NEWSBOOK 2021

ifmnovation

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Product innovations automation technology

ifm products

Position sensors

Sensors for motion control

Industrial imaging

Safety technology

Systems for mobile machines

Connection technology

moneo

ifm

Huge IO-Link performance in a tiny M8 housing

Inductive sensors

Long sensing range, minimal space required

Easy installation and replacement thanks to standard M8 connector

The ideal solution where space is at a premium: remote IO-Link parameter setting

Process reliability guaranteed by switch point monitoring for detection of wear

Diagnostic functions, such as internal unit temperature monitoring, help prevent failures
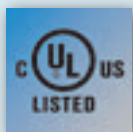
Excellent performance in a small housing

With 3 mm (flush) and 6 mm (non-flush), the sensing range is much than the standard of conventional M8 sensors. Thanks to the high switching frequency of 600 Hz, the sensors also solve demanding position detection tasks where space is limited.

More performance thanks to O-Link

In addition to the switching output, the sensor has an IO-Link interface. Convenient remote parameter setting is also possible. Thanks to the high precision, the user can monitor the switch point to the nearest millimetre and detect mechanical deviations e.g. caused by wear at an early stage. Extensive diagnostic functions, such as integrated unit temperature monitoring, provide additional safety in the installation by sending early warnings in critical applications.
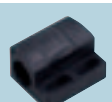
Type	Installation	Measuring range [mm]	Setting range [mm]	Correction factor	Order no.
	flush	0.3…3	0.56...2.8	Steel 1 · stainless steel 0.7 · brass 0.4 aluminium 0.4 · copper 0.3	**IE5457**
	non flush	0.6…6	1.23...5.61	Steel 1 · stainless steel 0.7 · brass 0.5 aluminium 0.5 · copper 0.4	**IE5456**

Accessories

Design	Description	Order no.
Installation		
	Mounting bracket for M8 housing, stainless steel	**E10734**
	Mounting clamp for M8 housing, aluminium, black anodized	**E10221**
	Mounting clamp for type M8, PC	**E11521**
IO-Link		
	IO-Link master DataLine, USB	**AL1060**
	Memory plug, parameter memory for IO-Link sensors	**E30398**
	moneo⎪configure SA (Stand-alone) licence, software for online and offline parameter setting of IO-Link devices including maintenance and support until the end of the following year	**QMP010**
	IO-Link display	**E30391**
Connection technology		
	Connection cable, M8, 3-pole, 2 m, black, PUR cable	**EVC268**
	Connection cable, M8, 3-pole, 5 m, black, PUR cable	**EVC269**
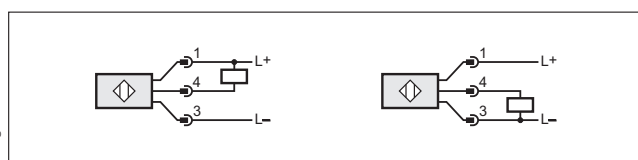
Further technical data		
Design		M8 x 1
Housing length	[mm]	50
Electrical design		DC PNP / NPN can be set via IO-Link
Output function		NC / NO adjustable via IO-Link
Operating voltage	[V DC]	10...30
Current rating	[mA]	100
Reverse polarity protection		ja
Short-circuit protection		ja
Protection rating		IP 65 / IP 66 / IP 67 / IP 68 / IP 69 K
Protection class		III
Switching frequency DC	[Hz]	600
Ambient temperature	[°C]	-40...75
Switching status indication	[LED]	4 x yellow

IO-Link process data (cyclic)		
	Function	Bit length
	Process value	16
	Device status	4
	Binary switching information	2
IO-Link process data (acyclical)		Switching cycles counter, switch-on cycles counter, operating hours counter, internal temperature, application-specific marking

Dimensions

IE5457

IE5456

Wiring diagram

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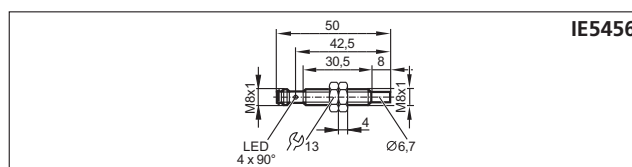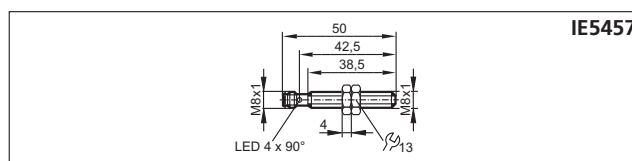
Twice as good: inductive sensors with analogue output and IO-Link.

Inductive sensors

High-precision distance measurement for early diagnosis of mechanical changes.

Distance measurement and switch using only one unit.

Flexible use due to adaptable output range.

Measured value transmission without any loss via IO-Link.

More functionality with full compatibility using standard input devices.
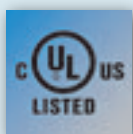
Prepared for plant retrofit

The new inductive analogue sensors are fully compatible for use in existing plants. A wide range of functions and information are provided additionally via IO-Link.

Increased measurement accuracy with IO-Link

On the one hand, conversion losses or electromagnetic interference are avoided thanks to digital communication. On the other hand, the detection range of the sensor is freely scalable via IO-Link – allowing also adjustment of the switch-on curve. Thus, the resolution can be specifically maximised whenever tiny changes in distance, for example caused by first stages of wear, need to be detected quickly. When connected to an ERP, the digital data can be used to implement automated, demand-based maintenance.

IO-Link

TEACH-IN

IP 67
IP 68
IP 69 K

cULus
LISTED

4...20 mA

0...10 V

Type	Total length [mm]	Measuring range [mm]	Installation	Output signal	Protection rating	Order no.
M12 connector · analogue output programmable/ IO-Link						
M12	70	0.2...2	flush	4...20 mA	IP 65...IP 69K	**IF6028**
M12	70	0.2...2	flush	0...10 V	IP 65...IP 69K	**IF6029**
M12	70	0.4...4	non flush	4...20 mA	IP 65...IP 69K	**IF6030**
M12	70	0.4...4	non flush	0...10 V	IP 65...IP 69K	**IF6031**
M18	60	0.8...8	non flush	4...20 mA	IP 65...IP 69K	**IG6083**
M18	60	0.8...8	non flush	0...10 V	IP 65...IP 69K	**IG6084**
M18	60	0.5...5	flush	4...20 mA	IP 65...IP 69K	**IG6086**
M18	60	0.5...5	flush	0...10 V	IP 65...IP 69K	**IG6087**
M30	65	1...15	non flush	4...20 mA	IP 65...IP 69K	**II6913**
M30	65	1...15	non flush	0...10 V	IP 65...IP 69K	**II5914**
M30	65	1...10	flush	0...10 V	IP 65...IP 69K	**II5917**
rectangular	40 x 40 x 54	1...15	flush	4...20 mA	IP 67	**IM5139**
rectangular	40 x 40 x 54	1...15	flush	0...10 V	IP 67	**IM5140**
rectangular	40 x 40 x 54	1...26	non flush	4...20 mA	IP 67	**IM5141**
rectangular	40 x 40 x 54	1...26	non flush	0...10 V	IP 67	**IM5142**
rectangular	40 x 40 x 54	3...35	non flush	0...10 V	IP 67	**IM5143**
rectangular	40 x 40 x 54	3...35	non flush	0...10 V	IP 67	**IM5175**

Accessories

Type	Description	Order no.
Installation		
	Angle bracket for M12 design, stainless steel	**E10735**
	Angle bracket for M18 design, stainless steel	**E10736**
	Angle bracket for M30 design, stainless steel	**E10737**
IO-Link		
	1-port IO-Link master (connects IO-Link sensors to the PC via USB)	**AL1060**
	Memory plug, parameter memory for IO-Link sensors	**E30398**
	IO-Link master EtherNet/IP, 4-port	**AL1320**
	moneo|configure SA (Stand-alone) licence, software for online and offline parameter setting of IO-Link devices including maintenance and support until the end of the following year	**QMP010**

Focus area with highest resolution
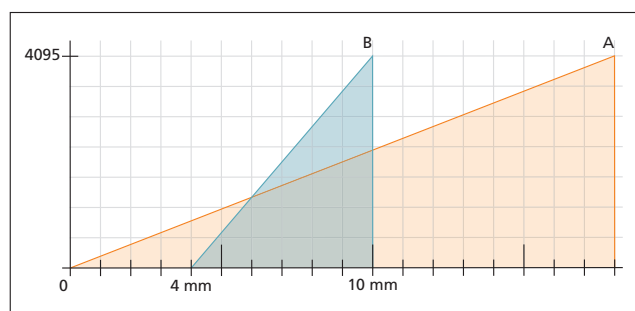
A = detection zone, B = focus zone

In the case of measuring sensors, the 4096 measuring points (i.e. the resolution) extend over the entire detection zone (A).

With the new analogue sensors, however, this resolution can be (e.g.) specifically maximised in any focus zone where minimal changes in distance need to be detected quickly.
For this purpose, all available 4096 measuring points are "placed" in the particular zone to be considered.

In present example, this results in the highest possible resolution of 628 measuring points per mm. This precise measurement accuracy not only increases process reliability, but can also prevent rejects, thus allowing substantial savings.

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On the safe side: capacitive IIoT sensors for hazardous dust areas

Capacitive ATEX sensors

Level and position detection in hazardous areas

No switching amplifier required, reducing costs and complexity

Robust and impact resistant housing

Easy connection via M12 connector (straight or angled)

Easy remote parameter setting and process monitoring
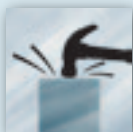
Maximum protection ensures safe operation

The robust and impact resistant housing of the capacitive ATEX sensors ensures safe operation in hazardous dust areas (ATEX zone 22). No expensive switching amplifiers are required. Level and position can be monitored without any risk, as no combustible energy from the sensor can penetrate into the hazardous area, even in long-term use.

Intelligent remote diagnostics and control

The ifm sensors are not only the first on the market to feature a standard M12 connector, they are also the first ones featuring IO-Link. This enables safe and convenient remote parameter setting, which is a great advantage e.g. in case of high tanks or limited space. Another advantage is the digital process value transmission which ensures for example that tanks are filled as required. The sensors can be used to easily replace currently installed sensors and used without IO-Link thanks to their backward compatibility.

The all-rounder for position and process monitoring

The capacitive IO-Link ATEX sensors have been designed especially for zone 22 hazardous dust areas. The well-known M30 sensors with a high sensing range are found in many applications in position and process monitoring.
Examples include the non-contact detection of grain in mills or silos and position detection of bakery products, wood, plastic parts or even pasta. This makes the sensors real all-rounders.

More flexibility with IO-Link

The sensors are the first to feature an integrated IO-Link chip, allowing them to deliver their full potential. Process values can be transferred in real-time and the sensors can be conveniently adapted to the application remotely.

Put an end to extensive stock-keeping

Each sensor can be set to PNP or NPN as well as NO or NC, which is an advantage especially for overflow or dry running applications. Integrated time functions can be used to implement automatic replenishment without an upstream controller. The complementary switching output of the sensors can be set directly on the unit via a potentiometer or via IO-Link. The potentiometer can also be deactivated to prevent external influences.

Dimensions

Example KI531A
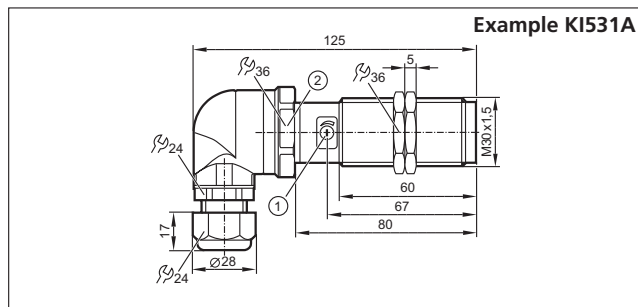
1) Potentiometer
2) Tightening torque 10 Nm

Wiring diagram
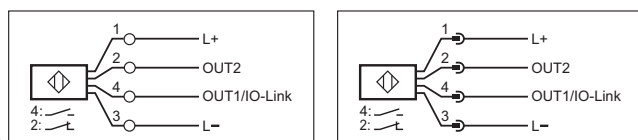
KI530A, KI531A

KI532A, KI533A

Type	Description	Order no.
Use in hazardous dust areas (ATEX zone 22)		
	Type M30 with terminals; straight	**KI530A**
	Type M30 with terminals; angled	**KI531A**
	Type M30 with M12 connector; straight	**KI532A**
	Type M30 with M12 connector; angled	**KI533A**

Common technical data		
Operating voltage	[V DC]	10...30
Current consumption	[mA]	200
Output function		complementary
Protection rating		IP 65, IP 67
Sensing range [mm]		15
Real sensing range (Sr)		± 10 % of Sn
Setting range		3..26
ATEX labelling		II 3D Ex tc IIIC T90°C Dc X

Accessories

Type	Description	Order no.
Installation		
	Mounting adapter POM; G 1 1/2 external thread	**E11033**
	Mounting adapter PVDF; G 1 1/2 external thread	**E11034**
	Mounting adapter POM; G 1 1/4 external thread	**E11035**
	Mounting adapter PVDF; G 1 1/4 external thread	**E11036**
	Mounting set, fixture for M30 threads; stainless steel	**E20873**
	Angle bracket for M30 threads; stainless steel	**E10737**
Connection technology		
	Connection cable M12 / M12, 2 m, PUR, ATEX approval	**EVC07A**
	Connection cable M12 / M12, 5 m, PUR, ATEX approval	**EVC12A**

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KQ10 for continuous range monitoring of point levels

TOP PRODUCT

Capacitive sensors
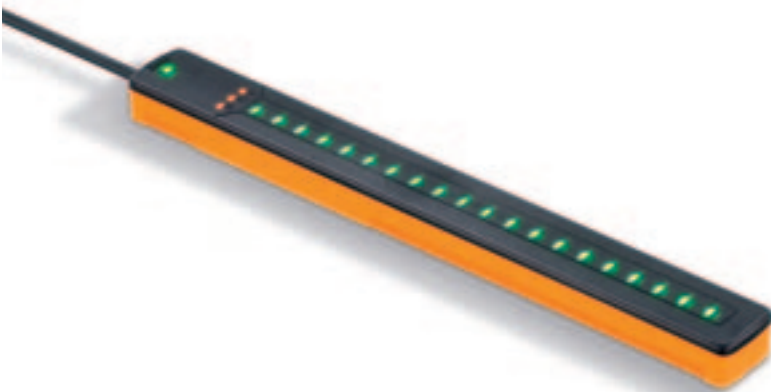
Continuous level monitoring from outside the process

No stress caused by the medium thanks to non-contact detection

Three point level positions in one sensor

Deposits can be detected and signalled to improve quality of the process

Several KQ10 units can be linked via IO-Link

IO-Link

IP 65 IP 67

LED

Laptop parameter setting
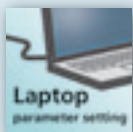
Continuous monitoring of empty and overflow condition

The KQ10 for range monitoring can "see" through all non-metallic walls, to detect granulates or liquids without contact. Therefore, no maintenance is required. Process values of 0...100 % can continuously be transferred via IO-Link over the entire length of 250 mm without dead band. 20 LEDs display the real level inside the vessel directly at the sensor. If several KQ10 units are combined, the detection zone can be increased accordingly.

Three switch points with just one sensor

Up to three point levels can be monitored with just one sensor where normally three sensors would be needed – and this at the same time with continuous range monitoring. Switch points and other functions such as NC / NO, hysteresis or orientation and detection zone of the sensor can be set.

Type	U_b [V DC]	I_load [mA]	Current consumption [mA]	Ambient temperature [°C]	Protection rating / protection class	Connection	Order no.
Operating principle capacitive, without contact							
	10...30 / 18...30 IO-Link	200	< 50	-20...80	IP 65, IP 67	2 m cable	**KQ1000**
	10...30 / 18...30 IO-Link	200	< 50	-20...80	IP 65, IP 67	0.1 m cable, M12 connector, 5 pins	**KQ1001**

100	SSC1	SSC2	SSC3
	ON	OFF	OFF
0 / 38 %	active	inactive	inactive

Further technical data		
Short-circuit protection		•
Protected against reverse polarity		•
Switching frequency	[Hz]	1
Switching outputs		3, NO/NC programmable Deposit diagnostics
Switching status indication	LED	orange
Operating status indication	LED	green
Level indication	LED	20 x green
Type, rectangular	[mm]	250 x 28 x 16.7
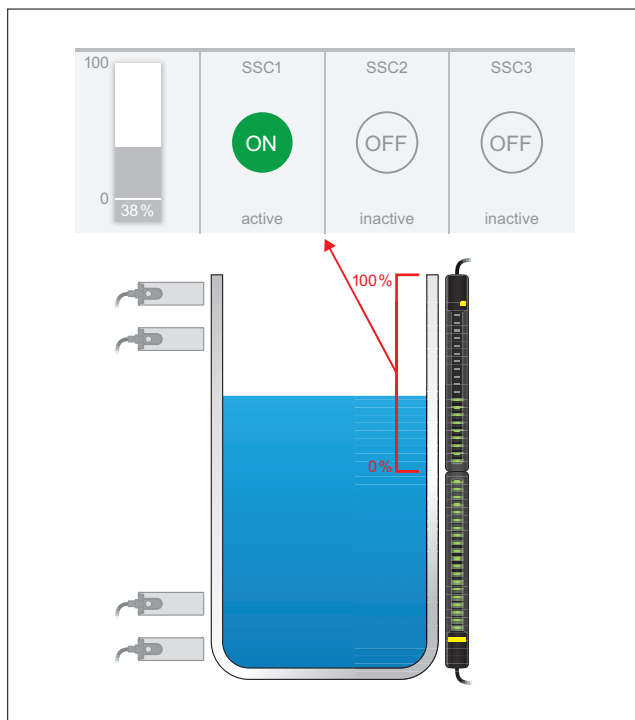
Point level and continuous level monitoring

As opposed to the conventional solution with two point level sensors each at the lower (empty) and upper end (overflow) of the tank, one single KQ10 comes with three switch points to indicate empty, full and overflow condition. This reduces the number of sensors and installation complexity. Moreover, it continuously measures levels in ranges of 250 mm and provides these, in addition to the switching states, as a percentage value via IO-Link.

Slight deposits on the inner walls of the tank do not impair the level detection, and they can be signalled via the switching output or IO-Link if the threshold is exceeded. This permanent condition monitoring prevents unplanned production downtime.

Accessories

Type	Description	Order no.
Installation		
	Adapter for flat mounting	**E12675**
	Adapter for pipes	**E12676**
	Surface mount tape for KQ10	**E12677**
	Cable tie, PA, 760 mm long, pack quantity 5 pieces	**E10880**
IO-Link		
	USB IO-Link master for parameter setting and analysis of units Supported communication protocols: IO-Link (4.8, 38.4 and 230 Kbits/s)	**ZZ1060**
	IO-Link master with PROFINET interface	**AL1100**
Connection technology		
	Connection cable, M12, 5-pole, 2 m black, PUR cable	**EVC058**
	Connection cable, M12, 5-pole, 5 m black, PUR cable	**EVC059**

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Measuring light grids for easy object monitoring in intralogistics.

Photoelectric sensors

Simple object dimensioning in intralogistics without complex programming.

High resolution for precise object detection.

Ease of integration due to a standardised IO-Link interface.

Selective evaluation of beams to determine the dimensions or distances between objects.
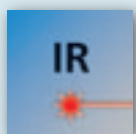
For optimised logistic processes

The measuring light grids are perfectly suitable for monitoring intralogistics processes. An evaluation of how many and which light beams are obstructed is provided and can be used to detect whether the conveyed objects are in the correct and safe transport position.
With a beam distance of 10 millimetres, the height and width of pallets, packages and boxes, too, can be precisely detected.

Precise monitoring with IO-Link

Five different measured values in total can be transmitted via IO-Link using the multi-beam system. The height, position, but also the contour of one or several objects can be derived from these values. What is more, diagnostic information on operating hours are determined and transmitted digitally for needs-based maintenance.

Products

Height Light grids [mm]	Height Measuring range [mm]	Number of beams	Order no.
Measuring light grids with IO-Link			
213	140	15	**OY5100**
663	590	60	**OY5103**
1113	1040	105	**OY5106**
1713	1640	165	**OY5110**
2163	2090	210	**OY5113**
2613	2540	255	**OY5116**

Common technical data		
Operating voltage	[V DC]	24 +/- 20%
Ambient temperature	[°C]	-10...55
Max. range* (distance from transmitter to receiver)	[m]	10
Protection rating, Protection class		IP 65 / IP 67 III
Type of light		infrared
Distance of beams	[mm]	10
Output**		PNP / NPN
Output H = light-on / D = dark-on mode		H / D

* with Y splitter cable EY5053, ** switchable via IO-Link

Functional principle
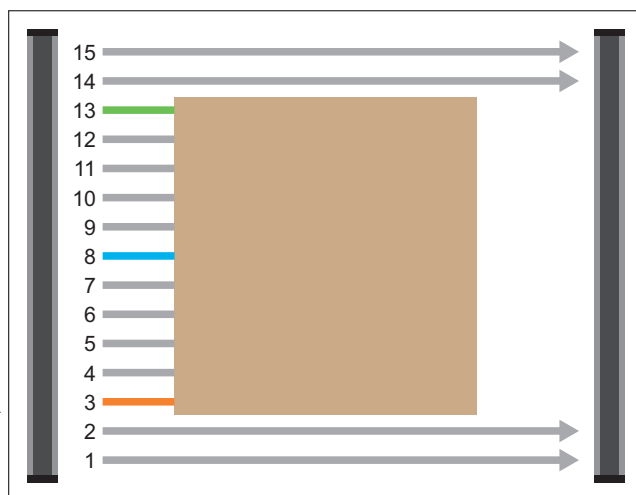
Accessories

Design	Description	Order no.
Mounting accessories		
	Mounting and fine adjustment unit	**EY3013**
	Adjustable brackets	**EY3004**
	Laser adjustment aid	**EY3099**
	USB IO-Link master set	**ZZ1060**
Connection technology		
	Socket, M12, 5 poles 1 m, black, PUR cable	**EVC196**
	Socket, M12, 5 poles 2 m, black, PUR cable	**EVC070**
	Socket, M12, 5 poles 5 m, black, PUR cable	**EVC071**
	Socket, M12, 5 poles 10 m, black, PUR cable	**EVC072**
	Y splitter cable Range: 1...10 m	**EY5053**
	Y splitter cable Range: 0...2 m	**EY5054**

Multi-beam system with 5 measured values

The five different measured values in total are used to derive the height, position and but also the contour of one or several objects.

FBO	First beam occupied:	**3**
LBO	Last beam occupied:	**13**
CBO	Central beam occupied:	**8**
NBO	Number of beams occupied:	**11**
NCBO	Number of consecutive beams occupied:	**11**

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TOP PRODUCT

The PMD profiler: up to 10 target profiles for precise quality assurance

Photoelectric sensors

Inline quality assurance checks ensure correct assembly and sorting of parts

Quick set-up without software

Colour independence and insensitivity to extraneous light ensure universal use

Software-supported fault analysis with profile visualisation and measured values

Up to 10 selectable profiles offer increased flexibility

PMD Technology

IO-Link

IP 65

Class 1 laser

vision assistant

Visible red light
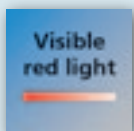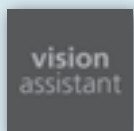
Precise object scan for quality control

The PMD profiler compares the profile of the checked object with a taught target profile using the light section technology. The OPD101 can store up to 10 target profiles, which simplifies the checking of changing objects on the same production line. Using the sensor's 3 intuitive pushbuttons, profiles can even be taught without software. The profile to be checked can be set on the device or via software.

Thanks to its high colour tolerance and insensitivity to extraneous light, the PMD profiler can safely detect the smallest differences, e.g. between almost identical parts, even if the lighting or object colour changes. In addition, the ifm Vision Assistant can be used to visualise object profiles and read out measured values, which can indicate a displaced object, for example. This simplifies fault analysis and prevents quality loss.

Type [H, W, D mm]	Measuring distance (Z direction) [mm]	Width of the measuring range (X direction) [mm]	Region of Interest (ROI)	Storable profiles	Order no.
PMD profiler · Laser protection class 1 · M12 connector·· Output function PNP/NPN					
88 x 65 x 28.5	150...300	90 (for a maximum distance of 300 mm)	1	1	**OPD100**
88 x 65 x 28.5	150...300	90 (for a maximum distance of 300 mm)	1 (on unit) or 2 (in VA)	10	**OPD101**

Accessories

Type	Description	Order no.
Installation		
	Mounting set OPD, 12 mm	**E2D118**
	Mounting rod, 100 mm, Ø 12 mm, M10 thread, stainless steel	**E20938**
IO-Link		
	USB IO-Link master for parameter setting and analysis of units Supported communication protocols: IO-Link (4.8, 38.4 and 230 kbits/s)	**ZZ1060**
	IO-Link master, EtherNet/IP, 4 ports	**AL1320**
	moneo|configure SA (Stand alone) licence, software for online and offline parameter setting of IO-Link devices including maintenance and support until the end of the following year	**QMP010**

Further technical data		
Operating voltage	[V DC]	10...30
Resolution	[µm]	Z direction: 200 µm X direction: 500 µm
Accuracy	[µm]	± 500 µm (x,z dimension)
Output		2x PNP/NPN programmable OUT1: switching output (good/bad) / IO-Link OUT2: switching output (good/bad or „ready signal" output)
Protection rating, protection class		IP 65, III
Current rating	[mA]	2 x 100
Type of light / wave length		Laser light 650 nm
Extraneous light immunity	[klx]	20
Switching frequency	[Hz]	5
Current consumption	[mA]	< 200, 10 V DC
Short-circuit protection, pulsed		•
Reverse polarity protection / overload protection		• / •
Ambient temperature	[°C]	-10...55
Materials		Diecast zinc, PPSU, ABS, PMMA, PBT+PC, EPDM
User interface		TFT display, 3 operating keys, operation display, switching status indication

Region of Interest:
high degree of accuracy
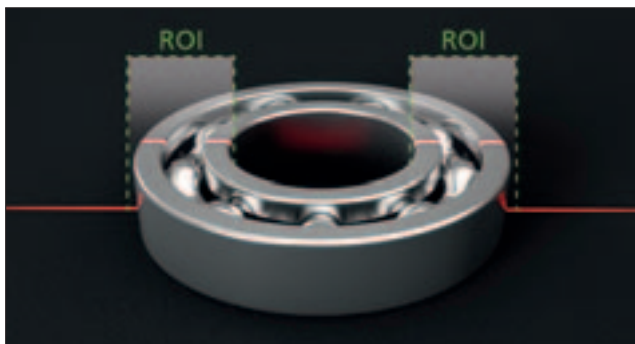
To make the determination of differences between nearly identical components even more reliable, the profile evaluation can be narrowed down to the relevant object area with green markings by using the Region of Interest function.

With the OPD101, 2 ROIs can be defined in the ifm Vision Assistant, e.g. to precisely detect both elevations of a ball bearing.

The function can be used in the fixed mode to verify whether the object is accurately positioned. In the floating mode, the contour comparison is variable along the laser line. It is not necessary to position the parts to be tested in exactly the same way.

Quality assurance: definition of tolerances

The similarity between the reference and the target object is provided as a value between 0 and 100 %. The threshold function can be used to define the value from which the reference object is no longer acceptable. This allows the user to adjust the settings precisely to the corresponding application.

ifm – close to you!

TOP PRODUCT

OGD with plastic front lens: distance measurement with added safety

Laser sensors / distance sensors

High process reliability thanks to shatterproof plastic front lens

2 in 1: simultaneous output of distance value and reflectivity

Identification and sorting of objects based on reflectivity

Process values shown on 2-colour display and sent via IO-Link

PMD Technology

IO-Link

Visible red light

Class 1 laser

IP 65 / IP 67

High-grade stainless steel
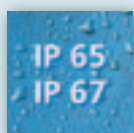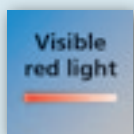
Everything under control thanks to OGD Reflectivity with plastic lens

The OGD Reflectivity features a switching output for the reflectivity value in addition to providing distance information. This increases the reliability of process control: For example, it not only detects whether toppings have been added to a deep-frozen product, but also determines whether the correct topping has been used based on its reflectivity.

In addition, the OGD Reflectivity now features a plastic front lens to eliminate the possibility of glass splintering, especially in food applications. This not only ensures reliable process control, but also a high degree of process safety. All parameters of the sensor can be set as usual using three pushbuttons and are clearly indicated on the two-colour display. Parameter setting and reading is also possible via IO-Link.

Measuring range [mm]	Background suppression [m]	Output	Laser protection class	Spot Ø at max. range [mm]	Unit of measurement	Order no.
Photoelectric distance sensor · M12 connector						
80...1,500	...20	PNP	1	5	cm, refl (selectable)	**OGD583**

Accessories

Type	Description	Order no.
Installation		
	Mounting set for clamp mounting, M10 thread, diecast zinc	**E20718**
	Mounting set for clamp mounting, M10 thread, stainless steel	**E20870**
	Mounting set for clamp mounting, Ø 12 mm, diecast zinc	**E20836**
	Mounting set for clamp mounting, Ø 12 mm, stainless steel	**E21207**
	Mounting rod, 100 mm, Ø 12 mm, M10 thread, stainless steel	**E20938**
	Cube for mounting on an aluminium profile, M10 thread, diecast zinc	**E20951**
IO-Link		
	USB IO-Link master for parameter setting and analysis of units Supported communication protocols: IO-Link (4.8, 38.4 and 230 kbits/s)	**ZZ1060**
	Memory plug, parameter memory for IO-Link sensors	**E30398**
	IO-Link master with PROFINET interface	**AL1100**
	moneo|configure SA (Stand alone) licence, software for online and offline parameter setting of IO-Link devices including maintenance and support until the end of the following year	**QMP010**
Connection technology		
	M12 socket, 2 m black, PUR cable	**EVC001**
	M12 socket, 5 m black, PUR cable	**EVC002**
	M12 socket, 2 m black, PUR cable	**EVC004**
	M12 socket, 5 m black, PUR cable	**EVC005**

Further technical data		
Operating voltage	[V DC]	10...30
Type of light / wave length		Laser light 650 nm
Laser protection class		1
Output L = Light-on / D = Dark-on mode		L / D selectable
Protection rating, protection class		IP 65 / IP 67 III
Extraneous light immunity	[klx]	10
Switching status indication	LED	2 x yellow
Switching frequency	[Hz]	11
Current rating	[mA]	2 x 100
Current consumption	[mA]	75
Short-circuit protection, pulsed		•
Reverse polarity protection / overload protection		• / •
Ambient temperature	[°C]	-25...50
Materials	Housing	Stainless steel (316Ti/1.4404); ABS; PPSU;PMMA
	Lens	PMMA

Dimensions
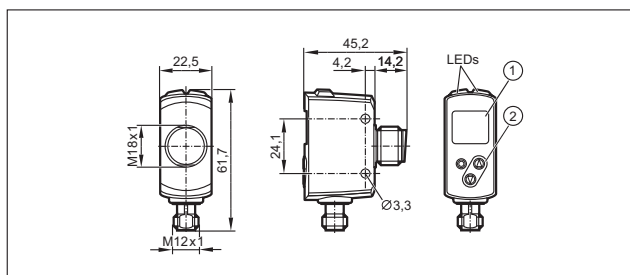
1) Alphanumeric display, 3 digits
2) Programming buttons

Wiring diagram
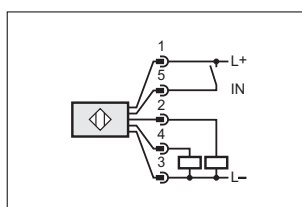
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For further technical details please visit: ifm.com

Always know where you stand: position feedback for ball valves

Valve feedback systems

- **The ball valve's type and position are directly visible in the plant**

- **Direct visualisation thanks to the flexible position indicator for T-port, L-port, and Y-port directional flow valves**

- **Free angular adjustment of the targets reduces type versions and stock-keeping**

- **Universally applicable on drives according to VDI/VDE 3845**

VDI VDE 3845

Flexible position feedback

The switching cams are mounted on ball valves for position feedback. Adjustable damping elements allow the pucks to be used in both standard and individual position feedback applications.

Position of the ball valve at a glance

The uniqueness of this puck is the adjustable position indicator on the top, which can be flexibly adapted to L-port and, via an additional indicator element, also to T-port and Y-port valves. This makes it possible to clearly visualise the position of the ball valve directly in the system.

The flow direction can be clearly seen via the position indicator
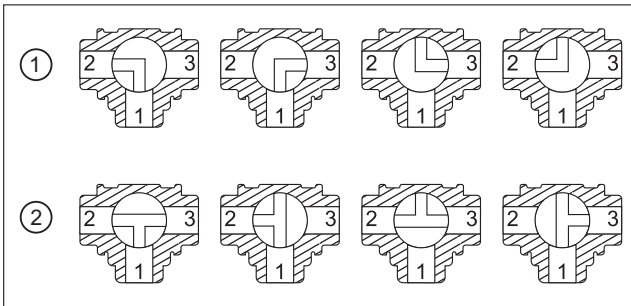
1) L-port valve
2) T-port valve

The user can set the position indicator according to the type of ball valve (I, L, T or Y)

The position of the ball valve can be seen directly in the plant

Target pucks

Mounting dimensions [X / Y mm]	Height of the actuator shaft [Z mm]	Description	Order no.
Ø shaft stub: ≤ 58 mm			
80 / 30	30	Puck basic	**E12724**
80 / 30	30	Puck adjustable	**E12725**
–	–	Multi-cover indicator for T/Y	**E12726**
Ø shaft stub: ≤ 38 mm			
80 / 30	30	Puck adjustable	**E12516**
80 / 30	30	Puck basic	**E12517**

Dimensions
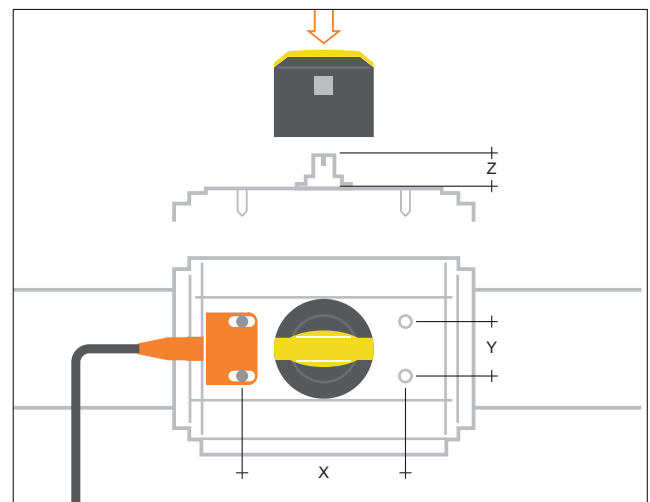
Accessories

Design	Description	Order no.
	Spacer, 10 mm	**E12526**

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A safe choice: draw-wire mechanisms for encoders.

Encoders

Precise position detection including over long distances.

High operational reliability thanks to robust mechanical construction even under permanent strain.

Mechanically compatible across manufacturers, for encoders with synchro flange.

Compact design even with rope spans up to 15 m.
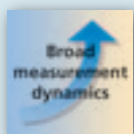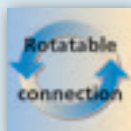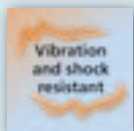
Exact positioning including over long distances

Draw-wire mechanisms for encoders are the ideal choice when positions must be accurately determined over straight distances. Examples of use range from short distances, for example with scissor lifts or fork lift trucks, to long distances, such as those covered by trolleys on crane booms or transport systems in high-bay warehouses.

Solid connection, robust against external influences

Advantage of the pulley principle: there is an uninterrupted connection between the encoder and the moving object. Adverse effects on distance detection e.g. caused by dirt with optical distance measurement, are mostly eliminated.
The mechanical components are designed for industrial, long-lasting use with up to 1 million pulls.

Draw-wire mechanisms

Design	Dimensions [mm]	Linearity [%]	Housing type/ Housing material	Rope spans up to * [m]	Order no.
	80 x 48 x 82	± 0.02	cylindrical / metal, aluminium, anodised	1.5	**E61439**
	60 x 57 x 89	± 0.1	cylindrical / PA	2.4	**E61440**
	78 x 40 x 75	± 0.01	rectangular / die-cast zinc, plastic	3	**E61441**
	115 x 103 x 115	± 0.01	rectangular / aluminium, anodised	5	**E61442**

* draw wire mechanisms with other lengths on request

Encoders

Draw wire mechanisms in combination with encoder						
IO-Link	HTL TTL	CAN open		SSI	4...20 mA	0...10 V
RMU300	**RU3100**	**RM9007**	**RM3006**	**RMU400**	**RMU100**	**RMU200**
IO-Link multiturn, 31 bits	Incremental (IO-Link), 3 tracks	CANopen 24 bits	PROFIBUS 25 bits	SSI 24 bits	Analogue 4…20 mA	Analogue 0...10 V

These encoder versions solve the majority of applications. In principle, other encoders with 58 mm diameter, synchro flange and 6 mm shaft diameter can also be used with the draw wire mechanisms. You will find further encoders at ifm.com.

Accessories

Description	Order no.
Pulley	**E61445**
IO-Link master Profinet, 4 ports	**AL1100**
IO-Link master, EtherNet/IP, 4 ports	**AL1120**

Connection technology

Description	Order no.
M12 socket, 5-pole, 5 m black, PUR cable	**EVC545**
M12 socket, 8-pole, 5 m black, PUR cable	**E12403**

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For further technical details, please visit: ifm.com

Decentralised and smart monitoring of rotating machines

Systems for signalling and indication

Mini display with speed monitoring function for direct mounting on the sensor

On-site speed display with colour change (red/green)

Two adjustable limit values, each with its own switching output

⬖ **IO-Link enables parameter setting outside the danger zone**

⬖ **Transmission of the current speed to the controller via IO-Link**
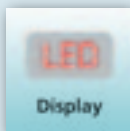
Transforms any sensor into a speed monitor

Whether inductive, capacitive or photoelectric sensor: This small device transforms any pulse-generating sensor into a speed monitor. The mini display with speed monitoring function is either screwed directly onto the sensor using an M12 connection or installed in the field. Two adjustable limit values, each with its own switching output, as well as a display with altering red/green indication signal if the current value is above or below the defined speed range.

The unit is conveniently set via IO-Link or using the buttons on the device. The speed value can also be transmitted to the controller via the digital communication protocol.

This makes the speed monitor plug an inexpensive and flexible solution for decentralised monitoring of conveyor belts, screw conveyors, fans, centrifuges, separators, etc.

Dimensions

DP2122
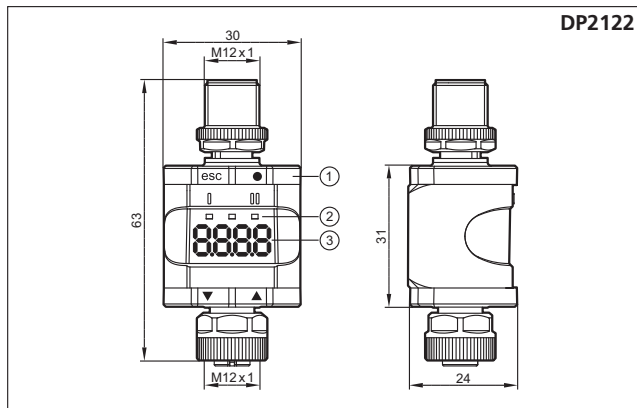
1) Push ring
2) LEDs
3) Display

Wiring diagram
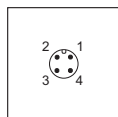
M12, 4-pole male connector

Pin 1: L+ / supply voltage
Pin 2: OUT2 / digital output 2
Pin 3: L- / supply voltage
Pin 4: OUT1 / IO-Link (C/Q)
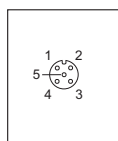
M12, 5-pole female connector

Pin 1: L+
Pin 2: enable input
Pin 3: L-
Pin 4: IN1 / digital input 1
Pin 5: not used

Accessories

Type	Description	Order no.
	Mounting clip, robust design for use in harsh industrial environments	**E89208**
	1-port IO-Link master (for connecting IO-Link sensors to a PC via USB)	**AL1060**

Technical data

Mini display with speed monitoring function		Order no. DP2122
Nominal voltage	[V DC]	24
Input frequency	[Hz]	2000
Current consumption	[mA]	30...380 (24 V DC, full load)
Inputs		2 x digital
Outputs		2 x digital
Voltage range	[V DC]	18...30
Output function		NO / NC (configurable)
Current rating per output	[mA]	50 (pin 4) / 100 (pin 2)
Ambient temperature	[°C]	-25...60
Storage temperature	[°C]	-25...60
Protection rating		IP 67
Communication interface		IO-Link
Operation indication	LED	1 x green
Output indication	LED	2 x yellow
Connection		M12 connection

Applications

Especially in the field of conveying technology the speed sensors can be used in various applications, for example, to monitor belt conveyors or bucket elevators. Here they are typically used to monitor underspeed, blockage or standstill.

Advantages

The mini display incorporates the complete speed monitoring. The switch points and other parameters can be set directly on the display.
In addition, IO-Link provides remote information about the current speed or the switch point and the configuration of important parameters such as the start-up delay time.

Operating principle

The sensor is damped by passing cams or other metallic targets and transmits the pulses to the display. On the basis of the time interval between the damping operations, the evaluation calculates the period duration or the frequency (actual rotational speed value) and compares it to the set switch point (preset value).
The output is switched during the start-up delay and when the rotational speed exceeds the set switching value.
The mini display signals over- and underspeed and switch-off of the output.

ifm – close to you!

Accelerate pallet detection using 3D cameras

3D sensors

For all standard pallets with two pallet pockets

Position accuracy of ± 1cm

Ranges up to 4 m

Detection time < 1 s

Communication via Ethernet or CAN

Support on GitHub
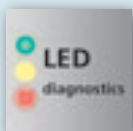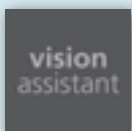
Powerful

The PDS pallet detection system is a tried-and-tested software solution for faster, fully automatic and position-independent detection of standard pallet types with two pockets. In combination with the O3D hardware, pallet position detection is extremely fast and accurate. This constitutes a significant reduction of the overall cycle time of pallet detection in autonomous and semi-autonomous pallet handling vehicles.

Efficient

Even in adverse environmental conditions, the sophisticated software solution will lead the lift fork reliably to its destination by means of the 3D point cloud of the ToF camera. The Pallet Detection System directly impacts the performance of the autonomous and semi-autonomous vehicles by increasing the speed of detecting the pallet position without sacrificing the quality of the detection.

Interface	Type of sensor	Material Front pane / LED window	Protection rating / Protection class	Angle of aperture [°]	Max. field of view size [m]	Order no.
PMD 3D sensors · O3D type · M12 connector · housing material: Aluminium						
Ethernet	PMD 3D ToF chip	Gorilla glass / polyamide	IP 65, IP 67 / III	40 x 30	2.61 x 3.47	**O3DP01**
CAN	PMD 3D ToF chip	Gorilla glass / polyamide	IP 65, IP 67 / III	40 x 30	2.61 x 3.47	**O3DP21**
Ethernet	PMD 3D ToF chip	Gorilla glass / polyamide	IP 65, IP 67 / III	60 x 45	3.75 x 5.00	**O3DP03**
CAN	PMD 3D ToF chip	Gorilla glass / polyamide	IP 65, IP 67 / III	60 x 45	3.75 x 5.00	**O3DP23**

Technical data Pallet detection		
Operating distance	[m]	0.3...2 (4)
Position accuracy	[cm]	±1
Detection time	[s]	< 1
Angle of approach	[°]	+12 / -12

Accessories

Housing	Description	Order no.
Mounting accessories		
	Mounting set for O3D	**E3D301**
	Dissipators	**E3D302**
	Double cooling element	**E3D304**
	Heat conductor	**E3D303**
Connection technology		
	Ethernet, cross-over patch cable, 2 m, PVC cable, M12 / RJ45	**E11898**
	Ethernet, jumper cable, 2 m, PVC cable, M12 / M12	**E21138**
	Socket, M12, 2 m black, PUR cable, 8-pole	**E11950**
	Socket, M12, 4-pole 2 m black, PUR cable	**EVC001**
	CAN connection cable, M12 socket, 2 m purple, PUR cable	**E11596**
	CAN connection cable, M12 socket, 5 m purple, PUR cable	**E11597**

Further technical data		
Operating voltage	[V DC]	20.4...28.8
Current consumption	[mA]	< 2400 peak current pulsed; typ. mean value 420
Current rating (per switching output)	[mA]	100
Short-circuit protection, pulsed		•
Overload protection		•
Ambient temperature	[°C]	-10...50
Real chip resolution		25,000 / 100,000
Resulting resolution		176 x 132 pixels
Function display	LED	2 x yellow, 2 x green
Illumination		850 nm, infrared
Immunity to extraneous light	[klx]	8 (up to 100 klx possible with reduced measuring accuracy and repeatability)
Trigger		external; 24 V PNP / NPN according to IEC 61131-2 type 3
Switching inputs		2 (configurable), 24 V PNP / NPN according to IEC 61131-2 type 3
Switching outputs digital		3 (configurable), 24 V PNP / NPN, according to IEC 61131-2
Switching outputs analogue		1 (can be configured as current output 4...20 mA or voltage output 0...10 V)
Parameter setting interface Ethernet		10 Base-T /100 Base-TX
Possible parameter settings		via PC / notebook
Dimensions (H, W, D)	[mm]	72 x 67.1 x 95

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Collision protection for automated guided vehicle systems

3D cameras

3D camera also detects obstacles above the detection zone of conventional safety laser scanners

The system optimises the collision warning based on speed and steering angle

Safe detection even in case of difficult obstacles

Three-dimensional detection in driving direction: 60° x 45°

Unaffected by ambient light
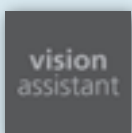
Powerful obstacle recognition

Collisions of automated guided vehicles in indoor areas with protruding or suspended objects and other obstacles must be avoided under all circumstances. For this purpose, ifm offers the ODS (Obstacles Detection System) collision protection system, which consists of a PMD 3D camera and intelligent integrated software. Supplementing the mandatory safety laser scanner, it monitors the manoeuvring range in three dimensions and can even detect obstacles positioned higher up, such as forklift arms, high-speed doors or crane hooks.

Intelligent prediction

The unit features three collision warning levels. Both the speed and the steering angle are taken into account. This prevents unnecessary braking and provides optimum protection during all vehicle manoeuvres.

Interface	Type of sensor	Material Front lens / LED window	Protection rating/ protection class	Angle of aperture [°]	Max. field of view size [m]	Order no.
PMD 3D camera · O3D type · M12 connector · housing material: aluminium **Obstacle detection for collision avoidance**						
Ethernet	PMD 3D ToF chip	Gorilla glass / PA	IP 65, IP 67 / III	60 x 45	3.2 x 4.52	**O3DC02**

Technical data Collision avoidance		
Operating distance	[m]	0.2…2 (4)
Response time	[s]	< 1
Minimum height of objects above ground	[cm]	15
Typ. objects		Boxes, fork arms (lateral), bicycles, AGVs,...

Accessories

Type	Description	Order no.
Mounting accessories		
	Mounting set for O3D	**E3D301**
	Cooling element	**E3D302**
	Double cooling element	**E3D304**
	Heat conductor	**E3D303**
Connection technology		
	Ethernet, cross-over patch cable, 2 m, PVC cable, M12 / RJ45	**E11898**
	Ethernet, jumper cable, 2 m, PVC cable, M12 / M12	**E21138**
	Socket, M12, 2 m black, PUR cable, 8-pole	**E11950**

Further technical data		
Operating voltage	[V DC]	20.4…28.8
Current consumption	[mA]	< 2400 peak current pulsed; typ. mean value 1600
Short-circuit protection, pulsed		•
Overload protection		•
Ambient temperature	[°C]	-10...50
Real chip resolution		25,000 / 100,000
Resulting resolution		176 x 132 pixels
Function display	LED	2 x yellow, 2 x green
Lighting		850 nm, infrared
Immunity to extraneous light	[klx]	8 (up to 100 klx possible with reduced measuring accuracy and repeatability)
Parameter setting interface Ethernet		10 Base-T /100 Base-TX
Parameter setting options		Via PC / notebook
Dimensions (H, W, D)	[mm]	72 x 65 x 95

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Flexible LED strip for illumination and signalling.

Illumination

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

Extremely robust, fully potted design with protection rating IP 68.

Bent or straight installation.

Powerful LEDs for high light yield.

Different length versions available.

Illumination and signalling all-in-one.

LED strips cannot only be used as machine light but also indicate the machine status with different light colours. The LED strips are available in different lengths and flexible in use. They can be quickly and securely fastened with optional aluminium profiles so that even out-of-the way corners are lit up without casting shadows. Their robust design with protection rating IP 68 allows for a wide range of applications.

Enough colour

The LED strips consist of powerful LEDs in the colours 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 with using pulse width modulation control.

Design	Dimensions [mm]	Illuminated area [mm]	Current consumption [mA]	Luminous flux [lm]	Order no.
LED strip RGBW					
	77.5 x 14.2 x 4.5	62.5	100	red: 12.6 / green: 23.6 / blue: 4.6 / white: 35.6	**DV1000**
	265 x 14.2 x 4.5	250	400	red: 25.3 / green: 67.2 / blue: 9.2 / white: 71.3	**DV1001**
	515 x 14.2 x 4.5	500	800	red: 50.6 / green: 94.4 / blue: 18.5 / white: 142.6	**DV1002**
	765 x 14.2 x 4.5	750	1200	red: 75.9 / green: 161.6 / blue: 27.7 / white: 213.9	**DV1003**
	1015 x 14.2 x 4.5	1000	1600	red: 101.2 / green: 188.8 / blue: 37 / white: 285.2	**DV1004**

Accessories

Design	Description	Order no.
Mounting accessories		
	Mounting profile 62.5 mm	**E89030**
	Mounting profile 250 mm	**E89031**
	Mounting profile 500 mm	**E89032**
	Mounting profile 750 mm	**E89033**
	Mounting profile 1000 mm	**E89034**
	Mounting clip	**E70442**
Connection technology		
	Y cable for connection to output modules	**EVC854**

Common technical data		
Operating voltage	[V DC]	21.6...26.4
Nominal voltage	[V DC]	24 (according to SELV / PELV)
Colour temperature	[K]	4,000
Typ. life cycle	[h]	30,000
Input circuit digital inputs	[V PNP]	24
Input current high	[mA]	10
Ambient temperature	[°C]	-20...45
Max. permissible relative humidity	[%]	90
Max. height above sea level	[m]	4,000
Protection		IP 68
Degree of soiling		2

Diagrams and graphs
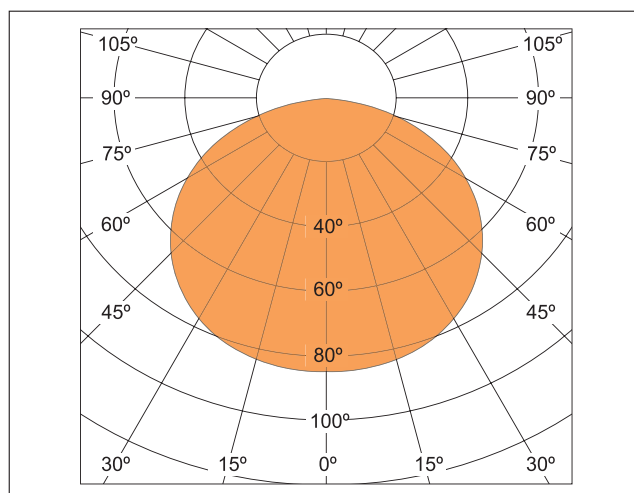
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For further technical details, please visit: ifm.com

Ultra-flat backlight for vision sensors

Bit detection using a backlight

Illumination units

Powerful permanent light for contour and position verification

Longer life through pulse operation

Homogeneous illumination with red or infrared light

Space-saving installation – only 9.8 mm overall height

Three different illuminated area sizes available

Industrially-compatible M12 connector
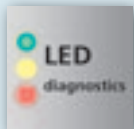
Perfect illumination

These powerful backlights create homogeneous light, ensuring optimal, shadow-free illumination of the objects to be inspected. The outer contours are strongly highlighted by the background illumination and can be optimally analysed by a vision sensor. The sensor verifies contours and positions rapidly and reliably. The backlight can be operated in permanent or pulsed mode. In addition to many other advantages, this especially results in a longer life of the unit.

Ultra-flat design

Due to its extremely flat design with an overall height of only 9.8 mm, ifm's new generation of backlights allows for a very space-saving installation. Optional mounting sets ensure quick and easy fastening.

Type	Active illuminated area [mm]	Current consumption [mA]	Length [mm]	Width [mm]	Height [mm]	Weight [g]	Order no.
Backlight · Light colour red 617 nm							
	25 x 25	< 80	70.5	33.4	9.5	58	**O2D940**
	50 x 50	< 205	105	81	9.8	160	**O2D942**
	100 x 100	< 410	155	133	9.8	347	**O2D944**
Backlight · Light colour infrared 875 nm							
	25 x 25	< 95	70.5	33.4	9.5	58	**O2D941**
	50 x 50	< 325	105	81	9.8	160	**O2D943**
	100 x 100	< 620	155	133	9.8	347	**O2D945**

Type	Description	Order no.
Mounting accessories		
	Mounting set for backlight 25 x 25 mm	**E2D107**
	Mounting set for backlight 50 x 50 mm	**E2D108**
	Mounting set for backlight 100 x 100 mm	**E2D109**
	Connection piece for clamps, stainless steel	**E21076**
	Clamp, stainless steel, Ø 12 mm	**E21110**
	Rod, 150 mm, Ø 12 mm, stainless steel	**E21111**
	Rod, 200 mm, Ø 12 mm, stainless steel	**E21112**
	Rod, 300 mm, Ø 12 mm, stainless steel	**E21113**

Further technical data		
Operating voltage	[V DC]	24
Trigger	[V DC]	5...24
Protection rating, protection class		IP 54, III
Ambient temperature	[°C]	-10...50
Connection		Connection cable 0.3 m, PUR with M12 connector, gold-plated contacts
Housing materials		Anodised aluminium, illuminated area: glass

Homogeneity

In industrial imaging applications, the use of backlights is essential to ensure fast and reliable object recognition. Especially with flat lighting concepts, creating a homogeneous illuminated area poses a challenge.

The new powerful backlights from ifm improve the lighting of application backgrounds. This results in shorter exposure times of industrial cameras and reduces the influence of extraneous light.

Wiring diagram
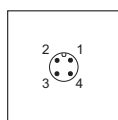
M12 connector
Pin 1: 24 V DC
Pin 2: N.C.
Pin 3: 0 V
Pin 4: on / trigger

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For further technical details please visit: ifm.com

Simply reliable: fail-safe sensors for mobile machines

Fail-safe inductive sensors

Safety sensor enters the safe state, logic "0", as soon as the sensor is damped

Installation costs and time reduced as the target is only required in the end position

Comprehensive self-diagnostics for maintenance-free continuous operation

Designed for use in harsh environments
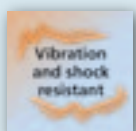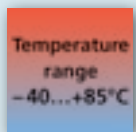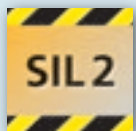
Target activates safe state

The fail-safe sensors switch into the safe state as soon as the target is detected inside the safe switch-off distance. The safety-related function is inverted when compared to the previous fail-safe sensors. This function is ideal in applications such as the protection of crane installations or industrial robots because the targets only need to be mounted at the end positions. Both the number of metallic targets and the installation complexity are considerably reduced.

Perfectly equipped for mobile use

Thanks to the robust design the sensor is perfectly suited for use in mobile machines. Applications on mobile machines such as monitoring whether supports are fully extended or waste bins gripped in the right way. Neither strong vibration nor extreme temperatures and cleaning processes affect the function of the fail-safe sensor in any way.

Design	Housing length [mm]	Installation	Enable zone [mm]	Safe switch-off distance [mm]	Order no.
M12 connector · 4 poles					
M12 x 1	60	non flush	> 6.0	< 3.0	**GF854S**
M18 x 1	60	flush	> 7.5	< 4.0	**GG855S**
M18 x 1	60	non flush	> 11.5	< 6.5	**GG854S**
M30 x 1.5	65	flush	> 14.5	< 8.0	**GI855S**
M30 x 1.5	65	non flush	> 21.5	< 12.0	**GI854S**

Connection technology

Design	Description	Order no.
	Socket, M12, 2 m, PUR cable, halogen-free, black	**EVM001**
	Socket, M12, 5 m, PUR cable, halogen-free, black	**EVM002**
	Socket, M12, 10 m, PUR cable, halogen-free, black	**EVM003**
	Socket, M12, 2 m, PUR cable, halogen-free, black	**EVM004**
	Socket, M12, 5 m, PUR cable, halogen-free, black	**EVM005**
	Socket, M12, 10 m, PUR cable, halogen-free, black	**EVM006**

Dimensions

GF854S

GG855S
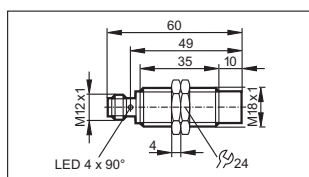
GG854S
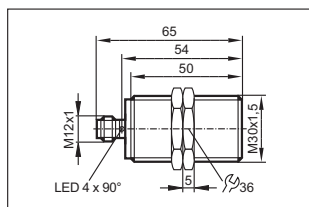
GI855S
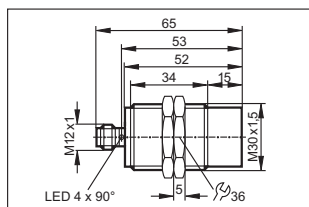
GI854S

Wiring diagram
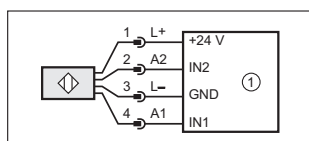
1) safety-related logic unit

Further technical data	
Safety-related function	Safe state when properly damped
Operating mode	Permanent operation
ISO 13849-1	Category 2 PL d
IEC 61508	SIL 2
IEC 62061	SIL 2 cl 2
Applications	Use in mobile and harsh applications
Operating voltage [V DC]	8...32
Protection rating	IP 65, IP 66, IP 67, IP 68, IP 69K
Protection class	III
Electrical design	PNP
Output function	2 x OSSD, CB 24 I / C 1
Switching status indication [LED]	yellow (4 x 90°)
Permanent current rating [mA]	50
Ambient temperature [°C]	-40...85
Materials	Threaded sleeve, fixing nuts: Brass plated with white bronze Sensing face: LCP yellow Connector housing: PEI

Reliable operation without interruptions

The sensor is equipped with sophisticated internal diagnostic functions. Among others, they detect component defects, short circuits or cross faults reliably and disconnect the outputs in case of a fault.

When used as intended, maintenance of the sensor is no longer necessary.

We reserve the right to make technical alterations without prior notice. · 11.2020

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Front flush miniature pressure sensor with G1/4 process connection
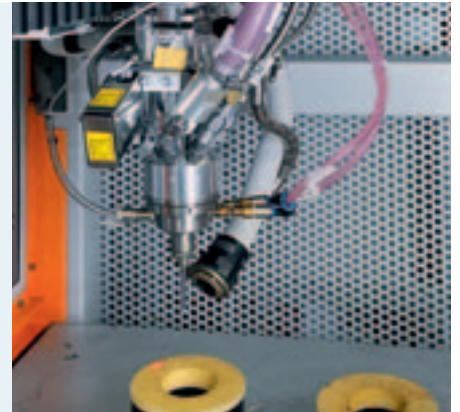
Pressure sensors

Compact design (SW 19)

High measuring accuracy < ± 0.5 %

Precise repeatability < ± 0.05 %

Robust low-cost solution with welded stainless steel housing
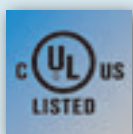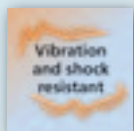
Small and flush-mount

The new miniature pressure sensors of the PL54 series have a flush-mount diaphragm seal with G1/4 thread directly welded to the sensor.
This measuring cell guarantees high accuracy in a very compact housing with only 19 mm across flats. In addition, the sensors feature a particularly cost-optimised price-performance ratio.

Applications

The PL54 sensors are especially used for pressure measurement in applications where flush mounting is required. This is usually the case with adhesives, glues, sealants, foams and other viscous media that would cure in dead spaces. The flush connection prevents clogging of the process connection even with contaminated media.

Accessories

Type	Description	Order no.
Installation		
	Seal FKM	**E30145**
	Seal EPDM	**E30442**
	Welding adapters G1/4	**E30503**
	Welding aid	**E30508**
Connection technology		
	M12 socket, 2 m black, PUR cable	**EVC001**
	M12 socket, 5 m black, PUR cable	**EVC002**
	M12 socket, 2 m black, PUR cable	**EVC004**
	M12 socket, 5 m black, PUR cable	**EVC005**

Dimensions
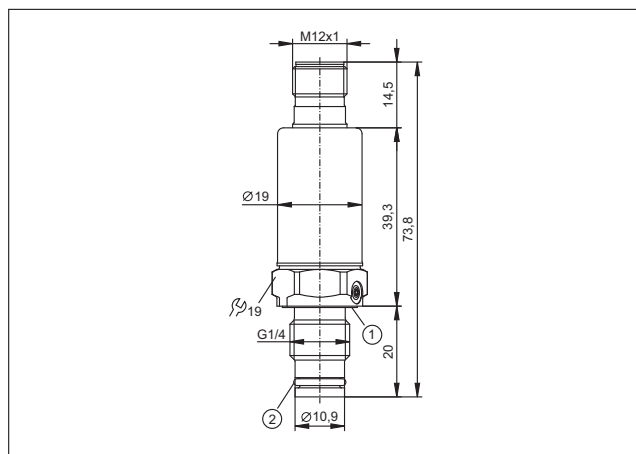
1) Seal

Wiring
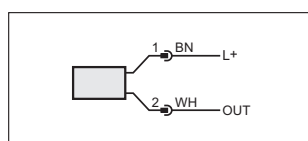
Measuring range relative pressure [bar]	P overload max. (static) [bar]	P bursting min. [bar]	Order no.
Output function 4...20 mA			
0...400	1000	1,700	**PL5400**
0...250	625	1,200	**PL5401**
0...160	400	1,100	**PL5412**
0...100	250	1000	**PL5402**
0...60	150	900	**PL5423**

Common technical data		
Operating voltage	[V DC]	8.5...36
Reverse polarity protection		•
Step response time	[ms]	1
Accuracy / deviations (in % of the span) Linearity error Linearity Hysteresis Repeatability Long-term stability		< ± 0.5 < ± 0.1 (BFSL) / < ± 0.2 (LS) < ± 0.2 < ± 0.05 < ± 0.1
Temperature coefficients (TEMPCO) in the temperature range -40...90°C (in % of the span per 10 K) TEMPCO of zero		< ± 0.1 (-25...90 °C) / < ± 0.2 (-40...-25 °C)
TEMPCO of the span		< ± 0.1 (-25...90 °C) / < ± 0.2 (-40...-25 °C)
Medium temperature	[°C]	-40...90
Protection		IP 67 / IP 69K
Materials (wetted parts)		NBR, high-grade stainless steel (630 / 1.4542)

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For further technical details please visit: ifm.com

With E1 approval: Pressure transmitters for mobile machines

Pressure sensors

Compact design with 19 mm across flats and G 1/4-inch process connection

Fast response time of only 2 milliseconds

Measuring accuracy < ±0.8%, repeatability < ±0.05%

Easy connection via M12 or DEUTSCH connector

Welded stainless steel housing for reliable use in harsh working environments
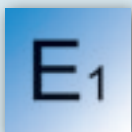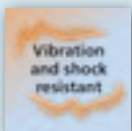
E1 type approval for mobile applications

The PT/PU-type sensors are suited for mobile applications and especially for hydraulic and pneumatic applications with high operating pressure. They offer high vibration and shock resistance, a high degree of protection and very good EMC resistance. They also have the E1 type approval.

High measuring accuracy in compact housing

The thin-film measuring cell of the sensor is directly welded to the process connection and features a high measuring accuracy and short response time. The measurement technology used also enables the extremely compact housing dimensions with a width across flats of only 19 millimetres. This facilitates installation even where space is at a premium.

Accessories

Type	Description	Order no.
Installation		
	Adapter G 1/4 – G 1/2, high-grade stainless steel (1.4571/316Ti)	**E30135**
	Seal FKM	**E30145**
	Seal EPDM	**E30442**
Connection technology		
	Socket, M12, 2 m, PUR cable, halogen-free, black	**EVM001**
	Socket, M12, 5 m, PUR cable, halogen-free, black	**EVM002**
	Socket, M12, 10 m, PUR cable, halogen-free, black	**EVM003**
	Socket, M12, 2 m, PUR cable, halogen-free, black	**EVM004**
	Socket, M12, 5 m, PUR cable, halogen-free, black	**EVM005**
	Socket, M12, 10 m, PUR cable, halogen-free, black	**EVM006**

Dimensions
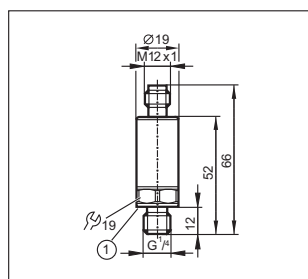
PT5 / PU5
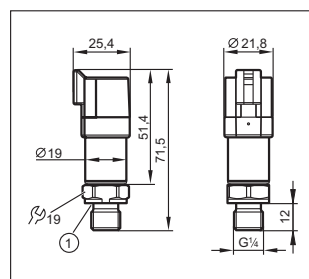
PT7
1) Seal: FKM / DIN 3869

Wiring diagram
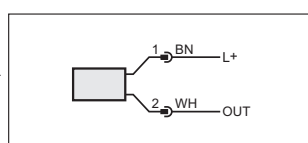
PT5
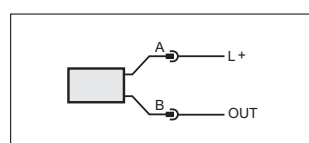
PT7
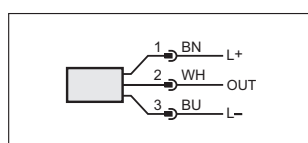
PU5

Measuring range relative pressure [bar]	P_overload max. (static) [bar]	P_bursting min. [bar]	Order no.
Output function 4...20 mA, M12 connector			
0...600	1500	2500	**PT560E**
0...400	1000	1700	**PT500E**
0...250	625	1200	**PT501E**
0...100	250	1000	**PT502E**
0...25	65	600	**PT503E**
0...10	25	300	**PT504E**
Output function 4...20 mA, DEUTSCH connector			
0...600	1500	2500	**PT760E**
0...400	1000	1700	**PT700E**
0...250	625	1200	**PT701E**
0...100	250	1000	**PT702E**
0...25	65	600	**PT703E**
0...10	25	300	**PT704E**
Output function 0.5...4.5 V, M12 connector			
0...600	1500	2500	**PU560E**
0...400	1000	1700	**PU500E**
0...250	625	1200	**PU501E**
0...100	250	1000	**PU502E**
0...60	150	900	**PU523E**
0...25	65	600	**PU503E**
0...10	25	300	**PU504E**

Common technical data		
Operating voltage	[V DC]	8...32
Reverse polarity protection		•
Accuracy / deviation (in % of the span)		
Linearity error		< ± 0.8
Linearity		< ± 0.25 (BFSL)/< ± 0.5 (LS)
Hysteresis		< ± 0.2
Repeatability		< ± 0.05
Long-term stability		< ± 0.1
Temperature coefficient (TEMPCO) in the temperature range -40...125°C (in % of the span per 10 K)		
TEMPCO of zero + span		< ± 0.1 (0...80 °C) < ± 0.2 (-40...0 °C and 80...125 °C)
Medium temperature	[°C]	-40...125
Protection		IP 67 / IP 69K
Materials (wetted parts)		high-grade stainless steel (1.4542) (17-4 PH / 630)
Restrictor		•
EMC		compliant with UN ECE R10 Rev. 5 ISO 11452-2: 100 V/m EN61326-1

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More than hot air: flow sensor ensures safety

Flow sensors / flow meters

Specially developed for fresh and exhaust air monitoring on machines

Special adjustment to air for optimum performance

Robust probe for demanding applications

2-in-1: flow velocity and temperature

Flexible parameter setting, diagnostics and data handling thanks to IO-Link

IO-Link

High-grade stainless steel

IP 65 / IP 67

LED Display
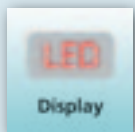
A must for extraction systems on machines

During machining or forming processes, the use of coolants, for example, may generate toxic aerosols, smoke or vapours. Extraction systems ensure that these do not escape from the machine. What is very important is to maintain the ideal flow velocity. If the suction is too weak, the dangerous vapours would not be completely extracted. On the other hand, too strong an extraction flow could suck in chips or cooling lubricant which could clog the filter.

The flow sensor, which operates according to the calorimetric measuring principle, has been developed especially for this purpose. It is distinguished by a robust full-metal probe that is resistant to aggressive aerosols, vapours and any particles carried in the extracted air. This ensures a long service life of the sensor. The integrated temperature measurement reduces costs and installation complexity, as no additional sensor is required.

Type	Measuring range [m/s]	Medium temperature [°C]	Response time [s]	Probe length [mm]	Order no.
Output signal: switching signal; analogue signal; frequency signal; IO-Link; (configurable)					
M18	0.6…30	-20...90	7	45	**SA5020**
Progressive ring	0.6…30	-20...100	7	100	**SA4120**
Progressive ring	0.6…30	-20...100	7	200	**SA4320**

Accessories

Type	Description	Order no.
	USB IO-Link master for parameter setting and analysis of units Supported communication protocols: IO-Link (4.8, 38.4 and 230 kbits/s)	**ZZ1060**
	Progressive ring fitting G 1/2, flat seal	**E40258**
	Progressive ring fitting G 1/4, flat seal	**E40259**
	Progressive ring fitting G 3/4, flat seal	**E40260**
	Progressive ring fitting 1/2 NPT	**E40261**
	Progressive ring fitting 1/4 NPT	**E40262**
	Progressive ring fitting R 1/2	**E40263**
	Progressive ring fitting R 1/4	**E40264**
	Progressive ring fitting for SL mounting adapter	**E40269**
	Progressive ring fitting G 1/2 metal-to-metal seal	**E40267**
	Progressive ring fitting G 3/4 metal-to-metal seal	**E40268**
	Welding adapter for progressive ring	**E40265**
	Mounting clamp for E40269 progressive ring fitting	**E40048**
	Progressive ring fitting for thin-walled pipes	**E43908**

Further technical data		
Operating voltage	[V DC]	18...30
Precision		± (10 % MV + 2 % VMR)
Repeatability		± (3 % MV + 0.6 % VMR)
Protection rating, protection class		IP 65 / IP 67, III
Housing materials		high-grade stainless steel (1.4404/316L); PBT-GF 20; PBT-GF 30
Installation		adjustable to internal pipe diameter; (15...400 mm)
Connection		M12 connector

Wiring diagram
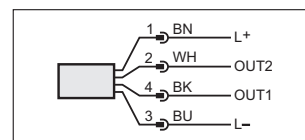
Connection technology

Type	Description	Order no.
	Socket, M12, 2 m black, PUR cable	**EVC001**
	Socket, M12, 5 m black, PUR cable	**EVC002**
	Socket, M12, 2 m black, PUR cable	**EVC004**
	Socket, M12, 5 m black, PUR cable	**EVC005**
	Socket, M12, 2 m orange, PVC cable	**EVT064**
	Socket, M12, 5 m orange, PVC cable	**EVT001**

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Better without a float: maintenance-free capacitive level measurement

Level sensors

Optimised for use in hydraulic oils and coolants

No maintenance necessary, free from mechanical parts

Easy adjustment and setting of the output function via inductive teach button

2 configurable switching outputs defined by media or temperature

Adjustment to different media (e.g. water/oil)

Reliable alternative for float switches

The LI level sensor is perfectly suited for the detection of level or leakage. The capacitive measurement technology has no moving parts, which eliminates mechanical failures due to deposits. This increases machine availability, saving maintenance costs and time.

Plug and play point level sensor with digital communication

The LI comes pre-programmed from the factory for use in water-based applications making installation plug and play. No additional setup is required for simple point level applications.
Additionally, the sensor outputs can be programmed via an inductive teach button or IO-Link digital communication can be used to get both point level and temperature over a single wire.

Accessories

Design	Description	Order no.
Mounting accessories		
	Mounting clamp for level sensors Ø 16 mm	E43000
	Mounting clamp for level sensors Ø 16 mm	E43016
Mounting adapters		
	Mounting adapter, G 3/4, stainless steel	E43003
	Installation adapter for level sensors, D16, stainless steel	E43004
	Flange plate for level sensors, 65-80 mm, anodised aluminium	E43006
	Flange plate for level sensors, 73-90 mm, anodised aluminium	E43001
	Flange plate for level sensors, 100-125 mm, anodised aluminium	E43005
	Mounting adapter for level sensors, D16; nickel-plated brass	E43019
	Flange plate for level sensors, 54-52 x 52 mm, anodised aluminium	E43007
	Mounting adapter for level sensors; 3/4 " NPT, stainless steel	E43012
	Mounting adapter for level sensors; 1 " NPT, stainless steel	E43013
Welding adapter		
	Welding adapter for level sensors Ø 50 mm, stainless steel	E43002
IO-Link accessories		
	USB IO-Link master for parameter setting and analysis of units Supported communication protocols: IO-Link (4.8, 38.4 and 230 Kbits/s)	ZZ1060
	LR DEVICE (supplied on USB flash drive) Software for online and offline parameter setting of IO-Link sensors and actuators	QA0011

Probe length [mm]	Temperature water [°C]	Temperature oil [°C]	Order no.
2 switching outputs, 1 x temperature, 1 x level or 2 x level depending on the damping (e.g. water/oil)			
132	-25...85	-25...85	**LI5131**
273	-25...85	-25...85	**LI5132**
481	-25...85	-25...85	**LI5133**
737	-25...85	-25...85	**LI5134**

Further technical data		
Operating voltage	[V DC]	9,6...35; (IO-Link: 18...30)
Ambient temperature	[°C]	-25...80
Process connection	[mm]	Ø 16
Protection rating, protection class		IP 68; IP 69K, III
Tank pressure	[bar]	0.5

Dimensions

Example LI5131
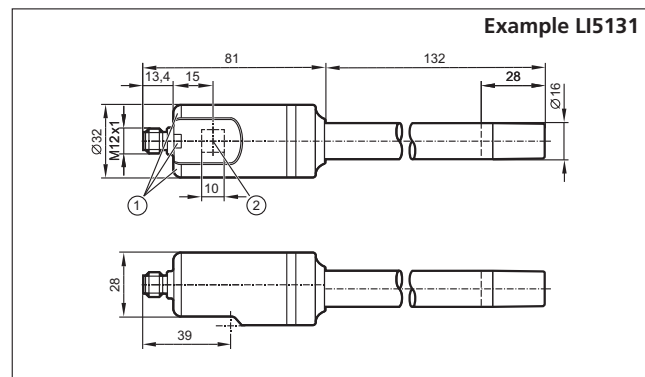
1) LED
2) inductive teach button

Wiring diagram
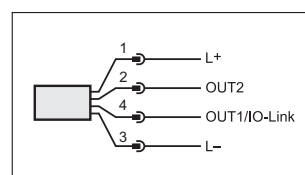
```
1  L+
2  OUT2
4  OUT1/IO-Link
3  L-
```

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Air humidity sensor: ensure the perfect climate for your processes

Analytical sensors

Easy temperature and air humidity monitoring for protection of electrical systems, control cabinets or production processes

Plug & play thanks to screw or DIN rail mounting and M12 connector

Data output via analogue signal or IO-Link

Easy sensor replacement – parameters are set automatically when connected to an IO-Link master

Permanent temperature and humidity control

The air humidity sensor provides transparency and safety for electrical installations and sensitive production processes. Fixtures for wall or DIN rail mounting and a standard M12 connector guarantee quick and error-free installation. Depending on the type, the sensor transmits the temperature and relative humidity to the controller via IO-Link in analogue or digital form.

This makes it possible to protect control cabinets or test benches as well as electrical installations exposed to weather and moist conditions, such as drinks vending machines, radar measuring points or ticket machines, from moisture-related malfunctions or short circuits. In addition, the air humidity sensor can be used for quality assurance of temperature or moisture-sensitive production processes, enabling permanent indoor climate monitoring.

Accessories

Type	Description	Order no.
IO-Link		
	USB IO-Link master for parameter setting and analysis of units Supported communication protocols: IO-Link (4.8, 38.4 and 230 kbits/s)	ZZ1060
	LR DEVICE (supplied on USB flash drive) Software for online and offline parameter setting of IO-Link sensors and actuators	QA0011
Connection technology		
	Socket, M12, 4 poles 5 m, grey, MPPE cable	EVF001
	Socket, M12, 4 poles 2 m, grey, MPPE cable	EVF064
	Socket, M12, 4 poles 5 m, grey, MPPE cable	EVF004
	Socket, M12, 4 poles 2 m, grey, MPPE cable	EVF067
	Socket, M12, 2 m, black, PUR cable	EVC001
	Socket, M12, 5 m, black, PUR cable	EVC002
	Socket, M12, 2 m, black, PUR cable	EVC004
	Socket, M12, 5 m, black, PUR cable	EVC005

Wiring diagram
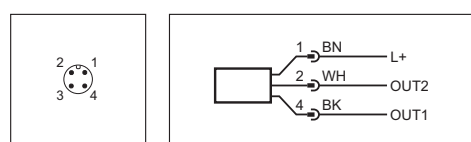
LDH290
OUT1: 4…20 mA (temperature)
OUT2: 4…20 mA (relative humidity)
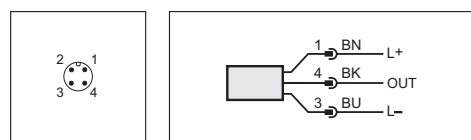
LDH292
OUT: IO-Link

Technical data

Description 2 x 4...20 mA		Order no. LDH290
Operating voltage	[V DC]	12...30
Temperature measuring range	[°C]	-40...60
Temperature application range	[°C]	-40...70
Max. power consumption	[W]	1.8

Description IO-Link		Order no. LDH292
Operating voltage	[V DC]	18...30
Temperature measuring range	[°C]	-40...80
Temperature application range	[°C]	-40...80
Max. power consumption	[W]	0.3

Common technical data	
Protection rating, protection class	IP 20, III
Fastening - DIN rail	35 mm DIN rail
Fastening - screws	M5
Connection	M12 connector
Dimensions (H x W x D) [mm]	140 x 40 x 38

Dimensions
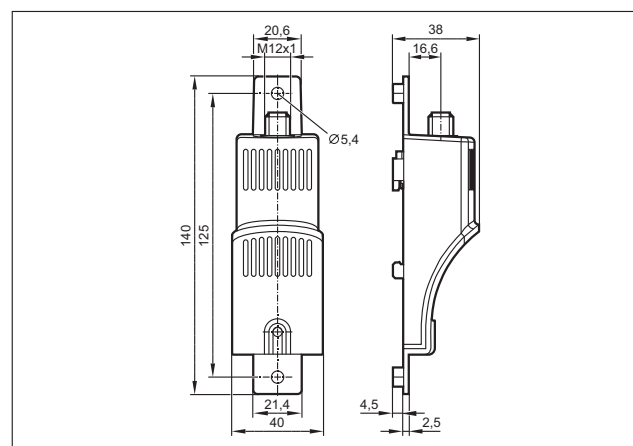
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TOP PRODUCT

Conductivity sensor for clamp and hygienic pipe fittings
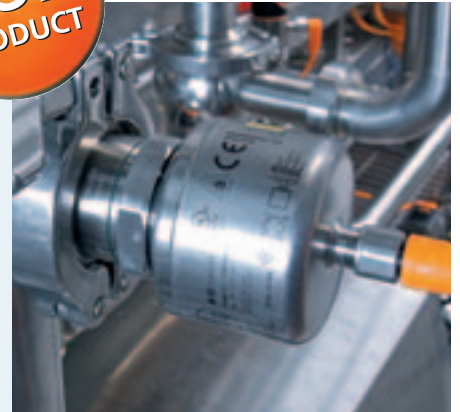
Analytical sensors

Solid tip prevents breakage

Reduce inaccuracies associated with a time-based cleaning process

Flexible process adjustments increase system efficiency

Easily adapted to new recipes and media

Loss-free digital transmission of measured values
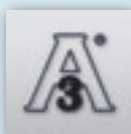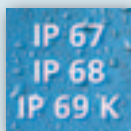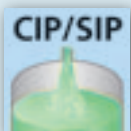
Applications

The sensors are used in cleaning processes (CIP) in the food industry. They detect the concentration of cleaning agents, check the rinsing water for residues and are used for product validation.

Potential

Precise, fast and reliable measurements during the process help to improve plant availability and optimise cleaning cycles. A reduced amount of cleaning agents, lower energy consumption during rinsing and lower water consumption result in considerable cost savings. In addition, the machine uptime is increased.

Stability

The solid tip design guarantees stability even if the sensor is exposed to increased stress.

Accessories

Type	Description	Order no.
Welding adapter		
	D60 – G 1 external thread Aseptoflex Vario with leakage port	**E30149**
	D60 – G 1 external thread Aseptoflex Vario	**E30150**
	D50 – G 1 external thread Aseptoflex Vario	**E30122**
	D50 – G 1 external thread Aseptoflex Vario with leakage port	**E30130**
	D38 – G 1 external thread Aseptoflex Vario with leakage port	**E30500**
	G 1 welding mandrel	**E30435**
Process adapters clamp and hygienic pipe fittings		
	Clamp – G 1 Aseptoflex Vario DN50 with leakage port	**E33309**
	Tri-clamp – G 1 Aseptoflex Vario 2" with leakage port	**E33209**
	Tri-clamp – G 1 Aseptoflex Vario 2"	**E33202**
	Tri-clamp – G 1 Aseptoflex Vario 1.5" with leakage port	**E33208**
	Tri-clamp – G 1 Aseptoflex Vario 1 – 1.5" with leakage port	**E33201**
	Hygienic pipe fitting – G 1 Aseptoflex Vario 1.5"	**E33212**
	Hygienic pipe fitting – G 1 Aseptoflex Vario 2"	**E33213**
	Hygienic pipe fitting – G 1 Aseptoflex Vario 1.25"	**E33211**
	Pipe fitting – G 1 Aseptoflex Vario DN33,7 Series B with leakage port	**E33304**
	Pipe fitting – G 1 Aseptoflex Vario DN40 with leakage port	**E33302**
	Clamp connection with notch – G 1 Aseptoflex Vario DN40 with leakage port	**E33308**

Process connection	Installation depth [mm]	Order no.
Application: version with long tip, installation in screwed socket connections		
G 1 Aseptoflex Vario	77	**LDL201**

Further technical data		
Operating voltage	[V DC]	18...30
Current consumption	[mA]	< 70
Measuring range conductivity	[µS/cm]	100...1000000
Measuring range medium temperature	[°C]	-25...100; (< 1 h: 150)
Pressure rating	[bar]	16
Conductivity accuracy		2 % MW ± 25 µS/cm
Conductivity repeatability		1 % MW ± 25 µS/cm
Materials		Stainless steel (1.4404 / 316L); PEEK; PEI; FKM

Accessories

Type	Description	Order no.
IO-Link		
	USB IO-Link master for parameter setting and analysis of units Supported communication protocols: IO-Link (4.8, 38.4 and 230 kbits/s)	**ZZ1060**
	LR DEVICE (supplied on USB flash drive) Software for online and offline parameter setting of IO-Link sensors and actuators	**QA0011**
Connection technology		
	Socket, M12, 4 poles 5 m, grey, MPPE cable	**EVF001**
	Socket, M12, 4 poles 2 m, grey, MPPE cable	**EVF064**
	Socket, M12, 4 poles 5 m, grey, MPPE cable	**EVF004**
	Socket, M12, 4 poles 2 m, grey, MPPE cable	**EVF067**

Advantages of LDL at a glance:

Much shorter commissioning time
– No need for additional evaluation electronics
– Simple wiring using M12 connector

Robust and compact design
– The fully welded stainless steel housing prevents water ingress
– Tip made of solid material prevents breakage under high load

Attractive offer
– High availability and fast delivery times
– Flexible adapter concept reduces / simplifies warehousing

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For AS-i and IO-Link: passive power distributor for hygienic areas

AS-i interface I/O modules, field modules for wet areas

Robust field module supplies up to 8 IO-Link masters or AS-i participants

Housing material meets the hygiene requirements for food production

Voltage supply via standard M12 supply cables, A-coded

Overcurrent detection for each port
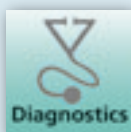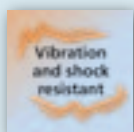
Two options

The passive power distributor can be operated either in AS-i networks or in IO-Link structures. This helps to minimise stock-holding, especially where both technologies are used. Up to 8 participants, either intelligent AS-i sensors or actuators or IO-Link masters, can be connected via standard M12 sockets.

Robust design for demanding applications

The special housing material and the high ingress protection allow operation in areas with frequent intensive cleaning processes, for example in the food industry. The module signals an excessive current flow per port via a red LED. Malfunctions or damage to infrastructure, actuators or even the plant can thus be avoided.

Advantages and customer benefits

• AS-i or IO-Link power distributor

These power distributors can be used in hygienic applications due to the materials used and their innovative housing design.

The 4-way or 8-way power distributors can either be used to supply up to 8 AS-i participants, e.g. valve heads, quarter-turn sensors, motor controls etc., or to supply power to IO-Link masters.

Overcurrent detection indicates by a red-flashing LED at the respective M12 connection that more than the permitted 4.4 A per channel are being drawn.

Technical data

AS-i or IO-Link power distributor		
AC2950 (4-way), AC2951 (8-way)		
AS-i operation		
Operating voltage	[V DC]	18...31.6; (AS-i)
Additional voltage supply	[V DC]	15...30; (AUX)
IO-Link operation		
Operating voltage	[V DC]	20 … 30 US
Additional voltage supply	[V DC]	20 … 30 UA
Total current rating	[A]	8; (AS-i 4; AUX: 4; US:4; UA:4)
Overcurrent detection		yes (per channel)
Ambient temperature	[°C]	-25...60
Storage temperature	[°C]	-25...85
Protection rating		IP 65, IP 66, IP 67, IP 69K
Housing materials		polyamide; socket stainless steel
M12 plugs / sockets		A-coded
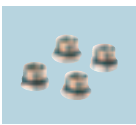
Accessories

Design	Description	Order no.
	M12 protective caps, 4 pcs, high-grade stainless steel	**E12542**
	AS-Interface FC insulation displacement connector, stainless steel (1.4404 / 316L)	**E70354**

Connection technology

Design	Description	Order no.
M12 1mm²		
	0.25 m	**EVF490**
	0.5 m	**EVF491**
	1 m	**EVF492**
	2 m	**EVF493**
	5 m	**EVF494**

Dimensions

AC2950

AC2951

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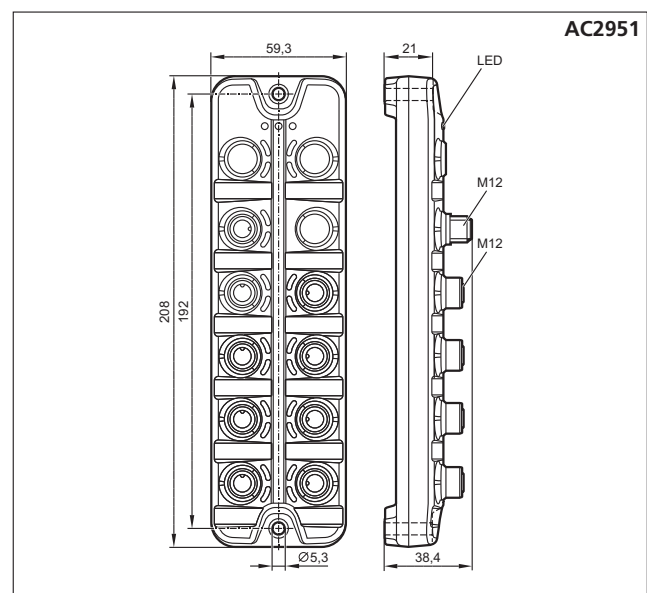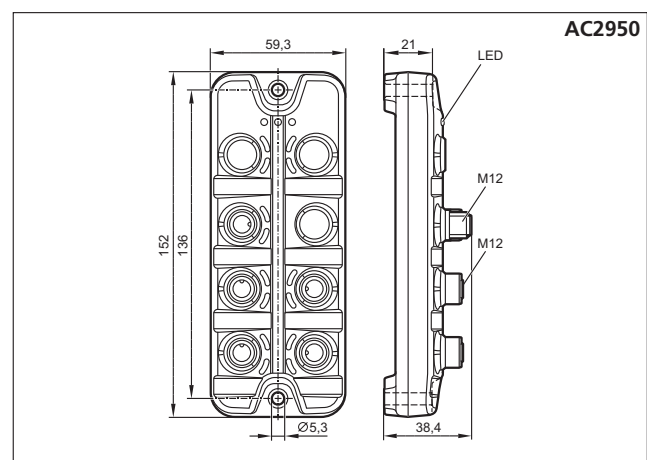
Robust data distribution: Ethernet switches for field applications

Industrial Ethernet switches (unmanaged)

6-port Ethernet switch compatible with all common automation protocols and IIoT applications

Flexible voltage supply with or without daisy chain

Suited for mobile machines thanks to increased operating voltage and temperature range

Robust housings, food-grade option available

Ethernet switches for field applications

The decentralised modules serve as network nodes between the participants in the field. They are connected directly via robust and reliable M12 connection cables. The use of EVC connection cables with ecolink technology ensures a particularly robust connection and thus reliable data transfer. The M12 connector ensures a much more secure connection than an RJ-45 connector - especially outside the control cabinet.

Robust proven materials

The Ethernet modules are the perfect choice, even in the most difficult environments: The materials and production methods are identical to the EVC jumper cables.

Products

Design	Description	Order no.	
		Coolant	**Food**
Ethernet 6-port switches (unmanaged)			
	StandardLine IIoT (TCP/IP), EtherNet/IP, Modbus TCP	**AL3050**	**AL3051**
	StandardLine PROFINET CC-A	**AL3000**	**AL3001**
	PerformanceLine IIoT (TCP/IP), EtherNet/IP, Modbus TCP	**AL3150**	**AL3151**
	PerformanceLine PROFINET CC-A	**AL3100**	**AL3101**

Advantages and customer benefits

- **Expansion of the IO-Link master family**

  The Ethernet switches are the perfect addition to ifm's IO-Link master family. They feature the same design, port configuration and standardised M12 connections.
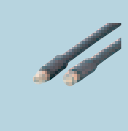
- **Also suited for mobile machines**

  With their increased operating temperature and voltage range as well as high vibration and shock resistance, the switches are also suited for harsh environments. In addition, the E20 approval means that the product is also suited for use outside vehicles.

- **Simple voltage supply**

  The Ethernet modules offer different connection options for the voltage supply: an A-coded M12 connector and an L-coded M12 connector. The latter can be daisy-chained to other modules of the product family.

Connection technology

Design	Description	Order no.	
		Coolant	**Food**
Ethernet cable		**RJ45 - M12**	
	0.5 m	**EVC924**	**EVF549**
	2 m	**EVC926**	**EVF551**
	5 m	**EVC927**	**EVF552**
	10 m	**EVC928**	**EVF553**
Ethernet cable		**M12 - M12**	
	0.5 m	**EVC904**	**EVF429**
	2 m	**EVC906**	**EVF531**
	5 m	**EVC907**	**EVF532**
	10 m	**EVC908**	**EVF533**
	20 m	**EVC909**	**EVF534**
Socket, A-coded (power)		**M12 - open**	
	2 m; 1 mm²	**EVC706**	**EVF480**
	5 m; 1 mm²	**EVC707**	**EVF481**
	10 m; 1 mm²	**EVC708**	**EVF482**
		–	**–**
Socket, L-coded (power)		**M12 - open**	
	2 m; 2.5 mm²	**E12641**	**–**
	5 m; 2.5 mm²	**E12642**	**–**
	10 m; 2.5 mm²	**E12643**	**–**
		–	**–**
Connection cable, L-coded (power)		**M12 - M12**	
	2 m; 2.5 mm²	**E12654**	**–**
	5 m; 2.5 mm²	**E12655**	**–**
	10 m; 2.5 mm²	**E12656**	**–**
		–	**–**

Further technical data

Unmanaged Ethernet switches		AL3050 IIoT / AL3000 PROFINET CC-A	AL3051 IIoT / AL3001 PROFINET CC-A	AL3150 IIoT / AL3100 PROFINET CC-A	AL3151 IIoT / AL3101 PROFINET CC-A
		StandardLine		**PerformanceLine**	
Operating voltage	[V DC]	8...32 (US; to SELV / PELV)			
Current consumption	[mA]	100 (US)			
Interface		Ethernet			
Number of ports		6			
Transmission standard		10Base-T (IEEE 802.3i); 100Base-TX (802.3u)			
Transmission rate	[MBits/s]	10; 100			
Ambient temperature	[°C]	-25...70			
Daisy chain voltage supply		no		yes	
Voltage supply connection		M12 A-coded		M12 L-coded	
Protection rating		IP 65, IP 66, IP 67	IP 65, IP 66, IP 67, IP 69K	IP 65, IP 66, IP 67	IP 65, IP 66, IP 67, IP 69K
Housing material		polyamide; socket: nickel-plated brass	polyamide; socket: stainless steel	polyamide; socket: nickel-plated brass	polyamide; socket: stainless steel

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IO-Link master: Connection of sensors to the PLC and to the IT world

IO-Link master
DataLine Coolant / Food

Industry 4.0 ready via new IoT core

Separation between automation and IT network

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

PROFINET, EtherNet/IP, EtherCat, Modbus TCP, TCP/IP JSON or Powerlink

Master and device configurable via the LR DEVICE software

IO-Link master for the automation and IT world

The decentralised IO-Link master modules serve as a gateway between intelligent IO-Link sensors and the field bus. Besides, important information of the intelligent sensors can simultaneously be sent into the IT world. With a separate IoT Ethernet socket the IT network can be set up completely separated from the automation network. Sensor information is transferred into the IT world via the established TCP/IP JSON interface.

Robust field bus modules for demanding applications

Thanks to their special housing materials and high ingress resistance (IP 67 or IP 69K), they can be used in coolant applications or directly in wet areas in the food industry. The ecolink technology guarantees reliable, permanently ingress-resistant M12 connections of the connection cables.

Advantages and customer benefits

- **Separation between automation and IT network**

  Machine uptime is of highest priority. The automation network must by no means be interrupted by external factors. Therefore the unit features a separate IoT Ethernet socket separating IT and automation network. This means that important sensor information can be safely sent to the IT and ERP system.

- **Sensor configuration with LR DEVICE**

  The intuitive software finds all IO-Link masters in the network and creates an overview of the whole plant. In addition, all connected sensors are displayed with the respective parameters. This makes it possible to set the parameters of all sensors in the system from one central point.

- **Easy sensor connection**

  The sensors and actuators are connected via standard M12 connection cables without screening. Depending on the device type, up to 4 or 8 IO-Link sensors can be connected and supplied with up to 3.6 A.
  With the EVC693 or EVF693 accessories, additional auxiliary power for the connection of IO-Link actuators can be supplied. The cable can be up to 20 m long.

Connection technology

Type	Description	Order no.	
		Coolant	**Food**
Ethernet cable (fieldbus)			
	0.5 m	**E12490**	**EVF530**
	2 m	**E12090**	**EVF531**
	5 m	**E12491**	**EVF532**
	10 m	**E12492**	**EVF533**
M12 socket 1 mm² (power)			
	2 m	**EVC706**	**EVF480**
	5 m	**EVC707**	**EVF481**
	10 m	**EVC708**	**EVF482**
	20 m	**EVC709**	**EVF483**
M12 jumper cable 0.34 mm² (sensor)			
	1 m	**EVC042**	**EVF042**
	2 m	**EVC043**	**EVF043**
	5 m	**EVC044**	**EVF044**
	10 m	**EVC493**	**EVF045**
Y splitter (adapter A port / B port)			
	1 m	**EVC693**	**EVF693**
	2 m	**EVC694**	**EVF694**
	5 m	**EVC695**	**EVF695**
	10 m	**EVC696**	**EVF696**

The products

Type	Description	Order no.	
		Coolant	**Food**
IO-Link master DataLine			
	PROFINET + IoT 4 Port	**AL1300**	**AL1301**
	EtherNet/IP + IoT 4 Port	**AL1320**	**AL1321**
	EtherCat + IoT 4 Port	**AL1330**	**AL1331**
	Modbus TCP + IoT 4 Port	**AL1340**	**AL1341**
	IoT only 4 Port	**AL1350**	**AL1351**
	Powerlink + IoT 4 Port	**AL1370**	**AL1371**
	PROFINET + IoT 8 Port	**AL1302**	**AL1303**
	EtherNet/IP + IoT 8 Port	**AL1322**	**AL1323**
	EtherCat + IoT 8 Port	**AL1332**	**AL1333**
	Modbus TCP + IoT 8 Port	**AL1342**	**AL1343**
	IoT only 8 Port	**AL1352**	**AL1353**
	Powerlink + IoT 8 Port	**AL1372**	**AL1373**

Technical data

IO-Link master DataLine Coolant / Food	Order no.			
	AL1300 AL1320 AL1330 AL1340 AL1350 AL1370	**AL1302 AL1322 AL1332 AL1342 AL1352 AL1372**	**AL1301 AL1321 AL1331 AL1341 AL1351 AL1371**	**AL1303 AL1323 AL1333 AL1343 AL1353 AL1373**
Operating voltage	20...30 V DC			
Total current consumption	≤ 3.9 A			
IO-Link version	1.1			
Number of IO-Link ports	4 A ports	8 A ports	4 A ports	8 A ports
Number of binary inputs	4 + 4	8 + 8	4 + 4	8 + 8
Number of binary outputs	4	8	4	8
Parameter memory	●			
Current for all A ports	≤ 3.6 A (device supply)			
Protection	IP 65, IP 67		IP 65, IP 67, IP 69K	
Ambient temperature	-25...60 °C			
Housing materials / socket	Polyamide / brass nickel-plated		Polyamide / stainless steel	

Accessories

Type	Description	Order no.
	LR DEVICE (supplied on USB flash drive) Software for online and offline parameter setting of IO-Link sensors and actuators	**QA0011**
	Coolant, protective caps M12, (10 pcs)	**E73004**

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IO-Link master for intelligent sensors in the control cabinet
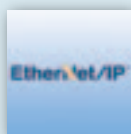
IO-Link masters CabinetLine

Separation between automation and IT network

Industry 4.0 ready via new IoT core

8 IO-Link ports with full V1.1 functionality

PROFINET, EthernNet/IP, EtherCat, Modbus TCP, TCP/IP JSON or Powerlink

Master and device configurable via the LR DEVICE software

IO-Link master for the automation and IT world

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

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

Advantages and customer benefits

- **Separation between automation and IT network**

  Machine uptime is of highest priority. The automation network must by no means be interrupted by external factors. Therefore the unit features a separate IoT Ethernet socket separating IT and automation network. This means that important sensor information can be safely sent to the IT and ERP systems.

- **Sensor configuration with LR DEVICE**

  The intuitive software finds all IO-Link masters in the network and creates an overview of the whole plant. In addition, all connected sensors are displayed with the respective parameters. This makes it possible to set the parameters of all sensors in the system from one central point.

- **Easy sensor connection**

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

- **Reliable digital data**

  The sensor data is transferred digitally.
  Unlike analogue signals, contact resistance and EMC interference cannot corrupt the signals.

Dimensions
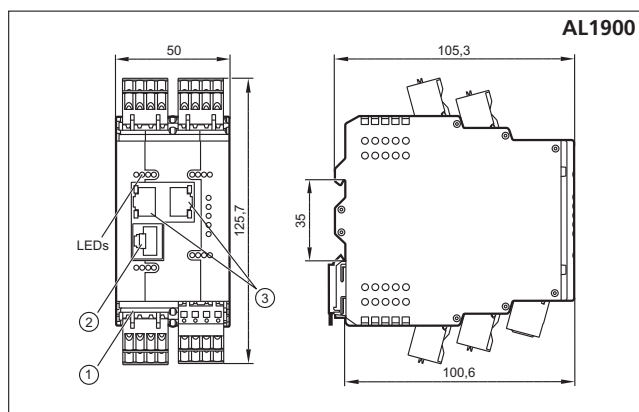
AL1900

1) Combicon connector
2) IoT-Port
3) Profinet IO data interface

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The products

Type	Description	Order no.
IO-Link master CabinetLine		
	PROFINET + IoT 8-port	**AL1900**
	EtherNet/IP + IoT 8-port	**AL1920**
	EtherCat + IoT 8-port	**AL1930**
	Modbus TCP + IoT 8-port	**AL1940**
	Powerlink + IoT 8 Port	**AL1970**
	IoT only 8-port	**AL1950**

Technical data

IO-Link master CabinetLine AL1900, AL1920, AL1930, AL1940, AL1970		
Operating voltage	[V DC]	20...30
Total current consumption	[A]	≤ 3.9
IO-Link version		1.1
Number of IO-Link ports		8 A ports
Number of binary inputs		8 + 8
Number of binary inputs		8
Parameter memory		•
Current for all ports (device supply)	[A]	≤ 3.6
Protection		IP 20
Electrical connections		COMBICON connector
Installation		DIN rail
Ambient temperature	[°C]	-25...65
Dimensions	[mm]	114.2 x 50 x 105.3

Accessories

Type	Description	Order no.
	LR DEVICE (supplied on USB flash drive) Software for online and offline parameter setting of IO-Link sensors and actuators	**QA0011**
	Ethernet adapter M12 / RJ45	**E21140**

Connection technology

Type	Description	Order no.
M12 socket		
	1 m black, PUR cable	**EVC471**
	2 m black, PUR cable	**EVC001**
	5 m black, PUR cable	**EVC002**
	10 m black, PUR cable	**EVC003**
	20 m black, PUR cable	**EVC083**

For further technical details please visit: ifm.com

Connect IO-Link to a PC via USB
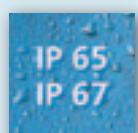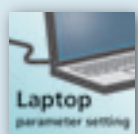
USB IO-Link master

For connecting IO-Link sensors to a PC via USB

For quick parameter setting and easy reading of IO-Link sensors

Does not require a separate power supply

Industrially compatible, robust M12 connectors

Complete set with sensor cable, USB cable and parameter setting software

IO-Link for the PC

The AL1060 interface is a 1-port IO-Link master that acts as a gateway, establishing a connection between the IO-Link communication and a PC (via USB interface).

This allows users to conveniently configure sensors with IO-Link capability on a PC with the corresponding software prior to installation in the plant. This considerably reduces the set-up time and minimises setting faults.

For most sensors, no separate power supply is required. This makes it particularly easy to connect sensors installed in the plant to a laptop, e.g. to read out process values or adjust sensor parameters on site.

Advantages and customer benefits

• No power supply required

The AL1060 interface has a powerful integrated voltage converter, which generates a 24 V sensor voltage from the 5 V USB voltage at the IO-Link port. Depending on the computer, this output can be loaded with up to 150 mA. This is sufficient to operate most sensors. If higher currents are required at the sensor output, a separate power supply can be connected.

• Robust, field-compatible connections

The three connections on the device – IO-Link, USB and optional supply voltage – are designed as robust and field-compatible M12 connections. This means that the interface can even be used in harsh environments.

• Status LEDs

Several status LEDs on the unit provide the user with a status overview and facilitate error localisation. For example, if the USB power supply is insufficient for a sensor, this is indicated by an LED.

• Scope of supply

In addition to the AL1060 IO-Link master, the set includes all connection cables required for operation (M12 B-coded for USB, M12 A-coded for sensor) as well as the LR DEVICE parameter setting software.

A wide-range power supply unit with different adapter plates for worldwide use is available as an option.

Products

Type	Description	Order no.
Included in the set		**ZZ1060**
	IO-Link master USB 1 port	**AL1060**
	Connection cable M12 / M12, 1 m, PUR cable	**EVC012**
	Connection cable M12 socket, B-coded / USB plug	**E12689**
	LR DEVICE (USB stick), IO-Link parameter setting software	**QA0011**
Optional accessories		
	Plug-in power supply with interchangeable adapter, 230V/24V, worldwide	**E80121**
	Plug-in power supply with interchangeable adapter, 230V/24V, Germany	**E80120**

Technical data

IO-Link master USB 1 port AL1060		
Sensor supply	[V DC]	24
Sensor supply - AUX Current consumption	[mA]	< 650
Sensor supply - USB Current consumption	[mA]	< 150
IO-Link version		1.1
USB version		2.0
Number of IO-Link A-ports		1
Number of binary inputs		2
Number of binary inputs		2
Protection rating		IP 65, IP 67

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Safety over IO-Link

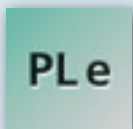**PROFIsafe IO-Link module**

Safety module for IO-Link

8 safe OSSD inputs

4 powerful outputs with separate 24 V supply

PROFIsafe telegram tunnelled via IO-Link

Safety to SIL 3 and PLe

IO-Link for safety-related applications

Thanks to the transmission protocol "PROFIsafe", standard safety sensors and actuators can be operated via IO-Link.
All you need is the PROFIsafe IO-Link module. It features 8 safe digital inputs (OSSD) and 4 safe outputs. The innovation: On the hardware side, the module is simply connected to a normal IO-Link master via IO-Link. The special PROFIsafe transmission telegram ensures a "tunneled" connection with the safety controller within the normal IO-Link communication.
It fulfils the safety levels SIL 3 to IEC 61508 / EN 61508 and PLe to EN ISO 13849-1.

Powerful safe outputs

A separate 24 V supply via L-coded M12 sockets enables connection of powerful actuators. The outputs can be configured as PNP or NPN.
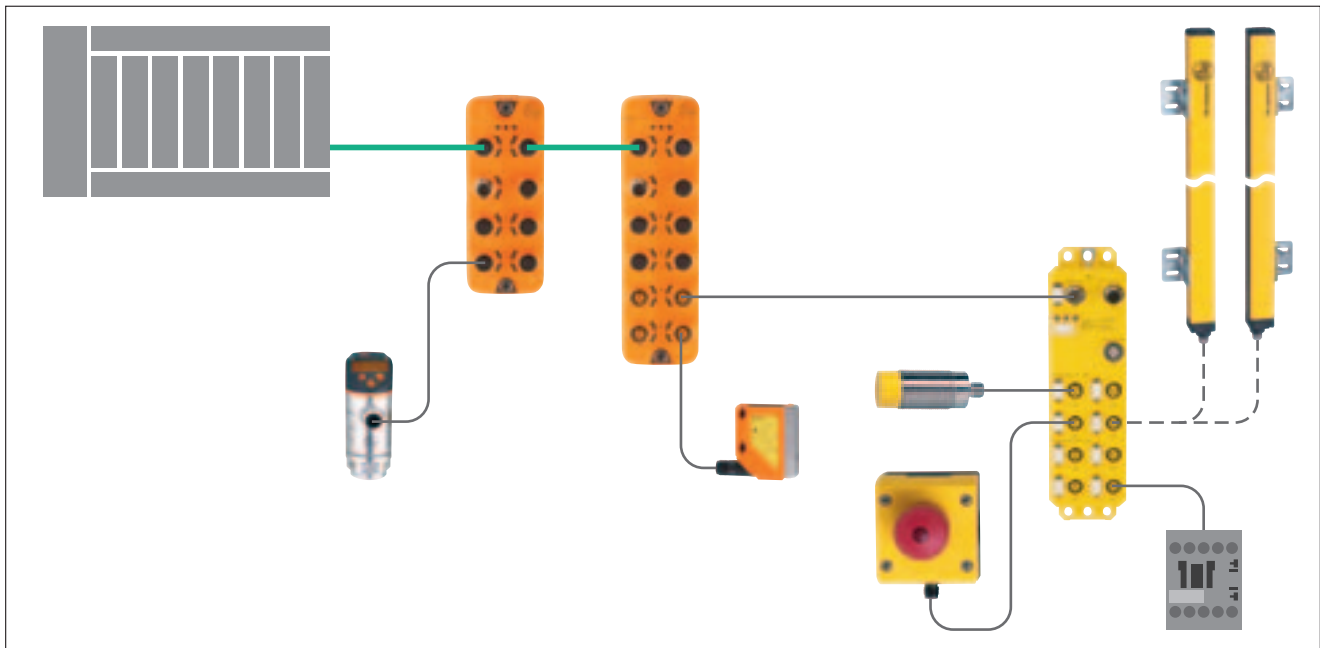
Accessories

Type	Description	Order no.
IO-Link master PerformanceLine Coolant		
	Profinet, 4-port	**AL1400**
	Profinet, 8-port	**AL1402**
Accessories for AL200S		
	PROFIsafe address plug	**E7700S**

M12 socket, connection cable 2.5 mm² , L-coded (power)	M12 - open	M12 - M12
1 m	–	**E12653**
2 m	**E12641**	**E12654**
5 m	**E12642**	**E12655**
10 m	**E12643**	**E12656**

M12 connection cable 0.34 mm² (sensor)		
1 m	–	**EVC042**
2 m	–	**EVC043**
5 m	–	**EVC044**
10 m	–	**EVC493**

Wirable		
M12 connector L-coded (power)	–	**E12673**
M12 socket L-coded (power)	–	**E12672**

On the hardware side, the PROFIsafe IO-Link module is connected to an A or B port of an AL1400 or AL1402 IO-Link master.
The safety module is powered via a separate L-coded M12 cable.
The "PROFIsafe" transmission protocol ensures tunnelled safety communication with the safety controller.

Easy replacement of units through address plug

The PROFIsafe address plug E7700S enables simple and fast replacement of the AL200S without a computer and without additional software. This memory plug is simply plugged into the new AL200S and the stored PROFIsafe address is automatically transferred to the new PROFIsafe IO-Link module.

Technical data PROFIsafe IO-Link module		Order no. AL200S
Operating voltage	[V DC]	19.2...30.2; (US; to SELV/PELV)
Additional voltage supply	[V DC]	19.2...30.2; (UA)
Actuator supply UA Total current rating	[A]	6
Current rating per port	[A]	2
IO-Link version		1.1
IO-Link transmission type		COM3
Number of inputs / outputs		8 / 4
Safety classification 1-channel (ISO 13849-1)		PL d
1-channel (IEC 61508)		SIL 2
2-channel (ISO 13849-1)		PL e
2-channel (IEC 61508)		SIL 3
Protection rating		IP 65, IP 67
Ambient temperature	[°C]	-25...60

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TOP PRODUCT

io-key – the key to the industrial IoT
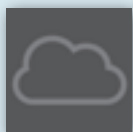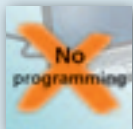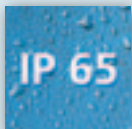
IO-Link accessories

Pre-configured, no SIM card required

Web-based dashboard for visualisation and analysis of cloud data

Email or text message when limit values are exceeded

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

Two IO-Link sensors can be connected

IP 65

No programming

GSM

IO-Link

Cloud connection for all IO-Link sensors

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

Alarms are sent as a text message or email

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

Export

The data from all sensors can be summarised and exported automatically as a report at any time.

Accessories

Type	Description	Order no.
	Plug-in power supply, 90...264 V AC / 24 V DC	E80120
	Plug-in power supply with interchangeable adapter, 100...240 V AC / 24 V DC	E80121
	Level sensor 0.1 m cable, M12 connector, 5 pins	KQ1001
	Vibration diagnostics sensor for industrial machines	VVB001
	Signal converter for PT100/PT1000 temperature sensors to IO-Link	TP9237
	Smart valve sensor M12 connector	MVQ101
	IO-Link input module, 6 x 2 inputs; M12 connector; IP 67	AL2340
	Thermal compressed air meter, G 1/4 0.05...15 Nm³/h	SD5500
	Evaluation system and display for analogue signals	DP2200

Connection technology

	Connection cable, M12, 1 m, black, PUR cable	EVC042
	Connection cable, M12, 2 m, black, PUR cable	EVC043
	Y connection cable, M12, 0,3 m, black, PUR cable	EVC614

Products

Description	Order no.	
io-key version	**Europe**	**global**
io-key, IIoT gateway for 2 IO-Link sensors	AIK001	AIK050
Transmission interval XS 1 x per day	AIS910	AIS950
Transmission interval S 1 x per hour	AIS911	AIS951
Transmission interval M 1 x per minute	AIS912	AIS952
Transmission interval L every 10 seconds	AIS913	AIS953
Edge alarm function (up to 1000 alarms/month)	AIS990	
SMS notification (up to 10 SMS)	AIS991	

From sensor to IIoT

Sensor information can be collected directly and sent to the cloud without requiring any connection to a controller, PC or company network.

Apart from voltage supply and GSM network availability, the io-key requires no infrastructure.

ifm offers two versions of the io-key with different radio modules and data tariffs for European and global mobile networks.

As all ifm products, the io-key is a sturdy unit and has a high protection rating of IP 65. Hence, it can be used in harsh industrial environments.

Application examples

The io-key is suited for all applications that do not primarily require permanent transmission of measured values in real-time.

The io-key can even be used to monitor and evaluate remote parts of the plant that are not connected to the company infrastructure.

For example:

– Tank monitoring using a capacitive continuous level sensor type KQ10xx

– Measurement of compressed air consumption and leakage monitoring using an compressed air meter type SDxxxx

– Fan monitoring using a vibration diagnostics sensor type VVBxxx

– Valve monitoring using a valve sensor type MVQxxx

ifm – close to you!

No compromises: robust UHF evaluation system for harsh environments.

RFID UHF

Antenna, evaluation unit and switch, all in one device, reduces installation time.

Reads up to 16 tags at a distance of up to 3 meters.

Installation in metallic or wet environments is possible.

Fieldbus interface and digital inputs and outputs, minimise field wiring.

IP 67

IO-Link

EtherNet/IP

PROFINET

TCP/IP

LED diagnostics
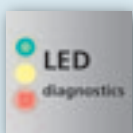
So compact, so flexible

The new RFID UHF evaluation systems convince with their compact design and the maximum flexibility they offer. Complete with antenna, evaluation unit and switch, the hardware provides everything required for a quick and easy installation. What is more, the optimised operating principle of the system allows direct installation in metallic or wet environments – without any loss of performance.

Transferring data over the network, controlling actuators directly

At maximum performance level, the antenna can detect up to 16 rapidly moving tags, at a distance of up to 3 m. The tag reading can be refined further via selective RSSI values. Using an additional fieldbus interface offers the possibility to directly connect another network point. The digital output can be used to control an actuator.

Advantages of ifm's UHF RFID solution:

Robust and expandable

Antenna, evaluation unit and interface are integrated in one compact, robust housing with protection rating IP 67. This makes the system perfectly suited for use in harsh industrial environments.

Powerful antenna

Thanks to the internal antenna with circular polarisation, the device can be installed in metallic housings without reception being affected.

Integrated web server

The evaluation systems have an integrated web server. Users log in via an HTTP address to get full access to the device set-up and, in case of cloud integration, to monitoring and diagnostic data.

Universal interface

The UHF RFID evaluation units with their interfaces for Profinet, EtherNet/IP and TCP/IP are ideal for direct connection to PCs, industrial PCs or PLCs. Using an additional fieldbus interface, it is also possible to pass through signals and minimise field wiring.

Additional digital inputs

The unit has two additional digital inputs and outputs. The inbuilt logic function can be used to provide additional control functionality directly, e.g. to immediately control a light tower when required.

Applications

The benefits of the evaluation systems really come in to their own in track and trace and traceability applications. Thanks to the long ranges, for example, tags on vehicles with access rights can be detected and evaluated at a distance of up to 3 meters, after detection it is possible to control the barriers or gates directly from the unit. Without time consuming programming effort.

In intralogistics, the system is used for seamless product tracking. It is possible to read up to 16 tags simultaneously and the products can be clearly assigned to their designated storage stations or pallets. This ensures that the correct quantity of the correct product reaches its destination on time.

Products

Design	Description	Order no.
PROFINET interface		
	RFID UHF compact unit 865...868 MHz (ETSI)	**DTE801**
	RFID UHF compact unit 902...928 MHz (FCC)	**DTE901**
EtherNet/IP interface		
	RFID UHF compact unit 865...868 MHz (ETSI)	**DTE802**
	RFID UHF compact unit 902...928 MHz (FCC)	**DTE902**
TCP/IP interface		
	RFID UHF compact unit 865...868 MHz (ETSI)	**DTE804**
	RFID UHF compact unit 902...928 MHz (FCC)	**DTE904**

Further country approvals and interfaces for IO-Link and IoT (cloud connection) are in preparation.

Design	Description	Order no.
Mounting accessories for DTE801, DTE802, DTE804		
	Mounting bracket, 1.4301 (stainless steel / 304)	**E80335**
	Mounting plate, 1.4301 (stainless steel / 304)	**E80336**
	Mounting rod 1.4301 (stainless steel / 304)	**E80337**

Selection RFID transponders	
ID-TAG/R30X10/04 – 865...870 MHz, 96 bit	**E80353**
ID-TAG/73.5X21.2/04 – 1000 pieces on reel	**E80386**
ID-TAG/139 x 53 x 15/04	**E80393**
ID-TAG/174 x 70 x 17.6/04	**E80394**
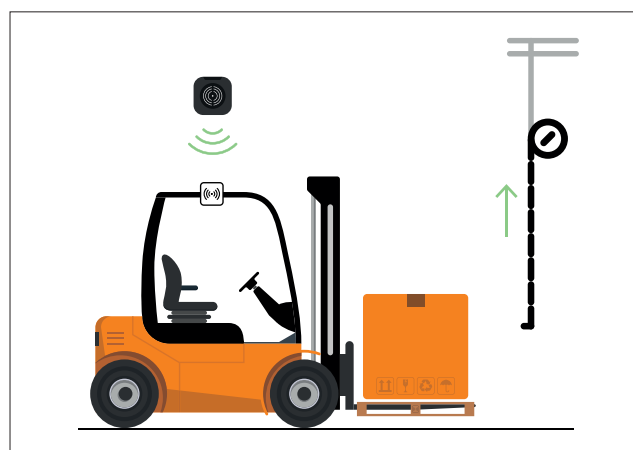
RFID solution for automated gate opening.

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Smart vibration monitoring without cabling

Versatile use thanks to battery operation and radio transmission

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

Vibration monitoring for simple machines.

The battery-operated VW vibration sensor in combination with the ZB0929 Gateway and LR SmartObserver 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.

Quick and easy integration thanks to wireless operation.

With the completely wireless sensors and intuitive software for analysing and visualising the data, a comprehensive plant monitoring system is quickly set up without any extra work. While ensuring the highest level of data security, the sensor data is transmitted from the measurement point to the gateway.

Accessories

Design	Type	Order no.
Installation		
	M8 magnetic adapter	**E30448**
	Adhesive adapter, stainless steel, internal thread M8 x 1,25	**E30473**
Connection technology		
	Ethernet jumper, cross-over patch cable 2 m, PVC cable, RJ45 connector / RJ45 connector	**EC2080**

The vibration sensor detects and transmits both the v-RMS value and the recorded temperature at the measurement point.
Below is additional information on the data provided as well as on the transmission capabilities.

v-RMS (fatigue)

Effective value of the vibration velocity. Enables an assessment of component fatigue.

Temperature

A temperature increase can be caused by excessive friction or other effects (e.g. electrical causes) and is an indicator of existing or imminent defects.

Comfortable, intelligent connectivity

In addition to an Ethernet interface via cable, the ZB0929 Gateway also offers a variety of wireless connection options like NB-IoT, LTE CAT 1, Wi-Fi and 2G GSM.

Up to 30 sensors can be connected to the Gateway and thus to the backend system indirectly or by using an intelligent mesh communication at the mere push of a button.

Evaluation

The sensor data can be visualised and analysed via LR SmartObserver, moreover, alarms can be conveniently configured so that a quick set-up of the entire measuring chain is ensured. Appropriate licenses are mandatory for evaluating the sensor data.

Without external power supply

Thanks to the built-in battery, the sensor can be operated for at least 4 years. As the electronics is completely potted, unwanted resonance vibrations are excluded.

Products

Design	Type	Order no.
	Wireless vibration sensor 1 measurement axis	**VWV001**
	Wireless vibration sensor 3 measurement axes	**VWV002**
	Gateway for wireless vibration sensors, IP 20	**ZB0929**

Common technical data VWV001, VWV002		
Measuring range	[mm/s]	0...25
Frequency range	[Hz]	10...1000
Ambient temperature	[°C]	-40...85
Protection rating		IP 68
Communication		2.4 GHz (ISM band)

Technical data ZB0929		
Operating voltage	[V DC]	5 (ZB0929)
Topology		Mesh network
Communication via cable		Ethernet (TCP/IP)
Wireless communication		LTE CAT 1, Wi-Fi, NB-IOT
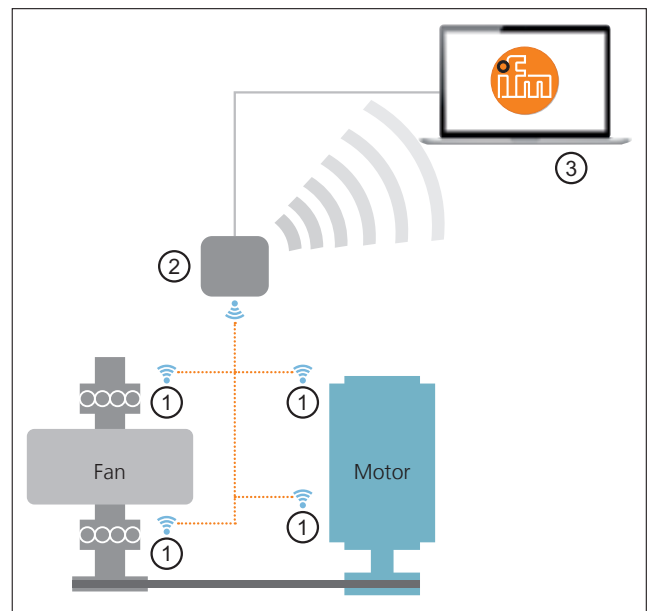
1) VW Vibration sensor
2) ZB0929 Gateway
3) LR SmartObserver

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For further technical details, please visit: ifm.com

ioControl – rugged I/O module with integrated controller

I/O modules

I/O module for mobile applications with high protection rating and DEUTSCH connectors or M12 connectors.

Can be used as independent, CODESYS-programmable mini controller

Display and keyboard interface for parameter setting

Configurable input/output function

Two CAN interfaces with CANopen and J1939 protocol

LED Display

CODESYS

IP 65 IP 67

Temperature range −40...+85°C

E₁

CANopen
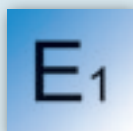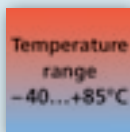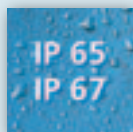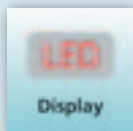
Decentralised I/O module and mini controller in one unit

ioControl is a decentralised I/O module connected to the controller via CAN bus. It is installed away from the controller on remote machine parts right where the signals are generated. The high protection rating makes it suitable for outdoor installation in wet and dirty areas.

DEUTSCH connectors or alternatively M12 connectors, which are widely used in mobile automation, ensure an easy and safe connection of sensors and actuators. Networking of the CAN bus is effected via prewired drop cables.

ioControl can either be used as a configurable I/O module or as a mini controller in the field. CODESYS is used as a programming system.

Features and benefits

The decentralised I/O modules of the ioControl system connect binary and analogue sensors to a controller via CAN bus using the CANopen protocol. Furthermore, I/O modules provide additional functions for signal preprocessing.

The compact, glass-fibre reinforced housing features reverse-polarity protected DEUTSCH connectors or M12 connectors suitable for mobile use, providing all the necessary connections for inputs, outputs, communication and programming. An integrated two-colour LED display with keyboard serves to indicate the most important system messages, the baud rate and the node number as well as for device configuration. An extensive range of connection cables completes the offer.

• Configurable inputs and outputs

A high degree of flexibility is provided by the configurable inputs and outputs. There is a choice of analogue and digital inputs. The analogue inputs can be set as current inputs (0...20 mA) or voltage inputs (0...10 V / 0...32 V).
For digital and analogue I/O modules, the profile DSP 401 has been defined. The input/output functions of the module are configured via the device object directory.

• The electronics

The core of the controller, which has been designed according to the applicable standards for electronics in mobile applications, is a modern 32-bit processor. Its monitoring and protective functions enable reliable operation even under extreme operating conditions.

Programmable to IEC 61131-3 with CODESYS

Apart from their application as I/O modules, all units can also be used as freely programmable mini controllers with CANopen and J1939 among others. Programming is done via CODESYS by means of the standardised IEC 61131-3 languages, allowing the user to build the application software with ease.
In addition, libraries are available for special functions of the controller.

• Communication interfaces

ioControl is equipped with two CAN interfaces to ISO 11898 for programming and data exchange with connected modules, controllers, displays or an engine controller.

Products

ioControl	Order no.		
M12	**CR2040**	**CR2041**	**CR2042**
DEUTSCH	**CR2050**	**CR2051**	**CR2052**

Number of inputs (can be configured)			
Analogue multifunctional/digital	8	–	–
Analogue multifunctional/ frequency/digital	–	–	4
Frequency/digital	4	–	–
Resistance/digital	4	–	4

Number of outputs (can be configured)			
PWMi/digital 4.0 A	–	4	4
PWM/digital 4.0 A	–	4	–
PWMi/digital 2.5 A	–	4	4
PWM/digital 2.5 A	–	4	–

Common technical data – ioControl		
Housing		impact-resistant polyamide
Device connection	inputs/outputs CAN interface 1	6 poles (Deutsch DT04-6p) or 5-pole (M12 connector)
	supply voltage CAN interface 2	6 poles (Tyco/AMP)
Protection		IP 65, IP 67
Operating voltage	[V DC]	8...32
Current consumption	[mA]	≤ 200 (without external load)
Temperature range operation/storage	[°C]	-40...85
Interfaces	CAN	2.0 A/B CiA DS 301 V4, CiA DS 401 V 1.4 ISO 11898, 20 Kbits/s...1 Mbit/s (default 250 Kbits/s)
Protocols	CAN	CANopen, SAE J 1939 or free protocol
Programming		CODESYS V 2.3
Total memory		1536 kBytes
Application memory		512 kBytes
Standards and tests (extract)		CE, E1 (UN-ECE R10), EN 50 155

Accessories

Description	Order no.	
	DEUTSCH	**M12**
Connection cable for 1 input, 2 m	**E12544**	**EVM085**
Connection cable for 2 inputs, 2 m	**E12562**	**EVM093**
Connection cable for 1 output, 2 m	**E12550**	**EVM085**
Connection cable, CAN, 1m	**E12556**	**EVC953**
Connection cable, AMP for module supply, 2 m	**E12565**	
CAN programming interface CANfox	**EC2112**	
Adapter set CAN/RS232 for CANfox	**EC2113**	

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For further technical details please visit: ifm.com

ecomatPanel: robust, multifunctional input module
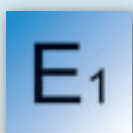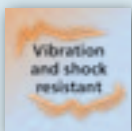
Units for operation and monitoring

Rotary button with integrated 4-way button and push function

6 RGB backlit function keys and one segmented LED ring

All lighting elements can be controlled individually in any colour

Communication via CAN interface

For 12 and 24 V on-board power supplies

Safe operation in rough environments

The ecomatPanel has been designed for use in the harsh environment in driver's cabins. The rotary button and the function keys are large enough to ensure easy handling even when wearing gloves. The rotary button is also equipped with a 4-way button (up/down/left/right). This makes it possible to quickly navigate through setting menus. Another switching function can be triggered by pushing the rotary button (push function).

Colour feedback

The illuminated ring around the rotary button, consisting of four segments, as well as the illuminated keys provide a clear overview of the set functions. All LED lighting elements can be set separately and assigned individual colours.

Easy integration into panels

CAN interface

Communication is effected via the integrated CAN interface. Via this interface, the individual LED segments are controlled and the status of the keys and the operating head is queried.

Plug & play with ifm displays

The ecomatPanel has been designed for direct communication with the ifm dialogue modules for mobile applications (ecomatDisplays). Once the dialogue module has been connected via CAN bus, the keys and LEDs of the ecomatPanel can be evaluated directly in the application program and be used for the operating functions of the display.

The innovation: No programming of the communication interface is required.

Designed for robust applications

The ecomatPanel can be used in 12 V and 24 V on-board networks.

The high protection rating IP 65 and the closed surface provide protection even under adverse environmental conditions. Even extreme temperatures or permanent shock and vibration do not affect the functions of the ecomatPanel.

Products

Description	Order no.
Devices	
ecomatPanel	**CR1300**
ecomatPanel, segmented LED ring	**CR1301**
Accessories	
Mounting frame	**EC1300**
Connection cable, 4 poles, 5m	**E12736**
Connector, 4 poles, single contacts	**E12737**

Technical data ecomatPanel		
Installation		Panel mounting
Dimensions	[mm]	136 x 86 x 73.5
Ambient temperature	[°C]	-40...85
Storage temperature	[°C]	-40...85
Protection rating		IP 65
Operating voltage	[V DC]	9...32
Nominal voltage	[V DC]	12 / 24
Max. current consumption	[mA]	400
Reverse polarity protection		•
CAN interfaces	Number Protocol Default baudrate [Kbit/s]	1 J1939 250 135 (dynamic address assignment is supported)
Connector		Tyco 1-967640-1, 4 poles

Display / operating elements	
Keys	6 function keys (silicone keyboard) with tactile feedback, freely programmable (softkey function)
Key background illumination	RGB LED (brightness adjustable)
Rotary button	24 stops per revolution with push function and joystick function in two axes
LED ring, segmented	**CR1300:** not included **CR1301:** around the rotary button, divided in 4 segments with RGB LED (brightness adjustable)

ifm – close to you!

3D collision warning system for mobile machines

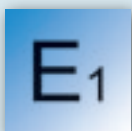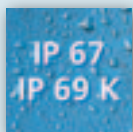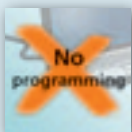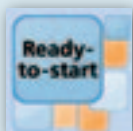**Cameras for mobile applications**

| Robust driver assistance system for the detection of obstacles in the path |
| Early detection of reflectors, e.g. persons with safety vests |
| Early warning of potentially dangerous situations to the driver |
| Ideal for new machines and for retrofitting to existing machines |
| Ready-to-start application package with easy set-up |
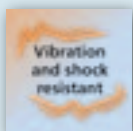
Easy retrofitting

The 3D collision warning system is based on the established 3D sensors from ifm. It precisely detects obstacles and visualises them in a 2D image on a monitor. This keeps the driver informed about the trigger of the alarm and the area to be monitored at all times. Thanks to powerful algorithms, false tripping is virtually excluded. The system is set up easily via the supplied operating display, no PC is required.

Ready-to-start application package

The set includes all components to set up a fully functioning collision warning system on a mobile machine, e.g. a fork lift, wheel loader, excavator, reach stacker or transport vehicle within a few minutes.

Features and benefits

Accident prevention

The driver can have poor visibility of some areas around the machine which can lead to dangerous situations. Further accident risks result from time pressure or fatigue of the machine operator. The ifm driver assistance system, which supports the daily work of the driver, provides the remedy.

Active obstacle detection

The active obstacle detection developed by ifm monitors six danger zones around the vehicle and warns the driver of imminent collisions in good time. For this purpose, a tried-and-tested 3D time-of-flight system from ifm is used which reduces false alarms to a minimum thanks to a sophisticated algorithm. Warnings are provided visually, acoustically and in the form of icons via the supplied 7" monitor.

Detection of reflective clothing

Thanks to a special classification of reflective materials, e.g. reflective vests or clothing, the collision warning for persons can be given priority over other objects. This increases the safety of persons.

Retrofit set for mobile machines

The innovation: The driver assistance system is provided as a ready-to-start application package.
It contains all necessary components including any cables and mounting accessories. This means it can be easily retrofitted on all mobile machines with 24 V on-board system voltage*.

Easy set-up

After mechanical installation of the system and plug & play wiring, set-up is carried out within a few minutes via the supplied colour display. Only a few parameters are required in the intuitive set-up process. Then the system is ready for operation.

* Please contact our service centre if you have a different on-board system voltage.

ifm – close to you!

Products

Description	Order no.
Ready-to-start application package (complete set)	
Area surveillance with collision warning	**ZZ1103**
Application package (individual components)	
Mobile 3D smart camera with integrated 2D/3D overlay **(The article is pre-programmed especially for the application package. If mobile camera is purchased on its own, there is no pre-programming.)**	**O3M261**
IR system illumination unit	**O3M960**
U-shaped bracket, suitable for 3D camera or illumination unit, stainless steel, black (application package contains 2 pieces)	**E3M102**
MCI cable, connection sensor / system illumination unit, 0.25 m	**E3M120**
Voltage supply system illumination unit, socket, M12, 10 m PUR cable, 4 poles	**E3M133**
BasicController, programmable controller with multi-functional input and output channels **(The article is pre-programmed especially for the application package. If BasicController is purchased on its own, there is no pre-programming.)**	**CR0403**
CAN adapter cable for the connection and voltage supply of O3M, CR0403 and CR0451, 10 m	**E3M171**
Upper part of the housing for CR0403, suitable for installation of the CR0451 display	**EC0402**
Adapter cable for the connection of the buzzer to CR0403 and use of the output channels	**E3M172**
BasicDisplay, programmable graphic display with CAN connection **(The article is pre-programmed especially for the application package. If BasicDisplay is purchased on its own, there is no pre-programming.)**	**CR0451**
7" TFT LCD monitor with LED backlight, 1 video input for display of the camera image	**E2M231**
Bracket for monitor E2M231	**E2M239**
Video extension cable, M16 connector / M16 socket, 5 m, black, PCV cable	**E2M203**
Video adapter cable M12 connector / M16 connector for the connection of O3M261 to E2M231	**E3M161**
Buzzer for connection to CR0403	

Extended functionality

For special requirements, expert settings are available during set-up. Pre-programmed inputs and outputs are available for an additional signal light, buzzers, standby operation or the ready status of the system.

Suitable for robust applications

The 3D sensors are suitable for robust applications in indoor and outdoor areas. A high protecting rating and shock and vibration resistance as well as a wide temperature range meet all requirements for use in mobile machines.

For further technical details please visit: ifm.com

ecolink M12, Ethernet D-Code for industrial applications
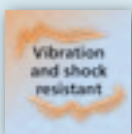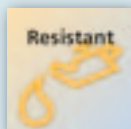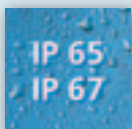
Industrial applications / factory automation

- Halogen-free and silicone-free

- Optimum sealing even when fastened by hand

- Permanent vibration protection with saw tooth contour

- Protection rating IP 65, IP 67

- Ethernet CAT 5 / CAT 5e

ecolink M12 for demanding applications

Most applications require special solutions. Only high-quality materials, assured production processes and faultless assembly lead to success in the long run.

The asymmetrically acting vibration protection holds the M12 screw connection tight in its position, guaranteeing optimum and permanent sealing.

No tools are needed for installation and removal as this can be done manually without any problem.

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

Technical data:

Operating voltage: 30 V AC / 60 V DC

Nominal current: 4 A

Protection rating: IP 65, IP 67
in locked condition with the matching counterpart.

Tightening torque
Threaded sleeve: 0.6 Nm – 1.2 Nm
Note the maximum value of the counterpart

Ambient temperature: -25...90 °C

Drag chain: > 3 million bending cycles

Materials:

Housing / moulded body: TPU
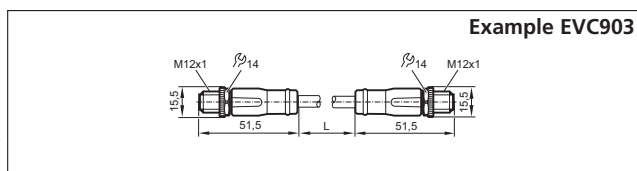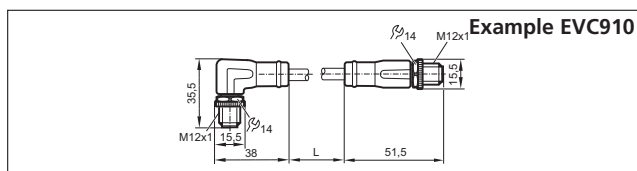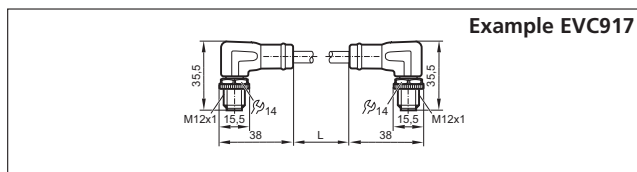
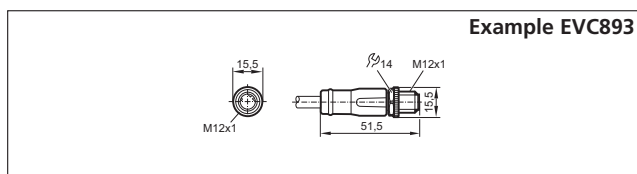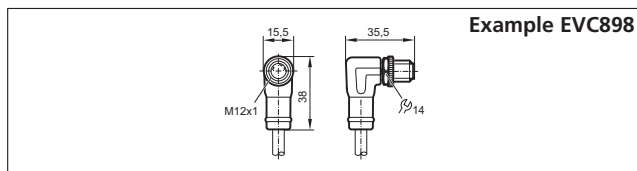Coupling nut: brass

Contacts: Gold-plated

Cable:

PUR, halogen-free, silicone-free
4 x 0.34 mm² (7 x Ø 0.25 mm), Ø 6.5 mm

Approvals:

UL approval in preparation

Applications: industrial applications

Dimensions

Example EVC898

Example EVC893

Example EVC917

Example EVC910

Example EVC903

Products

Design	Description	Order no.
M12 cable plug · 4 poles · straight		
	2.0 m	**EVC893**
	5.0 m	**EVC894**
	10.0 m	**EVC895**
	20.0 m	**EVC896**
	50.0 m	**EVC897**
M12 cable plug · 4 poles · angled		
	2.0 m	**EVC898**
	5.0 m	**EVC899**
	10.0 m	**EVC900**
	20.0 m	**EVC901**
	50.0 m	**EVC902**
M12 connection cable · 4 poles · straight-straight		
	0.25 m	**EVC903**
	0.5 m	**EVC904**
	1.0 m	**EVC905**
	2.0 m	**EVC906**
	5.0 m	**EVC907**
	10.0 m	**EVC908**
	20.0 m	**EVC909**
M12 cable plug · 4 poles · straight-angled		
	0.25 m	**EVC910**
	0.5 m	**EVC911**
	1.0 m	**EVC912**
	2.0 m	**EVC913**
	5.0 m	**EVC914**
	10.0 m	**EVC915**
	20.0 m	**EVC916**
M12 connection cable · 4 poles · angled-angled		
	0.25 m	**EVC917**
	0.5 m	**EVC918**
	1.0 m	**EVC919**
	2.0 m	**EVC920**
	5.0 m	**EVC921**
	10.0 m	**EVC922**
	20.0 m	**EVC923**

Wiring diagram

Example EVC898   Example EVC917

ifm – close to you!

For further technical details, please visit: ifm.com

ecolink M12 / RJ45: Ethernet cables for industrial applications

Industrial applications / factory automation

- **Halogen-free and silicone-free**
- **Optimum sealing even when fastened by hand**
- **Permanent vibration protection with saw tooth contour**
- **Protection rating IP 65, IP 67**
- **Ethernet CAT 5 / CAT 5e**

ecolink M12 for demanding applications

Most applications require special solutions. Only high-quality materials, assured production processes and faultless assembly lead to success in the long run.

The asymmetrically acting vibration protection holds the M12 screw connection tight in its position, guaranteeing optimum and permanent sealing.

No tools are needed for installation and removal as this can be done manually without any problem.

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

Technical data:

Operating voltage: 30 V AC / 60 V DC

Nominal current: 1.5 A

Protection rating: IP 65, IP 67 (M12 connector)
in locked condition with the matching counterpart.
RJ45 connector: IP 20

Tightening torque
Threaded sleeve: 0.6 Nm – 1.2 Nm
Note the maximum value of the counterpart

Ambient temperature:
M12 connector: -25...90 °C
RJ45 connector: -40...70 °C

Drag chain: > 3 million bending cycles

Materials:

Housing / moulded body:
M12 connector: TPU
RJ45 connector: PC

Coupling nut: brass

Cable:

PUR, halogen-free, silicone-free
4 x 0.34 mm² (7 x Ø 0.25 mm), Ø 6.5 mm

Approvals:

UL approval in preparation

Applications: industrial applications

Products

Design	Description	Order no.
Connection cable · connector M12 straight / connector RJ45		
	0.5 m	**EVC924**
	1.0 m	**EVC925**
	2.0 m	**EVC926**
	3.0 m	**EVC936**
	5.0 m	**EVC927**
	6.0 m	**EVC937**
	10.0 m	**EVC928**
	12.0 m	**EVC938**
	20.0 m	**EVC929**
Connection cable · connector M12 angled / connector RJ45		
	0.5 m	**EVC930**
	1.0 m	**EVC931**
	2.0 m	**EVC932**
	5.0 m	**EVC933**
	10.0 m	**EVC934**
	20.0 m	**EVC935**

Dimensions
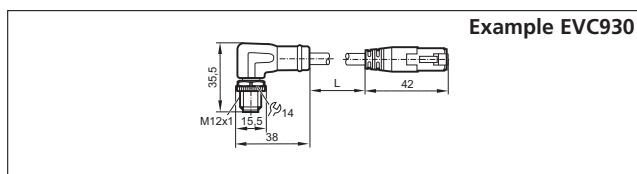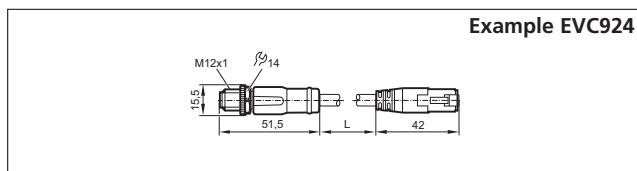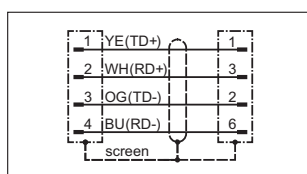
Example EVC924

M12x1 Ø14
15,5
51,5 L 42

Example EVC930

35,5
L 42
M12x1 15,5 Ø14
38

Wiring

1	YE (TD+)	1
2	WH (RD+)	3
3	OG (TD-)	2
4	BU (RD-)	6
	screen	

Example EVC924

ifm – close to you!

M12 CAN cables ecolink for mobile machines

For use in mobile and robust applications

Large cable cross-section for voltage drop reduction

Permanent vibration protection due to saw tooth contour

Optimum sealing even when fastened by hand

The mechanical end stop protects the O-ring against destruction
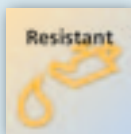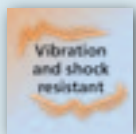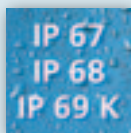
Maximum reliability for mobile applications

The increased cable cross-section of 2 x 0.75 mm² (voltage supply) and 2 x 0.5 mm² (CAN) allows for transmission of high currents with low voltage drop and for reliable data transfer.

The integrated end stop protects the O-ring against destruction caused by over-tightening the nut. No tools needed for installation and removal by hand. The asymmetrically acting vibration protection holds the nut tight in its position, guaranteeing optimum and permanent sealing. High-quality materials and intense monitoring during and after the production guarantee the highest quality standard.

Therefore, these CAN cables are perfectly suited for robust indoor and out-door applications on vehicles and mobile machines.

Technical data:

Operating voltage: 30 V AC / 36 V DC

Current rating: 4 A

Protection rating: IP 65, IP 67, IP 68, IP 69K
in locked condition with the matching counterpart.

Tightening torque: 0.6 Nm – 1.5 Nm

Vibration / shock: 750 g, 1 million cycles

Cable:

Drain wire (screen): 0.75 mm²

Voltage supply: 2 x 0.75 mm²

CAN: 2 x 0.5 mm²

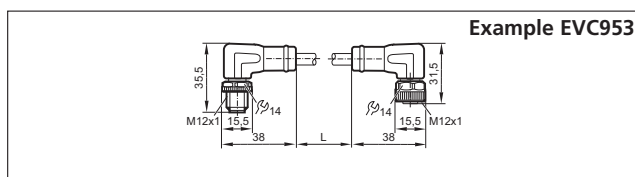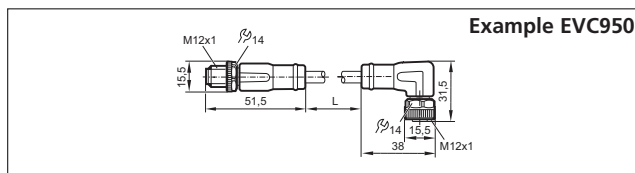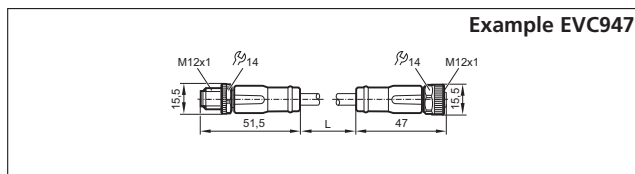**Drag chain:** > 5 million cycles

Approvals:

cULus

Applications:

EVC factory automation, machine tool industry;
use in mobile machines

Dimensions

Example EVC947

Example EVC950

Example EVC953

Wiring diagram

Example EVC943

Example EVC939
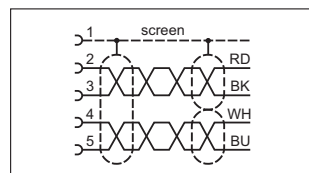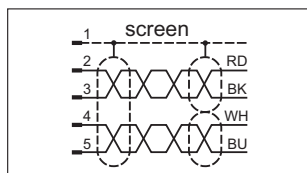
Products

Type	Description	Order no.
Connection cable M12 connector		
	2.0 m	**EVC943**
	5.0 m	**EVC944**
	2.0 m	**EVC945**
	5.0 m	**EVC946**
Connection cable M12 socket		
	2.0 m	**EVC939**
	5.0 m	**EVC940**
	2.0 m	**EVC941**
	5.0 m	**EVC942**
Connection cable with terminating resistor 120 Ω, M12 socket		
	2.0 m	**EVC957**
	5.0 m	**EVC958**
	2.0 m	**EVC959**
	5.0 m	**EVC960**
	10.0 m	**EVC961**
Connection cable M12 connector / M12 socket		
	1.0 m	**EVC947**
	2.0 m	**EVC948**
	5.0 m	**EVC949**
Connection cable M12 connector / M12 socket		
	1.0 m	**EVC950**
	2.0 m	**EVC951**
	5.0 m	**EVC952**
Connection cable M12 connector / M12 socket		
	1.0 m	**EVC953**
	2.0 m	**EVC954**
	5.0 m	**EVC955**
	10.0 m	**EVC956**
Connection cable with terminating resistor 120 Ω, M12 connector / M12 socket		
	2.0 m	**EVC962**
	5.0 m	**EVC963**
	10.0 m	**EVC964**
Connection cable with terminating resistor 120 Ω, M12 connector / M12 socket		
	2.0 m	**EVC965**
	5.0 m	**EVC966**
	10.0 m	**EVC967**

ifm – close to you!

For further technical details please visit: ifm.com

Who says we can only do hardware?

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

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

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

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

|appliance

|starterkit

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

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

www.moneo.ifm

moneo|OS

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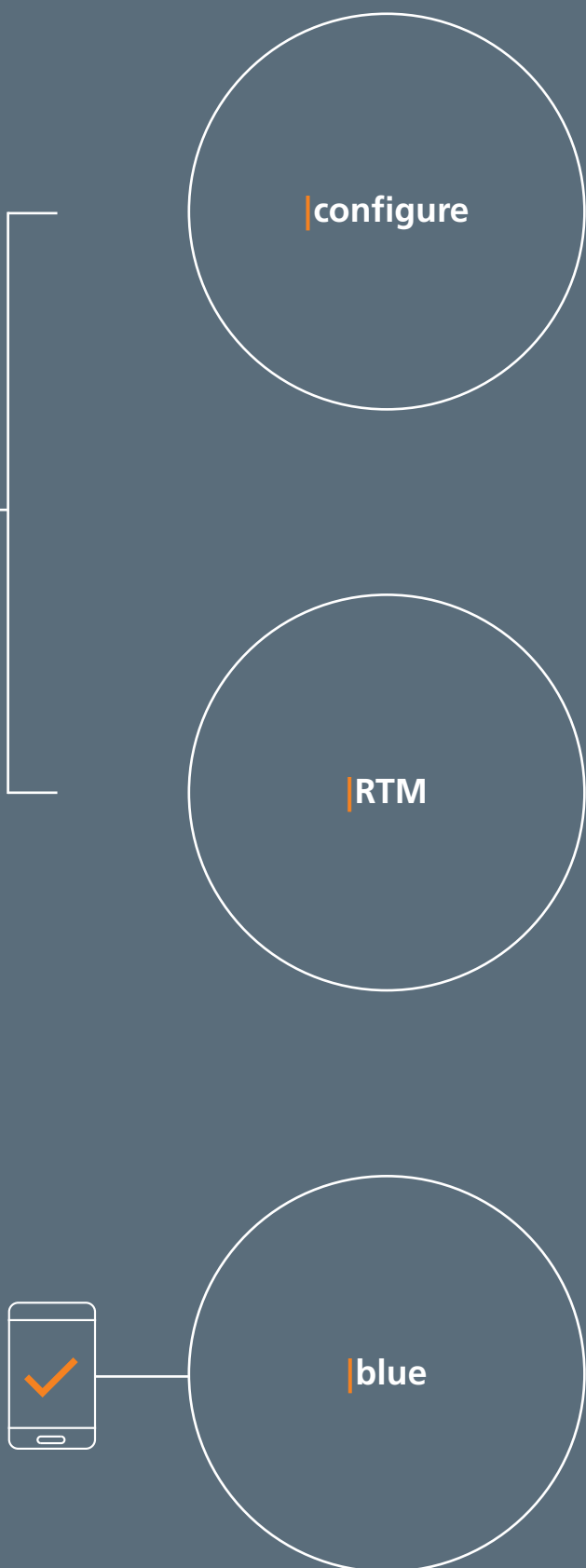
|configure

moneo|configure is the convenient management tool for your IO-Link network. Set the parameters of the IO-Link devices in your machines with just a few clicks. The visualisation in the cockpit facilitates both set-up and error diagnostics. The user-friendly parameter data set management contributes to speeding up new sensor integration.
moneo|configure SA The management tool is also available as a stand-alone version for those who wish to configure parameters easily via IO-Link.

|RTM

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

|blue

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

www.moneo.ifm

We love it when a plan comes together.

moneo|RTM: level monitoring in containers with 2-component casting resin.

In order to protect the electronics of the sensors from shock, vibration and moisture, potting processes are an essential part of sensor production. For a smooth production process, but also for a constantly high product quality, permanent availability of casting resin and casting hardener in the storage tank containers is essential. The level monitoring application implemented at ifm prover gmbh thus contributes to a reliable logistics organisation of temperature-critical media in the production process.

moneo|RTM: vibration monitoring on fans of an extraction system.

In various production processes of ifm prover gmbh, an exhaust air system permanently guarantees and secures the quality of the products, machine uptime and high air quality. The fan capacity is therefore a relevant factor in the entire production process.

moneo|RTM: consumption monitoring for sustainably optimised processes.

In production, cooling water is provided, for example, for cooling of lasers. A decreasing cooling capacity, for example caused by an insufficient water supply that is detected too late will increase energy costs and, in the worst case, lead to overheating and, thus, to a plant failure.
This can be remedied by measuring the consumption and calculating the heat output of the cooling circuit.

moneo|RTM: optimisation of the level monitoring in a calibration plant.

Flow sensors are calibrated in the calibration plant at ifm prover gmbh.
To ensure maximum measuring accuracy, both hot and cold water is sent through the sensors. The measured values are used for calibration.

www.moneo.ifm

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Trust our application know-how. We have been developing automation solutions for our customers for 50 years and know tomorrow's requirements.

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We do not only offer hardware, but also the matching software and IT connection.

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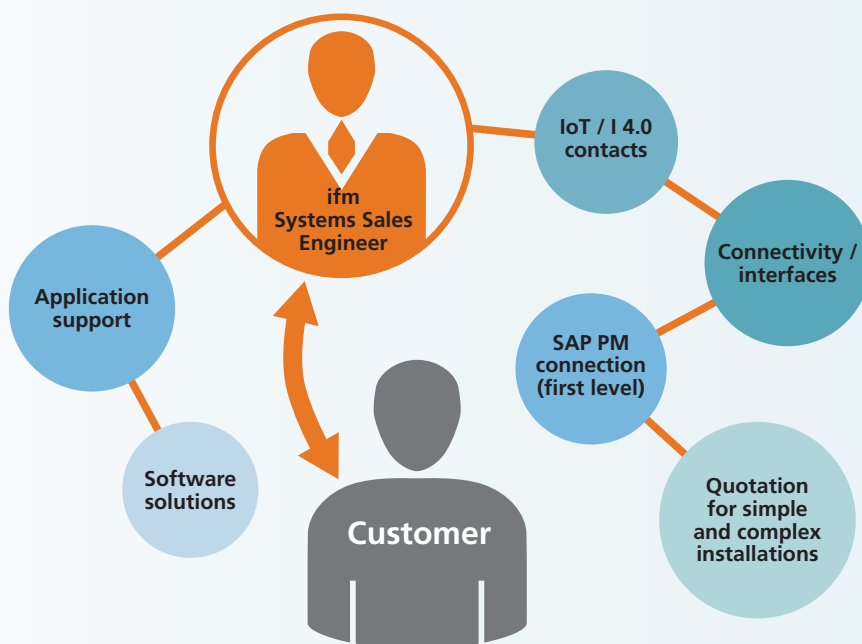You have a permanent contact who supports your project on site.

Together:
We support your project from advice and quotation to set-up. Even after project completion, we will continue to support you as a reliable partner.

ifm system consulting.

You want to make your application transparent? Fans, pumps, compressors or cooling circuits: Our system consultant helps you to find the ideal solution for monitoring your installation. Our service includes competent advice at your site, a fair offer, personal project assistance and support for set-up.
We offer sensors, evaluation systems and software for connection to ERP systems – all from a single source. Together we will make your project successful.
Do not hesitate to contact us:
info@ifm.com

ifm Systems Sales Engineer

IoT / I 4.0 contacts

Connectivity / interfaces

Application support

SAP PM connection (first level)

Software solutions

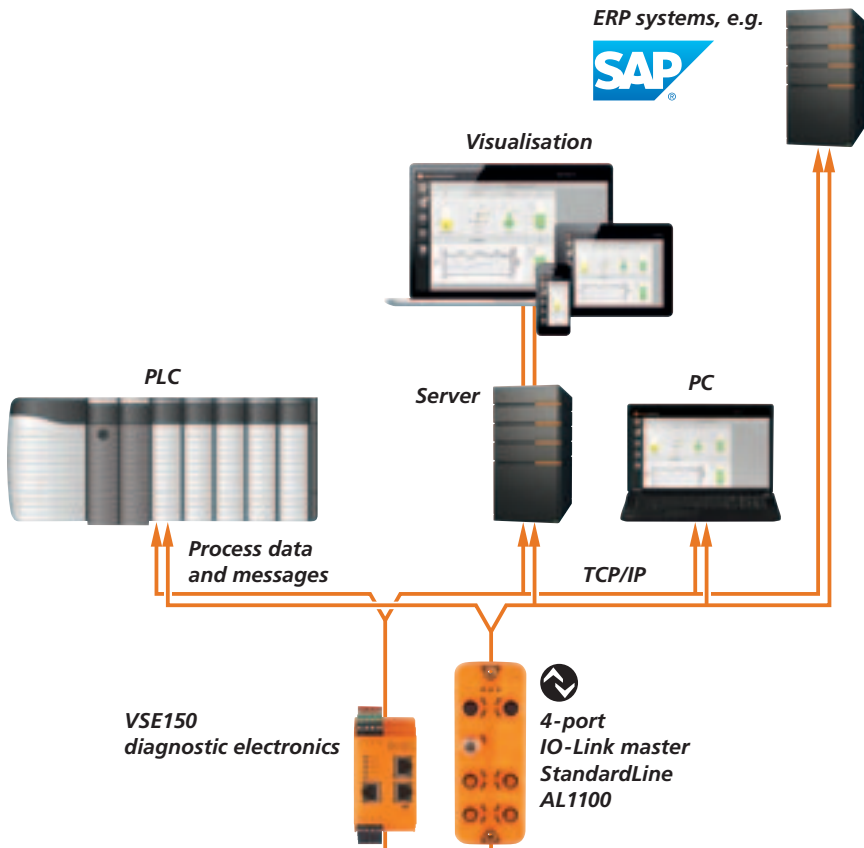Quotation for simple and complex installations

Customer

ifm system sales network.
Your personal ifm System Sales Engineer will provide you with the entire ifm know-how to realise and optimise your plant monitoring.

Reduce costs, prevent downtime, optimise processes – system solutions from ifm.
Example: fan monitoring

ERP systems, e.g.

SAP

Visualisation

SMARTOBSERVER

LR SMARTOBSERVER

The software visualises, logs and exports process data. Maintenance tasks can be planned by means of alarm and notification functions and worldwide connectivity.
LR SMARTOBSERVER has an integrated database and can be installed as a stand-alone or server application.

PLC

Server

PC

VSE diagnostic electronics

Records process data from sensors, interprets and prepares it and transmits the results to the PLC, PC or higher-level IT systems.

Process data and messages

TCP/IP

IO-Link master

The module records process data from sensors and transmits it to the PLC, PC or higher-level IT systems. It offers all advantages and possibilities of IO-Link.

VSE150 diagnostic electronics

4-port IO-Link master StandardLine AL1100

Detection of unbalance on rotor blades

With the VSE150 diagnostic electronics and the VSA001 vibration sensor

Filter monitoring

With the AL1100 IO-Link master and the PQ3809 pressure sensor

Vibration monitoring on motors

With the VSE150 diagnostic electronics and the VSA001 vibration sensor

Temperature monitoring on motors

With the VSE150 diagnostic electronics and the TS2229 + TP3237 temperature sensors

Vibration monitoring on bearings

With the VSE150 diagnostic electronics and the VSA001 vibration sensor

Speed monitoring

With the VSE150 diagnostic electronics and an inductive sensor

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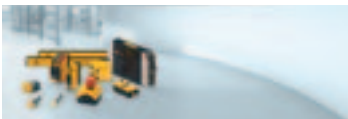in the ifm webshop**

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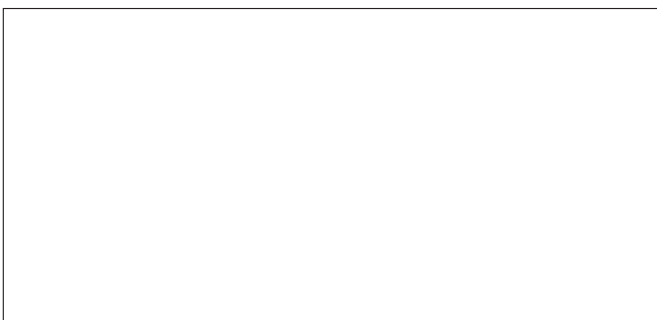
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