet/IP
EtherCAT
PROFIBUS
Modbus

PLC

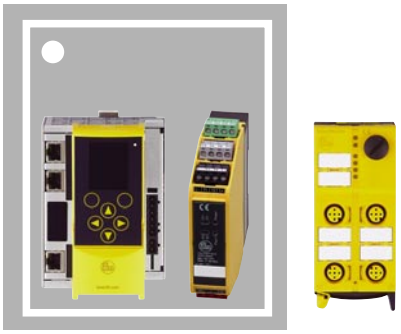


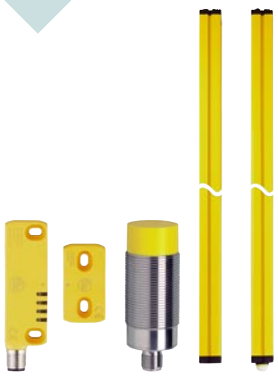
Sensors
Actuators
Light indicators



JSON
HTTP(S)
MQTT
OPC-UA
IO-Link

Safety





IO-Link masters and modules for hygienic areas

IO-Link components

4 or 8 IO-Link ports with full V1.1 functionality

IP 69K field module for the food industry

Master and devices configurable via the LR DEVICE software

Industry 4.0 ready via LR AGENT EMBEDDED

Robust field bus modules for demanding applications

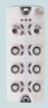
The decentralised IO-Link masters are used as gateways between intelligent IO-Link sensors and the fieldbus. Thanks to their special housing materials and high ingress resistance (IP 69K), they can be used directly in wet areas in the food industry. The materials and production methods are identical to the ifm jumper cables of the tried-and-tested EVF product series. The ecolink technology guarantees reliable, permanently ingress-resistant M12 connections of the connection cables.

High-quality materials especially suited to the application and extensive checks during and after production guarantee maximum quality standards.

IO-Link masters

Type	Description	Inputs / outputs	Interface	Protocol	Protection rating	Order no.
	IO-Link master StandardLine	8 x Digital input / 4 x Digital output	Ethernet / IO-Link	PROFINET	IP 65 / IP 66 / IP 67 / IP 69K	**AL1101**
	IO-Link master DataLine	16 x Digital input / 8 x Digital output	Ethernet / IO-Link	EtherNet/IP / MQTT JSON	IP 65 / IP 66 / IP 67 / IP 69K	**AL1323**
	IO-Link master StandardLine	8 x Digital input / 4 x Digital output	IO-Link / AS-i	–	IP 65 / IP 66 / IP 67 / IP 69K	**AC6001**

IO-Link modules

Type	Description	Inputs / outputs	Interface	Protocol	Protection rating	Order no.
	IO-Link input module	12 x Digital input	IO-Link	–	IP 65 / IP 67 / IP 69K	**AL2240**
	IO-Link output module	12 x Digital output	IO-Link	–	IP 65 / IP 67 / IP 69K	**AL2230**
	IO-Link input / output module	16 x Digital input / 8 x analogue input (0...10 V), (4...20 mA) / 16 x Digital output	IO-Link	–	IP 65 / IP 67 / IP 69K	**AL2205**

Software

Type	Description	Order no.
	IO-Link parameter setting software; USB stick; single licence; full version	**QA0011**

Accessories

Type	Description	Order no.
	Set USB IO-Link master; Connector · Housing: PA; socket: PA; lock nut: nickel-plated brass	**ZZ1060**
	IO-Link Bluetooth adapter; Connector · stainless steel (1.4404 / 316L); brass (2.0401); PA; PBT; FKM; Sealing: FKM;	**E30446**

Type	Description	Order no.
	IO-Link repeater; Connector · stainless steel (1.4404 / 316L); PEI; PA reinforced fibre; FKM; Grounding clamp: stainless steel (1.4301 / 304)	**E30444**
	IO-Link display; Connector · stainless steel (1.4404 / 316L); PC; PBT-GF30; PPS; FKM;	**E30443**
	Memory plug; PNP; Connector · PA PACM 12 (TROGAMID); PET	**E30398**

IO-Link circuit breakers

Type	Description	Order no.
	Power supply module for electronic circuit breaker; terminals; Approval CE,cULus,IO-Link,cRUus	**DF2101**
	Feeding module for ground potential; terminals; Approval CE,cRUus · feeding module GND (1 x 10 mm²)	**DF3100**
	Electronic circuit breaker; terminals; Approval CE,cULus,cRUus	**DF2212**
	Electronic circuit breaker; terminals; Approval CE,cULus,cRUus	**DF2214**
	Electronic circuit breaker; terminals; Approval CE,cULus,cRUus	**DF2210**

Connectors

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Pro-tection	LEDs	Order no.
Connecting cable with socket M12 · 5-pole · 4-wire								
	5 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF001**
	5 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF004**
Connecting cable with socket M12 · 5-pole · 5-wire								
	5 m MPPE grey	5 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	60 AC/DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF010**
	5 m MPPE grey	5 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	60 AC/DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF013**

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Pro-tection	LEDs	Order no.
Wirable socket M12 · 4-pole								
	–	–	PA 6.6 grey; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF565**
Wirable socket M12 · 5-pole								
	–	–	PA 6.6 grey; Sealing: EPDM	60 AC/DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF570**
Wirable plug M12								
	–	–	PA 6.6 grey; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF567**
	–	–	PA 6.6 grey; Sealing: EPDM	60 AC/DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF572**
Connecting cable with plug M12 · 4-wire								
	5 m MPPE grey	4 x 0.34 mm² (7 x Ø 0.25 mm)	PP Halogen-free	30 AC 60 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF524**
Connection cable M12 · 4-wire								
	5 m MPPE grey	4 x 0.34 mm² (7 x Ø 0.25 mm)	PP Halogen-free	30 AC 60 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF532**
Connection cable M12 / RJ45 · 4-wire								
	5 m MPPE grey	4 x 0.34 mm² (7 x Ø 0.25 mm)	housing: PP Halogen-free	30 AC 60 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF558**

Inductive sensors for cleaning processes

Inductive sensors

Stainless steel sensing face and housing protect against damage

Resistant to industrial alkalis and acids

High temperature range up to 100 °C, temperature shock resistant

Absolutely ingress-resistant to IP 68 / IP 69K resists high-pressure and steam cleaning

All round visibility of the switch point indication via LED simplifies mounting requirements

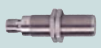
100 % ingress-resistant and robust

The ifm full metal sensors with sensing face made of stainless steel are made for position detection in extreme environments as in the food and beverage industry. The high-grade stainless steel sensor housing is resistant to industrial cleaning agents.
The 100 % ingress-resistant sensor housing with protection rating IP 69K prevents the penetration of liquids during high-pressure and steam cleaning. The high-grade stainless steel housing resists damage caused by impact e.g. in distribution plates.

Application example: hooks in meat processing

Full-metal inductive sensors detect the position of the hooks in wet areas. They are resistant to aggressive cleaning agents and temperature shocks.

Constant cleaning with aggressive cleaning agents

Type	Dimensions [mm]	Sensing range [mm]	Material	U_b [V]	Protection	f [Hz]	I_{load} [mA]	Order no.
	M8 x 1 / L = 45	3 quasi flush	stainless steel	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	250	100	**IET200**
	M8 x 1 / L = 45	5 nf	stainless steel	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	500	100	**IET201**
	M12 x 1 / L = 45	5 quasi flush	stainless steel	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	250	100	**IFT259**
	M12 x 1 / L = 45	6 nf	stainless steel	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	250	100	**IFT260**
	M12 x 1 / L = 60	3 f	stainless steel	10...30	IP 68 / IP 69K	100	100	**IFT240**
	M12 x 1 / L = 70	6 nf	stainless steel	10...30	IP 65 / IP 67 / IP 68 / IP 69K	250	100	**IFT245**
	M18 x 1 / L = 45	10 quasi flush	stainless steel	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	200	100	**IGT261**
	M18 x 1 / L = 45	12 nf	stainless steel	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	250	100	**IGT262**
	M18 x 1 / L = 70	5 f	stainless steel	10...30	IP 68 / IP 69K	100	100	**IGT247**
	M18 x 1 / L = 70	12 nf	stainless steel	10...30	IP 65 / IP 67 / IP 68 / IP 69K	250	100	**IGT249**
	M30 x 1.5 / L = 50	18 quasi flush	stainless steel	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	100	100	**IIT245**
	M30 x 1.5 / L = 65	10 f	stainless steel	10...30	IP 68 / IP 69K	50	100	**IIT228**
	M30 x 1.5 / L = 65	25 nf	stainless steel	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	100	100	**IIT246**
	M30 x 1.5 / L = 65	25 nf	stainless steel	10...30	IP 65 / IP 67 / IP 68 / IP 69K	100	100	**IIT231**

f = flush / nf = non flush / qf = quasi flush

Regular cleaning processes

Type	Dimensions [mm]	Sensing range [mm]	Material	U_b [V]	Protection	f [Hz]	I_{load} [mA]	Order no.
Connector: M12 · Output function: normally open · 3-wire · DC PNP								
	M8 x 1 / L = 50	2 f	stainless steel	10...36	IP 68 / IP 69K	1000	100	**IE5379**
	M12 x 1 / L = 45	4 f	stainless steel	10...36	IP 68 / IP 69K	800	100	**IFT203**
	M12 x 1 / L = 50	7 nf	stainless steel	10...36	IP 68 / IP 69K	800	100	**IFT200**
	M18 x 1 / L = 51	12 nf	stainless steel	10...36	IP 68 / IP 69K	300	100	**IGT200**
	M30 x 1.5 / L = 50	14 f	stainless steel	10...36	IP 68 / IP 69K	100	100	**IIT205**
	M30 x 1.5 / L = 50	22 nf	stainless steel	10...36	IP 68 / IP 69K	100	100	**IIT200**
Connector: M12 · Output function: normally open · 2-wire · 3-wire · DC PNP/NPN								
	M12 x 1 / L = 70	4 f	stainless steel	10...36	IP 68 / IP 69K	500	100	**IFT205**
	M12 x 1 / L = 70	7 nf	stainless steel	10...30	IP 68 / IP 69K	700	100	**IFT202**
	M18 x 1 / L = 70	8 f	stainless steel	10...36	IP 68 / IP 69K	400	100	**IGT205**
	M18 x 1 / L = 70	12 nf	stainless steel	10...30	IP 68 / IP 69K	300	100	**IGT202**
	M30 x 1.5 / L = 70	14 f	stainless steel	10...36	IP 68 / IP 69K	100	100	**IIT204**
	M30 x 1.5 / L = 70	22 nf	stainless steel	10...36	IP 68 / IP 69K	100	100	**IIT202**

f = flush / nf = non flush / qf = quasi flush

System components

Type	Description	Order no.
	Angle bracket · for type M8 · stainless steel (1.4301 / 304)	**E10734**
	Angle bracket · for type M12 · stainless steel (1.4301 / 304)	**E10735**
	Angle bracket · for type M18 · stainless steel (1.4301 / 304)	**E10736**
	Angle bracket · for type M30 · stainless steel (1.4301 / 304)	**E10737**

Connectors

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Protection	LEDs	Order no.
Connecting cable with socket M12 · 5-pole · 4-wire								
	5 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF001**
	5 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF004**
	5 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	10...36 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	LED	**EVF007**

Hygienic non-contact detection of objects and media

Capacitive sensors

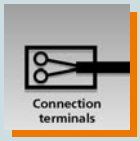
High noise immunity guarantees high operational reliability

Sensing range adjustable by means of a potentiometer or pushbuttons

Plastic or metal housings for different applications

Capacitive sensors for position and level detection

Different mounting accessories for tank and sight glass (bypass)



Capacitive sensors

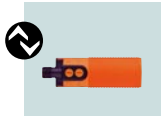
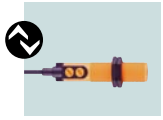
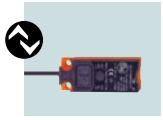
Capacitive sensors are used for non-contact detection of any types of objects and for level monitoring. In contrast to inductive sensors, which only detect metallic objects, capacitive sensors can also detect non-metallic materials.

Typical applications in the food industry: In packaging systems, capacitive sensors might check the presence of cardboard boxes, or monitor the medium level in a carton (e.g. full/empty check in milk cartons).

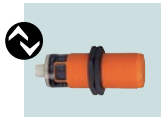
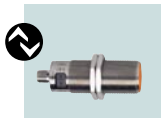
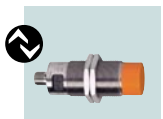
Application example: KQ10

20 LEDs display the real level inside the vessel directly at the sensor. By setting the sensitivity, the sensor can detect media with good conductive properties such as water or acids and also poorly conducting media such as oils or granulates.

Capacitive sensors IP 69K

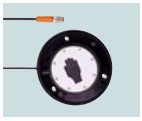
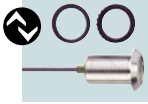
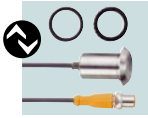
Type	Dimensions [mm]	Sensing range [mm]	Material	U_b [V]	Protection	f AC / DC [Hz]	I_{load} AC / DC [mA]	Order no.
Connector: M12 · Output function: normally open / normally closed; (selectable) · DC PNP								
	M30 x 1.5 / L = 92	0.5...40 nf	plastics	10...30	IP 65 / IP 67 / IP 69K	30	200	**KI6000**
cable: 2 m · Output function: normally open / normally closed; (selectable) · DC PNP								
	M18 x 1 / L = 92.5	0.5...30 nf	plastics	10...30	IP 65 / IP 67 / IP 69K	30	200	**KG6001**
	20 x 14 x 48	12 nf	plastics	10...30	IP 65 / IP 67 / IP 69K	10	100	**KQ6002**

Capacitive sensors

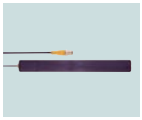
Type	Dimensions [mm]	Sensing range [mm]	Material	U_b [V]	Protection	f AC / DC [Hz]	I_{load} AC / DC [mA]	Order no.
Connector: M12 · Output function: normally open · DC PNP								
	M12 x 1 / L = 60	1...6 f	stainless steel	10...36	IP 65	50	100	**KF5001**
Cable: 2 m · Output function: normally open · DC PNP								
	M12 x 1 / L = 70	8 nf	stainless steel	10...36	IP 65	50	100	**KF5015**
Connector: M12 · Output function: normally open / normally closed; (selectable) · DC PNP								
	M30 x 1.5 / L = 90	20 nf	plastics	10...36	IP 65 / IP 67	10	200	**KI5083**
	M30 x 1.5 / L = 90	8 f	stainless steel	10...30	IP 65 / IP 67	10	100	**KI5085**
	M30 x 1.5 / L = 90	15 nf	stainless steel	10...30	IP 65 / IP 67	10	100	**KI5087**

f = flush / nf = non flush / qf = quasi flush

Touch sensors / Illuminated pushbuttons M22 IP 69K

Type	Dimensions [mm]	Sensing range [mm]	Material	U_b [V]	Protection	f AC / DC [Hz]	I_{load} AC / DC [mA]	Order no.
	Ø 96.9 / L = 11	–	plastics	12...30	IP 67 / IP 69K	–	200	**KT5011**
	Ø 32 / L = 39	–	stainless steel	10...30	IP 65 / IP 67 / IP 69K	–	150	**KT6300**
	Ø 32 / L = 39	–	stainless steel	10...30	IP 65 / IP 67 / IP 69K	–	150	**KT6301**

Electronic level sensors

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 · DC PNP/NPN								
	250 x 28 x 16.7	< 200	plastics	10...30	IP 65 / IP 67	–	200	**KQ1000**
Cable with connector: M12, 0.1 m · DC PNP/NPN								
	250 x 28 x 16.7	< 200	plastics	10...30	IP 65 / IP 67	–	200	**KQ1001**

Sensors with ATEX approval

Type	Dimensions [mm]	Sensing range [mm]	Material	$U_{nom.}$ at 1 KΩ [V]	U_b [V]	Internal capacit. [nF]	Internal inductance [µH]	f [Hz]	Order no.
Cable: 2 m · Output function: normally closed · DC NAMUR									
	M30 x 1.5 / L = 81	15 nf	plastics	8.2 DC; (1kΩ)	7.5...15	375	1	40	**KI5030**
Terminals · Output function: complementary · DC PNP									
	M30 x 1.5 / L = 125	15 nf	plastics	10...30 DC	–	–	–	10	**KI505A**
	M30 x 1.5 / L = 150	15 nf	plastics	10...30 DC	–	–	–	10	**KI503A**
Terminals · Output function: normally open / normally closed; (selectable) · DC PNP									
	105 x 80 x 42	60 nf	plastics	10...36 DC	–	–	–	10	**KD501A**

f = flush / nf = non flush / qf = quasi flush

System components

Type	Description	Order no.
	Switching amplifier for Namur sensors according to 94/9/EC (ATEX); Operating voltage 24 DC V; DC PNP; Number of channels 2; terminals: ...2.5 mm²; IP 20; Switching frequency 5000 Hz	**N0534A**
	Mounting adapters; PBT-GF20; PA; stainless steel (1.4310 / 301); nickel-plated brass	**E12675**
	Mounting adapter for capacitive sensors; Approval FDA	**E11033**
	Lock nut for mounting adapter; Approval FDA	**E11031**

Connectors

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Pro-tection	LEDs	Order no.
Connecting cable with socket M12 · 5-pole · 4-wire								
	5 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF001**
	5 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF004**

Seeing through walls

Magnetic sensors

Absolutely ingress-resistant to IP 68 / IP 69K resists high-pressure and steam cleaning

Small housings with extended sensing ranges up to 100 mm

Stainless steel sensing face and housing protect against damage

High temperature range up to 100 °C, temperature shock resistant

Detection through covers

Magnetic sensors allow non-contact position detection even at high switching frequencies. They can detect a magnet through materials such as stainless steel, non-ferrous metal, aluminium, plastic or wood.

Long sensing range and high switching frequency

Thanks to the GMR technology (giant magneto resistive) the magnetic sensors have very long sensing ranges compared to inductive sensors. They detect magnets up to a distance of 100 mm. The maximum switching frequency of 5,000 Hz applies over the complete temperature range.

Application example

Detection of a pig during the cleaning of pipes.

Full-metal inductive sensors

Type	Dimensions [mm]	Sensing range [mm]	Material	U_b [V]	Protection	f [Hz]	I_{load} [mA]	Order no.
Connector: M12 · Output function: normally open · DC PNP								
	M12 x 1 / L = 60	60	stainless steel	10...30	IP 65 / IP 68 / IP 69K	5000	100	**MFT202**
	M18 x 1 / L = 60	100	stainless steel	10...30	IP 68 / IP 69K	–	200	**MGT201**

Accessories damping magnets

Type	Description	Order no.
	Damping magnet · M 3.1 · Ø 20 · hard ferrite HF 26/22; stainless steel (1.4571/316Ti)	**E12291**
	Damping magnet · M 4.1 · Ø 40 / L = 13 · hard ferrite HF 24/23; stainless steel (1.4571/316Ti)	**E11803**

Connectors

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Pro-tection	LEDs	Order no.
Connecting cable with socket M12 · 5-pole · 4-wire								
	10 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF005**
	10 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF002**

Photoelectric sensors with M18 housing

Red light sensors

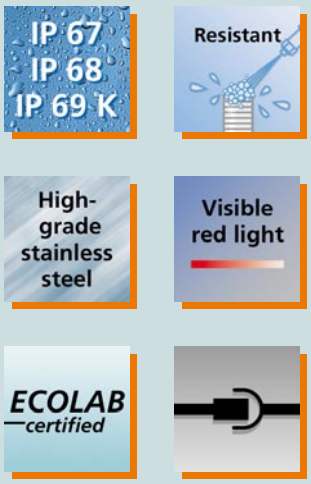
Industrially compatible high-grade stainless steel M18 housing

Ecolab certified – resistant to cleaning agents and rough environments

Visible red light simplifies alignment and maintenance

Plastic lens, avoids glass splinters in case of damage

Mounting accessories in stainless steel



For washdown applications

The OG series photoelectric sensors have been designed and tested for reliable detection even in extreme washdown conditions. The industrially compatible M18 housing is made of high-grade stainless steel. It is perfectly suited for food and beverage applications.

The visible red light simplifies alignment and maintenance. Extensive accessories made of stainless steel ensure fast and safe installation.

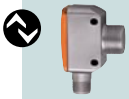
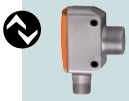
Ecolab-certified for food and beverage

The Ecolab-certified sensors are resistant to chemical solutions used in cleaning. Even in case of high-pressure cleaning the sensor remains absolutely ingress-resistant to IP 69K.

M18 WetLine series

Type	Operating principle	Range	Type of light	Spot Ø at max. range [mm]	Output	Order no.
Diffuse reflection sensor · IP 65; IP 67; IP 68; IP 69K						
	Background suppression	20...200 mm	red light	17	light-on/dark-on mode; (programmable) / PNP	**OGH314**
	Background suppression	15...300 mm	red light	25	light-on/dark-on mode; (programmable) / PNP	**OGH312**
Through-beam sensor · IP 65; IP 67; IP 68; IP 69K						
	Transmitter	< 20 m	red light	800	–	**OGS300**
	Receiver	< 20 m	red light	–	dark-on mode / PNP	**OGE300**
	Receiver	< 20 m	red light	–	light-on mode / PNP	**OGE301**
Retro-reflective sensor · IP 65; IP 67; IP 68; IP 69K						
	Polarisation filter	0.03...4 m	red light	160	dark-on mode / PNP	**OGP300**
	Polarisation filter	0.03...4 m	red light	160	light-on mode / PNP	**OGP301**

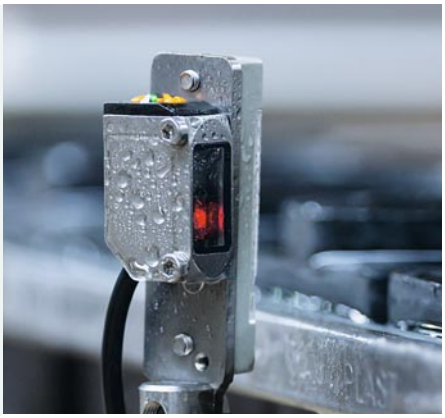
M18 Cube WetLine IO-Link series

Type	Operating principle	Range	Type of light	Spot Ø at max. range [mm]	Output	Order no.
Diffuse reflection sensor · IP 65; IP 67; IP 68; IP 69K						
	Background suppression	< 100 mm	red light	7	light-on mode / PNP	**OGH380**
	Background suppression	< 200 mm	red light	13	light-on mode / PNP	**OGH381**
Through-beam sensor · IP 65; IP 67; IP 68; IP 69K						
	Through-beam sensor transmitter	15 m	red light	800	–	**OGS380**
	Receiver	15 m	red light	–	dark-on mode / PNP	**OGE380**

System components

Type	Description	Order no.
	Reflector for retro-reflective sensors; Ø 50 mm	**E20956**
	Reflector for retro-reflective sensors; 48 x 48 mm	**E20744**
	Mounting set for position sensors; Ø 18.5 mm	**E20870**

Photoelectric sensors with O6 WetLine housing



Red light sensors

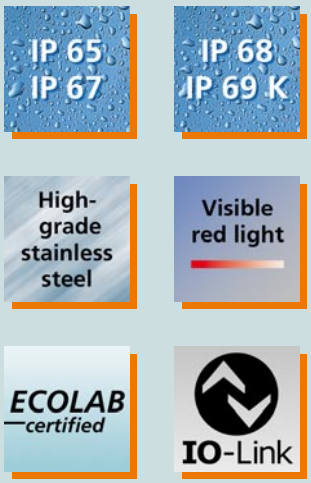
Stainless steel housing with protection rating IP 65 / IP 67 / IP 68 / IP 69K

Easy adjustment by potentiometer

Diffuse reflection sensor with reliable background suppression

Object colour has no influence on the range

Also available as through-beam or retro-reflective system



IO-Link

The O6 WetLine sensors with IO-Link interface offer the user the possibility to set, for example, range, sensitivity, light-on/dark-on, switching delay or deactivation of the operating elements.

Perfectly sealed

The compact O6 offers maximum ingress protection. A double seal protects the two setting potentiometers. Front face and potentiometer sit flush to allow residue-free cleaning. The stainless steel housing has the high protection ratings IP 65 / IP 67 / IP 68 / IP 69K. A transparent black housing cover provides a good contrast to the integrated LEDs (operating status, switch point) for optimum visibility from any angle even in bright lighting conditions. The coated front pane is made of resistant, shatterproof plastic.

O6 WetLine series

Type	Operating principle	Range	Type of light	Spot Ø at max. range [mm]	Output	Order no.
Cable with connector: M12, 0.3 m · 4 poles · 10...30 DC · stainless steel · IP 65; IP 67; IP 68; IP 69K						
	Diffuse reflection sensor	5...500 mm	red light	15	light-on/dark-on mode; (selectable) / PNP	**O6T301**
	Background suppression	2...200 mm	red light	8	light-on/dark-on mode; (selectable) / PNP	**O6H301**
	Receiver	< 10 m	red light	–	light-on/dark-on mode; (selectable) / PNP	**O6E301**
	Polarisation filter	0.05...5 m	red light	150	light-on/dark-on mode; (selectable) / PNP	**O6P301**
	Transmitter	< 10 m	red light	300	–	**O6S301**
Cable: 2 m · 10...30 DC · stainless steel · IP 65; IP 67; IP 68; IP 69K						
	Diffuse reflection sensor	5...500 mm	red light	15	light-on/dark-on mode; (selectable) / PNP	**O6T300**
	Background suppression	2...200 mm	red light	8	light-on/dark-on mode; (selectable) / PNP	**O6H300**
	Receiver	< 10 m	red light	–	light-on/dark-on mode; (selectable) / PNP	**O6E300**
	Polarisation filter	0.05...5 m	red light	150	light-on/dark-on mode; (selectable) / PNP	**O6P300**
	Transmitter	< 10 m	red light	300	–	**O6S300**
Connector: M8 · 3 poles · 10...30 DC · stainless steel · IP 65; IP 67; IP 68; IP 69K						
	Diffuse reflection sensor	5...500 mm	red light	15	light-on/dark-on mode; (selectable) / PNP	**O6T302**
	Background suppression	2...200 mm	red light	8	light-on/dark-on mode; (selectable) / PNP	**O6H302**
	Receiver	< 10 m	red light	–	light-on/dark-on mode; (selectable) / PNP	**O6E302**
	Polarisation filter	0.05...5 m	red light	150	light-on/dark-on mode; (selectable) / PNP	**O6P302**
	Transmitter	< 10 m	red light	300	–	**O6S302**

O6 WetLine IO-Link series

Type	Operating principle	Range	Type of light	Spot Ø at max. range [mm]	Output	Order no.
Connector: M8 · 4 poles · 10...30 DC · stainless steel · IP 65; IP 67; IP 68; IP 69K						
	Diffuse reflection sensor	5...500 mm	red light	15	light-on/dark-on mode; (selectable) / PNP	**O6T309**
	Background suppression	2...200 mm	red light	8	light-on/dark-on mode; (selectable) / PNP	**O6H309**
	Receiver	< 10 m	red light	–	light-on/dark-on mode; (selectable) / PNP	**O6E309**
	Polarisation filter	0.05...5 m	red light	150	light-on/dark-on mode; (selectable) / PNP	**O6P309**
	Transmitter	< 10 m	red light	300	–	**O6S305**

System components

Type	Description	Order no.
	Mounting set for photoelectric sensors	E21272
	Angle bracket	E21271
	Protective bracket	E21273
	Reflector for retro-reflective sensors; 48 x 48 mm	E21269
	Reflector for retro-reflective sensors; 56 x 38 mm	E21268
	Reflector for retro-reflective sensors; Ø 80 mm	E20005
	Reflector for retro-reflective sensors; 96 x 96 mm	E20454
	Reflective tape; 50 x 1000 x 0.4 mm	E21015

Connectors

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Protection	LEDs	Order no.
Connecting cable with socket M8 · 3-pole · 3-wire								
	5 m MPPE grey	3 x 0.34 mm² (42 x Ø 0.1 mm)	–	50 AC 60 DC	-25...80	IP 65 / IP 67 / IP 68 / IP 69K	–	EVF123
	5 m MPPE grey	3 x 0.34 mm² (42 x Ø 0.1 mm)	housing: PP grey; Sealing: EPDM	50 AC 60 DC	-25...80	IP 65 / IP 67 / IP 68 / IP 69K	–	EVF127
	5 m MPPE grey	3 x 0.34 mm² (42 x Ø 0.1 mm)	housing: PP black transparent; Sealing: EPDM	10...36 DC	-25...80	IP 65 / IP 67 / IP 68 / IP 69K	LED	EVF131
	2 m MPPE grey	3 x 0.34 mm² (42 x Ø 0.1 mm)	–	50 AC 60 DC	-25...80	IP 65 / IP 67 / IP 68 / IP 69K	–	EVF122
	2 m MPPE grey	3 x 0.34 mm² (42 x Ø 0.1 mm)	housing: PP grey; Sealing: EPDM	50 AC 60 DC	-25...80	IP 65 / IP 67 / IP 68 / IP 69K	–	EVF126

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Pro-tection	LEDs	Order no.
Connecting cable with socket M8 · 3-pole · 3-wire								
	2 m MPPE grey	3 x 0.34 mm² (42 x Ø 0.1 mm)	housing: PP black transparent; Sealing: EPDM	10...36 DC	-25...80	IP 65 / IP 67 / IP 68 / IP 69K	LED	**EVF130**
Connecting cable with socket M8 · 4-pole · 4-wire								
	2 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	–	50 AC 60 DC	-25...80	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF134**
	25 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	–	50 AC 60 DC	-25...80	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF137**
	10 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	housing: PP grey; Sealing: EPDM	50 AC 60 DC	-25...80	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF140**

Automated **tradition**

The company "Leksands Knäckebröd" was founded in 1920 and has been family-owned since then, today in the 4th generation.

Typical of Leksands' crisp bread: the round shape with a hole in the middle.

Sensors support the crisp bread production in Sweden

What is the most typical Swedish product? It does not take long to give the answer: crisp bread. In the little town of Leksand in Central Sweden, there is Sweden's largest producer of the traditional round crisp bred. Also involved: ifm as the automation specialist.

While the recipes are still the same after about 100 years, the production process is completely different now. Production is automated according to the latest state-of-the-art technology. To ensure that the systems run smoothly, different sensors monitor the production process – from the supply of the ingredients to the dispatch area.

Peter Joon, Managing Director at Leksands Knäckebröd: *"We use many sensors since this is a very modern production and a highly automated process. Since we have a very high productivity of 99.6 %, we need sensors we can trust and which are of high quality. Today we use many sensors from ifm. They are of high quality and function very well with our products."*

Lars Ohlner, Automation Engineer at Leksands Knäckebröd adds, *"We use products from ifm because they are easy to configure and which are cost effective; they simply function reliably. We mainly use photoelectric and*

Capacitive sensors detect the flour through the walls of the pipes.

"Since we have a very high productivity of 99.6 %, we need sensors we can trust and which are of high quality. Today, we are using many sensors from ifm.

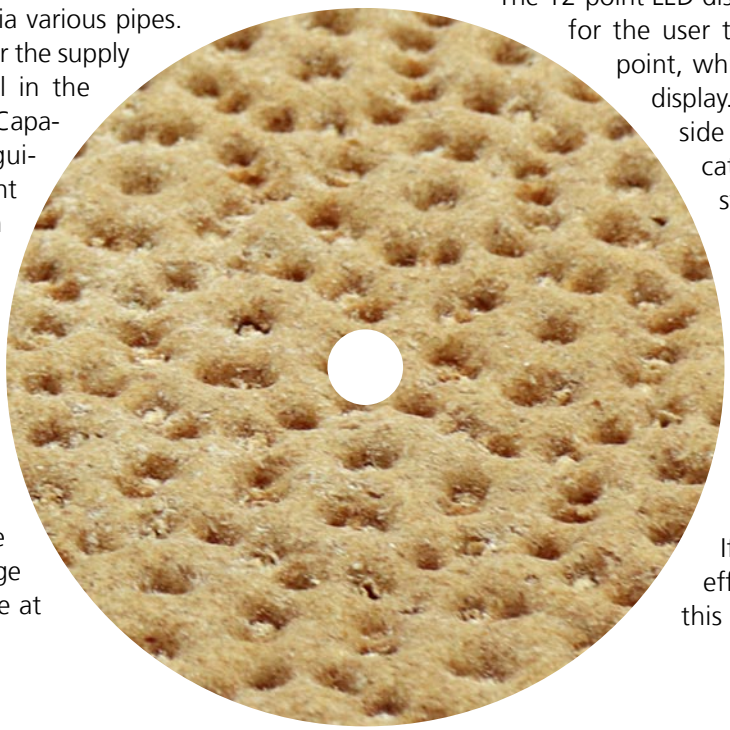
capacitive sensors and some flow sensors. This should ensure a high degree of automation, good automation and a reliable process."

Some particularly innovative sensors as example:

Capacitive sensors

The main ingredients of crisp bread are rye meal and finely ground rye and wheat flour. They are supplied to the mixing tools via various pipes. Capacitive sensors monitor the supply at the pipes or the level in the temporary storage tanks. Capacitive sensors are distinguished by detecting different materials, even through the tank wall, unless they are of metal. If a pipe is no longer completely filled with flour, the capacitive sensor detects this state and sends a switching signal to the controller.

Often, several capacitive sensors are used on storage tanks or silos, for example at the very top, to signal a possible overflow in time or at the very bottom of the silo to signal a critical empty state. Potentiometers are used to adjust the sensors after installation. the switch point is adjusted depending on the wall thickness of the pipe and the type of the medium to be detected. The new KI6000 sensors from ifm are to be set particularly precisely. Since they have a unique LED signal display for the perfect switch point setting.



The 12-point LED display makes it much easier for the user to set the optimal switch point, which is in the centre of the display. The green LEDs on either side of the switch point indicate the reliability of the switch point. Deposits, material changes etc. are directly displayed on the sensor and the user can readjust perfectly the switch point as needed. That means that an imminent error can be detected in good time and avoided.

If help is needed with the effects of process changes this is much easier to explain

„ifm is our first choice when it comes to sensors because they have the products we need.

and rectify with the clear switch-point visualisation. Over the phone the user can describe the LED behaviour and a support engineer can easily advise corrective measures.

By using non-contact potentiometers, the new units have the high protection rating IP 69K and are perfectly suited for medium temperatures up to 110 °C. Moreover, different functions such as PNP/NPN or NC/NO can be selected. The ifm sensors are equipped with IO-Link and prepare the user optimally for Industry 4.0.

O6 photoelectric sensor

Diffuse reflection sensors are installed at various places in production. They monitor the flow of material on conveyor belts. These are, for example, individual slices of crisp bread but also completely packed products in the dispatch area.

In most cases, they use the ifm diffuse reflection sensors of type O6 at Lecksands Knäckebröd.

Their optical performance is excellent. They are distinguished by a particularly noise-immune background suppression while the range of up to 200 mm is independent of the object colour. This is important since the crisp bread slices have a different surface depending on the type and recipes.

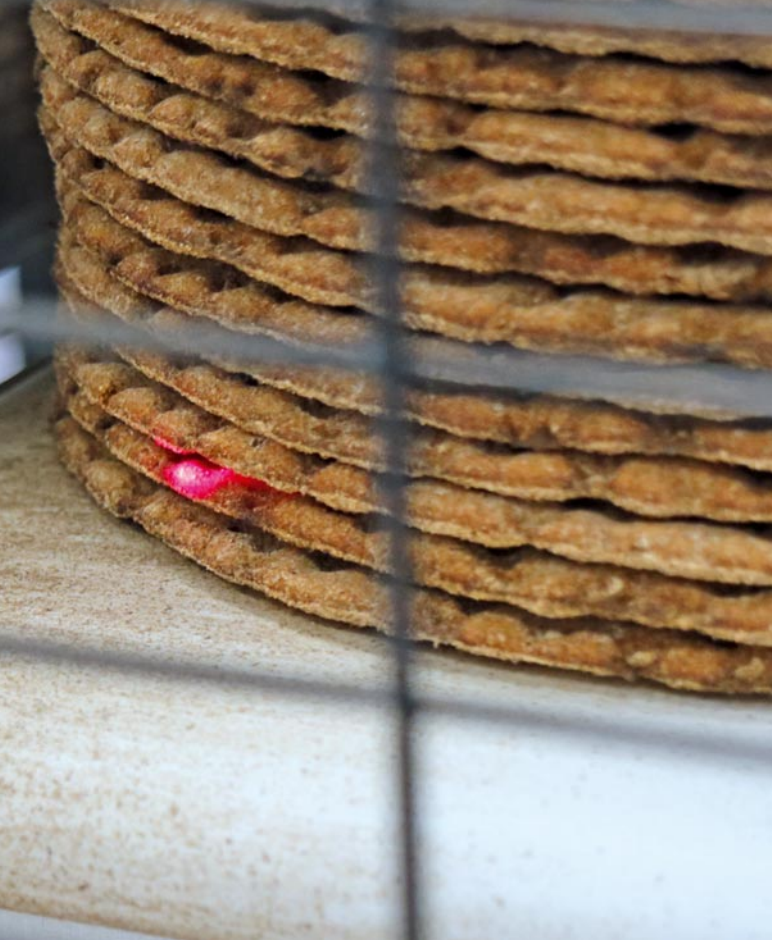
Even in the event of vapour, dust and highly reflective environments the automatic sensitivity compensation guarantees a reliable function. The clean round light spot in the operating area ensures a consistent light distribution in the light cone. Scattered light around the light spot is avoided. The compact O6 WetLine is perfectly sealed. The two setting potentiometers are fitted with a double seal. Front pane and potentiometer are embedded flush to allow residue-free cleaning. These compact powerful units from ifm can also be supplied as through-beam and retro-reflective systems.

The particularly resistant stainless steel housing with protection rating IP 68 / IP 69K ensures reliable use even

The ifm O6-series diffuse reflection sensors monitor the flow of material.

Distance measurement for position detection across longer distances: O1D with time of flight technology.

The amount of water for dough production is precisely detected by means of magnetic-inductive flow meters.



under severe conditions and ensures an extremely long life time. The O6 sensors are now also available as versions with IO-Link. Via this interface, the range, sensitivity, light-on / dark-on modes, switching delay or deactivation of the operating elements can, for example, be set remotely.

O1D distance sensor

When position detection across longer distances is of importance, the O1D distance sensor is a cost-effective and also very precise problem solver. Thanks to laser beam and time of flight measurement, it provides reliable and precise distance measurement with a long range of up to 10 m. It is ideal for applications with bak-kground suppression.

Thanks to the innovative on-chip time-of-flight process with PMD technology, the detection is independent of the object colour or its surface, e.g. mat or shiny. O1D is insensitive to extraneous light up to 100,000 lux and remains unaffected even if direct sunlight hits the sensor or object thus operating reliably and accurately at all times. The user can choose switching outputs, analogue outputs or IO-Link for data provision.

100 years of Swedish tradition:
Leksands are Sweden's largest producers of crisp bread.

MID flow sensor

Besides the grain, water is an elementary part of the crisp bread dough. In the field of dough production, a magnetic-inductive flow meter from ifm is used.

These units feature high accuracy, measurement dynamics and repeatability. They are suited for conductive media as from 20 µS/cm. The 4-digit alphanumeric LED display is highly visible. Besides the volumetric flow, the units also measure temperatures from -10…70 °C. Furthermore, an additional measuring point is no longer needed thanks to the integrated temperature monitoring. The robust compact housing, use of resistant materials and pressure rating up to 16 bar allow flexible use.

Using the IO-technology, process values are not only available via the analogue output but also digitally. Con-version losses during measured value transmission are a thing of the past. Saving all sensor parameters not only allows an easy replacement of sensors but also a simple and quick configuration and remote parameter setting. The user is well prepared for Industry 4.0 with the new IO-Link functionality.

Continuing with ifm in the future

At Leksands, they have been using the reliable and long-life sensors from ifm for a long time. No wonder that you can find ifm sensors which are older than 25 years in some places in the plant. Also in the future, they want to tackle new challenges in automation with ifm as their partner.

Peter Joon: *"For the future we have to develop sensors that can perceive the different colours of the bread and their shades. ifm is part of the development of these sensors. We have created a new area which is based mainly on ifm products and which has proved its worth so that we will further develop our future areas with sensors from ifm."*

He concludes, *"ifm is our first choice when it comes to sensors because they have the products we need."*

Valve sensors for quarter-turn actuators and rising stem valves

Valve feedback systems

- **Simple pushbutton setup and LED feedback**
- **Units with M12 connector or terminal chamber**
- **Non-contact and self-cleaning system**
- **Resistant to mechanical stress such as vibration and shocks**
- **Permanent valve monitoring for condition-based maintenance**

IP 67

IO-Link

TEACH-IN

Dual sensor for quarter-turn actuators

A compact dual inductive sensor with two integral sensors is used for position feedback on valve actuators. A puck on the actuator shaft with two targets positioned 90° apart supplies the switching signals to the dual sensor and also visually indicates the valve position.

Precise monitoring of rising stem valves

The sensors of the IX series are placed on top of the valve stem with an adapter. The valve end positions are set via the teach button. The sensor indicates three key positions via a switching signal: valve open, valve closed and any intermediate position, e.g., seat lift. The high resolution of 0.2 mm across the entire measuring range allows precise monitoring.

Sensors for valve actuators

Type	Dimensions [mm]	Sensing range [mm]	Material	U_b [V]	Protection	f AC / DC [Hz]	I_{load} AC / DC [mA]	Order no.
	95 x 50 x 57	–	plastics	10...30	IP 65 / IP 67	–	–	**MVQ201**
	40 x 26 x 47	4 nf	plastics	10...36	IP 67	1300	250	**IN5327**
	33 x 60 x 92	4 nf	plastics	10...30	IP 67	500	100	**IN5409**
	55 x 60 x 35	4 nf	plastics	26.5...31.6	IP 67	–	100	**AC2316**

f = flush / nf = non flush / qf = quasi flush

Sensors for rising stem valves

Type	Dimensions [mm]	Sensing range [mm]	Material	U_b [V]	Protection	f AC / DC [Hz]	I_{load} AC / DC [mA]	Order no.
	65 x 52 x 110	0...80	plastics	18...36	IP 65 / IP 67	–	100	**IX5010**
	65 x 52 x 110	0...80	plastics	26.5...31.6	IP 65 / IP 67	–	–	**IX5030**

Mounting sets for hand and ball valves, pucks

Type	Description	Order no.
	Mounting set; Top flange diameter 165 mm	**E12592**
	Target puck; diameter 53 mm	**E12517**

Mounting adapters for rising stem valves

Type	Description	Order no.
	Mounting adapter for position sensors used on rising stem valves	**E11900**
	Mounting adapter for position sensors used on rising stem valves	**E12515**

Intelligent encoders

Encoders

Resolution of 1...10,000 and signal level (TTL / HTL) freely programmable

Display: two-colour electronic rotatable display of the process values

Versatile: M12 connector can be used radially or axially

Adaptable: solid shaft (clamp / synchro flange) or hollow shaft design

IP 65
IP 67

IO-Link

LED

Vibration and shock resistant

IP 69 K

High-grade stainless steel

Synchronisation in conveying – example: chain conveyors

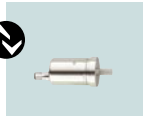
Transfer of transport hooks from the production belt to the storage belt. If the chain conveyors do not operate synchronously, the transport hooks are not transferred correctly to the storage belt. The hooks might get stuck.

In this case, the chain conveyor will stop, the conveyor will be damaged, products may fall to the floor and have to be disposed of.

Incremental encoders ensure synchronous movement of the two chains and prevent production loss and standstill.

Encoders can be indirectly affected by the floor cleaning process. Vapours resulting from the cleaning process can condensate on the encoder and lead to the corrosion of the flange and shaft bearing. ifm's encoders have flanges made from high-grade stainless steel that prevent such corrosion.

Aggressive cleaning agents

Type	Resolution	U_b [V]	f [kHz]	I_{load} [mA]	Shaft [mm]	Ambient temperature [°C]	Cable entry	Order no.
Hollow shaft open to one side · IP 68 / IP 69K								
	1...10000	4.75...30	1000	50	12	-40...85	axial	**RA3110**
Solid shaft · IP 68 / IP 69K								
	31 Bit	18...30	–	–	10	-40...85	axial	**RMB310**
	24 Bit	9...30	–	–	10	-40...85	axial	**RM9010**

Incremental encoders for wet areas

Type	Resolution	U_b [V]	f [kHz]	I_{load} [mA]	Shaft [mm]	Ambient temperature [°C]	Cable entry	Order no.
Hollow shaft open to one side · IP 67								
	1...10000	4.75...30	1000	50	15	-40...85	radial / axial	**RO3110**
Solid shaft · IP 67								
	1...10000	4.75...30	1000	50	10	-40...85	radial / axial	**RV3110**
	1...10000	4.75...30	1000	50	6	-40...85	radial / axial	**RU3110**

Accessories

Type	Description	Order no.
	Flexible coupling with clamp connection	**E60215**
	Flexible coupling for encoders	**E61433**
	Set USB IO-Link master; Connector	**ZZ1060**

Reliable pressure and level monitoring

Pressure sensors

- **High-grade stainless steel housing for hygienic applications**
- **Versions with display, analogue display or as transmitter only**
- **High overall accuracy and electronic temperature compensation**
- **High temperature resistance, therefore suitable for SIP and CIP processes**
- **Easy process connection using adapter**

100 % stainless steel housing – ingress-resistant and robust

The robust high-grade stainless steel housing of ifm's pressure sensors has been optimised for demanding hygienic applications, e.g. for monitoring levels in tanks or for pressure measurement in piping systems.

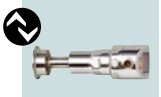
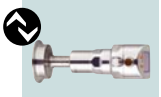
The completely-welded housing with protection rating IP 69K prevents see page from aggressive cleaning agents and withstands harsh washdown conditions. The sensor vent contains a Gore-Tex® membrane which itself resists high-pressure cleaning and is resistant to aggressive cleaning agents.

A variety of process adapters allows easy integration into the application. The Aseptoflex adapters feature PEEK and Viton sealing for food and beverage applications. These materials provide long-term sealing and are particularly resistant to swelling and aggressive chemicals.

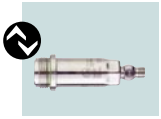
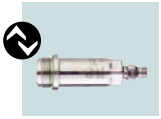
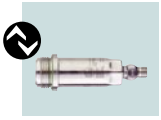
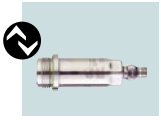
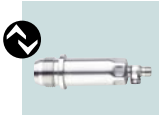
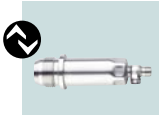
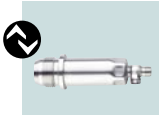
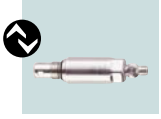
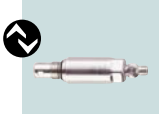
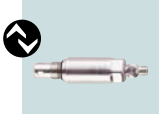
Pressure sensor with analogue display

Type	Process connection	Display	Measuring range [bar]	$P_{overload}$ max. [bar]	$P_{bursting}$ min. [bar]	U_b DC [V]	Order no.
IP 67; IP 69K							
	G 1 external thread Aseptoflex Vario	analogue, 4-digit alphanumeric display	-0.0124...0.25	6	30	18...32	**PG2798**
	G 1 external thread Aseptoflex Vario	analogue, 4-digit alphanumeric display	-0.05...1	10	30	18...32	**PG2797**
	G 1 external thread Aseptoflex Vario	analogue, 4-digit alphanumeric display	-1...10	50	150	18...32	**PG2794**
	G 1 external thread sealing cone	analogue, 4-digit alphanumeric display	-0.0124...0.25	6	30	18...32	**PG2898**
	G 1 external thread sealing cone	analogue, 4-digit alphanumeric display	-0.05...1	10	30	18...32	**PG2897**
	G 1 external thread sealing cone	analogue, 4-digit alphanumeric display	-1...10	50	150	18...32	**PG2894**

Flush pressure sensor with display

Type	Process connection	Display	Measuring range [bar]	$P_{overload}$ max. [bar]	$P_{bursting}$ min. [bar]	U_b DC [V]	Order no.
IP 67; IP 68; IP 69K							
	G 1 external thread Aseptoflex Vario	alphanumeric display	-0.0124...0.25	6	30	20...32 DC	**PI2798**
	G 1 external thread Aseptoflex Vario	alphanumeric display	-0.05...1	10	30	20...32 DC	**PI2797**
	G 1 external thread Aseptoflex Vario	alphanumeric display	-1...10	50	150	20...32 DC	**PI2794**
	G 1 external thread sealing cone	alphanumeric display	-1...10	50	150	20...32 DC	**PI2894**
	G 1 external thread sealing cone	alphanumeric display	-0.0124...0.25	6	30	20...32 DC	**PI2898**
	G 1 external thread sealing cone	alphanumeric display	-0.05...1	10	30	20...32 DC	**PI2897**
	Clamp DN40 (1.5")	alphanumeric display	-1...10	50	100	20...32 DC	**PI2204**
	Clamp DN40 (1.5")	alphanumeric display	–	10	30	20...32 DC	**PI2207**
	Clamp DN50 (2")	alphanumeric display	-1...10	50	100	20...32 DC	**PI2304**
	Clamp DN50 (2")	alphanumeric display	–	10	30	20...32 DC	**PI2307**

Electronic pressure sensor

Type	Process connection	Display	Measuring range [bar]	$P_{overload}$ max. [bar]	$P_{bursting}$ min. [bar]	U_b DC [V]	Order no.
Connector: M12 · Output function: analogue · DC							
	G 1 external thread Aseptoflex Vario	–	-0.0125...0.25	6	30	18...30	**PM1708**
	G 1 external thread Aseptoflex Vario	–	-0.05...0.4	8	30	18...30	**PM1718**
	G 1 external thread Aseptoflex Vario	–	-1...10	50	150	18...30	**PM1704**
	G 1 external thread Aseptoflex Vario	–	-0.05...1	10	30	18...30	**PM1707**
	G 1 external thread sealing cone	–	-0.0125...0.25	6	30	18...30	**PM1608**
	G 1 external thread sealing cone	–	-0.05...0.4	8	30	18...30	**PM1618**
	G 1 external thread sealing cone	–	-1...10	50	150	18...30	**PM1604**
	G 1 external thread sealing cone	–	-0.05...1	10	30	18...30	**PM1607**
	G 1/2 external thread sealing cone	–	-1...10	75	175	18...30	**PM1504**
	G 1/2 external thread sealing cone	–	–	30	50	18...30	**PM1506**
	G 1/2 external thread sealing cone	–	-1...6	50	120	18...30	**PM1515**

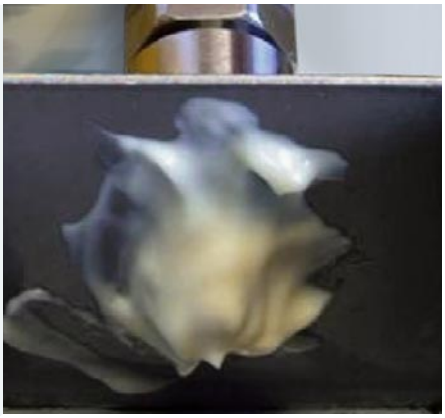
System components

Type	Description	Order no.
	IO-Link master with USB interface; IO-Link,USB; Number of digital inputs 2; Number of digital outputs 2; IP 65; IP 67	**AL1060**

Connectors

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Pro-tection	LEDs	Order no.
Connecting cable with socket M12 · 5-pole · 4-wire								
	5 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF004**
	5 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF001**

Level measurement – never too high, never too low



Level sensors

Point level detection and level measurement of different media

Resistant to foam and deposits

Hygienic design with maintenance-free sealing concept

Robust stainless steel housing with laser type label for durable legibility

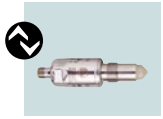
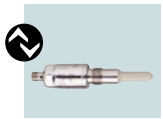
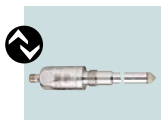
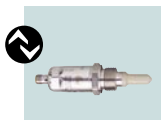
Monitor tanks and containers

LMT series point level sensors have been designed for the monitoring of the levels of liquids, viscous media and powders in food applications.
The high-frequency capacitance spectrum profiling technology eliminates challenges with deposits, residue and foam build-up that commonly cause more traditional point-level sensors to falsely switch.
The LR series level sensor uses a stainless-steel rod that can be inserted into tanks from above and cut to the required length if required. The guided wave radar measuring principle is ideal for water and water-based media. Even in applications with foam build-up, the sensor can deliver reliable measured values.

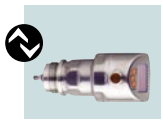
Suited for food and hygienic applications

The sensors' 316 stainless steel body and food-grade materials ensure chemical compatibility even with the harshest cleaning agents. A high protection rating of IP 68 / IP 69K prevents moisture ingress.

Point level sensors

Type	Process connection	Probe length [mm]	Process pressure max. [bar]	Application	Protection	Order no.
IP 68; IP 69K						
	G 1/2 sealing cone	11	-1...40	Liquids, viscous media, powder	IP 68 / IP 69K	**LMT100**
	G 1/2 sealing cone	38	-1...40; (MAWP (for applications according to CRN): 40 bar / 4 MPa)	Liquids, viscous media, powder	IP 68 / IP 69K	**LMT102**
	G 1/2 sealing cone	253	-1...40	Liquids, viscous media, powder	IP 68 / IP 69K	**LMT105**
	G 3/4 external thread	28	-1...40	Liquids, viscous media, powder	IP 68 / IP 69K	**LMT202**

Variable level sensors, guided wave radar

Type	Process connection	Probe length [mm]	Active zone [mm]	U_b [V]	Medium temperature [°C]	I_{load} [mA]	Order no.
IP 68; IP 69K							
	G 1 Aseptoflex Vario	150...2000	L-40	18...30	-40...150; (For 3-A applications, the medium temperature is limited to 121 °C and COP cleaning is required.)	150	**LR2750**

Accessories

Type	Description	Order no.
	IO-Link master with USB interface; IO-Link,USB; Number of digital inputs 2; Number of digital outputs 2; IP 65; IP 67	**AL1060**
	Probe for level sensors; Approval EC1935/2004,EHEDG,FDA,FCM,3-A	**E43341**
	Probe for level sensors; Approval EC1935/2004,EHEDG,FDA,FCM,3-A	**E43340**
	Probe for level sensors; Approval EC1935/2004,EHEDG,FDA,FCM,3-A	**E43345**
	Probe for level sensors; Approval EC1935/2004,EHEDG,FDA,FCM,3-A	**E43342**

Fast and precise: temperature monitoring at the highest level

Temperature sensors

High precision for demanding applications

Very fast response time: T05 / T09 = < 0.5 s / < 2 s

Versions with different hygienic process connections

Versions with different installation lengths

Measured value transmission, parameter setting and diagnostics via IO-Link

CIP/SIP

High-grade stainless steel

3A

FDA

EC 1935/2004

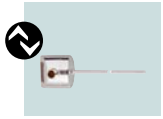
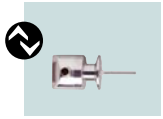
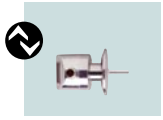
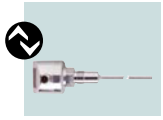
Fast and precise

Regardless of being a modular system with evaluation unit and separate probe, with or without a display: ifm offers the right high-precision temperature measurement solution for every application.

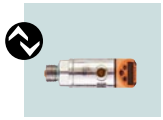
The class A Pt1000 measuring element achieves a high precision with the factory-internal calibration. The innovation besides the wide measuring range is the excellent response time. Therefore the sensor is suitable for all highly-precise and fast processes in hygienic environments.

The transmission of the measured values is carried out via a 4...20 mA analogue output as well as via IO-Link. Parameter setting and sensor diagnostics are also accessible via the integrated IO-Link interface.

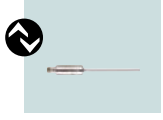
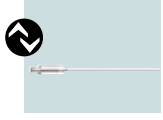
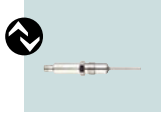
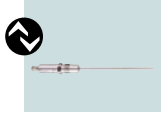
Temperature Transmitter with Display

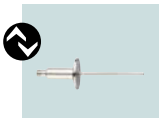
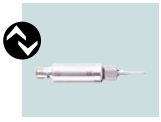
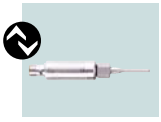
Type	Factory setting [°C / °F]	Process connection	Installation length [mm]	U_b [V]	Ambient temperature [°C]	Order no.
Connector: M12 · Output function: analogue · DC						
	0...100 °C	diameter Ø 6 mm	50	18...32	-25...80	**TD2217**
	0...100 °C	diameter Ø 6 mm	350	18...32	-25...80	**TD2297**
	0...100 °C	Clamp DN25...DN40 (1...1.5")	30	18...32	-25...80	**TD2807**
	0...100 °C	Clamp DN25...DN40 (1...1.5")	150	18...32	-25...80	**TD2847**
	0...100 °C	Clamp DN50 (2")	30	18...32	-25...80	**TD2907**
	0...100 °C	Clamp DN50 (2")	150	18...32	-25...80	**TD2947**
	0...100 °C	G 1/2 sealing cone	30	18...32	-25...80	**TD2507**
	0...100 °C	G 1/2 sealing cone	150	18...32	-25...80	**TD2547**

Evaluation unit with display for PT100/PT1000 temperature sensors

Type	Factory setting [°C / °F]	Process connection	Installation length [mm]	U_b [V]	Ambient temperature [°C]	Order no.
Connector: M12 · Output function: normally open / normally closed; (parameterisable); analogue · DC PNP/NPN						
	-40...300 °C / -40...572 °F	G 1/2 external thread	–	18...32	-25...80	**TR2439**

Temperature transmitters

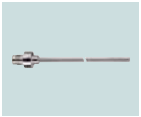
Type	Factory setting [°C / °F]	Process connection	Installation length [mm]	U_b [V]	Ambient temperature [°C]	Order no.
Connector: M12 · Output function: analogue · DC						
	0...200 °C	diameter Ø 6 mm	100	18...32	-25...80	**TA2232**
	0...200 °C	diameter Ø 6 mm	250	18...32	-25...80	**TA2262**
	-10...150 °C	G 1/2 sealing cone	50	18...32	-25...80	**TA2511**
	0...200 °C	G 1/2 sealing cone	150	18...32	-25...80	**TA2542**

Type	Factory setting [°C / °F]	Process connection	Installation length [mm]	U_b [V]	Ambient temperature [°C]	Order no.
Connector: M12 · Output function: analogue · DC						
	0...200 °C	Clamp DN10...DN20 (1/2...3/4")	25	18...32	-25...80	**TA2002**
	0...200 °C	Clamp DN25...DN40 (1...1.5")	100	18...32	-25...80	**TA2832**
	0...100 °C	M12 x 1.5 sealing cone	17	18...32	-25...80	**TA1107**
	0...200 °C	G 1/8 internal thread	29	18...32	-25...80	**TA1602**
	0...200 °C	G 1/8 internal thread	39	18...32	-25...80	**TA1612**

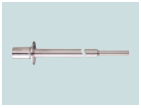
Temperature sensor with process connection

Type	Measuring range [°C / °F]	Process connection	Installation length [mm]	Sensor element	Dynamic response T05 / T09 [s]	Order no.
Connector: M12						
	-40...150 / -40...302	Clamp DN25...DN40 (1...1.5")	30	1 x Pt 100	1 / 3	**TM4801**
	-40...150 / -40...302	Clamp DN25...DN40 (1...1.5")	150	1 x Pt 100	1 / 3	**TM4841**
	-40...150 / -40...302	Clamp DN50 (2")	30	1 x Pt 100	1 / 3	**TM4901**
	-40...150 / -40...302	Clamp DN50 (2")	150	1 x Pt 100	1 / 3	**TM4941**
	-40...150 / -40...302	G 1/2 sealing cone	20	1 x Pt 100	1 / 3	**TM4591**
	-40...150 / -40...302	G 1/2 sealing cone	150	1 x Pt 100	1 / 3	**TM4541**

Temperature probe sensor

Type	Measuring range [°C / °F]	Process connection	Installation length [mm]	Sensor element	Dynamic response T05 / T09 [s]	Order no.
Connector: M12						
	-40...150 / -40...302	diameter Ø 6 mm	100	1 x Pt 100	1 / 3	**TT0291**
	-40...150 / -40...302	diameter Ø 6 mm	250	1 x Pt 100	1 / 3	**TT2291**

Accessories

Type	Description	Order no.
	Thermowell for temperature sensors; Approval 3-A,EC1935/2004,EHEDG,FDA	**E37830**
	Welding thermowell for temperature sensors; Approval 3-A,EC1935/2004,EHEDG,FDA	**E37421**
	Thermowell for temperature sensors; Approval EC1935/2004,EHEDG Tested,FDA	**E37511**

Connectors

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Pro-tection	LEDs	Order no.
Connecting cable with socket M12 · 5-pole · 4-wire								
	5 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF001**
	5 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF004**

The temperature sensor that checks itself

Temperature sensors

Immediate notification of deviations in accuracy

Improved quality assurance in between calibration intervals

Robust design for permanently precise measurements even in demanding environments

Transparent sensor monitoring thanks to logging of the diagnostic values

Simulation function simplifies installation

IO-Link

FDA

EC 1935/ 2004

IP 68 IP 69 K

3A

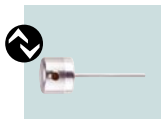
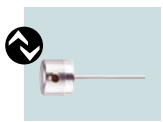
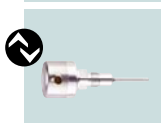
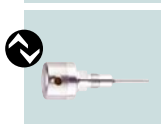
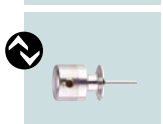
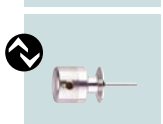
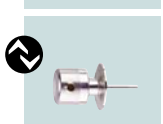
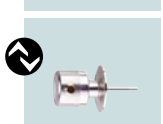
Maximum reliability for temperature-critical processes

Thanks to the improved inline calibration process, the TCC achieves an accuracy of ± 0.2 K across the entire measuring range. This makes it perfectly suited for use in temperature-sensitive processes such as food, rubber or carbon processing. Besides, the TCC ensures a smooth process and a high product quality by permanently monitoring its own reliability. If the sensor deviates from the individually defined tolerance values or in the event of a sensor malfunction, it provides a corresponding signal via the clearly visible LED and the diagnostic output.

Robust design for long-time use

Thanks to its fully welded and sealed housing and a new measuring probe design, the TCC is permanently resistant to external influences such as moisture, thermal and mechanical shocks and vibrations.

Self-monitoring temperature transmitters

Type	Factory setting [°C / °F]	Process connection	Installation length [mm]	U_b [V]	Ambient temperature [°C]	Order no.
Connector: M12 · Output function: normally closed; (diagnostic signal); analogue · DC PNP/NPN						
	-10...150 °C / 14...302 °F	diameter Ø 6 mm	100	18...32	-25...70	**TCC231**
	-10...150 °C / 14...302 °F	diameter Ø 6 mm	550	18...32	-25...70	**TCC201**
	-10...150 °C / 14...302 °F	G 1/2 sealing cone	30	18...32	-25...70	**TCC501**
	-10...150 °C / 14...302 °F	G 1/2 sealing cone	150	18...32	-25...70	**TCC541**
	-10...150 °C / 14...302 °F	Clamp DN25...DN40 (1...1.5")	50	18...32	-25...70	**TCC811**
	-10...150 °C / 14...302 °F	Clamp DN25...DN40 (1...1.5")	100	18...32	-25...70	**TCC831**
	-10...150 °C / 14...302 °F	Clamp DN50 (2")	50	18...32	-25...70	**TCC911**
	-10...150 °C / 14...302 °F	Clamp DN50 (2")	100	18...32	-25...70	**TCC931**

Connectors

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Pro-tection	LEDs	Order no.
Connecting cable with socket M12 · 5-pole · 4-wire								
	5 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF001**
	5 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF004**

Conductive principle conductivity sensor for hygienic applications

Conductivity sensors

Reduce inaccuracies associated with a time-based cleaning process

Improve process performance with flexible measurement points

Compact, high-quality sensor design prevents failures and unplanned downtime

Easy installation and commissioning

Loss-free digital transmission of measured values

IO-Link

CIP/SIP

FDA

IP 67
IP 68
IP 69 K

3A

EHEDG

Applications

The differentiation between media plays an important role, especially in the food industry. Cleaning agents, rinsing water and food products located in process pipes have different conductivity values and can therefore be easily and reliably detected.

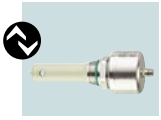
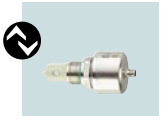
Benefits

Product validation is possible at all times. Quick and reliable differentiation between the media leads to a reduction in wasted product and rinsing water.

Handling

The ability to differentiate between products is an out-of-the-box solution. During installation it is not necessary to make adjustments to the sensor. Enhanced functionality such as simulation is available.

Compact conductivity sensors

Type	Process connection	Measuring range Conductivity [µS/cm]	Accuracy Conductivity	Measuring range Temperature [°C]	Pressure rating [bar]	U_b [V]	Order no.
Connector: M12 · Output function: analogue output; scalable; selectable conductivity / temperature; analogue · DC							
	G 1/2 sealing cone	100...15000	10 % MV ± 25 µS/cm	-25...150	16	18...30	**LDL100**
	G 1 external thread Aseptoflex Vario	100...1000000	2 % MV ± 25 µS/cm	-25...150	16	18...30	**LDL200**
	G 1 external thread Aseptoflex Vario	100...1000000	2 % MV ± 25 µS/cm	-25...150	16	18...30	**LDL201**
	G 1 external thread sealing cone	100...1000000	2 % MV ± 25 µS/cm	-25...150	16	18...30	**LDL210**

System components

Type	Description	Order no.
	IO-Link master with USB interface; IO-Link,USB; Number of digital inputs 2; Number of digital outputs 2; IP 65; IP 67	**AL1060**

Connectors

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Pro-tection	LEDs	Order no.
Connecting cable with socket M12 · 5-pole · 4-wire								
	5 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF004**
	5 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF001**

Spaetzle al dente

Precise control of the cooking process.

Cook the dough in hot water, drain and refresh with cold water, ready. The spaetzle cooker from staedler uses the same method we all know from home but on industrial dimensions, accurately controlled using sensors from ifm – to ensure the product quality remains at a high level.

staedler automation AG is located in Henau, Switzerland and has over 10 years of experience manufacturing systems for process automation.

Among other things, the company staedler automation produces fully automated cooking systems for the food industry. The system illustrated here is for a customer who makes spaetzle, a special southern german pasta.

Lukas Staedler, the CEO of staedler automation AG, explains how the system works: *"You have to imagine a saucepan which is continually on the go. That means the fresh dough is loaded at the beginning of the cooking line and is passed through during a defined period so that at the end you have a product which is cooked to the right degree. Using a defined cooking time we ensure constant product quality."*

The foodstuff which is being cooked is transferred to hot water using a paddle. As there are hardly any mechanical contacts between the machine and the product during the cooking process this minimizes any damage to the product. At the end of the cooking process the

Cooking system type staedler CK1600, manufactured by staedler automation AG. This system will be used to cook spaetzle.

product is transferred quickly over a waterfall edge to the cooling zone. This blanching with cold water stops the product from cooking any further.

"In principle, systems like this can cook anything that floats" emphasizes **Lukas Staedler.** *"In this specific line we process fresh pasta such as ravioli, tortellini or in this case spaetzle. But it could also be cold meats or vegetables. This system reaches a product output of 2.5 tons per hour".*

Maintaining the exact temperature

When cooking at home and we see the water starts to boil we know this is the right temperature, however, in industrial cooking processes the temperatures used have to be more accurate. Only in this way is it possible to provide the constant product quality the customer requires.

In this system the temperature is measured at two points providing the most important process values also known as Critical Control Points, in short CCP. One is the temperature of water which is nearly boiling. In this case it has to be exactly 95 °C. The other is the temperature of the cooling bath where the cooking process is stopped.

Temperature sensors type TA monitor the required temperature values in the cooker as well as in the cooling bath.

Two temperature sensors control the heat exchanger ensuring exact temperatures.

For these critical points staedler relies on temperature sensors type TA2502 from ifm. These sensors have a highly accurate, fast response Pt1000-measuring element covering a wide temperature range of -50 … 200 °C. Also the sensors have a high repeatability and long-time stability which are pre-requisites for optimum and stable product quality.

> *Basically automation means more effort but IO-Link provides a definite added-value.*

In the future staedler plans to use the self-monitoring temperature sensors type TCC from ifm to monitor these points. ((Foto 8)) The special feature of this unit: It has two independent measuring elements with opposing temperature characteristics that counteract each other. Deviations in accuracy are thus recognised immediately and signalised by alarm switching signals. They are also clearly visualized via a LED directly on the unit. This simplifies reliable product quality enormously, as between calibration intervals the temperature is safe at all times so long as the sensor does not detect a drift which it then signals. With other industrial temperature sensors deviations in temperature or a drift can occur even a day after calibration has taken place. They are not recognized and only detected during the next calibration. Worst case would be an expensive product recall which would have a negative effect on the manufacturer's reputation.

The conductivity sensor LDL200 reliably recognizes if clear water or cleaning detergents from the CIP process are in the lines. Simultaneously it also measures the temperature and transfers both measuring values using IO-Link to the control system.

■ Monitoring CIP-cleaning process with conductivity

After each production charge the system undergoes a CIP-cleaning process. A separate pump is used to rinse the product lines with alkaline and acidic cleaning agents. They are then rinsed with clear water before production is restarted. During this process the ifm conductivity sensor LDL200 plays an important role. Based on precise conductivity measurement it is possible to confirm if the line contains a cleaning agent and at which concentration. According to the measurement values the control system recognizes, for example, if further cleaning agents are to be added or if the pre-, intermediate and final rinsing has taken place. The final stage of the cleaning process is rinsing with clear water. Only when the exact conductivity of the final rinsing water is reached, is the system then released for production. This ensures clear phase separation during the CIP-process.

Simultaneous to the conductivity, LDL200 measures the medium temperature and transfers the values using the communication protocol IO-Link to the control system. This is also used to control the heat exchanger to ensure that it always has sufficient energy to regulate the temperature of the boiling water.

Pressure sensors type PM use the hydrostatic pressure to detect the level in the cooker and the cooling bath.

Will be used in future by staedler: The temperature sensor TCC is self-monitoring which means that calibration intervals can be extended. Deviations in accuracy are recognised automatically and signalled using a switching signal and LED.

Level at a glance

The system has two large water tanks: The bath with the hot water and the cooling bath at the end of the process. Pressure sensors are installed at the bottom of each tank. They are used to measure the hydrostatic pressure. The ifm sensors which are used have an ideal pressure range 100 mbar … 2.5 bar. They determine the exact level and are used to regulate it. It is therefore possible to avoid the tank overflowing when it is refilled with water.

Detect water supply

Water is lost during the cooking process. One reason being that the product itself, in this case spaetzle, absorbs water, and also water escapes in the form of steam during the cooking process. For those reasons water has to be continuously added.

Lukas Staedler: *"We use the magmeter SM2100 from ifm to regulate the replenishment of fresh water. It continuously measures the flow during the cooking process. This takes place in cooperation with level sensors. When the level sensors signal that the level of the water is decreasing then fresh water is added and the flowmeter determines how much water has been lost, having been absorbed by the product or as steam. Water is also lost during the removal of residual sludge. Used water is drained off and fresh water is added. This takes place during a time factor which is determined by the recipe. Also in this case the SM is used to measure the quantity of water which is to be added."*

The flowmeter also plays an important part during the cleaning process as it monitors the quantity of fresh water used for rinsing. In doing so it provides transparency throughout the entire cooking process.

The magmeter SM2100 is used to detect the current flow velocity as well as the total quantity of the feed water supply. Both values are transferred using IO-Link to the control system.

> *We are very satisfied with ifm. We have also used ifm in earlier projects.*

Position monitoring with inductive sensors

Inductive sensors for position detection are also installed. Even though they are not directly part of the cooking process they have an important monitoring function. The cooling band with which the product is transferred to and from the cooling bath can be lifted out of the bath using a lift for the purpose of being cleaned manually. Two inductive sensors are used for non-contact detection of the top and bottom position. They also ensure that the system can only be restarted if the band is in the correct lower position.

A third inductive sensor is mounted on the slot screen. This is also removed for manual cleaning purposes. The sensor checks if is correctly fitted before production can be resumed.

Sensor communication using IO-Link

All sensors are connected to the control system via IO-Link. This digital communication protocol transfers the measuring values to the control system in digital form. This means that measurement errors caused by conversion loss are reliably avoided. However, IO-Link can do more.

Lukas Staedler: *"Each sensor which is a CCP sensor has to be checked on an annual or six-monthly basis. The temperature sensors are placed in a reference temperature liquid and calibrated. We calibrate temperature sensors using IO-Link. With the conductivity sensor LDL we use both process values, temperature and conductivity over a single wire. The flowmeter SM transfers the counter values as well as the current velocity over one output via IO-Link to the control system."*

In reply to the question whether IO-Link simplifies automation, **Lukas Staedler** has a clear opinion: *"Basically automation means more effort but IO-Link provides a definite added-value. It is possible to transfer several signal values over one wire. That saves mounting costs. Or if we look at the temperature sensors: Calibration takes place directly on the sensor and not as before using corrective values in the control system. This simplifies programming the controls. All in all the advantages of IO-Link are greater by far."*

The cooling band can be lifted out for cleaning purposes using a pulley. Inductive sensors are used to detect the relevant top and bottom position.

After the slot screen has been cleaned manually and returned in place, production can only be resumed after it has been released by the inductive sensor.

Conclusion

staedler is convinced by the automation solutions provided by ifm.

Lukas Staedler summarizes: *"We are very satisfied with ifm. We have also used ifm in earlier projects. The reason being that ifm has a comprehensive sensor concept, from inductive sensors, magmeters, temperature sensors, pressure sensors through to conductivity measurement. In short: We can cover all our needs in the system with ifm sensors. A further reason is that the price performance ratio is right. The sensors make sense for this type of system and are also affordable. We will also use ifm for future projects."*

For optimum temperatures in your processes

5 YEARS Warranty on **ifm products**

Modular or all-in-one

Only an exact process temperature ensures consistent product quality. That is why we recommend temperature sensors from ifm; our solutions stand out due to their high accuracy, fast response time, clear red/green display, easy 3-button handling and large temperature ranges.
Whether as a display and evaluation unit (type TR) for external Pt sensors or as an all-in-one system (type TN) with integrated measuring probe and different process connections: We ensure reliability in your application. ifm – close to you!

Go ifmonline
www.ifm.com/gb/tn-tr

ecolink for use in wet areas

Connectors

- **Halogen-free and silicone-free**
- **Contoured nut with enhanced grip makes for optimum sealing even when only hand tightened**
- **The mechanical end stop protects the O-ring against destruction**
- **Permanent vibration protection with saw tooth contour**
- **LEDs clearly visible even in bright lighting conditions**

Connection technology for hygienic and wet areas

ecolink connectors guarantee a perfect long lasting seal even when fastened by hand. The integrated end stop protects the O-ring against destruction caused by an over-tightened coupling nut. The connectors have special vibration protection to prevent unwanted loosening. Some types are fitted with highly visible LEDs for operation and switching status indication.

Their high-grade stainless steel nut and food-grade sealing materials make the connectors ideal for use in hygienic and wet areas. The connectors are resistant to frequent high-pressure cleaning with aggressive cleaning agents. Thanks to their wide temperature range and their insensitivity to fast temperature changes they are particularly suited for use in the food and beverage industry.

Connectors for wet areas

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Pro-tection	LEDs	Order no.
Connection cable M12 · 5-pole								
	2 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF043**
	10 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF051**
	2 m MPPE grey	5 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	60 AC/DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF061**
	10 m MPPE grey	5 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	60 AC/DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF063**
Connecting cable with socket M12 · 5-pole								
	2 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF064**
	10 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF005**
	5 m MPPE grey	5 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	60 AC/DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF010**
	25 m MPPE grey	5 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	60 AC/DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF012**
Connection cable M8 · 3-pole								
	2 m MPPE grey	3 x 0.34 mm² (42 x Ø 0.1 mm)	housing: PP grey; Sealing: EPDM	50 AC 60 DC	-25...80	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF145**
Connection cable M12 / M8 · 4-pole								
	2 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	housing: PP Halogen-free; Sealing: EPDM	50 AC 60 DC	-25...80	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF256**
Connection cable M8 / M12 · 5-pole								
	5 m MPPE grey	3 x 0.34 mm² (42 x Ø 0.1 mm)	housing: PP Halogen-free; Sealing: EPDM	50 AC 60 DC	-25...80	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF269**
Connecting cable with socket M8 · 3-pole								
	5 m MPPE grey	3 x 0.34 mm² (42 x Ø 0.1 mm)	–	50 AC 60 DC	-25...80	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF123**

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Pro-tection	LEDs	Order no.
Connecting cable with socket M8 · 3-pole								
	5 m MPPE grey	3 x 0.34 mm² (42 x Ø 0.1 mm)	housing: PP grey; Sealing: EPDM	50 AC 60 DC	-25...80	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF127**
Connecting cable with socket M8 · 4-pole								
	25 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	–	50 AC 60 DC	-25...80	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF137**
	25 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	housing: PP grey; Sealing: EPDM	50 AC 60 DC	-25...80	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF141**

Connectors with LED, IP 65 / IP 67 / IP 68 / IP 69K

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Pro-tection	LEDs	Order no.
Connection cable M12 · 5-pole								
	2 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	–	10...36 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	LED	**EVF055**
	10 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	–	10...36 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	LED	**EVF057**
Connection cable M8 · 3-pole								
	10 m MPPE grey	3 x 0.34 mm² (42 x Ø 0.1 mm)	housing: PP grey; Sealing: EPDM	10...36 DC	-25...80	IP 65 / IP 67 / IP 68 / IP 69K	LED	**EVF159**
Connecting cable with socket M12 · 5-pole								
	5 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	10...36 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	LED	**EVF007**
	25 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	10...36 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	LED	**EVF009**
Connecting cable with socket M8 · 3-pole								
	5 m MPPE grey	3 x 0.34 mm² (42 x Ø 0.1 mm)	housing: PP black transparent; Sealing: EPDM	10...36 DC	-25...80	IP 65 / IP 67 / IP 68 / IP 69K	LED	**EVF131**
	25 m MPPE grey	3 x 0.34 mm² (42 x Ø 0.1 mm)	housing: PP black transparent; Sealing: EPDM	10...36 DC	-25...80	IP 65 / IP 67 / IP 68 / IP 69K	LED	**EVF133**

Wirable connectors socket / plug

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Pro-tection	LEDs	Order no.
	–	–	PA 6.6 grey; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF565**
	–	–	PA 6.6 grey; Sealing: EPDM	60 AC/DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF570**
	–	–	PA 6.6 grey; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF567**
	–	–	PA 6.6 grey; Sealing: EPDM	60 AC/DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF572**

Y splitters

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Pro-tection	LEDs	Order no.
	–	–	Housing: PA Halogen-free; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EBF006**

Y connection cable

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Pro-tection	LEDs	Order no.
	2 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	–	60 AC/DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF333**
	5 m MPPE grey	3 x 0.34 mm² (42 x Ø 0.1 mm)	–	10...36 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	LED	**EVF337**
	5 m MPPE grey	2 x 0.34 mm² (42 x Ø 0.1 mm) / 5 x 0.34 mm² (42 x Ø 0.1 mm)	–	24 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF695**

Ethernet D-coded

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Pro-tection	LEDs	Order no.
	5 m MPPE grey	4 x 0.34 mm² (7 x Ø 0.25 mm)	PP Halogen-free	30 AC 60 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF524**
	5 m MPPE grey	4 x 0.34 mm² (7 x Ø 0.25 mm)	PP Halogen-free	30 AC 60 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF532**
	5 m MPPE grey	4 x 0.34 mm² (7 x Ø 0.25 mm)	housing: PP Halogen-free	30 AC 60 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF558**

Mounting adapters for the food and beverage industry

Process adapter

- **Simple, quick and secure mounting**
- **Particularly suited for use in hygienic environments**
- **Food-grade stainless-steel adapters**
- **High pressure rating**

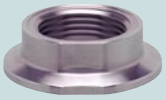
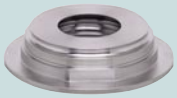
ECOLAB certified

High-grade stainless steel

Mounting adapters for the food and beverage industry

The adapters allow hygienic installation of process sensors in tanks or piping systems.

ifm offers a wide range of process connections made of high-grade stainless steel for use in industrial process, food, and beverage applications.

Type	Aseptoflex Vario		G1/2	G1
	Rubber sealing	Metal sealing		
Clamp				
DIN32676 / ISO2852 	1…1,5"; 2"	1…1,5"; 2"	1…1,5"; 2"	1…1,5"
Varivent 	Form F, Form N	Form F, Form N	Form F, Form N	Form N
DIN11864 	•		•	
Welding adapter				
	•		•	•
Screwed pipe connection				
DIN11851 	•	•	•	•
SMS 		•	•	
DIN11864 	•		•	
Flange				
DRD 	•			
T-piece				
	•		•	

Packaging and intralogistics

Bringing quality to the customer

Producing food with permanently high quality is the first step to ensure long-term success. The second step – filling or packaging – and the third step – delivery to the point of sale – should be handled with the same great care and attention to quality. Only then will the consumers be able to enjoy the quality of the foods produced to the highest level of satisfaction.

This industry-specific catalogue is available for download on our website at:
ifm.com/gb/food

System architecture Packaging and intralogistics

Cloud
Datenbank
Analyse
Cockpit

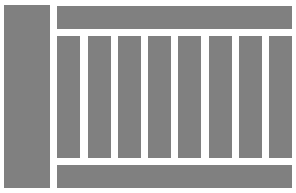
Edge gateways

IO-Link

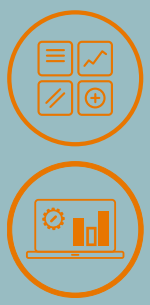
PLC
Control cabinet modules
Power supply
Field modules

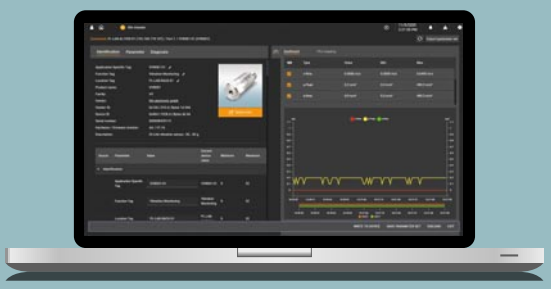
PROFINET
EtherNet/IP
EtherCAT
PROFIBUS
Modbus

PLC



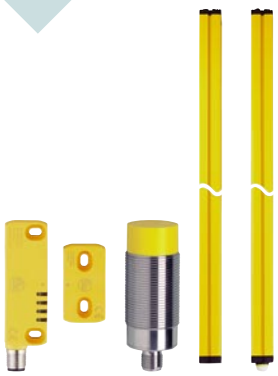
Sensors
Actuators
Light indicators





JSON
HTTP(S)
MQTT
OPC-UA
IO-Link

Safety



A strong network for packaging and logistics

IO-Link components

Separation between automation and IT network

Industry 4.0 ready via new IoT core

8 IO-Link ports with full V1.1 functionality

PROFINET, EtherNet/IP, EtherCAT or TCP/IP JSON

Master and device configurable via LR DEVICE software

IO-Link master for the automation and IT world

The IO-Link master modules for the control cabinet serve as a gateway between intelligent IO-Link sensors and the field bus. Besides, important information of the intelligent sensors can simultaneously be sent into the IT world.

With a separate IoT Ethernet socket the IT network can be set up completely separated from the automation network. Sensor information is transferred into the IT world via the established TCP/IP JSON interface.

IO-Link master control cabinet IP 20

Type	Description	Inputs / outputs	Interface	Protocol	Protection rating	Order no.
	IO-Link master CabinetLine	8 x Digital input / 8 x Digital output	Ethernet / IO-Link	MQTT JSON / PROFINET	IP 20	**AL1900**
	IO-Link master CabinetLine	8 x Digital input / 8 x Digital output	Ethernet / IO-Link	MQTT JSON / EtherCAT	IP 20	**AL1930**

IO-Link masters for field applications IP 67

Type	Description	Inputs / outputs	Interface	Protocol	Protection rating	Order no.
	IO-Link master PerformanceLine	12 x Digital input / 12 x Digital output	Ethernet / IO-Link	PROFINET	IP 65 / IP 66 / IP 67	**AL1402**
	IO-Link master PerformanceLine	12 x Digital input / 12 x Digital output	Ethernet / IO-Link	EtherNet/IP	IP 65 / IP 66 / IP 67	**AL1422**
	IO-Link master StandardLine	16 x Digital input / 8 x Digital output	Ethernet / IO-Link	PROFINET	IP 65 / IP 66 / IP 67	**AL1102**
	IO-Link master StandardLine	16 x Digital input / 8 x Digital output	Ethernet / IO-Link	EtherNet/IP	IP 65 / IP 66 / IP 67	**AL1122**
	IO-Link master DataLine	16 x Digital input / 8 x Digital output	Ethernet / IO-Link	MQTT JSON / EtherCAT	IP 65 / IP 66 / IP 67	**AL1332**
	IO-Link master DataLine	8 x Digital input / 4 x Digital output	Ethernet / IO-Link	MQTT JSON / PROFINET	IP 65 / IP 66 / IP 67	**AL1300**
	IO-Link master StandardLine	8 x Digital input / 4 x Digital output	IO-Link / AS-i	–	IP 65 / IP 66 / IP 67	**AC6000**
	IO-Link master StandardLine	4 x Digital input / 2 x Digital output	IO-Link / AS-i	–	IP 65 / IP 66 / IP 67	**AC6002**

IO-Link modules for field applications IP 67

Type	Description	Inputs / outputs	Interface	Protocol	Protection rating	Order no.
	IO-Link input/output module	16 x Digital input / 16 x Digital output	IO-Link	–	IP 65 / IP 67	**AL2325**

IO-Link

Type	Description	Inputs / outputs	Interface	Protocol	Protection rating	Order no.
	IO-Link output module	12 x Digital output	IO-Link	–	IP 65 / IP 67	**AL2330**
	IO-Link input / output module	16 x Digital input / 8 x analogue input (0...10 V), (4...20 mA) / 16 x Digital output	IO-Link	–	IP 65 / IP 67	**AL2605**

Displays

Type	Description	Order no.
	IO-Link display; Connector · display of all process values of the sensors connected to the same master	**E30443**
	IO-Link display; Connector · display for freely definable process values, texts and messages assigned from the controller	**E30391**

Accessories

Type	Description	Order no.
	Measured value and limit value display / converter 4…20 mA – IO-Link; Connector	**DP2200**
	Converter IO-Link - 0...10 V	**DP1223**
	Converter IO-Link - 4...20 mA	**DP1213**
	Connection cable; Ethernet cable, D-coded; 0.5 m; PVC; housing materials TPU / PA; IP 67; IP 20; (M12 plug / RJ45 plug)	**E12490**
	IO-Link repeater; Connector	**E30444**
	IO-Link Bluetooth adapter; Connector	**E30446**

IO-Link circuit breakers

Type	Description	Order no.
	Power supply module for electronic circuit breaker; terminals; Approval CE, cULus, IO-Link, cRUus	**DF2101**
	Electronic circuit breaker; terminals; Approval CE, cULus, cRUus	**DF2212**
	Electronic circuit breaker; terminals; Approval CE, cULus, cRUus	**DF2210**

Software

Type	Description	Order no.
	IO-Link parameter setting software; USB stick; single licence; full version	**QA0011**

LED strip RGBW

Type	Description	Order no.
	LED strip RGBW; signalling machine conditions: LED multi-colour RGB; illumination of installations: LED white; IP 68 · 62.5 x 14.2 x 4.5 mm	**DV1000**
	LED strip RGBW; signalling machine conditions: LED multi-colour RGB; illumination of installations: LED white; IP 68 · 250 x 14.2 x 4.5 mm	**DV1001**
	LED strip RGBW; signalling machine conditions: LED multi-colour RGB; illumination of installations: LED white; IP 68 · 500 x 14.2 x 4.5 mm	**DV1002**
	LED strip RGBW; signalling machine conditions: LED multi-colour RGB; illumination of installations: LED white; IP 68 · 750 x 14.2 x 4.5 mm	**DV1003**
	LED strip RGBW; signalling machine conditions: LED multi-colour RGB; illumination of installations: LED white; IP 68 · 1000 x 14.2 x 4.5 mm	**DV1004**

Signal lamps

Type	Dimensions [Ø x H]	Communication	Items supplied	Protection rating	Order no.
	70 x 384	Digital inputs: 6 / IO-Link	Mounting base / buzzer	IP 54	**DV1510**

Type	Dimensions [Ø x H]	Communication	Items supplied	Protection rating	Order no.
	70 x 244	IO-Link	–	IP 65	**DV2520**

Accessories for signal lamps

Type	Description	Order no.
	Mounting base	**E89060**
	Wall bracket	**E89061**
	Mounting tube	**E89066**

Connectors

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Pro-tection	LEDs	Order no.
Connection cable M12 · 5-pole · 3-wire								
	5 m PUR black	3 x 0.34 mm² (42 x Ø 0.1 mm)	housing: TPU orange; Sealing: FKM	250 AC 300 DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVC044**
Connecting cable with socket M12 · 5-pole · 4-wire								
	5 m PUR black	4 x 0.34 mm² (42 x Ø 0.1 mm)	housing: TPU orange; Sealing: FKM	250 AC 300 DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVC005**
	5 m PUR black	4 x 0.34 mm² (42 x Ø 0.1 mm)	housing: TPU orange; Sealing: FKM	250 AC 300 DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVC002**
	2 m PUR black	4 x 0.34 mm² (42 x Ø 0.1 mm)	housing: TPU orange; Sealing: FKM	250 AC 300 DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVC004**

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Protection	LEDs	Order no.
Y-splitter M12 · 5-pole								
	–	–	housing: PA orange; Sealing: FKM	250 AC 300 DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EBC113**
Y-splitter M12 / M8 · 3-pole								
	–	–	housing: PA orange; Sealing: FKM	50 AC 60 DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EBC112**
Y connection cable M12 · 5-pole · 4-wire								
	5 m PUR black	4 x 0.34 mm² (42 x Ø 0.1 mm)	–	60 AC/DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVC433**
Y connection cable M12 · 5-pole · 3-wire								
	5 m PUR black	3 x 0.34 mm² (42 x Ø 0.1 mm)	–	10...36 DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	LED	**EVC439**
Y connection cable M12 · 2/5-wire								
	5 m PUR black	2 x 0.34 mm² (42 x Ø 0.1 mm) / 5 x 0.34 mm² (42 x Ø 0.1 mm)	–	24 DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVC695**
Wirable plug M12								
	–	–	–	250 AC 300 DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVC813**
Wirable socket M12 · 5-pole								
	–	–	–	60 AC/DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVC814**

Inductive sensors for conveying and material handling

Inductive sensors

Very long sensing ranges up to 60 mm

Different sizes for demanding applications

M12 connector easy to mount and maintain

Type IM: sensing face can be rotated to 5 different positions whilst maintaining clear visibility of the corner LEDs

Applications

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

Type IM

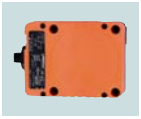
The two clearly visible corner LEDs of the inductive rectangular sensor IM (40 x 40 mm) can be seen even in challenging installation conditions.

By loosening the adjusting screw, the sensing face can be rotated to 5 different positions providing additional flexibility to suit your application.

Long sensing ranges

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

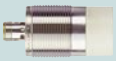
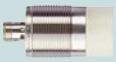
Rectangular housings

Type	Dimensions [mm]	Sensing range [mm]	Material	U_b [V]	Protection	f [Hz]	I_{load} [mA]	Order no.
Connector: M12 · Output function: normally open / normally closed; (selectable) · 3-wire · DC PNP								
	105 x 80 x 40	20...60 nf	plastics	10...36	IP 67	100	250	**ID5046**
Connector: M12 · Output function: normally open · 3-wire · DC PNP								
	40 x 40 x 54	20 f	plastics	10...36	IP 67	100	200	**IM5115**
	92 x 80 x 40	50 f	plastics	10...36	IP 67	70	250	**ID5055**
Connector: M12 · Output function: complementary · 3-wire · DC PNP								
	40 x 40 x 54	20 f	plastics	10...36	IP 67 / IP 69K	200	200	**IM5132**
	40 x 40 x 54	35 nf	plastics	10...36	IP 67	200	200	**IM5133**
	40 x 40 x 54	40 nf	plastics	10...36	IP 67 / IP 69K	200	200	**IM5135**

Accessories for rectangular housings

Type	Description	Order no.
	Mounting plate · Mounting plate: stainless steel; washer: stainless steel; screws: stainless steel	**E12106**
	Mounting bracket · stainless steel (1.4305 / 303)	**E10730**
	Connecting cable with socket; Operating voltage < 250 V AC; 2 m; PUR; housing materials housing: TPU orange; Sealing: FKM; IP 65; IP 67; IP 68; IP 69K; Free from silicone yes; Halogen-free yes; Gold-plated contacts yes · housing: TPU orange; Sealing: FKM	**EVC001**
	Connecting cable with socket; Operating voltage < 250 V AC; 2 m; PUR; housing materials housing: TPU orange; Sealing: FKM; IP 65; IP 67; IP 68; IP 69K; Free from silicone yes; Halogen-free yes; Gold-plated contacts yes · housing: TPU orange; Sealing: FKM	**EVC004**

Cylindrical housing, correction factor 1, increased sensing range, ambient temperature -40 °C

Type	Dimensions [mm]	Sensing range [mm]	Material	U_b [V]	Protection	f [Hz]	I_{load} [mA]	Order no.
Connector: M8 · Output function: normally open · 3-wire · DC PNP								
	M8 x 1 / L = 40	3 f	stainless steel	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	2000	100	**IES200**
	M8 x 1 / L = 40	6 nf	stainless steel	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	2000	100	**IES201**
Connector: M12 · Output function: normally open · 3-wire · DC PNP								
	M12 x 1 / L = 45	4 f	stainless steel	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	2000	100	**IFS297**
	M12 x 1 / L = 45	10 nf	stainless steel	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	2000	100	**IFS299**
	M18 x 1 / L = 45	8 f	stainless steel	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	2000	100	**IGS287**
	M18 x 1 / L = 45	12 nf	stainless steel	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	2000	100	**IGS288**
	M18 x 1 / L = 60	15 nf	stainless steel	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	2000	100	**IGS292**
	M30 x 1.5 / L = 60	15 f	stainless steel	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	2000	100	**IIS282**
	M30 x 1.5 / L = 60	22 nf	stainless steel	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	2000	100	**IIS283**
	M30 x 1.5 / L = 60	30 nf	stainless steel	10...30	IP 65 / IP 66 / IP 67 / IP 68 / IP 69K	2000	100	**IIS284**

Accessories for cylindrical types

Type	Description	Order no.
	Angle bracket · for type M8 · stainless steel (1.4301 / 304)	**E10734**
	Angle bracket · for type M12 · stainless steel (1.4301 / 304)	**E10735**
	Angle bracket · for type M18 · stainless steel (1.4301 / 304)	**E10736**
	Angle bracket; Approval CE · for type M30 · stainless steel (1.4301 / 304)	**E12487**

Connectors

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Protection	LEDs	Order no.
Connecting cable with socket M12 · 5-pole · 4-wire								
	5 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF001**
	5 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF004**

Full control: capacitive sensors

Capacitive sensors

High noise immunity guarantees high operational reliability

Sensing range adjustable by means of a potentiometer or pushbuttons

Plastic or metal housings for different applications

Capacitive sensors for position and level detection

Different mounting accessories for tank and sight glass (bypass)

Capacitive sensors

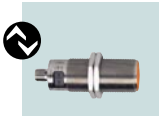
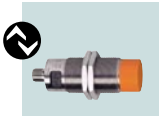
Capacitive sensors are used for non-contact detection of any types of objects and for level monitoring. In contrast to inductive sensors, which only detect metallic objects, capacitive sensors can also detect non-metallic materials.

In packaging systems, capacitive sensors might check the presence of cardboard boxes, or monitor the medium level in a carton (e.g. full / empty check in milk cartons). Another application is the detection of sheets of glass or wood panels on a roller conveyor.

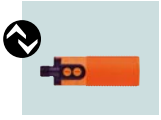
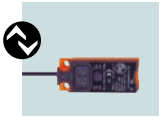
Parameter setting

The parameters can either be set via the buttons on the sensor or via IO-Link interface. The LR SENSOR software also simplifies the monitoring of different types of sensors.

Capacitive sensors

Type	Dimensions [mm]	Sensing range [mm]	Material	U_b [V]	Protection	f AC / DC [Hz]	I_{load} AC / DC [mA]	Order no.
Connector: M12 · Output function: normally open / normally closed; (selectable) · DC PNP								
	M30 x 1.5 / L = 90	8 f	stainless steel	10...30	IP 65 / IP 67	10	100	**KI5085**
	M30 x 1.5 / L = 90	15 nf	stainless steel	10...30	IP 65 / IP 67	10	100	**KI5087**
	M30 x 1.5 / L = 90	20 nf	plastics	10...36	IP 65 / IP 67	10	200	**KI5083**

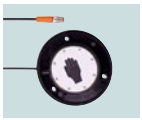
Capacitive sensors IP 69K

Type	Dimensions [mm]	Sensing range [mm]	Material	U_b [V]	Protection	f AC / DC [Hz]	I_{load} AC / DC [mA]	Order no.
Connector: M12 · Output function: normally open / normally closed; (selectable) · DC PNP								
	M30 x 1.5 / L = 92	0.5...40 nf	plastics	10...30	IP 65 / IP 67 / IP 69K	30	200	**KI6000**
Cable: 2 m · Output function: normally open / normally closed; (selectable) · DC PNP								
	20 x 14 x 48	12 nf	plastics	10...30	IP 65 / IP 67 / IP 69K	10	100	**KQ6002**

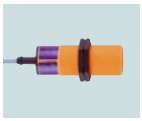
f = flush / nf = non flush / qf = quasi flush

Touch sensors / Illuminated pushbuttons M22

Type	U_b [V]	I_{load} [mA]	Current consumption [mA]	Ambient temperature [°C]	Protection	Order no.
Cable with connector: M12, 0.3 m · Output function: normally open · DC PNP						
	12...30	200	30	-40...85	IP 65 / IP 67 / IP 69K	**KT5106**
Cable: 2 m · Output function: normally open · DC PNP						
	12...30	200	30	-40...85	IP 65 / IP 67 / IP 69K	**KT5110**

Type	U_b [V]	I_{load} [mA]	Current consumption [mA]	Ambient temperature [°C]	Protection	Order no.
Cable with connector: M8, 0.3 m · Output function: normally open · DC PNP						
	12...30	200	30	-40...85	IP 67 / IP 69K	**KT5011**

Sensors with ATEX approval

Type	Dimensions [mm]	Sensing range [mm]	Material	$U_{nom.}$ at 1 KΩ [V]	U_b [V]	Internal capacit. [nF]	Internal inductance [µH]	f [Hz]	Order no.
Cable: 2 m · Output function: normally closed · DC NAMUR									
	M30 x 1.5 / L = 81	15 nf	plastics	8.2 DC; (1kΩ)	7.5...15	375	1	40	**KI5030**
Terminals · Output function: complementary · DC PNP									
	M30 x 1.5 / L = 125	15 nf	plastics	10...30 DC	–	–	–	10	**KI505A**
	M30 x 1.5 / L = 150	15 nf	plastics	10...30 DC	–	–	–	10	**KI503A**
Terminals · Output function: normally open / normally closed; (selectable) · DC PNP									
	105 x 80 x 42	60 nf	plastics	10...36 DC	–	–	–	10	**KD501A**

f = flush / nf = non flush / qf = quasi flush

System components

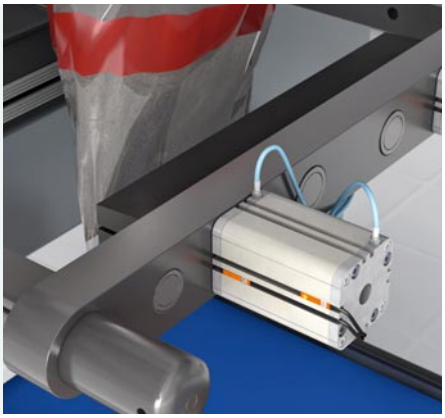
Type	Description	Order no.
	Switching amplifier for Namur sensors according to 94/9/EC (ATEX); Operating voltage 24 DC V; DC PNP; Number of channels 2; terminals: ...2.5 mm²; IP 20; Switching frequency 5000 Hz	**N0534A**
	Mounting adapter for capacitive sensors; Approval FDA	**E11033**
	Lock nut for mounting adapter; Approval FDA	**E11031**

Type	Description	Order no.
	Coloured surround for touch sensors	**E12384**
	Coloured surround for touch sensors	**E80373**
	Coloured surround for touch sensors	**E80375**
	Coloured surround for touch sensors	**E80372**
	Coloured surround for touch sensors	**E80374**
	Coloured surround for touch sensors	**E80376**

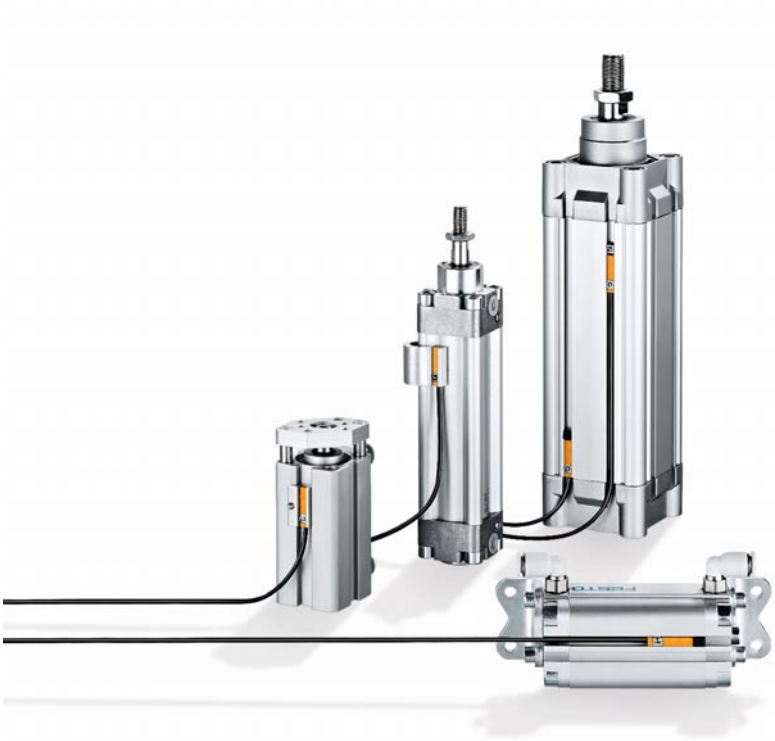
Connectors

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Protection	LEDs	Order no.
Connecting cable with socket M12 · 5-pole · 4-wire								
	2 m PUR black	4 x 0.34 mm² (42 x Ø 0.1 mm)	housing: TPU orange; Sealing: FKM	250 AC 300 DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVC001**
	2 m PUR black	4 x 0.34 mm² (42 x Ø 0.1 mm)	housing: TPU orange; Sealing: FKM	250 AC 300 DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVC004**
Connecting cable with socket M8 · 3-pole · 3-wire								
	2 m PUR black	3 x 0.25 mm² (32 x Ø 0.1 mm)	housing: TPU orange; Sealing: FKM	50 AC 60 DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVC141**
	2 m PUR black	3 x 0.25 mm² (32 x Ø 0.1 mm)	housing: TPU orange; Sealing: FKM	50 AC 60 DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVC144**

Cylinder sensors for hygienic and wet areas



Cylinder sensors



Wear-free, without mechanical components (in contrast to reed switches)

Simple installation on round cylinder by means of protective bracket and a jubilee clip

High switching frequencies and travel speeds possible

Mounting accessories and adapters for different cylinder types

Compact housing and simple mounting for washdown environments

The small cylinder sensors can be easily mounted on clean line cylinders, even if space is at a premium. A protective bracket available as accessory protects the sensor in the application.

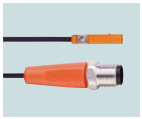
Advantages compared to reed switches

In contrast to reed switches the cylinder sensors work without mechanical components and thus without wear. This guarantees an unlimited number of switching cycles.

Mechanical wear of reed switches can lead to switch point drift. The cylinder sensors from ifm however have a very good repeatability permanently.

ifm sensors also function in case of weak magnetic fields. Reed switches require a higher field intensity. The cylinder sensors are also characterised by a fast response time.

Use on T-slot cylinders

Type	Dimensions [mm]	Material	U_b [V]	f [Hz]	Protection	I_{load} [mA]	T_a [°C]	Order no.
	25 x 5 x 6.5	plastics	10...30	10000	IP 65 / IP 67 / IP 69K	100	-25...85	**MK5111**
	25 x 5 x 6.5	plastics	10...30	10000	IP 65 / IP 67 / IP 69K	100	-25...85	**MK5128**

Use on C-slot cylinders

Type	Dimensions [mm]	Material	U_b [V]	f [Hz]	Protection	I_{load} [mA]	T_a [°C]	Order no.
	17.5 x 2.8 x 7.7	plastics	10...30	10000	IP 65 / IP 67	100	-25...85	**MK5301**
	26.1 x 2.8 x 5.5	plastics	10...30	10000	IP 65 / IP 67	100	-25...85	**MK5312**

Fixing straps for clean line cylinders

Type	Description	Order no.
	Fixing strap for clean-line cylinders; Ø 20...25 mm	**E11976**
	Mounting adapter for clean-line cylinders	**E11877**

Connectors

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Protection	LEDs	Order no.
Connecting cable with socket M12 · 5-pole · 4-wire								
	2 m PUR black	4 x 0.34 mm² (42 x Ø 0.1 mm)	housing: TPU orange; Sealing: FKM	250 AC 300 DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVC001**

Ultrasonic sensors with stainless steel housing

Ultrasonic sensors

Robust high-grade stainless steel housing for demanding applications

Sensing range up to 1.2 m in M18 cube design and 2.2 m in M18 design

The vibrating sound transducer reduces the deposit of dirt

Retro-reflective operation for orientation-independent object detection

Easy setting via teach button, wire teach or IO-Link

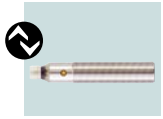
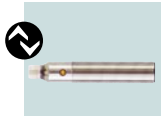
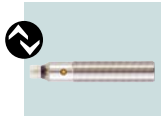
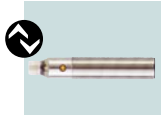
The alternative for difficult surfaces

Ultrasonic sensors transmit and receive sound waves in the ultrasonic range. The object to be detected reflects the sound waves and the distance information is determined via time of flight measurement. As opposed to photoelectric sensors colour, transparency or the object's surface shine do not affect sensing. Blister packages in packaging technology or transparent plastic bowls in the food industry, for example, can be reliably detected.

High performance

The ifm ultrasonic sensors in M18 design provide a particularly small blind zone and long sensing ranges which are usually only achieved by sensors of a considerably larger design. The sensors operate reliably with heavy soiling so that they can be used in applications in which photoelectric sensors meet their limits.

Ultrasonic diffuse-reflection sensor with stainless steel housing

Type	Dimensions [mm]	Sensing range [mm]	Material	U_b [V]	Protection	f [Hz]	I_{load} [mA]	Order no.
Connector: M12 · Output function: normally open / normally closed; (parameterisable) · DC PNP								
	M18 x 1 / L = 97.5	150...1600	stainless steel	10...30	IP 67	3	100	**UGT509**
	M18 x 1 / L = 97.5	200...2200	stainless steel	10...30	IP 67	2	100	**UGT512**
Connector: M12 · Output function: normally open / normally closed; (parameterisable + 1x current output); analogue · DC PNP								
	M18 x 1 / L = 97.5	150...1600	stainless steel	10...30	IP 67	3	100	**UGT510**
	M18 x 1 / L = 97.5	200...2200	stainless steel	10...30	IP 67	2	100	**UGT513**
	M18 x 1	40...300	stainless steel	10...30	IP 67	8	100	**UGT580**
	M18 x 1	80...1200	stainless steel	10...30	IP 67	5	100	**UGT584**

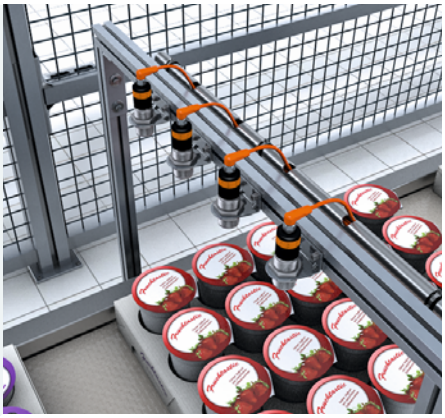
System components

Type	Description	Order no.
	Angle bracket · for type M18 · stainless steel (1.4301 / 304)	**E10736**

Connectors

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Protection	LEDs	Order no.
Connecting cable with socket M12 · 5-pole · 4-wire								
	2 m PUR black	4 x 0.34 mm² (42 x Ø 0.1 mm)	housing: TPU orange; Sealing: FKM	250 AC 300 DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVC001**

Photoelectric sensors – keep your process monitored at all times



Red light sensors / laser sensors

Reliable background suppression and colour-independent detection

Shiny surfaces are detected reliably (e.g. stainless steel)

Any sensor position, even an oblique angle to the object

IO-LINK integrated, e.g. for reading the actual value

IO-Link

PMD Technology

Class 1 laser

Class 2 laser

Time of flight technology as standard sensor

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

Any surface and mounting position

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

Rectangular housing O5 BasicLine

Type	Operating principle	Range	Type of light	Spot Ø at max. range [mm]	Output	Order no.
Diffuse reflection sensor · IP 65						
	Background suppression	50...1400 mm	red light	50	light-on mode / PNP	**O5H200**
Retro-reflective sensor · IP 67						
	polarisation filter	0.1...7 m	red light	175	dark-on mode / PNP	**O5P200**
Through-beam sensor · IP 67						
	transmitter	< 20 m	red light	500	–	**O5S200**
	receiver	< 20 m	red light	–	dark-on mode / PNP	**O5E200**

Rectangular housing O5 PerformanceLine

Type	Operating principle	Range	Type of light	Spot Ø at max. range [mm]	Output	Order no.
Diffuse reflection sensor · IP 67						
	Background suppression	50...1800 mm	red light	50	light-on/dark-on mode; (programmable) / PNP	**O5H500**
Retro-reflective sensor · IP 67						
	polarisation filter	0.075...10 m	red light	250	light-on/dark-on mode; (programmable) / PNP	**O5P500**
Through-beam sensor · IP 67						
	transmitter	< 25 m	red light	625	–	**O5S500**
	receiver	< 25 m	red light	–	light-on/dark-on mode; (programmable) / PNP	**O5E500**

Rectangular O5 housing, laser class 1 and 2

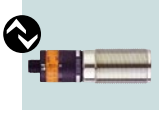
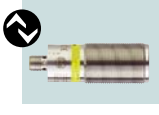
Type	Operating principle	Range	Type of light	Laser protection class	Output	Order no.
Photoelectric distance sensor · IP 65; IP 67						
	Background suppression	0.03...2 m	red light	1	Number of digital outputs: 2 / normally open / normally closed; (complementary) / PNP	**O5D150**

Type	Operating principle	Range	Type of light	Laser protection class	Output	Order no.
Photoelectric distance sensor · IP 65; IP 67						
	Background suppression	0.03...2 m	red light	2	Number of digital outputs: 2 / normally open / normally closed; (complementary) / PNP	**O5D100**

Rectangular plastic housing in O6 design

Type	Operating principle	Range	Type of light	Spot Ø at max. range [mm]	Output	Order no.
Diffuse reflection sensor · IP 65; IP 67						
	Background suppression	2...200 mm	red light	8	light-on/dark-on mode; (selectable) / PNP	**O6H200**
Retro-reflective sensor · IP 65; IP 67						
	Polarisation filter	0.05...5 m	red light	150	light-on/dark-on mode; (selectable) / PNP	**O6P200**
Through-beam sensor · IP 65; IP 67						
	Transmitter	< 10 m	red light	300	–	**O6S200**
	Receiver	< 10 m	red light	–	light-on/dark-on mode; (selectable) / PNP	**O6E200**

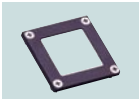
Cylindrical OI (M30) housing, laser class 1 and 2

Type	Operating principle	Range	Type of light	Laser protection class	Output	Order no.
Photoelectric distance sensor · IP 65; IP 67						
	Background suppression	0.03...2 m	red light	1	Number of digital outputs: 2 / normally open / normally closed; (complementary) / PNP	**OID251**
Photoelectric distance sensor · IP 65; IP 67; IP 68; IP 69K						
	Background suppression	0.03...2 m	red light	2	Number of digital outputs: 2 / normally open / normally closed; (complementary) / PNP	**OID204**

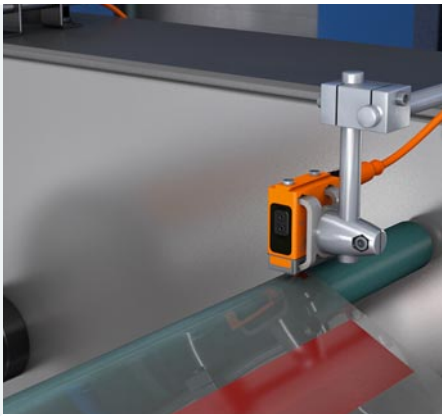
Rectangular O1 housing

Type	Operating principle	Range	Type of light	Laser protection class	Output	Order no.
Photoelectric distance sensor · IP 67						
	Photoelectric distance sensor	0.3...6 m	red light	1	Number of digital outputs: 2 / Number of analogue outputs: 1 / normally open / normally closed; (programmable) / PNP	**O1D155**
	Photoelectric distance sensor	0.2...10 m	–	2	Number of digital outputs: 2 / Number of analogue outputs: 1 / normally open / normally closed; (parameterisable) / PNP	**O1D100**
Optical level sensor · IP 67						
	Optical level sensor	0.2...10 m	–	2	Number of digital outputs: 2 / Number of analogue outputs: 1 / normally open / normally closed; (programmable) / PNP	**O1D300**

System components

Type	Description	Order no.
	Angle bracket	**E10737**
	Mounting set for position sensors; Ø 30.2 mm	**E20874**
	Mounting adapter for photoelectric level sensors; 42 x 43.5 x 42; flange: stainless steel (1.4404 / 316L); Sealing: FKM; Protective cover: PMMA transparent; screws: stainless steel; washers: stainless steel	**E21224**
	Protective cover	**E21133**

Colour, contrast sensor and sensor for transparent objects



Photoelectric sensors for specific applications

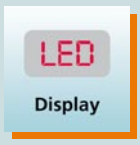
The colour sensor detects even finest shades of colour, 5 tolerance steps can be selected

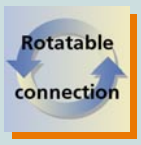
Contrast sensor with teach function for automatic transmitted-light colour

The sensor for transparent objects detects among others glass, films and PET bottles

High switching frequencies for fast moving applications

Auto-Detect for PNP/NPN configuration, time-saving teach functions





Colour sensor for production control

The colour sensor detects objects based on their colour. With five selectable tolerance steps the user defines the permissible colour differences. An adjustment to the application is made via pushbuttons.

Contrast sensor for object detection

The highly sensitive contrast sensor reliably detects registration marks or printed colour bars by determining the difference between the target and the background.

Detection of transparent objects

The sensors of the O5G series detect transparent objects such as film, glass, PET / plastic bottles or transparent packaging. Normal photoelectric sensors are not suited for this, as they would look through the transparent material without detecting it.

Sensors for colour detection

Type	Operating principle	Measuring range	Light spot diameter [mm]	U_b [V]	Current consumption [mA]	Sampling rate / switching frequency [Hz]	Order no.
Connector: M12 · Output function: light-on/dark-on mode; (programmable) · DC PNP/NPN							
	Colour sensor	15...19 mm	–	10...36	50; ((24 V))	2000	**O5C500**

Contrast sensors

Type	Operating principle	Range	Type of light	Spot Ø at max. range [mm]	Output	Order no.
Connector: M12 · 10...36 DC · plastics · IP 67						
	Contrast sensor	18...22 mm	red light	1.5 x 5	light-on/dark-on mode; (programmable) / PNP/NPN	**O5K500**

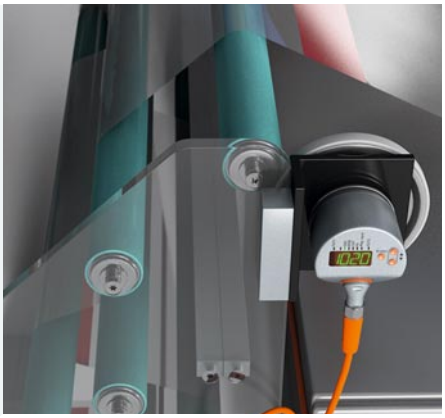
Sensors for the detection of transparent objects

Type	Operating principle	Range	Type of light	Spot Ø at max. range [mm]	Output	Order no.
Connector: M12 · 10...36 DC; ("supply class 2" to cULus) · plastics · IP 67						
	Polarisation filter	0...3 m	red light	80	light-on/dark-on mode; (programmable) / PNP/NPN	**O5G500**

System components

Type	Description	Order no.
	Reflector for retro-reflective laser sensors; 48 x 48 mm	**E20722**
	Mounting set for photoelectric sensors	**E21083**
	Mounting set with protective cover for photoelectric sensors	**E21084**

Incremental and absolute encoders



Encoders

Resolution of 1...10,000 and signal level (TTL / HTL) freely programmable

Display: Two-colour electronic rotatable display of the process values

Versatile: M12 connector can be used radially or axially

Adaptable: Solid shaft (clamp / synchro flange) or hollow shaft design

IP 65
IP 67

IO-Link

LED

Vibration and shock resistant

Motion controller: encoder, speed / direction monitor and counter all in one

The magnetic sensing principle provides the accuracy of photoelectric encoders and the robustness of magnetic systems.

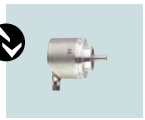
Resolution and signal level can be programmed. The encoders have a wide voltage range of 4.75...30 V DC and are therefore suited for universal use.

Performance Line encoders have an integrated signal evaluation for speed monitoring, counter functions and detection of the direction of rotation. They provide easy setting and position value indication by means of display and operating keys with intuitive menu navigation.

Diagnostic and parameter data are reliably transferred via IO-Link.

Ready for Industry 4.0!

Encoders

Type	Resolution	U_b [V]	f [kHz]	I_{load} [mA]	Shaft [mm]	Ambient temperature [°C]	Cable entry	Order no.
Type: ROP · Connector: M12 · stainless steel · DC								
	1...10000	4.75...30	1000	50	12	-40...85	radial / axial	**ROP520**
Type: RVP · Connector: M12 · stainless steel · DC								
	1...10000	4.75...30	1000	50	10	-40...85	radial / axial	**RVP510**
Type: RUP · Connector: M12 · stainless steel · DC								
	1...10000	4.75...30	1000	50	6	-40...85	radial / axial	**RUP500**
Type: RMS · Connector: M12 · stainless steel · DC								
	31 Bit	18...30	–	–	10	-40...85	radial / axial	**RMV300**
Type: RM · Connector: M12 · aluminium · DC								
	25 Bit	10...30	–	–	12	-40...85	–	**RM3010**
	25 Bit	10...30	–	–	10	-40...85	–	**RM3011**

Accessories

Type	Description	Order no.
	spring arm for encoders	**E61438**

Connectors

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Protection	LEDs	Order no.
Connecting cable with socket M12 · 8-pole · 8-wire								
	5 m PUR black	8 x 0.25 mm² (14 x Ø 0.15 mm)	TPU	30 AC 36 DC	-25...90	IP 67	–	**E12403**

Pressure sensors with digital display

Pressure sensors

Clearly indicate the acceptable ranges: programmable red / green display

Intuitive, user-friendly handling

Clearly visible indication of the switching status

Robust all-rounders

Their robustness and high protection rating ensure reliable operation of the PN type sensors even in harsh industrial environments. The ceramic-capacitive measuring principle with a special support of the measuring diaphragm makes the sensors immune to overload operation and high pressure peaks, ensuring outstanding long-term stability.

Pneumatics specialists

The sensors of the PQ series are optimised for pneumatic and compressed air applications. They can be used for both relative and differential pressure measurement. This makes them particularly suited for monitoring of filters blocking. The measuring cell is insensitive to liquids or deposits that might occur in the system. It is overload protected and highly accurate.

Pressure sensor with display

Type	Process connection	Display	Measuring range [bar]	$P_{overload}$ max. [bar]	$P_{bursting}$ min. [bar]	U_b DC [V]	Order no.
Connector: M12 · Output function: normally open / normally closed; (parameterisable); analogue · DC PNP/NPN							
	G 1/4 internal thread	4-digit display with colour change	-1...6	40	100	18...30	**PN2015**
	G 1/4 internal thread	4-digit display with colour change	-1...10	75	150	18...30	**PN2094**
	G 1/4 internal thread	4-digit display with colour change	0...16	85	150	18...30	**PN2014**
	G 1/4 external thread	4-digit display with colour change	-1...6	40	100	18...30	**PN2515**
	G 1/4 external thread	4-digit display with colour change	-1...10	75	150	18...30	**PN2594**
	G 1/4 external thread	4-digit display with colour change	0...16	85	150	18...30	**PN2514**

Compact pressure sensor with display

Type	Process connection	Display	Measuring range [bar]	$P_{overload}$ max. [bar]	$P_{bursting}$ min. [bar]	U_b DC [V]	Order no.
Connector: M8 · Output function: normally open / normally closed; (parameterisable); analogue · DC PNP							
	G 1/8 internal thread	alphanumeric display	-1...1	20	30	18...32	**PQ3809**
	G 1/8 internal thread	alphanumeric display	-1...10	20	30	18...32	**PQ3834**
Connector: M8 · Output function: normally open / normally closed; (parameterisable) · DC PNP							
	G 1/8 internal thread	alphanumeric display	-1...1	20	30	18...32	**PQ7809**
	G 1/8 internal thread	alphanumeric display	-1...10	20	30	18...32	**PQ7834**

Connectors

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Pro-tection	LEDs	Order no.
Connecting cable with socket M8 · 4-pole · 4-wire								
	5 m PUR black	4 x 0.25 mm² (32 x Ø 0.1 mm)	housing: TPU orange; Sealing: FKM	50 AC 60 DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVC151**
Connecting cable with socket M12 · 5-pole · 4-wire								
	5 m PUR black	4 x 0.34 mm² (42 x Ø 0.1 mm)	housing: TPU orange; Sealing: FKM	250 AC 300 DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVC002**

Completeness control for the packaging industry

3D sensors

Different handling units can be taught

Reliable detection of underfill or overfill

Automatic position tracking

Colour-independent and extraneous-light resistant due to time-of-flight technology (PMD)

Switching outputs and Ethernet process data interface

IP 65
IP 67

Stainless steel

Ethernet

EtherNet/IP

IP 69 K

PROFINET

Incomplete shipments never again

If a pallet with only one incomplete handling unit reaches the customer, he often returns all goods. This does not only lead to dissatisfaction but also to additional costs. Completeness monitoring provides the remedy. Often individual sensors are installed above each individual handling unit position. This is, however, not very flexible if the handling unit type or size changes. Then changes become necessary. If colour or texture of the handling units change, conventional sensors reach their limits.

All these problems are unknown to completeness monitoring on the basis of 3D sensors: The 3D sensor looks at the handling unit from above and compares it with the models taught in by the user. It signals any deviation via a switching output.

Continuous experience exchange with users and extensive handling tests have led to extraordinarily simple operation and integration of the sensor.

Sensors for 3D object recognition

Type	Operating principle	Resolution (pixels)	Angle of aperture (horizontal x vertical) [°]	Lighting	Max. sampling rate [Hz]	Ambient temperature [°C]	Order no.
3D sensor · Type: O3D · Connector: M12 · aluminium · DC							
	PMD 3D ToF-Chip	176 x 132	40 x 30	yes; (infrared: 850 nm invisible radiation LED)	25	-10...50	**O3D300**
	PMD 3D ToF-Chip	176 x 132	60 x 45	yes; (infrared: 850 nm invisible radiation LED)	25	-10...50	**O3D302**
3D sensor · Type: O3D · Connector: M12 · stainless steel · DC							
	PMD 3D ToF-Chip	176 x 132	40 x 30	yes; (infrared: 850 nm invisible radiation LED)	–	-10...50	**O3D310**
	PMD 3D ToF-Chip	176 x 132	60 x 45	yes; (infrared: 850 nm invisible radiation LED)	–	-10...50	**O3D312**

System components

Type	Description	Order no.
	Mounting set for 3D sensors	**E3D301**

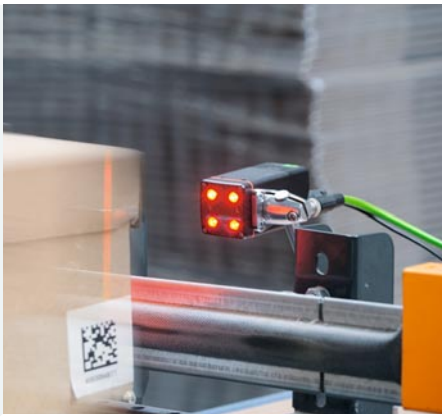
Connection cables for 2D and 3D sensors

Type	Description	Order no.
	Connection cable; Ethernet cable, D-coded; 2 m; PVC; housing materials PUR / PC; IP 67; IP 42; (M12 plug / RJ45 plug)	**E11898**
	Connection cable; Operating voltage < 50 V AC; Ethernet cable, D-coded; 2 m; PVC; housing materials TPU; IP 67; Gold-plated contacts yes	**E21138**
	Connecting cable with socket; Operating voltage < 30 V AC; 2 m; PUR; housing materials PUR; IP 68; Halogen-free yes	**E11950**

Software

Type	Description	Order no.
	Operating software	**E3D300**

Powerful multicode reader – simple like a sensor



1D/2D code readers

Freely definable data output via Ethernet/IP or Profinet

Easy setting by teaching using one button, or by using the ifm Vision Assistant software

Detects different codes in one image

Detects codes on various backgrounds without any difficulty

Data migration via ifm memory plug

EtherNet/IP

PROFINET

TCP/IP

vision assistant

Further information:
ifm.com/gb/o2i

Powerful detection and quick set-up

The new multicode reader reliably detects 1D and 2D codes. It ensures reliable identification even under difficult conditions, e.g. in case of changing extraneous light or shiny surfaces. Several different codes in one or more images can be evaluated in just a few milliseconds.

Simple applications with one code per image can be set quickly via teach button. The preset device configuration can be changed by means of a user-friendly smartphone app.

Vision Assistant software

For complex identification tasks, the multicode reader can be configured using the award-winning Vision Assistant software. The intuitive navigation and the visualisation help you to keep track.

Multicode reader

Type	Dimensions [mm]	Max. field of view size [mm]	Type of light LED	Motion speed [m/s]	Process interface	Order no.
1D/2D code reader · Stecker: M12 · Pole: 5 · Pole: 4						
	45 x 45 x 86	192 x 144	red light	7	Digital inputs: 1 / Ethernet / TCP/IP / EtherNet/IP	**O2I504**
	45 x 45 x 86	302 x 227	red light	7	Digital inputs: 1 / Ethernet / TCP/IP / EtherNet/IP	**O2I500**
	45 x 45 x 86	604 x 453	red light	7	Digital inputs: 1 / Ethernet / TCP/IP / PROFINET	**O2I512**
	45 x 45 x 86	192 x 144	infrared light	7	Digital inputs: 1 / Ethernet / TCP/IP / PROFINET	**O2I515**
	45 x 45 x 86	302 x 227	infrared light	7	Digital inputs: 1 / Ethernet / TCP/IP / PROFINET	**O2I511**
	45 x 45 x 86	604 x 453	infrared light	7	Digital inputs: 1 / Ethernet / TCP/IP / EtherNet/IP	**O2I503**

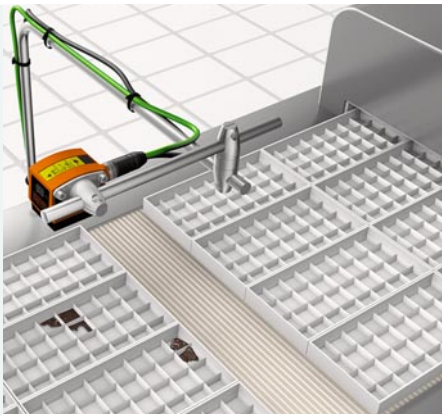
Accessories

Type	Description	Order no.
	Mounting set	**E2D500**
	Mounting set for illumination unit	**E2D501**
	Illumination unit; 256.8 x 197 x 106.7 mm; red light,cyan light; Connector	**O2D933**

Jumpers for the multi-code reader

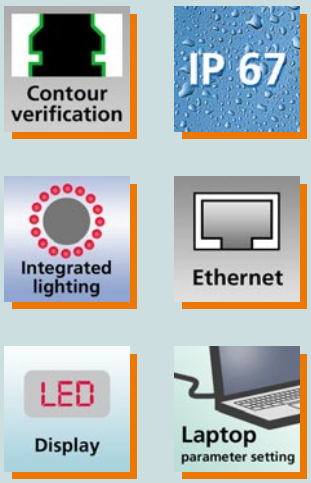
Type	Description	Order no.
	Connection cable; Ethernet cable, D-coded; 2 m; PVC; housing materials PUR / PC; IP 67; IP 42; (M12 plug / RJ45 plug)	**E11898**
	Y connection cable; Operating voltage < 60 V AC; 2; 0.4 m; PUR; IP 65; IP 67; IP 68; IP 69K; Free from silicone yes; Halogen-free yes; Gold-plated contacts yes	**EVC847**

Quality assurance by means of objective object inspection



Vision sensors

- **Object inspection by means of defined shapes and contours**
- **For applications in production and quality control**
- **Robust housing for harsh industrial environments**
- **Wizard for easy parameter setting**



Application example: pixel counter

Before the liquid chocolate is filled into moulds, it has to be ensured that the moulds are empty. The O2V vision sensor is used for this task. It checks the presence, size, position or completeness on the basis of variable features.

Contour sensor

Type	Operating principle	Max. field of view size [mm]	Detection rate [Hz]	Type of light	Ambient temperature [°C]	Order no.
Type: O2D2 · Connector: M12 · diecast zinc · DC						
	CMOS image sensor black/white, Resolution 640 x 480	400 x 300	20	infrared light	-10...60	**O2D224**
	CMOS image sensor black/white, Resolution 640 x 480	640 x 480	20	infrared light	-10...60	**O2D220**
	CMOS image sensor black/white, Resolution 640 x 480	1320 x 945	20	infrared light	-10...60	**O2D222**

Pixel counters

Type	Operating principle	Max. field of view size [mm]	Detection rate [Hz]	Type of light	Ambient temperature [°C]	Order no.
Type: O2V · Connector: M12 · diecast zinc · DC						
	CMOS image sensor black/white, Resolution 640 x 480	400 x 300	20	white light	-10...60	**O2V104**
	CMOS image sensor black/white, Resolution 640 x 480	640 x 480	20	white light	-10...60	**O2V100**
	CMOS image sensor black/white, Resolution 640 x 480	1320 x 945	20	infrared light	-10...60	**O2V122**

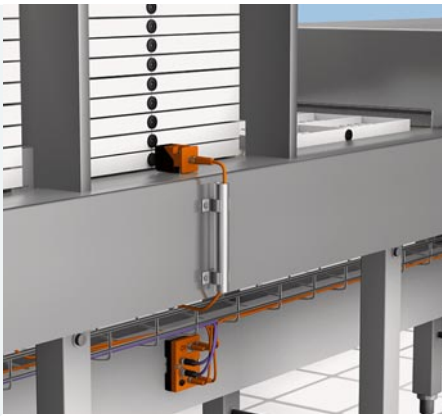
System components

Type	Description	Order no.
	Mounting set	**E2D110**
	Plastic protective pane for the food industry	**E21166**

Software

Type	Description	Order no.
	Operating software	**E2D200**
	Operating software	**E2V100**

RFID for production and conveying



RFID

RFID evaluation unit with PROFIBUS, PROFINET, Ethernet or TCP/IP

Evaluation unit with 4 antenna connections or digital I/Os

Read / write antennas in industrial housings

Transponder with memory sizes from a few bits up to several Kbytes

Protection rating IP 67 meets the requirements for harsh environments

PROFINET PROFIBUS EtherNet/IP http

Flexible RFID system with evaluation unit, antennas and transponders

The DTE100 RFID system was designed especially for identification tasks in production and conveying. It is often used for quality assurance and serves as “electronic route card”.

Parameters can be easily set via a laptop. Due to the high protection rating IP 67 and a large temperature range, the unit also meets the requirements of harsh industrial environments.

Application example: Traceability of chocolate moulds

Traceability is of great importance in the food industry. The RFID system from ifm is used to identify chocolate moulds. It ensures for example that the correct mould is used.

RFID system 13.56 MHz

Type	Description	Process interface	Order no.
Connector: M12			
	RFID evaluation unit; PROFIBUS DP; 115 x 46.2 x 85 mm; Ambient temperature -20...60 °C; IP 67	PROFIBUS DP	**DTE100**

RFID antennas 125 kHz / 13.56 MHz

Type	Description	Order no.
Connector: M12		
	Read/write head; 13.56 MHz; IO-Link; 40 x 40 x 54 mm; Ambient temperature -20...60 °C; IP 67; IP 69K	**DTI513**
	Read/write head; 0.125 MHz; DATA / DTE10x; 40 x 40 x 54 mm; Ambient temperature -20...60 °C; IP 67; IP 69K	**ANT512**
	Read/write head; 13.56 MHz; DATA / DTE10x; M12 x 1 / L = 70 mm; Ambient temperature -20...60 °C; IP 67; IP 69K	**ANT410**
	Read/write head; 13.56 MHz; DATA / DTE10x; M30 x 1.5 / L = 50 mm; Ambient temperature -20...60 °C; IP 67; IP 69K	**ANT431**

ID tags

Type	Description	Order no.
	ID tag; 13.56 MHz; Ø 30 / L = 3 mm; Ambient temperature -40...85 °C; IP 68; IP 69K; Pack quantity 1 pcs.	**E80371**
	ID tag; 13.56 MHz; 50 x 80 x 0.1 mm; Pack quantity 500 pcs.	**E80379**
	ID tag; 13.56 MHz; 90 x 34 x 7 mm; Ambient temperature -25...85 °C; IP 68; Pack quantity 5 pcs.	**E80343**

Jumpers for hygienic and wet areas

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Protection	LEDs	Order no.
Connection cable M12 · 5-pole · 5-wire								
	5 m PUR black	5 x 0.34 mm^2 (42 x Ø 0.1 mm)	–	60 AC/DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVC059**

Production environment

Because quality and availability are also influenced by the "ancillary plant"

A consistently smooth production not only requires sensors for quality and process control in the immediate vicinity of the product, but also solutions for permanent monitoring of the surrounding infrastructure – from the supply and removal of energy/resources, such as water and gases, to motors, pumps or fans. This enables our customers to meet the high demands regarding plant availability, production quality and environmental aspects.

This industry-specific catalogue is available for download on our website at:
ifm.com/gb/food

io-key – the key to industrial IoT

IO-Link components

Pre-configured, no SIM card required

Web-based dashboard for visualisation and analysis of cloud data

Email or text message when limit values are exceeded

IO-Link sensor data is sent directly via mobile network to the cloud

Two IO-Link sensors can be connected

Cloud connection for all IO-Link sensors

The io-key recognises up to two connected IO-Link sensors and sends their process values automatically via GSM mobile network to the cloud where the data is stored. The user can visualise and analyse the data via a web-based dashboard.

Alarms are sent as a text message or email

A few mouse clicks and limit values are set in the dashboard, so that the plant operator will be warned by email or text message when preset values are exceeded or not reached.

Application examples

The io-key is suited for all applications that do not primarily require permanent transmission of measured values in real-time. The io-key can even be used to monitor and evaluate remote parts of the plant that are not connected to the company infrastructure.

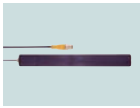
Wireless IoT gateway

Type	Description	Order no.
	wireless IoT gateway · Radio approval: EU/RED	**AIK001**
	wireless IoT gateway · Radio approval: USA · Radio approval: Canada · Radio approval: EU/RED · Radio approval: Australia · Radio approval: United Arab Emirates	**AIK050**

Data tariffs

Description	Order no.
Mobile phone tariff for ifm io-key IoT gateway	**AIS910**

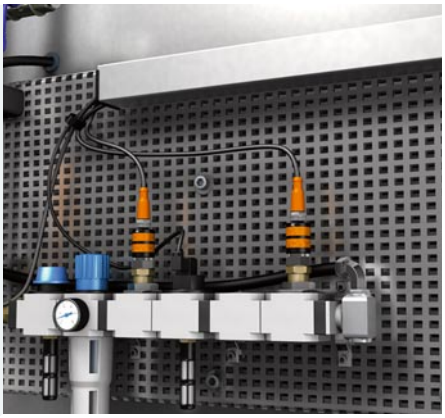
Accessories

Type	Description	Order no.
	Electronic level sensor; 250 x 28 x 16.7 mm; DC PNP/NPN; 0.1 m PUR-Cable; M12 Connector; IP 65; IP 67; 3-wire; Ambient temperature -20...80 °C	**KQ1001**
	Compressed air meter; PNP/NPN; switching signal; analogue signal; pulse signal; IO-Link; (configurable); Measuring range 0.05...15 m³/h; Measuring range 0.8...250 l/min; Medium temperature -10...60 °C; Pressure rating 16 bar; G 1/4 DN8; Connector	**SD5500**
	Vibration sensor; PNP/NPN; (configurable); normally open / normally closed; (parameterisable); Frequency range 2...10000 Hz; Ambient temperature -30...80 °C; IP 67; IP 68; IP 69K; Connector; [a-Peak / a-RMS]: Measuring range of vibration 0...50 g; [v-RMS]: Measuring range of vibration 0...45 mm/s	**VVB001**
	95 x 50 x 57 mm; 3 x normally open / normally closed; (selectable); DC PNP; M12 Connector; IP 65; IP 67; (Target puck area dust-protected); 3-wire; Ambient temperature -25...70 °C	**MVQ101**
	Plug-in power supply; Input voltage AC 90...264 V; Cable with connector; Approval CE	**E80120**

Connectors

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Pro-tection	LEDs	Order no.
Connection cable M12 · 5-pole · 3-wire								
	2 m PUR black	3 x 0.34 mm² (42 x Ø 0.1 mm)	housing: TPU orange; Sealing: FKM	250 AC 300 DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVC043**
Y connection cable M12 · 5-pole · 5-wire								
	0.3 m PUR black	5 x 0.34 mm² (42 x Ø 0.1 mm)	–	60 AC/DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVC614**

Adjustable pressure sensor with two switch points



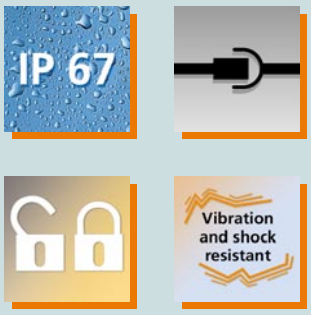
Pressure sensors

Switch point setting via IO-Link or setting rings with optimum readability

Robust stainless steel measuring cell

High bursting pressure range for gases and liquid media

Ideal use in accumulator charging circuits, hydraulic and pneumatic applications



Versatile use

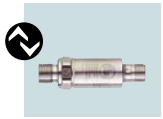
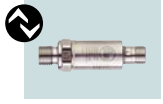
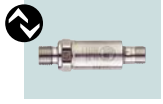
The robust pressure switch can be used in nearly all industrial applications, not only in standard hydraulic and pneumatic applications but also at gas pressures up to 400 bar. The maximum robustness of the stainless steel measuring cell ensures high long-term stability and reliable operation over millions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

Easy to use

The parameters of the PV sensor are set via IO-Link. The compact housing ensures flexible integration even where space is limited.

The setting rings of the PK sensor allow the user to adjust the set point and reset point quickly and precisely even without system pressure being applied. Thanks to mechanical locking unintentional manipulation is prevented.

Pressure switch with IO-Link

Type	Process connection	Measuring range [bar]	Measuring range [°C]	$P_{overload}$ max. [bar]	$P_{bursting}$ min. [bar]	U_b DC [V]	Order no.
	G 1/4 external thread	-1...10	–	25	300	18...30	**PV7004**
	G 1/4 external thread	0...400	–	1000	1700	18...30	**PV7000**
	G 1/4 external thread	-1...10	-40...90	25	300	18...30	**PV8004**
	G 1/4 external thread	0...400	-40...90	1000	1700	18...30	**PV8000**

Pressure switch with intuitive switch point setting

Type	Process connection	Measuring range [bar]	Measuring range [°C]	$P_{overload}$ max. [bar]	$P_{bursting}$ min. [bar]	U_b DC [V]	Order no.
	G 1/4 external thread	0...10	–	25	300	9.6...32	**PK6524**
	G 1/4 external thread	0...400	–	600	1600	9.6...32	**PK6530**

Connectors

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Protection	LEDs	Order no.
Connection cable M12 · 5-pole · 4-wire								
	2 m PUR black	4 x 0.34 mm² (42 x Ø 0.1 mm)	housing: TPU orange; Sealing: FKM	250 AC 300 DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVC018**
	3 m PUR black	4 x 0.34 mm² (42 x Ø 0.1 mm)	housing: TPU orange; Sealing: FKM	250 AC 300 DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVC100**

Compact flow sensors with display

Flow sensors / flow meters

Wear-free due to calorimetric measuring principle

Extensive range of process adapters available

LED bar graph display for flow and set point

Easy parameter setting via pushbuttons, flexible mounting options

Different probe lengths for optimum insertion depth

Compact and wear free

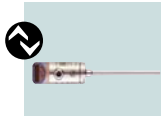
The flow sensors are used to detect the flow velocity of liquids and gases. As they have no moving parts to jam or break, they are wear and maintenance free. Evaluation, LED status display and stainless steel probe are integrated in one compact housing.

Wide range of applications

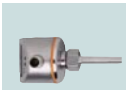
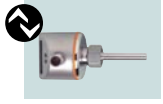
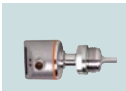
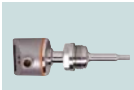
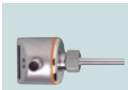
The SI series flow sensor allows reliable monitoring of liquids and gases. The flow range and the switch points are adjusted using a pushbutton on the unit. A multicolour LED display indicates the nominal flow range and the switch point.

In addition to monitoring the volumetric flow, the SA series flow sensor also detects the medium temperature. Measured values can be output as an analogue signal, via IO-Link or switching outputs.

Compact housings can be configured for T-pieces 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.
Connector: M12 · Output function: normally open / normally closed; (parameterisable); analogue · DC PNP/NPN							
	0.04...60...200	stainless steel (1.4404 / 316L)	-20...90	100	0.5	18...30	**SA5000**
	0.04...60...200	stainless steel (1.4404 / 316L)	-20...100	50	0.5	18...30	**SA4100**
	0.04...60...200	stainless steel (1.4404 / 316L)	-20...100	50	0.5	18...30	**SA4300**

Compact flow sensors

Type	Setting range liquids / gases [cm/s]	Material sensor tip	Medium temperature [°C]	Pressure rating [bar]	Response time [s]	U_b [V]	Order no.
Connector: M12 · Output function: normally open / normally closed; (parameterisable)							
	3...300 / 200...3000	stainless steel (1.4404 / 316L)	-25...80	30	1...10	19...36	**SI5000**
	3...300 / 200...3000	stainless steel (1.4404 / 316L)	-25...80	300	–	18...36	**SI5010**
	3...300 / 200...3000	stainless steel (1.4435 / 316L)	-25...95; (for SIP process: ...140 °C)	30	1...10	19...36	**SI6600**
	3...300 / 200...3000	stainless steel (1.4435 / 316L)	-25...95; (for SIP process: ...140 °C)	30	1...10	19...36	**SI6800**
Connector: M12 · Output function: analogue							
	3...300 / -	stainless steel (1.4404 / 316L)	-25...80	300	1...10	19...36	**SI5004**

Accessories

Type	Description	Order no.
	Clamp fitting for process sensors; Sensor connection Ø 8 mm; Process connection G 1/2 sealing cone; stainless steel (1.4404 / 316L); clamping ring: PEEK; Pressure rating 10 bar; Approval EC1935/2004,FDA	**E43020**

Inline flow sensors for precise measurement of liquids up to 900 l/min

Flow sensors / flow meters

Makes the purchase of further sensors superfluous: Measurement and transmission via IO-Link

Minimum / maximum memory and simulation mode for extended diagnostics

Suited for liquids with a conductivity from 20 µ S/cm

Integrated empty pipe detection and simulation mode

Volumetric flow quantity, total quantity and temperature indication

MID Technology

IO-Link

Broad measurement dynamics

IP 67

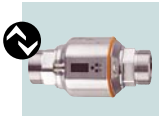
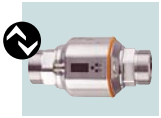
Compact and low cost

efector mid is a volumetric flow sensor for measurement of liquids up to 900 l/min, with electronics and evaluation unit in one of the most compact housings available. It is not only more compact but also less expensive than some comparable sensors. In addition to the volumetric flow quantity, it also monitors the total quantity and the temperature of conductive liquids. Analogue, binary, pulse and frequency outputs as well as IO-Link offer a variety of options to process the measured data.

Application example:
Flow rate and temperature measurement of cooling water

The SM magnetic-inductive volumetric flow sensor monitors the cooling process of rollers. It detects the smallest deviations of volumetric flow quantity, e.g. in the event of leakage. Simultaneously it also monitors the cooling water temperature.

Flow meters with integrated temperature measurement

Type	Process connection	Measuring range [l/min]	Medium temperature [°C]	Pressure rating [bar]	Response time [s]	U_b [V]	Order no.
Connector: M12 · Output function: normally open / normally closed; (parameterisable); analogue							
	G 1/2 DN15	0.05...35	-20...90	16	0.25	18...30	**SM6020**
	G 1 DN25	0.2...150	-20...90	16	0.25	18...30	**SM8020**
	G 2 DN50	5...300	-10...70	16	0.35	18...32	**SM9000**
	G 2 DN50	5...900	-10...70	16	0.35	18...32	**SM0510**

Adapters

Type	Description	Order no.
	Mounting adapter for flow sensors; Sensor connection G 1/2; Process connection R 1/2; Adapter: stainless steel (1.4571/316Ti); Gasket: Centellen 18.5 x 12 x 3 mm; Approval ACS,Reg31	**E40199**
	Mounting adapter for flow sensors; Sensor connection G 1; Process connection R 3/4; Adapter: stainless steel (1.4404 / 316L); Gasket: Centellen 23.5 x 30 x 3 mm; Approval ACS,Reg31	**E40180**
	Mounting adapter for flow sensors; Sensor connection G 2; Process connection Clamp DN50 (2"); Adapter: stainless steel (1.4404 / 316L); O-ring: FKM 47.22 x 3.53 mm	**E40254**

Connectors

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Protection	LEDs	Order no.
Connecting cable with socket M12 · 5-pole · 4-wire								
	5 m PUR black	4 x 0.34 mm² (42 x Ø 0.1 mm)	housing: TPU orange; Sealing: FKM	250 AC 300 DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVC005**

Precise compressed air measurement for effective energy management

Compressed air meters

Exact allocation of energy costs due to precise consumption measurement

Improvement of energy efficiency via leakage monitoring

The basis for a comprehensive energy management system according to DIN EN ISO 50001

Pressure monitoring thanks to the integrated pressure sensor

Different process values being indicated simultaneously removes the need for multiple instruments

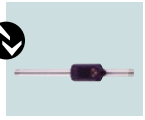
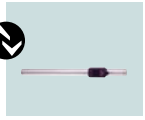
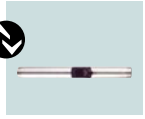
"All-in-one sensor" reduces costs

The SD compressed air meter is a real all-rounder. Thanks to the additionally integrated sensors for pressure and temperature, the user can see four process values (flow rate, pressure, temperature and total consumption) at a glance, which provide information about the energy efficiency of his system. In addition to the inline version, a screw-in version is also available for pipes from 14 to 254 mm diameter.

Compressed air monitoring at a glance

Integration of the SD into the maintenance unit of existing or new installations provides additional advantages: The process values of compressed air in industrial use can be effectively monitored in common compressed-air networks via the integrated TFT display, which allows for selection between four individually adjustable graphical layouts. The process values can also be transmitted via IO-Link.

Compressed air meters

Type	Process connection	Setting range [Nm³/h]	Pressure rating [bar]	Response time [s]	U_b [V]	Order no.
Connector: M12 · Output function: normally open / normally closed; (parameterisable); analogue · DC PNP/NPN						
	G 1/4 DN8	0.13...14.99 / 2.2...249.9	16	0.1; (dAP = 0)	18...30	**SD5500**
	G 1 internal thread	0.8...26260	16	0.1; (dAP = 0)	18...30	**SD1540**
	R 1/2 DN15	0.65...74.97 / 11...1250	16	0.1; (dAP = 0)	18...30	**SD6500**
	R 1 DN25	1.9...224.9 / 32...3749	16	0.1; (dAP = 0)	18...30	**SD8500**
	R 1 1/2 DN40	3.6...409.8 / 60...6830	16	0.1; (dAP = 0)	18...30	**SD9500**
	R 2 DN50	5.9...699.7 / 100...11660	16	0.1; (dAP = 0)	18...30	**SD2500**

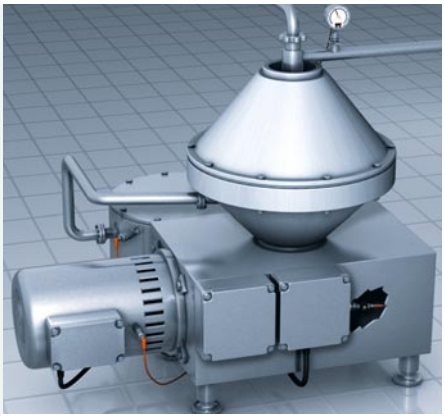
Industrial gas counter

Type	Process connection	Setting range [Nm³/h]	Pressure rating [bar]	Response time [s]	U_b [V]	Order no.
Connector: M12 · Output function: normally open / normally closed; (parameterisable); analogue · DC PNP/NPN						
	G 1/4 DN8	0.13...14.99 / 2.2...249.9	16	0.1; (dAP = 0)	18...30	**SD5600**
	G 1/4 DN8	0.08...5 / 1.3...83.3	16	0.1; (dAP = 0)	18...30	**SD5800**

Calibration certificates

Description	Order no.
ISO calibration certificate for flow sensors	**ZC0020**
DAkkS calibration certificate for flow sensors SD 6-point	**ZC0075**

Good vibrations



Systems for vibration monitoring

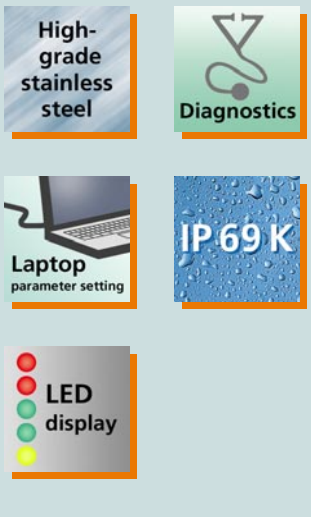
Continuous vibration diagnosis for rotating plant parts

Higher plant uptime thanks to condition-based maintenance

Vibration monitoring according to ISO 10816 and ISO 13373-1

Integrated history memory for trend analysis and documentation

Ethernet interface for integration into operational data logging systems



Predictive maintenance solutions

Vibration diagnostic systems provide continuous monitoring of machines and machine parts in food processing such as the detection of unbalance on rolling element bearings and gears.
The diagnostic electronics analyses the vibration characteristics of the machine and compares this to the permissible limit values. If these values are exceeded, the system automatically sets alarm outputs and transfers these data to the controller or the control system via Ethernet.

Innovative software

The analysis software allows the user to evaluate the state of the machine remotely. A bar graph display provides a quick overview of all operating states of the machine and the trend history shows machine condition changes over the time. All this allows condition-based maintenance of the machines. This increases plant uptime and at the same time reduces the operating costs.

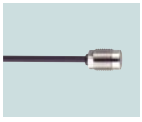
Diagnostic electronics – control cabinet modules for vibration diagnosis type VSE

Type	Description	Order no.
	Diagnostic electronics for vibration sensors; Total number of inputs and outputs 8; (configurable); Ethernet; 114 x 50 x 105 mm	**VSE101**
	Diagnostic electronics for vibration sensors; Total number of inputs and outputs 8; (configurable); Ethernet; 114.2 x 50 x 105.3 mm	**VSE150**
	Diagnostic electronics for vibration sensors; Total number of inputs and outputs 8; (configurable); Ethernet; 114.2 x 50 x 105.3 mm	**VSE151**
	Diagnostic electronics for vibration sensors; Total number of inputs and outputs 8; (configurable); Ethernet; 100 x 25.4 x 103.4 mm	**VSE003**
	Diagnostic electronics for vibration sensors; Total number of inputs and outputs 8; (configurable); Ethernet; 114.2 x 50 x 105.3 mm	**VSE153**
	Diagnostic electronics for vibration sensors; PNP; normally open / normally closed; (parameterisable); analogue; Total number of inputs and outputs 8; (configurable); Frequency range 0...12000 Hz; Ambient temperature 0...60 °C; IP 67; Connector	**VSE953**

Accelerometers

Type	Description	Measuring range of vibration [g]	Frequency range [Hz]	Ambient temperature [°C]	Protection	Order no.
	Acceleration sensor	-25...25	1...6000	-30...125	IP 67 / IP 68 / IP 69K	**VSA001**
	Acceleration sensor	-40...40	0...4500	-30...85	IP 67 / IP 68 / IP 69K	**VSM101**
	Acceleration sensor	-50...50	2...10000	-55...125	IP 67	**VSP001**

Vibration sensors for external diagnostic electronics type VSE

Type	Description	Measuring range of vibration [g]	Frequency range [Hz]	Ambient temperature [°C]	Protection	Order no.
	Acceleration sensor	-25...25	1...10000	-20...80	IP 67	**VSA005**
	Acceleration sensor	-25...25	1...10000	-30...85	IP 67	**VSA006**
	Acceleration sensor	-50...50	2...10000	-55...90	IP 68	**VSP01A**

Vibration sensors and transmitters

Type	Description	Measuring range of vibration [mm/s]	Frequency range [Hz]	Ambient temperature [°C]	Protection	Order no.
	Vibration monitor	0...25	10...1000	-25...80	IP 67	**VKV021**
	Vibration sensor	0...45	2...10000	-30...80	IP 67 / IP 68 / IP 69K	**VVB001**
	Vibration sensor	0...45	2...10000	-30...80	IP 67 / IP 68 / IP 69K	**VVB020**
	Vibration transmitter	0...25	10...1000	-20...60	IP 67	**VTV12A**
	Vibration transmitter	0...50	10...1000	-30...125	IP 67 / IP 68 / IP 69K	**VTV121**

Accessories

Type	Description	Order no.
	Parameter setting software for VSExxx and VNBxxx	**VES004**
	Connection cable; Cable with connector	**EC2080**
	Connection cable; Operating voltage 30 V AC; Ethernet cable, D-coded; 5 m; MPPE; housing materials housing: PP Halogen-free; IP 65; IP 67; IP 68; IP 69K; (M12 plug / RJ45 plug: IP 20); Free from silicone yes; Halogen-free yes; Gold-plated contacts yes	**EVF552**

Type	Description	Order no.
	Mounting adapter	**E30469**
	Adhesive adapter for acceleration and vibration sensors	**E30473**

Connectors

Type	Cable	Wire specification	Material housing / nut	U [V]	T_a [°C]	Protection	LEDs	Order no.
Connecting cable with socket M12 · 5-pole · 4-wire								
	5 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF001**
	5 m MPPE grey	4 x 0.34 mm² (42 x Ø 0.1 mm)	PP Halogen-free; Sealing: EPDM	250 AC 300 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVF004**
	2 m PUR black	4 x 0.34 mm² (42 x Ø 0.1 mm)	housing: TPU orange; Sealing: FKM	250 AC 300 DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVC001**
	2 m PUR black	4 x 0.34 mm² (42 x Ø 0.1 mm)	housing: TPU orange; Sealing: FKM	250 AC 300 DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVC004**
Connecting cable with socket M12 · screen: yes · 5-pole · 4-wire								
	5 m PUR black	4 x 0.34 mm² (42 x Ø 0.1 mm)	housing: TPU orange; Sealing: FKM	50 AC 60 DC	-25...90	IP 65 / IP 67	–	**EVC539**
	2 m PUR black	4 x 0.34 mm² (42 x Ø 0.1 mm)	housing: TPU orange; Sealing: FKM	50 AC 60 DC	-25...90	IP 65 / IP 67	–	**EVC541**
Connecting cable with socket M12 · screen: yes · 5-pole · 5-wire								
	30 m PUR black	5 x 0.25 mm² (32 x Ø 0.1 mm)	housing: TPU orange; Sealing: FKM	30 AC 36 DC	-25...90	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVC561**
	25 m PVC orange	5 x 0.25 mm² (32 x Ø 0.1 mm)	housing: PVC orange; Sealing: EPDM	30 AC 36 DC	-25...100	IP 65 / IP 67 / IP 68 / IP 69K	–	**EVT392**

Permanent vibration diagnostics

Sensors allow vibration diagnostics in places that you could never access during operation for safety reasons.

With an annual output of about 765 million litres the Hassia group is one of Germany's largest mineral springs offering mineral waters and non-alcohol beverages in the upper price classes with various subsidiaries and brands. In the parent plant in Bad Vilbel, Hesse, alone there are six filling stations parallel in three-shift operation.

Permanent vibration diagnostics in mineral water bottling

To avoid unplanned machine downtimes Hassia Mineralquellen rely on permanent electronic vibration diagnostics in bottle filling. The investment already paid off in the pilot phase: Imminent damage to a drive was detected in time and eliminated. Unplanned downtime could thus be prevented.

High-performance drives transport the bottles across several hundreds of metres through the individual stations – from rinser, filler, capper, labelling to packaging and dispatch.

When the bottles pass from one conveyor belt to the next and when bottles touch the guide rail and each other, these stress points add up – via hundreds of bottles – to strong irregular vibration at the drive. Therefore the bearings on the gear and motor have to be monitored to predict the wear limit in time so that maintenance can be carried out.

Manual detection of sounds

A common method to monitor vibration characteristics is the manual, acoustic detection of sounds using a stethoscope.

Gerhard Simon, Maintenance Manager at Hassia Mineralquellen, says: *"In the past we used to monitor manually. A person was sent to the machine to listen to the sound of its motor. That was, however, a rather subjective feeling. Three people listening to the drive, motor or gear feel completely different things. This manual listening has one decisive disadvantage: There are never the same operating states when listening three times. I must listen to the machine when it is rotating, but I cannot do it during the filling process, e.g. filler / rinser areas, for microbiological reasons: You cannot enter this clean room during filling. That means you can only do it at the weekend when there is no filling. During idling operation there is, however, a different vibration characteristic. And then there are areas, for example at the labelling machine, where drive shafts are running, where the motors and gears are very close to each other. You can't get in there when it's running."*

Electronic vibration diagnostics

There was urgent need for another solution for machine diagnostics. The automation and sensor specialist ifm offers vibration diagnostic systems under the name "efector 800". Quickly a meeting was agreed.

Gerhard Simon: *"We have decided to make first tests with the electronic vibration diagnostics on one of our returnable PET bottle plants. Some machines such as Spiragrip, the machine cleaning machine, de-labelling machine, decapper and the filler-rinser area were equipped with the sensors."*

Sensors detect in time that the wear limit on the motor and gearbox has been reached.

> *In the beverage industry we are probably the first bottling plant that has started to work with the ifm vibration diagnostics*

The system consists of type VSA001 vibration sensors and type VSE100 evaluation units.

The cylindrical sensors are screwed directly into the motor or gearbox via bore holes. They continuously detect vibration on non-rotating machine surfaces.

They operate according to the capacitive measuring principle and are free from saturation and tribo-electrical noise interference thanks to their special microelectro-mechanical design (MEMS). An integrated self-test provides additional protection.

The type VSE evaluation unit monitors up to 32 accelerometers (objects) on up to 4 different measurement points where a type VSA vibration pick-up is installed.

The vibration characteristics can be visualised on the PC in the control room; furthermore the operator can set limits (yellow and red lines for pre-alarm and main alarm).

Vibration sensors on the drives detect even smallest vibrations.

The pre-alarm and main alarm are provided via switching outputs and, as is the case at Hassia, via light indicators. The evaluation unit communicates for example with the machine controller or the process control level via Ethernet TCP/IP.

Gerhard Simon: *"Here I have a value-free system where I can define my own limits and say "OK that is my level, I do not want to exceed it, there I must intervene and make some mechanical improvement, for example by lubrication or replacement of components". Before this was not possible."*

Crucial test passed

Shortly after installation the vibration diagnostics was already successful in a major challenge.

"After just a few weeks we had first successes when an imminent plant downtime was detected by the vibration diagnostics on the basis of a mechanical disturbance value. We could make a repair in time thus preventing a plant failure. The yellow light indicators signalled a pre-alarm. Then the machine was thoroughly inspected at the weekend and it was found that a bearing had increased tolerances at a transfer starwheel where the bottles are transferred from the rinser to the filler and also a shaft that drives the rinser and the capper block was off-centre causing vibration in the entire system. We could repair these sources of interference thus preventing an unplanned stop in the middle of production which would have had fatal consequences in a 3-shift operation and meant immense cost." said Gerhard Simon.

The VSE100 evaluation unit evaluates the signals from up to four vibration sensors.

Full protection

Besides local display of the vibration status by indicator lights the evaluation unit can also be networked with the control desk via Ethernet TCP/IP.

Here Hassia plan a further extension of their plant.

Maintenance Manager **Simon**: *"At the moment only one single line is networked through to a staff working station. We will gradually extend this. The other three lines are at present monitored by operators who inform the maintenance staff about a yellow pre-alarm or a red main alarm displayed on the indicator lights. Then we can react in time. But the system is being gradually extended. The goal is that we in maintenance can permanently monitor the live state of our systems. So far we have been monitoring four machines in our pilot plant.*

In the future we want to monitor the entire plant by means of vibration diagnostics and to document what had to be replaced in what kind of damage event so that the plant can be further optimised, if necessary. We also want to record the cost to prove that the investment into the diagnostic system has paid off. I have many more ideas for the system: We have numerous pumps in such plants that should be monitored and very many subsystems and auxiliary drive systems that could be monitored to be able to intervene any time before a standstill is about to occur."

Visual status monitoring on site:
The light indicators for "pre-alarm" and "main alarm".

Gerhard Simon, Maintenance Manager at Hassia Mineralquellen in Bad Vilbel.

Pioneer praised

The decision to secure process reliability by means of permanent vibration diagnostics was particularly pointed out at the annual IFS (International Featured Standards) audit, a certification common in the food industry.

Gerhard Simon: *"In the beverage industry we are probably the first bottling plant that has started to work with the ifm vibration diagnostics. The final report particularly mentioned that in maintenance we are starting with monitoring such systems in the plant which logically has effects on the product safety. Because if they have a standstill in their plant this plant has to be emptied. This emptying process is necessary to avoid germs in cleaned bottles that are standing on the belts in case of repair or germs in the clean room should work be carried out there. This means that a repair that only takes 30 minutes can cause a standstill of up to 2 hours. This would entail unnecessary costs."*

Conclusion

The wear of machine parts cannot be prevented. Permanent vibration diagnostics, however, ensures that such damage is reliably detected in time. Maintenance can now be planned. Expensive plant downtime can be prevented with comparably little investment which in the end has positive effects on the product quality.

Industrial communication AS-i

Safety technology

This industry-specific catalogue is available for download on our website at:
ifm.com/gb/food

AS-Interface – the simple connection between sensor and fieldbus

AS-Interface

Simplified system installation by means of AS-Interface wiring system

A two-wire flat cable transmits data and energy, eliminating complex parallel wiring

Modular structure and flexible connection technology

Perfectly complements different fieldbuses or industrial Ethernet

Actuator sensor interface (AS-i)

AS-i is a manufacturer-independent standard for connection of actuators and sensors out in the field. AS-Interface has become established as an economic wiring system in industrial automation. A two-wire flat cable transmits data and energy. This considerably reduces wiring complexity as conventional wiring of each individual sensor or actuator to the controller is no longer required, saving the user considerable numbers of terminals, splitter boxes, input / output cards and cable trays.

Controllers / Gateways

Type	Number of AS-i masters	Description	Order no.
	2	AS-i EtherNet/IP gateway; Number of AS-i masters 2; terminals	**AC1422**
	1	AS-i PROFINET gateway; Number of AS-i masters 1; terminals	**AC1401**

I/O modules for control cabinets

Type	Inputs / outputs	Description	Order no.
	4 x Digital input / 4 x Digital output	AS-i input/output module; SmartL25 4DI 4DO T C; terminals; IP 20	**AC3200**
	4 x analogue input (4...20 mA)	AS-i input module; SmartL25 4 AI (C) C IP20; terminals; IP 20	**AC3216**

ProcessLine IP 69K

Type	Inputs / outputs	Description	Order no.
	–	AS-i splitter module; ProcessLine 8 SB IP69K; Connector; IP 68; IP 69K	**AC2900**

AS-i for hazardous areas

Type	Inputs / outputs	Description	Order no.
	2 x analogue input (4...20 mA)	AS-i input module; ClassicLine 2AI C II 3D; Connector; IP 50	**AC522A**
	2 x Digital input / 2 x Digital output	AS-i input/output module; ClassicL 2DO-Y 2DI-Y II 3D; Connector; IP 50	**AC514A**
	4 x Digital input / 2 x Pneumatic output / DC AS-i	AS-i pneumatic module; AS-i; AirBox 5/3 closed 4DI-Y II 3D; Connector; IP 50	**AC570A**
	4 x Digital input / 2 x Pneumatic output / DC AS-i	AS-i pneumatic module; AS-i; AirBox 2x3/2 4DI-Y II 3D; Connector; IP 50	**AC528A**

CompactLine modules

Type	Inputs / outputs	Description	Order no.
	4 x Digital input	AS-i input module; CompactModule 4DI M12; Connector; IP 67; (when flat cables are used E7400x / E7401x)	**AC2410**
	4 x Digital output	AS-i output module; CompactModule 4DO T M12; Connector; IP 67; (when flat cables are used E7400x / E7401x)	**AC2417**

ClassicLine modules

Type	Inputs / outputs	Description	Order no.
	2 x Digital input / 2 x Digital output	AS-i input/output module; ClassicL 2DO-Y 2DI-Y IP67; Connector; IP 67	**AC5214**
	2 x analogue input (4...20 mA)	AS-i input module; ClassicLine 2AI C IP67; Connector; IP 67	**AC5222**

AS-i AirBoxes

Type	Inputs / outputs	Description	Order no.
	4 x Digital input / 1 x Pneumatic output	AS-i pneumatic module; AirBox 5/2 4DI-Y IP67; Connector; IP 65; IP 67	**AC5246**
	4 x Digital input / 2 x Pneumatic output	AS-i pneumatic module; AirBox 2x3/2 4DI-Y IP67 AUX; Connector; IP 65; IP 67	**AC5243**
	4 x Digital input / 2 x Pneumatic output	AS-i pneumatic module; AirBox 5/3 closed 4DI-Y IP67; Connector; IP 65; IP 67	**AC5270**

AS-i switch power supplies

Type	Current [A]	Output voltage [V]	Nominal voltage [V]	Mains buffering time [ms]	Efficiency typ. [%]	Order no.
	2.8	30.5; (to PELV; NEC Class II)	110 / 230 AC / 100...120 AC	98 (120 V AC / 60 Hz) / 96 (230 V AC / 50 Hz)	86.9 (120 V AC; 60 Hz) / 88 (230 V AC; 50 Hz)	**AC1256**
	8	30.5	400 AC / 380...480 AC	34 (400 V AC / 60 Hz) / 53 (480 V AC / 50 Hz)	92 (400 V AC; 60 Hz) / 92.1 (480 V AC; 50 Hz)	**AC1253**

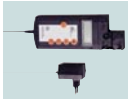
24 V DC power supplies

Type	Current [A]	Output voltage [V]	Nominal voltage [V]	Mains buffering time [ms]	Efficiency typ. [%]	Order no.
	3.3	24...28	< 230 AC / 100...240 AC	30 (120 V AC / 60 Hz) / 128 (230 V AC / 50 Hz)	88 (120 V AC; 60 Hz) / 89.8 (230 V AC; 50 Hz)	**DN4011**
	20	24...28	< 400 AC / 380...480 AC	22 (400 V AC / 60 Hz) / 22 (480 V AC / 50 Hz)	95 (400 V AC; 60 Hz) / 94.8 (480 V AC; 50 Hz)	**DN4034**

Illuminated pushbuttons IP 67

Type	Inputs / outputs	Description	Order no.
	–	AS-i illuminated pushbutton module; AS-i Module 2BI 2LO WT/WT; IP 67	**AC2386**

Accessories

Type	Description	Order no.
	AS-i flat cable; cable	**E74000**
	AS-i flat cable; cable	**E74010**
	Flat cable insulation displacement connector; Connector	**E70471**
	Flat cable splitter box; Connector	**E70354**
	Cable clip for fixing the AS-Interface flat cable	**E70442**
	Flat cable insulation displacement connector; Connector	**AC5005**
	Wall passage	**E73009**
	AS-i addressing unit	**AC1154**
	Protective cap	**E73004**

AS-i
Safety at Work

AS-Interface Safety at Work

AS-i safety monitor, 1 or 2 channels

Safety function freely configurable

Positively driven relay contacts for the enabling of drives, etc.

Replaces traditional safety relays

Toolless DIN rail mounting

type 4
SIL 3

TÜV certified

Safety on the AS-i bus

The AS-i safety monitor functions according to the Safety at Work specification. It monitors the data exchange between safe modules and the AS-i controllers.

Should data transmission be disrupted, the module fail or a wire break occurs, the monitor ensures the safe state. The same happens when the safety system is activated. The safety monitor receives a module address to enable direct diagnosis via the AS-i master. It can be mounted anywhere on the network. The safety monitor features one or two independent OSSDs which can be configured via PC software. The parameter setting includes functions like emergency stop, start button, stop category 0 or 1, two-hand operation, and muting.

It can thus replace many different units. In addition, ifm offers a variety of safety AS-i modules, illuminated e-stop buttons and wiring solutions.

Gateways with fail-safe PLC

Type	Description	Order no.
	AS-i EtherNet/IP gateway with safe preprocessing	**AC422S**
	AS-i PROFINET gateway with safe preprocessing	**AC402S**
	AS-Interface EtherCAT gateway with PLC	**AC432S**

Safety monitors

Type	Description	Order no.
	AS-i safety monitor	**AC041S**

I/O modules

Type	Description	Order no.
	AS-i input module; Connector	**AC505S**
	AS-i input/output module; Connector	**AC507S**
	AS-i PCB	**AC015S**

I/O modules for control cabinets

Type	Description	Order no.
	Safe active AS-i module; AS-i; terminals	**AC009S**
	Safe active AS-i output module; AS-i; terminals	**AC030S**

Operating elements

Type	Description	Order no.
	illuminated E-STOP with integrated AS-i connection; AS-i; Connector	**AC010S**
	Safe AS-i E-STOP operating unit with integrated AS-i connection; AS-i; Connector	**AC012S**
	safety switch with guard locking	**AC904S**
	Actuator S standard straight	**E7903S**
	Safety rope emergency stop switch	**ZB0051**
	Safety rope emergency stop switch	**ZB0052**
	rope tension kit	**ZB0057**
	safety spring	**ZB0061**
	pulley	**ZB0062**

Accessories

Type	Description	Order no.
	Quad M12; AS-i; Connector	**E70588**
	Flat cable splitter box; Connector	**E70354**
	Flat cable insulation displacement connector; AS-i; Cable with connector	**E70582**
	Cable clip for fixing the AS-Interface flat cable	**E70442**
	COMBICON connector	**E11930**
	COMBICON connector	**E70231**

AS-i flat cable

Type	Description	Order no.
	AS-i flat cable; cable	**E74300**
	AS-i flat cable; cable	**E74310**

Because safety is also a quality feature

Safety technology

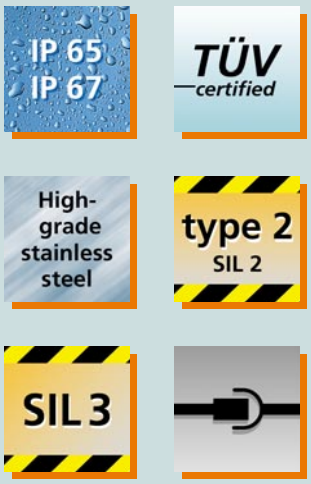
For safety-related position and area monitoring

Minimises the risk of damage to persons or installations

Conforms to the safety requirements of type 2 / SIL 1 or type 4 / SIL 3

Protected against simple defeating

Self-monitoring sensor function

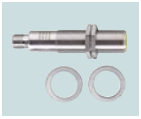


ifm safety service: your safety is our service

Many machines feature protective devices to minimise the potential hazards they pose. Correct functioning, proper installation and an adequate safety distance between the protective device and the point of danger (shutdown delay) are important factors to ensure a reliable protective function.

These factors must be checked at regular intervals, as changes can for example occur due to mechanical wear or software modifications.

Fail-safe inductive sensors 2 x OSSD or clock signal

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.
Connector: M12 · Output function: 2 x OSSD (A1 and A2) · DC PNP							
	86.5	> 10 f	brass	10...30	IP 65 / IP 67	≤ 5 / ≤ 5	**GG851S**
	70	0.5...4 nf	stainless steel	19.2...30	IP 65 / IP 67	≤ 1 / ≤ 1	**GF711S**
	80	6...12 nf	stainless steel	19.2...30	IP 68 / IP 69K	≤ 50 / ≤ 200	**GI701S**
	70	1...15 nf	stainless steel	19.2...30	IP 65 / IP 67	≤ 10 / ≤ 1	**GI711S**
	66	4...20 nf	plastics	19.2...30	IP 65 / IP 67	≤ 50 / ≤ 200	**GM705S**
Connector: M12 · Output function: clock signal · DC							
	90	3...6 nf	stainless steel	19.2...30	IP 68 / IP 69K	≤ 20 / ≤ 200	**GG505S**
	66	10...15 nf	plastics	19.2...30	IP 65 / IP 67	≤ 20 / ≤ 200	**GM504S**

f = flush / nf = non flush / qf = quasi flush

Safety light curtains

Type	Sensor length [mm]	Resolution / detection capacity [mm]	Protected area height [mm]	Protected area width [m]	Response time [ms]	Protection	Order no.
cable: 15 m							
	337	30	160	0...3 / 2...10	4.5	IP 65 / IP 67 / IP 69K	**OY431S**
	1237	14	1060	0...2 / 1...5	14.5	IP 65 / IP 67 / IP 69K	**OY407S**
	1987	30	1810	0...7 / 3...15	11	IP 65 / IP 67 / IP 69K	**OY453S**

Type	Sensor length [mm]	Resolution / detection capacity [mm]	Protected area height [mm]	Protected area width [m]	Response time [ms]	Protection	Order no.
Connector: M12							
	663	30	610	0...4 / 3...12	8.5	IP 65 / IP 67	**OY044S**
	813	30	760	0...4 / 3...12	11	IP 65 / IP 67	**OY035S**
	1413	30	1360	0...4 / 3...12	17	IP 65 / IP 67	**OY049S**

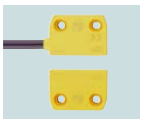
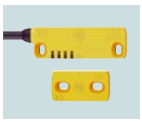
Safety light grids

Type	Dimensions [mm]	Number of beams	Protected area height [mm]	Protected area width [m]	Response time [ms]	Protection	Order no.
cable: 15 m							
	Ø 56 / L = 1077	3	810	0...7 / 3...15	2.5	IP 65 / IP 67 / IP 69K	**OY422S**
	Ø 56 / L = 777	2	510	0...3 / 2...10	3	IP 65 / IP 67 / IP 69K	**OY411S**
Connector: M12							
	1053 x 28 x 30	4	910	0...4 / 3...12	3.5	IP 65 / IP 67	**OY113S**
	685 x 50 x 50	2	510	0...4 / 3...12	5.5	IP 65 / IP 67	**OY511S**

Safety relays

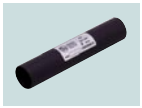
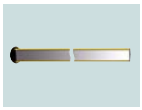
Type	Description	Order no.
	Safety relay	**G1501S**
	Safety relay; relay; terminals	**G2001S**
	safe standstill monitor for underspeed detection	**DA102S**
	safe speed monitor	**DD110S**
	safe speed monitor for underspeed detection	**DU110S**

RFID-coded and magnetically coded safety sensors

Type	Dimensions [mm]	Sensing range [mm]	Material	U_b [V]	Protection	f [Hz]	I_{load} [mA]	Order no.
cable: 2 m · Output function: 2 x normally open; (potential-free) · DC								
	36 x 13 x 26	5 nf	plastics	24	IP 67 / IP 69K	150	50	**MN200S**
Cable with connector: M12, 0.1 m · Output function: 2 x normally open; (potential-free) · DC								
	88 x 13.1 x 25	8 nf	plastics	24	IP 67 / IP 69K	150	50	**MN503S**
cable: 2 m · Output function: 2 x OSSD, 1 x PNP · DC PNP								
	72 x 18 x 25	12 nf	plastics	20.4...26.4	IP 67 / IP 69K	1	50	**MN705S**
Connector: M12 · Output function: 2 x OSSD, 1 x PNP · DC PNP								
	72 x 18 x 25	12 nf	plastics	20.4...26.4	IP 67 / IP 69K	1	50	**MN701S**

f = flush / nf = non flush / qf = quasi flush

Accessories

Type	Description	Order no.
	Test rod for safety light curtains; Ø 30 mm	**EY3008**
	Corner mirror for safety light grids with mounting stand; Approval CE	**EY1015**
	Corner mirror for safety light grids; Approval CE	**EY1010**

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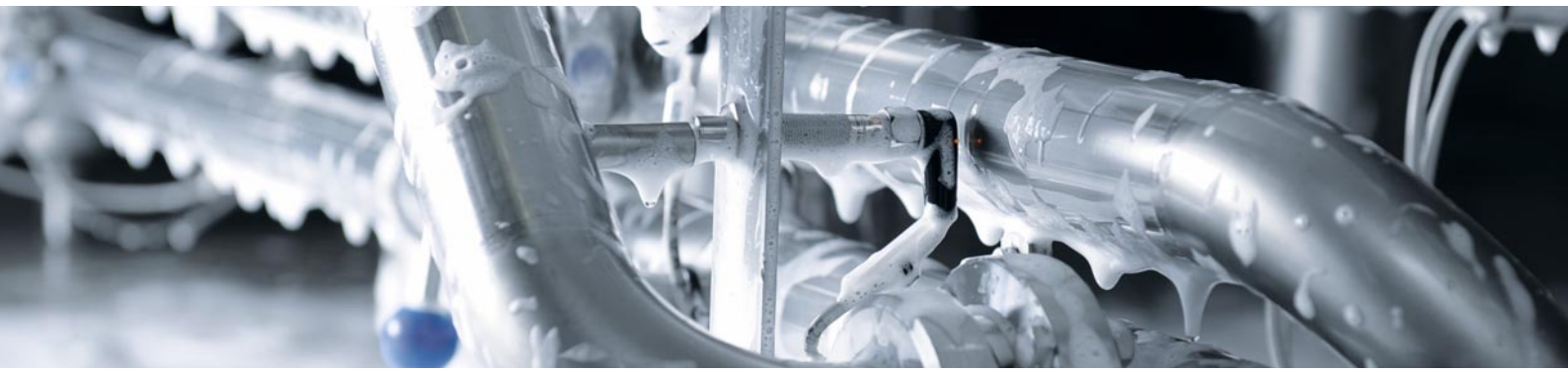

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