THE ORANGE BOOK

PRODUCT **FACTSHEETS**

2024

INSPIRATION FOR AUTOMATION

5 YEARS
Warranty
on **ifm products**

Our product news:
ifm.com/gb/product-news

P|Prox: detection with micrometre precision

Accurate detection of distances to metallic surfaces

- Non-contact, inductive detection principle, suitable for all types of metal

- Ready for use out of the box, high repeatability

- Simple 1-point or even more accurate 3-point calibration possible

- Robust industrial design for a wide range of applications

ifm – close to you!

Housing [mm]	Installation	Measuring range [mm]	Adjustable switch point [mm]	Order no.
M12 x 1 x 60	flush	0.2…2	0.2…1.9	**IFP200**
M12 x 1 x 60	non-flush	0.4…4	0.4…3.8	**IFP201**
M18 x 1 x 60	flush	0.5…5	0.5…4.75	**IGP200**
M18 x 1 x 60	non-flush	0.8…8	0.8…7.6	**IGP201**
M30 x 1.5 x 60	flush	1…10	1…9.5	**IIP200**
M30 x 1.5 x 60	non-flush	1.5…15	1.5…14.25	**IIP201**

Inexpensive alternative to expensive measuring systems

Many industrial applications require accurate detection of distances to metallic surfaces, for example, sheet metal detection in the automotive industry or distances at grinding mills in the food sector. In these applications, the new distance sensors are an inexpensive and powerful alternative to expensive measuring systems.

Accurate distance detection

Using an inductive and, thus, non-contact detection principle, these sensors detect distances in the micrometre range and provide them as distance values via IO-Link. The type of metal has no influence on the measured value. Only the shape factor of the target influences the possible measuring range and the accuracy of the sensor. The sensor is factory calibrated and ready for immediate use. Thanks to 1-point or the even more accurate 3-point calibration, IO-Link guarantees high accuracy even with deviating target shape factors.

Robust design

The sensors are available in 60 mm long industry standard M12, M18 or M30 housings for flush or non-flush mounting. Moreover, the sensors are magnetic field resistant and have a stainless steel threaded sleeve. As a result, they have a high protection rating of up to IP69K and can be easily used in demanding environments.

Technical data		
Communication interface		IO-Link
Type of transmission		COM2 (38.4 kBaud)
IO-Link revision		1.1
SIO mode		Yes
Required master port class:		A
Min. process cycle	[ms]	3.2
Ambient temperature	[°C]	-25…70
Indication		4x yellow LED
Connection		M12 connector
Protection rating		IP69K

BEST FRIENDS
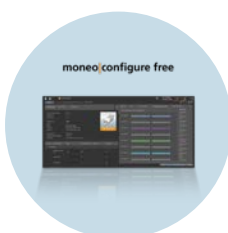
moneo|configure free
Software for parameter setting of the IO-Link infrastructure

IO-Link interface
For setting the parameters of IO-Link devices on a PC

IO-Link masters
Masters with Profinet interface for use in the field

For further technical details, please visit:
ifm.com/fs/IFP200

Precision in confined spaces

Miniature inductive sensors with M8 connector

- M5 housing or cylindrical smooth 4 mm housing for confined installation conditions

- Longer sensing range for accurate and reliable position detection

- High switching frequencies for dynamic processes

- Robust housing for demanding industrial environments

- M8 connector simplifies connection

IP67

ifm – close to you!

Type	Electrical design	Switching output	Order no.
3-wire sensors with M8 connector - housing length: 40 mm			
M5x1	PNP	normally open	**IY5062**
M5x1	PNP	normally closed	**IY5063**
M5x1	NPN	normally closed	**IY5064**
M5x1	NPN	normally open	**IY5065**
Ø 4 mm	PNP	normally open	**IZ5057**
Ø 4 mm	PNP	normally closed	**IZ5058**
Ø 4 mm	NPN	normally closed	**IZ5059**
Ø 4 mm	NPN	normally open	**IZ5060**

Applications

The inductive IY/IZ type sensors are used in various industrial areas where space is limited, for example, in machine tools, assembly automation and electronics production. They detect end positions of small grippers and clamps, can be used to accurately monitor speed of gears and rotary movements.

Longer sensing range for stable processes

The longer sensing range makes it easy to position the sensors. The position detection is reliable even in case of mechanical tolerances, avoiding accidental switching. This increases the process reliability.

Installation

The M5 thread makes it easy to screw in the IY housing. The IZ housing has a 4 mm smooth sleeve and can be fastened precisely and efficiently using the corresponding holder.

Protection rating IP67 for challenging environmental conditions

The robust housing has been specially developed for demanding industrial environments and offers durability and reliability. Thanks to protection rating IP67, the sensors guarantee reliable performance even under extreme conditions such as dust, moisture and vibrations, which improves process stability and efficiency in various industrial sectors.

Technical data		
Sensing range [mm]		1.5
Installation		flush
Current rating	[mA]	100
Operating voltage	[V]	10…30
Switching frequency	[Hz]	2000
Housing material		sensing face: PBT orange housing: stainless steel LED window: PEI
Switching status indication		4x yellow LED
Protection rating		IP67

BEST FRIENDS

M8 connection cables
Reliable connections for harsh environments

Inductive sensors, M8
Compact housings and long sensing ranges.
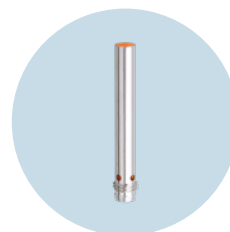
Smooth sleeve inductive sensors
Space-saving sensors for limited space

For further technical details, please visit:
ifm.com/fs/IY5062
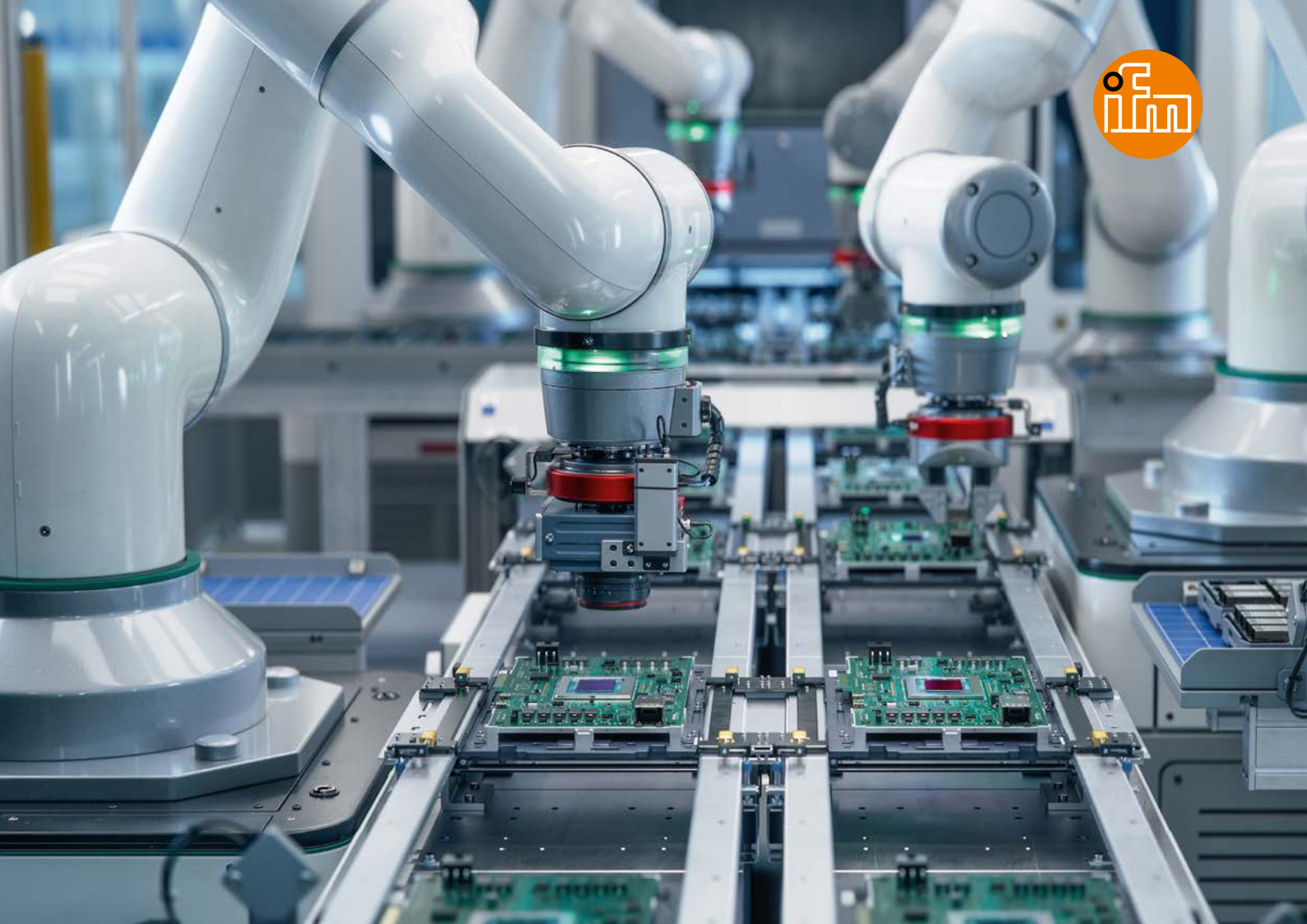
Fast and precise

**Photoelectric sensor measures distances
in the μm range**

- Detects tiny objects with highest precision

- High switching frequencies for dynamic applications

- 3 operating modes and a robust, compact design enable
  a wide range of applications

- Versatile and future-proof connectivity thanks to analogue
  outputs and IO-Link

IP67   **IO-Link**

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Measuring range [mm]	Resolution [mm]	Laser spot [Ø mm]	Output	Order no.
30...80	0.01	0.5	2x PNP/NPN (selectable)	**OMH550**
30...80	0.01	0.5	1x PNP/NPN 1x analogue	**OMH551**
50...200	0.05	1	2x PNP/NPN (selectable)	**OMH552**
50...200	0.05	1	1x PNP/NPN 1x analogue	**OMH553**
50...500	0.5	1	2x PNP/NPN (selectable)	**OMH554**
50...500	0.5	1	1x PNP/NPN 1x analogue	**OMH555**

High-precision object detection

Thanks to its high resolution, the OMH sensor detects tiny objects in standard mode with an accuracy in the micrometre range. Even precise arrangements and positioning of delicate components, such as those used in battery cell production, can be reliably ensured with the high-precision OMH.

Additional speed and power mode

In fast conveyor belt applications, the sensor achieves impressive measuring frequencies of 1200 Hz in speed mode.

In power mode, the OMH maintains this micrometre precision even under challenging conditions, such as in PCB assembly. This is an outstanding feature, as ordinary distance sensors often fail to reliably detect such objects.

Ready for all kinds of challenges

Thanks to its compact and robust design as well as its analogue output, the highly precise OMH will also convince you in retrofit applications. IO-Link ensures easy parameter setting and data use in fully automated processes.

Technical data		
Measuring frequency	[Hz]	up to 1200
Temperature range	[°C]	0...50
Type of light / wave length	[nm]	laser light 630
Laser protection class		1
Electrical connection		M12, A-coded
Housing material		diecast zinc
Protection rating		IP67

BEST FRIENDS
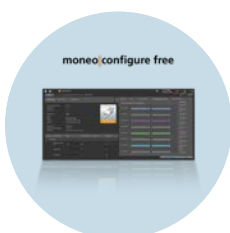
moneo|configure free
Software for parameter setting of the IO-Link infrastructure
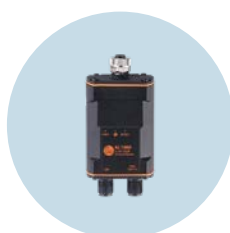
USB IO-Link masters
For parameter setting and analysis of devices

IO-Link masters
Masters with Profinet interface for use in the field

For further technical details, please visit:
ifm.com/fs/OMH550

Withstand dirt and moisture

Eternity touch sensors for machine control

- Ideally suited for use in demanding installation situations

- Permanently reliable operation due to the suppression of deposits and splashing water

- Also available as a signal lamp for clear feedback of the machine status

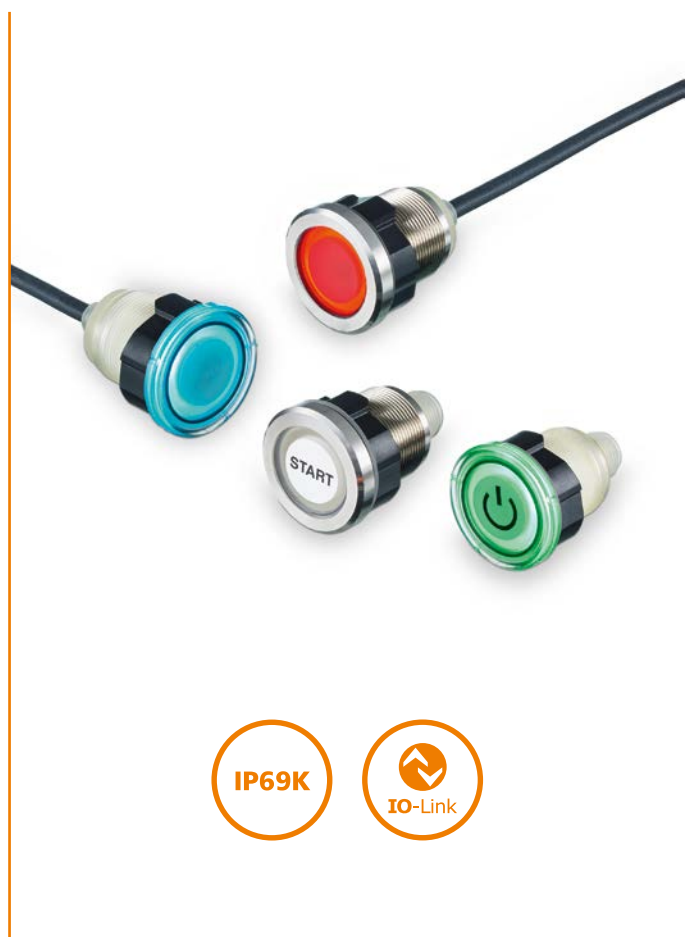IP69K   IO-Link

ifm – close to you!

Material	Connection	Order no.	
		Touch sensor	Signal lamp
plastic	M12 connector	**KTE101**	**KTV101**
plastic	cable, 2 m	**KTE102**	**KTV102**
stainless steel	M12 connector	**KTE301**	–
stainless steel	cable, 2 m	**KTE302**	–

Ergonomic control of machines and processes

No more aching fingers and wrists, no more uncertainty about the process status: With the Eternity touch sensors, you can control machines and processes with a light tap of your finger. To ensure that this works reliably even in case of deposits, the sensitivity of the touch sensor can be adjusted to suit the working environment.

Permanently reliable and FDA-compliant

Thanks to protection class IP69K and the suppression of splashing water, you don't need to worry about the KTE even in damp environments. No water can get inside; and splashing water, for example from cleaning processes, is distinguished from deliberate actuation of the sensor. Important for the food industry: When installed with the optionally available E12840 seal, the KTE is compliant with FDA. This also underlines its permanently reliable operation. You have our word on that – and a 5-year warranty.

Button, switch, colours – experience the new versatility

For clear visual feedback, the touch sensors, which are also available as pure feedback indicators, can adopt any RGB colour and display it permanently or in flash mode. Regardless of whether the KTE is operated with or without IO-Link, versatile switching functions are available: as button or switch, normally closed or normally open, with or without time delay.

Bundling switches, networking operations

For networked operations, up to two additional sensors or even mechanical switches can be connected to a touch sensor. If an 8-port IO-Link master bundles the signals decentrally in the field, up to 24 devices can be integrated.

Common technical data	
Installation size	M22
Interface	IO-Link
Displayable colours	16.7 million (RGB)
Protection rating	IP69K front IP65 | IP67 back

BEST FRIENDS
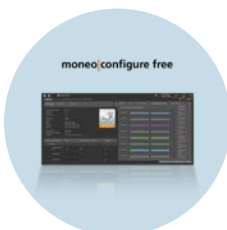
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Software for parameter setting of the IO-Link infrastructure
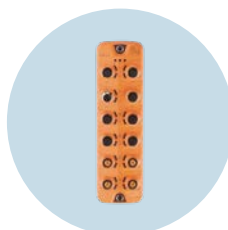
IO-Link masters
Field-compatible masters for use in hygienic areas

IO-Link interfaces
For setting the parameters of IO-Link devices on the PC

For further technical details, please visit:
ifm.com/fs/KTE101

Smartly positioned

High-precision positioner for industrial valves

- Precisely approach and hold any valve position

- Extensive diagnostic functions enable condition monitoring via IO-Link

- Individually adjustable RGB LEDs for clear visual feedback and localisation

- Flexible, modular system: sensor, solenoid valve, throttle plate and connection cables in a set

IP65

IO-Link

ifm – close to you!

Precise positioning of valves

Positioners are used to move valves and ball valves precisely to the required position, based on a signal from the control level indicating the degree to which the valve is to open in percent.

The positioner developed by ifm is based on the proven MVQ sensor and is supplemented by a new control unit. The connected solenoid valve is precisely controlled using the algorithms integrated in the MVQ. By controlling the supply and exhaust air, the valve is reliably moved to the required position and held there securely. The positioner provides feedback via its indicators and the control system when the valve has reached the required position.

The device has several teach-in modes to maximise efficiency and ease of set-up. Besides, a self-learning algorithm has been developed that continuously monitors, improves and expands the performance of the positioner.

Complete set

The MVQ positioner is supplied as a comprehensive set consisting of the MVQ301 sensor and control unit, a pneumatic solenoid valve, a throttle plate and a Y cable. Its modular design makes it easy to install directly on the NAMUR interface of the actuator. Different versions of the set are available, which differ, for example, in their behaviour to power or compressed air failures.

Available sets			Order no.
MVQ301 sensor and control unit, EVC508 Y connection cable, throttle plate, silencer (pre-mounted)	+	3/3-way solenoid valve (NAMUR)	**ZZ0687**
	+	5/3-way solenoid valve (NAMUR)	**ZZ0686**
	+	5/3-way solenoid valve (NAMUR) with fail-safe position	**ZZ0688**

Common technical data of the sets		
Operating range of the actuator	[°]	50…300
Indication of the operating range	[%]	0 corresponds to CLOSE, 100 corresponds to OPEN
Control accuracy	[%]	±2
Operating pressure of the solenoid valve	[bar]	3…8
Compressed air flow rate	[l/min]	max. 1250
Environmental conditions	[°C]	-25...70 (sensor) -10…50 (solenoid valves)
Communication interface		IO-Link
Required master port class		B
Protection rating		IP65

BEST FRIENDS
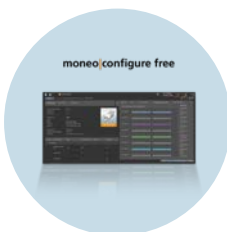
moneo|configure free
Software for parameter setting of the IO-Link infrastructure

IO-Link masters
Masters with Profinet interface for use in the field

Flow meters
Flow, total quantity and temperature measurement

For further technical details, please visit: ifm.com/fs/MVQ301

Distance measurement even in poor visibility

Radar sensor for harsh environmental and weather conditions

- Long ranges and a wide temperature range

- Reliable measurements even in precipitation, fog, dust and dirt

- Simultaneous detection of distance and speed

- Adaptable to specific applications thanks to various operating modes

- Intuitive set-up and visualisation of the measured data using the ifm Vision Assistant software

ifm – *close to you!*

IP69K

IO-Link

Type	Horizontal x vertical opening angle [°]	Frequency [GHz]	Output (2x configurable)	Order no.
Distance sensor	40 x 30	60...64	IO-Link | binary | 4...20 mA | 0...10 V	**R1D100**
Distance sensor with reduced transmitter power	40 x 30	60...64	IO-Link | binary | 4...20 mA | 0...10 V	**R1D102**
Distance sensor	40 x 20	77...81	IO-Link | binary | 4...20 mA | 0...10 V	**R1D200**
Area surveillance	140 x 50	60...64	IO-Link | binary | 4...20 mA | 0...10 V	**R2D100**
Area surveillance	140 x 30	77...81	IO-Link | binary | 4...20 mA | 0...10 V	**R2D200**
Area surveillance	140 x 50	60...64	IO-Link | binary	**R2D110**
Area surveillance	140 x 30	77...81	IO-Link | binary	**R2D210**

Distance sensor

The distance sensor detects objects by means of a focused radar beam. The powerful technology also allows the detection of targets whose reflection properties are poor.

The data obtained in this way can be clearly visualised using the "Vision Assistant" software. For example, the distance profile can show multiple objects simultaneously, while their relative speed can also be output at the same time.
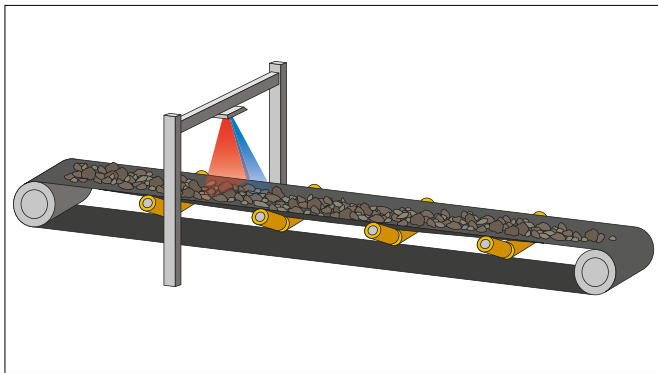
The radar sensor detects the load height and speed of a conveyor belt.

Common technical data		
Temperature range	[°C]	-40…80
Protection rating		IP65 | IP67 | IP69K

Reliable detection in harsh environments

With its long range, shock and vibration resistance properties and different operating modes, the radar sensor is designed to accurately detect objects even in the most adverse conditions. Whether in rain, snow, strong wind or extreme dust: the powerful radar sensor technology ensures reliable operation at all times.

Application areas

The result is a wide range of applications for the sensor, for example the detection of vehicles such as trucks and ships, during docking processes at loading and unloading ramps.

In addition, the radar sensor enables conveyor belt monitoring with regard to load and speed and scores in car washes with its robustness against spray. In a nutshell: a true all-rounder in distance and speed measurement.

BEST FRIENDS

IO-Link interface
For setting the parameters of IO-Link devices on the PC

IO-Key
Sending sensor data to the cloud via a mobile network
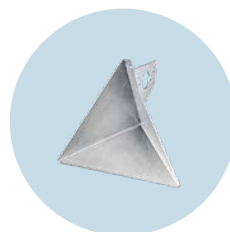
Corner reflectors
Used as set-up aid and as a reliable target object

For further technical details, please visit: ifm. com/fs/R1D100

Bringing everything safely into position

Safety encoders for mobile machines

- Integrated safety check, TÜV certificate and daisy chain option simplify system set-up

- Accurate position synchronisation in motion thanks to the "preset on the fly" function

- Additional ifm mode with active safe state e.g. for faster system response

IP69K · PL/SIL · CODESYS

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Safety for mobile machines

Whether in municipal vehicles, in AGVs in intralogistics, or in AMRs for heavy-duty use in mines or harbours: Wherever vehicles or superstructures are moved or steered automatically, the safety of the surroundings and the vehicle itself must be guaranteed at all times. The safety encoder from ifm can be used to record the position, angle and speed values of moving elements such as axles, turntable ladders, crane arms or tipping skips. This information can be used to derive steering, turning or tilting angles or the current height position of lifting elements. Continuous position synchronisation, for example, via RFID, is also possible thanks to the "preset on the fly" function.

Fast integration, also in series

The sensor redundancy required to ensure safe operation is already integrated in the safety encoder. This and the corresponding continuous self-monitoring of safe operation have been tested and certified by TÜV Rheinland. The sensor is also integrated into the SISTEMA library. This immensely reduces the effort required to implement and subsequently accept safety-related automation. The safety encoder also has both a CAN input and a CAN output. Hence, several encoders or other compatible sensors can be connected in series, making the installation of safety sensors efficient and simple.

Seamless communication with the controller

The combination with the ifm controller also significantly reduces the programming effort in Codesys because the seamless connection of the encoder to the controller and secure communication between the two products is guaranteed by default.

Safety encoder, 58 mm	Order no.
Axial connection	
solid shaft 10 mm	**RM900S**
hollow shaft, 12 mm	**RM901S**
Radial connection	
solid shaft, 10 mm	**RM902S**
hollow shaft, 12 mm	**RM903S**

Technical data		
Operating voltage	[V DC]	8...36
Resolution	[bits]	29 (Multiturn: 16; single turn: 13)
M12 CANbus connections		1x in; 1x out
Communication protocols		CANopen, CANopen Safety
Safety level		SIL2; PLd; AgPLd*; MPLd*
Protection rating		IP69K

*in preparation
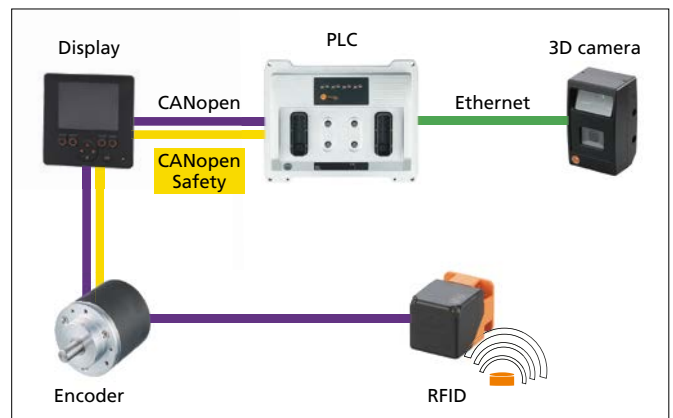
BEST FRIENDS

ecomatController
Controller for mobile applications, also for safety applications

Graphic display
Programmable HMI for the control of mobile machines

RFID read/write head
Antenna and evaluation in one device

For further technical details, please visit:
ifm.com/fs/RM900S

The grip strength always clearly in view

PQ Cube pressure sensor sets new standards

- Robust measuring cell resists dust, dirt and moisture
- Easy-to-read 1" TFT display
- Smart installation concept requires fewer adapters
- Made for use in demanding environments

IP65

IO-Link

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Measuring range [bar]	Outputs	Order no.
		G $^1/_8$
-1...10	2 switching outputs DC PNP/NPN	**PQS812**
-1...1	2 switching outputs DC PNP/NPN	**PQS816**
-1...0	2 switching outputs DC PNP/NPN	**PQS819**
-1...10	1 switching output + 1 analogue output 4...20 mA / 0...10 V / 1...5 V	**PQC812**
-1...1	1 switching output + 1 analogue output 4...20 mA / 0...10 V / 1...5 V	**PQC816**
-1...0	1 switching output + 1 analogue output 4...20 mA / 0...10 V / 1...5 V	**PQC819**

Robust in every corner

The robustness of the PQ Cube makes it the ideal choice for use on vacuum grippers and all other pneumatic applications. Whether it is the IP65 housing, the brass sockets or the proven accurate, dust and dirt resistant measuring cell – everything is designed for permanent use in demanding industrial environments.

## TFT display: convenient data visualisation

At the same time, we have not compromised on comfort: On the 1" TFT display you can read all relevant data and information in clear writing. A nine-language installation wizard helps you set it up.

Avoid the flood of adapters

Thanks to the smart installation concept, you can install the PQ Cube in many cases without additional adapters. Find out more in our online shop.

Common technical data		
Ambient temperature / medium temperature	[°C]	0...60
Switch point accuracy	[%]	< ± 0.5
Linearity error		< ± 0.5 % (LS) / < ± 0.25 % (BFSL)
Communication interface		IO-Link 1.1 COM 3
Connector		M8
Protection rating		IP65

LS = Limit Value Setting
BFSL = Best Fit Straight Line
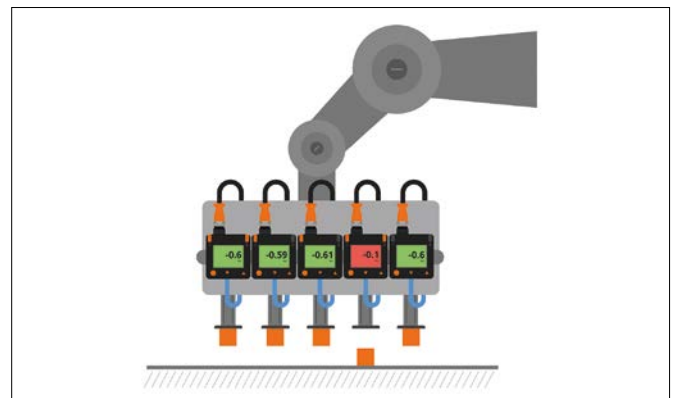
The current status can be identified quickly and clearly due to the red / green colour change.

BEST FRIENDS
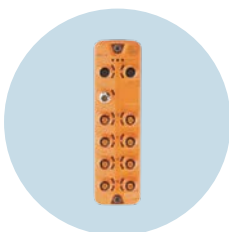
IO-Link masters
For use in the field with up to 8 ports.
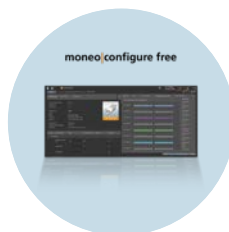
moneo|configure free
Software for parameter setting of the IO-Link infrastructure

IO-Link interface
For parameter setting of IO-Link devices on the PC

For further technical details, please visit:
ifm.com/fs/PQS812

Safe
without a float

LI level sensor for point level and leakage monitoring

- Approved as overflow prevention and leakage sensor to the German Federal Water Act (WHG)

- Maintenance-free as there are no moving parts

- Adjustment and setting via inductive teach button

- 2 switching outputs can be defined at the measuring point

- Adjustable to different media (e.g. water, oil, cooling lubricants)

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IP69K

IO-Link

Probe length [mm]	With WHG approval	Without WHG approval
	Order no.	Order no.
132	**LI2131**	**LI5131**
273	**LI2132**	**LI5132**
481	**LI2133**	**LI5133**
737	–	**LI5134**

Technical data		
Output function		2 switching outputs: 1 x temperature, 1 x level or 2 x level, depending on the damping (e.g. water/oil)
Operating voltage	[V DC]	9.6...35 (IO-Link: 18...30)
Medium temperature water / oil	[°C]	-25...85
Process connection	[mm]	Ø 16
Tank pressure	[bar]	0.5
Protection rating		IP69K

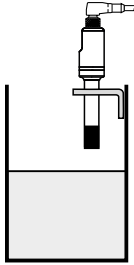## Smart alternative for float switches

With the LI level sensor, you can reliably detect leakages and point levels on a permanent basis. The capacitive measuring system has no moving parts. Malfunction or maintenance measures due to deposits on the mechanical parts is therefore eliminated. Thanks to the WHG approval, you can also comply with the legal requirements in the environment of substances that are hazardous to water.

Easy set-up, digital communication
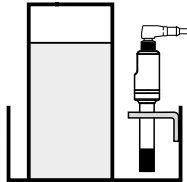
The sensors are factory-set for specific media (LI21xx: oils, LI51xx: aqueous media), so they can be easily put into operation via plug & play. Thanks to the teach button and IO-Link, the sensor can be adjusted to other media just as easily. Another advantage: the sensor also detects the temperature of the medium. This is transmitted via IO-Link, but can also be assigned to one of the two switching outputs.

Application examples:

Overflow prevention in a supply tank for coolant emulsion

Leakage monitoring in the overflow vessel of a hydraulic power pack

Underflow prevention in a supply tank for coolant emulsion

BEST FRIENDS
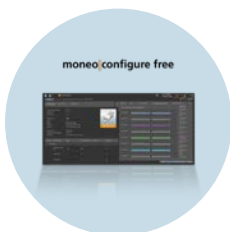
moneo|configure free
Software for parameter setting of the IO-Link infrastructure

IO-Link interface
For parameter setting of IO-Link devices on the PC

IO-Link data splitter
Transmits IO-Link sensor data to IT level and PLC

For further technical details, please visit: ifm.com/fs/LI2131

Non-contact level measurement

Radar sensor for open and closed containers

- Level measurement with millimetre precision up to 10 metres

- Non-contact measuring principle, therefore no problems from deposits or wear

- Direct measurement or through non-metallic walls

- Remote sensor parameter setting and level monitoring via connection to the IT system

IP69K

IO-Link

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Process connection	Outputs	Frequency range [GHz]	Order no.
G1	2 switching outputs or 1 switching and 1 analogue output 4...20 mA	77-81	**LW2120**
G1	2 switching outputs or 1 switching and 1 analogue output 4...20 mA	76-77	**LW2160***

*Available for India and Malaysia

Precise measurement on open and closed tanks and containers

The LW2120 radar level sensor measures levels of liquid media up to 10 metres precisely and without blind areas. The 80 GHz frequency used ensures stable and precise measurement results, even in the presence of steam or condensate in the tank for example.

With the antenna extension, available as an accessory, the sensor may also be used outside closed metal tanks, for example on open tubs.

The radar measuring system can also penetrate through non-metallic walls, allowing the level sensor to be easily mounted above plastic tanks such as IBC containers.

View measurement behaviour in real time

The freely available Vision Assistant software enables intuitive set-up of the sensor and clear visualisation of the process values. The behaviour of the sensor can be viewed in real time and reliable measurement ensured.
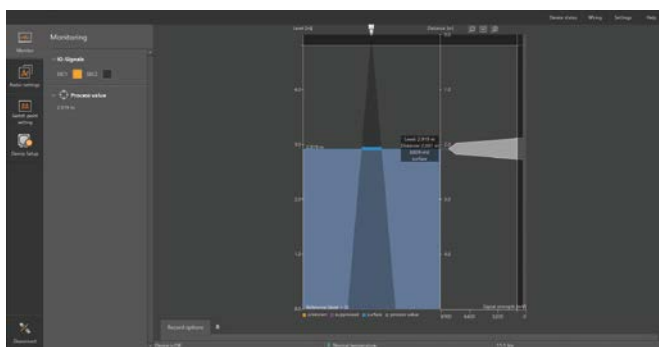
Common technical data		
Measuring range	[m]	0.01...10
Measuring accuracy	[mm]	± 2
Measuring principle		FMCW (80 GHz)
Protection rating		IP69K
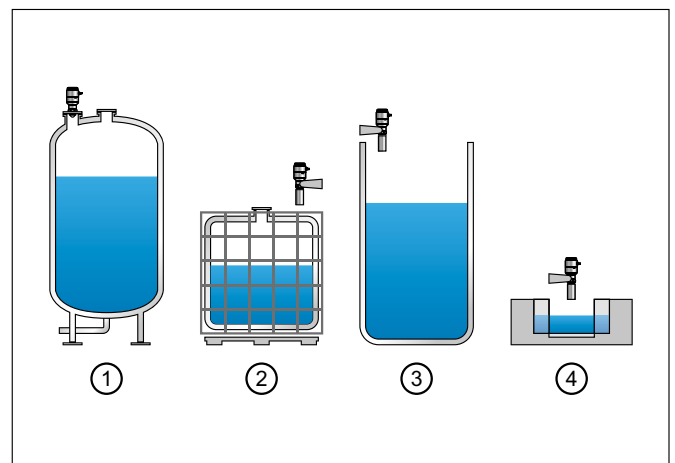
1) Storage tank
2) Plastic container
3) Outside use
4) Flow measurement
   Flow rate measurement in Venturi flumes (e.g. Parshall, Khafagi-Venturi) can also be implemented with the radar sensor.

BEST FRIENDS

Antenna extension
For use of the sensor outside closed tanks

moneo|RTM
Analysis software for simple condition monitoring

IO-Link interface
For setting the parameters of IO-Link devices on the PC

For further technical details, please visit: ifm.com/fs/LW2120

Non-contact level measurement

Hygienic radar level sensor with IO-Link

- 80 GHz frequency enables level measurement with millimetre precision of up to 10 metres

- Non-contact measuring principle, therefore no problems from deposits or wear

- Certified for use in hygienic areas

- Remote sensor parameter setting and level monitoring via connection to the IT system

IP69K

IO-Link

ifm – close to you!

Process connection	Outputs	Frequency range [GHz]	Order no.
Aseptoflex Vario G1	2 switching outputs or 1 switching and 1 analogue output 4...20 mA	77-81	**LW2720**
Aseptoflex Vario G1	2 switching outputs or 1 switching and 1 analogue output 4...20 mA	76-77	**LW2760***

*Available for India and Malaysia

Trouble-free monitoring of large tanks

With the LW2720 level sensor, levels of liquid media in tanks with a height of up to 10 metres can be monitored precisely and without blind areas. The non-contact radar measuring principle prevents malfunctions or failures of the sensor caused by the adhesion of viscous media or damage from agitators.

The 80 GHz frequency used ensures stable and precise measurement results even in the presence of steam or condensate in the tank. The sensor is designed for use in hygienic areas, so that even CIP and SIP processes or the use of spray balls do not impair its proper functioning.

More convenience thanks to IO-Link

The powerful LW2720 package is completed by the following comfort factors: Sensor installation only takes a few minutes, and sensor parameters can be conveniently set and read out remotely via IO-Link.
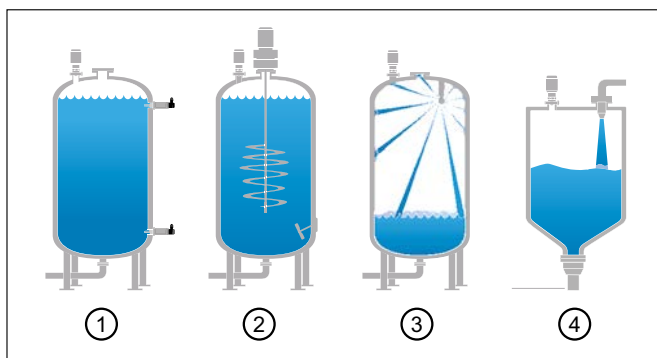
1) Storage tank
2) Mixing tank
3) CIP process
4) Batch filling

Common technical data		
Measuring range	[m]	0.01...10
Measuring accuracy	[mm]	± 2
Measuring principle		FMCW (80 GHz)
Protection rating		IP69K
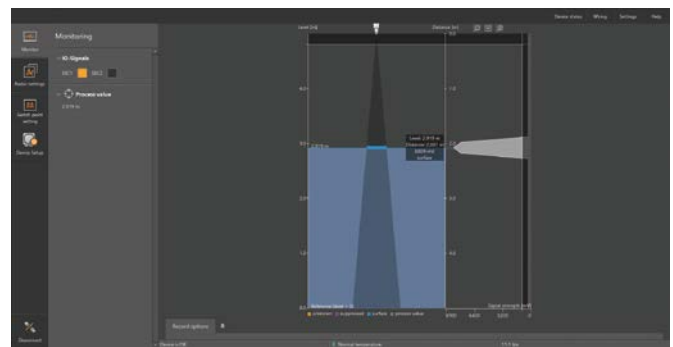
View measurement behaviour in real time

The freely available Vision Assistant software enables intuitive set-up of the sensor and clear visualisation of the process values. The behaviour of the sensor can be viewed in real time and reliable measurement ensured.

BEST FRIENDS

Starterkit
Hardware and software for testing the LW2720 via IO-Link
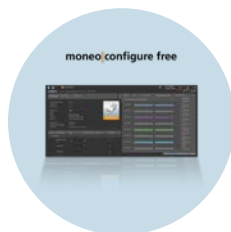
moneo|configure free
Software for parameter setting of the IO-Link infrastructure

IO-Link interface
For setting the parameters of IO-Link devices on the PC

For further technical details, please visit:
ifm.com/fs/LW2720

The game changer

Hygienic flow meter with IO-Link

- Magnetic-inductive flow meter completes the portfolio for the food industry

- Reduces the need for measuring points by providing flow rate, total volume, temperature and conductivity

- Easy to set up thanks to app-based menu and guided installation

IP69K

IO-Link

ifm – close to you!

Nominal width	Measuring range m³/h	Order no.	
		Units of measurement: SI, EU	Units of measurement: SI, EU, imperial
DN40	0.3…45.00	**SMF320**	**SMF321**
DN50	0.6…72.00	**SMF420**	**SMF421**
DN65	1.2…120.00	**SMF520**	**SMF521**
DN80	1.8…180.00	**SMF620**	**SMF621**
DN100	3.0…300.00	**SMF720**	**SMF721**

No more blind spots in the digital process

The SM Foodmag magnetic-inductive flow meter takes the flow measurement of liquid and creamy foods to a new level. Equipped with IO-Link, the sensor is the first of its kind to enable digital data transmission from the process, eliminating the last blind spot in the digitalised, transparent production process. On site, the display itself and the all-round visible status LED provide information on the current status.

Measures what matters

The sensor detects the current flow rate, total volume and flow direction, as well as the presence of the medium (often referred to as empty pipe detection). It also transmits conductivity and temperature to the control system and IT level. This can reduce the need for additional measuring points in the system.

Convenience, clarity, safety

The integration of the SM Foodmag almost takes care of itself. Combined with our patented cables, the standard M12 connection ensures a fast, waterproof and error-free connection to the data infrastructure. Standard installation dimensions and a flexible choice of seals and process adapters make it easy to integrate into existing systems. The app-based menu structure and guided installation make parameter setting a breeze. Locally and digitally, the SM Foodmag ensures maximum visibility inside the pipe – for greater process reliability.

Technical data		
Accuracy, flow rate under reference conditions, optional (subject to a charge)	[%]	± 0.5 MW + 1.5 mm/s ± 0.2 MW + 2 mm/s
Response time	[s]	0.3
Repeatability	[%]	± 0.1 MW
Medium temperature	[°C]	-20...150 (continuous)
Accuracy, temperature	[K]	± 1
Conductivity measuring range	[µS/cm]	100...100,000
Accuracy, conductivity 100...20,000 µs/cm 20,000...100,000 µs/cm	[%]	± 10 MW ± 20 MW
Materials (wetted parts)		PFA; high-grade stainless steel (316L / 1.4435)
Protection rating		IP67, IP69K

MW: measured value

BEST FRIENDS

IO-Link masters
Field-compatible masters for use in hygienic areas

Conductivity sensors
Precise distinction of liquid media based on their conductivity

Pressure sensors
Hygienic, with robust and flush-mounted ceramic measuring cell

For further technical details, please visit:
ifm.com/fs/SMF320

Measuring flow rates without any obstacles

The SU Puresonic ultrasonic sensor

- Accurate flow measurement of water and ultrapure water

- Component-free stainless steel measuring pipe offers high media resistance and permanent ingress resistance

- Conclusions about the signal quality possible on the basis of the signal strength provided

- Sensor status always in view via the operating status LED

IP69K

IO-Link

ifm – close to you!

Process connection	Measuring range		Order no.	
	[l/min]	[gpm]	only [l/min]	[l/min] + [gpm]
G 1/2 " (DN15)	0.5...65	0.13...17.17	**SU6020**	**SU6021**
G 3/4 " (DN20)	0.5...75	0.13...19.81	**SU7020**	**SU7021**
G 1 " (DN25)	1...240	0.25...63.4	**SU8020**	**SU8021**
G 1 1/4 " (DN32)	1...275	0.25...72.64	**SU9020**	**SU9021**
G 2 " (DN50)	5...1000	1.32...264.18	**SU2020**	**SU2021**
Clamp 1 " (DIN32676 series C)	1...240	0.25...63.4	**SUH200**	**SUH201**
Clamp 2 " (DIN32676 series C)	5...1000	1.32...264.18	**SUH400**	**SUH401**
1/2 " NPT	0.5...65	0.13...17.17	-	**SU6621**
3/4 " NPT	0.5...75	0.13...19.81	-	**SU7621**
1 " NPT	1...240	0.25...63.4	-	**SU8621**
2 " NPT	5...1000	1.32...264.18	-	**SU2621**

Ensuring process quality easily and permanently

The SU Puresonic detects flows with high precision. Thanks to ultrasound technology, this also applies to ultrapure water as produced in reverse osmosis plants. In combination with the LDL101 conductivity sensor, reliable quality control can be established in the filtration process.

Robust measuring pipe without structures

The measuring pipe of the SU Puresonic is made of stainless steel and is free of measuring elements, seals and moving parts. This means that faults due to damage, leaks or blockages are excluded from the outset, as are design-related pressure drops.

Condition monitoring made easy

Equipped with IO-Link and a highly visible status LED, the SU Puresonic has everything you need to continuously monitor process quality. In this way, the status of the signal quality can be quickly read both at the IT level and in the field. If it is decreasing, this can be an indication of increased particle density or deposits on the inner wall of the pipe.

You can find further information about the SU Puresonic as well as customer experience reports on our website.

Common technical data		
Pressure rating	[bar]	< 100
Output functions		IO-Link, analogue output 4...20 mA, pulse output, switching output, diagnostic output
Flow		
Accuracy	[%]	
SU8, SU9, SU2, SUH2, SUH4:		± (1.0 MW + 0.5 MEW)
SU6, SU7:		± (2.0 MW + 0.5 MEW)
Repeatability	[%]	± 0.2
Medium temperature	[°C]	± 0.2
Minimum conductivity	[µS]	from 0
Temperature		
Measuring range	[°C]	-20...100
Accuracy	[K]	± 2.5
Protection rating		IP69K

MW = Measuring range value
MEW = Measuring range end value

BEST FRIENDS

Vortex flow meter
Also detects deionised water and cooling water

Conductivity sensor
Measures the conductivity of a medium, such as ultrapure water

IO-Link masters
Field-compatible master with Profinet interface

For further technical details, please visit:
ifm.com/fs/SU6020

Do you want to know the flow?

The new generation of vortex sensors

• Suitable for ultrapure water, water and water-based media

• Precise measurement of flow and temperature

• Durable and robust thanks to hydrolysis-resistant plastic

• High pressure and temperature resistance

IP65

ifm – close to you!

Process connection	Nominal width	Order no.	
		Seal: FKM	Seal: EPDM
G ½ "	DN6	**SV3051**	**SV3151**
G ½ "	DN8	**SV4051**	**SV4151**
G ¾ "	DN10	**SV5051**	**SV5151**
G ¾ "	DN15	**SV6051**	**SV6151**
G 1 "	DN20	**SV7051**	**SV7151**
G 1 ¼ "	DN25	**SV8051**	**SV8151**

Common technical data		
Outputs		1x 4…20 mA 1x Pt1000
Measuring accuracy water	[%]	Q < 50 % MEW: < 1 (MEW) Q > 50 % MEW: < 2 (MW)
Repeatability	[%]	0.2 (MEW)
Medium temperature	[°C]	-15…125
Pressure rating	[bar]	16 (to max. 90 °C)
Bursting pressure	[bar]	100 (to max. 90 °C)
Materials (wetted parts)		PPS; PPSU; FKM or EPDM
Protection rating		IP65

Q = volume flow
MW = Measuring range value
MEW = Measuring range end value

Tried-and-tested principle redesigned

New design, improved robustness and proven precision: with their inner and outer values, the new generation of Vortex sensors convinces all along the line, making the flow measurement of deionised water, drinking water or cooling water more easier than ever before.

Thanks to the new design and new materials, the number of inner seals could be minimised: housing and bluff body are made of one piece, guaranteeing high pressure and temperature resistance.

More robust against hydrolysis, pressure and temperature

The material used is characterised by high hydrolysis resistance, which has a positive effect on the service life of the device. In addition, the material is resistant to microbiological attack, which reduces the risk of legionella development, especially in cooling water circuits.

Identical installation dimensions

The installation dimensions correspond to those of the existing Vortex generation, allowing for a smooth changeover to the new generation.

BEST FRIENDS

Temperature plug
Converts resistance values into analogue or IO-Link signals

Converter and display
Converts an analogue current signal into a digital signal

Level sensor
Continuous level detection in tanks and containers

For further technical details, please visit: ifm.com/fs/SV3051
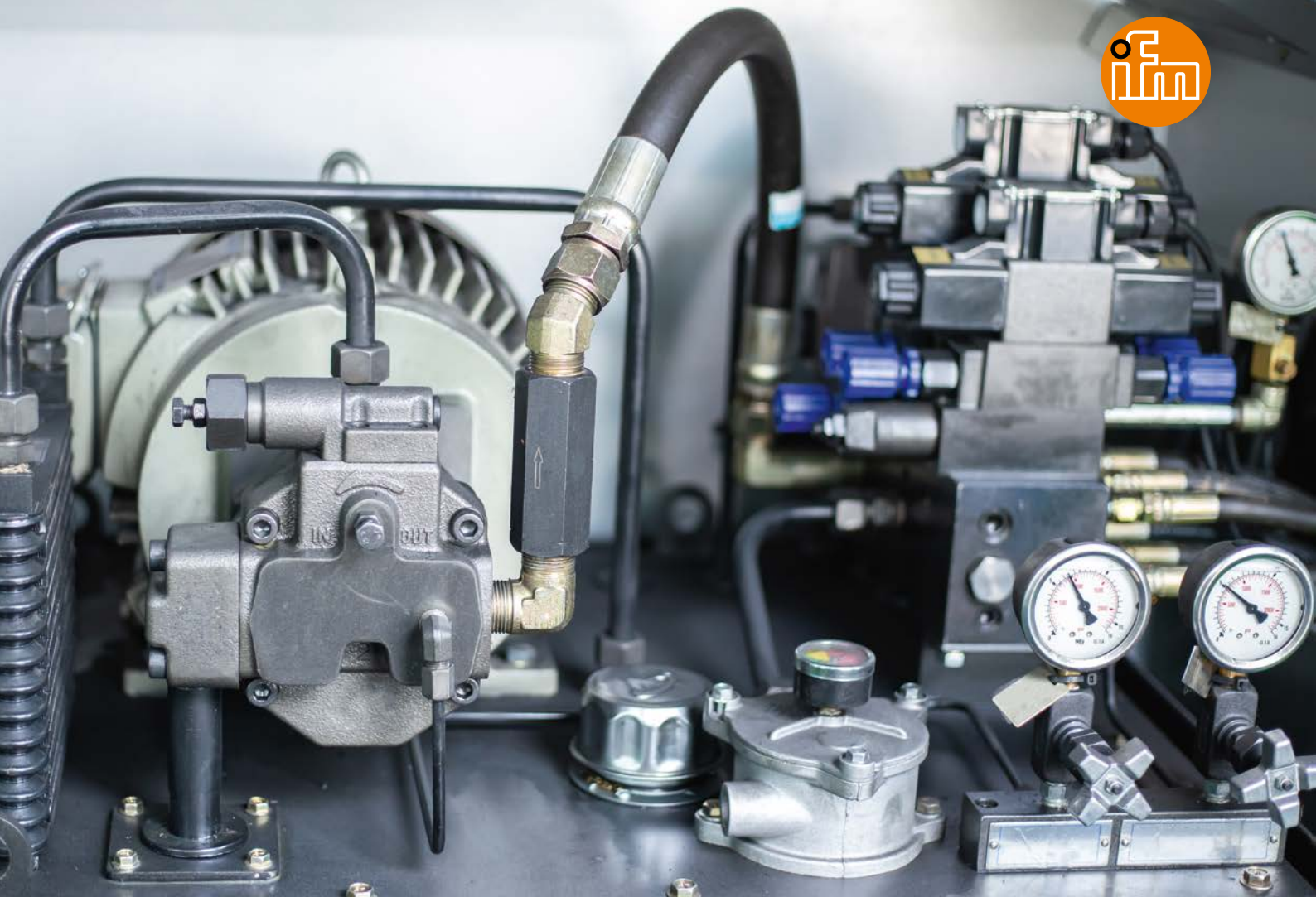
Every drop counts

Mechatronic flow sensors designed for oils

- Precise measurements for viscosities from 5 to 320 cSt
- Fast flow or temperature changes do not affect the measurement
- High measurement dynamics reduces type versions
- For high-pressure applications up to 100 bar

ifm – close to you!

IO-Link   IP67

Process connection and pressure rating	Order no.								
	G ¾ – PN 100			G 1 – PN 100				G 1 ½ – PN 63	
Max. flow in l/min	15	25	50	15	25	50	100	100	200
ISO VG – 10 cSt	SB1232	SB1233	SB1234	–	–	–	SB1246	–	SB1257
ISO VG – 32 cSt	SB9232	SB9233	–	–	–	–	–	–	–
ISO VG – 46 cSt	SB2232	SB2233	SB2234	–	–	–	SB2246	–	SB2257
ISO VG – 68 cSt	SB3232	SB3233	–	–	–	SB3244	SB3246	–	SB3257
ISO VG – 100 cSt	SB4232	–	–	–	SB4243	SB4244	–	SB4256	SB4257
ISO VG – 150 cSt	–	–	–	SB5242	–	SB5244	–	SB5256	–
ISO VG – 220 cSt	–	–	–	SB6242	SB6243	–	–	–	–
ISO VG – 320 cSt	–	–	–	SB7242	SB7243	SB7244	–	SB7256	SB7257

Easily withstands even the harsh environments of heavy industry

The rougher the process environment, the higher the stress that the sensors need to withstand. For such conditions, the SB mechatronic flow sensor, specifically suited for viscous oils, is the right choice.
It provides the perfect combination of accuracy, flexibility and robustness required in heavy industry or in the steel industry. The sensor easily deals with high pressures, temperature fluctuations and air bubbles in the medium.

High performance

Due to the use of application-specific mechanics and a complex adjustment carried out during production, the SB, like all other sensors of this series, is designed for maximum precision and minimum response time. Even with fluctuating temperature and viscosity values, the integrated temperature compensation and special oil calibration guarantee precise measurement results.

Common technical data	
Accuracy flow measurement	± 5 % of the final value*
Repeatability	± 1 %
Accuracy temperature measurement	3 K (25 °C; Q > 1 l/min)
Response time [s]	0.01
Medium temperature [°C]	-10...100
Pressure rating [bar]	up to 100
Output signal	IO-Link (configurable), switching output, frequency output, flow / temperature
Protection rating	IP65	IP67

* Q > 1 l/min; 20...70 °C medium temperature

BEST FRIENDS

Level sensor
Detects minimum levels, overflow or leakage

Pressure sensor with display
Precisely detects tank pressures and levels
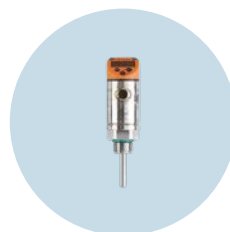
Temperature sensor with display
Highly accurate measured values with local display

For further technical details, please visit: ifm.com/fs/SB1232

Energy saving made easy

Precise compressed air measurement for effective energy management

- The basis for a comprehensive energy management system according to ISO 50001 or EMAS

- Improvement of energy efficiency via leakage monitoring

- Pressure monitoring thanks to the integrated pressure sensor

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

IP67   IO-Link

ifm – close to you!

"All-in-one sensor" reduces costs

The compressed air meter is a real all-rounder. Thanks to the integrated sensors for temperature and optionally also for pressure, 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 their system. In addition to the inline versions, screw-in versions (SD1540, SD1440) are also available for pipes from 14 to 254 mm diameter and a pressure of up to 50 bar.

Energy efficiency thanks to leakage monitoring

The precise flow monitoring allows for leakage detection and energy cost savings. In addition, the high repeatability of the device enables exact allocation of the costs of compressed air to the respective production line as well as optimised product cost calculation.

Basis for seamless energy management

Following the EU directive on energy efficiency DIN EN ISO 50001, all member states have undertaken to achieve energy savings. The requirement for obtaining energy tax reductions is the implementation of an energy management system. Combining the compressed air meter with regular DAkkS calibrations provides the optimum basis for this.
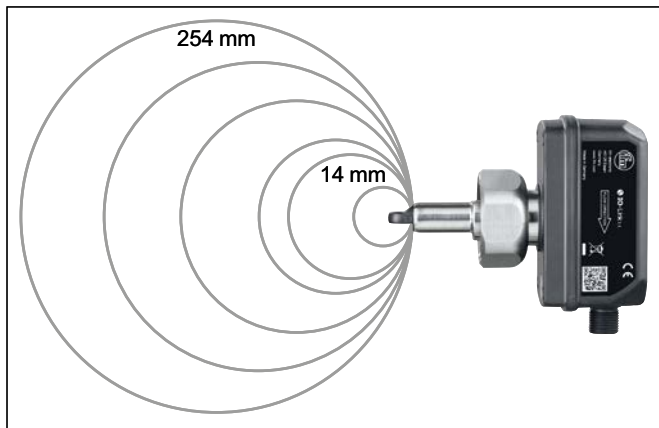
The sensor outputs the consumption depending on the pipe diameter.

Measuring range [m³/h]	Medium	Process connection	Order no.
0.05...15	air	G ¼ (DN8)	**SD5500**
0.25...75	air	R ½ (DN15)	**SD6500**
0.8...225	air	R 1 (DN25)	**SD8500**
1.4...410	air	R 1 ½ (DN40)	**SD9500**
2.5...700	air	R 2 (DN50)	**SD2500**
0.3...26260	air	G 1	**SD1540**
0.3...26260	air / nitrogen	G 1	**SD1440**

Calibration certificates	Order no.
ISO calibration (6 calibration points)	**ZC0020**
DAkkS calibration (6 calibration points)	**ZC0075**

Common technical data		
Flow		
Accuracy	[%]	± (2.0 MV + 0.5 MEW)
Repeatability	[%]	± (0.8 MV + 0.2 MEW)
Response time	[s]	0.1
Flow SD1440, SD1540		
Accuracy	[%]	± (6.0 MV + 0.6 MEW)
Repeatability	[%]	± (1.5 MV)
Response time	[s]	0.1
Temperature		
Measuring range	[°C]	-10...60
Pressure		
Measuring range	[bar]	-1...16
Output signal		Switching output, analogue output, pulse output, IO-Link (configurable)
Protection rating		IP67

MW = value of the measuring range
MEW = final value of the measuring range

BEST FRIENDS

Pressure sensors
Especially for pneumatic processes

IO-Link masters
Field-compatible masters with Profinet interface

Compressed air meters
Precisely measures flow and consumption

For further technical details, please visit: ifm.com/fs/SD5500

Fast, precise, non-invasive

Passive surface temperature probe

- Clamp-on solution reduces installation costs and effort

- Also suitable for use in hygienic areas

- Fast response time and high measurement accuracy for a clear process overview

IP69K

ifm – close to you!

External pipe diameter [mm]	Nominal width	Order no.
21…24	DN20	**TSM301**
25…30	DN25	**TSM401**
32…36	DN32	**TSM501**
38…45	DN40	**TSM601**
48…54	DN50	**TSM701**

Common technical data		
Temperature measuring range	[°C]	-25...160
Measurement accuracy	[%]	2
Measuring element		Pt1000
Response time T09	[s]	25
Protection rating		IP69K

Simple process monitoring even on small pipes

The temperature probe for surface mounting enables quick, flexible and easy measuring point configuration. The passive temperature probe is particularly suitable for use on small pipe diameters where invasive temperature monitoring would significantly affect the flow of the medium. As the values are recorded non-invasively, there is no risk of contamination of the medium. Instead, the installation is easy and does not require time-consuming and cost-intensive drilling and welding, so that the measuring point can also be installed in the running process.

Tested hygienic suitability

Thanks to a temperature range of up to 160 °C, high protection rating IP69K and the hygienically safe mounting principle tested by Ecolab, the probe is also suitable for use in food production. In combination with invasive temperature monitoring, for example, complete heating of the pipes required in the CIP process can be ensured.

BEST FRIENDS

Temperature plug
Converts resistance values into analogue or IO-Link signals

moneo|blue
Manage IO-Link devices conveniently via smartphone app

IO-Link masters
Field-compatible masters for use in hygienic areas

For further technical details, please visit:
ifm.com/fs/TSM301

Digitise your temperature values

Temperature plug for hygienic applications

- Ideal for demanding control tasks thanks to 0.01K resolution

- Analogue and switching output as well as IO-Link

- Hygienic stainless steel housing with status LED

- Versatile: temperature measuring range from -100 to 600 °C

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IP69K

IO-Link

Measuring range	Factory settings	Order no.
M12 connections · Output function 4…20 mA **Switching output · IO-Link 1.1**		
-100…600 °C	-100…600 °C	**TP2009**
-100…300 °C	-50…300 °C	**TP2008**
-100…300 °C	-50…150 °C	**TP2005**
-100…300 °C	-10…150 °C	**TP2001**
-100…300 °C	0…100 °C	**TP2007**
-148…572 °F	0…300 °F	**TP2003**
M12 connections · Output function 0…10 V **Switching output · IO-Link 1.1**		
100…300 °C	0…100 °C	**TP2017**

Suitable probe sensors for hygienic applications can be found on our website at **ifm.com**

Convert & digitise your temperature measurement

The measured signal converter converts the resistance values of the temperature probes into standardised analogue and switching signals. Using IO-Link, the measured value can also be transmitted in digital form without conversion losses. This makes the temperature plug an important component for a digital retrofit for existing installations.

Versatile use

The transmitter has a connection for 4-wire Pt100 / Pt1000 measuring elements. It can either be screwed directly onto the measuring element or connected using a connecting cable. The small design is also suitable for rough applications, as the plug can be mounted in a safe place away from the probe.

Plug & play

If the temperature plug is connected to the measuring element, it recognises it automatically. If the scaling of the measuring range set at the factory meets the requirements of the application, no further settings are necessary. If necessary, the user can simply adjust the scaling via IO-Link.

Minimised installation and error sources

Using two standardised M12 connections, the installation complexity of the TP temperature plug is reduced to a minimum as compared to a common head / DIN rail transmitter. Sources of error, such as cable clamps, are eliminated.

Individual adjustment

For consistently high accuracy, you can adjust the temperature plug after calibration to meet your specific requirements. For this purpose, the TP offers a wide range of setting options enabling perfect coordination of your system.

Common technical data		
Ambient temperature	[°C]	-25…80
Resolution	[K]	0.01 (TP2009: 0.1)
Display via IO-Link	[K]	±0.1
Precision via the analogue output		±0.1K ±0.1% of the scaled measuring span
Temperature coefficient (in % of the span per 10 K)		< 0.1
4-wire evaluation		Pt100 and Pt1000
Protection rating		IP69K

BEST FRIENDS
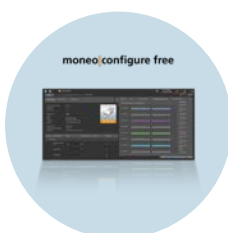
moneo|configure free
Software for parameter setting of the IO-Link infrastructure

IO-Link masters
Field-compatible masters for use in hygienic areas

IO-Link interface
For setting the parameters of IO-Link devices on the PC

For further technical details, please visit:
ifm.com/fs/TP2009

Time for an oil change?

Oil humidity sensor keeps an eye on quality

- Monitors the relative humidity and temperature of ester and mineral oils
- Continuous measurement enables condition-based changes and maintenance
- Easy installation thanks to standardised process connection and M12 connector

IP69K

IO-Link

ifm – close to you!

Process connection	Outputs	Order no.
G ½	2x 4…20 mA	**LDH110**
G ½	IO-Link	**LDH112**
½ NPT	IO-Link	**LDH122**

Common technical data		
Media		Mineral oils, synthetic esters, organic oils
Operating voltage LDH110	[V DC]	9…33
Operating voltage LDH1x2	[V DC]	18...30
Rel. oil humidity measuring range	[% RH]	0...100
Temperature measuring range	[°C]	-40…120
Pressure rating	[bar]	50
Materials housing		stainless steel (316L / 1.4404), PEI
Materials seal		FKM
Protection rating		IP68	IP69K

Condition-based oil management

The LDH oil humidity sensor continuously measures the relative humidity and temperature of the oil. This enables plant operators to carry out condition-based changes and maintenance. It allows the medium to be used with maximum efficiency while avoiding plant damage due to reduced cooling or lubricating action. Corrosion and cavitation caused by free water can also be effectively prevented.

Thanks to the G½ thread and standardised M12 connector the LDH can be put into operation easily and correctly, and with the IO-Link technology the data can be conveniently used for IT-based condition monitoring.

The stainless steel housing permanently withstands the harshest conditions of the operating environment.

BEST FRIENDS

Flow sensor
Mechatronic measuring principle with fast response time
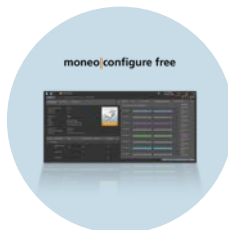
moneo|configure free
Software for parameter setting of the IO-Link infrastructure

Oil particle monitor
Measures the particle concentration and displays the degree of purity

For further technical details, please visit:
ifm.com/fs/LDH110

Continuous corrosion resistance

Conductivity sensor made of polypropylene

- Resistant to salt and other aggressive media

- Detects conductivity using the tried-and-tested inductive measuring principle

- Compact design facilitating installation where space is limited

ifm – close to you!

IO-Link

IP69K

Measuring principle	Installation depth [mm]	Process connection	Connector type	Order no.
Inductive	81	G 1½ coupling nut	M12	**LDL400**

For filter installations, shipping applications and dosing stations

The LDL400 is the polypropylene version of ifm's proven LDL200 inductive conductivity sensor. Its material properties make it the ideal choice for applications in which metallic sensors tend to corrode: direct contact with salty ambient air or other aggressive, acidic or alkaline media, such as cleaning agents, poses no problem for the LDL400. With a diameter of eight millimetres, the measuring channel ensures optimum flow of the medium while minimising the risk of blockages.

Continuous, temperature-compensated measurement

The sensor continuously measures the conductivity of a medium in the range from 100 to 2 million µS/cm and outputs this as a temperature-compensated digital or analogue value. Furthermore, the percentage concentration of NaCl in ultrapure water can be accessed acyclically. This means that the LDL400 can be used universally in almost every conceivable water treatment application and, since it comes with an MR type approval certificate from the EU RO MR Group, the LDL400 can be easily integrated in ship automation applications.

Technical data		
Conductivity measuring range	[µS/cm]	100...2000000
Measurement accuracy	[%]	2 (MW) ± 25µS/cm
Temperature measuring range	[°C]	-25...100
NaCl concentration measuring range	[%]	0...25 (at 20...50 °C)
Medium temperature under UL conditions	[°C] [°C]	-25...80 -25...65
Pressure rating	[bar]	10 (at 20 °C) 6 (at 60 °C)
Ambient temperature	[°C]	-25...50
Output		IO-Link, 1x 4...20 mA
Protection rating		IP68 | IP69K

MW = value of the measuring range

BEST FRIENDS

Vortex flow meter
Monitors flow and temperature in water pipes

LW level sensor
80 GHz radar sensor for non-contact measurement
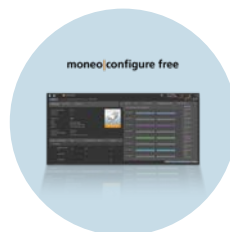
moneo|configure free
Software for parameter setting of the IO-Link infrastructure

For further technical details, please visit: ifm.com/fs/LDL400

For easy welding(-in) operations

Welding adapters for tanks

- Welding adapters for quick and uncomplicated welding

- Flexibility at the weld seam and maximum dimensional stability on the inside weld area

- Optimum sensor fitting even with thicker metals and multiple welding layers

- Useful accessories for post-processing and leak checking

ifm – close to you!

Process connection	Adapter diameter	Description	Order no.
G ½ sealing cone	85 mm	for tank top and wall	**E43919**
G ½ sealing cone	85 mm	for small tank diameters at the hopper and outlet	**E43918**
G ½ sealing cone	85 mm	for large tank diameters at the hopper and outlet	**E43920**
G 1 Aseptoflex Vario	85 mm	for tank top and wall	**E30528**
G 1 Aseptoflex Vario	85 mm	for small tank diameters at the hopper and outlet	**E30531**
G 1 Aseptoflex Vario	85 mm	for large tank diameters at the hopper and outlet	**E30529**

Special welding adapters for tanks

The special adapters represent an innovative solution allowing for a quick and simple welding operation to be carried out in the tank. All stresses from the welding operation that may be caused by multiple welding layers and thick-walled metals are absorbed in the flexible transition area of the adapter.

Optional cooling adapters simplify and improve the welding result with special and standard adapters and provide additional stabilisation during the welding operation.

Post-processing

For post-processing, in particular for grinding and polishing of the weld seam, the grinding protection devices provided for the respective adapters, and appropriate for internal and external processing, must be used.

Leak check

With the leak check kit, available as an accessory, the sealing edge of the welded adapter can be checked for leaks without the need for time-consuming filling of the tank. In the event of a leak, this is made visible or audible at the leakage port of the welding adapter.

Accessories

Description	Order no.	
	G ½ sealing cone	G 1 Aseptoflex Vario
Grinding protection for the sealing edge of welding adapters E30528, E43919	**E43924***	**E30161**
Grinding protection for the sealing edge of welding adapters E30529, E30531, E43918, E43920	**E43923***	**E30162**
Welding mandrel	**E43314**	**E30452**
Welding mandrel, water-cooled	**E43929***	**E30532**
Leak test kit	**E43922***	**E30530**

*Available from Q3 2024
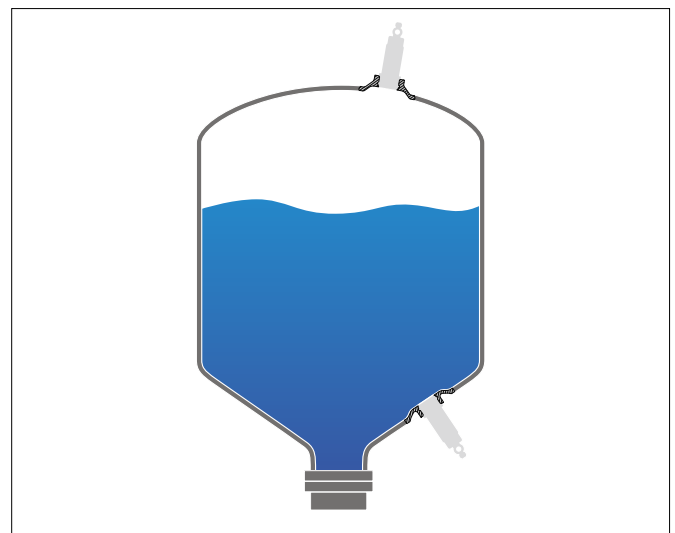
BEST FRIENDS
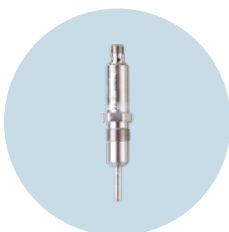
Temperature sensors
Reliable temperature measurement

Pressure sensors
Accurate measurement of pressure values and levels
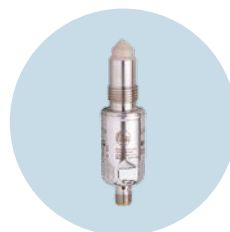
Level sensors
Point level detection even with difficult media

For further technical details, please visit: ifm.com/fs/E43919
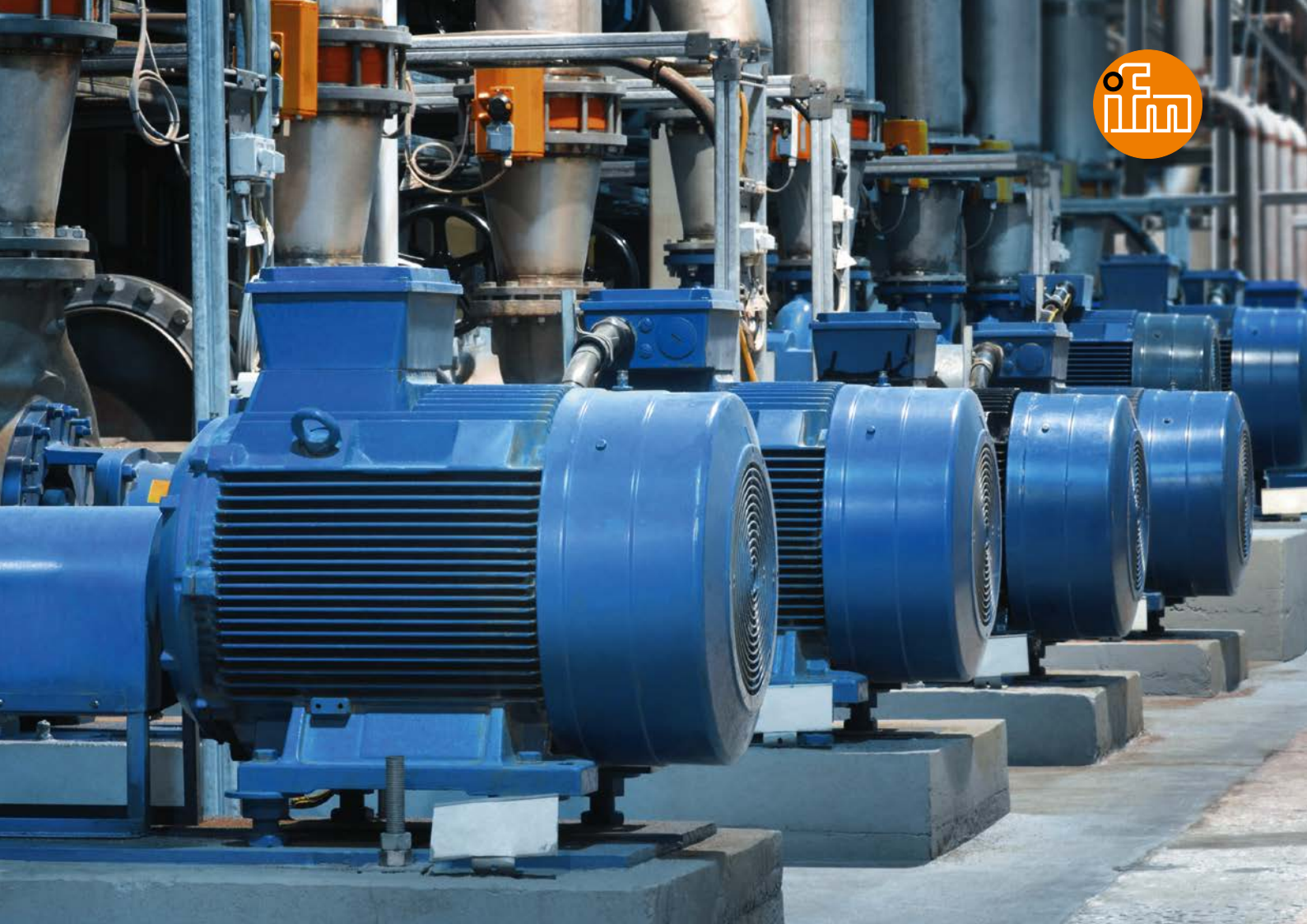
Wireless vibration monitoring

Battery-powered vibration sensor VWV

- For overall vibration and temperature monitoring in places that are difficult to access

- Radio technology with intelligent mesh topology for efficient data transmission

- Easy implementation from sensor to data visualisation

IP20   IP68

ifm – close to you!

Description	Order no.
Wireless vibration sensor 1 measurement axis	**VWV001**
Wireless vibration sensor 3 measurement axes	**VWV002**
Gateway for wireless vibration sensors	**ZB0929**

Common technical data VWV001, VWV002		
Measuring range	[mm/s]	0…25
Frequency range	[Hz]	10…1000
Ambient temperature	[°C]	-40…85
Communication	[GHz]	2.4 (ISM band)
Protection rating		IP68

Technical data ZB0929		
Operating voltage	[V DC]	5
Communication via cable		Ethernet TCP/IP
Wireless communication		LTE CAT 1, Wi-Fi, NB-IOT
Protocol		MQTT, HTTP
Protection rating		IP20

Vibration monitoring for simple machines

The battery-operated vibration sensor in combination with the ZB0929 Gateway and **moneo|RTM** enables overall monitoring of the machine condition according to ISO 10816. Together with the integrated temperature monitoring it is possible to detect imminent damage to machines and schedule demand-oriented maintenance to prevent major damage and costly downtimes.

Fast integration, reliable communication

The wireless design allows the sensors to be installed on machine parts that are difficult to access. Data is then transmitted to the gateway directly or via mesh technology - and thanks to low power consumption and a high-capacity battery, it lasts for at least four years.
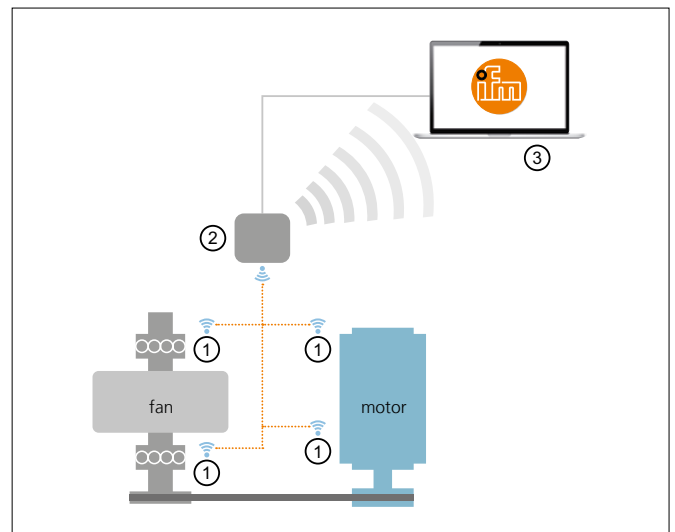
Extensive gateway connectivity

Up to 30 sensors can be connected to the gateway at the touch of a button. In addition to a wired Ethernet interface, the gateway itself also has a variety of wireless connection options.

Seamless integration into the IT level

Seamless integration into the moneo IIoT software makes the data quickly and easily available for analysis and visualisation. This makes it easy to establish reliable IT-based plant monitoring.

1) VW Vibration sensor
2) ZB0929 Gateway
3) moneo|RTM

BEST FRIENDS

moneo|RTM
Analysis software for simple condition monitoring

moneo|edgeConnect IoTCore
Required interface for the integration of IoT Core devices

Ethernet-Switch
Field-ready switch with six ports

For further technical details, please visit:
ifm.com/fs/VWV001

360° vision for mobile robots

3D camera-based perception platform

- Obstacle avoidance and clear space detection for route planning of autonomous vehicles

- Also detects objects below and above the scanning plane of a safety scanner

- 3D PMD cameras detect even difficult scenes and objects, e.g. forks

- Powerful integrated image evaluation, output of zone evaluation and occupancy grid

ifm – *close to you!*

Video Processing Unit	
Description	**Order no.**
Video Processing Unit (VPU) Connection for up to 6 cameras, Gigabit Ethernet interface for sensor signals	**OVP801**

| Camera heads			
Dimensions [mm]	**Image resolution [pixel]**	**Angle of aperture [°]**	**Order no.**
90 x 31 x 26	38 K	60 x 45	**O3R222**
90 x 31 x 26	38 K	105 x 78	**O3R225**

3D obstacle detection

Autonomous transport systems have to overcome two major challenges: on the one hand, collision avoidance with objects and persons, on the other hand, autonomous avoidance of obstacles. The frequently used safety scanners are only of limited help here, as they only detect the travel path in a plane just above the ground. This is where the camera platform shows its advantage: it processes the signals from up to six 3D PMD cameras installed all around the vehicle and evaluates the environment three-dimensionally, i.e. both the ground area below the field of view of the safety scanners (e.g. holes in the ground) and the view diagonally upwards. In this way, hanging loads such as crane hooks, for example, are also detected. Powerful algorithms ensure that false detections are virtually eliminated despite the high detection rate.

Easy integration

The user can define zones in the form of segmented polygons in which the system evaluates the occupancy and provides the vehicle's steering system with clear data for safe and collision-free driving.

The robotics platform captures the situation in a 2D image and in 3D distance data.
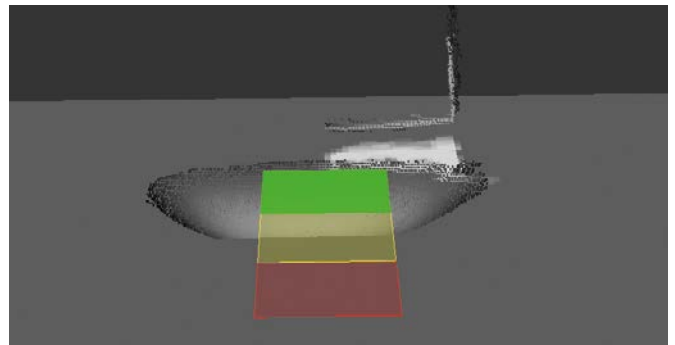
The obstacle in front of the vehicle is projected in a map on the ground. One of the three zones or the area in the so-called occupancy grid is then output as occupied.

BEST FRIENDS

Graphic display
Programmable HMI for the control of mobile machines

Multiturn encoders
Precise detection of positions and rotational movement

ecomatController
Powerful 32-bit controllers reliably control AGVs

For further technical details, please visit:
ifm.com/fs/OVP801

Uniting all senses

Versatile perception platform

- Central processing of image and sensor information

- Synchronisation of several cameras for 360° coverage

- Standardised SDKs for Docker architecture as well as Python, C++, CUDA and ROS

- Latest time-of-flight imager with high extraneous light stability

ifm – close to you!

Video Processing Unit (VPU)	
Version	**Order no.**
Video Processing Unit (VPU), Connection for up to 6 cameras, Gigabit Ethernet interface for sensor signals	**OVP810**

Camera heads			
Dimensions [mm]	**Image resolution [pixel]**	**Angle of aperture [°]**	**Order no.**
90 x 31 x 26	38 K	60 x 45	**O3R222**
90 x 31 x 26	38 K	105 x 78	**O3R225**

Integrated and upgradeable vision system

The O3R platform is the comprehensive solution for centralised, synchronised processing of image and sensor information in autonomous mobile robots such as automated guided vehicles. The simplified integration and reliable interaction of cameras and sensors enables the robust implementation of relevant functions such as collision avoidance, navigation and positioning.

In addition, analysis and dimensioning of stationary objects can be implemented, and is handled more effectively by means of several cameras. Examples include the measurement of pallets, logs, packages or suitcases.

Powerful and open

The core of the system is a powerful computing unit called Video Processing Unit (VPU). Based on a yocto-Linux and Docker architecture, open development environments such as Python, C++, CUDA and ROS are supported. The VPU analyses information from up to six camera heads as well as sensor information via the Gigabit Ethernet interface. All relevant "senses" that an AGV needs for safe autonomous navigation are thus available at a central point.

Camera head with imager developed in-house

ifm also offers suitable, high-performance camera heads as part of the platform solution: the 2D/3D cameras have an angle of aperture of either 60 or 105 degrees and are equipped with the latest time-of-flight imager from pmdtechnologies ag. This company of the ifm group of companies develops all sensors for the vision products of the automation specialist and adapts them precisely to the respective requirements.

Thanks to the modulated infrared light, the 2D/3D camera detects objects with maximum reliability even with increased exposure to ambient light.

BEST FRIENDS

Graphic display
Programmable HMI for the control of mobile machines

Multiturn encoders
Precise detection of positions and rotational movement

ecomatController
Powerful 32-bit controllers reliably control AGVs

For further technical details, please visit: ifm.com/fs/OVP810
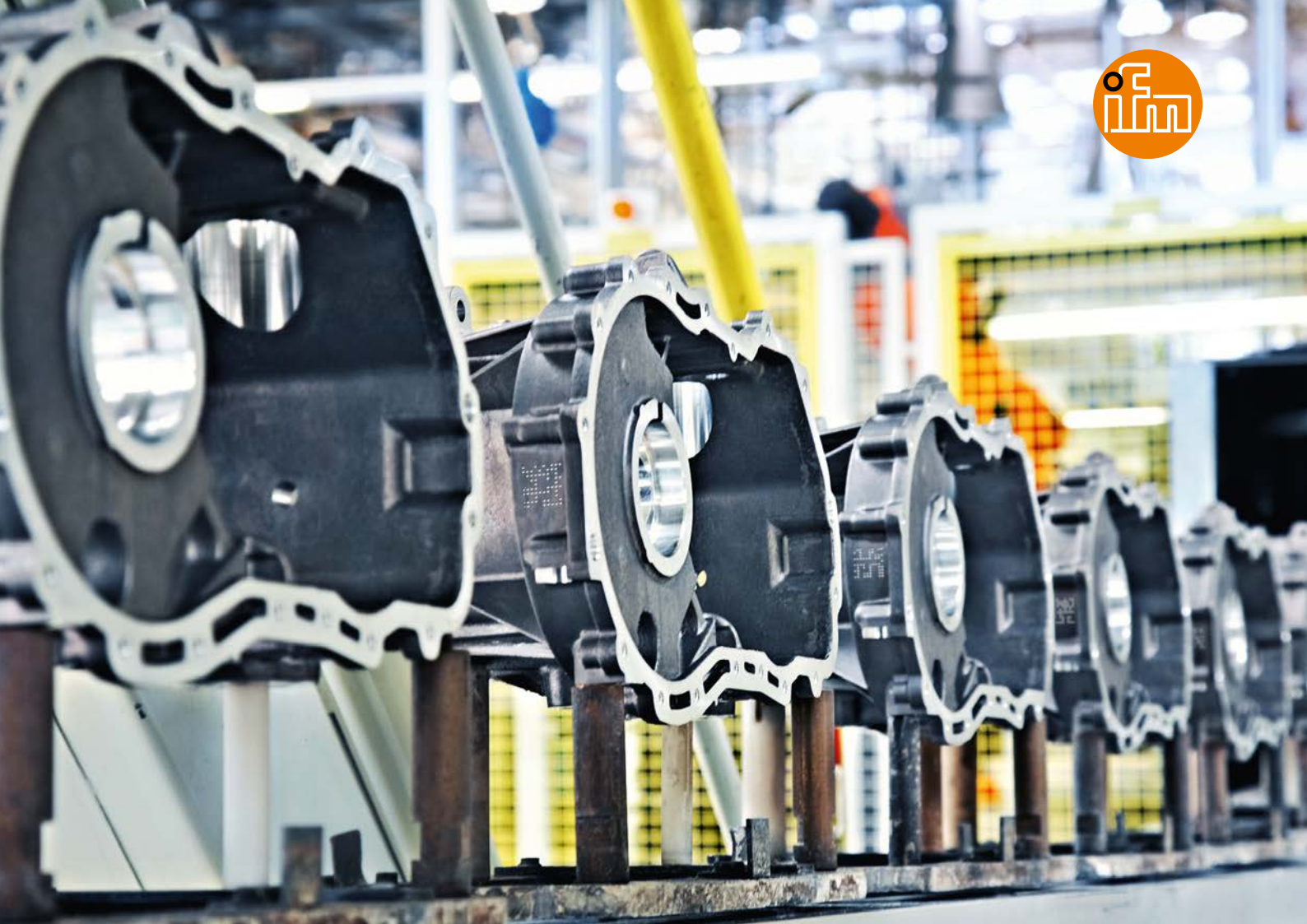
Surface inspection, code analysis

O2U5: two vision sensors in one

- The 2D vision sensor allows for analysis of surfaces and contours as well as for reading of codes and characters

- Universal - numerous interfaces enable seamless integration into the controller

- Easy handling thanks to user-friendly software, application wizards and removable memory

IP65

IO-Link

ifm – close to you!

Versatile inspection options

The O2U5 provides the user with almost unlimited combination possibilities in 2D inspection. Surfaces and contours of objects can now be analysed simultaneously with QR or bar codes. For example, the QR code can be used to check whether the component actually corresponds to the order, while at the same time the contour and surface analysis allows for performing the final quality control before installation.

Tailored integration, simple configuration

The variety of combinations now available to the user for quality assurance remains easily manageable thanks to the ifm Vision Assistant, with the user-friendly software being available free of charge.
It allows for setting of interface, exposure and other parameters of the O2U5. In addition, numerous application presets (wizards) provide powerful support for fast set-up. If the device needs to be replaced, the stored parameters can be quickly transferred to the new device thanks to the removable memory. For ideal integration into your application, you can select the suitable combination of illumination and lens.

Benefit from more information online: performance overview and field of view calculator

A comprehensive overview of the performance range in contour and surface analysis as well as in code and character reading is available online where we also provide you with a field of view calculator to help you select the right lens.

Version	Order no.
Illumination: red light	
standard lens	**O2U530**
wide-angle lens	**O2U532**
telephoto lens	**O2U534**
Illumination: RGBW	
standard lens	**O2U540**
wide-angle lens	**O2U542**
telephoto lens	**O2U544**
Illumination: infrared	
standard lens	**O2U550**
wide-angle lens	**O2U552**
telephoto lens	**O2U554**

Technical data		
Connection		5 poles
Interfaces		TCP/IP; PROFINET; Ethernet/IP; IO-Link
Operating voltage	[V]	18…30 DC
Ambient temperature	[°C]	-10…50
Protection rating		IP65

BEST FRIENDS
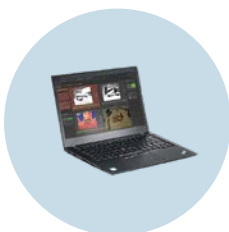
Vision Assistant
PC software for configuration and parameter setting

Monitoring add-on
Visualisation of images and data on the dashboard

IO-Link masters
Field-compatible masters with PROFINET interface

For further technical details, please visit:
ifm.com/fs/O2U530
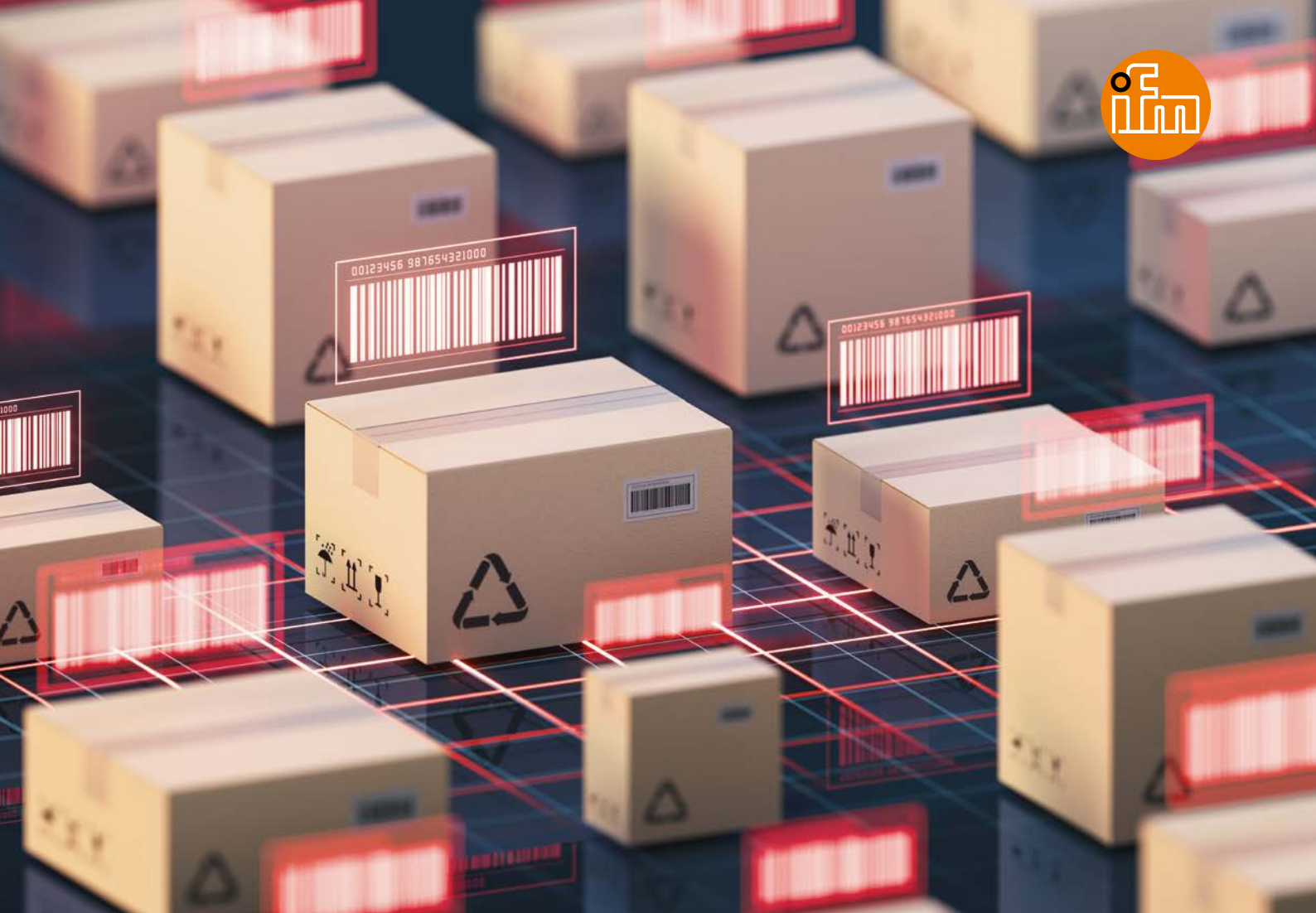
Multicode reader for IO-Link

Optical identification of 1D/2D codes and text

- Evaluation of various codes and texts in a single image

- Easy integration and configuration via IO-Link

- Ready to use out of the box, only the codes need to be taught

- Reliable detection even in case of extraneous light and demanding surfaces

IP65

IO-Link

ifm – close to you!

Versatile solution for production and logistics

The O2I multicode reader detects 1D and 2D codes as well as text elements. Even in case of multiple codes and text sections or combinations thereof, the O2I provides accurate evaluations in a single image capture. This makes the multicode reader a universally applicable solution for production and logistics processes where codes and text information are to be checked for quality or used for product tracking.

Thanks to the integrated and customisable RGBW lighting, even difficult colour combinations of code / text and background can be read with ease.

Easy integration with IO-Link

Integration is extremely simple thanks to the use of IO-Link. Once removed from the packaging, the multicode reader can be directly inserted into the existing IO-Link infrastructure. All that needs to be done in order to set the sensor to a code is to run through the teaching process. For more demanding identification tasks, the user-friendly PC software "Vision Assistant" is available.

Data with a size of more than 32 bytes are automatically divided into several blocks and transmitted to the controller via IO-Link using the fast COM3 standard. There is an automatic separation of the data blocks with an adjustable hold time of the data. A major advantage for the user is that no special function blocks are required in the control programme.

In addition, IO-Link enables convenient setting of various sensor parameters directly from the controller, including, for example, focus, data strings for code comparison or diagnosis. This makes it easy to adapt the reader to changing products or operating processes.

Description	Order no.
Illumination: RGWB	
standard lens	**O2I400**
wide-angle lens	**O2I402**
telephoto lens	**O2I404**
Illumination: red light	
standard lens	**O2I410**
wide-angle lens	**O2I412**
telephoto lens	**O2I414**
Illumination: infrared	
standard lens	**O2I420**
wide-angle lens	**O2I422**
telephoto lens	**O2I424**

BEST FRIENDS

Vision Assistant
PC software for configuration and parameter setting

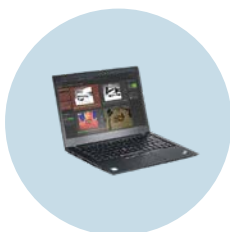**Monitoring add-on**
Visualisation of images and data on the dashboard

IO-Link masters
Masters with Profinet interface for use in the field

For further technical details, please visit:
ifm.com/fs/O2I400

Linking digital
IO signals in the field

I/O modules for PROFINET and EtherNet/IP

- Efficient network structure thanks to direct connection of sensors and actuators with the fieldbus level

- Integrated counter function for high-frequency counter applications and direct switching of the outputs

- Robust housing suited for use in environments with high hygiene requirements

IP67   IP69K

ifm – close to you!

Description	Order no.	
	Coolant (orange)	Food (grey)
PerformanceLine		
PROFINET	**AL4302**	**AL4303**
EtherNet/IP	**AL4322**	**AL4323**

Common technical data	
Voltage supply PerformanceLine	M12 L-code, daisy chain option
Number of inputs and outputs	4x 2 DO (UA) 4x 2 DI (US)
Current rating of the outputs	3.6 A Port 1 + 2 3.6 A Port 3 + 4
Counter application	yes
Output switching function (SSC)	adjustable per counter
Passive safety	PL d
Coolant (orange) Protection rating Housing Socket / connector	IP67 polyamide nickel-plated brass
Food (grey) Protection rating Housing Socket / connector	IP69K polyamide stainless steel

Ethernet modules for field applications

The decentralised IO modules serve as a gateway between binary sensors / actuators and the fieldbus. This means that binary input and output signals in the field can be transmitted directly via the fieldbus.
No further transmission systems are needed in the fieldbus topology.

Robust and permanently tight

In combination with ifm's ecolink connection technology, the ifm modules are the perfect choice, even for the most difficult applications. The materials and production methods are identical to the ifm jumper cables of the tried-and-tested EVC and EVF product series.
The ecolink technology guarantees reliable, permanently ingress-resistant M12 connections of the connection cables.

Extension with digital input / output modules

The new Ethernet modules are the perfect addition to ifm's IO-Link master family. They feature the same design, port configuration and standardised M12 connections.
The upper 4 output ports allow an output current of up to 3.6 A, while the lower 4 ports enable the connection of sensors.

Integrated counter function

Sensor pulses are counted within the module and are cyclically transmitted to the PLC as a counter packet. This provides an accurate count that is not affected by the controller's cycle time. Direct control of the outputs with different switching logics is thus enabled.

Powerful voltage supply

For power supply, the modules have L-coded M12 connections with 2x16A. This allows daisy-chaining.

BEST FRIENDS
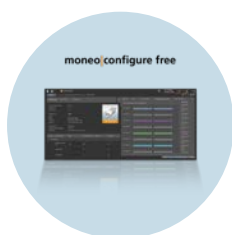
moneo|configure free
Software for parameter setting of the IO-Link infrastructure

IO-Link masters
Transmission of data and parameters to the PLC
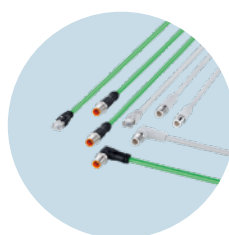
Ethernet cables
Available in various lengths and versions

For further technical details, please visit:
ifm.com/fs/AL4302

Digital
sensor signals

Non-stop transmission via fieldbus

- Digital input modules for PROFINET, EtherNet/IP, EtherCAT and Modbus TCP
- Direct connection of sensors simplifies network structure
- Integrated counter function for high-frequency counter applications
- Robust housing suited for use in environments with washdown cleaning requirements

IP67   **IP69K**

ifm – close to you!

Description	Order no.	
	Coolant (orange)	Food (grey)
StandardLine		
PROFINET	**AL4002**	**AL4003**
EtherNet/IP	**AL4022**	**AL4023**
EtherCAT	**AL4032**	**AL4033**
Modbus TCP	**AL4042**	**AL4043**
PerformanceLine		
PROFINET	**AL4102**	**AL4103**
EtherNet/IP	**AL4122**	**AL4123**
EtherCAT	**AL4132**	**AL4133**
Modbus TCP	**AL4142**	**AL4143**

Common technical data	
Voltage supply StandardLine PerformanceLine	M12 A-code M12 L-code, Daisy chain option
Number of digital inputs	2 x 8 (type 2 to IEC 61131-2)
Coolant (orange) Protection rating Housing Socket / connector	IP67 polyamide nickel-plated brass
Food (grey) Protection rating Housing Socket / connector	IP69K polyamide stainless steel

Ethernet modules for field applications

The decentralised DI modules serve as a gateway between binary sensors and the fieldbus. This means that binary switching signals in the field can be transmitted directly via the fieldbus. No further transmission systems are needed in the fieldbus topology.

Robust and permanently tight

The ifm modules are the perfect choice, even in the most difficult environments: The materials and production methods are identical to the ifm jumper cables of the tried-and-tested EVC and EVF product series.
The ecolink technology guarantees reliable, permanently ingress-resistant M12 connections of the connection cables.

Expansion of the IO-Link master family with digital input modules

The Ethernet modules are the perfect addition to ifm's IO-Link master family. They feature the same design, port configuration and standardised M12 connections.

Integrated counter function for high-frequency counter applications

Sensor pulses are counted within the module and are cyclically transmitted to the PLC as a counter packet. This ensures accurate counting that is not affected by the cycle time of the PLC.

Powerful voltage supply

For voltage supply, the modules offer an A-coded M12 connector with 1 x 4 A and an L-coded M12 connector with 2 x 16 A including daisy chain functionality.

BEST FRIENDS

moneo|configure free
Software for parameter setting of the IO-Link infrastructure

IO-Link masters
Transmission of data and parameters to the PLC
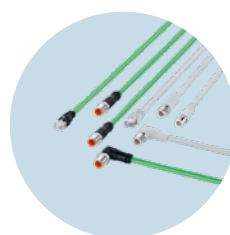
Ethernet cables
Available in various lengths and versions

For further technical details, please visit:
ifm.com/fs/AL4002

Reliable connection

**moneo|edgeGateway for use in the field
and in the control cabinet**

- Easy and secure connection of the sensor level to the cloud

- Translation of incoming IO-Link process data into readable information

- Aggregation, selection, processing and linking of information with the Dataflow Modeler to obtain relevant key figures

- Version with IP20 protection rating for the control cabinet or with IP67 for use in the field

- Physical separation of the IT and automation network

IP20   IP67

ifm – close to you!

Description	Order no.
moneo|edgeGateway for the control cabinet	**AE2100**
moneo|edgeGateway for use in the field	**AE2400**
moneo IIoT Core Cloud subscription	**QCM100**

Common technical data		
Operating voltage	[V DC]	18...32 (PELV)
Ambient temperature	[°C]	-25...55
Housing material		Passivated die-cast aluminium, stainless steel
Dimensions	[mm]	AE2100: 125 x 125 x 36 AE2400: 251 x 125 x 34
Protection rating		IP20 (AE2100) IP67 (AE2400)

Powerful and secure

moneo\|edgeGateway is the powerful, convenient and secure solution for transmitting data from the sensor level into the IT infrastructure.

Its centrepiece is the 1.2 GHz quad-core processor which works at maximum performance level in environments with ambient temperatures of up to 55°C.

moneo\|edgeGateway can be easily configured in order to send all relevant plant data as readable information into various cloud platforms.

Thanks to the integrated ifm Dataflow Modeler, using custom processing logics is very intuitive and particularly secure because there are two independent networks, one for the plant network and one for the IT infrastructure.
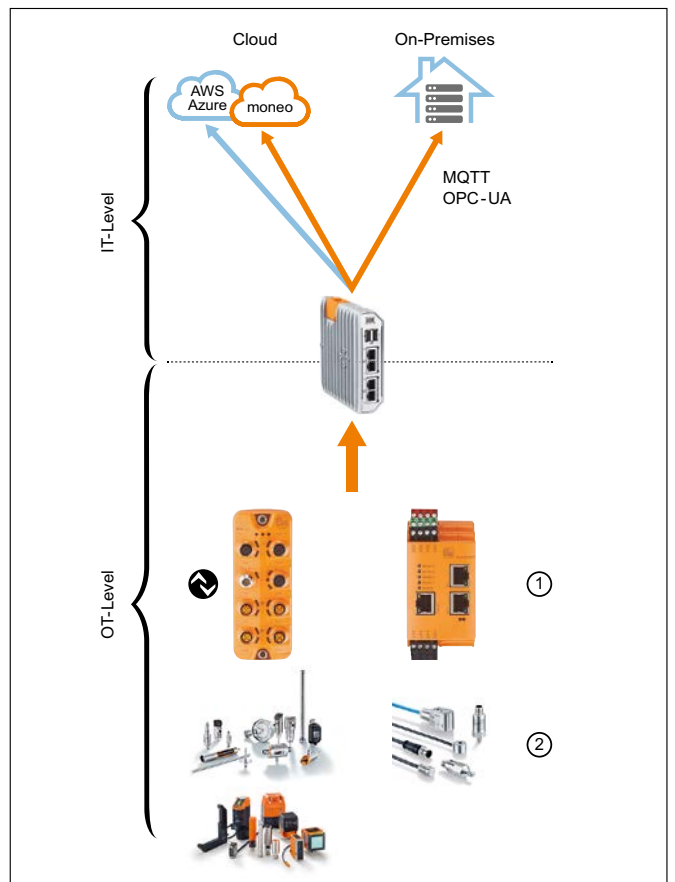
Direct connection to different clouds

The device guides you step-by-step through the basic IT configuration to get it up and running on your network and connect it to the ifm **moneo\|cloud**.

With the ifm **moneo\|cloud**, we offer you an IIoT platform that provides basic functions for optimising your machine availability, process quality and energy consumption without programming knowledge.

Optionally, connections to the AWS IoT Core and Microsoft Azure IoT Hub can be set up, or to on-premise servers in the IT infrastructure via the IIoT de facto standards of OPC-UA and MQTT.

1) Middleware: ifm devices
2) Sensors: ifm and third-party manufacturers
   IT = Information Technology
   OT = Operational Technology

BEST FRIENDS

IO-Link masters
Field-compatible masters with Profinet interface

moneo\|RTM
Analysis software for simple condition monitoring

Diagnostic electronics
Vibration monitoring of machines and equipment

For further technical details, please visit: ifm.com/fs/AE2100

IO-Link master

**IO-Link master for control cabinet
with IoT connection**

- Separation of automation and IT network protects
  the installation from unauthorised access from outside

- Product versions enable simple connection
  to all common fieldbuses

- Easy parameter setting of master and devices
  using **moneo|configure free**

IP20

IO-Link

ifm – close to you!

Description	Order no.
PROFINET + IoT 8 ports	**AL1901**
EtherNet/IP + IoT 8 ports	**AL1921**
EtherCat + IoT 8 ports	**AL1930**
Modbus TCP + IoT 8 ports	**AL1940**
Powerlink + IoT 8 ports	**AL1970**
IoT only 8 ports	**AL1950**

Technical data		
Voltage supply	[A]	3.9 (US)
IIoT port		HTTP(S), JSON, MQTT
Output power	[mA]	300
Electrical connections		cage clamps
Cabinet Protection rating housing		IP20 polyamide

Secure exchange between OT and IT level

Even in the modern world of Industry 4.0, securing your system infrastructure against external influences is a top priority. The IoT-enabled IO-Link master modules act as decentralised gateways in the automation network and forward the data from the connected sensors to the fieldbus. The connection to the IT level is made via a separate IoT Ethernet socket. The data is transmitted via the established TCP/IP JSON interface. This allows you to process relevant process data in the IT level and in ERP systems while maintaining the safety of your installation.

Convenient parameter setting using moneo|configure free

The intuitive **moneo|configure free** software automatically detects your entire IO-Link infrastructure and arranges it in the defined tree structure in a clear manner. Masters and sensors are displayed with their respective parameters and can be managed centrally in the software.

Easy sensor connection

The sensors and actuators are connected via standard M12 connection cables without screening. The connection cables are fixed via removable cage clamps on the IO-Link master. Up to 8 IO-Link sensors can be connected and supplied with a total of up to 3.6 A. The cable can be up to 20 m long.

BEST FRIENDS
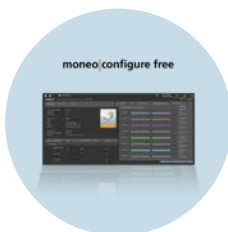
moneo|configure free
Software for parameter setting of the IO-Link infrastructure

Ethernet modules
Transmit digital sensor data from the field to the fieldbus

Ethernet adapter
M12 / RJ45

For further technical details, please visit:
ifm.com/fs/AL1901

Digitise temperatures

Integrate measuring probes directly into IO-Link

- 4 ports for direct connection of Pt100, Pt1000 elements and thermocouples

- Recognise tiny temperature trends thanks to the fine resolution of 0.01 °C

- High precision (0.3 %) across the entire measuring range

- Robust housing with high protection rating

IP67   IP69K

ifm – close to you!

Digitisation of measuring probe for IO-Link

IO-Link has become established as an intelligent interface for integrating smart sensors and devices in various industries. Nevertheless, conventional temperature probes (Pt100 / Pt1000 elements or thermocouples) are still widely used in many machines and systems, which have to be connected to the central controller.

With the new IO-Link measuring modules, up to four temperature probes can be connected to an IO-Link master port, optionally in 2-, 3- or 4-wire connection technology.

The pin configuration of the M12 connector can be customised using the IO-Link parameter setting.

Adjustment of the measured value

Especially when measuring temperature with thermocouple elements, the metals used in the cables and contacts have a considerable influence on the measured value. The measured value can therefore be adjusted to the measuring line used using the "Cold junction offset" and "Temperature zero point calibration" parameters.

To cover a large number range with high resolution, the measured value is displayed as a "floating number" in the process data.

Protection rating	Order no.
IP65 | IP67 | IP69K (Operation with stainless steel protective caps: IP69K)	**AL2284**
IP65 | IP67	**AL2384**

Common technical data		
Operating voltage	[V]	18…30
Current consumption	[mA]	< 200 (US)
Number of inputs		4
Type of inputs		2-, 3- and 4-wire sensors: Pt100, Pt1000 thermocouple: type K, type J
Communication interface		IO-Link, COM3 (230.4 kbaud)
Ambient temperature	[C°]	-25…60

In thermoplastic moulding processes, temperature probes detect even the finest temperature trends thanks to an impressive resolution of 0.01 °C.

In mining, the digitised measured temperature values can be transmitted precisely and without loss even over long distances.

BEST FRIENDS
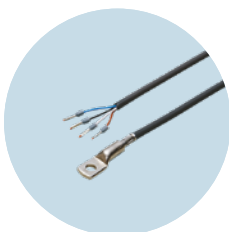
Temperature probe
Precise measurement of temperatures

IO-Link masters
Field-compatible masters with Profinet interface

USB IO-Link masters
For parameter setting and analysis of devices

For further technical details, please visit:
ifm.com/fs/AL2284

Digitising switching signals

Universal IO module for IO-Link

- 16 connection wires for digital input or output signals
- Easy installation in panels, button housings or directly in the cable path
- Reliable M12 connector for connection to IO-Link masters
- Robust plastic housing with high protection rating IP67

IP67

IO-Link

ifm – close to you!

Description	Order no.
IO module for IO-Link	**AL5021**

Technical data		
Operating voltage	[V DC]	18...30
Inputs / outputs (configurable)		16
Digital input circuit		PNP (type 3 (IEC 61131-2))
Max. current load of the outputs in total	[A]	1
Communication interface		IO-Link
Protection rating		IP67

Digital connection ports for IO-Link

The digital connection of IO-Link has proven its worth as an intelligent interface for integrating smart sensors and devices. Many machines and installations, however, still have conventionally wired units which need to be connected to the central controller. Examples in this context include keypad modules, control panels and panels, light towers or valve terminals. The universal module, characterised by its ability to connect 16 digital inputs or outputs directly to an IO-Link master port, provides a remedy in this respect. The compact and potted design requires but little space while enabling flexible mounting, for example directly next to signal transmitters or in button housings.

Easy connection

Each of the 16 connection wires can be used as input or output.

As the signal state of the output is always fed back to the input, no special configuration is required. When not operated as an output, an external signal can be detected as an input signal at the connection.

The universal module is designed such as to fit straight away into many customary button housings, allowing connection of the control and signalling devices.

Power supply for external actuators

The module is supplied with power from an IO-Link A-port master. The total current consumption of all IOs can be up to 1 A, which ensures an efficient supply of external actuators.

In case of small button housings, the module can be mounted outside in the cable path. The potted plastic housing provides the high protection rating IP67.

BEST FRIENDS

IO-Link interface
For setting the parameters of IO-Link devices on the PC

IO-Link masters
Field-compatible masters with Profinet interface

Illuminated capacitive touch sensors
Non-contact switching without mechanical pressure

For further technical details, please visit:
ifm.com/fs/AL5021

Signalling and detection in retrofit applications

Light tower with interface for detecting machine states

- Usual signalling via freely configurable LEDs

- Detection of machine states and transfer to higher-level evaluation software via IO-Link

- Generates production KPIs thus enabling maximum transparency

- Ideal for retrofitting existing machinery and installations

ifm – close to you!

IP54 IP65 IO-Link

Buzzer	Mounting base	Protection rating	Segments	Inputs	Output	Order no.
no	yes	IP65	5	5	IO-Link	**DV1501**
yes	yes	IP54	5	6	IO-Link	**DV1511**
no	no	IP65	5	5	IO-Link	**DV1521**
yes	no	IP54	5	6	IO-Link	**DV1531**

KPIs for more transparency

In the global manufacturing industry, machinery and equipment form the heart of production. For plant operators, measuring statistical performance metrics such as Overall Equipment Effectiveness (OEE), machine availability and productivity is of critical importance.

Questions such as "Which machine has been in production and for how long?" or "How long did the last unplanned downtime last?" are omnipresent. With newly installed machines and systems, monitoring machine conditions is usually straightforward. To collect this information, modern IO-Link masters from ifm with additional IoT interfaces can be used optimally.

However, this can be a challenging task with existing machines having no such interfaces. Here too, machine conditions need to be monitored. But retrofitting existing machines with additional functionalities often proves extremely difficult. On the one hand, this is because considerable intervention in the machine could result in the loss of the CE declaration of conformity. On the other hand, subsequent changes are often costly and in some cases not even possible because the controllers used are outdated and adapting the software is hardly feasible.

The perfect solution for existing production plants

This is where ifm's innovative light tower comes into the picture, offering a smart solution for subsequent acquisition of machine data. Almost every machine has a signal light to provide visual indicators of its states using different colours. All the user needs to do is replace the "old" signal light of the machine with the new light tower from ifm. This light tower can be controlled with up to six digital signals and indicate the machine states as usual.

The integrated interface converts the segment states into IO-Link communication. The light tower is connected in parallel to an IO-Link master to transmit the machine condition to an analysis tool such as **moneo|RTM**. moneo visualises the machine condition and calculates key process metrics using its dashboards.

This retrofit solution allows easy evaluation and analysis of key process metrics even for older machines, thereby achieving maximum transparency.

BEST FRIENDS

IO-Link masters
Field-compatible masters with Profinet interface

moneo|RTM
Analysis software for simple condition monitoring

IO-Key
Sending IO-Link sensor data to the cloud via a mobile network

For further technical details, please visit: ifm.com/fs/DV1501

Unlimited variety of colours

Control module for RGBW LED light bars

- For controlling 24 V RGBW LED light bars
- PWM outputs for setting any colour and brightness
- Control via IO-Link or by means of digital inputs
- The IP67 protection rating allows installation directly in the field

IP67

IO-Link

ifm – close to you!

Description	Order no.
Control module for ifm RGBW light bars	**DP1615**

Technical data		
Operating voltage	[V]	21.6...26.4
Current rating per output	[mA]	400 (red, green, blue) 640 (white)
Total current rating	[mA]	1200
Control		IO-Link or 3x digital inputs
Protection rating		IP67

Create any colour imaginable

This control module for RGBW LED light bars from ifm opens up limitless possibilities in illumination. It enables precise setting of any colour, which is particularly effective when illuminating company logos.

The brightness of the LED light bars can also be adjusted as required to reduce glare when used as a status indicator.

Control via IO-Link or switching signal

Thanks to the integration of IO-Link, it is now possible to define three different display presets, consisting of colour, brightness and flashing pattern, which can be activated either via IO-Link or via the digital inputs on the control module.

The use of IO-Link allows the values for each output to be set individually. This enables a smooth transition between brightness values and colours.
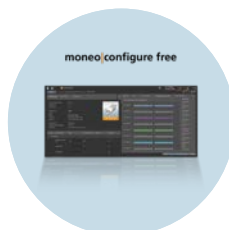
BEST FRIENDS

IO-Link masters
Field-compatible PerformanceLine, up to 2 A per port

moneo|configure free
Software for parameter setting of the IO-Link infrastructure

LED strips
For illumination and signalling

For further technical details, please visit:
ifm.com/fs/DP1615

The perfect complement to sensors

Converter plugs with different functions

- Addition of useful functions to sensors

- Small robust plastic housing with high protection rating for local mounting on the sensor

- Clearly visible display for status or measured value indication

- Special housing versions for hygienic applications

- Parameter setting via IO-Link or rotary button

ifm – close to you!

IP67   IP69K   IO-Link

Function	Input	Output	Industrial automation	Hygienic applications
			IP67	IP69K
			Order no.	
Converter IO-Link ››› analogue output	IO-Link	2x analogue 4…20 mA	**DP1213**	**DP3213**
Converter IO-Link ››› analogue output	IO-Link	2x analogue 0...10 V	**DP1223**	**DP3223**
Converter analogue ››› IO-Link	2x analogue 0...10 V	IO-Link	**DP1222**	**DP3222**
Relay adapter	2x digital PNP	2x semiconductor relay normally open	**DP1603**	**DP3603**
Relay adapter	2x digital PNP	2x semiconductor relay normally closed	**DP1613**	**DP3613**
Speed monitor	1x digital PNP	2x digital PNP/NPN	**DP2122**	**DP4122**
Threshold relay	1x analogue 4…20 mA	1x digital, 1x analogue	**DP2200**	**DP4200**
Counter	2x digital PNP	2x digital PNP/NPN	**DP2302**	**DP4302**
Pulse stretcher	2x digital PNP	2x digital PNP	**DP2402**	**DP4402**

Small on the outside, big on the inside

These handy sensor signal converters are only a few centimetres in size but feature a wide range of functions. They are the perfect complement to existing sensors, whether for retrofitting machines or simply when special functions are required that the sensor alone cannot provide.

Thanks to their compact design and high protection rating, the converters can be mounted directly on the sensor or in the field.

Versions for hygienic areas

Special versions are also available for hygienic areas. Their housing material is resistant to aggressive cleaning agents and features protection rating IP69K. The smooth housing without dead band leaves no room for deposits. They have no rotary pushbuttons for setting, but can be easily configured via IO-Link, just like the versions for general industrial use. Of course, they have the ECOLAB certificate for tested material resistance.

BEST FRIENDS
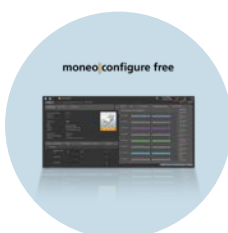
moneo|configure free
Software for parameter setting of the IO-Link infrastructure

Temperature sensors
Reliable temperature measurement
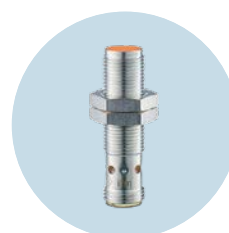
Inductive sensors
Pulse pick-up for the detection of rotating movements

For further technical details, please visit:
ifm.com/fs/DP1213

Maximum performance in the smallest of spaces

The 4.3"ecomatDisplay sets new standards

• High-brightness display for maximum readability even in daylight conditions

• High computing power and memory capacity offer sufficient capacity for demanding tasks

• Maximum freedom of communication thanks to the support of multiple protocols

ifm – close to you!

New standard in the compact class

Whenever clear communication, precision and performance in the smallest of spaces are required, the most compact member of the ecomatDisplay family is the perfect choice.
Because the 4.3-inch HMI makes no compromises when it comes to human-machine interaction: 16 million colours, high-resolution display and good readability even at extreme angles or in extreme lighting conditions ensure clear information exchange in any situation.

Easy to connect, economical, communicative

Numerous connection options and a wide range of supported communication protocols allow for simple and extensive integration of the ecomatDisplay into the machine. Codesys 3.5 and the comprehensive ifm library of software modules enable convenient visualisation of the most relevant information. Besides, the Linux-based operating system can be used for customisation, such as visualisation via QT. The powerful DualCore processor and the equally efficient DDR4 RAM ensure reliable processing of all data and control commands. For all these technical feats, the compact HMI requires only five watts of power.

Tough

The robust housing, already known from other ecomatDisplays, provides the 4.3" device with maximum protection against external influences, making it ideally suited for use in extreme working environments.

Connections	Order no.
1x CAN, 1x Ethernet	**CR1140**
1x CAN, 1x USB	**CR1141**

Technical data	
Processor	ARM dual core, 1.4 GHz
Memory / RAM	4 GB / 1 GB DDR4
Retain variables [kB]	8
Communication protocols	CAN, CANopen, J1939, Modbus TCP, Ethernet/IP, OPC UA
Display resolution [pixel]	800 x 480
Display brightness [cd/m^2]	1,000
Real-time clock	battery-buffered, up to 15 years
Power consumption [W]	5–8
Protection rating	IP67

BEST FRIENDS

ecomatController
Controller for mobile applications, also for safety applications

ecomatPanel
Keypad with rotary button and six keys, backlit

ioControl
Decentralised connection of sensors, freely programmable

For further technical details, please visit:
ifm.com/fs/CR1140

For more efficient farming

ISOBUS gateway for agricultural machines

- Reliable communication between add-on unit and tractor unit.

- User-friendly configuration via CODESYS using ISOBUS libraries.

- Full integration of the "Task Controller" smart farming interface.

IP67

CODESYS

ifm – close to you!

Description	Order no.
ISOBUS gateway (VT, AUX-N, Task Controller)	**CR3122**
ISOBUS gateway (VT, AUX-N)	**CR3121**

Technical data		
Ambient temperature	[°C]	-40...80
Operating voltage	[V DC]	8...32
Nominal voltage	[V DC]	12 / 24
CAN interfaces	Number	2
	Protocol	CAN ISO11898, ISOBUS ISO11783
Default baud rate	[Kbit/s]	250
Protection rating		IP67

Efficient smart farming made easy

The ISOBUS gateway enables easy integration of the smart farming-relevant ISOBUS functionalities in the control programme of agricultural add-on units. Thanks to the supplied ISOBUS function library, visualisation for the add-on unit can be configured quickly and conveniently using CODESYS V2.3 or V3.5.
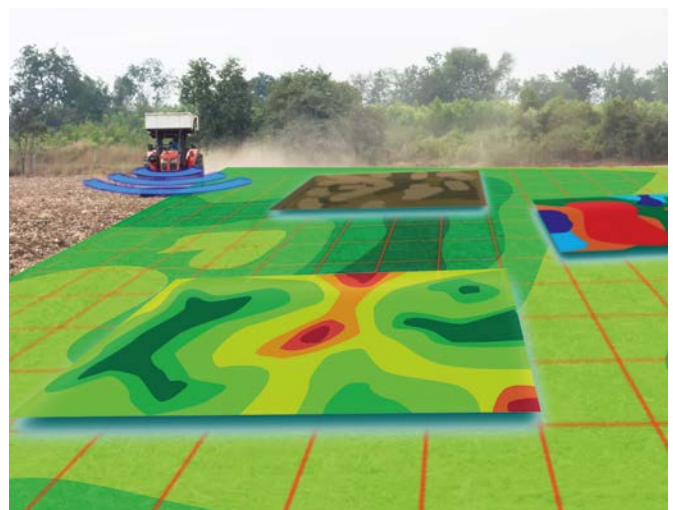
Thanks to optimised data processing, only the values to be visualised on the tractor unit's display are transmitted, reducing the load on the data bus significantly.

Making full use of the Task Controller

In addition to the Virtual Terminal and the AUX-N function (Auxiliary Control Function), the automation functions TC-Basic, TC-Geographic and TC-Section Control of the "Task Controller" smart farming interface can also be fully used via the ISOBUS gateway. With the M12 connector, the ISOBUS gateway can be easily connected with any mobile controller from ifm via the CAN interface, even subsequently.

No additional licence fees for using the AEF certified ISOBUS gateway will be required.

The data recorded by the Task Controller can be processed at IT level and used for further efficient smart farming measures.

BEST FRIENDS

ecomatController
Controller for mobile applications, also for safety applications

BasicController
Controller with H-bridge, 16 inputs and outputs

ioControl
Decentralised connection of sensors, freely programmable

For further technical details, please visit:
ifm.com/fs/CR3122

Machines, how are you?

mobile IoT gateway for global data exchange

- Enables centralised operation and maintenance planning of mobile machines used throughout the world

- Transfer of raw data and pre-processed information to the cloud

- Local and global access to the machine via mobile network or WLAN

- Acceleration, inclination and position data provide extended insight into the machine's condition

ifm – close to you!

IP67   E1

Interface between machine and man

The mobile IoT gateway is the dialogue interface between the mobile machine and the cloud level. Via an Ethernet interface and in future also via CAN, the gateway transmits all relevant data from the vehicle to the cloud via mobile network or WLAN. The gateway itself can also transmit information about acceleration and inclination as well as position data.

Efficient maintenance and operation planning

The mobile IoT gateway is configured via ifm's IoT suite, which can be used free of charge. The data and information can then be displayed and processed in a central IT-based machine management system. In the IoT portal, which is also available in the IoT suite, you can, for example, keep an eye on the current health status of your machines at all times via freely configurable dashboards.

This means that maintenance requirements can be responded to quickly and in a targeted manner, reducing downtimes to a minimum. Besides, it is possible to import application-specific machine configurations or software updates via mobile network. Thanks to satellite-based positioning, the machine's location can be determined precisely at any time. For simplified local maintenance, the gateway can also be accessed via WLAN or Bluetooth.

Description	Order no.
mobile IoT gateway	**CR3171**

Technical data	
Internal interfaces	1x Ethernet, 3x CAN*
External interfaces	mobile network, WLAN, Bluetooth
SIM card	eSIM
Mobile network connection	4G / LTE
Inputs / outputs	3 digital inputs, 1 digital output
Protection rating	IP67

*corresponding firmware update in preparation

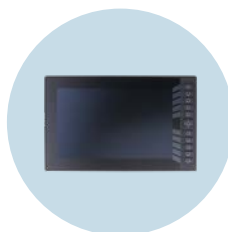For the use of the mobile IoT gateway, an additional data contract must be concluded with ifm.

Further information on the data tariffs

BEST FRIENDS

Control electronics
Standard and safety controller in one device

Robust HMI
Dialogue module with integrated controller

Ethernet switch
Extends the vehicle infrastructure by 6 ports

For further technical details, please visit: ifm.com/fs/CR3171
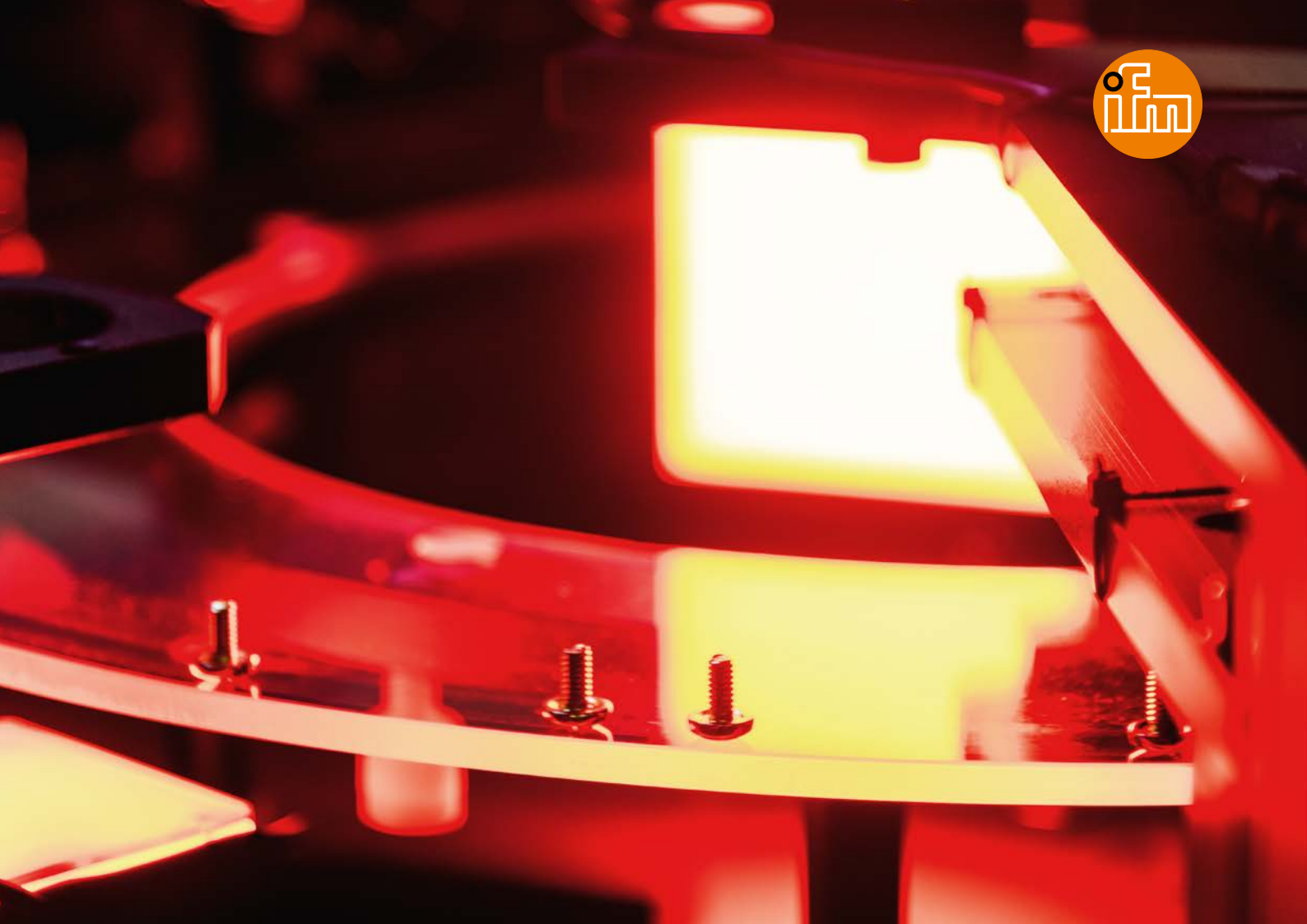
Coloured signals and bright light

Flexible LED strip in RGB and white

- LEDs in RGB and white can be controlled directly via digital inputs

- Extremely robust, fully potted design with protection rating IP68

- Powerful LEDs for high light yield

- Bent or straight installation

IP68

ifm – close to you!

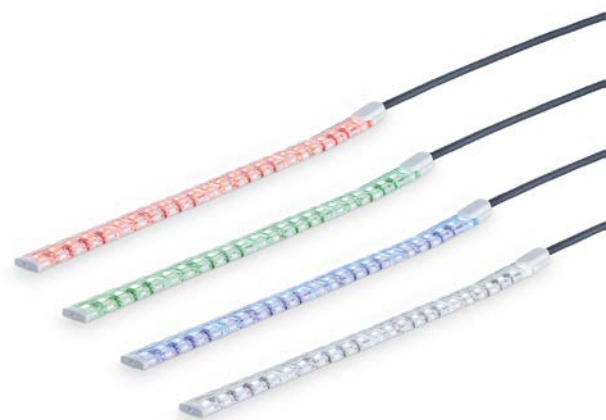| Illuminated area length [mm]	Current consumption [mA]	Luminous flux [lm]	Order no.	
			Industry	Food
62.5	90	red: 11.56 / green: 35.75 / blue: 7.25 / white: 49.83	**DV1100**	**DV1200**
250	360	red: 46.24 / green: 143.12 / blue: 29 / white: 199.32	**DV1101**	**DV1201**
500	720	red: 92.48 / green: 286.24 / blue: 58 / white: 398.64	**DV1102**	**DV1202**
750	1080	red: 138.72 / green: 429.36 / blue: 87 / white: 597.96	**DV1103**	**DV1203**
1000	1440	red: 184.96 / green: 572.48 / blue: 174 / white: 797.28	**DV1104**	**DV1204**

Illumination and signalling all-in-one

LED strips not only fulfil the function of illumination, for example during mounting. They can also indicate the machine status via different light colours.

Flexible application options and different lengths make the LED strips extremely versatile. Thanks to the optional use of aluminium profiles, they can be quickly and securely fastened, and they illuminate even out-of-the way corners without casting shadows.

The robust design with protection rating IP68 allows their use in various demanding environments.

Wide range of colour options

The powerful LEDs of the LED strips are available in RGB and white. Triggering is via four digital inputs that can be used to produce the colours red, yellow, green, blue, cyan and purple, as well as pure white light. Indeed any colour shade is possible thanks to PWM control.

Common technical data		
Operating voltage	[V DC]	21.6...26.4
Colour temperature	[K]	7500
Typ. life cycle	[h]	30000
Ambient temperature	[°C]	-20...45
Housing material - Versions for industrial applications: - Versions for food applications:		TPU (orange) TPU (grey)
Protection rating		IP68

BEST FRIENDS

Light towers
Clearly visible visualisation of operating states

Illuminated capacitive touch sensors
Switching of machines and systems.

Air humidity sensors
Monitoring the climate in the control cabinet or production process

For further technical details, please visit: ifm.com/fs/DV1100

Keeping an eye on the measured values at all times

Current loop display for 4...20 mA signals

- Analogue signal powers display
- Easy-to-read 4-digit LED display
- Simple setting menu and 3-button operation
- Free scaling and linearization of signals
- Ideal for installation in control cabinets and panels

IP65

ifm – close to you!

Display analogue values

Despite growing digitalisation, there are still many situations where analogue measured values such as the level in a tank or the temperature of a climatized room must be directly readable in the control cabinet or at the control desk. The current loop display is designed for precisely this purpose.

It is simply looped into the line of the 4...20 mA analogue signal. No voltage source is required, as the energy of the analogue signal is sufficient to power the device.

Flexible adjustment of values

The display can be configured to indicate the measurand as an actual value, such as the level in centimetres or the temperature in degrees Celsius. To this end, the user can freely define and scale the measuring range using start and end points. Even non-linear signals can easily be displayed as linear values using freely positionable linearization points. For example, an angle of aperture can be indicated using measured distance values. This provides the user with a powerful and easy-to-use measured value display.

Description	Order no.
Current loop display for 4...20 mA signals	**DX1041**

Technical data		
Analogue input	[mA]	4...20
Voltage supply		from analogue signal
Installation cut-out	[mm]	68 x 33
Digit height	[mm]	14
Display range		-1999...1999

BEST FRIENDS

Optical distance sensor
PMD time-of-flight technology for millimetre precision

Temperature transmitter
High accuracy and particularly good response dynamics

Vortex flow meter
Monitors flow and temperature in water pipes

For further technical details, please visit:
ifm.com/fs/DX1041

Making good connections

Robust cables for currents up to 16 amperes

- Low voltage drop on long cable lengths due to 2.5 mm² cable cross-section

- Standard L-code with tried-and-tested ecolink technology for safe, error-free connection

- Suitable for power supply of IO-Link masters

- Withstand the stress factors in industrial applications

IP65   IP67   IP69K

ifm – close to you!

Connection	Order no.
M12 connection cable · with socket · 5 poles · straight	
2 m	**EVCA15**
10 m	**EVCA17**
50 m	**EVCA19**
M12 connection cable · with socket · 5 poles · angled	
2 m	**EVCA20**
10 m	**EVCA22**
50 m	**EVCA24**
M12 jumper cable · 5 poles · straight-straight	
0.25 m	**EVCA25**
2 m	**EVCA28**
10 m	**EVCA30**
20 m	**EVCA31**
M12 jumper cable · 5-poles · straight-angled	
0.25 m	**EVCA32**
2 m	**EVCA35**
10 m	**EVCA37**
20 m	**EVCA38**
M12 jumper cable · 5 poles · angled-angled	
0.25 m	**EVCA39**
2 m	**EVCA42**
10 m	**EVCA44**
20 m	**EVCA45**

Common technical data		
Nominal current	[A]	16
Cables	[mm²]	5 x 2.5
Protection rating		IP65 | IP67 | IP69K in locked condition with the matching counterpart
Materials		
Housing / moulded body		TPU orange
Coupling nut		nickel-plated brass
Sealing ring		FKM
Sheath		PUR, grey

Securely permanently tight

The M12 standard connections simplify the connection of sensors and actuators. Wiring faults are ruled out. The contoured nut is easy to tighten sufficiently, so as to guarantee a perfect lasting seal even when fastened by hand.The vibration protection holds the threaded sleeve tight in its position.

With IO-Link master: secure connection at the process level

Combined with our PerformanceLine IO-Link masters, the EVC cables ensure reliable connection of sensors and actuators to the subsequent infrastructure.

Transmission of high currents with low voltage drop

Controlling loads such as actuators via IO-Link master requires a robust infrastructure based on L-code. Our industrial-grade jumper cables are provided with an appropriately dimensioned cable cross-section and can transmit currents of up to 16 amperes without any difficulty and with almost no voltage drop.

BEST FRIENDS

IO-Link module
Input / output module

L-code
Y splitter

IO-Link master
Field-compatible masters

For further technical details,please visit:
ifm.com/fs/EVCA15

Utilise the full power of your data

moneo: the IIoT platform for those who care about their plants

„My pulse frequency is 45 per minute when I'm asleep and healthy. If I am ill, it is about 55. Under full exertion, my heart pumps more than three times per second. I run my home course of ten kilometres in less than 50 minutes on a good day and at a temperature of about 20°C. How do I know all that?

The fitness tracker on my wrist collects my body data and my performances on a daily basis and analyses them for me. It helps me understand my body system. I can tell at a glance whether my body can cope with the exertion or whether I'm in the red zone and overexerting."

The sensors on my wrist make my complex human organism transparent to me. While such a thing may have been difficult to imagine in the past, it is hardly anything special for us today. Take a glance at your wrist to check how your body is doing. Just like that.

moneo: the result of a deep understanding of the machine
Monitoring the status and current condition of your machines and plants is very simple. With moneo. For more than half a century, we have had our finger on the pulse of the industry, shaping the evolution of automation. We are now distilling this expertise and in-depth understanding of all kinds of machines and plants from the OT level and combine it with the inexhaustible possibilities of digitalisation. Thanks to our IIoT platform, you can check the condition of your plant at any time. It will show you whether everything is running in the green zone or whether performance is declining, consumption values are getting out of hand or maintenance is required.

Get **actionable insights**

Data becomes information.
Information becomes added value.

Your plant already offers the preconditions for it: sensors permanently provide data on temperature, pressure, level and object presence. In most cases, however, this data only reaches the controller. And this only accounts for about 5 per cent of the wealth of knowledge that is available. Thanks to moneo, you can easily benefit from the remaining 95 per cent. Like a fitness tracker, our IIoT platform collects the incoming data, evaluates it and generates information you can use to optimise your processes and workflows and to optimise maintenance schedules.

Never again in the red

Temperature curves, compressed air consumption, cycle times, operating hours, levels, vibration behaviour – whatever may have an influence on the **performance, production quality** and **energy efficiency** of your industrial organism, with

moneo, you will be able to act before your investments will run out of steam and before wear, lacking supplies or defects will lead to downtime or before precious energy will escape ineffectively through leaks. That is real added value. It saves money, nerves and time. You can, for example, rather invest the time you save after work to improve your best time on your 10-kilometre home run.

Do you want to understand your machines and plants better and keep them fit? Are you ready for more information, performance and efficiency?

Then start now. With moneo.

Turning the dream of clockwork into reality

How the IIoT can help you achieve a perfectly synchronised supply chain

Reference 57260, Aeternitas Mega 4, Calibre 89. If this name gets you excited, then you are definitely someone who is fascinated by the art of watchmaking. And that is totally understandable. It really is incredible to see how countless complications – as a horologist calls the different functions of a watch – can be implemented in such a small space. It's all down to precise interaction of cogs, springs, levers and shafts. Of course, a work of art like this doesn't come about overnight.
It took around eight years for the 2,826 components of the Reference 57260 to be conceived, developed, produced and assembled, resulting in no less than 31 hands that provide 57 different functions. Sorry, we mean complications.

Complicated? It doesn't have to be that way.
The issue of time (and unfortunately sometimes also the issue of complications) plays a crucial role in supply chain management. Every unused or wasted unit of time costs money. Efficiency is to a supply chain manager what perfection is to a watchmaker. And they are essentially one and the same thing. To achieve maximum efficiency, all the units involved need to engage perfectly with one another, like clockwork, at all times. That is the only way to deliver the best possible results across all functions – ideally without any complications getting in the way. It sounds complicated but it's not really. At least not if you look for experienced supply chain specialists to perform the task, just like a watchmaker. They have perfected the craft of composing and synchronising all the cogs in the supply chain over many decades.

The first bit of good news is that you've already found these experts. The second bit of good news is that our seamless combination of sensors and software can turn your dream of perfectly clean, well-oiled and pleasantly whirring clockwork into a reality much more quickly than the example we talked about earlier.

Bringing two worlds together: GIB SCX meets Industry 4.0
How does it work? Very easy: We bring the production and IT levels closer together, ideally using existing frameworks. No matter whether we are talking about machine maintenance requirements, production capacity or intralogistic material flows: in Industry 4.0 they are all recorded using sensors, forwarded to the IT level and converted into readable information, for example using the moneo IIoT software. Our native "Shop Floor Integration" interface sends the information to SAP in real time. There, thanks to our "GIB SCX" supply chain solution, which also has native SAP integration and certification, all of the operational and strategic units involved access the exact same standardised data. This creates transparency and ensures that all subprocesses are perfectly synchronised. This means that everyone from purchasing to shipping can respond very quickly to even unscheduled maintenance requirements or spur-of-the-moment large orders. Everything is integrated and coordinated.

One cog engages with the other. Complex operations that were previously carried out manually run automatically in the background. Like the delicate work of art behind a clock face. An onlooker only sees the information displayed. But they know that the clockwork is running.

Precisely, cleanly and reliably. We turn the dream into a reality.

# Everything the automation heart desires.

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Products, accessories and interesting facts

Are you looking for the suitable accessories for your product? No problem! We have compiled everything you need to know about installation, parameter setting and set-up and added it to the respective product page. Of course, in our online shop you will also find lots of interesting information about the technologies in our sensors, inspiration in the form of application reports, factory certificates for free download, and, and, and...

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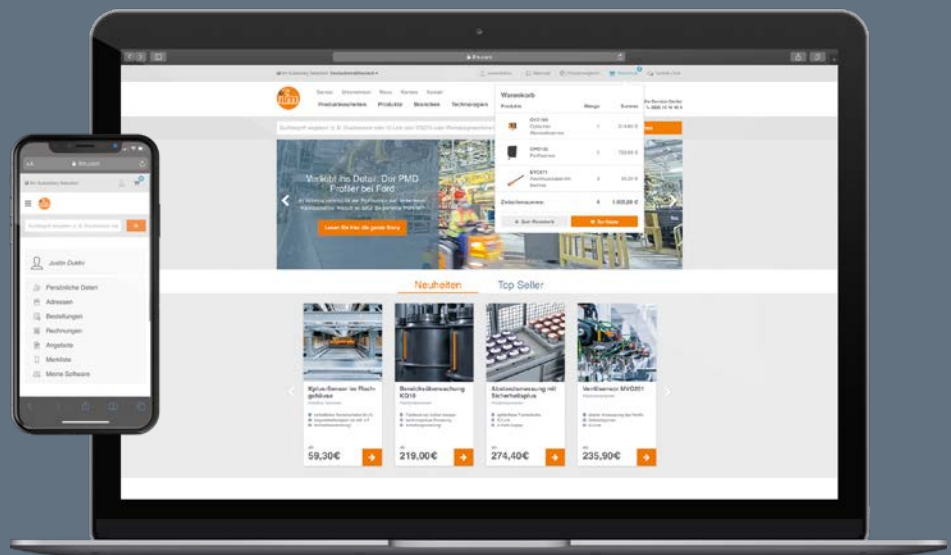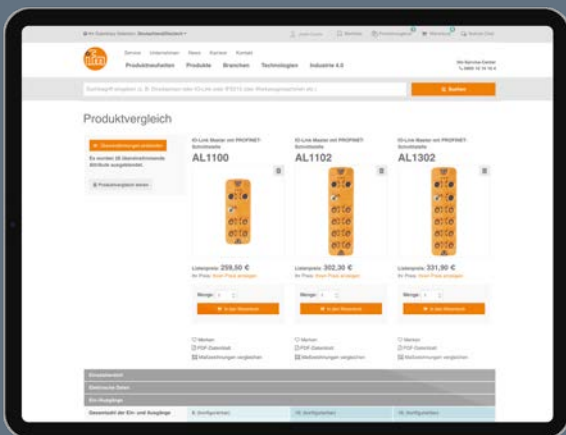
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More you: Create offers yourself, convert them into orders with one click, track shipments and status, save and retrieve invoices. my ifm – it's yours!

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