

ifm electronic



Fluid sensors and diagnostic systems *Catalogue 2008/2009*

www.ifm-electronic.com



fluid sensors
and diagnostic
systems

position
sensors
and object
recognition

bus,
identification
and control systems

ifm electronic – close to you!

The easy way to find what you are looking for

Header

- ① Section
- ② Heading
- ③ Environment
- ④ Product group name
- ⑤ Heading repeated
- ⑥ Illustration

① Flow sensors

② Flow sensors and transmitters

③ For industrial applications

④ efector300

⑤ Flow sensors and transmitters

⑥



Increased repeatability across the extended measuring range.

Switching output for flow and temperature.

Output function NC/NO programmable or analogue (4...20 mA).

LED bar graph for indication of switch point and flow.

All 5000 versions in the same design.

S15007: Flow monitoring and temperature monitoring

S15004: Analogue output

Approvals: CULS

Setting range	Greatest sensitivity	Medium	Response time	U _i	Current consumption	I _{load}	Draw- ing no.	Order no.
3...200 / 200...2000	3...1000 / 200...800	-25...80	1...10	10...36 DC	< 60	2 x 250	1	S15007
M12 connector Output function 2 x 4...20 mA analogue Connector groups 7, 8, 10 Wiring diagram no. 6								
3...300 / -	3...100 / -	-25...80	1...10	10...36 DC	< 60	-	1	S15004
M12 connector Output function 4...20 mA analogue Connector groups 7, 8, 10 Wiring diagram no. 8								

Accessories

Type	Description	Order no.
	Adapter M18 x 1.5 - L18 for mounting in T-pieces	E40104
	Adapter M18 x 1.5 - G 1/2	E40096
	Welding adapter M18 x 1.5 - Ø 24 mm	E40124
	Flow adapter (for low flow rates) M12 x 1 - G 1/8	E40129

Further accessories are available starting on page 217

Connectors and splitter boxes

Type	Description	Order no.
	Socket M12 Group 7 2 m black, PUR cable	EVC004
	Socket M12 Group 7 5 m black, PUR cable	EVC005
	Socket M12 Group 7 2 m black, PUR cable	EVC001
	Socket M12 Group 7 5 m black, PUR cable	EVC002
	Socket M12 2 m black, PUR cable	E10909
	Socket M12 5 m black, PUR cable	E10910
	Socket M12 2 m black, PUR cable	E10915
	Socket M12 5 m black, PUR cable	E10916

Further connectors and splitter boxes are available starting on page 191

Flow meters

⑦

⑧

⑨

⑩

Flow meters

⑦

⑧

⑨

⑩

Navigation bar

- ⑦ Current heading
- ⑧ Current environment
- ⑨ Arrow = You are here
- ⑩ Other environments

Right

- ⑮ Technical data
- ⑯ Current section
- ⑰ Common technical data

Left

- ⑪ Special features of the units
- ⑫ Recommended accessories
- ⑬ Recommended connectors
- ⑭ Notes for further details



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Pressure sensors	<i>Pressure sensors and transmitters</i>	79 - 127	Pressure sensors
Temperature sensors	<i>Temperature sensors and transmitters</i>	129 - 153	Temperature sensors
Diagnostic systems	<i>Systems for vibration diagnosis</i>	155 - 171	Diagnostic systems
Evaluation systems, power supplies	<i>Amplifiers, transformer and switched-mode power supplies</i>	173 - 189	Evaluation systems, power supplies
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General information

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General information
List of articles
Level sensors
Flow sensors
Pressure sensors
Temperature sensors
Diagnostic systems
Evaluation systems, power supplies
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For industrial applications

Industrial applications require robust and uncomplicated electronic units but with a high level of technology. ifm makes sensors and evaluation electronics in accordance with quality standards which are far above average. The production materials employed are subjected to demanding tests and have been selected for a maximum long-term stability in universal applications. The result of this production philosophy is an optimum resistance and reliability of all products used in industrial applications.

For hygienic areas and viscous media

In all areas of process technology, especially in the food and pharmaceutical industries a hygienic design of the components used is required. Important features for sensors in contact with product are good cleanability and use of high quality materials. ifm sensors meet these requirements, which is evidenced by conformity with the EHEDG guidelines and approval in accordance with the sanitary 3A standard.

Due to the high viscosity of viscous media the sensors must be insensitive to product build-up and the affected measurement accuracy. For ifm sensors this is implemented in various ways, e.g. by electronic compensation or a sensor design specially adapted to the medium.

For hazardous areas

Sensors and evaluation amplifiers to 94/9/EC (ATEX):

Fluid sensors are available for hazardous areas (ATEX). The requirements of the applicable installation regulations must be strictly followed by the user. Intrinsically safe sensors are only allowed to be operated with suitable amplifiers holding an EC type test certificate. There are also special requirements for the sensor wiring which must also be strictly adhered to. This is the user's responsibility. Also note the EC type test certificate, operating instructions and the technical data sheet.

For oils and coolants

For fluid sensors ifm offers special cables and connectors for factory automation.

Halogen-free PUR cables with high resistance to alternate bending stress, PUR housing materials, gold-plated contacts and protection rating IP 68 guarantee long life in an oily and greasy environment. The international UL and CSA approval means these units are accepted anywhere in the world market.

For hygienic and wet areas

ifm offers special cables and connectors designed for the food and hygienic sector. High quality PVC cables and housing materials, coupling nuts of high-grade stainless steel (316S12) as well as gold-plated contacts are ideal for use in wet areas. The high protection ratings IP 68 and IP 69K withstand high-pressure steam cleaning. The sensors are chemically resistant to most common cleaning agents. The UL / CSA approval is a matter of course for these units.

CCC	CCC (China Compulsory Certification) is a compulsory Chinese certification for certain products put on the market in China. Which products are concerned is specified in a catalogue created by the Chinese authorities. Among others, proximity sensors with a voltage range of over 36 V fall under the duty of certification.	General information
CE	With the CE marking the manufacturer documents that the units sold by him adhere to the European directives for specified electrical equipment.	List of articles
EHEDG	The EHEDG (European Hygienic Equipment Design Group) prepares guidelines for Europe concerning the requirements for measuring systems in machines of the food and pharmaceutical industries. Units with the EHEDG marking have been tested and approved for the food and pharmaceutical industries in accordance with these guidelines.	Level sensors
Ex	The units of the categories 1 and 2 have been tested and approved by a notified European body (e.g. PTB, EXAM) for use in hazardous areas.	Flow sensors
FDA	Food and Drug Administration. US-American supervisory authority for food and drugs. This authority grants approvals for products and materials used in the food and pharmaceutical industries.	Pressure sensors
German overspill standard WHG	Units with this marking have been tested and approved by a notified body as overspill protection for liquids that are harmful to ground water in accordance with the German overspill standard WHG.	Temperature sensors
UL / CSA or cULus / cULus	Units with this marking meet the requirements of UL (Underwriters Laboratories Inc.) and CSA (Canadian Standards Association). In many cases this approval is necessary to access the North American market. cULus is a combined approval and corresponds to the two individual approvals CSA and UL.	Diagnostic systems
		Evaluation systems, power supplies
		Connection technology
		Accessories
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**Order numbers
in alphanumeric order**

Fluid sensors and diagnostic systems

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DN2012	CUL	189	E10822		215	E11223		212
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DN2014	CUL	189	E10825		215	E11225		212
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Level sensors

efector160®

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Continuous and point level measurement

System description
Selection chart

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Continuous measurement for industrial applications

Type LK with display
Type LR with display
Type LT with display
Type LL with display
Types PY / PN with display

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Universal application



Continuous measurement for hygienic areas and viscous media

Type PI with display

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Special application



Point level measurement for industrial applications

Type LI

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Universal application

Introduction

In industrial applications where industrial fluids or bulk material are used, storage tanks or silos are used for processing or storing of media. Tanks are filled and emptied almost automatically. Sensors are used to detect the level. Even critical process states such as an empty hydraulic tank and the resulting running dry of the pump or the unintentional overspill of a tank are permanently monitored by level sensors.

Advantages of electronic sensors

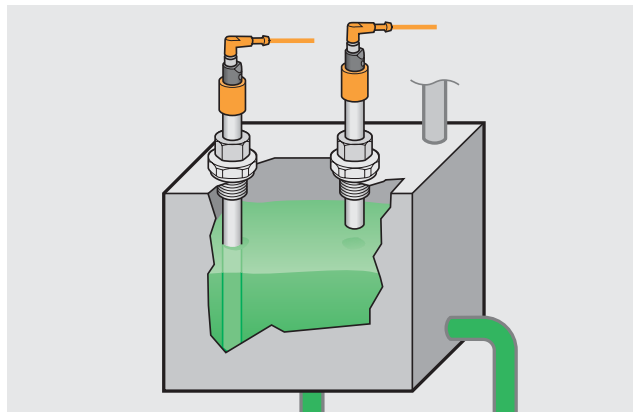
Level measurement distinguishes between direct measurement in the medium and the indirect detection from the outside (for example through the tank wall by means of capacitive sensors). Deposits and wear and tear often lead to failures in particular if mechanical switches are in contact with the medium. The electronic ifm sensors however can do without any mechanical component. This makes the sensors especially robust and reliable. Regular maintenance and cleaning are not necessary. Failures for example due to overspill or downtime of plant sections are a matter of the past. The suitable electronic sensors work without any problem even in aggressive media, such as lubricants and coolants.

Another advantage of electronic sensors is the local indication of the level or the easy setting of the switching threshold simply by pressing a button as offered for some types.

Types of level detection and signal processing

There are two basic types of level detection in tanks: continuous measurement and the detection of defined limits.

*Limit detection:
Two probes
for minimum /
maximum
monitoring.*

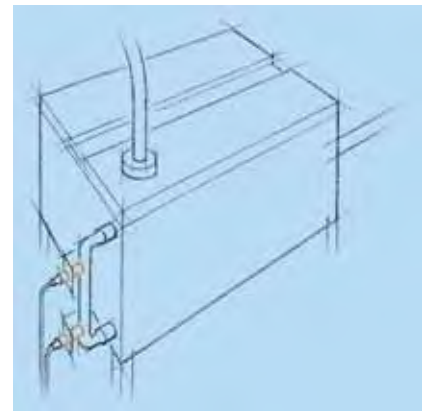


Continuous level measurement

For continuous level measurement the level is detected continuously, converted into an electrical signal and indicated. Depending on the type the units have freely programmable switching outputs or an analogue output for further processing. The four freely programmable switching outputs enable easy setup for complete control without additional electronics. Example: Two switch points monitor the minimum and maximum of the acceptable range. The two remaining switch points signal overspill or unintentional complete emptying of the tank.

Continuous level sensors from ifm electronic use three physical measuring principles: capacitive, hydrostatic and guided wave radar.

*Measurement in
the medium:
The LK probe is
directly immersed
in the medium to
be monitored.*

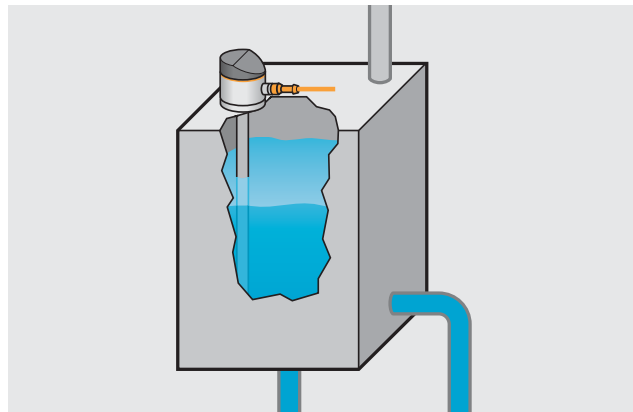


*Indirect detection
from the outside:
Capacitive level
sensors detect
the level through
the pipe wall.*



*For special
applications:
Capacitive probe
for monitoring
oils and coolants.*

For the capacitive measurement the tank and the material form an electrical capacitor. The capacity changes analogously to the level and is converted into a measure for the level by means of a microprocessor. The patented sensor system allows an automatic adaptation of the sensor to the medium to be measured. Storage costs are saved and maintenance is simplified.



*Continuous
level sensors:
The sensors
adapt to the
medium
automatically.*

For hydrostatic level measurement a ceramic measuring cell detects the hydrostatic pressure of the material. Here the pressure change is a measure for the level. Suitable process connections enable flush and thus sanitary mounting of the pressure sensors into the tank to be measured. They are thus perfectly suitable for the food industry.

Innovative measuring principle – guided wave radar – for level monitoring in compact tanks.

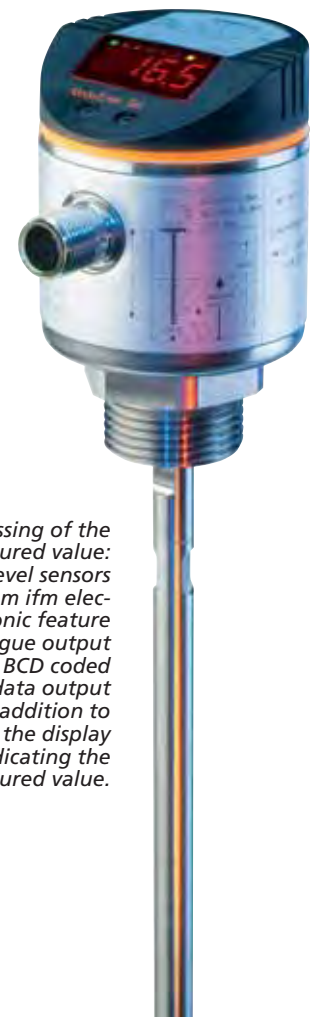
The **efector gwr** operates to the principle of guided wave radar and measures the level using electromagnetic pulses in the nanosecond range. The pulses are transmitted by the sensor head and guided along the probe. When the microwave pulse hits the medium to be detected it is reflected and guided back to the sensor where it is evaluated.

The time between transmitting and receiving the pulse directly relates to the travelled distance and the current level.

Limit detection

For limit detection a defined level reached is detected and converted into an electrical switching signal. Different capacitive sensors are for use in liquids as well as in bulk material. The variety of types such as threaded, rectangular or smooth sensors enable fast and economic adaptation of the sensors to the shape of the respective tank. Suitable accessories enable simple installation.

Thanks to the microprocessor technology the user can adjust the sensors to the medium by pressing buttons. The integrated electronics ensure an exact repeatability of the set switch points. An electronic lock protects against unauthorised manipulation of the sensors.



*Processing of the
measured value:
The level sensors
from ifm elec-
tronic feature
analogue output
or BCD coded
data output
in addition to
the display
indicating the
measured value.*



*In industrial
part washer
applications the
efector gwr
reliably detects
the level of
aqueous cleaning
agents at medium
temperatures up
to 80 °C.*

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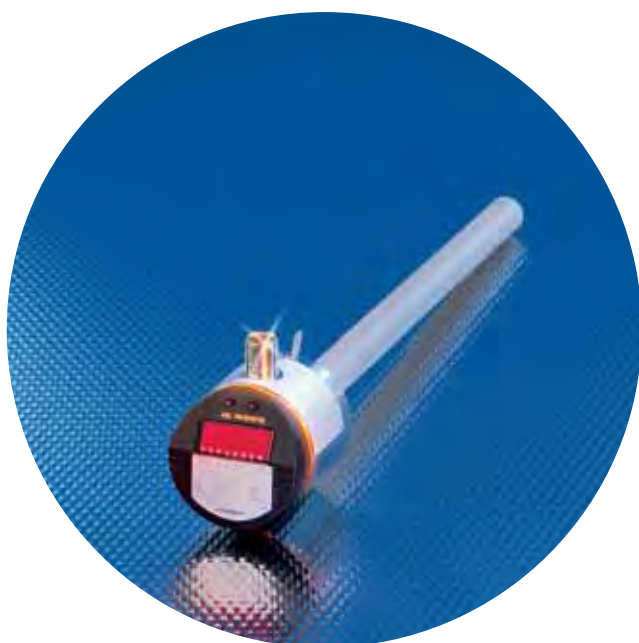
Housing / Dimensions / Process connection		Measurement		Measuring principle			Medium		Appli- cation	Page	
		Con- tinuous	Point level	Capa- citive	Hydro- static	gwr*	Liquid	Viscous			
[mm]											
	type LK	probe	•	–	•	–	–	•	–	●	22
	type LR	G 3/4 male 3/4 NPT	•	–	–	–	•	•	–	●	24
	type LT	probe	•	–	•	–	–	•	–	●	26
	type LL	probe	•	–	•	–	–	•	–	●	28
	type PY / PN	G 1/4 female	•	–	–	•	–	•	•	●	30
	type PI	ASEPTOFLEX	•	–	–	•	–	•	•	●	32
	type LI	probe	–	•	•	–	–	•	–	●	34

*gwr = guided wave radar

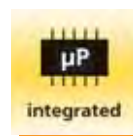
For industrial
applications

For hygienic
areas and
viscous media

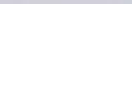

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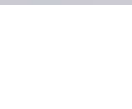
- Preferably used for applications in oils and coolants.
- The integrated LED display provides direct read-out of the current level.
- Freely selectable switch points or analogue signal output.
- High reliability due to the elimination of mechanical components.
- Versions with approval to the German overspill standard WHG section 19.



Accessories

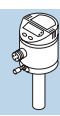
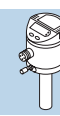
Type	Description	Order no.
	Mounting set Ø 16 mm for capacitive level sensors LK, LI, LT, LL	E43016
	Welding adapter Ø 50 D16 for capacitive level sensors LK, LI, LT, LL	E43002
	Mounting adapter G 3/4 D16 for capacitive level sensors LK, LI, LT, LL	E43003
	Mounting adapter G 1 D16 for capacitive level sensors LK, LI, LT, LL	E43004
	Flange plate 73-90 D16 for capacitive level sensors LK, LI, LT, LL	E43001

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 7 2 m black, PUR cable	EVC004
	Socket, M12, Group 7 5 m black, PUR cable	EVC005
	Socket, M12, Group 15 2 m black, PUR cable	E11231
	Socket, M12, Group 15 5 m black, PUR cable	E11232
	Socket, M12, Group 7 2 m black, PUR cable	EVC001
	Socket, M12, Group 7 5 m black, PUR cable	EVC002

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	LK with display	LR with display	LT with display	LL with display	PY / PN with display	For hygienic areas and viscous media	PI with display
Level sensors Continuous								
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Rod length 264, 472 and 728 mm
Electrical design: DC PNP
LK12xx: Approval to the German overspill standard WHG section 19

Rod length [mm]	Active zone [mm]	Inactive zone [mm]	U _b [V]	Current consumption [mA]	I _{load} 25°C / 60°C [mA]	Draw- ing no.	Order no.
M12 connector · Output function 1 x  /  , 1 x overflow output · Connector groups 7, 8, 9 · Wiring diagram no. 1							
264	195	53 / 15	12...30	0...65 * / 35 ***	200	1	LK1222
472	390	53 / 30	12...30	0...65 * / 35 ***	200	1	LK1223
728	585	102 / 40	12...30	0...65 * / 35 ***	200	1	LK1224
M12 connector · Output 1 x analog 4...20 mA / 0...10 V, 1 x overflow output · Connector groups 7, 8, 10 · Wiring diagram no. 2							
264	195	53 / 15	18...30	0...70 * / 90 ** / 65 ***	200	2	LK3122
472	390	53 / 30	18...30	0...70 * / 90 ** / 60 ***	200	2	LK3123
728	585	102 / 40	18...30	0...70 * / 90 ** / 55 ***	200	2	LK3124
M12 connector · Output function 2 x  /  · Connector groups 7, 8, 9 · Wiring diagram no. 3							
264	195	53 / 15	18...30	0...70 * / 90 ** / 65 ***	200	2	LK1022
472	390	53 / 30	18...30	0...70 * / 90 ** / 60 ***	200	2	LK1023
728	585	102 / 40	18...30	0...70 * / 90 ** / 55 ***	200	2	LK1024
M12 connector · Output function 3 x  /  , 1 x overflow output · Connector group 15 · Wiring diagram no. 26							
264	195	53 / 15	18...30	0...70 * / 90 ** / 65 ***	200	2	LK8122
472	390	53 / 30	18...30	0...70 * / 90 ** / 60 ***	200	2	LK8123
728	585	102 / 40	18...30	0...70 * / 90 ** / 55 ***	200	2	LK8124

Common technical data

Switch point accuracy: ± 5 %
Repeatability: ± 2 %
Dielectric constant medium: > 2
Protection: IP 67, III
Materials (wetted parts): PP
Housing materials: EPDM/X, FPM, stainless steel, NBR, PA, PBT, PC; PP
* for oils (Continuous)
** for oils (Short time)
*** for hydrous coolants, water and media similar to water
For water > 35° C use climatic tube!
(climatic tube s. page 218)

You can find scale drawings from page 236

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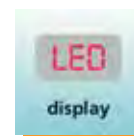
LI

Level sensors
Point level





- 2 or 4 progr. switching outputs with hysteresis and window function.
- Direct indication of the current level by LED display.
- Easy handling via the user menu.
- The rod can be cut to length, if needed.
- Excellent price / performance ratio.



Accessories

Type	Description	Order no.
	Probe for level sensors LR, probe length 228 mm	E43203
	Probe for level sensors LR, probe length 438 mm	E43204
	Probe for level sensors LR, probe length 688 mm	E43205
	Flange plate 73-90 / G3/4 for level sensors LR	E43201
	Flange plate 65-80 / G3/4 for level sensors LR	E43202
	Protective cover for LK / LL / LR / LT sensors	E43910

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 7 2 m black, PUR cable	EVC001
	Socket, M12, Group 7 5 m black, PUR cable	EVC002
	Socket, M12, Group 9 2 m black, PUR cable, LED	EVC007
	Socket, M12, Group 9 5 m black, PUR cable, LED	EVC008
	Socket, M12, Group 15 2 m black, PUR cable	E11231
	Socket, M12, Group 15 5 m black, PUR cable	E11232
	Socket, M12, Group 15 10 m black, PUR cable	E11311

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	LK with display	LR with display	LT with display	LL with display	PY / PN with display	For hygienic areas and viscous media	PI with display
Level sensors Continuous								
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Selectable rod lengths: 240, 450 and
Electrical design: DC PNP, 4-wire or 8-wire
Process connection: LR7000, LR8000: G 3/4, LR7300, LR8300: 3/4 NPT

Active range [mm]	Inactive range [mm]	Set point [mm]	Reset point [mm]	In steps of [mm]	Draw-ing no.	Order no.
M12 connector · Output 2 x  /  programmable · Wiring diagram no. 3						
190 / 400 / 650 *	40 / 10	15...200 / 15...410 / 15...660 *	10...195 / 10...405 / 10...655 *	5	3	LR7000
190 / 400 / 650 *	40 / 10	15...200 / 15...410 / 15...660 *	10...195 / 10...405 / 10...655 *	5	4	LR7300
M12 connector · Output 4 x  /  programmable · Wiring diagram no. 27						
190 / 400 / 650 *	40 / 10	15...200 / 15...410 / 15...660 *	10...195 / 10...405 / 10...655 *	5	5	LR8000
190 / 400 / 650 *	40 / 10	15...200 / 15...410 / 15...660 *	10...195 / 10...405 / 10...655 *	5	6	LR8300

Common technical data

Switch point accuracy: +/- 1.5 cm
Repeatability: +/- 0.5 cm
Dielectric constant medium: > 20
Protection: IP 67 II
Materials (wetted parts): stainless steel (303S22), PTFE, NBR
Housing materials: FKM, NBR, PBT, PC, PEI, PTFE, TPE-V, stainless steel (304S15)
Medium temperature: 0...80 °C
Maximum tank pressure: -1...4 bar
* For probe sonda E43203, E43204, E43205

You can find scale drawings from page 236

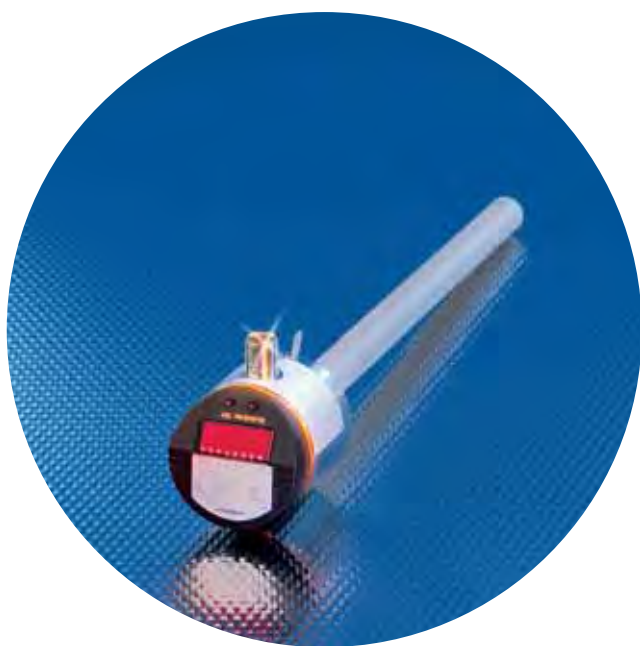
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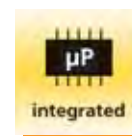
LI

Level sensors
Point level





- LED display for direct indication of level and temperature.
- Adjustable hysteresis and window function of the switching outputs.
- Reduced mounting complexity due to two measuring systems in one unit.
- No need for a second borehole in the hydraulic system.
- 2 progr. switching outputs each for level and oil temperature monitoring.



Accessories

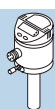
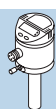
Type	Description	Order no.
	Flange plate 65-80 D16 for capacitive level sensors LK, LI, LT, LL	E43006
	Flange plate 73-90 D16 for capacitive level sensors LK, LI, LT, LL	E43001
	Flange plate 54-52X52 D16 for capacitive level sensors LK, LI, LT, LL	E43007
	Mounting adapter G1 D16 for capacitive level sensors LK, LI, LT, LL	E43004
	Mounting adapter G3/4 D16 for capacitive level sensors LK, LI, LT, LL	E43003

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 15 2 m black, PUR cable	E11231
	Socket, M12, Group 15 5 m black, PUR cable	E11232

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Further connectors and splitter boxes are available starting on page 191

	For industrial applications	LK with display	LR with display	LT with display	LL with display	PY / PN with display	For hygienic areas and viscous media	PI with display
Level sensors Continuous								
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Probe lengths 264, 472 and 728 mm
Direct level and temperature display
Protection rating IP 67

Probe length [mm]	Active range [mm]	Inactive range [mm]	U _b [V]	Medium temperature [°C]	I _B [mA]	Draw- ing no.	Order no.
M12 connector · Output 2 x / prog. (level) 2 x / prog. (temp.) · Connector gr. 15 · Wiring diag. no. 27							
264	195	53 / 15	18...30	0...70 * / 0...90 **	200	7	LT8022
472	390	53 / 30	18...30	0...70 * / 0...90 **	200	7	LT8023
728	585	102 / 40	18...30	0...70 * / 0...90 **	200	7	LT8024

Common technical data

Switch point accuracy: ± 5 %
Repeatability: ± 2 %
Dielectric constant medium: > 2
Protection: IP 67, III
Materials (wetted parts): PP
Housing materials: FKM, NBR, PBT, PC, PP,
TPE / V, stainless steel
* Continuous
** Short time

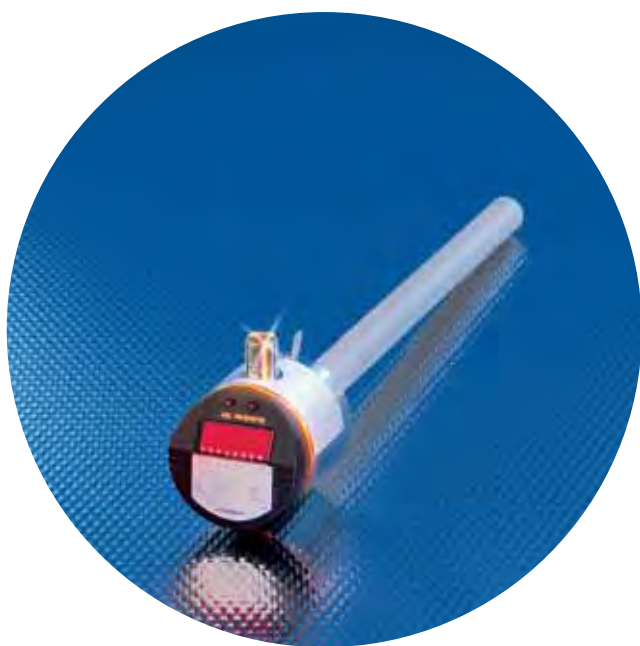
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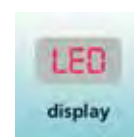
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LI

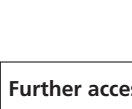
Level sensors
Point level



- Level and leakage monitoring in power packs.
- Direct indication of the current level by LED display.
- Reliable detection of sudden and progressive leakage.
- Freely programmable switching outputs for level monitoring.
- Easy operation and teach function via the user menu.



Accessories

Type	Description	Order no.
	Mounting set Ø 16 mm for capacitive level sensors LK, LI, LT, LL	E43016
	Mounting adapter G3/4 D16 for capacitive level sensors LK, LI, LT, LL	E43003
	Mounting adapter G1 D16 for capacitive level sensors LK, LI, LT, LL	E43004
	Flange plate 73-90 D16 for capacitive level sensors LK, LI, LT, LL	E43001
	Flange plate 65-80 D16 for capacitive level sensors LK, LI, LT, LL	E43006
	Flange plate 54-52X52 D16 for capacitive level sensors LK, LI, LT, LL	E43007

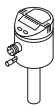
Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 15 2 m black, PUR cable	E11231
	Socket, M12, Group 15 5 m black, PUR cable	E11232
	Socket, M12, Group 15 10 m black, PUR cable	E11311

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

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Level sensors Continuous								
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Probe lengths: 264, 472 and 728 mm
Electronic design: DC PNP, 8-wire
M12 connector

Probe length [mm]	Active range [mm]	Inactive range [mm]	U _b [V]	Medium temperature [°C]	I _B [mA]	Draw- ing no.	Order no.
M12 connector (according to EN 61076-2-101) · Output function 4 x  /  · Connector group 15 · Wiring diagram no. 28							
264	195	53 / 15	18...30	0...70 * / 0...65 **	200	7	LL8022
472	390	53 / 30	18...30	0...70 * / 0...60 **	200	7	LL8023
728	585	102 / 40	18...30	0...70 * / 0...55 **	200	7	LL8024

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Common technical data

Switch point accuracy: +/- 5 %
Repeatability: +/- 2 %
Dielectric constant medium: > 2
Protection: IP 67 II
Materials (wetted parts): PP
Housing materials: FKM, NBR, PBT, PC, PEI, PP, TPE-V, stainless steel
* for oils
** for hydrous coolants, water and media similar to water
For water > 35° C use climatic tube!
(climatic tube s. page 218)

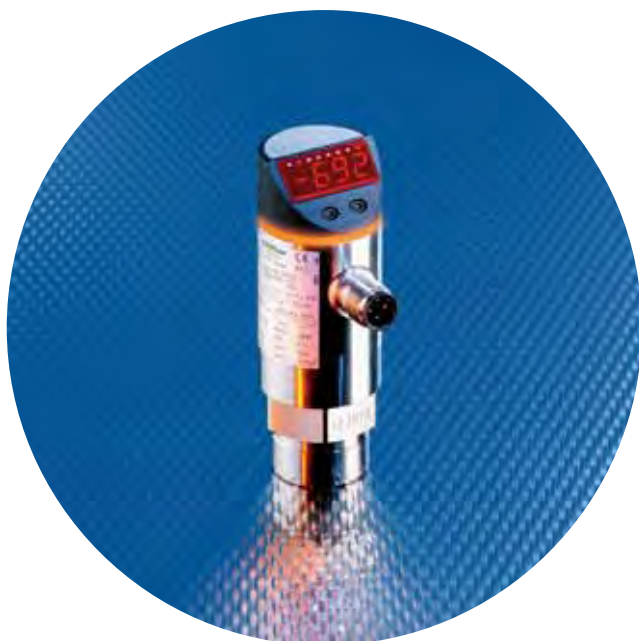
You can find scale drawings from page 236

For industrial applications

LI

Level sensors
Point level





- High-precision level measurement with long-term stability in liquids.
- Independent of the electrical characteristics of the bulk material.
- No interference in the case of foaming or high temperatures.
- Analogue transmission of the level in combination with switching output.
- Variable connection concept by means of a variety of process fittings.

Stainless steel

IP 67

Vibration and shock resistant

M12 connector

Accessories

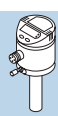
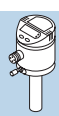
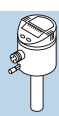
Type	Description	Order no.
	Adapter, G 1/4 - G 1/2	E30000
	Adapter, G 1/4 - G 1/4	E30007
	Protective cover, sealable	E30006

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 58 5 m orange, PVC cable	EVT004
	Socket, M12, Group 58 10 m orange, PVC cable	EVT005
	Socket, M12, Group 7 2 m black, PUR cable	EVC001
	Socket, M12, Group 7 5 m black, PUR cable	EVC002

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	LK with display	LR with display	LT with display	LL with display	PY / PN with display	For hygienic areas and viscous media	PI with display
Level sensors Continuous								
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Output 1: switching output programmable
Output 2: switching output programmable or analog output 4...20 mA / 0...10 V
measuring accuracy : PY2068: 0.2 %, PN2069: 0.6 %

Measuring range [bar]	P _{overload} max. [bar]	P _{bursting} min. [bar]	Analog lower end [bar]	Analog upper end [bar]	Switch-on point SP1 / SP2 [bar]	Switch-off point rP1 / rP2 [bar]	In steps of [bar]	Draw- ing no.	Order no.
Process connection: G 1/4 I · Medium temperature: -25...80 °C · Connector groups 7, 8, 10 · Wiring diagram no. 29									
-0.25...0.25	10	30	-0.25...0.125	-0.125...0.25	-0.248...0.25	-0.25...0.248	0.001	8	PY2068
Process connection: G 1/4 I · Medium temperature: -25...80 °C · Connector groups 7, 8, 10 · Wiring diagram no. 30									
-0.5...0.5	10	30	-0.5...-0.1	-0.25...0.5	-0.496...0.5	-0.5...0.496	0.001	9	PN2069

Note: For hydrostatic level measurement the above-mentioned sensors are mounted in the bottom of the tank.

Common technical data

Ub: 20...30 DC
Current rating: 1 x or 2 x 250 mA
Current consumption: < 60 mA
Materials (wetted parts): stainless steel, ceramics
Shock resistance: 50 g (11 ms)
Vibration resistance: 20 g (10...2,000 Hz)
Protection: IP 67
For further data see
www.ifm-electronic.com

You can find scale drawings from page 236

For industrial applications

LI



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Temperature sensors

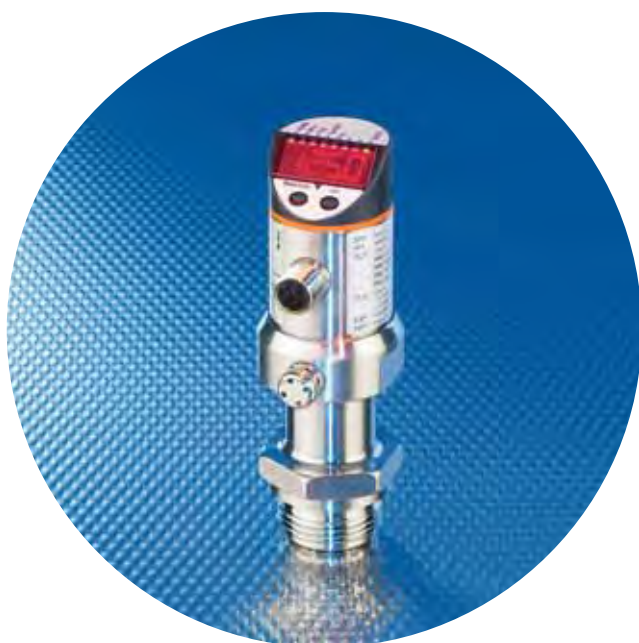
Diagnostic systems

Evaluation systems, power supplies

Connection technology

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Technical information and customer service



- Level measurement with long-term stability in aseptic applications.
- Independent of the electrical characteristics of the bulk material.
- 0.2 percent measuring accuracy and temperature compensation.
- Level indication in % referred to the final value of the measuring range.
- The right connection for each process, e.g. SMS, Clamp, pipe fitting.



Accessories

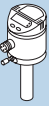
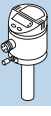
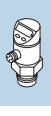
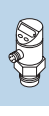
Type	Description	Order no.
	Welding adapter, Ø 50 mm	E30052
	Protective cover, stainless steel (320S31), O-ring: Viton	E30101
	Protective cover, stainless steel (320S31), O-ring: EPDM	E30104
	Aseptoflex adapter, DIN11851 - 1.5" / DN40	E33012
	Aseptoflex adapter, Clamp 1.5"	E33001

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 58 5 m orange, PVC cable	EVT004
	Socket, M12, Group 58 10 m orange, PVC cable	EVT005
	Socket, M12, Group 7 2 m black, PUR cable	EVC001
	Socket, M12, Group 7 5 m black, PUR cable	EVC002

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

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Level sensors Continuous								
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Output 1: switching output programmable; Output 2: switching output programmable or analog output
4...20 mA / 0...10 V, zero and span adjustable
PI10xx: Two-wire connection with 4...20 mA analogue output

Measuring range [bar]	P _{overload} max. [bar]	P _{bursting} min. [bar]	Analog lower end [bar]	Analog upper end [bar]	Switch-on point SP1 / SP2 [bar]	Switch-off point rP1 / rP2 [bar]	In steps of [bar]	Draw- ing no.	Order no.
Process connec.: Aseptoflex adapter · Medium temp.: -25...125 °C (145 °C max. 1h) · Connec. gr. 58, 59, 61, 64 · Wiring diag. no. 29									
-1...1	10	30	-1...0.5	-0.5...1	-0.998...1	-1...0.998	0.001	10	PI2099
-0.0124...0.25	10	30	-0.0124...0.1874	0.05...0.25	-0.012...0.25	-0.0124...0.2496	0.0002	10	PI2098
-0.05...1	10	30	-0.05...0.75	0.2...1	-0.048...1	-0.05...0.998	0.001	10	PI2097
Process connec.: Aseptoflex adapter · Medium temp.: -25...125 °C (145 °C max. 1h) · Connec. gr. 58, 59, 61, 64 · Wiring diag. no. 31									
-1...1	10	30	-1...0.5	-0.5...1	–	–	0.001	10	PI1099
-0.0124...0.25	10	30	-0.0124...0.1874	0.05...0.25	–	–	0.00002	10	PI1098
-0.05...1	10	30	-0.05...0.75	0.2...1	–	–	0.001	10	PI1097

Note: For hydrostatic level measurement the above-mentioned sensors are mounted in the bottom of the tank.

Common technical data

Ub: 20...30 DC
Current rating: 250 mA
Current consumption: < 50 mA
Characteristics deviation: < ± 0.2 %
Materials (wetted parts): stainless steel (316S12), ceramics, PTFE
Shock resistance: 50 g (11 ms)
Vibration resistance: 20 g (10...2,000 Hz)
Protection: IP 67 / IP 69K
For further data see
www.ifm-electronic.com

You can find scale drawings from page 236

For industrial applications

LI

Level sensors
Point level



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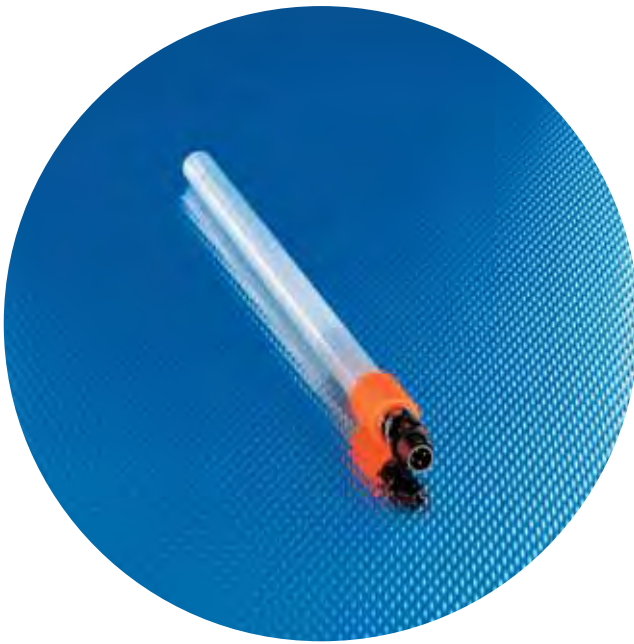
Diagnostic systems

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- Binary point level switch for oils and coolants.
- Safe medium detection even in the case of soiling and foaming.
- The modular installation concept reduces the usual variety of types.
- Easy setting of switch point via push-buttons.
- Approval for overspill protect. to the German overspill std. WHG, sec. 19.



Accessories

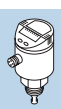
Type	Description	Order no.
	Mounting set Ø 16 mm for capacitive level sensors LK, LI, LT, LL	E43016
	Welding adapter Ø 50 D16 for capacitive level sensors LK, LI, LT, LL	E43002
	Flange plate 100-125 D16 for capacitive level sensors LK, LI, LT, LL	E43005
	Flange plate 65-80 D16 for capacitive level sensors LK, LI, LT, LL	E43006
	Mounting adapter G 3/4 D16 for capacitive level sensors LI	E43019

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 7 2 m black, PUR cable	EVC004
	Socket, M12, Group 7 5 m black, PUR cable	EVC005
	Socket, M12, Group 58 5 m orange, PVC cable	EVT004
	Socket, M12, Group 58 10 m orange, PVC cable	EVT005
	Socket, M12, Group 7 2 m black, PUR cable	EVC001
	Socket, M12, Group 7 5 m black, PUR cable	EVC002
	Socket, M12, Group 58 5 m orange, PVC cable	EVT001
	Socket, M12, Group 58 10 m orange, PVC cable	EVT002

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

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Level sensors Continuous								
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Rod lengths 132, 273, 481 and 737 mm
LED switching status indication, programming via pushbutton
Type LI2: Approval to the German overspill standard WHG, section 19

Electrical design	Rod length [mm]	Draw- ing no.	Order no.
M12 connector · Output function  · Connector groups 7, 8, 9, 10 · Wiring diagram no. 4			
DC PNP	132	1	LI2041
DC PNP	273	1	LI2042
DC PNP	481	1	LI2043
M12 connector · Output function  /  · Connector groups 7, 8, 9, 10 · Wiring diagram no. 32			
DC PNP	132	1	LI5041
DC PNP	273	1	LI5042
DC PNP	481	1	LI5043
DC PNP	737	1	LI5044

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Common technical data

Ub: 10...36 DC
Dielectric constant medium: > 1.8
Current rating: 250 mA
Current consumption: < 13 mA
Voltage drop: < 2.5 V
Material: PP (Polypropylen)
Protection: IP 67, II
Medium temperature: oil: 0...65 °C,
for hydrous coolants: 0...35 °C
For further data see
www.ifm-electronic.com

You can find scale drawings from page 238

For industrial applications

LI



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Level sensors
Point level



Flow sensors

efector300®

Universal application

Special application

Universal application

Flow sensors and transmitters, flow meters

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Flow sensors and transmitters for industrial applications

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Type SF / VS3000 thermal flow sensors	60 - 65



Flow sensors for hygienic areas and viscous media

Type SI thermal flow sensors	66 - 67
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Flow sensors for hazardous areas

Type SF / VS2000 thermal flow sensors	68 - 71
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Flow meters for industrial applications

Type SD compressed air / consumed quantity meter	72 - 75
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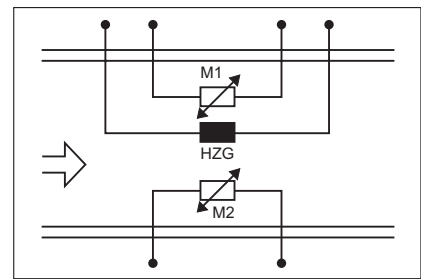
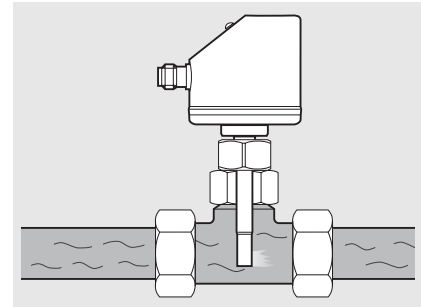
Introduction

In almost all fields of process and plant engineering liquids or gases are used for coolant and lubricant supply of machines and aggregates, ventilation of installations and buildings and the processing of products. Even the product itself may be the medium which is to be monitored permanently. In case of no flow of these media considerable damage and downtime may result. Thus it is very important to monitor that these media are at the right place at the right time and in sufficient quantities. In modern installations electronic flow monitors are used for this purpose. They work without wear and tear and without mechanical components. This guarantees reliable monitoring even in case of difficult media over a long period.

Use of flow monitors for monitoring seal water on pumps.



Electronic sensor: Wear-free monitoring of flow.



Operating principle

Many applications require a simple binary flow monitoring. This means that the states "medium flowing" and "medium not flowing" or value below or above a defined threshold must be detected safely.

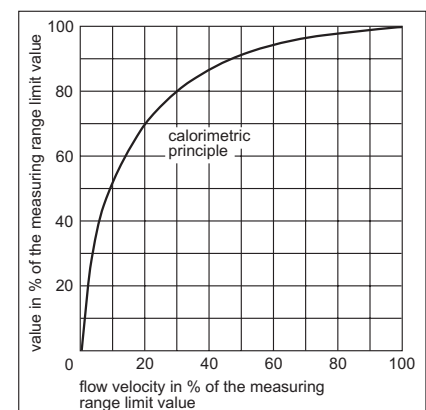
Electronic flow monitors operating on the basis of the calorimetric principle are perfectly suited for this. They use the physical effect that a flowing medium absorbs heat energy and conducts it away. The sensor tip contains two temperature-dependent measuring elements as well as a heat source. The heat source generates a local temperature rise in the medium which is detected by one of the measuring elements. If the medium flows, energy is conducted away from the heat source, i.e. it is cooled. The resulting temperature change is an indication of flow.

To avoid a falsification of the result of the measurement by a change in the medium temperature, a second measuring element is used for temperature compensation. The difference in the measured values of the measuring elements results in the signals "medium flowing" or "medium not flowing" being provided by the control monitor after comparison with the set preset and limit values.

Sudden high temperature changes of the medium can only be compensated for within the data given in the data sheet. In order to avoid a temporarily false output signal, these values should not be exceeded.

As these systems work without any mechanically moved parts the user can mount them independent of mounting position and flow direction. For certain applications and environments preferred positions are recommended.

Principle of the transducer: Two temperature-dependent measuring elements (M1 / M2) and a heat source (HZG).



Preferred applications: The system is particularly sensitive in the area of low flow.

Due to the steep curve at low flow velocities the calorimetric system is especially suited for a precise and fast detection of flow and no flow in this range. The temperature gradient and the heat conductivity of the medium have less influence on the heat dissipation at the sensor tip and the switching characteristics of the sensor than in the area of the flat curve. This feature of the calorimetric flow monitor is of significance when selecting the switch point or the threshold value: In order to obtain a stable switch point and a low switching hysteresis with reference to the flow velocity, it is preferable to set a switch point at a slow flow velocity. In the technical data sheets this area is stated as "Greatest sensitivity setting".

Flow sensors for separate control monitor

ifm flow sensors type SF are intended for connection to a separate control monitor type VS3000. Flow sensor and control monitor, together form the flow monitor. This flow monitor can be used for monitoring liquids and gases.

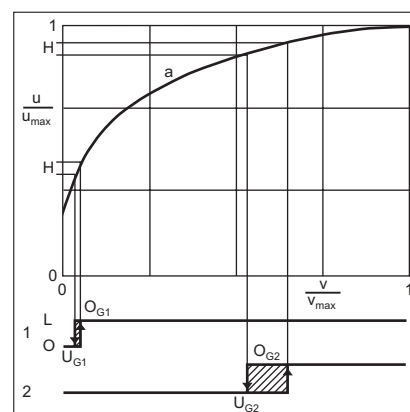
The units for separate control monitor are preferably used where environmental conditions and regulations do not permit local installation of the control monitor – such as for high medium temperatures and operating temperatures or where space is at a premium.

The sensors consist of a one-piece stainless steel or titanium housing with integrated PTCs and heat source. The sensors can be connected to different process connections via adapters which are available as accessories. The sensors are connected to the control monitor via a fixed cable connection or connector. The control monitor is available as a housing to be mounted on a rail.

Apart from the power supply it contains the voltage regulator and evaluation of the sensing circuit, the output circuits, the adjustment potentiometer for the switch point as well as an 11-digit coloured LED display for flow indication.

Using the control monitor it is also possible to monitor the medium temperature. With a potentiometer the user can set a temperature threshold value with another output signal being given when the medium temperature is exceeded. If the same flow sensor is connected to an extended control monitor, it is possible to monitor flow and temperature.

Stable
switch point:
Low switching
hysteresis at low
flow velocity.



External VS3000
control monitor:
The sensor
becomes a
flow monitor.



For safety applications wire break monitoring of the cable from the sensor to the control monitor is included. In the case of a failure a separate output signal (normally closed circuit) is given. The output signals of the control monitors are passed on for further processing via floating relay contacts. Faults are indicated by a red LED on the front face. All control monitors are available for various supply voltages.

Very small flow quantities in the ml range can also be monitored by using flow adapters which are available as accessories.

To cover the large field of applications, sensors are available for high medium temperatures, high pressures, aggressive media as well as for applications in hazardous areas.



*Compact
flow monitor:
Sensors of
type SI5000.*

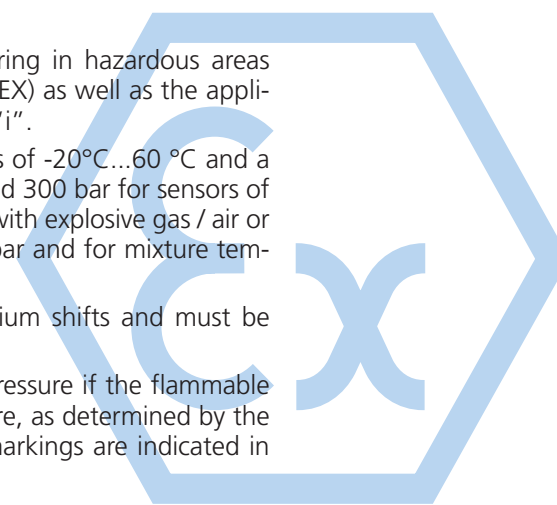
Flow monitoring in hazardous areas

The sensors and control monitors for flow monitoring in hazardous areas meet the requirements of the directive 94/9/EC (ATEX) as well as the applicable standards and requirements of intrinsic safety "i".

The flow sensors are rated for medium temperatures of -20°C...60 °C and a pressure of 30 bar for sensors of the category 2 G and 300 bar for sensors of the category 1/2 G. They are tested for installations with explosive gas / air or vapour / air mixtures at pressures of 0.8 bar to 1.1 bar and for mixture temperatures of -20 °C...60°C.

At higher pressures the explosion limit of the medium shifts and must be assessed and approved by the user.

The sensors can be mounted in pipes with higher pressure if the flammable media do not form explosive mixtures at that pressure, as determined by the user together with the respective authorities. The markings are indicated in the data sheets and operating instructions.



Flow monitors with integrated control monitor

The compact SI flow monitor combines flow sensor and control monitor in one unit. This offers a high degree of functionality, simple handling and flexible process connection options. This compact and space-saving version is suitable for use in both liquid and gaseous media. The wetted parts of the sensor are made of stainless steel (316S12) and can be rated for several pressure ranges.

Another version enables process connection by means of a special ifm thread which can be screwed into the process connections which are common in hygienic and sterile areas. This solution is tested and certified to EHEDG.

*Flow sensors for
use in hazardous
areas.*



*Process
connection:
The adapter
enables easy
integration
of the flow
monitor in the
installation.*



Programming and adjustment of the sensor are done via pushbuttons. The 10-digit LED bar display allows local indication of the flow range and the programmed switch points. The sensor has a "Learn" button allowing simple and quick setup. By briefly pressing this button the sensor "learns" the present flow conditions and stores them as the nominal flow. Zero flow (or a non-zero, minimum flow) can also be stored in the same way.

The LED bar display indicates the selected monitoring range. The factory pre-set switch point can be changed within this selected range as desired.

When the flow is above or below the selected range, this is indicated by flashing of the right or left LED. Another setting option enables the monitoring of excessive flow.

For applications where a fast flow change must be monitored another monitor version has an additional menu option for setting both the switch-on and the switch-off points. Flow changes can then be confirmed after 1 second within the flow range. All settings performed can be protected via an electronic lock. Versions with analogue output, AC supply and two switching outputs complete the range.

Airflow monitoring

Designed for monitoring airflows in ventilation systems the ifm airflow monitor type SLG is a reliable and inexpensive alternative for mechanical flaps and pressure cells.

Sensor, evaluation electronics, output relay, setting potentiometer, LEDs as well as a timer that serves as a switch-on delay for the fan or ventilator are incorporated in a smooth cylindrical plastic housing.

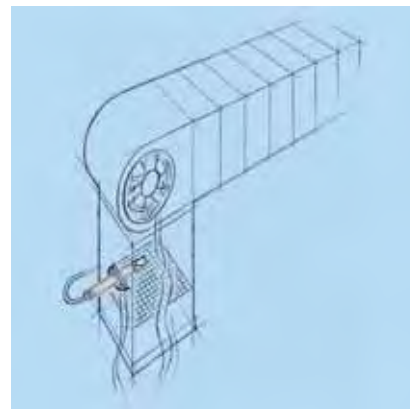
The switch-on delay is indicated by means of a simultaneous lighting of the two LEDs. During this time the output relay is energised and the contact is closed. The switch point can be set continuously with the potentiometer. A red or green LED indicates flow below or above the nominal value.

In the case of no flow the red LED lights, the output relay is deenergised, the relay contact is open. When the airflow monitor detects flow the green LED lights and the relay contact is closed. The output signal is available as a volt-free NO contact.

The length of the airflow monitor allows a maximum immersion of 120 mm into the air duct. It is installed in the air duct by means of the supplied mounting clamp which is secured to the duct via two self-tapping screws.

A mark on the airflow monitor housing ensures correct orientation to the airflow.

During the design of the sensor part special emphasis was put on the protection of the PTCs against mechanical destruction by solid particles in the medium. The PTCs are included in the sensor head and are protected against mechanical damage from outside by means of flush mounted metal plates. The titanium-palladium plates also provide a good heat contact to the medium. The airflow monitor can thus also be used in industrial applications without any problem.



*Measurement in the air duct:
The airflow monitor can be used in horizontal pipes as well as in rising pipes. Only the mounting position must be in accordance with the arrow on the cap.*

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Thermal compressed air meter

Much success has recently been achieved as regards saving of energy, production costs and processes. It has been possible to use electricity, water, coolants and other process materials more efficiently and at reduced costs. Against this background, industry has focused in the past few years on the cost reduction as regards the use and consumption of compressed air. As it is one of the most expensive media for transferring energy used in industry, considerable cost savings and less strain on the environment are possible when it is used efficiently.

In order to find points where savings can be made the user has to know where too much energy is used and where expensively generated energy is lost due to leakages. **efector metris** provides a low-cost solution for the measurement of the compressed air used as well as the possibility of detecting progressive leakages.

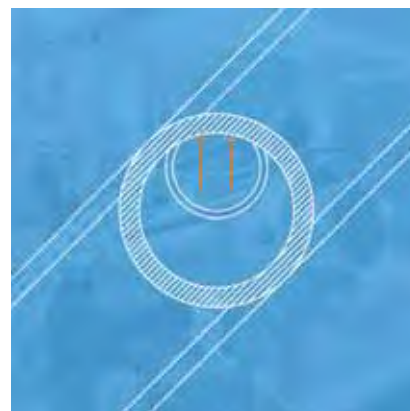
Annual energy costs caused by leakage:						
Hole Ø [mm]	Air loss at 6 bar [l/s]	Air loss at 12 bar [l/s]	Energy loss kWh at 6 bar	Energy loss kWh at 12 bar	Costs at 6 bar [EUR]	Costs at 12 bar [EUR]
1	1.2	1.8	0.3	1.0	144	480
3	11.1	20.8	3.1	12.7	1,488	6,096
5	30.9	58.5	8.3	33.7	3,984	16,176
10	123.8	235.2	33.0	132.0	15,840	63,360

kWh x EUR 0.06 x 8,000 operating hours / year; source: www.druckluft-effizient.de

Operating principle

The compressed air meter **efector metris** works according to the calorimetric principle.

As a thermal measuring method it is especially suited for the measurement of volumetric flow of gaseous media. An additional correction of the measured data via pressure and temperature is not necessary in this case. The temperature of the medium is detected by means of two PT elements positioned in the air flow one of which serves as reference. The other probe which is heated additionally, is maintained at the same heat level depending on the heat loss caused by the medium flowing past it. The electrical energy needed to maintain the constant heat level is proportional to the volumetric flow of the gaseous media. The mechanical design of the measuring elements in a defined measuring pipe allows high measuring dynamics, fast response times and high sensitivity. The measured data is processed by means of state-of-the-art microprocessor technology with a variety of possibilities for signal processing. The measured data which is displayed and provided refers to standard cubic metres to DIN / ISO 2533 (1013 hPa, 15 °C, 0 % relative air humidity).



The calorimetric principle measures the standard volume flow irrespective of temperature and pressure.

Applications

Many sources including the campaign “druckluft-effizient” clearly indicate the growing interest in the optimised use of compressed air as a medium for transferring energy. There is a substantial saving potential for operating costs. **efector metris** helps to explore this potential.

The installation of several measuring points in the compressed air system clearly shows where and how much compressed air is consumed. The consumption can be allocated to production processes or products for optimising the cost structure.



Optimised consumption of compressed air.



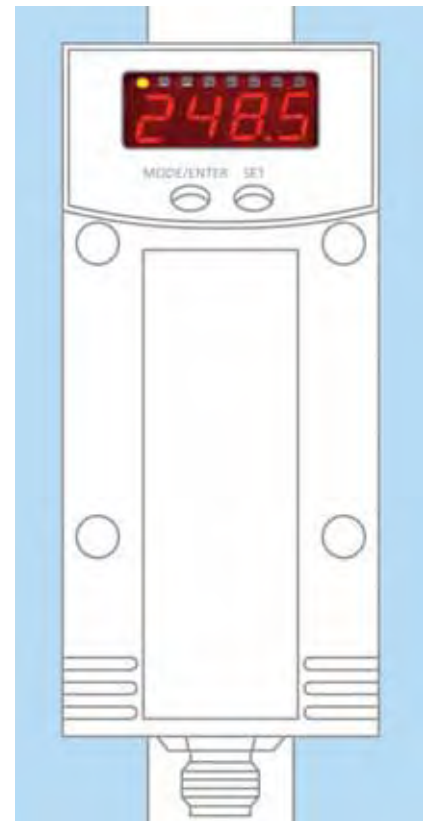
Leakage monitoring.



Allocation of consumed quantities.

Consumed quantity meter for special gases

A special version of **efector metris** detects the flow of gases in closed pipe systems. The unit can detect the volume flow of the gases argon (Ar), carbon dioxide (CO₂) or nitrogen (N₂). The integrated totaliser function allows the determination of the consumed quantities of the used gases and the retrieval of the total quantity over a certain period of time. There are other versions for the smallest quantities, too.



The integral 4-digit LED display plus the status LEDs allow information to be available at the point of monitoring. Whether peak consumption, present or accumulated consumption:

Set switch or alarm levels can be accessed and programmed via pushbutton. All settings can be protected using the electronic lock function.

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Ultrasonic flow rate meter

If binary monitoring of a flowing medium is sufficient and efficient for plant safety, process control and safety in many applications it is also important to know and monitor how much medium moves in what time from A to B. In this case a quantified statement about the quantity used, the consumption or the optimum quantity is required. Measurement of the flow rate on the basis of ultrasonic technology has gained increasing acceptance in the market and in applications during the past few years.

Due to its measuring characteristics this physical method is suited for the use in the following areas:



Monitoring of cooling water.



Monitoring of leaks.

Optimisation of cooling.



Exact determination of water supply.



Operating principle

Sound is the propagation and perception of pressure waves. It is the same as the perception of tones, e.g. music. In this case there is the sound emitter, the loudspeaker, and the receiver.

The ultrasonic flow rate meter type SU functions according to the transit time difference method. Two sound transducers are positioned at a defined distance in a defined pipe length. These sound transducers alternately emit sound pulses which are directed in the direction of the flow and against the direction of the flow. The pulse trains emitted with the flow in the pipe length are transported faster to the receiver by the flowing medium than the signals emitted against the direction of the flow.

The resulting transit time difference of the sound pulses enables the determination of the flow velocity and flow rate on the basis of the defined conditions like distance of sound transducer and cross-section. State-of-the-art microprocessor technologies process the measured data for display and signal processing.

Decentralised flow rate monitoring: Also ideal in widely branched cooling systems, e.g. welding lines. The flow rate meter SU detects very small deviations (100 ml/min)

from the set flow rate, for example when leaks occur – and monitors at the same time the temperature of the cooling water. This guarantees process safety and quality.

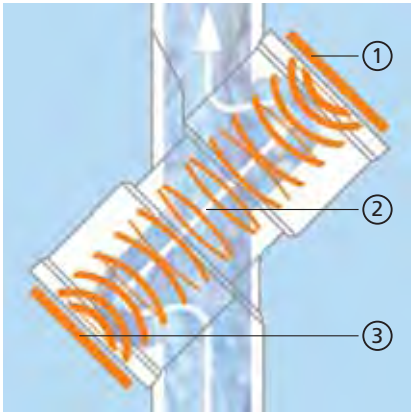
The flow rate meter type SU is an inline flow rate meter. The propagation time of the sound depends to a large extent on the medium (gaseous, liquid). Therefore information about the type of medium must be given to the measuring system so that the respective correction factors can be included. In addition to simple flow rate monitoring the SU also monitors the temperature of the medium. It is displayed on site and provided for signal processing. This makes the system particularly suitable for the monitoring of cooling circuits, because temperature and flow rate can be monitored at the same time.

The processed information for integration into the process and further processing is of course important for the user. The SU provides a variety of possibilities for representing and processing the data.

In addition to the display of all settings and process data on site there are also various possibilities of signal processing. If continuous documentation of processes is required the measured values are available via analogue outputs (0...10 V / 4...20 mA).

Binary evaluation of measured values is part of the standard. Pulse outputs for counting and totaliser functions are available internally as well as externally. There is also the possibility to allocate an output to the function of a preset counter. In this case a switched signal is provided after a preset flow rate. The operating principle is similar to that of an electronic water meter. A compact design which is ready for connection and can be adapted to various process connections enables the SU ultrasonic flow rate meter to be used in a wide range of applications.

All functions described here can be set directly on site via alphanumeric menu navigation, but they can also be set before installation.



1. Piezoceramic sound transducer
2. Measuring length
3. Piezoceramic sound transducer
Differential transit time principle: Sound pulses are alternately emitted and detected in and against the direction of flow

using piezoceramic sound transducers. The flow rate is exactly calculated from the difference of the transit time (in the nanosecond range from 0.5 to 500 ns). Reliably, wear-and maintenance-free.



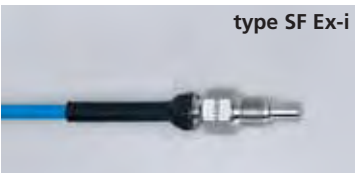
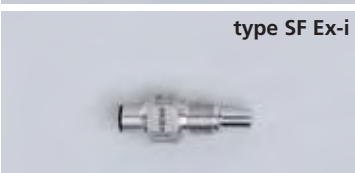
Four-digit alphanumeric display for information on site: Current flow rate, accumulated total quantity and medium temperature. l/min or m³/h can be selected as the unit of measurement. Two LEDs indicate the switch points.

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Housing / Process connection	Application / Flow range	Medium temperature	Supply voltage		Appli- cation	Sensor material			
			DC	AC		Stainless steel Page	Titanium Page	PTFE Page	
	[cm/s]	[°C]							
Thermal flow sensors and transmitters with integrated control monitor									
 type SI5...	sealing cone fitting adapter	liquids: 3...300 gases: 200...3000	-25...80	•	•	●	52 / 54	–	–
 type SI6...	ifm adapter thread	liquids: 3...300 gases: 200...3000	-25...95 -25...120*	•	–	●	66	–	–
 type SLG	mounting clamp	air: 100...1000	-10...50	•	•	●	–	–	58
Thermal flow sensor with integrated control monitor for flow and temperature detection									
 type SI5...	sealing cone fitting adapter	liquids: 3...300 gases: 200...3000	-25...80	•	–	●	56	–	–

* max. 1 hour at 60 °C operating temperature

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applicationsFor hygienic
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viscous mediaFor hazardous
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Housing / Process connection		Application / Flow range	Medium temperature [°C]			Appli- cation	Sensor material			General information	
			-20...60	-20...80	0...120		Stainless steel Page	Titanium Page	Ceramic Page		
Thermal flow sensors with external control monitor											List of articles
	M12 x 1	liquids: 3...300 gases: 2...2000	•	–	–	●	68	–	–	Level sensors	
	G 1/4	liquids: 0...300 gases: 2...2000	•	–	–	●	68	–	–	Flow sensors	
	G 1/2	liquids: 0...300 gases: 2...2000	•	–	–	●	68	–	–	Pressure sensors	
	sealing cone fitting adapter	liquids: 3...300 gases: 200...3000	–	•	–	●	61	61	–	Temperature sensors	
	sealing cone fitting adapter	liquids: 3...300 gases: 200...3000	–	–	•	●	61	61	–	Diagnostic systems	
	M12 x 1	liquids: 3...300 gases: 200...3000	•	–	–	●	68	–	–	Evaluation systems, power supplies	
	G 1/4	liquids: 3...300 gases: 200...3000	•	–	–	●	68	–	68	Connection technology	
	G 1/2	liquids: 3...300 gases: 200...3000	•	–	–	●	68	–	–	Accessories	
										Technical information and customer service	

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For hazardous
areas



Housing / Process connection	Application / Flow range	Medium temperature [°C]			Appli- cation	Sensor material			
		-20...60	-20...80	0...120		Stainless steel Page	Titanium Page	Ceramic Page	
Thermal flow sensors with external control monitor									
 type SF (ceramic)	G 1/4	liquids: 0...60	—	•	—		—	—	63
 type SF (ceramic)	G 1/2	liquids: 0...60	—	•	—		—	—	63
 type SF (ceramic)	G 1/2	liquids: 0...60	—	•	—		—	—	63
 type SF (ceramic)	G 1/4	liquids: 0...60	—	•	—		—	—	63

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Housing / Dimensions [mm]		Monitoring			Appli- cation	DC Page	AC Page	General information		
		Flow	Flow / Temperature	Flow / Wire						
Control monitors									List of articles	
 type VS3000 25 x 103.5 x 100	•	•	•		64	64	Level sensors			
 type VS0200 Ex-i 55 x 75 x 110	–	–	•		70	70			Flow sensors	
									Pressure sensors	
									Temperature sensors	
									Diagnostic systems	
									Evaluation systems, power supplies	
									Connection technology	
								Accessories		
								Technical information and customer service		



Housing / Process connection [mm]		Measuring principle	Measuring range Nm³ / h NI / min	Supply voltage		Appli- cation	Medium- tempe- rature [°C]	Medium	Page
				DC	AC				
Thermal compressed air meters									
 type SD60..	DN 15	thermal	0.25...75.0 4...1,250	•	–	●	0...60	com- pressed air / gases	72
 type SD80..	DN 25	thermal	0.75...225.0 12.5...3,750	•	–	●	0...60	com- pressed air / gases	72
 type SD90..	DN 40	thermal	1.8...410 30...6,830	•	–	●	0...60	com- pressed air / gases	72
 type SD20..	DN 50	thermal	2.3...700 390...11,670	•	–	●	0...60	com- pressed air / gases	72
 type SD50..	DN 8	thermal	0.06...15.00 0.88...250.0	•	–	●	0...60	com- pressed air / gases	74
Consumed quantity meter for gases									
 type SD61..	DN 15	thermal	Ar: 0.35... 105 / – CO ₂ : 0.22... 65 / – N ₂ : 0.23... 67.5 / –	•	–	●	0...60	Ar CO ₂ N ₂	74
 type SD51..	DN 8	thermal	Ar: 0.08... 24.54 / – CO ₂ : 0.047... 14.38 / – N ₂ : 0.05... 14.94 / –	•	–	●	0...60	Ar CO ₂ N ₂	74

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Housing / Process connection [mm]	Measuring principle	Measuring range l / min	Supply voltage		Appli- cation	Medium- tempe- rature [°C]	Medium	Page	
			DC	AC					
Ultrasonic flow rate meters									
type SU7... 	R 1/2	ultrasonic	0...50	•	–		0...80	water / liquids	77
type SU8... 	R 1/2 R 3/4	ultrasonic	0...100	•	–		0...80	water / liquids	77

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For hygienic
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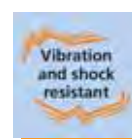
For hazardous
areas





All SI5xxx versions in the same design.

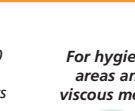
- Increased repeatability across the extended measuring range.
- Simplified setting mode for quick set-up.
- AC and DC version.
- Reliable monitoring of gaseous and liquid media.
- Electronic locking of the setting values.



Accessories

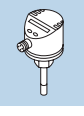
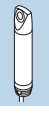
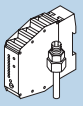
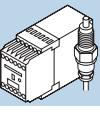
Type	Description	Order no.
	Adapter M18 x 1.5 - L18 for mounting in T-pieces	E40104
	Adapter, M18 x 1.5 - G 1/2	E40096
	Welding adapter, M18 x 1.5 - Ø 24 mm	E40124
	Flow adapter (for low flow rates), M12 x 1 - G 1/8	E40129

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 7 2 m black, PUR cable	EVC004
	Socket, M12, Group 7 5 m black, PUR cable	EVC005
	Socket, M12, Group 7 2 m black, PUR cable	EVC001
	Socket, M12, Group 7 5 m black, PUR cable	EVC002
	Socket, M12 2 m black, PUR cable	E10909
	Socket, M12 5 m black, PUR cable	E10910
	Socket, M12 2 m black, PUR cable	E10915
	Socket, M12 5 m black, PUR cable	E10916

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	SI thermal flow sensors / transmitters	SL thermal airflow sensors	SF / VS3000 thermal flow sensors	For hygienic areas and viscous media	SI thermal flow sensors / transmitters	For hazardous areas	SF / VS2000 Ex thermal flow sensors
Flow sensors and transmitters								
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Approvals: cULus

Setting range liquids / gases [cm/s]	Greatest sensitivity [cm/s]	Medium- temperature [°C]	Response time [s]	U _b / tolerance [V] / [%]	Current / Power consump.	I _{load} [mA]	Draw- ing no.	Order no.
M12 connector · Output function  · Connector groups 7, 8, 10 · Wiring diagram no. 5								
3...300 / 200...3000	3...100 / 200...800	-25...80	1...10	19...36 DC	< 60	–	1	SI5000
M12 connector · Output function 2 x  · Connector groups 7, 8, 10 · Wiring diagram no. 6								
3...300 / 200...3000	3...100 / 200...800	-25...80	1...10	19...36 DC	< 60	–	1	SI5002
1/2" UNF-Connector · Output function  · Connector group 29 · Wiring diagram no. 7								
3...300 / 200...3000	3...60 / 200...800	-25...80	1...10	85...265 AC / -5 / +10	–	< 3.5	2	SI1006 *

* Note for AC and AC/DC units

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

Common technical data

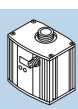
Pressure rating: 30 bar (SI5006: 300 bar)
Power-on delay time: 10 s
Short-circuit and overload protection
Housing material: stainless steel (304S15);
PC (Makrolon); PBT-GF 20; EPDM/X
(Santoprene)
Sensor material: stainless steel (316S12)
Operating temperature: -25...80 °C
Switch point adjustment: automatically via
pushbutton or programming wire P
Max. temperature gradient 300 K / min.
Function display: 10 LEDs

You can find scale drawings from page 239

For industrial applications

SD
compressed air /
consumed quantity
meter

SU
ultrasonic
flow rate
meters



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Flow
meters

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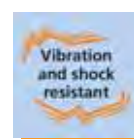
Accessories

Technical
information
and customer
service



All SI5xxx versions in the same design.

- 300 bar pressure rating.
- Fast response times.
- Increased repeatability across the extended measuring range.
- Simplified setting mode for quick set-up.
- Reliable monitoring of gaseous and liquid media.



Accessories

Type	Description	Order no.
	Adapter M18 x 1.5 - L18 for mounting in T-pieces	E40104
	Adapter, M18 x 1.5 - G 1/2	E40096
	Welding adapter, M18 x 1.5 - Ø 24 mm	E40124
	Flow adapter (for low flow rates), M12 x 1 - G 1/8	E40129

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 7 2 m black, PUR cable	EVC004
	Socket, M12, Group 7 5 m black, PUR cable	EVC005
	Socket, M12, Group 7 2 m black, PUR cable	EVC001
	Socket, M12, Group 7 5 m black, PUR cable	EVC002
	Socket, M12 2 m black, PUR cable	E10909
	Socket, M12 5 m black, PUR cable	E10910
	Socket, M12 2 m black, PUR cable	E10915
	Socket, M12 5 m black, PUR cable	E10916

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	SI thermal flow sensors / transmitters	SL thermal airflow sensors	SF / VS3000 thermal flow sensors	For hygienic areas and viscous media	SI thermal flow sensors / transmitters	For hazardous areas	SF / VS2000 Ex thermal flow sensors
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Approvals: cULus
SI5010: particularly fast switching

Setting range liquids / gases [cm/s]	Greatest sensitivity [cm/s]	Medium- temperature [°C]	Response time [s]	U _b / tolerance [V] / [%]	Current / Power consump.	I _{load} [mA]	Draw- ing no.	Order no.
M12 connector · Output function  /  · Connector groups 7, 8, 10 · Wiring diagram no. 5								
3...300 / 200...3000	3...100 / 200...800	-25...80 / -	1...2 *	19...36 DC	< 60	–	3	SI5010

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Common technical data

Power-on delay time: 10 s
Short-circuit and overload protection
Housing material: stainless steel (304S15);
PC (Makrolon); PBT-GF 20; EPDM/X
(Santoprene)
Sensor material: stainless steel (316S12)
Operating temperature: -25...80 °C
Switch point adjustment via pushbutton
Function display LED 10
Max. temperature gradient: 300 K / min
* for liquids and temperature gradient
1 K/min. For gases: 1...10

You can find scale drawings from page 239

For industrial applications



SD
compressed air /
consumed quantity
meter



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SU
ultrasonic
flow rate
meters



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Flow
meters



All SI5xxx versions in the same design.

- Increased repeatability across the extended measuring range.
- Switching output for flow and temperature.
- Output function NC/NO programmable or analogue (4...20 mA).
- LED bar graph for indication of switch point and flow.



Accessories

Type	Description	Order no.
	Adapter M18 x 1.5 - L18 for mounting in T-pieces	E40104
	Adapter, M18 x 1.5 - G 1/2	E40096
	Welding adapter, M18 x 1.5 - Ø 24 mm	E40124
	Flow adapter (for low flow rates), M12 x 1 - G 1/8	E40129

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 7 2 m black, PUR cable	EVC004
	Socket, M12, Group 7 5 m black, PUR cable	EVC005
	Socket, M12, Group 7 2 m black, PUR cable	EVC001
	Socket, M12, Group 7 5 m black, PUR cable	EVC002
	Socket, M12 2 m black, PUR cable	E10909
	Socket, M12 5 m black, PUR cable	E10910
	Socket, M12 2 m black, PUR cable	E10915
	Socket, M12 5 m black, PUR cable	E10916

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	SI thermal flow sensors / transmitters	SL thermal airflow sensors	SF / VS3000 thermal flow sensors	For hygienic areas and viscous media	SI thermal flow sensors / transmitters	For hazardous areas	SF / VS2000 Ex thermal flow sensors
Flow sensors and transmitters								
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SI5007: Flow monitoring and temperature monitoring
SI5004: Analogue output
Approvals: cULs

Setting range liquids / gases [cm/s]	Greatest sensitivity [cm/s]	Medium- temperature [°C]	Response time [s]	U _b [V]	Current consumption	I _{load} [mA]	Draw- ing no.	Order no.
M12 connector · Output function 2 x  · Connector groups 7, 8, 10 · Wiring diagram no. 6								
3...300 / 200...3000	3...100 / 200...800	-25...80	1...10	19...36 DC	< 60	2 x 250	1	SI5007
M12 connector · Output function 4...20 mA analogue · Connector groups 7, 8, 10 · Wiring diagram no. 8								
3...300 / -	3...100 / -	-25...80	1...10	19...36 DC	< 60	-	1	SI5004

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Common technical data

Pressure rating: 30 bar
Power-on delay time: 10 s
Short-circuit and overload protection
Housing material: stainless steel (304S15);
PC (Makrolon); PBT-GF 20; EPDM/X (Santo-
prene)
Sensor material: stainless steel (316S12)
Operating temperature: -25...80 °C
Temperature gradient 300 K / min. (SI5007)
Function display: 10 LEDs

You can find scale drawings from page 239

For industrial applications



SD
compressed air /
consumed quantity
meter



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SU
ultrasonic
flow rate
meters



76 - 77



- Airflow monitoring up to 10 m/s.
- LED indicating readiness for operation and flow.
- Signal output via relay.
- AC and DC version.
- Compact design, cylindrical.

Set-up
LED

IP 65

Cable

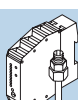
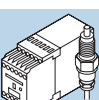
Accessories

Type	Description	Order no.
	Mounting clamp Ø 23 mm for air flow monitor SLG	E40048

Description

Designed for monitoring air flows in ventilation systems this airflow monitor type SLG based on the calorimetric principle is an inexpensive alternative for mechanical flaps and pressure cells. The smooth cylindrical plastic housing incorporates sensor, control monitor, output relay, LEDs, adjustment potentiometer as well as a timer. This timer serves as a switch-on delay for the fan or ventilator. The different operating states are indicated by the LEDs. The output signal is available as a floating NO contact. The airflow monitor is installed by means of a special mounting clamp. The length of the unit allows a maximum immersion of 120 mm into the air duct.

Further accessories are available starting on page 217

	For industrial applications	SI thermal flow sensors / transmitters	SL thermal airflow sensors	SF / VS3000 thermal flow sensors	For hygienic areas and viscous media	SI thermal flow sensors / transmitters	For hazardous areas	SF / VS2000 Ex thermal flow sensors
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AC/DC version
Set-up LED
PPU cable, 2 m

Setting range [cm/s]	Greatest sensitivity [cm/s]	Medium temperature [°C]	U _B / tolerance [V] / [%]	Current consumption [mA]	Power consumption [VA]	Draw- ing no.	Order no.
Cable 2 m · Output function relay energised when flow is present · Wiring diagram no. 9							
100...1000	100...400	-10...50	80...250 AC/DC	–	3	4	SL0101 *
Cable 2 m · Output function relay energised when flow is present · Wiring diagram no. 10							
100...1000	100...400	-10...50	24 AC	–	1.5	4	SL0201
Cable 2 m · Output function relay energised when flow is present · Wiring diagram no. 11							
100...1000	100...400	-10...50	24 DC ± 25 %	–	1	4	SL5101

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

Common technical data

Pressure rating: 1 bar
Power-on delay time: 60 s
Material housing: pocan / titanium
Response time: 3...60 s
Operating temperature: -10..50 °C
Switch point adjustment: via pot
Function display: 1 x red, 1 x green
Max. relative air humidity: 90 %
Switching power relays: 3 A / 250 V AC

You can find scale drawings from page 239

For industrial applications

SD
compressed air /
consumed quantity
meter

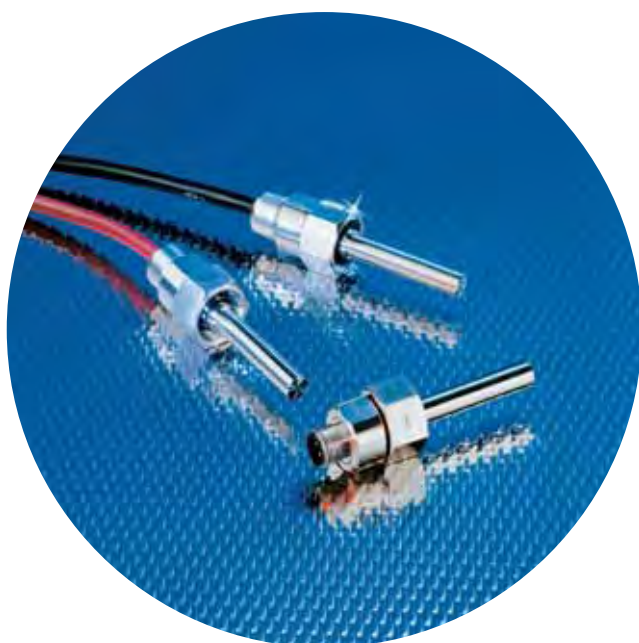
SU
ultrasonic
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meters

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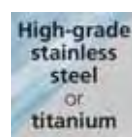
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Technical information and customer service



Connector and cable versions
for the connection to VS3000 control monitors.

- Suitable for liquids and gases.
- Optional fittings for flexible process connection.
- One-piece metal housing, resistant to aggressive media.
- Up to 120 °C medium temperature in liquids.
- Connector and cable versions.



Accessories

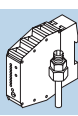
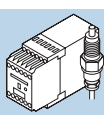
Type	Description	Order no.
	Adapter M18 x 1.5 - L18 for mounting in T-pieces	E40104
	Adapter, M18 x 1.5 - G 1/2	E40096
	Welding adapter, M18 x 1.5 - Ø 24 mm	E40124
	Flow adapter (for low flow rates), M12 x 1 - G 1/8	E40129

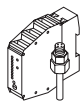
Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, 5-pole 2 m black, PUR cable	EVC073
	Socket, M12, 5-pole 5 m black, PUR cable	EVC074
	Socket, M12, 5-pole 10 m black, PUR cable	EVC075
	Socket, M12 2 m black, PUR cable	E10957
	Socket, M12 5 m black, PUR cable	E10958
	Socket, M12 10 m black, PUR cable	E10959

Further accessories are available starting on page 217

Further connectors and splitter boxes are available
starting on page 191

	For industrial applications	SI thermal flow sensors / transmitters	SL thermal airflow sensors	SF / VS3000 thermal flow sensors	For hygienic areas and viscous media	SI thermal flow sensors / transmitters	For hazardous areas	SF / VS2000 Ex thermal flow sensors
Flow sensors and transmitters								
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Connection to control monitor
Connector and cable version
High pressure and high temperature

Setting range liquids / gases [cm/s]	Greatest sensitivity [cm/s]	Medium temperature [°C]	Response time [s]	Max. T ₀ gradient [K/min]	Pressure rating [bar]	Material	Draw- ing no.	Order no.
M12 connector · Connector groups 11, 12 · Wiring diagram no. 12								
3...300 / 200...3000	3...60 / 200...800	-25...80	1...10	300	300	stainless steel	5	SF5200
Cable · Wiring diagram no. 13								
3...300 / 200...3000	3...60 / 200...800	-25...80	1...10	300	300	stainless steel	6	SF5350
3...300 / 200...3000	3...60 / 200...800	0...120 / 0...100	1...10	300	300	stainless steel	6	SF5300
M12 connector · Connector groups 11, 12 · Wiring diagram no. 12								
3...300 / 200...3000	3...60 / 200...800	-25...80	1...10	300	300	titanium (3.7035)	5	SF5700
Cable · Wiring diagram no. 13								
3...300 / 200...3000	3...60 / 200...800	0...120 / 0...100	1...10	300	300	titanium (3.7035)	6	SF5800

For evaluation units please see page 64.

Common technical data

Cable: 6 m / 5 x 0.34 mm,
silicone-sheathed or PUR cable
Max. cable length: 100 m / 5 x 0.5 mm
Protection: IP 67

You can find scale drawings from page 239

For industrial applications

SD
compressed air /
consumed quantity
meter

SU
ultrasonic
flow rate
meters

72 - 75

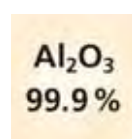
76 - 77

Flow
meters



Connector and cable versions
for the connection to VS3000 control monitors.

- Full ceramic one-piece housing (aluminium oxide, 99.9 %).
- Sensors with process connection via G 1/4 and G 1/2 male thread.
- Cable and connector variants.
- Evaluation and signalling of flow and wire break.



Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, 5-pole 2 m black, PUR cable	EVC073
	Socket, M12, 5-pole 5 m black, PUR cable	EVC074
	Socket, M12, 5-pole 10 m black, PUR cable	EVC075
	Socket, M12 2 m black, PUR cable	E10957
	Socket, M12 5 m black, PUR cable	E10958
	Socket, M12 10 m black, PUR cable	E10959

Further connectors and splitter boxes are available
starting on page 191

	For industrial applications	SI thermal flow sensors / transmitters	SL thermal airflow sensors	SF / VS3000 thermal flow sensors	For hygienic areas and viscous media	SI thermal flow sensors / transmitters	For hazardous areas	SF / VS2000 Ex thermal flow sensors
Flow sensors and transmitters								
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Sensors for connection to amplifier
For aggressive liquids
Types G 1/4 (SF24xx) and G 1/2 (SF34xx), protection rating IP 67

Setting range liquids / gases [cm/s]	Greatest sensitivity [cm/s]	Medium temp. [°C]	Response time [s]	Max. To gradient [K/min]	Pressure rating [bar]	Material	Draw- ing no.	Order no.
M12 connector · Connector groups 11, 12 · Wiring diagram no. 12								
3...60 / -	3...40 / -	5...70 / -	2...20	7	30	ceramics *	7	SF2405
3...60 / -	3...40 / -	5...70 / -	2...20	7	30	ceramics *	8	SF3405
Cable · Wiring diagram no. 13								
3...60 / -	3...40 / -	5...70 / -	2...20	7	30	ceramics *	9	SF2410
3...60 / -	3...40 / -	5...70 / -	2...20	7	30	ceramics *	10	SF3410

* aluminium oxide, 99.9 %

For evaluation units please see page 64.

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For industrial applications

SD
compressed air /
consumed quantity
meter

SU
ultrasonic
flow rate
meters

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Control monitors for the connection of flow sensors of the SF series.

- Integrated flow, temperature and wire-break monitoring.
- Adjustable switch points for flow and temperature.
- Multicolour LED bar graph display for quick setting.
- Signal output using potential-free relay contacts (changeover contacts).
- Connection options: Insulation displacement / screw terminals, cage clamps.



Accessories

Type	Description	Order no.
	Combicon connector with cage clamps 4 poles	E40171
	Combicon connector with insulation displacement terminals 4-pole	E40172

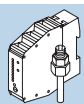
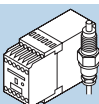
VS3000 – Three functions in one unit

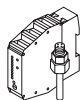
The control monitors of the VS3000 series ensure high functionality in a space-saving housing for control cabinet mounting.

The connection variants (Combicon) provide flexibility for different connection concepts. In addition to flow indication via the multicolour LED bar graph, the adjustable limit temperature of the medium as well as, for safety reasons, a wire break between the sensor and the control monitor are signalled via LEDs and a relay output. The operating elements are located on the front and can be set using a screwdriver.

The control monitors are available in two versions (AC or DC) and form a system for flow monitoring together with the SF type flow sensors.

Further accessories are available starting on page 217

	For industrial applications	SI thermal flow sensors / transmitters	SL thermal airflow sensors	SF / VS3000 thermal flow sensors	For hygienic areas and viscous media	SI thermal flow sensors / transmitters	For hazardous areas	SF / VS2000 Ex thermal flow sensors
Flow sensors and transmitters								
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AC and DC versions
Compact housing for control cabinet mounting
Control monitor for flow sensors of the SF series

U _b / Tolerance [V] / [%]	Current consump. [mA]	Power consumption [VA]	Power-on delay time [s]	Output when flow is present	Output when temp. is exceeded	Output in case of wire break	Draw- ing no.	Order no.
Combicon connector · Output function  · Wiring diagram no. 33								
90...240 AC / -5 / +10	–	4	10...80	relay energised	relay energised	relay de-energ.	11	SN0150 *
Combicon connector · Output function  · Wiring diagram no. 34								
24 DC / +10 / -20	90	–	10...80	relay energised	relay energised	relay de-energ.	11	SR0150

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

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You can find scale drawings from page 239

Flow
meters

For industrial
applications

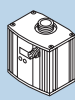


SD
compressed air /
consumed quantity
meter



72 - 75

SU
ultrasonic
flow rate
meters



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- Prepared and tested for process fittings of hygienic areas.
- Medium temperatures up to 120 °C.
- Setting and adjustment via push-button.
- LED bar graph for indication of switch point and flow.
- Process connections available as accessories.



Accessories

Type	Description	Order no.
	Aseptoflex adapter, DIN11851 - 1.5" / DN40	E33012
	Aseptoflex adapter, Varivent D68	E33022
	Aseptoflex adapter, Clamp 1.5"	E33001
	Aseptoflex adapter, Clamp 2"	E33002

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 58 5 m orange, PVC cable	EVT004
	Socket, M12, Group 58 10 m orange, PVC cable	EVT005
	Socket, M12, Group 58 25 m orange, PVC cable	EVT006
	Socket, M12, Group 58 5 m orange, PVC cable	EVT001
	Socket, M12, Group 58 10 m orange, PVC cable	EVT002
	Socket, M12, Group 58 25 m orange, PVC cable	EVT003

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	SI thermal flow sensors / transmitters	SL thermal airflow sensors	SF / VS3000 thermal flow sensors	For hygienic areas and viscous media	SI thermal flow sensors / transmitters	For hazardous areas	SF / VS2000 Ex thermal flow sensors
Flow sensors and transmitters								
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Integrated microprocessor
Probe length SI6000: 55 mm, SI6100: 20 mm. SI6200: 38 mm

Setting range liquids / gases [cm/s]	Greatest sensitivity [cm/s]	Medium temperature [°C]	Temperature gradient [K / min]	U _b [V]	Current consump. [mA]	I _{load} [mA]	Draw- ing no.	Order no.
M12 connector · Output function  /  · Connector groups 58, 59, 61 · Wiring diagram no. 5								
3...300 / 200...3000	3...60 / 200...800	-25...95 (120 max. 1 h)	300	19...36	< 60	250	12	SI6000
3...300 / 200...3000	3...60 / 200...800	-25...95 (120 max. 1 h)	300	19...36	< 60	250	13	SI6100
3...300 / 200...3000	3...60 / 200...800	-25...95 (120 max. 1 h)	300	19...36	< 60	250	14	SI6200

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Common technical data

Pressure rating: 30 bar
Power-on delay time: 10 s
Short-circuit and overload protection
Housing material / Sensor material: stainless steel (316S12)
Operating temperature: -25...80 °C
Function display: 10 LEDs
Protection: IP 67 III

You can find scale drawings from page 239

For industrial applications



SD
compressed air /
consumed quantity
meter



72 - 75

SU
ultrasonic
flow rate
meters



76 - 77

Flow
meters



Sensors for category 1 with cable,
for category 2 with cable or connector.

- Approved by DMT for hazardous areas category 1/2G and 2G.
- High-grade stainless steel (316S12) or ceramic housing (alum. oxide 99.9 %).
- Process connection thread M12 x 1, G 1/4 or G 1/2.
- Temperature class T4.
- Optional flow adapter for small volumetric flow quantities.



Description

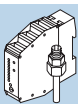
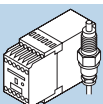
Type SFx1xA sensors are used for flow monitoring in category 1 / 2 G hazardous areas, in conjunction with the control monitor VS 2000 Ex i. The sensors can be used in zone 0 of pipes and tanks, of the explosion group II A, II B and II C with the sensor tip being in category 1 (zone 0) and the housing in category 2 (zone 1). The housings are made of stainless steel (316S12) and have potted cable connection. The sensors have the temperature class T4.

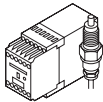
Type SFx2xA sensors are used for flow monitoring in category 2 hazardous areas in conjunction with the control monitor VS 2000 Ex i. The units meet the requirements of the directive 94 / 9 / EC as well as the applicable standards and requirements of intrinsic safety "i". The electrical data and the Ex marking are stated in the data sheet, the type test certificate and the operating instructions. For further information see our website www.ifm-electronic.com.

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 67 2 m blue, PUR / PVC cable	E40075
	Socket, M12, Group 67 5 m blue, PUR / PVC cable	E40076

Further connectors and splitter boxes are available
starting on page 191

	For industrial applications	SI thermal flow sensors / transmitters	SL thermal airflow sensors	SF / VS3000 thermal flow sensors	For hygienic areas and viscous media	SI thermal flow sensors / transmitters	For hazardous areas	SF / VS2000 Ex thermal flow sensors
Flow sensors and transmitters								
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94/9/EC (ATEX)

Group II, Category 1/2G: SF111A, SF211A, SF311A

Group II, Category 2G: SF120A, SF221A, SF223A, SF220A, SF321A, SF323A, SF320A, SF121A

Setting range liquids / gases [cm/s]	Greatest sensitivity [cm/s]	Medium temp. [°C]	Response time [s]	Max. T ₀ gradient [K/min]	Pressure rating [bar]	Process fitting / Material	Draw- ing no.	Order no.
Cable 6 m · Wiring diagram no. 14								
3...300 / 200...2000	3...60 / 200...800	-20...60	1...10	15	300	M12 / ss (316S12)	15	SF111A
3...300 / 200...2000	3...60 / 200...800	-20...60	1...10	15	300	G 1/4 A / ss (316S12)	16	SF211A
3...300 / 200...2000	3...60 / 200...800	-20...60	1...10	15	300	G 1/2 A / ss (316S12)	17	SF311A
3...300 / 200...2000	3...60 / 200...800	-20...70	1...10	15	30	M12 / ss (316S12)	18	SF121A
3...300 / 200...2000	3...60 / 200...800	-20...70	1...10	15	30	G 1/4 A / ss (316S12)	19	SF221A
3...300 / 200...2000	3...60 / 200...800	-20...70	1...10	15	30	G 1/2 A / ss (316S12)	20	SF321A
M12 connector · Connector group 67 · Wiring diagram no. 15								
3...300 / 200...2000	3...60 / 200...800	-20...70	1...10	15	30	M12 / ss (316S12)	21	SF120A
3...300 / 200...2000	3...60 / 200...800	-20...70	1...10	15	30	G 1/4 A / ss (316S12)	22	SF220A
3...300 / 200...2000	3...60 / 200...800	-20...70	1...10	15	30	G 1/2 A / ss (316S12)	23	SF320A
Cable 6 m · Wiring diagram no. 14								
3...60 / -	3...40 / -	5...70 / -	2...20	7	30	G 1/4 A / Al2 O3	9	SF223A
3...60 / -	3...40 / -	5...70 / -	2...20	7	30	G 1/2 A / Al2 O3	10	SF323A

Common technical data

Max. cable length: 100 m / 5 x 0.5 mm
Protection rating: IP 67
Capacitance for sensors category 1G:
10 nF / 6 m cable
Capacitance for sensors category 2G:
0.4 nF / 6 m cable
Inductance for sensors category 1G:
70 µH / 6 m cable
Inductance for sensors category 2G:
2 µH / 6 m cable
Temperature class: T4

You can find scale drawings from page 239

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Flow
meters

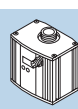
For industrial
applications



SD
compressed air /
consumed quantity
meter



SU
ultrasonic
flow rate
meters



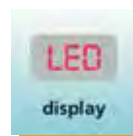
72 - 75

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Control monitors for connection of flow sensors
SF0... / SF1... / SF2... / SF3...

- Housing for DIN rail mounting.
- Multicolour LED bar graph for switch point and flow state.
- Integrated wire monitoring from the sensor to the control monitor.
- II (1) G [Ex ia] IIC.
- PTB 01 ATEX 2075.



VS2000 Ex i in standard DIN housing

Type SF flow sensors are rated for connection to a separate control monitor type VS2000 Ex i. Flow sensor and control monitor together form the flow monitor. These units, based on the calorimetric principle, are used for monitoring liquid and gaseous media. The systems are preferably used where environmental conditions or regulations do not permit local installation of the control monitors.

The control monitor in a DIN rail housing must be mounted outside the hazardous area. The limit values for gaseous and liquid media can be set by means of a slide switch and potentiometer. The current status is indicated via an 11-digit LED display.

In all versions the intrinsically safe heating and sensor circuit, the flow and monitoring circuit are electrically separated from each other and from the supply circuit.

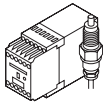
As standard, the control monitor monitors a jumper cable to the sensor for wire break and short circuit.

In case of a fault an additional monitoring relay is de-energised and a red LED indicates the fault. At the same time the flow relay is de-energised and the 11-digit LED display indicates "no flow" (red LED lights).

For installation and operation the applicable regulations for the installation of electrical equipment in hazardous areas as well as the EC type test certificate and operating instructions must be observed.

Further data: operating temperature: 0...60 °C, housing material: plastic, contact rating of the relays: 250 V AC cos phi 0.7 4 A, 250 V DC 0.2 A, 24 V DC 4 A. More details on the control circuit are given in the data sheets on our website www.ifm-electronic.com.

	For industrial applications	SI thermal flow sensors / transmitters	SL thermal airflow sensors	SF / VS3000 thermal flow sensors	For hygienic areas and viscous media	SI thermal flow sensors / transmitters	For hazardous areas	SF / VS2000 Ex thermal flow sensors
Flow sensors and transmitters								
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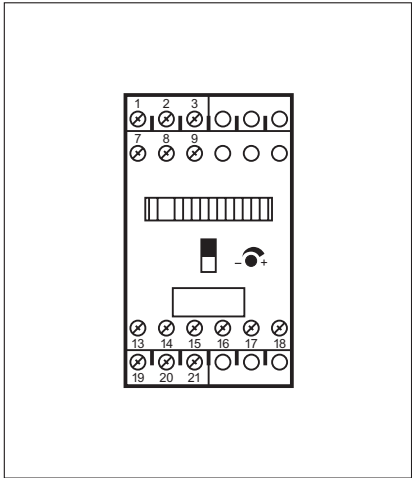
Ex (ia) IIC
Switch point setting via potentiometer
Connection terminals IP 40

U _b / Tolerance [V] / [%]	Current consumption [mA]	Power consumption [VA]	Power-on delay time [s]	Output when flow is present	Output when temp. is exceeded	Output in case of wire break	Draw- ing no.	Order no.
15 terminals...2.5 mm · Output function								
230 AC / ± 10	–	5	30	relay energised	–	relay de-energ.	24	SN2301 *
110 AC / ± 10	–	5	30	relay energised	–	relay de-energ.	24	SN2302 *
24 DC / ± 10	125	–	30	relay energised	–	relay de-energ.	24	SR2301

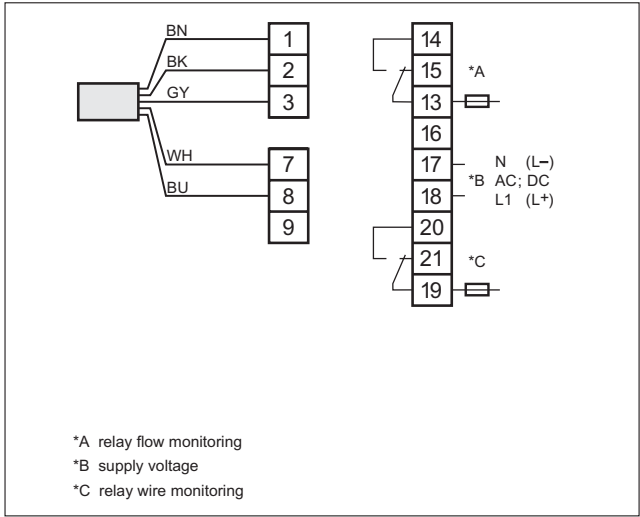
* Note for AC and AC/DC units

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

Front view



Terminal connection

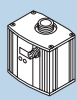


You can find scale drawings from page 239

For industrial applications

SD
compressed air /
consumed quantity
meter

SU
ultrasonic
flow rate
meters



72 - 75

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Flow
meters



- Checking compressed air consumption and leakage monitoring.
- Compressed air meter with display and totalizer function.
- Wide measuring range, detection of minute leaks.
- Integrated pipe length: easy mounting, high accuracy.
- Short response time and great measurement dynamics.

Outputs:
analogue
binary
pulse

Broad
measurement
dynamics

High-grade
stainless
steel
pipe length

Totalizer
function

efector[®]
metris

Precise detection of compressed air

The compressed air meter directly detects the standard volume flow (according to ISO 2533), thus eliminating the need to correct via temperature and pressure. The broad measurement dynamics of the system enables reliable detection of minute quantities, e.g. leakage. High accuracy and repeatability are ensured by the integration of the measurement sensor's key elements into a defined pipe length.

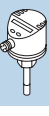
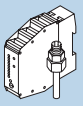
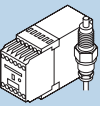
The integral 4-digit LED display plus the status LEDs allow information to be available at the point of monitoring. Whether peak consumption, present or accumulated consumption: set switch or alarm levels can be accessed and programmed via pushbutton. All settings can be protected using the electronic lock function.

Switching outputs, analogue outputs and pulse outputs are available for signal processing. Parameters are set in the user menu.

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 7 2 m black, PUR cable	EVC001
	Socket, M12, Group 7 5 m black, PUR cable	EVC002

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	SI thermal flow sensors / transmitters	SL thermal airflow sensors	SF / VS3000 thermal flow sensors	For hygienic areas and viscous media	SI thermal flow sensors / transmitters	For hazardous areas	SF / VS2000 Ex thermal flow sensors
Flow sensors and transmitters								
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Compressed air meter with integrated pipe length

Measuring [NI/min / Nm³/h]	Setting range [NI/min / Nm³/h]	Pressure rating [bar]	Medium temperature [°C]	Process connection	Draw- ing no.	Bestell- Nr.
M12 connector · Connector groups 7, 8, 9 · Wiring diagram no. 35						
39...11670 / 2,3...700	0,11...11,67 / 6...700	16	0...60	R2 (DN50)	1	SD2000
4...1250 / 0,25...75	11...1250 / 0,7...75	16	0...60	R1/2 (DN15)	2	SD6000
12,5...3750 / 0,75...225	34...3750 / 2,0...225	16	0...60	R1 (DN25)	3	SD8000
22,2...6830 / 1,3...410	60...6830 / 3,5...410	16	0...60	R1 1/2 (DN40)	4	SD9000

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Common technical data

Response time: < 0.1 s
Operating voltage: 19...30 V DC
Current rating: 2 x 250 mA
Measuring error in the measuring range:
±(3 % measured value + 0.3 % final value of the measuring range)
Display: 4-digit, alphanumeric, 2 x LED
Analog. output: 4...20 mA (max. 500 Ohm)
Repeatability: ± 1 % of the measured value
Protection: IP 65, III
Material housing: PBT, PC, st. steel (304S15)

You can find scale drawings from page 242

For industrial applications

SD
compressed air /
consumed quantity
meter

SU
ultrasonic
flow rate
meters

72 - 75

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Flow
meters



- Flow rate measurement for low flow of gases.
- Thermal measuring principle for air or N₂, CO₂ and argon.
- High accuracy and repeatability in the measuring range.
- Freely selectable output functions: binary, analogue and pulse.
- Short response time and great measurement dynamics.

Outputs:
analogue
binary
pulse

Broad
measurement
dynamics

High-grade
stainless
steel
pipe length

Totalizer
function

efector[®]
metris

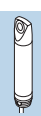
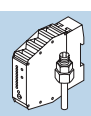
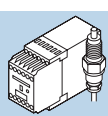
Measuring small quantities of air and gases

Three further versions complement the efector metris series in this respect: One of the versions reliably detects small quantities of compressed air and the other one small quantities of gases such as argon, carbon dioxide or nitrogen. Smallest quantities, e.g. for dosing, can thus be exactly controlled and monitored. Due to the integrated totaliser these units enable long-term detection and documentation of consumed total quantities. The sensors detect the standard volume flow directly (according to ISO 2533). The high measurement dynamics of the system also enables the reliable detection of minute leakage. High accuracy and repeatability are ensured by calibrating the sensors in their defined pipe length. The integral 4-digit LED display plus the status LEDs allow information to be available at the point of monitoring. Switching outputs, analogue outputs and pulse outputs are available for signal processing. Parameters are set in the user menu.

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 7 2 m black, PUR cable	EVC001
	Socket, M12, Group 7 5 m black, PUR cable	EVC002
	Socket, M12, Group 7 10 m black, PUR cable	EVC003

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	SI thermal flow sensors / transmitters	SL thermal airflow sensors	SF / VS3000 thermal flow sensors	For hygienic areas and viscous media	SI thermal flow sensors / transmitters	For hazardous areas	SF / VS2000 Ex thermal flow sensors
Flow sensors and transmitters								
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SD5000: consumed quantity meter for small compressed air quantities.
SD5100: consumed quantity meter for small quantities of special gases.
SD6100: consumed quantity meter for special gases.

Measuring [Nl/min / Nm³/h]	Setting range [Nl/min / Nm³/h]	Pressure rating [bar]	Medium temperature [°C]	Process connection	Draw- ing no.	Bestell- Nr.
M12 connector · Connector groups 7, 8, 9 · Wiring diagram no. 35						
0.06...15	0.14...15	16	0...60	G1/4 (DN8)	5	SD5000
Ar: 0.08...24.54 / CO2: 0.047...14.38 / N2: 0.05...14.94	Ar: 0.18...24.54 / CO2: 0.10...14.38 / N2: 0.10...14.94	16	0...60	G1/4 (DN8)	5	SD5100
Ar: 0.35...105 / CO2: 0.22...65 / N2: 0.23...67.5	Ar: 0.9...105 / CO2: 0.6...65 / N2: 0.6...67.5	16	0...60	R1/2 (DN15)	2	SD6100

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Pressure sensors
Temperature sensors
Diagnostic systems
Evaluation systems, power supplies
Connection technology
Accessories
Technical information and customer service

Common technical data

Response time: < 0.1 s
Operating voltage: 19...30 V DC
Current rating: 2 x 250 mA
Analogue output: 4...20 mA
(max. 500 Ohm)
Display: 4-digit, alphanumeric, 7 x LED
Analogue output: 4...20 mA
(max. 500 Ohm)
Protection: IP 67 / III
Material sensor: stainless steel, ceramics,
PEEK, polyester, Viton, aluminium

You can find scale drawings from page 242

For industrial applications

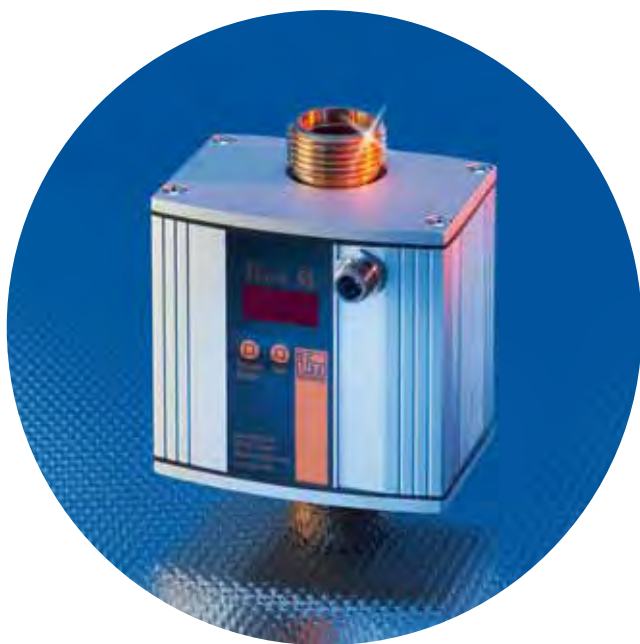
SD
compressed air /
consumed quantity
meter

SU
ultrasonic
flow rate
meters

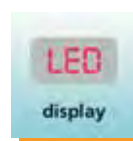
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Flow
meters



- Ultrasonic flow rate meter in robust inline design.
- Flow rate, totalising and medium temperature indication.
- Suited for water up to a flow rate of 100 l/min.
- Binary, analogue and pulse outputs for signal processing.
- R 1/2 and R 3/4 process connection via adapter fitting.



Accessories

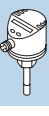
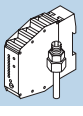
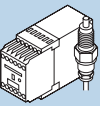
Type	Description	Order no.
	Adapter G 3/4 I - R1/2 for flow monitor type SU7	E40151
	Adapter G 1 I - R1/2 for flow monitor type SU8	E40152
	Adapter G 1 I - R3/4 for flow monitor type SU8	E40153

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 7 2 m black, PUR cable	EVC004
	Socket, M12, Group 7 5 m black, PUR cable	EVC005

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	SI thermal flow sensors / transmitters	SL thermal airflow sensors	SF / VS3000 thermal flow sensors	For hygienic areas and viscous media	SI thermal flow sensors / transmitters	For hazardous areas	SF / VS2000 Ex thermal flow sensors
Flow sensors and transmitters								
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Robust aluminium housing
4-digit alphanumeric display for the units of measurement l/min, m³/h and °C

Measuring range [Nl/min]	Setting range [Nl/min / Nm³/h]	Pressure rating [bar]	Medium temperature [°C]	Process connection	Draw- ing no.	Order- no.
M12 connector · OUT1: / / pulse output, OUT2: / / analog. · Connector gr. 7, 8, 9 · Wiring diagram no. 30						
0...50	0,1...50 / 0...3	16	5...80	G 3/4	6	SU7000
M12 connector · Output function 2 x / · Connector groups 7, 8, 9 · Wiring diagram no. 3						
0...50	0,1...50 / -	16	5...80	G 3/4	6	SU7200
M12 connector · OUT1: / / pulse output, OUT2: / / analog. · Connector gr. 7, 8, 9 · Wiring diagram no. 30						
0...100	0,2...100 / 0,01...6	16	5...80	G 1	7	SU8000
M12 connector · Output function 2 x / · Connector groups 7, 8, 9 · Wiring diagram no. 3						
0...100	0,2...100 / -	16	5...80	G 1	7	SU8200

Common technical data

Response time: < 2 s (flow rate), 15 s (temperature)
Operating voltage: 20...28 V DC
Analogue output: 4...20 mA (max. 500 Ohm), 0...10 V (max. 10 kOhm)
Current rating: 2 x 250 mA
Setting range temperature:
Switch point: 5...79,8 °C
Analogue starting point: 5...65 °C
Analogue end point: 20...80 °C
Resolution temperature: 0.2

You can find scale drawings from page 242

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Flow meters

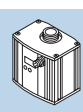
For industrial applications



SD
compressed air /
consumed quantity
meter



SU
ultrasonic
flow rate
meters



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Pressure sensors

efector500®

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Pressure sensors and transmitters for hazardous areas

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Introduction

ifm offers a wide range of electronic pressure and vacuum sensors to meet the requirements of various industrial applications. The ceramic-capacitive measuring cell traditionally used in the electronic pressure sensor of the PK series has been replaced by a stainless steel measuring cell with thick film wire strain gauge.

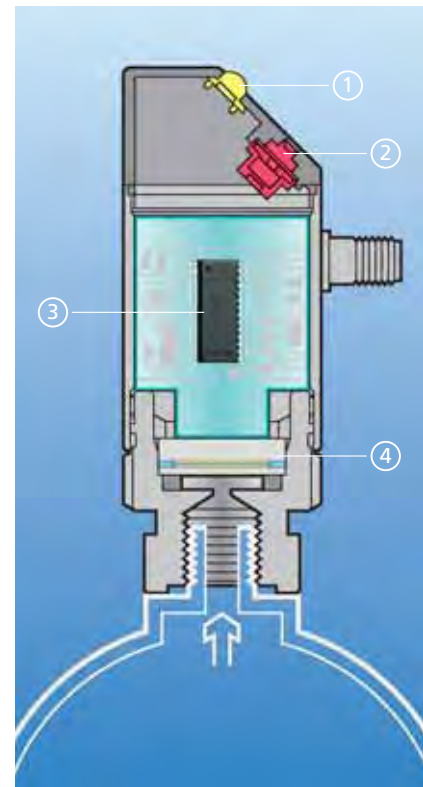
Ceramic measuring cell in pressure and vacuum sensors

Due to an optimised support in the process connection the ceramic measuring cell is designed for highest stress with nominal pressures of -1 to 600 bar. Contrary to the mechanical piston pressure sensor no moving parts like pistons or springs are required. The result: The sensors are robust against mechanical influence and work completely without wear and tear or fatigue.

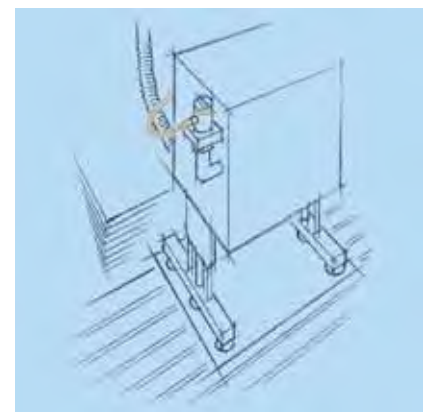
Advantages of the ceramic measuring cell: It is resistant to corrosion and absolutely long-term stable. In the long run this guarantees continuous accuracy of the measured values. These tried-and tested pressure sensors are resistant to dynamic pressure peaks and guarantee high overload resistance even in cases of extreme pressure peaks that occur for example with fast closing valves. Depending on the mounting position pressure peaks as well as vacuum peaks can alternate quickly. A typical example can be found in the vacuum transport technology. Materials are picked up and released by means of vacuum suckers. There are rapid changes between negative (vacuum) and positive pressure. Also with this operation with changing loads and strain on the material, the ceramic measuring cell proves its extraordinary robustness. As the electronic components are mounted on a flexible film instead of on a rigid circuit board, maximum shock and vibration resistance is achieved.

Operating principle of the ceramic-capacitive measuring principle

The most important element of the sensor is the ceramic pressure measuring cell made of aluminium oxide (Al_2O_3). It has a disk made of aluminium oxide with a layer of gold resinate at the inside. This gold layer forms a measuring electrode and a reference electrode on the aluminium oxide disk. The counterpart consists of a second disk made of aluminium oxide to which a further layer of gold is applied and which forms the second measuring electrode. The two disks are connected by means of glass frit with the electrode layers being opposite each other. The distance is approx. 10 μm . After assembly the structure of the ceramic measuring cell is similar to a plate capacitor. The change of the system pressure and the resulting change of capacitance is measured, processed by a microprocessor and provided as the requested output signal.



Structure of the pressure sensor with integrated control monitor:
1. 4-digit 10-segment display
2. Programming buttons
3. Microprocessor
4. Ceramic pressure measuring cell with special support for maximum strain



Typical application for vacuum sensors:
Transport technology by means of vacuum suckers.

Stainless steel measuring cell in pressure and vacuum sensors

Units with wire strain gauge in thick-film technology on a stainless steel measuring cell are distinguished by their very compact and robust design. They can be used in almost all industrial areas. The welded stainless steel measuring cell without any seals does not only ensure a high degree of safety in hydraulic and pneumatic applications, but also in applications with gas pressures of up to 400 bar. In the air conditioning and refrigeration technology where aggressive CFCs (freons) are used ifm pressure sensors with stainless steel measuring cell are also ideal. The three to thirty times greater bursting pressure, depending on the selected measuring range of the unit, and the high shock and vibration resistance support the maximum operational safety of ifm pressure sensors with stainless steel measuring cell.

The welded stainless steel measuring cell – for diverse applications in gases and liquids up to 400 bar: e.g. hydraulics, gas, water, brake liquid or cryogenics (freons).



A variety of electronic sensor solutions

The ifm pressure and vacuum sensors are available in various designs. These include pressure and vacuum switches and combined units with 4-digit alphanumeric 10-segment display as well as dedicated transmitter units which can be evaluated and parameterised via an additional interface (for further information please refer to the specific product pages under "FDT Container program"). The ifm pressure and vacuum sensors provide a binary-switched signal via one or two outputs. The ifm transmitter units provide an analogue current (4...20 mA) or voltage signal (0...10 V) which is proportional to the system pressure. The ifm combined units provide binary as well as analogue output signals.

Due to the flush sealing and high-purity ceramic measuring cell the pressure sensors are also suited for hygienic applications.

Sensors for hygienic areas

Special process sensors for liquid or viscous media monitor the pressure in applications in the food, beverage, and pharmaceutical industries where they meet the 3A, FDA, and EHEDG requirements.

PF, PI, PL, PM series

The ceramic measuring cell (Al_2O_3 , 99.9 %) is mounted flush into the high-grade stainless steel housing (316S12). This enables optimum cleaning of the sensor. The combined and transmitter units for hygienic applications are available in two versions: The PF and PL series for medium temperatures of up to 80 °C as well as the PI and PM series for applications with high temperatures of up to 125 °C or 145 °C for one hour.



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Sensors for industrial applications

The complete range of electronic pressure and vacuum sensors is available for hydraulic and pneumatic solutions. The sensors are integrated into the process by means of G 1/4 internal or external thread and with adapters in different sizes. Due to their versatility, ifm pressure and vacuum sensors can be used in various applications and they can be adapted to users' requirements worldwide.

This also means that additional thread sizes, which are typical in other countries, are available.

PN series

The robust pressure sensors for positive or negative pressures and the combined units of the PN series for hydraulic and pneumatic applications ensure trouble-free, reliable operation. The tried-and-tested ceramic-capacitive measuring principle makes this series immune to overload operation and high pressure peaks. Furthermore it guarantees maximum life. The structured menu navigation and the 4-digit alphanumeric 10-segment display allow easy operation adapted to the user's needs. This concept has been appreciated by ifm customers worldwide for more than ten years. The units of this series feature an interface by means of which all data and parameters can be monitored via PC and stored for documentation (*for further information please refer to the specific product pages under "FDT Container program"*). Depending on the version everything is available in the PN series – from binary switching outputs to scaleable analogue outputs and analogue input.

PP series

ifm also offers solutions for places which are difficult to access in installations and machines, or in mobile applications. The pressure sensors of the PP series have an integrated interface by means of which the operator can read data from the unit and can carry out parameterisation. This interface can be accessed on site or from longer distances by means of the ifm Container program (*for further information please refer to the specific product pages under "FDT Container program"*). An AS-i compatible pressure sensor is also available in this series.

PA series

If processing only of analogue values of a system pressure is required, ifm offers the pressure transmitters of the PA series.

PK series

Handling and mounting of the new PK series with the new *easy turn* operating concept is ingeniously simple. The set and reset points of the two complementary outputs can be set by means of the radial setting rings without pressure being applied. An additional version with two independent switching outputs and a fixed hysteresis of 2 % underlines the variety of applications for this series. These innovative pressure sensors with welded stainless steel measuring cell without any seals enable more than 50 million reliable switching cycles with a price / performance ratio which is a real alternative to mechanical pressure switches.



*The display:
The 4-digit,
alphanumeric
10-segment
display shows
the system
pressure at a
glance.*



*The easy turn
operating con-
cept: There is no
easier way. Set
and reset point
adjustment with
only two turns.*

Visit our website: www.ifm-electronic.com

Pressure sensors in hazardous areas

The pressure sensors are suitable for monitoring non-explosive liquids and gases in hazardous dust areas in accordance with group II, category 3D. The parts of the sensors which are in contact with the medium are made of high-grade stainless steel (316S12) or ceramics (Al_2O_3 , 96 %).

Relative pressure

For all ifm pressure and vacuum sensors the pressure is measured relative to the existing atmospheric pressure (air pressure). In this case the difference to the local atmospheric pressure is indicated. The measured positive range indicates that the measured pressure is higher than the existing atmospheric pressure and the measured negative pressure indicates the opposite.

Parameter setting and analysis

Data sets of individual sensors can be replaced quickly and conveniently by means of the ifm Container program. The software which is based on the innovative FDT technology ensures a clear overview of all parameters and the current process data. Process data and set parameters can be recorded and stored. For archiving on paper this data can be represented by means of standard computer programs and printed. (For further information see the product pages under FDT Container program).

Well-structured
menu and param-
eter overview
ifm Container
program.



PIM family – the pump diagnostic sensor

The pump diagnostic sensor enables diagnosis independently of pump type, pump characteristics and rotational speed range. The conveying characteristics of the pump to be monitored is continuously detected. Significant changes are detected and lead to an automatic alarm message when critical states are reached.

The pump sensor can be set up easily and without specialist knowledge. The conveying characteristics of the pump is simply taught.



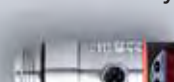
Robust: The use of high-quality materials makes the pressure and vacuum sensors resistant even under extreme environmental conditions.

A bar graph
displays the state
of the pump on
the unit.



Housing / Process connection	Output		Materials wetted parts	Measuring range [bar]	Medium temperature [°C]	Application / Page		
	Analogue	Binary						
Pressure sensors and transmitters								
type PK65..	G 1/4 male M5 female	–	2 x DC comple- mentary	stainless steel (316S12) Viton	0...400	-25...80		98
type PK67..	R 1/4 male	–	2 x DC comple- mentary	stainless steel (316S12) Viton	0...400	-25...80		98
type PK75..	G 1/4 male M5 female	–	2 x DC 2 % hysteresis	stainless steel (316S12) Viton	0...400	-25...80		98
type PK87..	R 1/4 male	–	2 x DC comple- mentary	stainless steel (316S12) Viton	0...400	-25...80		98
type PN.. ATEX	G 1/4 female	1 x 4...20 mA	1 x DC + EPS interface	stainless steel (303S21) ceramics Viton	-1...10	-20...60		126
type PN.. ATEX	G 1/4 female	–	2 x DC + EPS interface	stainless steel (303S21) ceramics Viton	0...10	-20...60		126
type PN20..	G 1/4 female	1 x 4...20 mA or 1 x 0...10 V scaleable	1 / 2 x DC + EPS interface	stainless steel (303S21) ceramics Viton	-1...400	-25...80		94
type PN30..	G 1/4 female	1 x 4...20 mA or 1 x 0...10 V	1 x DC + EPS interface	stainless steel (303S21) ceramics Viton	-1...600	-25...80		96

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viscous mediaFor hazardous
areas

Housing / Process connection		Output		Materials wetted parts	Measuring range [bar]	Medium temperature [°C]	Application / Page		General information	
		Analogue	Binary							
Pressure sensors and transmitters										
type PN50.. 	G 1/4 female	–	1 x DC + EPS interface	stainless steel (303S21) ceramics Viton	0...400	-25...80		90		List of articles
type PN70.. 	G 1/4 female	–	Diagnosis 2 x DC + EPS interface	stainless steel (303S21) ceramics Viton	-1...600	-25...80		90		Level sensors
type PE70.. 	G 1/4 female	–	Diagnosis 2 x DC + EPS interface	stainless steel (316S12) ceramics 99.9 % Viton	-1...100	-25...80		92		Flow sensors
type PE30.. 	G 1/4 female	1 x 4...20 mA or 1 x 0...10 V	1 x DC + EPS interface	stainless steel (316S12) ceramics Viton	-1...400	-25...80		92		Pressure sensors
type PNI.. 	G 1/4 female	analogue input 1 x 4...20 mA or 1 x 0...10 V	2 x DC	stainless steel (303S21) ceramics Viton	0...250	-25...80		108		Temperature sensors
type PY20.. 	G 1/4 female	1 x 4...20 mA or 1 x 0...10 V	1 x DC + EPS interface	stainless steel (303S21) ceramics Viton	-0.25...0.25	-25...80		94		Diagnostic systems
type PF20.. 	ASEPTOFLEX	1 x 4...20 mA or 1 x 0...10 V	1 / 2 x DC + EPS interface	stainless steel (316S12) ceramics 99.9 % Viton	-1...25	-25...80		124	Evaluation systems, power supplies	
type PI20.. 	ASEPTOFLEX	1 x 4...20 mA or 1 x 0...10 V	1 / 2 x DC + EPS interface	stainless steel (316S12) ceramics 99.9 % Viton	-1...25	-25...125 (-25...145 1h / day)		114	Connection technology	
									Accessories	
									Technical information and customer service	

For industrial applications



For hygienic areas and viscous media



For hazardous areas



Housing / Process connection	Output		Materials wetted parts	Measuring range [bar]	Medium temperature [°C]	Application / Page		
	Analogue	Binary						
Pressure sensors and transmitters								
type PF26..	G 1 male	1 x 4...20 mA or 1 x 0...10 V	1 / 2 x DC + EPS interface	stainless steel (316S12) ceramics 99.9 % Viton	-1...100	-25...80		124
type PF.. ATEX	G 1 male	1 x 4...20 mA or 1 x 0...10 V	1 / 2 x DC + EPS interface	stainless steel (316S12) ceramics 99.9 % Viton	-1...25	-25...80		126
type PI16..	G 1 male	1 x 4...20 mA	–	stainless steel (316S12) ceramics 99.9 % Viton	-1...25	-25...125		116
type PI26..	G 1 male	1 x 4...20 mA or 1 x 0...10 V	1 / 2 x DC + EPS interface	stainless steel (316S12) ceramics 99.9 % Viton	-1...100	-25...125 (-25...145 1h / day)		114
type PI10..	ASEPTOFLEX	1 x 4...20 mA	–	stainless steel (316S12) ceramics 99.9 % Viton	-1...10	-25...125		116
type PF29..	G 3/4 male	1 x 4...20 mA or 1 x 0...10 V	1 / 2 x DC + EPS interface	stainless steel (316S12) ceramics 99.9 % Viton	-1...25	-25...80		124
type PI29..	G 3/4 male	1 x 4...20 mA or 1 x 0...10 V	1 / 2 x DC + EPS interface	stainless steel (316S12) ceramics 99.9 % Viton	-1...25	-25...125 (-25...145 1h / day)		114
type PI7...	G 1 male G 3/4 male ASEPTOFLEX	–	2 x DC	stainless steel (316S12) ceramics 99.9 % Viton	-1...25	-25...125 (-25...145 1h / day)		118

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Housing / Process connection	Output		Materials wetted parts	Measuring range [bar]	Medium temperature [°C]	Application / Page	General information		
	Analogue	Binary							
Pressure sensors								List of articles	
 type PY7..	1 x G 1/4 female, 2 x M6 or 2 x G 1/4 female	–	Diagnosis 2 x DC	free cutting steel (441S29) ceramics Viton	0...400	-25...80			106
 type PIM..	G 1 male ASEPTOFLEX	–	2 x DC	stainless steel (316S12) ceramics 99.9 % Viton	-1...25	-25...125 (-25...145 1h / day)			120
 type PS..	Part seat monitoring: Non-contact position definition for gap distances of up to 1.7 mm. High measuring accuracy, almost independent of the supply pressure, integrated pressure sensor with two switching outputs.					104		Flow sensors	
Pressure transmitter								Pressure sensors	
 type PA30..	G 1/4 female	1 x 4...20 mA	–	stainless steel (303S21) ceramics Viton	-1...600	-25...80		102	Temperature sensors
 type PA90..	G 1/4 female	1 x 0...10 V	–	stainless steel (303S21) ceramics Viton	0...400	-25...80	102	Diagnostic systems	
 Typ PP75..	G 1/4 male	–	2 x DC	stainless steel (303S21) ceramics Viton	-1...400	-25...90	100	Evaluation systems, power supplies	
 type PPA	G 1/4 female	–	AS-interface	stainless steel (303S21) ceramics Viton	0...400	-25...80	102	Connection technology	
 type PL20..	ASEPTOFLEX	1 x 4...20 mA + EPS interface	–	stainless steel (316S12) ceramics 99.9 % Viton	-1...25	-25...80	122	Accessories	
								Technical information and customer service	

For industrial applications



For hygienic areas and viscous media



For hazardous areas



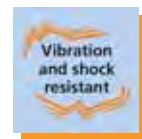
Housing / Process connection	Output		Materials wetted parts	Measuring range [bar]	Medium temperature [°C]	Application / Page		
	Analogue	Binary						
Pressure transmitter								
 type PL26..	G 1 male	1 x 4...20 mA + EPS interface	–	stainless steel (316S12) ceramics 99.9 % Viton	-1...100	-25...80		122
 type PM20..	ASEPTOFLEX	1 x 4...20 mA + EPS interface	–	stainless steel (316S12) ceramics Viton	-1...25	-25...125 (-25...145 1h / day)		122
 type PM26..	G 1 male	1 x 4...20 mA + EPS interface	–	stainless steel (316S12) ceramics 99.9 % Viton	-1...25	-25...125 (-25...145 1h / day)		122
EPS parameter-setting systems								
 type ZZ0050	EPS service system: Convenient configuration of sensors with EPS capability by means of notebook or PC. Easy archiving, fast setup and real time display.						 	110
 type PP2000	Programming and display unit: Quick and easy remote parameter setting of sensors with EPS capability. Local indication, country-specific pressure units and non-volatile storage memory function.						 	102

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- Country-specific pressure units, selectable in bar / mbar, kPa / MPa, psi.
- Memory function for the highest measured system pressure.
- Drift-free operation for more than 100 million pressure cycles.
- Setting and measured values indicated on a 4-digit 10-segment display.
- Easy operating concept with extended functions for optimum use.



Accessories

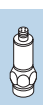
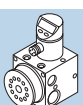
Type	Description	Order no.
	Adapter, G 1/4 - G 1/2	E30000
	Adapter, G 1/4 - G 1/4	E30007
	Flange adapter, G 1/4	E30003
	Mounting clamp, Ø 34 mm	E10193

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 7 2 m black, PUR cable	EVC004
	Socket, M12, Group 7 5 m black, PUR cable	EVC005
	Socket, M12, Group 7 10 m black, PUR cable	EVC006
	Socket, M12, Group 11 wirable	E11512

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Further connectors and splitter boxes are available
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	For industrial applications	PN pressure sensors with display	PE pressure sensors / transmitters with display	PN / PY pressure sensors / transmitters with display	PK pressure sensors with setting rings	PP pressure sensors	PA / PPA pressure transmitters	PS part seat monitoring
Pressure sensors and transmitters								
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Measuring cell
Process connection G 1/4 female
PN7: PNP/NPN switching, diagnostic output

Measuring range [bar]	P _{overload} max. [bar]	P _{bursting} min. [bar]	Switch-on point SP1 / SP2 [bar]	Switch-off point rP1 / rP2 [bar]	In steps of [bar]	Protection	Draw- ing no.	Order no.
M12 connector · Output function / · Connector groups 7, 8, 10 · Wiring diagram no. 5								
0...400	600	1000	4...400	2...398	2	IP 67	1	PN5000
0...250	400	850	2...250	1...249	1	IP 67	2	PN5001
0...100	300	650	1.0...100.0	0.5...99.5	0.5	IP 67	2	PN5002
0...25	150	350	0.2...25.0	0.1...24.9	0.1	IP 65	2	PN5003
-1...10	75	150	-0.90...10.00	-0.95...9.95	0.05	IP 65	2	PN5004
0...2.5	20	50	0.02...2.50	0.01...2.49	0.01	IP 65	2	PN5006
0...1	10	30	0.01...1	0.005...0.995	0.005	IP 65	2	PN5007
M12 con. · 2 x / progr or 1 x / progr. + 1 x · Connector groups 7, 8, 9 · Wiring diagram no. 36								
0...600	800	1200	6...600	3... 597	3	IP 67	1	PN7060
0...400	600	1000	4...400	2...398	2	IP 67	1	PN7000
0...250	400	850	2...250	1...249	1	IP 67	2	PN7001
0...100	300	650	1.0...100.0	0.5...99.5	0.5	IP 67	2	PN7002
0...25	150	350	0.2...25.0	0.1...24.9	0.1	IP 65	2	PN7003
-1...10	75	150	-0.90...10.00	-0.95...9.95	0.05	IP 65	2	PN7004
0...2.5	20	50	0.02...2.50	0.01...2.49	0.01	IP 65	2	PN7006
0...1	10	30	0.01...1	0.005...0.995	0.005	IP 65	2	PN7007
-1...1	20	50	-0.97...1	-0.98...0.99	0.01	IP 65	2	PN7009

Common technical data

Ub: 18...36 V DC
Current rating: 250 mA
Current consumption: < 50 mA
Switch point accuracy: < ± 0.5
Materials (wetted parts):
stainless steel (303S21), ceramics, FPM (Viton)
Shock resistance: 50 g (11 ms)
Vibration resistance: 20 g (10...2,000 Hz)
For further data see
[www. ifm-electronic.com](http://www.ifm-electronic.com)

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pressure sensors
with display



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PN1
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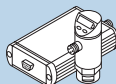
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- Optimised chemical resistance, high-purity ceramic measuring cell (99.9 %).
- Extremely robust and overload-protected.
- Low-cost alternative in non-aseptic peripheral processes.
- Setting and measured values indicated on a 4-digit 10-segment display.
- Drift-free operation for more than 100 million pressure cycles.



Accessories

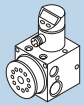
Type	Description	Order no.
	Mounting device 2 way	E30078
	Mounting device 3 way	E30079
	Protective cover, stainless steel (320S31), O-ring: EPDM	E30104
	Protective cover, stainless steel (320S31), O-ring: Viton	E30101

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 7 5 m black, PUR cable	EVC005
	Socket, M12, Group 7 10 m black, PUR cable	EVC006
	Socket, M12, Group 7 5 m black, PUR cable	EVC002
	Socket, M12, Group 7 10 m black, PUR cable	EVC003

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	PN pressure sensors with display	PE pressure sensors / transmitters with display	PN / PY pressure sensors / transmitters with display	PK pressure sensors with setting rings	PP pressure sensors	PA / PPA pressure transmitters	PS part seat monitoring
Pressure sensors and transmitters								
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Measuring cell with 99.9 % ceramics and EPDM cell sealing
Process connection G 1/4 I

Measuring range [bar]	P _{overload} max. [bar]	P _{bursting} min. [bar]	Switch-on point SP1 [bar]	Switch-off point rP1 [bar]	In steps of [bar]	Protection	Draw-ing no.	Order no.
M12 con. · 2 x / progr. or 1 x / progr. + 1 x · Connector groups 7, 8, 9 · Wiring diagram no. 36								
-1...1	20	50	-0.97...1	-0.98...0.99	0.01	IP 67	2	PE7009
0...2.5	20	50	0.02...2.50	0.01...2.49	0.01	IP 67	2	PE7006
0...10	75	150	0.10...10.00	0.05...9.95	0.05	IP 67	2	PE7004
0...25	150	350	0.2...25.0	0.1...24.9	0.1	IP 67	2	PE7003
0...100	300	650	1.0...100.0	0.5...99.5	0.5	IP 67	2	PE7002
M12 connector · Output function / 4...20 mA or 0...10 V · Connector groups 7, 8, 10 · Wiring diagram no. 16								
0...400	600	1000	4...400	2...398	2	IP 67	1	PE3000
0...250	400	850	2...250	1...249	1	IP 67	2	PE3001
0...100	300	650	1.0...100.0	0.5...99.5	0.5	IP 67	2	PE3002
0...25	150	350	0.2...25.0	0.1...24.9	0.1	IP 67	2	PE3003
-1...10	75	150	-0.90...10.00	-0.95...9.95	0.05	IP 67	2	PE3004
0...2.5	20	50	0.02...2.50	0.01...2.49	0.01	IP 67	2	PE3006
-1...0	10	30	-0.99...0	-0.995...-0.005	0.005	IP 67	2	PE3029
-1...1	20	50	-0.97...1	-0.98...0.99	0.01	IP 67	2	PE3009

Common technical data

Ub: 18...36 V DC
Current consumption: < 50 mA
Current rating: 250 mA
Switch point accuracy:< ± 0.5
Repeatability: < ± 0.1
Shock resistance: 50 g (11 ms)
Vibration resistance: 20 g (10...2,000 Hz)
Materials (wetted parts):
ceramics (99.9 % AL₂O₃), high-grade
stainless steel (316S12), EPDM

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pressure sensors
with display



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PNI
pressure sensors
with analogue
input



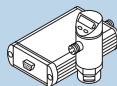
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- Scalable analogue output and integrated switching function.
- Analogue output selectable: 0...10 V or 4...20 mA.
- Local indication of measured values on a 4-digit 10-segment display.
- Clear and easy operating concept with extensive features.
- Country-specific pressure units, selectable switching output logic.



Accessories

Type	Description	Order no.
	Protective cover	E30006
	Mounting device 2 way	E30078
	Mounting clamp, Ø 34 mm	E10193
	Mounting device 3 way	E30079

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 7 2 m black, PUR cable	EVC004
	Socket, M12, Group 7 5 m black, PUR cable	EVC005
	Socket, M12, Group 7 10 m black, PUR cable	EVC006
	Socket, M12, Group 7 5 m black, PUR cable	EVC002
	Socket, M12, Group 7 10 m black, PUR cable	EVC003

Further accessories are available starting on page 217

Further connectors and splitter boxes are available
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	For industrial applications	PN pressure sensors with display	PE pressure sensors / transmitters with display	PN / PY pressure sensors / transmitters with display	PK pressure sensors with setting rings	PP pressure sensors	PA / PPA pressure transmitters	PS part seat monitoring
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PYxxxx: Measuring accuracy 0.2 %
PNxxxx: Measuring accuracy 0.6 %

Measuring range [bar]	P _{overload} max. [bar]	P _{bursting} min. [bar]	Analogue lower end [bar]	Analogue upper end [bar]	Switch-on point SP1 / SP2 [bar]	Switch-off point rP1 / rp2 [bar]	In steps of [bar]	Draw- ing no.	Order no.
M12 connector · Output 1 x / progr. + 1 x analogue · Connector groups 7, 8, 10 · Wiring diagram no. 29									
-0.25...0.25	10	30	-0.25...0.125	-0.125...0.25	-0.248...0.25	-0.25...0.248	0.001	2	PY2068
M12 connector · Output 2 x / or 1 x / + analogue · Connector groups 7, 8, 10 · Wiring diagram no. 30									
0...400	600	1000	0...160	100...400	4...400	2...398	1	3	PN2020
0...250	400	850	0.0...100.0	62.5...250.0	2.0...250.0	1.0...249.0	0.5	4	PN2021
0...100	300	650	0.0...40.0	25.0...100.0	0.8...100.0	0.4...99.6	0.2	4	PN2022
-1...25	100	350	-1.00...10.00	5.25...25.00	-0.80...25.00	-0.90...24.90	0.05	4	PN2023
-1...10	50	150	-1.00...3.40	1.76...10.00	-0.88...10.00	-0.94...9.94	0.02	4	PN2024
-0.13...2.50	20	50	-0.13...1.00	0.50...2.50	-0.11...2.50	-0.12...2.49	0.01	4	PN2026
-0.05...1	10	30	-0.05...0.4	0.2...1	-0.046...1	-0.05...0.996	0.002	4	PN2027
-1...1	20	50	-0.996...-0.2	-0.5...1	-0.988...1	-0.996...0.992	0.004	4	PN2009
-0.5...0.5	10	30	-0.5...-0.1	-0.25...0.5	-0.496...0.5	-0.5...0.496	0.001	4	PN2069
-0.0125...0.25	10	30	-0.0125...0.1	0.05...0.25	-0.0105...0.25	-0.0115...0.249	0.0005	4	PN2028

Common technical data

Ub: 20...30 V DC
Current consumption: < 60 mA
Current rating: 2 x 250 mA
Switch point accuracy: < ± 0.5
Deviation of the characteristics: < ± 0.6
Load: at 4...20 mA: ≤ 700 Ohm,
at 0...10 V: > 2 kOhm
Shock resistance: 50 g (11 ms)
Vibration resistance: 20 g (10...2,000 Hz)
Materials (wetted parts):
ceramics, stainless steel (303S21), viton

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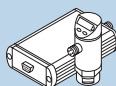
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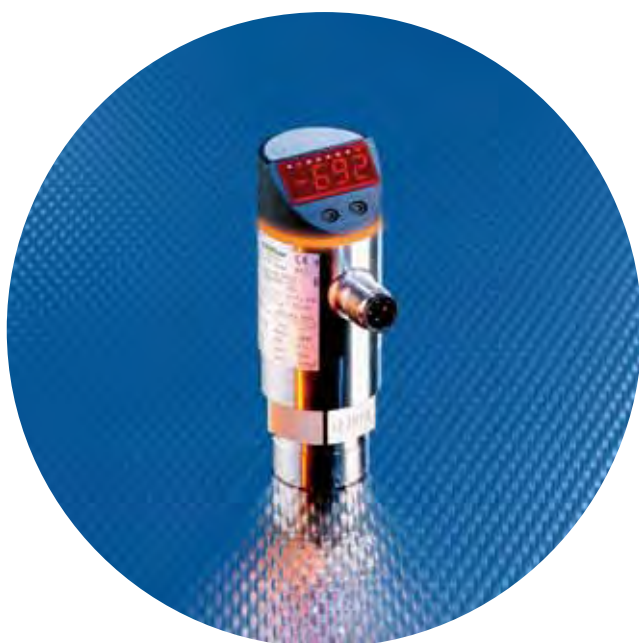


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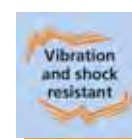
For hazardous
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- Electronic pressure sensor with switching output and analog. output.
- 4-digit 10-segment display for convenient unit configuration.
- Memory for minimum and maximum measured system pressure.
- Country-specific pressure units, selectable in bar / mbar, kPa / MPa, psi.
- High overload range, maximum long-term stability.



Accessories

Type	Description	Order no.
	Adapter, G 1/4 - G 1/2	E30000
	Adapter, G 1/4 - G 1/4	E30007
	Flange adapter, G 1/4	E30003
	Mounting clamp, Ø 34 mm	E10193

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 7 2 m black, PUR cable	EVC004
	Socket, M12, Group 7 5 m black, PUR cable	EVC005
	Socket, M12, Group 7 10 m black, PUR cable	EVC006
	Socket, M12 wirable	E11512

Further accessories are available starting on page 217

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Ceramic measuring cell
Process connection G 1/4 female

Measuring range [bar]	P _{overload} max. [bar]	P _{bursting} min. [bar]	Switch-on point SP1 [bar]	Switch-off point rP1 [bar]	In steps of [bar]	Protection	Draw- ing no.	Order no.
M12 connector · Output function 4...20 mA or 0...10 V · Connector groups 7, 8, 10 · Wiring diagram no. 16								
0...600	800	1200	6...600	3...597	3	IP 67	1	PN3060
0...400	600	1000	4...400	2...398	2	IP 67	1	PN3000
0...250	400	850	2...250	1...249	1	IP 67	2	PN3001
0...100	300	650	1.0...100.0	0.5...99.5	0.5	IP 67	2	PN3002
0...25	150	350	0.2...25.0	0.1...24.9	0.1	IP 65	2	PN3003
-1...10	75	150	-0.90...10.00	-0.95...9.95	0.05	IP 65	2	PN3004
0...2.5	20	50	0.02...2.50	0.01...2.49	0.01	IP 65	2	PN3006
0...1	10	30	0.01...1	0.005...0.995	0.005	IP 65	2	PN3007
-1...0	10	30	-0.99...0	-0.995...-0.005	0.005	IP 65	2	PN3029

Common technical data

Ub: 18...36 V DC
Current rating: 250 mA
Load analogue output mA: max. 500 Ohm
Load analogue output V: min. 2000 Ohm
Switch point accuracy: ± 0.5
Materials (wetted parts):
stainless steel (303S21), ceramics, FPM
Shock resistance: 50 g (11 ms)
Vibration resistance: 20 g (10...2,000 Hz)
For further data see:
www.ifm-electronic.com

You can find scale drawings from page 243

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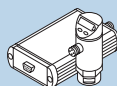
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- Easy switch point adjust. by means of 2 setting rings for simple reading.
- New stainless steel measuring cell, e.g. for freons in refrigerating technology.
- Mechanical lock prevents unintentional manipulation.
- High bursting pressure range for gases and liquids.
- Ideal for use in accumulator charging in hydraulics and pneumatics.



Accessories

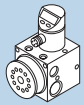
Type	Description	Order no.
	Flange adapter G 1/4 for pressure sensors type PP7 / type PK	E30063
	Damping screw for pressure sensors type PK	E30057
	Protective cover, sealable	E30094

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 7 5 m black, PUR cable	EVC005
	Socket, M12, Group 7 10 m black, PUR cable	EVC006
	Socket, M12, Group 7 5 m black, PUR cable	EVC002
	Socket, M12, Group 7 10 m black, PUR cable	EVC003

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Further connectors and splitter boxes are available starting on page 191

	For industrial applications	PN pressure sensors with display	PE pressure sensors / transmitters with display	PN / PY pressure sensors / transmitters with display	PK pressure sensors with setting rings	PP pressure sensors	PA / PPA pressure transmitters	PS part seat monitoring
Pressure sensors and transmitters								
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Stainless steel measuring cell, welded without sealing ring
Process connection: PK65xx, P75xx: G 1/4 A, PK67xx, PK87xx: R 1/4 A

Measuring range [bar]	P _{overload} max. [bar]	P _{bursting} min. [bar]	Switch-on point SP1 [bar]	Switch-off point rP1 [bar]	Protection	Drawing no.	Order no.
M12 connector · Output function complementary PNP · Connector groups 7, 8, 9 · Wiring diagram no. 17							
0...400	600	1600	20...400	12...392	IP 67	5	PK6520
0...250	400	1000	12.5...250	7.5...245	IP 67	5	PK6521
0...100	200	1000	5...100	3...98	IP 67	5	PK6522
0...25	60	500	1.25...25	0.75...24.5	IP 67	5	PK6523
0...10	25	300	0.5...10	0.3...9.8	IP 67	5	PK6524
M12 connector · Output function PNP · Connector groups 7, 8, 9 · Wiring diagram no. 3							
0...400	600	1600	12...400	2 % hysteresis	IP 67	5	PK7520
0...250	400	1000	7.5...250	2 % hysteresis	IP 67	5	PK7521
0...100	200	1000	3...100	2 % hysteresis	IP 67	5	PK7522
0...10	25	300	0.3...10	2 % hysteresis	IP 67	5	PK7524
M12 connector · Output function complementary PNP · Connector groups 7, 8, 9 · Wiring diagram no. 17							
0...400	600	1600	20...400	12...392	IP 67	6	PK6730
0...250	400	1000	12.5...250	7.5...245	IP 67	6	PK6731
0...100	200	1000	5...100	3...98	IP 67	6	PK6732
0...10	25	300	0.5...10	0.3...9.8	IP 67	6	PK6734
M12 connector · Output function complementary NPN · Connector groups 7, 8, 9 · Wiring diagram no. 18							
0...400	600	1600	20...400	12...392	IP 67	6	PK8730
0...250	400	1000	12.5...250	7.5...245	IP 67	6	PK8731
0...100	200	1000	5...100	3...98	IP 67	6	PK8732
0...10	25	300	0.5...10	0.3...9.8	IP 67	6	PK8734

Common technical data

Ub: 9.6...32 V DC
 Current consumption: < 25 mA
 Current rating: 500 mA
 Switch point accuracy: < ± 2.5 %
 Repeatability: < ± 0.5 %
 Shock resistance: 50 g (11 ms)
 Vibration resistance: 20 g (10...2,000 Hz)
 Materials (wetted parts):
 high-grade stainless steel (316S12);
 FPM (Viton)

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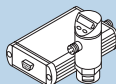
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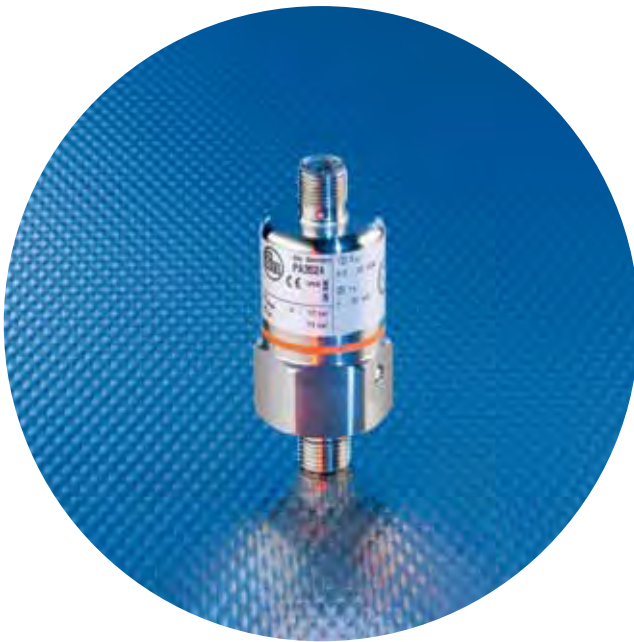
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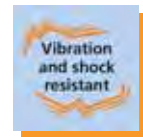
Connection
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Accessories

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- Pressure sensor for mobile use, shock resistant up to 1000 g.
- 1 switching output and remote setting function.
- 2 switching outputs freely configurable.
- Excellent EMC resistance e.g. 100 V/m.
- Optional parameter setting and documentation via PC connection.



Accessories

Type	Description	Order no.
	Programming and display unit for EPS sensors	PP2000
	Teach button	E30051
	EPS service system	ZZ0050
	Flange adapter G 1/4 for pressure sensors type PP7 / type PK	E30063

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 7 2 m black, PUR cable	EVC004
	Socket, M12, Group 7 5 m black, PUR cable	EVC005
	Socket, M12, Group 7 10 m black, PUR cable	EVC006

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	PN pressure sensors with display	PE pressure sensors / transmitters with display	PN / PY pressure sensors / transmitters with display	PK pressure sensors with setting rings	PP pressure sensors	PA / PPA pressure transmitters	PS part seat monitoring
Pressure sensors and transmitters								
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Approvals: e1
Ceramic measuring cell, Process connection G 1/4 male
For gaseous media up to 25 bar

Measuring range [bar]	P _{overload} max. [bar]	P _{bursting} min. [bar]	Switch-on point SP1 [bar]	Switch-off point rP1 [bar]	In steps of [bar]	Protection	Draw- ing no.	Order no.
M12 connector · Output function 2 x · Connector groups 7, 8, 9 · Wiring diagram no. 37								
0...400	600	1000	4...400	2...398	1	IP 68 / IP 69 K	7	PP7530
0...250	400	850	3...250	2...249	1	IP 68 / IP 69 K	7	PP7531
0...100	300	650	1.0...99.9	0.5...99.5	0.1	IP 68 / IP 69 K	7	PP7532
0...25	100	350	0.3...25.0	0.2...24.9	0.1	IP 68 / IP 69 K	7	PP7533
0...10	50	150	0.10...9.99	0.05...9.94	0.01	IP 68 / IP 69 K	7	PP7534

Common technical data

Ub: 9.6...30 V DC
Current rating: 250 mA
Current consumption: < 45
Accuracy of switch point: < ±1.5
Material (wetted parts): stainless steel (303S22), ceramics, FPM (Viton)
Shock resistance: 1,000 g
Vibration resistance: 20 g (10...2,000 Hz)
For further data see:
www.ifm-electronic.com

You can find scale drawings from page 243

PY7
pressure sensors
with display



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PNI
pressure sensors
with analogue
input



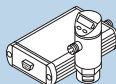
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For hygienic
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- Pressure transmitter with analogue output 4...20 mA or 0...10 V.
- High overload resistance especially in the low pressure range.
- Robust design, therefore resistant to shock and vibration.
- Versions with AS-i slave according to the profile S-7.3.C.
- Flexible process connection by commonly used fittings.



Accessories

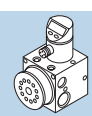
Type	Description	Order no.
	Adapter, G 1/4 - G 1/2	E30000
	Adapter, G 1/4 - G 1/4	E30007
	FC insulation displacement connector for order No. PPA020, PPA024, PPA060	E70096
	Flange adapter, G 1/4	E30003
	Mounting clamp for types M30	E10077

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 7 2 m black, PUR cable	EVC004
	Socket, M12, Group 7 5 m black, PUR cable	EVC005
	Socket, M12, Group 7 10 m black, PUR cable	EVC006
	Socket, M12 wirable	E11512

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

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Ceramic measuring cell
Process connection G 1/4 female, PA35xx: G 1/4 male; PA3228: 1/4" NPT
Approvals: e1 type approval

Measuring range [bar]	P _{overload} max. [bar]	P _{bursting} min. [bar]	Medium temperature [°C]	Protection	U _b [V]	Draw- ing no.	Order no.
M12 connector · Output function 4...20 mA analogue · Connector groups 7, 8 · Wiring diagram no. 19							
0...600	800	1200	-25...90	IP 68 / IP 69 K	9.6...32	8	PA3060
0...400	600	1000	-25...90	IP 68 / IP 69 K	9.6...32	8	PA3020
0...250	400	850	-25...90	IP 68 / IP 69 K	9.6...32	9	PA3021
0...100	300	650	-25...90	IP 68 / IP 69 K	9.6...32	9	PA3022
0...25	150	350	-25...90	IP 65	9.6...32	9	PA3023
0...10	75	150	-25...90	IP 65	9.6...32	9	PA3024
0...2.5	20	50	-25...90	IP 65	9.6...32	9	PA3026
0...1	10	30	-25...90	IP 65	9.6...32	9	PA3027
-1...0	10	30	-25...90	IP 65	9.6...32	9	PA3029
0...0.25	10	30	-25...90	IP 65	9.6...32	10	PA3228
0...250	150	350	-25...90	IP 65	9.6...32	11	PA3521
0...100	150	350	-25...90	IP 65	9.6...32	11	PA3522
0...25	150	350	-25...90	IP 65	9.6...32	11	PA3523
0...10	75	150	-25...90	IP 65	9.6...32	11	PA3524
M12 connector · Output function 0...10 V analogue · Connector groups 7, 8 · Wiring diagram no. 20							
0...400	600	1000	-25...90	IP 68 / IP 69 K	16...32 DC	8	PA9020
0...250	400	850	-25...90	IP 68 / IP 69 K	16...32 DC	9	PA9021
0...100	300	650	-25...90	IP 68 / IP 69 K	16...32 DC	9	PA9022
0...25	150	350	-25...90	IP 65	16...32 DC	9	PA9023
0...10	75	150	-25...90	IP 65	16...32 DC	9	PA9024
0...2.5	20	50	-25...90	IP 65	16...32 DC	9	PA9026
0...1	10	30	-25...90	IP 65	16...32 DC	9	PA9027
M12 connector · Output function AS-i · Connector groups 7, 8 · Wiring diagram no. 21							
0...400	600	1000	-25...80	IP 67	26.5...31.6 DC	12	PPA020
0...10	50	150	-25...80	IP 65	26.5...31.6 DC	13	PPA024
0...600	800	1200	-25...80	IP 67	26.5...31.6 DC	12	PPA060

Common technical data

Current consumption PA90xxx: < 18 mA
Load analog output
PA 30...: 660 Ohm / 24 V
Load analog output PA 90...: min. 5 kOhm
Material (wetted parts): stainless steel (303S22), ceramics, FPM (Viton)
Shock resistance: 50 g (11 ms)
Vibration resistance: 20 g (10...2,000 Hz)
For further data see:
www.ifm-electronic.com

You can find scale drawings from page 243

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pressure sensors
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PNI
pressure sensors
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input



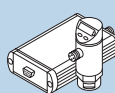
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For hygienic
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viscous media

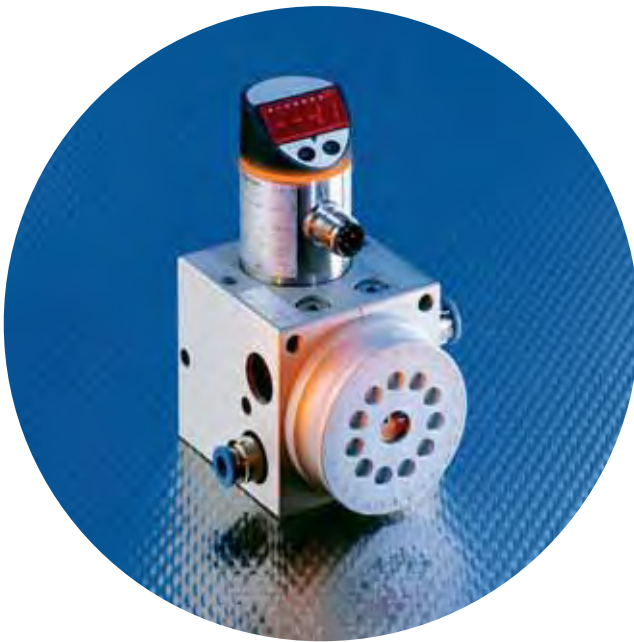


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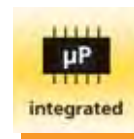
For hazardous
areas



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- PS7 part seat monitoring for precise monitoring with long-term stability.
- Adjust. to the desired gap distance by means of mechanical setting dial.
- Low supply pressures for process-optimised use.
- 2 switch points: Fine / coarse detection or additional function check.
- Non-contact measurement in the micrometer range.



Applications

Metal forming and machining to assembly automation, workpiece positioning and gap detection in harsh operating conditions (dirt, fluids extreme temperatures) continue to present a challenge for project engineers.

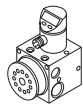
Whether workpiece or tool, pallet or conical spindle insert – the success of the machining operation depends on a clear position definition with gap distances sometimes down to 0.01 mm.

The pneumatic backpressure measurement system is often used to blow the work surface clean. At the same time the required gap distances are clearly detected and converted into OK signals.

System description

The principle of backpressure measurement converts the distance between the nozzles and the "deflector" (the surface of the seated workpiece) into a suitable pressure signal. This signal is evaluated to generate reliable and high repeatability switch points for even the smallest gaps. One single unit can thus be used universally for a wide range of tasks with different nozzle combinations or diameters and gap distances. Gap distances from 0.01 mm to approx. 0.7 mm can be detected depending on the nozzle combinations.

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Integrated pressure sensor with ceramic measuring cell
Relative pressure
Backpressure measurement independent of the supply pressure

Supply pressure [bar]	Measurable gap distances [mm]	Max. detection accuracy	Supply pressure connection	Measuring branch connection	Draw-ing no.	Order no.
M12 connector · Output function 2 x  						
1	0.02...0.7	0.01 mm	2 x 1/8" thread for push-in air fitting	3 x 1/8" thread for push-in air fitting	14	PS7570

Common technical data

Ub: 20...32 V DC
Switching status: 2 LEDs yellow
LED display: 4-digit alphanumeric or trend display
Current rating: 2 x 250 mA
Switch point accuracy: < ± 0.5 %
Repeatability: < ± 0.1 %
Hysteresis: < ± 0.1 % of the span
Shock resistance: 6 g (11 ms)
Vibration resistance: 6 g (10...100 Hz)

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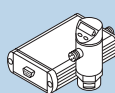
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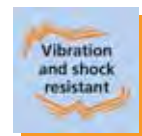
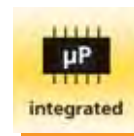
For hazardous
areas



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- Integrated air vent screw for time-critical applications.
- Variable fixing options for surface or wall mounting.
- Flange connection to CETOP with bore holes for several hole patterns.
- Robust, long-term stable design for demanding hydraulics.
- Two switching outputs with selectable diagnostic function.



Accessories

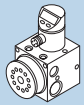
Type	Description	Order no.
	Protective cover, sealable	E30006

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 7 2 m black, PUR cable	EVC004
	Socket, M12, Group 7 5 m black, PUR cable	EVC005
	Socket, M12, Group 7 2 m black, PUR cable	EVC001
	Socket, M12, Group 7 5 m black, PUR cable	EVC002

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

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2 programmable switching outputs PNP/NPN

Diagnostic function

Process connection: PY700x: 1 x G 1/4 female, 2 x M6; PY703x: 2 x G 1/4 female

Measuring range [bar]	P _{overload} max. [bar]	P _{bursting} min. [bar]	Switch-on point SP1 [bar]	Switch-off point rP1 [bar]	In steps of [bar]	Protection	Draw-ing no.	Order no.
M12 con. · 2 x / progr. or 1 x / progr. + 1 x · Connector groups 7, 8, 9 · Wiring diagram no. 36								
0...400	450	1000	4...400	2...398	2	IP 67	15	PY7000
0...250	400	850	2...250	1...249	1	IP 67	15	PY7001
0...100	300	650	1.0...100.0	0.5...99.5	0.5	IP 67	15	PY7002
0...25	150	350	0.2...25.0	0.1...24.9	0.1	IP 65	16	PY7003
0...100	300	650	1.0...100.0	0.5...99.5	0.5	IP 67	17	PY7032

Common technical data

Current consumption: < 50 mA
Operating voltage: 18...36 V DC
Current rating switching output: 250 mA
Power-on delay time: 0.3 s
Repeatability: < ± 0.1 %
Accuracy of switch point: < ± 0.5 %
Operating temperature: -25...80 °C
Shock resistance: 50 g (11 ms)
Vibration resistance: 20 g (10...2000 Hz)
Pressure cycles: 100 Millionen

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pressure sensors
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pressure sensors
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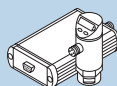
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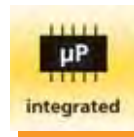
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- With analogue input for automatic switch point adjustment.
- Evaluation of external voltage / current values.
- Continuous comparison of set / actual values directly in the sensor.
- Integrated special functions for specific tasks.
- Differential pressure monitoring with separate pressure transmitter possible.



Accessories

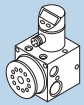
Type	Description	Order no.
	Protective cover, sealable	E30006
	Mounting clamp, Ø 34 mm	E10193
	Adapter, G 1/4 - G 1/2	E30000
	Adapter, G 1/4 - G 1/4	E30007

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 15 2 m black, PUR cable	E11231
	Socket, M12, Group 15 5 m black, PUR cable	E11232
	Socket, M12, Group 7 2 m black, PUR cable	EVC004
	T-splitter box	E11566

Further accessories are available starting on page 217

Further connectors and splitter boxes are available
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	For industrial applications	PN pressure sensors with display	PE pressure sensors / transmitters with display	PN / PY pressure sensors / transmitters with display	PK pressure sensors with setting rings	PP pressure sensors	PA / PPA pressure transmitters	PS part seat monitoring
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Ceramic measuring cell, process connection G 1/4 female
Analogue input (scaleable)

Measuring range [bar]	P _{overload} max. [bar]	P _{bursting} min. [bar]	Analogue lower end [bar]	Analogue upper end [bar]	Switch-on point SP1 / SP2 [bar]	Switch-off point rP1 / rp2 [bar]	In steps of [bar]	Draw- ing no.	Order no.
M12 connector · Output function 2 x  /  · Connector group 7, 15 · Wiring diagram no. 22									
0...250	400	850	–	–	-62...250	-63...249	1	2	PNi021
0...100	300	650	–	–	-24.6...100.0	-25.0...99.6	0.2	2	PNi022
0...25	100	350	–	–	-6.2...25.0	-6.3...24.9	0.1	2	PNi023
0...10	50	150	–	–	-2.46...10.00	-2.50...9.96	0.02	2	PNi024

Common technical data

Ub: 20...30 V DC
Current consumption: < 90 mA
Current rating: 2 x 250 mA
Analogue voltage input: 0...10 V
(input resistance min. 90 kOhm)
Analogue current input: 0/4...20 mA
(load max. 300 Ohm)
Rise time analogue input: 3 ms
Deviation of the characteristics: < ± 0.6 %
Materials wetted parts: ceramics, high-
grade stainless steel (316S12), PTFE

You can find scale drawings from page 243

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pressure sensors
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PNi
pressure sensors
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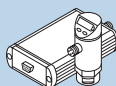


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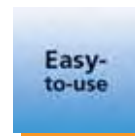
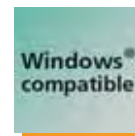
Connection
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- Parameter setting and analysis software on FDT/DTM basis.
- Data exchange with pressure, temperature, and flow sensors.
- Special wizard simplifies necessary settings.
- Device configuration, documentation and diagnostics for the entire plant.
- Simple point-to-point connection possible.



The FDT Container program from ifm

The FDT framework software, the ifm Container, features a user-friendly user mode. When starting the program, users are supported by a wizard that does all necessary settings for them.

The FDT technology

The FDT technology standardises the communication interface between field devices and the system environment (host). The special feature of this technology is that it is independent of the communication protocol used and the software environment. The user can also freely choose the device to be used and the control system used. In brief: With FDT it is possible to address any unit via any system using any protocol.

	For industrial applications	PN pressure sensors with display	PE pressure sensors / transmitters with display	PN / PY pressure sensors / transmitters with display	PK pressure sensors with setting rings	PP pressure sensors	PA / PPA pressure transmitters	PS part seat monitoring
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Set article ZZ0050: includes all hardware and software required
FDT framework software: ifm Container

U _b [V]	Current consumption [mA]	Operating temperature [°C]	Interface	Language	Order no.
Set article					
10.8...30	< 80	-20...70	RS-232	–	ZZ0050
Parameter setting and analysis software ifm Container					
–	–	–	–	German / English	E30110

The following families of units in this catalogue can be analysed and configured using the ifm Container program:

Pressure sensor series:

PN5xxx / PN7xxx, PE7xxx / PE3xxx, PY2068 / PN2xxx,
PN3xxx, PP7xxx,
PI2xxx, PI1xxx, PI7xxx, PL2xxx / PM2xxx, PF2xxx, PF00xA

Temperature sensor series:

TADxxx, TR 2432 / TR8430

Flow sensor series:

SD6100

Note:

You can download a continuously updated DTM catalogue from ifm's website.

Common technical data

System requirements for E30110
PC min. Pentium 3 / 700 MHz
min. 256 MB RAM
min. 150 MB free hard disk memory
Microsoft Windows NT / XP
Microsoft Internet Explorer 6.x

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pressure sensors
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PNI
pressure sensors
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input



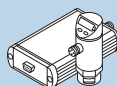
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- Fast and easy handling.
- Flexible local indication of the measured values.
- Indication in country-specific pressure units, (bar / mbar, kPa / MPa, psi).
- Three read-only memories for any duplication of the data records.
- Permanent or demand-oriented operation possible.

IP 67

Stainless
steelVibration
and shock
resistantGold-
plated
contacts

Accessories

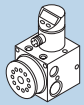
Type	Description	Order no.
	Jumper ifm electronic straight / straight	E10881
	Teach button for EPS sensors	E30051
	Jumper Bedia straight / angled	E11274

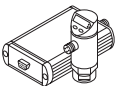
Description

The programming and display unit PP2001 enables remote parameter setting and evaluation of sensors of the PP7xxx, PLxxx, PMxxx series. The clearly visible 7-segment LED display provides permanent or demand-oriented information about the current system pressure using the country-specific units. A working memory contains the currently used data record of the connected sensor which can be stored and accessed on request by means of the clearly structured menu navigation.

Due to the voltage supply via the programming and display unit PP2001, an additional external supply of the sensors is not necessary.

Further accessories are available starting on page 217

	For industrial applications	PN pressure sensors with display	PE pressure sensors / transmitters with display	PN / PY pressure sensors / transmitters with display	PK pressure sensors with setting rings	PP pressure sensors	PA / PPA pressure transmitters	PS part seat monitoring
Pressure sensors and transmitters								
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Programming and display unit for EPS sensors

U _b [V]	Current consumption [mA]	Operating temperature [°C]	Measuring / display cycle [ms]	Vibration resistance	Protection	Draw- ing no.	Order no.
10.8...30	< 60	-25...80	200	20 (DIN / IEC 68-2-6, 10 - 2000 Hz)	IP 67	18	PP2000

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Flow sensors
Pressure sensors
Temperature sensors
Diagnostic systems
Evaluation systems, power supplies
Connection technology
Accessories
Technical information and customer service

You can find scale drawings from page 243

PY7
pressure sensors
with display



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PNI
pressure sensors
with analogue
input

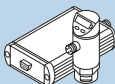


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EPS
parameter-
setting
systems



112 - 113

For hygienic
areas and
viscous media

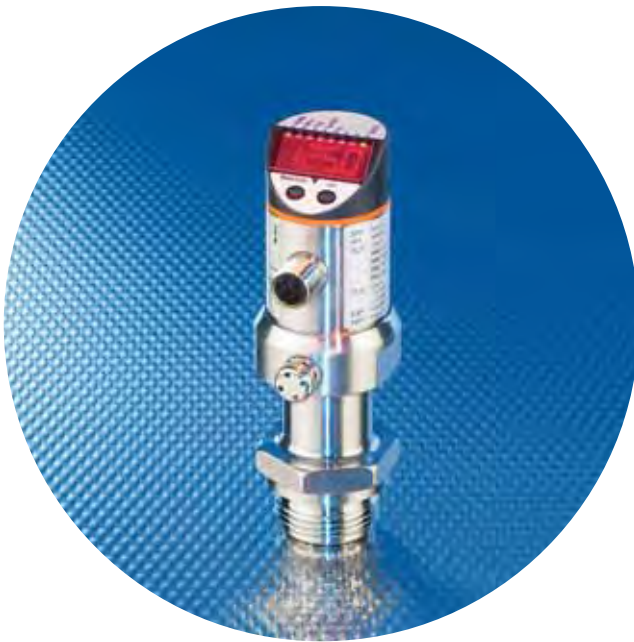


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For hazardous
areas



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- Flush sensors for medium temperatures up to 125 °C.
- 0.2 % measuring accuracy and fast temperature compensation.
- Determination of zero point and measuring range via teach button.
- O-ring free sealing concept for maintenance-free long-term operation.
- Optional parameter setting and documentation via PC connection.



Accessories

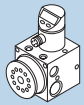
Type	Description	Order no.
	Adapter, G 1 - Clamp ISO2852/1-1.5	E33601
	Aseptoflex adapter, DIN11851 - 1.5" / DN40	E33012
	Protective cover	E30101
	Protective cover	E30104
	EPS service system	ZZ0050

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 58 5 m orange, PVC cable	EVT004
	Socket, M12, Group 58 10 m orange, PVC cable	EVT005
	Socket, M12, Group 58 5 m orange, PVC cable	EVT001
	Socket, M12, Group 58 10 m orange, PVC cable	EVT002

Further accessories are available starting on page 217

Further connectors and splitter boxes are available
starting on page 191

	For industrial applications	PN pressure sensors with display	PE pressure sensors / transmitters with display	PN / PY pressure sensors / transmitters with display	PK pressure sensors with setting rings	PP pressure sensors	PA / PPA pressure transmitters	PS part seat monitoring
Pressure sensors and transmitters								
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Output 1: Switching output programmable
Output 2: Analogue output 4...20 mA / 0...10 V or 20...4 mA / 10...0 V

Measuring range [bar]	P _{overload} max. [bar]	P _{bursting} min. [bar]	Analogue lower end [bar]	Analogue upper end [bar]	Switch-on point SP1 / SP2 [bar]	Switch-off point rP1 / rp2 [bar]	In steps of [bar]	Drawing no.	Order no.
Medium temperature: -25...125 °C (145 °C max. 1h) · Connector groups 58, 59, 61, 64 · Wiring diagram no. 29									
-1.00...25.00	100	350	-1.00...18.74	5.24...25.00	-0.96...25.00	-1.00...24.96	0.02	19	PI2093
-1.00...10.00	50	150	-1.00...7.25	1.75...10.00	-0.98...10.00	-1.00...9.98	0.01	19	PI2094
-1.000...4.000	30	100	-1.000...3.000	0.00...4.00	-0.990...4.000	-1.000...3.990	0.005	19	PI2095
-0.124...2.500	20	50	-0.124...1.880	0.50...2.50	-0.120...2.500	-0.124...2.496	0.002	19	PI2096
-0.05...1	10	30	-0.05...0.75	0.2...1	-0.048...1	-0.05...0.998	0.001	19	PI2097
-0.0124...0.25	10	30	-0.0124...0.1874	0.05...0.25	-0.012...0.25	-0.0124...0.2496	0.0002	19	PI2098
-1...1	10	30	-1...0.5	-0.5...1	-0.998...1	-1...0.998	0.001	19	PI2099
-1.0...100.0	200	650	-1.0...75.0	24.0...100.0	-0.8...100.0	-1.0...99.8	0.1	20	PI2692
-1.00...25.00	100	350	-1.00...18.74	5.24...25.00	-0.96...25.00	-1.00...24.96	0.02	20	PI2693
-1.00...10.00	50	150	-1.00...7.25	1.75...10.00	-0.98...10.00	-1.00...9.98	0.01	20	PI2694
-1.000...4.000	30	100	-1.000...2.750	0.25...4.00	-0.990...4.000	-1.000...3.990	0.005	20	PI2695
-0.124...2.500	20	50	-0.124...1.880	0.50...2.50	-0.120...2.500	-0.124...2.496	0.002	20	PI2696
-0.05...1	10	30	-0.05...0.75	0.2...1	-0.048...1	-0.05...0.998	0.001	20	PI2697
-0.0124...0.25	10	30	-0.0124...0.1874	0.05...0.25	-0.012...0.25	-0.0124...0.2496	0.0002	20	PI2698
-1...1	10	30	-1...0.5	-0.5...1	-0.998...1	-1...0.998	0.001	20	PI2699
-1.00...25.00	100	200	-1.00...18.74	5.24...25.00	-0.96...25.00	-1.00...24.96	0.02	21	PI2993
-1.00...10.00	50	150	-1.00...7.25	1.75...10.00	-0.98...10.00	-1.00...9.98	0.01	21	PI2994
-1.000...4.000	30	100	-1.000...3.000	0.00...4.00	-0.990...4.000	-1.000...3.990	0.005	21	PI2995
-0.124...2.500	20	50	-0.124...1.880	0.50...2.50	-0.120...2.500	-0.124...2.496	0.002	21	PI2996
-0.05...1	10	30	-0.05...0.75	0.2...1	-0.048...1	-0.05...0.998	0.001	21	PI2997

PI209x: Flush pressure sensors with Aseptoflex adapter thread
PI269x: Flush pressure sensors with G 1A adapter thread
PI299x: Flush pressure sensors with G 3/4A adapter thread
The 3A approval is only valid if adapters with 3A approval are used for installation.

Common technical data

Ub: 18...32 V DC
Accuracy PI20xx and PI26xxx: 0.2 %
Accuracy PI29xx: > 0.2 %
Current rating: 1 x 250 mA
Current consumption: < 50 mA
Deviation of the characteristics: < ± 0.2,
Materials (wetted parts):
high-grade stainless steel (316S12), ceramics
99.9 %, PTFE; Shock resistance: 50 g
(11 ms); Vibration resistance: 20 g
(10...2,000 Hz); Protection: IP 67 / IP 69K

You can find scale drawings from page 243

PY7
pressure sensors
with display



106 - 107

PNI
pressure sensors
with analogue
input



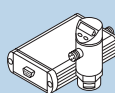
108 - 109

FDT-
Container-
Programm



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EPS
parameter-
setting
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112 - 113

For hygienic
areas and
viscous media

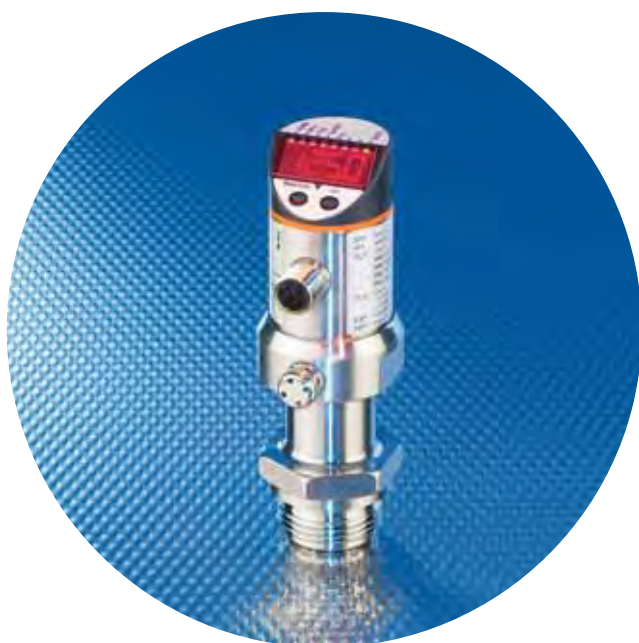


114 - 125

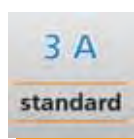
For hazardous
areas



126 - 127



- Pressure transmitter with LED display in 2-wire connection technology.
- Extensive menu functions for a high degree of process safety.
- High overall accuracy (0.2 %) and electronic temperature compensation.
- Overload resistant and drift-free ceramic measuring cell.
- O-ring free sealing concept for maintenance-free long-term operation.



Accessories

Type	Description	Order no.
	EPS service system	ZZ0050
	Protective cover, stainless steel (320S31), O-ring: Viton	E30101
	Protective cover, stainless steel (320S31), O-ring: EPDM	E30104
	Aseptoflex adapter, DIN 11864-BKS-3A / DN40	E33108
	Aseptoflex adapter, Clamp 1.5"	E33001

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 58 5 m orange, PVC cable	EVT004
	Socket, M12, Group 58 10 m orange, PVC cable	EVT005
	Socket, M12, Group 58 5 m orange, PVC cable	EVT001
	Socket, M12, Group 58 10 m orange, PVC cable	EVT002

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	PN pressure sensors with display	PE pressure sensors / transmitters with display	PN / PY pressure sensors / transmitters with display	PK pressure sensors with setting rings	PP pressure sensors	PA / PPA pressure transmitters	PS part seat monitoring
Pressure sensors and transmitters								
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Pressure transmitter 4...20 mA
Process connection: PI10xx: Aseptoflex adapter thread; PI16xx: G 1 male
optional PC connection

Measuring range [bar]	P _{overload} max. [bar]	P _{bursting} min. [bar]	Analogue lower end [bar]	Analogue upper end [bar]	Switch-on point SP1 / SP2 [bar]	Switch-off point rP1 / rp2 [bar]	In steps of [bar]	Draw- ing no.	Order no.
Medium temperature: -25...125 °C (145 °C max. 1h) · Connector groups 58, 59, 61, 64 · Wiring diagram no. 31									
-1.00...25.00	100	350	-1.00...18.74	5.24...25.00	–	–	0.02	19	PI1093
-1.00...10.00	50	150	-1.00...7.25	1.75...10.00	–	–	0.01	19	PI1094
-1.000...4.000	30	100	-1.00...3.00	0.00...4.00	–	–	0.005	19	PI1095
-0.124...2.500	20	50	-0.124...1.880	0.50...2.50	–	–	0.002	19	PI1096
-0.05...1	10	30	-0.05...0.75	0.2...1	–	–	0.001	19	PI1097
-0.0124...0.25	10	30	-0.0124...0.1874	0.05...0.25	–	–	0.00002	19	PI1098
-1...1	10	30	-1...0.5	-0.5...1	–	–	0.001	19	PI1099
-1.00...25.00	100	350	-1.00...18.74	5.24...25.00	–	–	0.02	20	PI1693
-1.00...10.00	50	150	-1.00...7.25	1.75...10.00	–	–	0.01	20	PI1694
-1.000...4.000	30	100	-1.000...3.000	0.00...4.00	–	–	0.005	20	PI1695
-0.124...2.500	20	50	-0.124...1.880	0.50...2.00	–	–	0.002	20	PI1696
-0.05...1	10	30	-0.05...0.75	0.2...1	–	–	0.001	20	PI1697
-0.0124...0.25	10	30	-0.0124...0.1874	0.05...0.25	–	–	0.00002	20	PI1698
-1...1	10	30	-1...0.5	-0.5...1	–	–	0.001	20	PI1699

The 3A approval is only valid if adapters with 3A approval are used for installation.

Common technical data

Operating voltage: 20...32 V DC
Characteristics deviation: 0.2 %
Repeatability: 0.1 %
Operating temperature: -25...80 °C
Load for analogue output: max. 300 Ohm
Materials (wetted parts): stainless steel (316S16), ceramics (99.9 % Al₂O₃), PTFE
Protection: IP 67 / IP 69K

You can find scale drawings from page 243

PY7
pressure sensors
with display



106 - 107

PNI
pressure sensors
with analogue
input



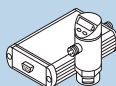
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For hygienic
areas and
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For hazardous
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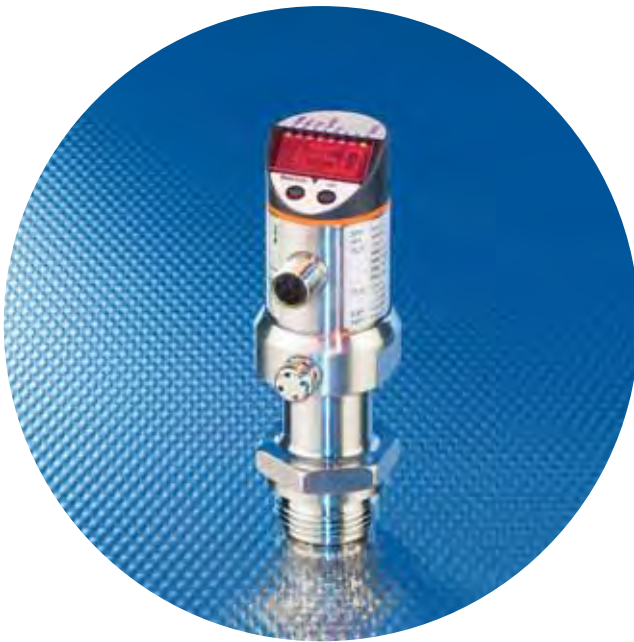
Diagnostic
systems

Evaluation
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power supplies

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technology

Accessories

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and customer
service



- Flush pressure sensor with 2 independent switching outputs
- 0.2 % measuring accuracy and fast temperature compensation.
- O-ring free sealing concept for maintenance-free long-term operation.
- Optional parameter setting and documentation via PC connection.
- Overload resistant and drift-free ceramic measuring cell.



Accessories

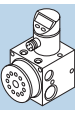
Type	Description	Order no.
	EPS service system	ZZ0050
	Protective cover, stainless steel (320S31), O-ring: Viton	E30101
	Protective cover, stainless steel (320S31), O-ring: EPDM	E30104

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 58 5 m orange, PVC cable	EVT004
	Socket, M12, Group 58 10 m orange, PVC cable	EVT005
	Socket, M12, Group 58 5 m orange, PVC cable	EVT001
	Socket, M12, Group 58 10 m orange, PVC cable	EVT002

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	PN pressure sensors with display	PE pressure sensors / transmitters with display	PN / PY pressure sensors / transmitters with display	PK pressure sensors with setting rings	PP pressure sensors	PA / PPA pressure transmitters	PS part seat monitoring
Pressure sensors and transmitters								
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2 switching outputs or 1 switching output and 1 diagnostic output selectable
Process connection: PI70xx: Aseptoflex adapter thread, PI76xx: G 1 male, PI79xx: G 3/4 male

Measuring range [bar]	P _{overload} max. [bar]	P _{bursting} min. [bar]	Analogue lower end [bar]	Analogue upper end [bar]	Switch-on point SP1 / SP2 [bar]	Switch-off point rP1 / rp2 [bar]	In steps of [bar]	Drawing no.	Order no.
Medium temperature: -25...125 °C (145 °C max. 1h) · Connector groups 58, 61 · Wiring diagram no. 36									
-1.00...25.00	100	350	–	–	-0.96...25.00	-1.00...24.96	0.02	19	PI7093
-1.00...10.00	50	150	–	–	-0.98...10.00	-1.00...9.98	0.01	19	PI7094
-0.124...2.500	20	50	–	–	-0.120...2.500	-0.124...2.496	0.002	19	PI7096
-1.00...25.00	100	350	–	–	-0.96...25.00	-1.00...24.96	0.02	21	PI7993

The 3A approval is only valid if adapters with 3A approval are used for installation.

Common technical data

Ub: 18...32 V DC
Switch point accuracy: 0.2 %
Deviation of the characteristics: 0.2 %
Current rating: 2 x 250 mA
Current consumption: < 50 mA
Materials (wetted parts): high-grade stainless steel (316S12) ceramics 99.9 %, PTFE
Shock resistance: 50 g (11 ms)
Vibration resistance: 20 g (10...2000 Hz)
Protection: IP 67 / IP 69K

You can find scale drawings from page 243

PY7
pressure sensors
with display



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PNI
pressure sensors
with analogue
input

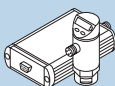


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For hazardous
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- Pressure sensor with diagnostic function for pumps.
- Diagnosis of disturbance in the suction area (e.g. cavitation).
- Outgassing liquids and air trapped in the pump are detected.
- Independ. system-pressure monitoring with second binary switching output.
- As an alternative: pump control by analogue output.

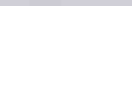
Al₂O₃
99.9 %



Accessories

Type	Description	Order no.
	Aseptoflex adapter, Clamp 1.5"	E33001
	Aseptoflex adapter, Clamp 2"	E33002
	Welding adapter, Ø 50 mm	E30052
	Welding adapter, G 1 - Ø 50 mm	E30013
	EPS service system For order No. PIMxxx	ZZ0050

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 58 5 m orange, PVC cable	EVT004
	Socket, M12, Group 58 10 m orange, PVC cable	EVT005
	Socket, M12, Group 58 5 m orange, PVC cable	EVT001
	Socket, M12, Group 58 10 m orange, PVC cable	EVT002

Further accessories are available starting on page 217

Further connectors and splitter boxes are available
starting on page 191

	For industrial applications	PN pressure sensors with display	PE pressure sensors / transmitters with display	PN / PY pressure sensors / transmitters with display	PK pressure sensors with setting rings	PP pressure sensors	PA / PPA pressure transmitters	PS part seat monitoring
Pressure sensors and transmitters								
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Sensors for pump diagnosis and
monitoring of the system pressure
Process connection: PIM09x: Asepteoflex thread; PIM69x: G 1 male

Measuring range [bar]	P _{overload} max. [bar]	P _{bursting} min. [bar]	Analogue lower end [bar]	Analogue upper end [bar]	Switch-on point SP1 / SP2 [bar]	Switch-off point rP1 / rp2 [bar]	In steps of [bar]	Draw- ing no.	Order no.
Combined sensor for pump diagnosis and pressure monitoring · Connector groups 44, 45, 49									
-1.00...25.00	100	350	-1.00...18.74	5.24...25.00	-0.96...25.00	-1.00...24.96	0.02	19	PIM093
-1.00...10.00	50	150	-1.00...7.25	1.50...10.00	-0.98...10.00	-1.00...9.98	0.01	19	PIM094
-1.00...25.00	100	350	-1.00...18.74	5.24...25.00	-0.96...25.00	-1.00...24.96	0.02	20	PIM693
-1.00...10.00	50	150	-1.00...7.25	1.50...10.00	-0.98...10.00	-1.00...9.98	0.01	20	PIM694

The 3A approval is only valid if adapters with 3A approval are used for installation.

Common technical data

Operating voltage: 18...32 V DC
Current rating: 250 mA
Permissible overl. pressure:
PIM094, PIM694: 50 bar;
PIM093, PIM693: 100 bar
Bursting pressure:
PIM094, PIM694: 150 bar;
PIM093, PIM693: 350 bar
Accuracy of switch point: 0.2 %
Characteristics deviation: 0.2 %
Protection: IP 67 / IP 69K

You can find scale drawings from page 243

PY7
pressure sensors
with display



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PNI
pressure sensors
with analogue
input

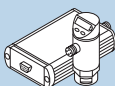


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- Flush sensors for integration in aseptic processes.
- 0.6 % measuring accuracy.
- Maintenance-free over the whole life cycle – climate-proof (potted housing).
- O-ring free sealing concept for maintenance-free long-term operation.
- Overload resistant & drift-free ceramic measuring cell with highest purity.



Accessories

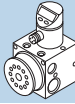
Type	Description	Order no.
	EPS service system	ZZ0050
	Aseptoflex adapter, Clamp 1.5"	E33001
	Aseptoflex adapter, DIN11851 - 1.5" / DN40	E33012
	Aseptoflex adapter, Varivent D68	E33022

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 58 5 m orange, PVC cable	EVT004
	Socket, M12, Group 58 10 m orange, PVC cable	EVT005
	Socket, M12, Group 58 5 m orange, PVC cable	EVT001
	Socket, M12, Group 58 10 m orange, PVC cable	EVT002

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	PN pressure sensors with display	PE pressure sensors / transmitters with display	PN / PY pressure sensors / transmitters with display	PK pressure sensors with setting rings	PP pressure sensors	PA / PPA pressure transmitters	PS part seat monitoring
Pressure sensors and transmitters								
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Analogue output: 4...20 mA (scaleable)
Process connection: PL / PM20xx: Aseptoflex adapter thread, PL / PM26xx: G 1A

Measuring range [bar]	P _{overload} max. [bar]	P _{bursting} min. [bar]	Analog lower end [bar]	Analog upper end [bar]	In steps of [bar]	Protection	Drawing no.	Order no.
Medium temperature: -25...80 °C · Connector groups 58, 61 · Wiring diagram no. 38								
-1.0...25	100	350	-1.0...18.8	5.3...25.0	0.1	IP 67	22	PL2053
-0.5...10	50	150	-0.50...7.49	2.0...9.99	0.01	IP 67	22	PL2054
-0.13...2.50	20	50	-0.13...1.88	0.50...2.50	0.01	IP 67	22	PL2056
-0.05...0.001	10	30	-0.05...0.749	0.2...0.999	0.001	IP 67	22	PL2057
-0.0125...0.25	10	30	-0.0125...0.1	0.05...0.25	0.0005	IP 67	22	PL2058
-0.0125...0.25	10	30	-0.0125...0.1	0.05...0.25	0.0005	IP 67	23	PL2658
-0.05...1	10	30	-0.05...0.749	0.2...0.999	0.001	IP 67	23	PL2657
-0.13...2.50	20	50	-0.13...1.88	0.50...2.50	0.01	IP 67	23	PL2656
-0.5...10	50	150	-0.50...7.49	2.0...9.99	0.01	IP 67	23	PL2654
-1.0...25	100	350	-1.0...18.8	5.3...25.0	0.1	IP 67	23	PL2653
-1...100	200	650	-1.0...75.0	24.0...100.0	0.1	IP 67	24	PL2652
Medium temperature: -25...125 °C (145 °C max. 1h) · Connector groups 58, 61 · Wiring diagram no. 38								
-1...25	100	350	-1.0...18.8	5.3...25.0	0.1	IP 67	25	PM2053
-0.5...10	50	150	-0.50...7.49	2.0...9.99	0.01	IP 67	25	PM2054
-0.99...4.00	30	100	-0.99...1.00	0.26...4.00	0.01	IP 67	25	PM2055
-0.13...2.50	20	50	-0.13...1.88	0.50...2.50	0.01	IP 67	25	PM2056
-0.05...0.001	10	30	-0.05...0.749	0.2...0.999	0.001	IP 67	25	PM2057
-0.0125...0.25	10	30	-0.0125...0.1	0.05...0.25	0.0005	IP 67	25	PM2058
-0.99...4.00	30	100	-0.99...1.00	0.26...4.00	0.01	IP 67	26	PM2655
-0.0125...0.25	10	30	-0.0125...0.1	0.05...0.25	0.0005	IP 67	26	PM2658
-0.05...0.001	10	30	-0.05...0.749	0.2...0.999	0.001	IP 67	26	PM2657
-0.13...2.50	20	50	-0.13...1.88	0.50...2.50	0.01	IP 67	26	PM2656
-0.5...10	50	150	-0.50...7.49	2.0...9.99	0.01	IP 67	26	PM2654
-1...25	100	350	-1.0...18.8	5.3...25.0	0.1	IP 67	26	PM2653

The 3A approval is only valid if adapters with 3A approval are used for installation.

Common technical data

Ub: 14...30 V DC
Load analogue output: 550 Ohm / 24 V
Materials (wetted parts):
high-grade stainless steel (316S12), ceramics
99.9 %, PTFE
Shock resistance: 50 g (11 ms)
Vibration resistance: 20 g (10...2,000 Hz)
For further data see:
www. ifm-electronic.com

You can find scale drawings from page 243

PY7
pressure sensors
with display



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PNI
pressure sensors
with analogue
input



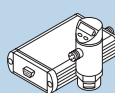
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FDT-
Container-
Programm



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EPS
parameter-
setting
systems



112 - 113

For hygienic
areas and
viscous media



114 - 125

For hazardous
areas



126 - 127



- Flush sensors for integration in aseptic processes.
- 0.6 % measuring accuracy.
- Maintenance-free over the whole life cycle – climate-proof (potted housing).
- O-ring free sealing concept for maintenance-free long-term operation.
- Overload resistant & drift-free ceramic measuring cell with highest purity.



Accessories

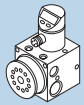
Type	Description	Order no.
	Adapter, G 1 - Clamp ISO2852/1-1.5	E33601
	Aseptoflex adapter, DIN11851 - 1.5" / DN40	E33012
	Aseptoflex adapter, Varivent D50	E33021
	EPS service system	ZZ0050

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 58 5 m orange, PVC cable	EVT004
	Socket, M12, Group 58 10 m orange, PVC cable	EVT005
	Socket, M12, Group 58 5 m orange, PVC cable	EVT001
	Socket, M12, Group 58 10 m orange, PVC cable	EVT002

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	PN pressure sensors with display	PE pressure sensors / transmitters with display	PN / PY pressure sensors / transmitters with display	PK pressure sensors with setting rings	PP pressure sensors	PA / PPA pressure transmitters	PS part seat monitoring
Pressure sensors and transmitters								
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Output 1: Switching output programmable
Output 2: Switching output programmable or analogue output 4...20 mA / 0 ...10 V

Measuring range [bar]	P _{overload} max. [bar]	P _{bursting} min. [bar]	Analogue lower end [bar]	Analogue upper end [bar]	Switch-on point SP1 / SP2 [bar]	Switch-off point rP1 / rp2 [bar]	In steps of [bar]	Draw- ing no.	Order no.
Medium temperature: -25...80 °C · Connector groups 58, 59, 61 · Wiring diagram no. 30									
-1.0...25	100	350	-1.0...18.8	5.3...25.0	-0.8...25.0	-0.9...24.9	0.1	27	PF2053
-0.5...10	50	150	-0.50...7.49	2.00...9.99	-0.45...9.99	-0.50...9.94	0.01	27	PF2054
-0.13...2.50	20	50	-0.13...1.88	0.50...2.50	-0.11... 2.50	-0.12... 2.49	0.01	27	PF2056
-0.05...1	10	30	-0.05...0.749	0.2...0.999	-0.045...0.999	-0.05...0.994	0.001	27	PF2057
-0.013...0.25	10	30	-0.013...0.188	0.05...0.25	-0.011...0.25	-0.012...0.249	0.001	27	PF2058
-1.0...100	200	650	-1.0...75.0	24.0...100	0.0...100	-0.5...99.5	0.1	28	PF2652
-1.0...25	100	350	-1.0...18.8	5.3...25.0	-0.8...25.0	-0.9...24.9	0.1	29	PF2653
-0.5...10	50	150	-0.50...7.49	2.00...9.99	-0.45...9.99	-0.50...9.94	0.01	29	PF2654
-0.13...2.50	20	50	-0.13...1.88	0.50...2.50	-0.11...2.50	-0.12... 2.49	0.01	29	PF2656
-0.05...1	10	30	-0.05...0.749	0.2...0.999	-0.045...0.999	-0.05...0.994	0.001	29	PF2657
-0.013...0.25	10	30	-0.013...0.188	0.05...0.25	-0.011...0.25	-0.012...0.249	0.001	29	PF2658
-0.99...1.00	20	50	-0.99...-0.20	-0.50...1.00	-0.97...1.00	-0.99...0.98	0.01	29	PF2609
-1.0...25	100	200	-1.0...18.8	5.3...25.0	-0.8...25.0	-0.9...24.9	0.1	30	PF2953
-0.5...10	50	150	-0.50...7.49	2.00...9.99	-0.45...9.99	-0.50...9.94	0.01	30	PF2954
-0.13...2.50	20	50	-0.13...1.88	0.50...2.50	-0.11... 2.50	-0.12 ... 2.49	0.01	30	PF2956
-0.05...1	10	30	-0.05...0.749	0.2...0.999	-0.045...0.999	-0.05...0.994	0.001	30	PF2957

PF205x: Flush pressure sensors with Aseptoflex adapter thread
PF265x: Flush pressure sensors with G 1A adapter thread
PF295x: Flush pressure sensors with G 3/4A adapter thread
The 3A approval is only valid if adapters with 3A approval are used for installation.

Common technical data

Ub: 20...30 V DC
Current rating: 1 x or 2 x 250 mA
Current consumption: < 60 mA
Deviation of the characteristics: < ± 0.6
Materials (wetted parts): high-grade stainless steel (316S12), ceramics 99.9 %, PTFE
Shock resistance: 50 g (11 ms)
Vibration resistance: 20 g (10...2,000 Hz)
Protection: IP 67
For further data see:
www.ifm-electronic.com

You can find scale drawings from page 243

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pressure sensors
with display

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PNI
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For hygienic
areas and
viscous media

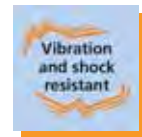
114 - 125

For hazardous
areas

126 - 127



- Pressure monitoring in hazardous dust areas – group II category 3D.
- Use in hazardous areas according to 94/9/EC (ATEX).
- Ceramic-capacitive measuring for maximum robustness.
- Drift-free operation for more than 100 million pressure cycles.
- Optimum reading of the display even at long distances.



Accessories

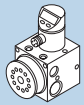
Type	Description	Order no.
	Adapter, G 1/4 - G 1/2	E30000
	Adapter, G 1/4 - G 1/4	E30007
	Adapter, G 1 - DIN11851/1.5" / DN 40	E33612
	Flange adapter, G 1/4	E30003
	Welding adapter, G 1 - Ø 50 mm	E30013

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 7 2 m black, PUR cable	EVC004
	Socket, M12, Group 7 5 m black, PUR cable	EVC005
	Socket, M12, Group 7 2 m black, PUR cable	EVC001
	Socket, M12, Group 7 5 m black, PUR cable	EVC002
	Socket, M12, Group 65 2 m blue, PUR / PVC cable	E10355
	Socket, M12, Group 65 5 m blue, PUR / PVC cable	E10356
	Socket, M12, Group 65 2 m blue, PUR / PVC cable	E10357
	Socket, M12, Group 65 5 m blue, PUR / PVC cable	E10358

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	PN pressure sensors with display	PE pressure sensors / transmitters with display	PN / PY pressure sensors / transmitters with display	PK pressure sensors with setting rings	PP pressure sensors	PA / PPA pressure transmitters	PS part seat monitoring
Pressure sensors and transmitters								
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Ceramic measuring cell
Process connection G 1/4 female, PF003A and PF008A: G 1male
ATEX approval group II, category 3D

Measuring range [bar]	P _{overload} max. [bar]	P _{bursting} min. [bar]	Switch-on point / set [bar]	Switch-off point / reset [bar]	In steps of [bar]	Protection	Draw- ing no.	Order no.
M12 connector · Output function / 4...20 mA analog · Connector group 7, 65 · Wiring diagram no. 16								
0...10	50	150	0.10...10.0	0.05...9.95	0.05	IP 65	31	PN004A
0...2.5	20	50	0.02...2.50	0.01...2.48	0.01	IP 65	31	PN006A
0...1	10	30	0.02...1.00	0.01...0.99	0.01	IP 65	31	PN007A
-1...0	10	30	-0.98...-0.03	-0.99...-0.04	0.01	IP 65	31	PN009A
M12 connector · Output function 2 x / · Connector group 7, 65 · Wiring diagram no. 3								
0...10	50	150	0.10...10.0	0.05... 9.95	0.05	IP 65	31	PN014A
0...2.5	20	50	0.02...2.50	0.01...2.48	0.01	IP 65	31	PN016A
M12 connector · Output function 2 x / or 1 x / + analog · Connector group 7, 65 · Wiring diagram no. 30								
-1.0...25	100	350	-0.8...25.0	-0.9...24.9	0.1	IP 67	29	PF003A
-0.013...0.25	10000	30	-0.011...0.25	-0.012...0.249	0.001	IP 67	29	PF008A

Common technical data

Operating voltage: 20...30 V DC
Current consumption: < 60 mA
Current rating: 250 mA
Operating temperature: -20...60 °C
Load analogue output: max. 500 Ohm
Shock resistance: 50 g
Vibration resistance: 20 g (10...2000 Hz)
Materials (wetted parts):
ceramics, stainless steel (303S21), FPM (Viton)

You can find scale drawings from page 243

PY7
pressure sensors
with display



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PNI
pressure sensors
with analogue
input



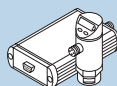
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For hygienic
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Temperature sensors

efector600®

Temperature sensors and transmitters

System description
Selection chart

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Temperature sensors and transmitters for industrial applications

Compact TN sensors with display
Control monitors TR with display
Probe sensors TT / TM
Cable sensors TS / TS ATEX
Temperature transmitters TA / TAA

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Universal application



Temperature sensors and transmitters for hygienic areas and viscous media

Probe sensors TT / TM
Cable sensors TS
Temperature transmitters TA / TAA
Temperature transmitters TAD

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Introduction

The controlling and monitoring of temperatures are amongst the most important measuring tasks in automation and process technology. In process technology for example the right temperature is decisive for the quality and efficiency of the process. In automation technology an exact temperature detection is very important for monitoring installations and as protection against dangerous states. In heating and air conditioning economic and easy operation is not possible without temperature measurement and control.

One of the most important measuring tasks: The right temperature is often decisive for the quality of a product.

Operating principle

The temperature sensors of ifm electronic are based on a Pt100 or Pt1000 resistor. The measured temperature value corresponds to a change in resistance and is converted into an electrical analogue signal. A microprocessor controls the evaluation of the electrical signal. For units with integrated display the current system temperature is indicated directly by means of an LED display.

Local display of the current temperature.



Fast and exact temperature measurement in the process technology.

The microprocessor and the display make process adjustment much easier. The user can set the values for the switch points, hysteresis and measuring range by means of programming buttons even without the system temperature being applied. This enables installation and setup of the system within a few minutes. The values are safely stored in an EEPROM independent of the supply voltage.

Film technology is used for the electronic circuitry. A flexible, temperature-resistant and extremely resistant polyamide film is used as carrier of the SMD components. Together with a special potting method an extreme shock and vibration resistance is achieved.

From sensor to system

A complete temperature measurement system usually consists of several components. The temperature in a medium (for example a liquid) is detected by a sensor and is converted into an electrical measured signal. The mechanical design and the dimensions of the sensors must vary to enable use for different media and measuring points. Depending on the application ifm electronic offers a selection of robust probe sensors or types with connection cables. To indicate and process the measured value the sensor is connected to a separate control monitor. It indicates the measured value on the integrated display. For further processing, freely programmable switching outputs or the conversion into analogue signals are also available for the user. Control tasks are either easily processed "on site" or by a superior process control system.

Variable: Probe sensors enable a flexible installation depth of the sensor into the medium to be measured.



Visit our website: www.ifm-electronic.com

To complete the modular systems, ifm electronic offers compact temperature sensors with integrated control monitors and transmitters without display. These feature excellent response times and high mechanical stability at the same time.

Furthermore, highly precise transmitters with redundant measuring elements are available, monitoring themselves for possible drift.

Due to the long-term stability of these units calibration is no longer required.

Requirements for temperature sensors

The general requirements for a temperature measuring unit depend on the measuring point and the application. In the food industry for example a measuring point requires fast response of the sensor to keep temperature-critical processes within a narrow temperature range. For hygienic reasons flush mounting in the process as well as easy cleanability of the sensors in contact with the medium are important.

In mechanical engineering however a heating process such as hydraulic oil in a power pack can be slower, here factors such as vibration and shock resistance are more important.

To meet the requirements described ifm electronic offers a modular system of sensors, process connections and control monitors. Depending on the requirements the individual components can be selected.

The product range is completed by a variety of accessories, for example mounting clamps, protective covers, protective tubes, fittings, etc.

A configuration tool available on the internet at www.ifm-electronic.com/temperature simplifies the selection of the right components and enables the clear representation of the selected temperature measuring system for ordering and / or documentation.

Safety during production

To ensure high quality all components are tested separately after each individual production step. The electronic components are for example tested in circuit directly after placement and the functioning of the circuitry is also tested.

The selection of the housing materials especially takes into account the environmental conditions in industry and also ecological aspects. This is why ifm electronic only uses plastics without cadmium for its housing materials. The high standard of the production technology, i.e. ICs specially developed by ifm for sensor requirements as well as ifm's film technology are the basis for the high reliability of the units.

Parameter setting and analysis

Data sets of individual sensors can be replaced quickly and conveniently by means of the ifm Container program. The software which is based on the innovative FDT technology ensures a clear overview of all parameters and the current process data. Process data and set parameters can be recorded and stored. For archiving on paper this data can be represented by means of standard computer programs and printed. (For further information see the product pages under FDT Container program).

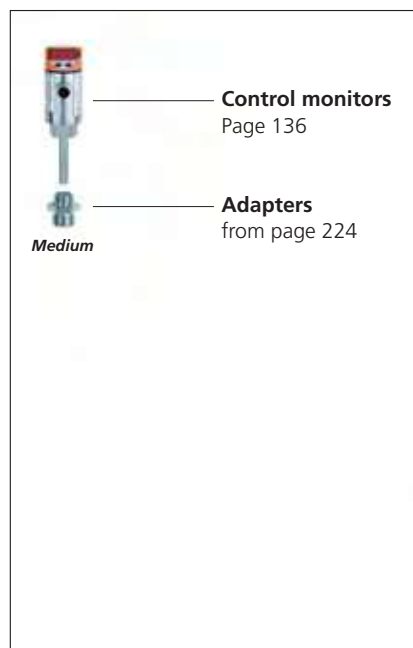
Most important element:
Control monitors ensure further processing of the temperature signals.



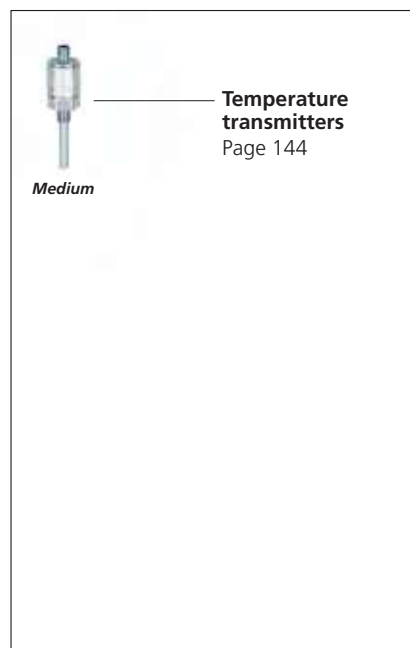
Modular:
Various possible combinations of sensors, control monitors and mounting solutions for different applications.

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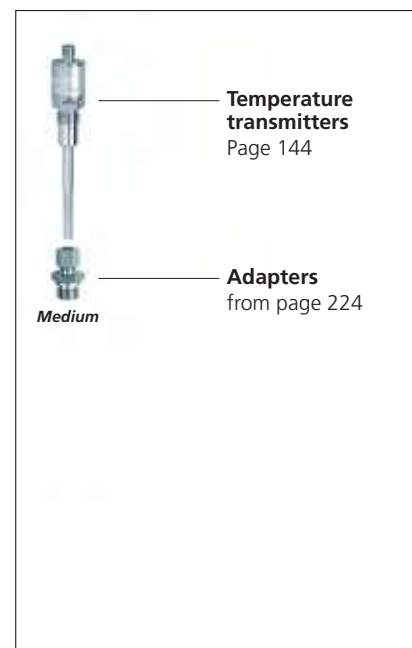
Mounting of sensor with integrated control monitor in the medium using an adapter



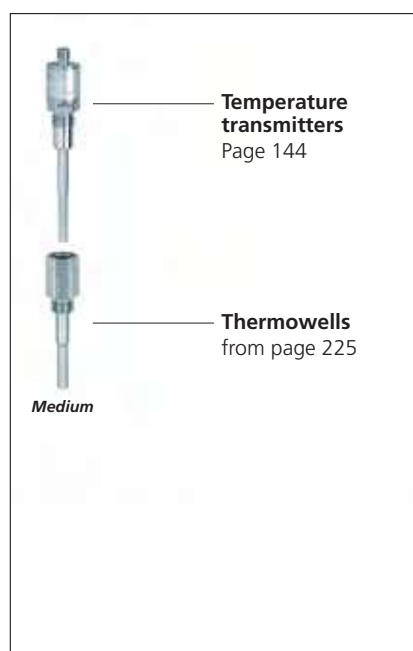
Mounting of temperature transmitter directly in the medium



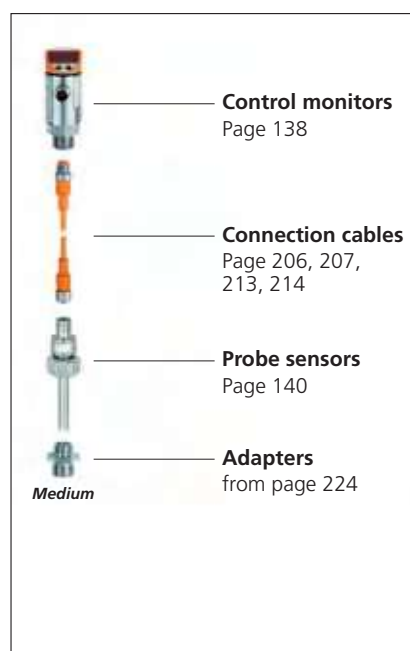
Mounting of temperature transmitter in the medium, directly or using an adapter



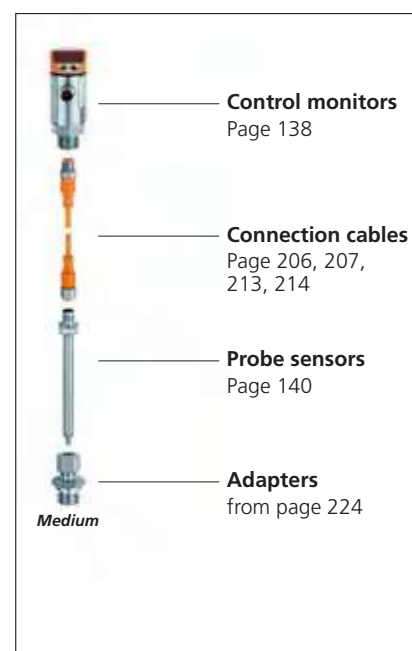
Mounting of temperature transmitter in the medium, directly or using a thermowell



Mounting of probe sensor with connection cable and external control monitor in the medium using an adapter



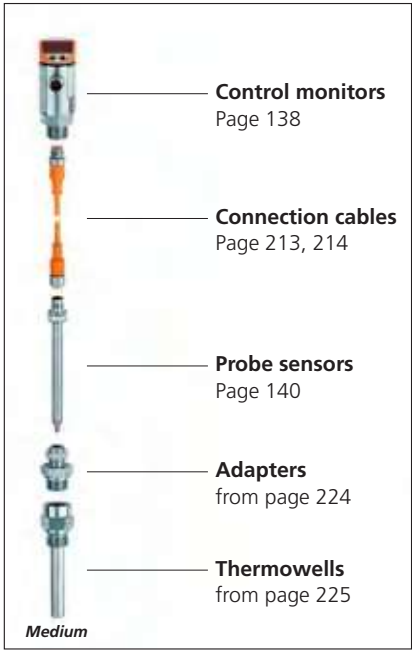
Mounting of probe sensor with connection cable and external control monitor in the medium using an adapter



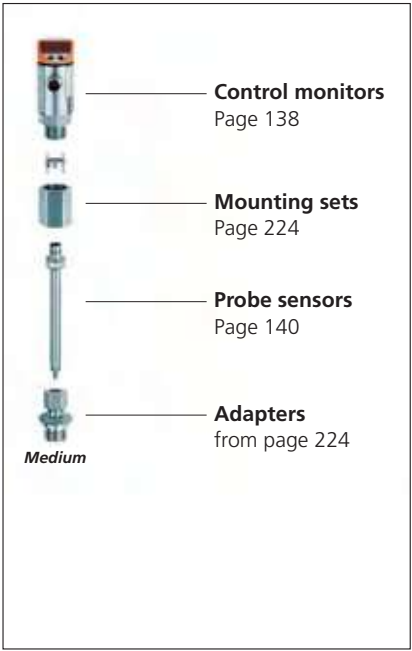
For industrial applications



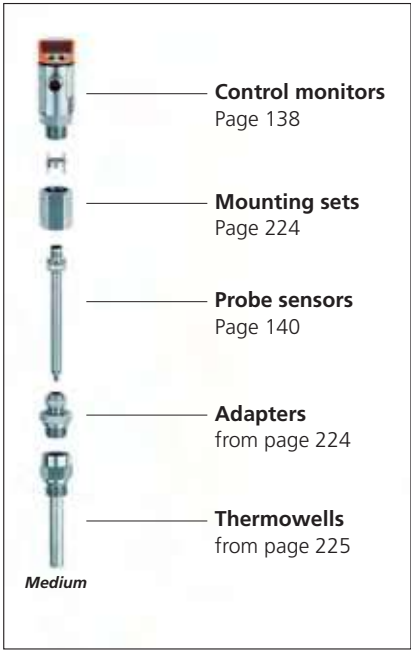
Mounting of probe sensor with connection cable and external control monitor in the medium using an adapter and thermowell



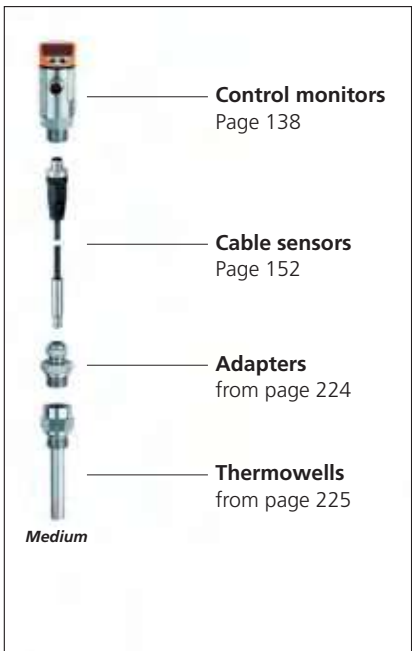
Mounting of probe sensor with mounting set and external control monitor in the medium using an adapter



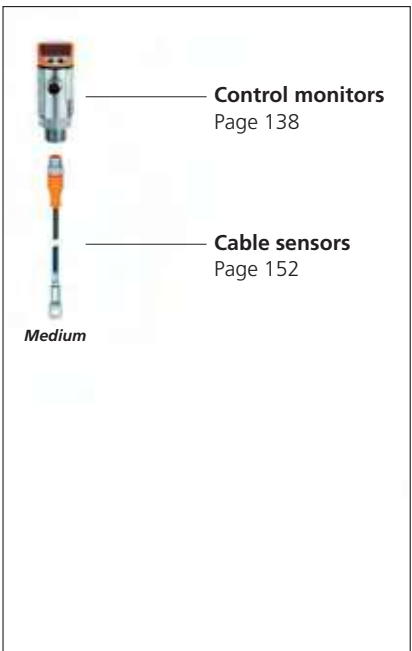
Mounting of probe sensor with mounting set and external control monitor in the medium using an adapter and thermowell



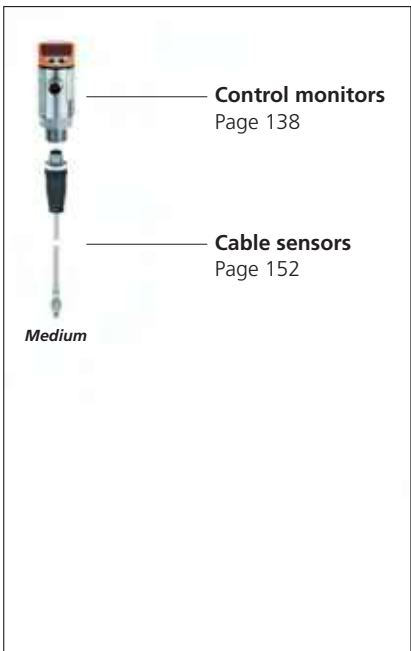
Mounting of cable sensor with external control monitor in the medium using a cable gland and thermowell



Surface sensor with external control monitor for mounting in solids



Screw-in sensor with external control monitor for mounting in solids



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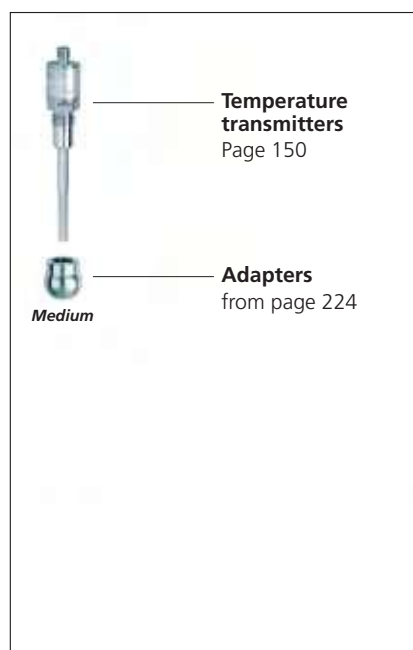
Accessories

Technical information and customer service

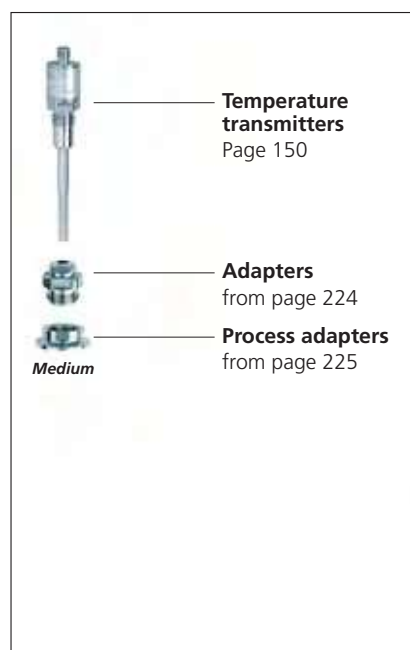
For industrial applications



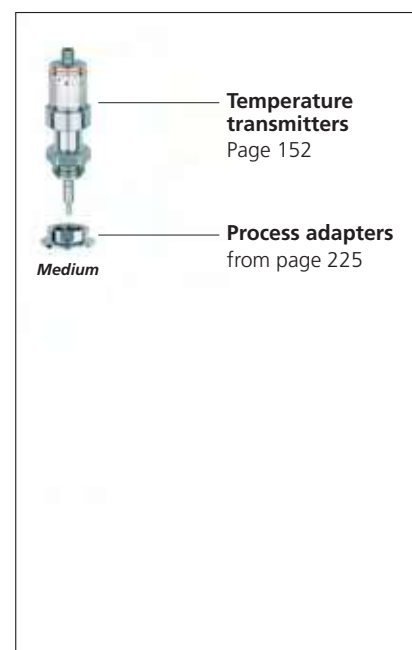
Mounting of temperature transmitter in the medium using an adapter



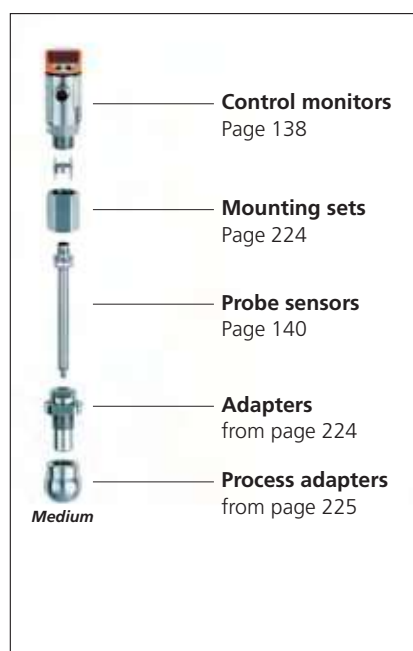
Mounting of temperature transmitter in the medium using a clamp adapter and a process adapter



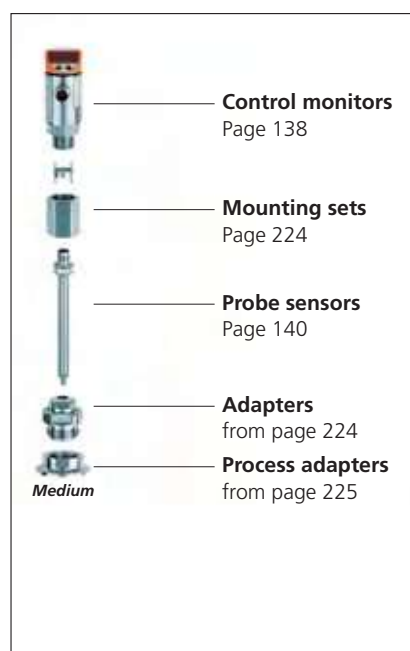
Mounting of calibration-free temperature transmitter in the medium using a process adapter



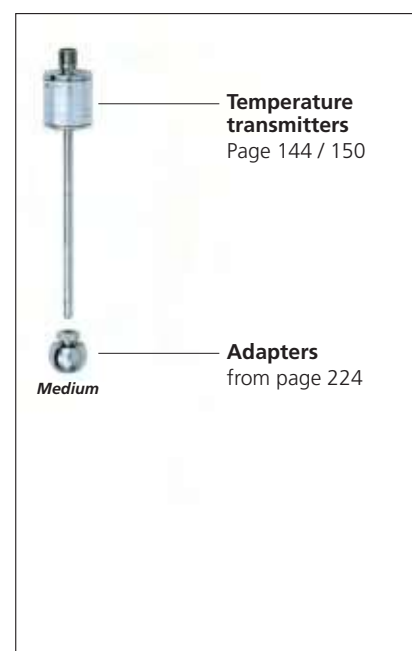
Mounting of probe sensor with mounting set and external control monitor in the medium using a clamp adapter and a welding adapter



Mounting of probe sensor with mounting set and external control monitor in the medium using a clamp adapter and a process adapter



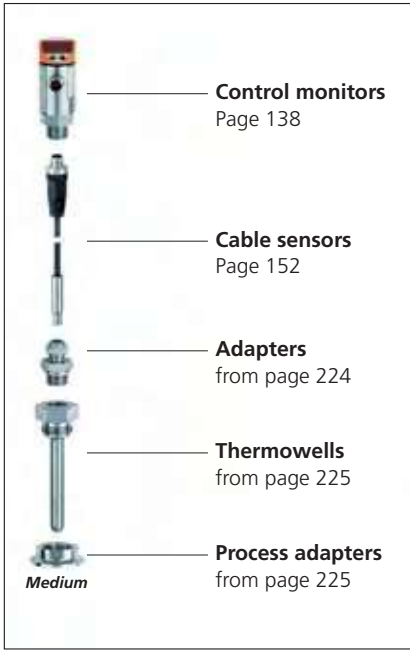
Mounting of temperature transmitter in the medium using an adapter



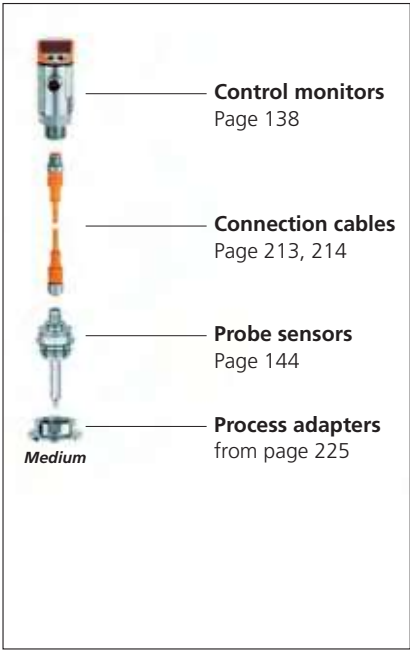
For hygienic areas and viscous media



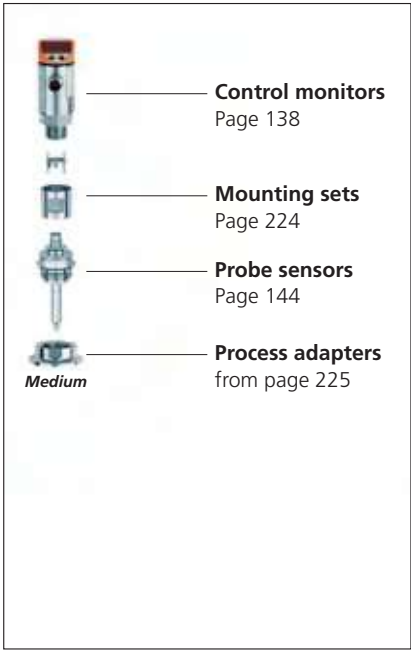
Mounting of cable sensor with external control monitor in the medium using a cable gland, thermowell and process adapter



Mounting of probe sensor with connection cable and external control monitor in the medium using a process adapter



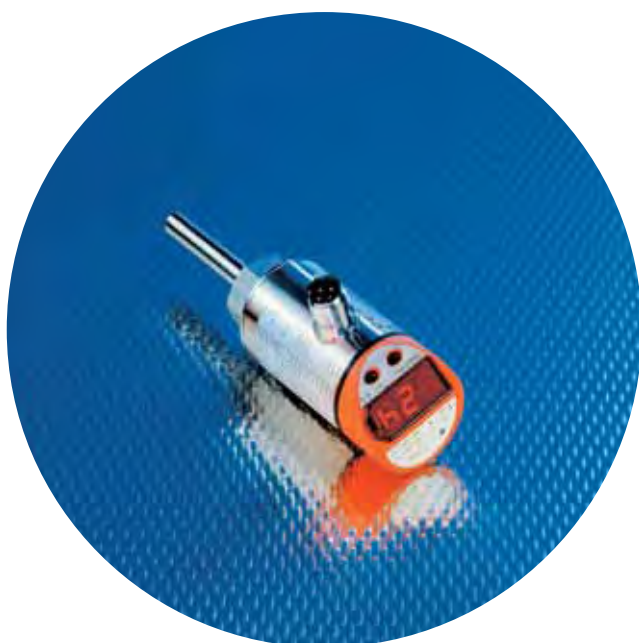
Mounting of probe sensor with mounting set and external control monitor in the medium using a process adapter



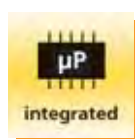
For hygienic
areas and
viscous media



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- Temperature monitoring of liquids and gases.
- High-grade stainless steel sensor, resistant to aggressive media.
- Rotatable display for system temperature, LEDs for the output status.
- Freely programmable hysteresis or window function.
- Robust mechanics with high resistance to vibration and shock.



Accessories

Type	Description	Order no.
	Protective cover, polyurethane (Desmopan), sealable	E30006
	Adapter, M18 x 1.5 - M12 x 1, brass (2.0401), Pressure rating 300 bar	E40100
	Adapter, M18 x 1.5 - M12 x 1, stainless steel (316S12), Pressure rating 300 bar	E40101
	Adapter, M18 x 1.5 - G 1/4, brass (2.0401), Pressure rating 300 bar	E40098
	Adapter, M18 x 1.5 - G 1/4, stainless steel (316S12), Pressure rating 300 bar	E40099
	Adapter, M18 x 1.5 - G 1/2, brass (2.0401), Pressure rating 300 bar	E40097
	Adapter, M18 x 1.5 - G 1/2, stainless steel (316S12), Pressure rating 300 bar	E40096

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 7 2 m black, PUR cable	EVC004
	Socket, M12, Group 7 5 m black, PUR cable	EVC005
	Socket, M12, Group 7 2 m black, PUR cable	EVC001
	Socket, M12, Group 7 5 m black, PUR cable	EVC002
	Socket, M12 5 m orange, PVC cable	EVT004
	Socket, M12 10 m orange, PVC cable	EVT005
	Socket, M12 5 m orange, PVC cable	EVT001
	Socket, M12 10 m orange, PVC cable	EVT002

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	TN compact sensors with display	TR control monitors with display	TT / TM probe sensors	TS / TS ATEX cable sensors	TA / TAA temperature transmitters	For hygienic areas and viscous media	TT / TM probe sensors
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System temperature displayed on the unit
Programming via push-button
Integrated watchdog

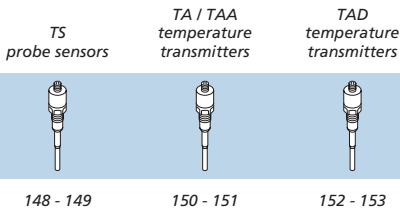
Setting range switch-on point [°C]	Resolution analog output [°C]	Display	U _b [V]	Current consumption [mA]	I _{load} [mA]	Draw- ing no.	Order no.
M12 connector · Output function 2 x  /  · Connector groups 7, 8, 9 · Wiring diagram no. 3							
-39.5...125	–	2 x red	18...30	< 50	250	1	TN7530
M12 connector · Output 1 x  /  progr. + 1 x analogue (4...20 mA / 0...10 V) · Connector gr. 7, 8, 10 · Wiring diagr. no. 16							
-39.5...125	0.125	red	20...30	< 66	250	1	TN2530

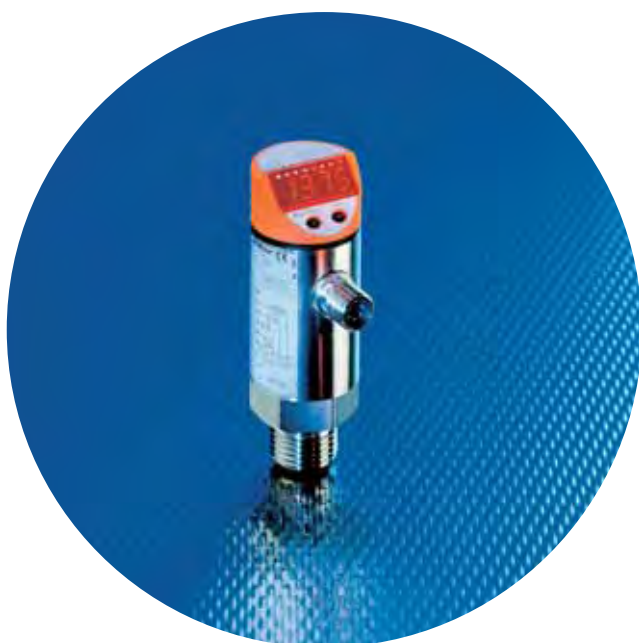
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Common technical data

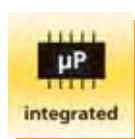
Measuring element: Pt1000
Accuracy of switch point / analog output:
± (Pt1000 + 0.2K) /
± (Pt1000 + 0.2 K + 0.4 %)
Resolution of switch point: 0.5 °C
Resolution of analog output: 0.125 °C
Operating temperature: -25...70 °C
Shock resistance: 50 g (11 ms)
Vibration resistance: 20 g (10...2,000 Hz)
Protection: IP 67, III
Further data see: www.ifm-electronic.com

You can find scale drawings from page 249





- Control monitor for temperature sensors with local display.
- Selection between analogue, binary or combined analogue / binary output.
- Connectable to standard Pt100 or Pt1000 temperature sensors.
- Freely programmable hysteresis or window function.
- Robust mechanics with high resistance to vibration and shock.



Accessories

Type	Description	Order no.
	Mounting clamp, Ø 34 mm	E10193
	Protective cover, sealable	E30006
	EPS service system	ZZ0050

Connectors and splitter boxes

Type	Description	Order no.
	Jumper, M12 1 m orange, PVC cable	EVT042
	Jumper, M12 2 m orange, PVC cable	EVT043
	Jumper, M12 2 m black, PUR cable	EVC018
	Jumper, M12 5 m black, PUR cable	EVC019

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	TN compact sensors with display	TR control monitors with display	TT / TM probe sensors	TS / TS ATEX cable sensors	TA / TAA temperature transmitters	For hygienic areas and viscous media	TT / TM probe sensors
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System temperature displayed on the unit
Programming via push-button
Integrated watchdog

Setting range switch-on point [°C]	Resolution analog output [°C]	Display	U _b [V]	Current consumption [mA]	I _{load} [mA]	Draw- ing no.	Order no.
M12 connector · Output function 2 x  /  · Connector groups 7, 8 · Wiring diagram no. 39							
-39.5...150	–	2 x red	18...30	< 50	250	2	TR7430
M12 connector · Output function 4 x  /  · Connector group 15 · Wiring diagram no. 40							
-39.8...150	–	4 x yellow	18...28	< 90	< 500	3	TR8430
M12 connector · Output 1 x  /  progr + 1 x analogue (4...20 mA / 0...10 V) · Connector gr. 7, 8, 10 · Wiring diagr. no. 41							
-39.8...300.0	0.1	yellow	20...30	< 55	250	3	TR2432

For information about the parameter and analysis software see pages 110 / 111 "ifm Container program".

Common technical data

Electrical design: DC PNP
Switch point accuracy: ± 0.2 K
(TR2432: ± 0.3 K)
Accuracy analogue output:
± 0.2 K + 0.4 % (TR2432: ± 0.3 K + 0.4 %)
Resolution switching output: 0.5 °C
(TR2432: ± 0.1 K)
Resolution analogue output: 0.125 °C
(TR2432: ± 0.1 K)
Operating temperature: -25...70 °C
Further data: www.ifm-electronic.com

You can find scale drawings from page 249

TS
probe sensors

TA / TAA
temperature
transmitters

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temperature
transmitters



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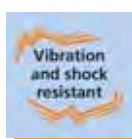
Connection
technology

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service



- Different lengths enable variable installation depth in the medium.
- Precise temperature measurement by integrated Pt1000 sensor element.
- Thermowell diameter 6 mm, 8 mm and 10 mm.
- Connection by means of gold contacts.
- Robust mechanics with high resistance to vibration and shock.



Accessories

Type	Description	Order no.
	Progressive ring fitting for temperature sensors, Ø 10 mm - G 1/2	E30016
	Progressive ring fitting for temperature sensors, Ø 8 mm - G 1/2	E30046
	Progressive ring fitting for temperature sensors, Ø 6 mm - G 1/2	E30047
	Mounting set for direct connection to control monitors TR	E30017

Connectors and splitter boxes

Type	Description	Order no.
	Jumper, M12 1 m orange, PVC cable	EVT042
	Jumper, M12 2 m orange, PVC cable	EVT043
	Jumper, M12 5 m black, PUR cable	E10884

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	TN compact sensors with display	TR control monitors with display	TT / TM probe sensors	TS / TS ATEX cable sensors	TA / TAA temperature transmitters	For hygienic areas and viscous media	TT / TM probe sensors
Temperature sensors and transmitters								
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Pt1000 sensor element

Nominal length [mm]	Total length [mm]	Sensor element [mm]	Dynamic response T05 / T09 [s]	Draw- ing no.	Order no.
M12 connector · Connector groups 7, 8 · Wiring diagram no. 23					
Ø 6 mm	160	Pt1000	1 / 3	4	TT1250
Ø 6 mm	260	Pt1000	1 / 3	4	TT2250
Ø 6 mm	360	Pt1000	1 / 3	4	TT3250
Ø 8 mm	160	Pt1000	1 / 3	5	TT1150
Ø 8 mm	260	Pt1000	1 / 3	5	TT2150
Ø 8 mm	360	Pt1000	1 / 3	5	TT3150
Ø 10 mm	160	Pt1000	1 / 3	6	TT1050
Ø 10 mm	260	Pt1000	1 / 3	6	TT2050
Ø 10 mm	360	Pt1000	1 / 3	6	TT3050
Ø 10 mm	560	Pt1000	1 / 3	6	TT5050
M12 connector · Knurled nut M18 x 1,5 · Connector groups 7, 8 · Wiring diagram no. 23					
Ø 8.2 mm	44	Pt1000	1 / 3	7	TM9550

For evaluation units please see page 138.

Common technical data

Measuring range: -40...150 °C
Measuring element: 1 x Pt1000, class B
Nominal pressure: 160 bar
(The permissible overload pressure
is determined by
the fitting used)
Protection: IP 67, III
Material: high-grade stainless steel (316S12)
Total length: L + 22 mm
TTxx: accuracy class A
TM9550: accuracy class B

You can find scale drawings from page 249

TS
probe sensors

TA / TAA
temperature
transmitters

TAD
temperature
transmitters



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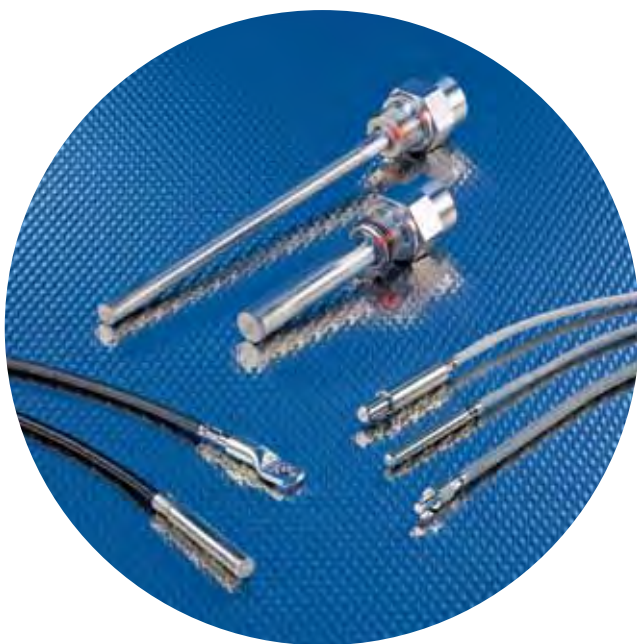
Diagnostic
systems

Evaluation
systems,
power supplies

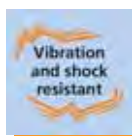
Connection
technology

Accessories

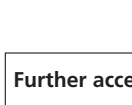
Technical
information
and customer
service



- Reliable temperature measurement where space is at a premium
- Precise temperature measurement by integrated Pt100 / Pt1000 element.
- Sensor diameter 6 mm, 8 mm and 10 mm.
- Connection by means of gold contacts.
- Robust mechanics with high resistance to vibration and shock.



Accessories

Type	Description	Order no.
	Thermowell for temperature sensors, Ø 10 mm - G 1/2, probe length 82 mm	E35010
	Thermowell for temperature sensors, Ø 10 mm - G 1/2, probe length 282 mm	E35030
	Thermowell for temperature sensors, Ø 8 mm - G 1/2, probe length 82 mm	E36010
	Thermowell for temperature sensors, Ø 8 mm - G 1/2, probe length 282 mm	E36030
	Thermowell for temperature sensors, Ø 6 mm - G 1/2, probe length 82 mm	E37010
	Thermowell for temperature sensors, Ø 6 mm - G 1/2, probe length 282 mm	E37030
	Clamp fitting Ø 6/8/10 mm - G 1/2 for temperature sensors TS / TT	E30018

Connectors and splitter boxes

Type	Description	Order no.
	Jumper, M12 1 m orange, PVC cable	EVT042
	Jumper, M12 2 m orange, PVC cable	EVT043
	Jumper, M12 5 m black, PUR cable	E10884
	Plug, M12, Group 36 wirable	E11504
	Plug, M12, Group 37 wirable	E11506

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	TN compact sensors with display	TR control monitors with display	TT / TM probe sensors	TS / TS ATEX cable sensors	TA / TAA temperature transmitters	For hygienic areas and viscous media	TT / TM probe sensors
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Pt100 or Pt1000 sensor element
Cable with connector, Gold-plated contacts
TS335A: ATEX approval group II, category 3D

Sensor diameter [mm]	Connection	Sensor element / class	Measuring range	Dynamic response T05 / T09 [s]	Drawing no.	Order no.
Cable with connector · Connector groups 7, 8 · Wiring diagram no. 23						
Ø 6 mm	FPM (Viton) cable; 2 m	Pt1000 / B	-40...150	3 / 10	8	TS2251
Ø 8 mm	FPM (Viton) cable; 2 m	Pt1000 / B	-40...150	7 / 18	9	TS2151
Ø 8 mm	FPM (Viton) cable; 5 m	Pt1000 / B	-40...150	7 / 18	9	TS5151
Ø 10 mm	FPM (Viton) cable; 2 m	Pt1000 / B	-40...150	6 / 25	10	TS2051
Ø 10 mm	FPM (Viton) cable; 5 m	Pt1000 / B	-40...150	6 / 25	10	TS5051
Ø 6 mm	PTFE cable; 2 m	Pt100 / A	-50...250	11 / 37	11	TS2256
Ø 10 mm	PTFE cable; 2 m	Pt100 / A	-50...250	12 / 39	12	TS2056
M5	silicone cable; 2 m	Pt100 / B	-30...180	3 / 8	13	TS2759
Bolt-on sensor	PUR / PVC cable; 2 m	Pt100 / A	-25...90	9 / 15	14	TS2229
M6	silicone cable; 2 m	Pt100 / B	-30...180	3 / 8	15	TS2659
ATEX approval: Group II, category 3D · Cable · Wiring diagram no. 24						
Ø 5 mm	silicone cable; 3 m	Pt 100 / B	-20...80 *	6 / 18	16	TS335A

For evaluation units please see page 138.

Common technical data

Protection: IP 67, III
Material sensor: high-grade stainless steel (316S12)
TS2229: Housing material: stainless steel (301 S 22); Cu tin-coated
* Measuring range for standard applications: -20...180 °C

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TS
probe sensors



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TA / TAA
temperature
transmitters



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TAD
temperature
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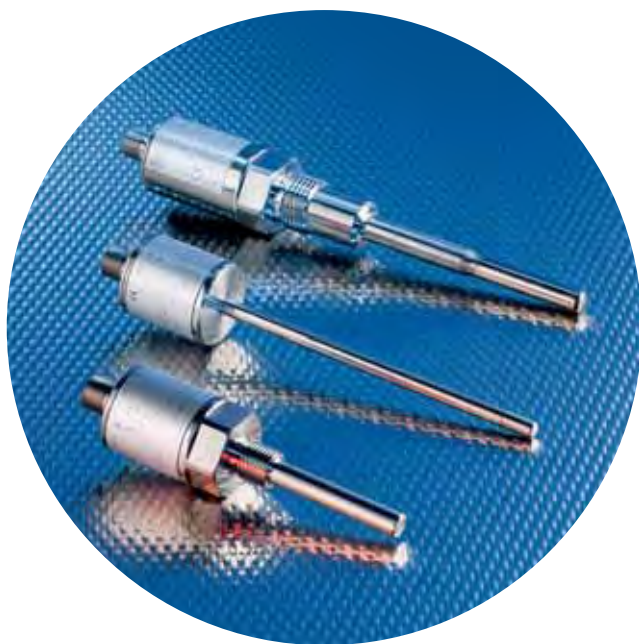
Diagnostic
systems

Evaluation
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power supplies

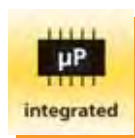
Connection
technology

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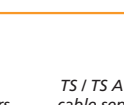
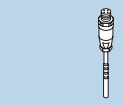
- Exact temperature transmitter.
- 4...20 mA analogue output or AS-i slave with profile S-7.3.
- Excellent dynamic response.
- Robust mechanics with high vibration and shock resistance.
- Flexible mounting options.



Accessories

Type	Description	Order no.
	Welding adapter G 1/2 - Ø 45 mm collar	E30056
	Progressive ring fitting for temperature sensors, Ø 10 mm - G 1/2	E30016
	Thread cover for types TA	E30090
	Clamp adapter Ø 10 mm for temperature sensors Ø 10 mm	E34110

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 7 2 m black, PUR cable	EVC004
	Socket, M12, Group 7 5 m black, PUR cable	EVC005
	Socket, M12, Group 7 2 m black, PUR cable	EVC001
	Socket, M12, Group 7 5 m black, PUR cable	EVC002
	Socket, M12 5 m orange, PVC cable	EVT004
	Socket, M12 10 m orange, PVC cable	EVT005
	Socket, M12 5 m orange, PVC cable	EVT001
	Socket, M12 10 m orange, PVC cable	EVT002

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	TN compact sensors with display	TR control monitors with display	TT / TM probe sensors	TS / TS ATEX cable sensors	TA / TAA temperature transmitters	For hygienic areas and viscous media	TT / TM probe sensors
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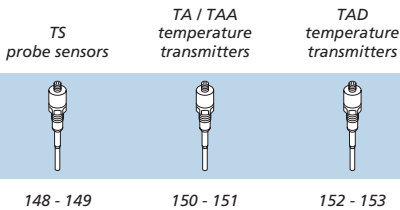
Pt1000 sensor element, class A
TA34xx, TAA43x: G 1/2 male, TA31xx, TAA13x: G 1/4 male
Cable with connector, gold-plated contacts

Measuring range [°C]	Resolution [°C]	Ub [V]	Dynamic response T05 / T09 [s]	Draw- ing no.	Order no.
M12 connector · Output function 4...20 mA analogue · Connector groups 7, 8 · Wiring diagram no. 19					
0...140	< 0.02	10...30	1 / 3	17	TA3430
-10...150	< 0.02	10...30	1 / 3	17	TA3431
0...100	< 0,02	10...30	1 / 3	17	TA3437
M12 connector · Output function AS-i · Connector groups 7, 8 · Wiring diagram no. 21					
-10...150	0.05	26.5...31.6	1 / 3	18	TAA431
-10...150	0.05	26.5...31.6	1 / 3	19	TAA131
M12 connector · Output function 4...20 mA analogue · Connector groups 7, 8 · Wiring diagram no. 19					
0...140	< 0.02	10...30	1 / 3	20	TA3130
-10...150	< 0.02	10...30	1.2 / 3.5	21	TA3231

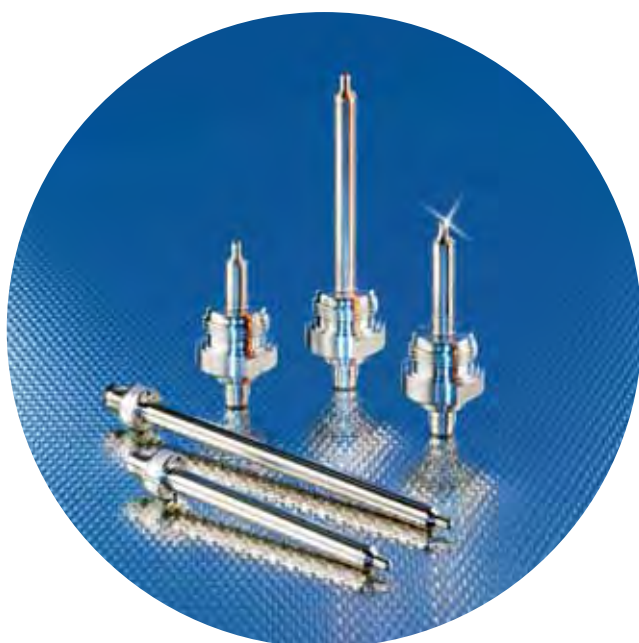
Common technical data

Sensor element: Pt1000, class A
Operating temperature: -25...80 °C
Shock resistance: 50 g (DIN / IEC 68-2-27,
11 ms)
Vibration resistance: 20 g (10...2,000 Hz)
Protection: IP 67
For further data see:
www.ifm-electronic.com

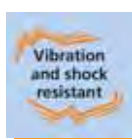
You can find scale drawings from page 249



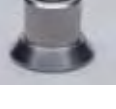
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- Different lengths enable variable installation depth in the medium.
- Precise temperature measurement by integrated Pt1000 sensor element.
- Flush clamp fitting for direct mounting in the medium.
- Connection by means of gold contacts.
- The right connection for each process: SMS, Clamp and many more.



Accessories

Type	Description	Order no.
	Mounting set for direct connection to control monitors TR	E30017
	Clamp adapter Ø 10 mm for temperature sensors Ø 10 mm	E34110
	Clamp adapter, Ø 10 mm - G 1/2	E34410
	Welding adapter G 1/2 - Ø 45 mm collar	E30056

Connectors and splitter boxes

Type	Description	Order no.
	Jumper, M12 1 m orange, PVC cable	EVT042
	Jumper, M12 2 m orange, PVC cable	EVT043

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	TN compact sensors with display	TR control monitors with display	TT / TM probe sensors	TS / TS ATEX cable sensors	TA / TAA temperature transmitters	For hygienic areas and viscous media	TT / TM probe sensors
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Pt1000 element, class A
Gold-plated contacts
Type TM with ifm adapter thread

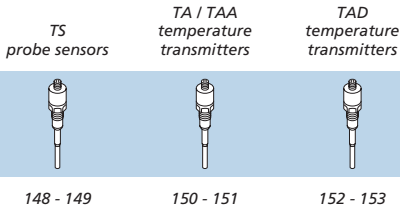
Nominal length [mm]	Total length [mm]	Dynamic response T05 / T09 [s]	Draw- ing no.	Order no.
M12 connector · Connector groups 58, 61 · Wiring diagram no. 23				
Ø 10 mm	110	1 / 3	6	TT0061
Ø 10 mm	160	1 / 3	6	TT1061
M12 connector · Aseptoflex thread · Connector groups 58, 61 · Wiring diagram no. 23				
Ø 10 mm	30	5 / 14	22	TM9061
Ø 10 mm	0	5 / 14	23	TM0061
Ø 10 mm	100	5 / 14	24	TM1061

For evaluation units please see page 138.

Common technical data

Measuring range: -40...150 °C
Accuracy: ± (Pt 1000 + 0,2 K) %
Nominal pressure: 50 bar
(The permissible overload pressure
is determined by
the fitting used)
Protection: IP 67, III
Material: high-grade stainless steel (316S12)
Total length: L + 22 mm

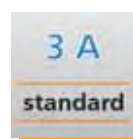
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- Reliable temperature detection in hygienic applications.
- Precise temperature measurement by integrated Pt1000 / Pt100 element.
- High pressure resistance by means of installation in hygienic thermowells.
- Connection by means of connector with gold contacts.
- The right connection for each process: e.g. SMS, Clamp and many more.



Accessories

Type	Description	Order no.
	Clamp fitting Ø 6/8/10 mm - G 1/2 for temperature sensors TS / TT	E30018
	Hygienic thermowell for temperature sensors, Ø 10 mm, probe length 45 mm	E34005
	Thermowell for temperature sensors, Ø 10 mm, probe length 82 mm	E34010
	Aseptoflex adapter, DIN11851 - 1.5" / DN40	E33012

Connectors and splitter boxes

Type	Description	Order no.
	Jumper, M12 1 m orange, PVC cable	EVT042
	Jumper, M12 2 m orange, PVC cable	EVT043

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	TN compact sensors with display	TR control monitors with display	TT / TM probe sensors	TS / TS ATEX cable sensors	TA / TAA temperature transmitters	For hygienic areas and viscous media	TT / TM probe sensors
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Cable with connector
Gold-plated contacts

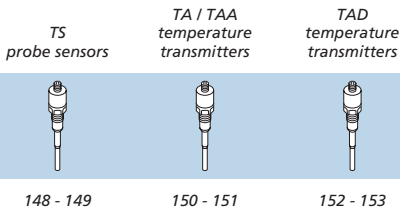
Sensor diameter [mm]	Connection	Sensor / class	Dynamic response T05 / T09 [s]	Drawing no.	Order no.
Cable with connector 2 m · Connector groups 58, 61 · Wiring diagram no. 23					
Ø 10 mm	FPM (Viton) cable; 2 m	Pt1000 / B	6 / 25	10	TS2051
Ø 10 mm	FPM (Viton) cable; 5 m	Pt1000 / B	6 / 25	10	TS5051
Ø 10 mm	PTFE cable; 2 m	Pt100 / A	12 / 39	12	TS2056

For evaluation units please see page 138.

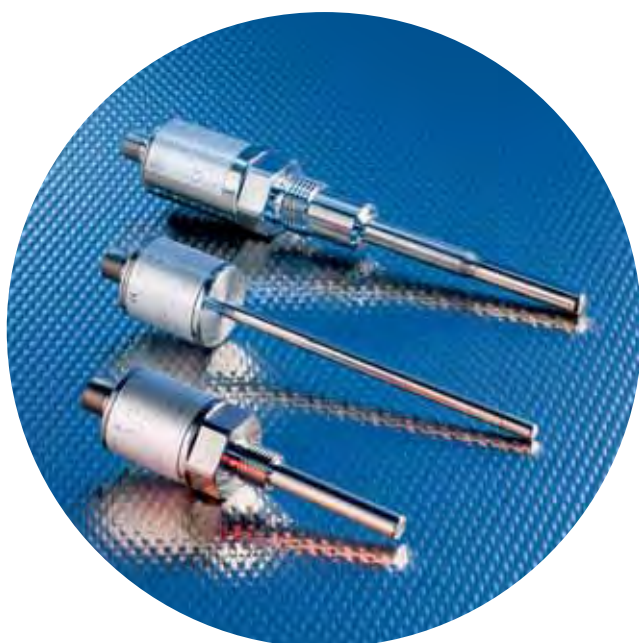
Common technical data

Measuring range: -40...150 °C
(TS2051, TS5051),
-40...250 °C (TS2056)
Protection: IP 67, III
Material sensor:
high-grade stainless steel (316S12)
Material connection cable:
FPM (Viton)
(TS2051, TS5051)
PTFE (TS2056)

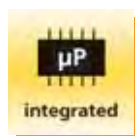
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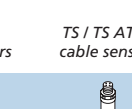
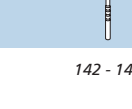
- Exact temperature transmitter.
- 4...20 mA analogue output or AS-i slave with profile S-7.3.
- Excellent dynamic response.
- Robust mechanics with high vibration and shock resistance.
- Flexible mounting options.



Accessories

Type	Description	Order no.
	Clamp adapter Ø 10 mm for temperature sensors Ø 10 mm	E34110
	Thread cover for types TA	E30090
	Welding adapter G 1/2 - Ø 35 mm ball	E30055
	Adapter, Clamp 1" / 1.5"	E33401
	Adapter, Clamp 2"	E33402

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12 2 m black, PUR cable	EVC004
	Socket, M12 5 m black, PUR cable	EVC005
	Socket, M12 2 m black, PUR cable	EVC001
	Socket, M12 5 m black, PUR cable	EVC002
	Socket, M12, Group 58 5 m orange, PVC cable	EVT004
	Socket, M12, Group 58 10 m orange, PVC cable	EVT005
	Socket, M12, Group 58 5 m orange, PVC cable	EVT001
	Socket, M12, Group 58 10 m orange, PVC cable	EVT002

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	TN compact sensors with display	TR control monitors with display	TT / TM probe sensors	TS / TS ATEX cable sensors	TA / TAA temperature transmitters	For hygienic areas and viscous media	TT / TM probe sensors
Temperature sensors and transmitters								
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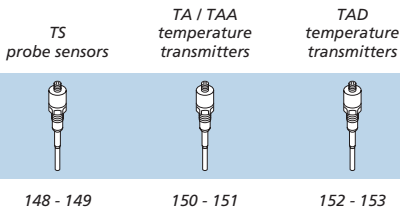
Pt1000 sensor element, class A
TA34xx, TAA43x: G 1/2 male, TA31xx, TAA13x: G 1/4 male
Cable with connector, gold-plated contacts

Measuring range [°C]	Resolution [°C]	Ub [V]	Dynamic response T05 / T09 [s]	Draw- ing no.	Order no.
M12 connector · Output function 4...20 mA analogue · Connector groups 58, 61 · Wiring diagram no. 19					
0...140	< 0.02	10...30	1 / 3	17	TA3430
0...100	< 0.02	10...30	1 / 3	17	TA3437
-10...150	< 0.02	10...30	1 / 3	17	TA3431
M12 connector · Output function AS-i · Connector groups 58, 61 · Wiring diagram no. 21					
-10...150	0.05	26.5...31.6	1 / 3	18	TAA431
M12 connector · Output function 4...20 mA analogue · Connector groups 58, 61 · Wiring diagram no. 19					
-10...150	< 0.02	10...30	1.2 / 3.5	21	TA3231

Common technical data

Sensor element: Pt1000, class A
Operating temperature: -25...80 °C
Shock resistance:
50 g (DIN / IEC 68-2-27, 11 ms)
Vibration resistance:
20 g (10...2,000 Hz)
Protection: IP 67
For further data see:
www.ifm-electronic.com

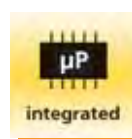
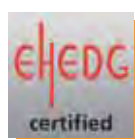
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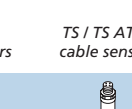
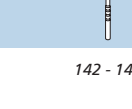
- Integrated temperature decoupl. and hygienic connection, for CIP and SIP.
- Accuracy 0.2 K from -10...100 °C, 0.3 K from 100...150 °C.
- Transmitter with backup function and drift monitoring.
- Configurable diagnosis, evaluated via a separate diagnostic output.
- Temperature range from -10...150 °C, peak temperatures from -25...170 °C.



Accessories

Type	Description	Order no.
	Aseptoflex adapter, Clamp 1.5"	E33001
	Aseptoflex adapter, Clamp 2"	E33002
	Aseptoflex adapter, Varivent D50	E33021
	Adapter, Clamp 1" / 1.5"	E33401
	Adapter, Clamp 2"	E33402

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12 2 m black, PUR cable	EVC004
	Socket, M12 5 m black, PUR cable	EVC005
	Socket, M12 2 m black, PUR cable	EVC001
	Socket, M12 5 m black, PUR cable	EVC002
	Socket, M12, Group 58 5 m orange, PVC cable	EVT004
	Socket, M12, Group 58 10 m orange, PVC cable	EVT005
	Socket, M12, Group 58 5 m orange, PVC cable	EVT001
	Socket, M12, Group 58 10 m orange, PVC cable	EVT002

Further accessories are available starting on page 217

Further connectors and splitter boxes are available
starting on page 191

	For industrial applications	TN compact sensors with display	TR control monitors with display	TT / TM probe sensors	TS / TS ATEX cable sensors	TA / TAA temperature transmitters	For hygienic areas and viscous media	TT / TM probe sensors
Temperature sensors and transmitters								
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Long-term stable temperature transmitter with diagnostic output
Probe length: TAD961, TAD971 = 40 mm, TAD161, TAD171 = 100 mm
Process connection via M12 connector, gold-plated contacts

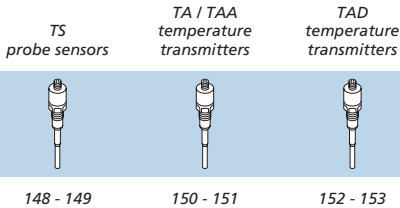
Measuring range [°C]	Resolution [°C]	Ub [V]	Process connection	Dynamic response	Draw- ing no.	Order no.
M12 connector · Output  /  / heartbeat progr., 4...20 mA analogue · Connector groups 58, 59, 61 · Wiring diagr. no. 25						
-25...150	0.05	20...32	Aseptoflex thread	6 / 13	25	TAD961
-25...150	0.05	20...32	Aseptoflex thread	6 / 13	26	TAD161
-25...150	0.05	20...32	G 1/2 male	6 / 13	27	TAD971
-25...150	0.05	20...32	G 1/2 male	6 / 13	28	TAD171

For information about the parameter and analysis software see pages 110 / 111 "ifm Container program".

Common technical data

Operating temperature: -25...70 °C
Shock resistance:
50 g (DIN / IEC 68-2-27, 11 ms)
Vibration resistance:
20 g (10...2.000 Hz)
Protection: IP 69K
For further data see:
www.ifm-electronic.com

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Diagnostic systems

efector800®

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Systems for vibration diagnosis

System description
Selection chart

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Systems for vibration diagnosis for industrial applications

Type VB / VE with RS-232 interface and LED diagnosis
Type VE with RS-485 interface
Types VSE / VSA diagnostic electronics and vibration sensor

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Universal application



Systems for vibration diagnosis for hazardous areas

Type VE with RS-485 interface

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Special application

Introduction – Condition-based maintenance

The market requirements for manufacturing companies are constantly increasing, the complexity of production is rising, and production systems are operated up to their capacity limit. Companies are ever closer linked to each other, time and stock buffers are further reduced. Downtimes have expensive consequences and the demands on the reliability of machinery and plant are increasing.

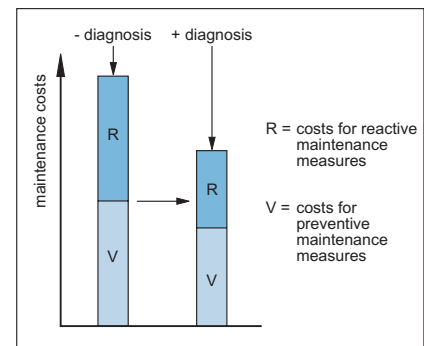
Due to selective maintenance measures machine uptime as well as competitiveness can be further increased.

In principle the following types of maintenance are distinguished:

- ▶ Preventive maintenance – machines are serviced at regular intervals and machine parts such as rolling element bearings are replaced as a preventive measure. The wear margin is in general not used up.
- ▶ Repair after “run until failure” - in this case the machine is deliberately operated beyond the deterioration limit. The damage is repaired.
- ▶ Condition-based maintenance – in this case the condition (= wear margin) of the machine is monitored, maintenance is initiated depending on the condition.
- ▶ If permanent monitoring based on a sensor provides the basis for a condition-based maintenance we talk about **Real Time Maintenance**.

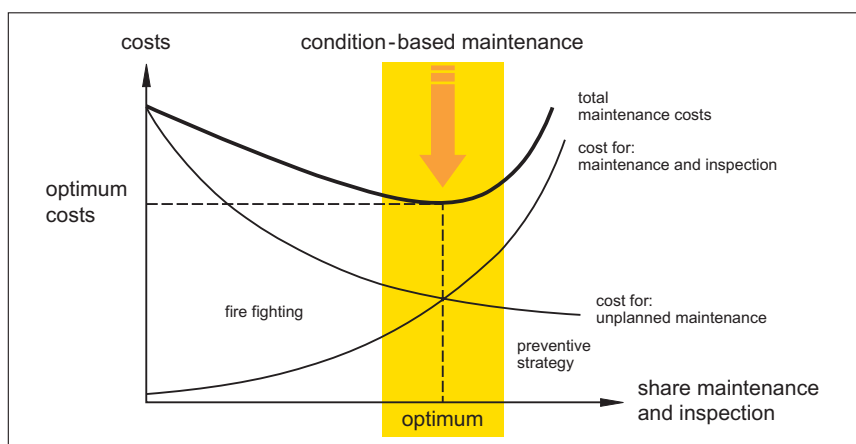
Condition-based maintenance has many advantages:

- ▶ The lifetime and the wear margin are used more efficiently, machines can be operated for a longer period of time. Studies have shown that with condition-based maintenance the number of unplanned machine downtimes can be reduced by up to 75 %.
- ▶ The production quality during operation remains constant.
- ▶ Rejects due to abrupt standstill are prevented. Especially critical machines and machine parts with a low wear margin should be monitored as they have the biggest potential for cost savings and productivity improvement. Intelligent sensors are the key to continuous monitoring and early detection of damages.



Maintenance costs can be reduced and the up-time of machines and plants can be increased by means of vibration diagnosis. For more information, please

read the study of the WZL laboratory on intelligent maintenance – “potentials of condition-based maintenance”. (www.ifm-electronic.com/studie).



Costs for the different maintenance strategies.

Vibration diagnosis

Vibration diagnosis provides most comprehensive information for early damage diagnosis and for judging operating conditions. **efector octavis** continuously detects, analyses and evaluates vibrations on the machine surface.

The following damages and operating conditions can be reliably detected already at an early stage by means of vibration diagnosis:

- ▶ Rolling element bearing damage
- ▶ Damage to couplings
- ▶ Rubbing
- ▶ Gear-mesh damage
- ▶ Unbalance
- ▶ Alignment condition
- ▶ Cavitation
- ▶ External influences (e.g. crash)
- ▶ Metal cutting operations (on machine tools)
- ▶ etc.

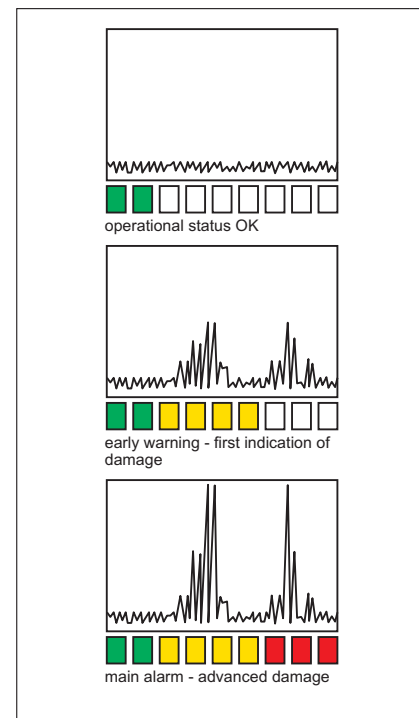
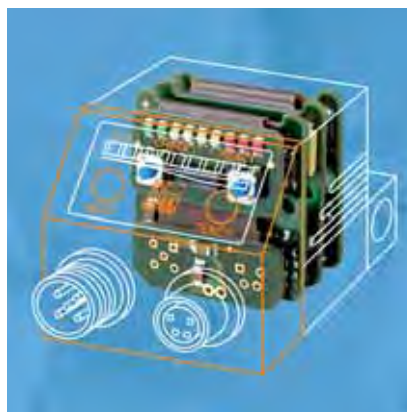
Function – efector octavis supports machine-integrated condition monitoring.

The target was to develop machine-oriented vibration monitoring. **efector octavis** should not only detect vibration data but also perform the requested signal analysis and machine diagnosis already on the machine. The machine condition can be determined right on the site of measurement and be signalled via binary alarms or as a diagnostic protocol to higher-level controllers. Three requirements of modern machine monitoring are met: compatibility, scalability and repeatability.

Compatibility with existing data structures enables full integration of condition information in higher-level systems. Scalability is an important requirement which allows companies to obtain modular extension of condition monitoring of machinery and plant.

High repeatability of < 5 % as well as a linearity error < 1 % provide optimum prerequisites for reliable (online) monitoring of long-term stability.

It is also important that monitoring is permanent and in real time to enable quick action in the events of slow development of damage such as rolling element bearing damage and of quick development of damage such as unbalance on spindles.



Clear function.

Powerful electronics where space is extremely restricted. 16-bit digital signal processor 160 MHz, 15-bit A/D converter, micro-mechanical acceleration processor. Software algorithm: envelope-curve FFT programmed in assembler.

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Hardware

Recent findings in micromechanical sensors and digital signal processing enable the development of a microsystem for detecting, evaluating and diagnosing measured data. Depending on the version up to 10 kHz can be evaluated linearly. The field devices in which the entire diagnostic electronics are already integrated in the sensor have a measuring range of up to 6 kHz.

The actual measuring cell of **efector octavis** consists of a micromechanical acceleration sensor with a linear measuring range of $\pm 30\text{ g}$ ($\pm 294\text{ m/s}^2$). The dynamic scope is approx. 48 dB. The special advantages of the MEMS technology (Micro-Electro-Mechanical Systems) are high reliability and ageing resistance. Even impacts of more than 500 g lead neither to signal fluctuations nor to destruction of the measuring cell. Moreover, the functionality is ensured by an integrated self-test. Recalibration as well as undetected faults in the measuring chain are thus a thing of the past.

Of considerable advantage are the cabling costs. The entire **octavis** family uses standard cables as they are used in machine and plant construction. The common cable problems of acceleration sensors caused by cable squeezing do not occur.

Condition monitoring

The firmware of **efector octavis** consists of an object-referred fault tree. Each error object consists of narrow frequency bands whose centre frequency corresponds to the kinematic damage frequency of a machine fault. If several frequencies are symptomatic for a damaged object (inner race, outer race and ball pass frequencies) – for example in the event of a damage to the rolling element bearing – the “object” rolling element bearing is assigned three frequency bands.

The basis for determining the damage amplitudes is the linear spectrum. Depending on the machine damage the frequency analysis can be made by means of the acceleration data or the envelope curve of the acceleration data.

The actual diagnosis is made via a trend analysis. That means the current value is compared with the basic value of an intact machine. This basic value can be generated for each object during the teach run. A structural influence to the measured value due to the component resonances or deviations from the mounting location to the diagnosis location is “standardised” by the teach value. Signal weighting filters automatically correct interference in applications with variable speed.

The fault tree is set in the beginning via the PC software by setting the application parameters such as damage frequencies, speed and switch points.

efector octavis features a speed input for applications with variable speed. The narrow frequency bands defined in the fault tree are automatically taken into account within the framework of a frequency factor analysis.

The field units of type VE feature 5 diagnosis objects (20 frequency bands) and 1 g-monitor to evaluate the general vibration condition (exception type VB).

The control cabinet units (type VSE) can use the signals from up to 4 vibration sensors (type VSA) and dispose of a total of 20 diagnosis objects and 4 level values or 16 diagnostic objects and 8 level values.

Mounting via the bore hole for crane hooks, in a radial direction to the axis of rotation.



efector octavis monitors the rolling element bearing of a motor.

Internal trend memory

All units of the **octavis** family feature an internal trend memory which ensures detailed analysis and optimisation of the application also without external data recording. Freely selectable storage intervals enable adaptation of the storage length of the non volatile ring memory to the requirements.

*Pumps:
Wear and tear
can cause reduced
performance
through to total
failure. **efector
octavis** detects
and signals first
indication of
damage to rolling
element bearings
at an early stage.*



Applications

Early damage diagnosis helps avoid unplanned downtime, increase technical uptime and prepare maintenance activities in an optimum way. The MTTR values (= mean time to repair) can be reduced. Identification of impermissible operating states helps increase the lifetime of the components. This is considered as an improvement of the MTBF values (= mean time between failure). Examples:

Application rolling element bearing:

Damage: Pittings in the bearing surface

Causes of the damage: Wear and tear due to insufficient lubrication, **efector octavis** monitors the specific damage frequencies of the rolling element bearing for the inner race, the outer race and the rolling elements.

The following data is required for parameter setting:

- The geometric data of the rolling elements, the diameter of the rolling element and the diameter of the pitch cycle, or the DIN designation of the rolling element bearing to be monitored.
- The operating speed

Application Unbalance:

efector octavis detects unacceptable unbalance at an early stage. The condition diagnosis enables preventive intervention before greater damage or failure is caused. To monitor unbalance, the operating speed is required as parameter.

*Ventilators:
Due to deposits
and wear unbal-
ance can consid-
erably increase in
the course of
time. Without
diagnosis of the
rolling element
bearings this can
go unnoticed
until the function
completely fails.*



*Screw
compressors:
Here the rolling
element bearings
are subjected to
high shearing
stress. The re-
sulting wear
can lead to
destruction of
the screws.*

efector octavis
detects the bear-
ing conditions
and possible rub-
effects. This guar-
antees maximum
lifetime.



*Spindles:
efector octavis
detects first indi-
cation of unbal-
ance and damage
of rolling element
bearings, thus
enabling maxi-
mum lifetime
with a low risk
of failure.*

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Housing / Process connection		Frequency range [Hz]	Spectral resolution [Hz]	Speed range* [U / min]	Minimum measuring time [s]	Output	Application / Page
Vibration diagnosis with RS-232 interface and LED diagnosis							
 type VB	M12 – electrical connection M8 – RS-232 communication	3...6,000 diagnosis of up to 2 different objects	1.25	500... 6,000	0.8	2 x 100 mA	● 162
 type VE	M12 – electrical connection M8 – RS-232 communication	3...6,000 (VE1002 0.125...500) diagnosis level for up to 20 different frequencies	1.25 (VE1002 0.125)	120... 12,000 (VE1002 12...3,500)	0.8 (VE1002 8**)	2 x 100 mA	● 162
Vibration diagnosis with RS-485 interface							
 type VE	M12 – electrical connection M8 – RS-485 communication	3...6,000 (VE1102 0.125) diagnosis level for up to 20 different frequencies	1.25 (VE1102 0.125)	120... 12,000 (VE1102 12...3,500)	0.8 (VE1002 8**)	2 x 100 mA	● 164
 type VE ATEX	M12 – electrical connection M8 – RS-485 communication	3...6,000 (VE112A 0.125...500)	1.25 (VE112A 0.125)	120... 12,000 (VE112A 12...3,500)	0.8 (VE112A 8)	DC	● 170
Vibration sensor for VSE diagnostic electronics							
 type VSA	M12 connector for connection to external diagnostic electronics VSE	0...6,000 vibration detection up to ± 25 g	–	–	–	0...100 mA	● 168
Diagnostic electronics for VSA vibration sensor							
 type VSE	Combicon connection, Ethernet interface	100	–	–	–	2 x DC or 1 x DC + 1 x 0/4... 20 mA	● 166

*The actual speed range depends on the type of rolling element bearing and can therefore deviate

**This response time has to be taken into account for the use

For industrial applications



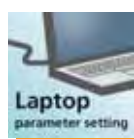
For hazardous areas



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- Permanent condition monitoring.
- Detects unbalance and damage to rolling element bearings.
- Up to 20 monitoring frequencies, freely programmable.
- Enables optimum uptime of critical machines.



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octavis

Accessories

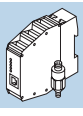
Type	Description	Order no.
	Expert software for efector octavis	VES001
	Parameter setting cable for efector octavis ifm electronic straight / straight	E11572
	Pulse generator	E30082
	Y connection cable ifm electronic 2 way	E11664

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 11 2 m black, PUR cable	EVC070
	Socket, M12, Group 11 5 m black, PUR cable	EVC071
	Socket, M12, Group 11 10 m black, PUR cable	EVC072

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	VB / VE with RS-232 interface and LED diagnosis	VE with RS-485 interface	VSE / VSA diagnostic electronics and vibration sensor	For hazardous areas	VE with RS-485 interface	
Systems for vibration diagnosis							
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Diagnosis of up to two different rolling element bearings
Sensor, evaluation and diagnosis in one unit, 2 switching outputs
LED display: Yellow = first indication of damage (output 1), red = advanced damage (output 2)

Frequency range [Hz]	Spectral resolution [Hz]	Monitoring rang [U/min]	Ub [V]	Operating temperature [°C]	Minimum measuring time [s]	Draw-ing no.	Order no.
Connection via M12 x 1 and M8 x 1 connectors							
3...6000	1.25	500...6000	10...32	-30...60	0.8	1	VB1001
3...6000	1.25	120...12000	10...32	-30...60	0.8	1	VE1001
0.125...500	0.125	12...1500	10...32	-30...60	8 **	1	VE1002
24...12500	15.625	1.500...96.000	10...32	-30...75	0.064	2	VE1103 *

Description

efector octavis is suited for the early detection of damage to rolling element bearings, unbalance, alignment errors and meshing, e.g. in critical plant parts such as pumps, spindles, compressors, ventilators, gears, and electric motors.

efector octavis parameters are easy to set at the PC via the RS-232 interface (accessory – SubD9 cable, article no. E11572). The parameter setting software (VES001) includes

an easy-to-follow setup assistant. The current machine condition is indicated on the unit and provided via potential free switching contacts. Networking and integration of the machine condition into higher-level systems or controllers is possible.

Using the VE1001 / VE1002 compact units with integrated control monitor machine states are permanently monitored in a decentralised

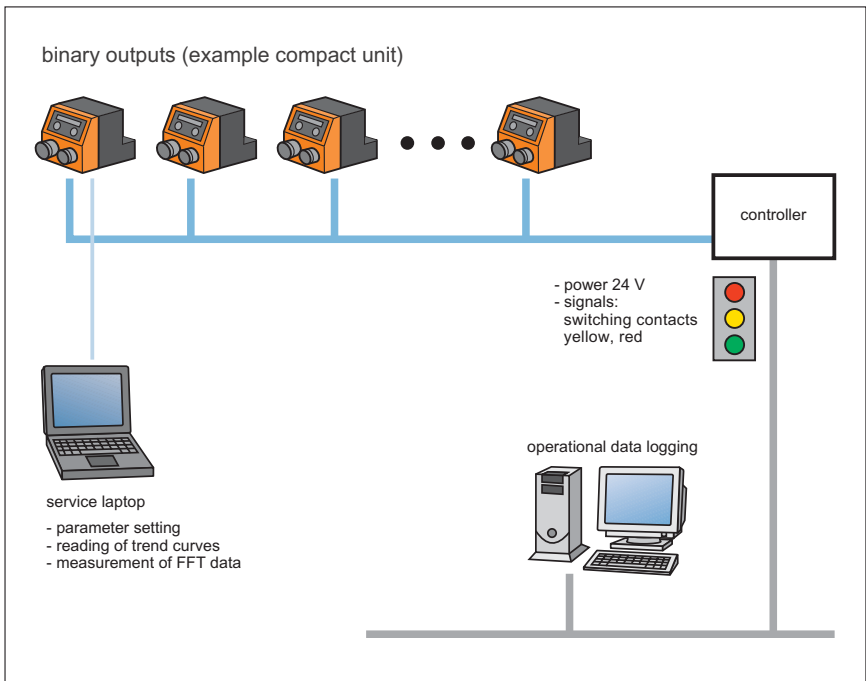
way. Higher-level systems are warned via the “warning” and “alarm” switching outputs. The trend information of machine damage is stored internally and can be read out using the sensor’s RS-232 interface.

Common technical data

Sensing principle: micromechanical acceleration sensor / capacitive measuring principle / one measurement axis
 Measuring range: ± 25 g
 Diagnostic method: spectral analysis envelope-curve FFT, trend analysis
 Current consumption: 100 mA (24 V)
 Protection: IP 67, III
 EMC: IEC 1000-4-2 / 3 / 4 / 6
 Overload protection: 100 g
 Housing material: diecast zinc nickel-plated, keypad: polyester
 * without LED protection: IP 69K
 ** the total reaction time which is correspondingly longer has to be taken into consideration

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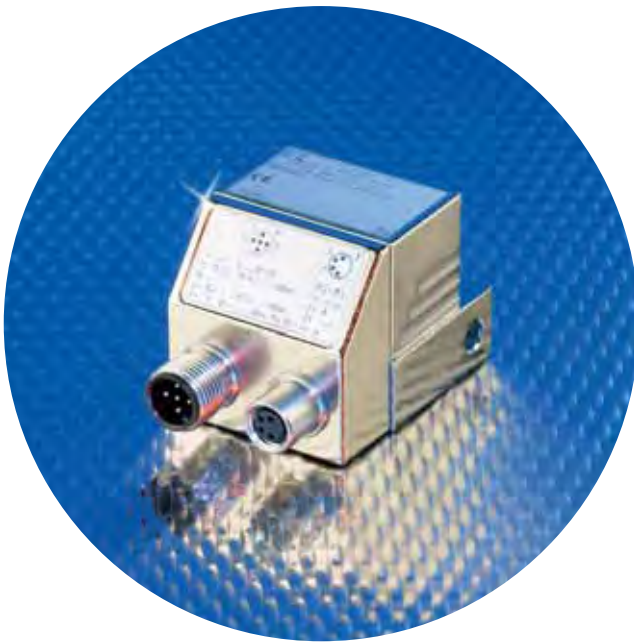
Evaluation systems

power supplies

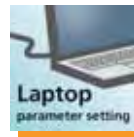
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- Permanent condition monitoring.
- Detects unbalance, damage to rolling element bearings.
- Up to 20 monitoring frequencies, freely programmable.
- For optimised uptime of critical machines.
- Continuous transmission of diagnostic values for operational data logging.



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octavis

Accessories

Type	Description	Order no.
	Expert software for efector octavis	VES001
	USB/RS485 adapter cable ifm electronic straight / straight	E30098
	Pulse generator	E30082
	Y connection cable ifm electronic 2 way	E11664

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12, Group 11 2 m black, PUR cable	EVC070
	Socket, M12, Group 11 5 m black, PUR cable	EVC071
	Socket, M12, Group 11 10 m black, PUR cable	EVC072

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	VB / VE with RS-232 interface and LED diagnosis	VE with RS-485 interface	VSE / VSA diagnostic electronics and vibration sensor	For hazardous areas	VE with RS-485 interface	
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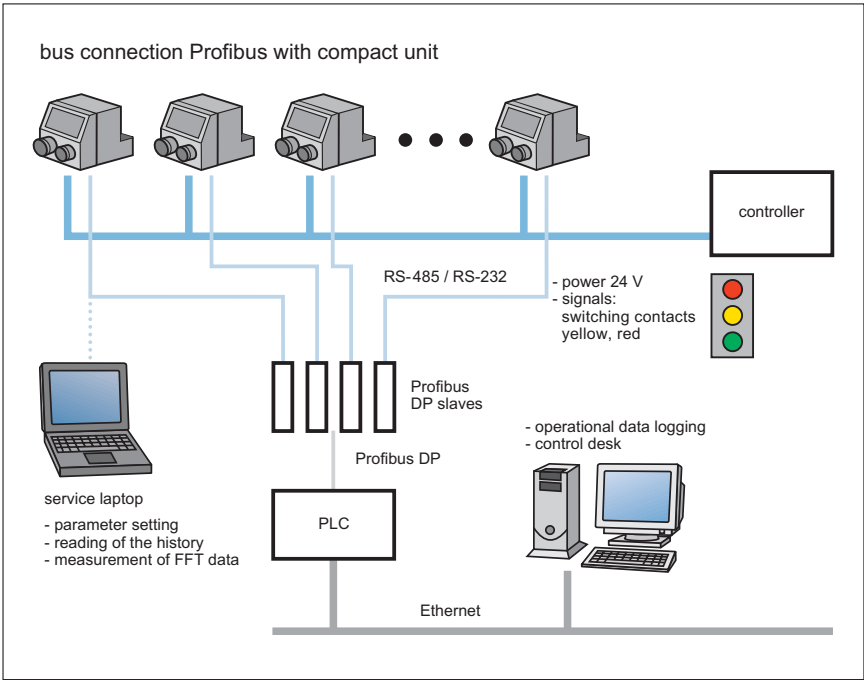
Up to 20 frequencies in the spectrum, freely selectable, diagnostic level adjustable
Sensor, evaluation and diagnosis in one unit, 2 switching outputs

Frequency range [Hz]	Spectral resolution [Hz]	Monitoring rang [U/min]	Ub [V]	Operating temperature [°C]	Minimum measuring time [s]	Draw- ing no.	Order no.
Connection via M12 x 1 and M8 x 1 connectors							
3...6000	1.25	120...12000	10...32	-30...75	0.8	3	VE1101
0.125...500	0.125	12...1500	10...32	-30...75	8 *	3	VE1102

Description

The VE1101 / VE1102 compact units with integrated evaluation electronics are used for the continual decentralised monitoring of the machine conditions. Higher-level systems are warned via the "warning" and "alarm" switching outputs. In addition the diagnostic values can be transferred to the Profibus via the RS-485 interface and a suitable fieldbus coupler. The trending of machine damage is stored internally. The RS-485 interface is used to read out the internally stored trend information as well as to set the sensor.

Illustration



Common technical data

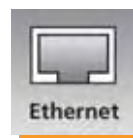
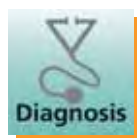
Sensing principle: micromechanical acceleration sensor / capacitive measuring principle / one measurement axis
Measuring range: ± 25 g
Diagnostic method: spectral analysis envelope-curve FFT, trend analysis
Current consumption: 100 mA (24 V)
Protection: IP 69K, overload protec.: 100 g
EMC: IEC 1000-4-2 / 3 / 4 / 6
Housing material: diecast zinc nickel-plated, Keypad: polyester
* the total reaction time which is correspondingly longer has to be taken into consideration

You can find scale drawings from page 252

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- Low system costs for an optimised machine uptime.
- Frequency-selective machine diagnosis of up to 4 measuring points.
- Ethernet interface for the integration into operational data logging.
- Integrated history memories with real-time clock.



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octavis

Accessories

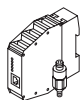
Type	Description	Order no.
	Parameter setting software for VSExxx	VES003
	Cross-over patch cable Cable length 5 m	E30112
	Cross-over patch cable Ethernet interface, cable length 2 m	EC2080

Description

The cabinet units of type VSE are used for the continual decentralised monitoring of machine conditions of up to four vibration sensors (type VSA). Higher-level systems are warned via the "warning" and "alarm" switching outputs or the analogue output. Integration into the production data acquisition system is possible using an integrated Ethernet TCP interface and the efector octavis OPC Server (order number E30114).

Further accessories are available starting on page 217

	For industrial applications	VB / VE with RS-232 interface and LED diagnosis	VE with RS-485 interface	VSE / VSA diagnostic electronics and vibration sensor	For hazardous areas	VE with RS-485 interface	
Systems for vibration diagnosis							
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Compact housing for control cabinet mounting
Diagnostic electronics for vibration sensors type VSA

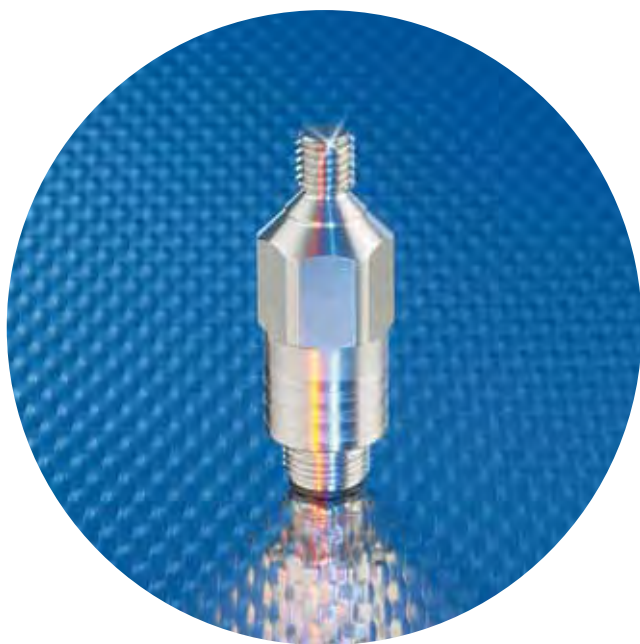
Current consumption [mA]	Data interface	Sampling-rate [kSamples]	Operating voltage [V]	Operating temperature [°C]	Drawing no.	Order no.
Combicon connection · Output 2 x  /  L progr. or 1 x <Pic>0003</Pic> progr + 1 x analog. (0/4...20 mA) · Wiring diag. no.						
100	TCP/IP	100	10...32	0...70	4	VSE001

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Common technical data

Protection: IP 20, III
Housing: DIN rail 1 inch
Housing material: PA
Dynamic inputs: 4 x 0...10 mA
Static inputs: 2 x 0/4...20 mA or pulse
Communication: Ethernet interface (10 / 100 Mbits)
Connection: Combicon

You can find scale drawings from page 252



- Vibration sensor for VSE diagnostic electronics.
- The right enclosure for harsh environmental conditions.
- Standard M12 connection (4 poles) as well as standard cable.
- Temperature range -30 to 125 °C.
- Integrated self-test.

High-
grade
stainless
steel

IP 69 K

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octavis

Accessories

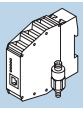
Type	Description	Order no.
	Ø 8.4 / 15 mm for efector octavis	E30115

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12 5 m orange, PVC cable	EVT001
	Socket, M12 10 m orange, PVC cable	EVT002
	Socket, M12 25 m orange, PVC cable	EVT003

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	VB / VE with RS-232 interface and LED diagnosis	VE with RS-485 interface	VSE / VSA diagnostic electronics and vibration sensor	For hazardous areas	VE with RS-485 interface	
Systems for vibration diagnosis							
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Process connection M8 x 1.25

Frequency range [Hz]	Linearity [%]	Overload protection [g]	Sensitivity [mg/√Hz]	Operating temperature [°C]	Measuring range [g]	Draw- ing no.	Order no.
0...6000	0,2	500	0,2	-30...125	+/- 25	5	VSA001

M12 connector · Output function 0...10mA, analogue · Connector groups 7, 8

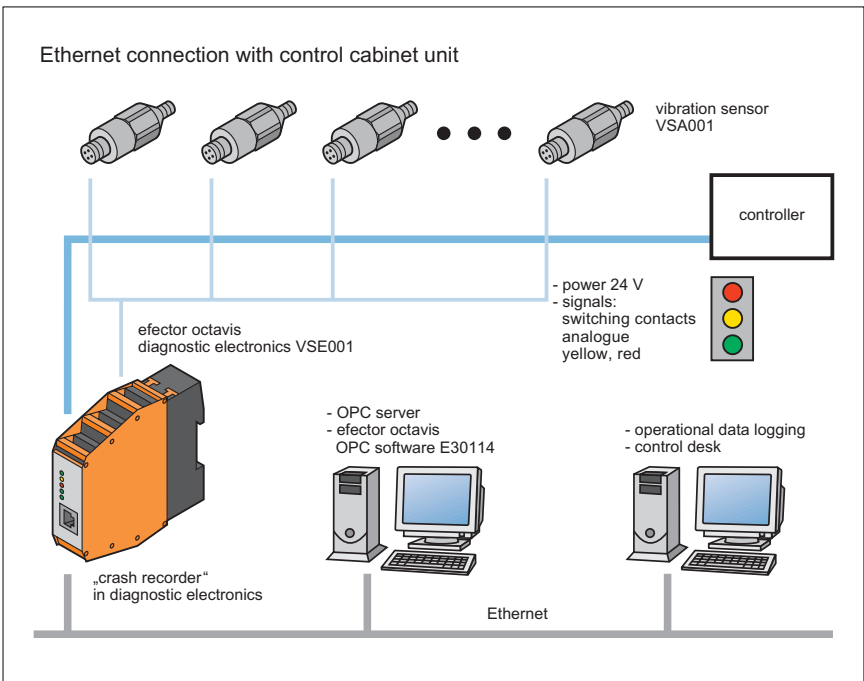
Description

The vibration sensor is used for the detection of measured data and was specially developed for the octavis diagnostic electronics (type VSE).

The highly dynamic analogue output ensures the correct transmission of high-frequency vibration signals even over distances of up to 30 m in a standard cable. The compact and highly robust design provides good long-term stability even under adverse environmental conditions (load up to 500 g). Due to the use of modern silicon technology the sensitivity of the sensor is both long-term stable and temperature independent. The measuring chain is continuously checked via the integrated self-test.

There is no overshoot of the measuring signal in the event of overload or crushed cables.

Illustration

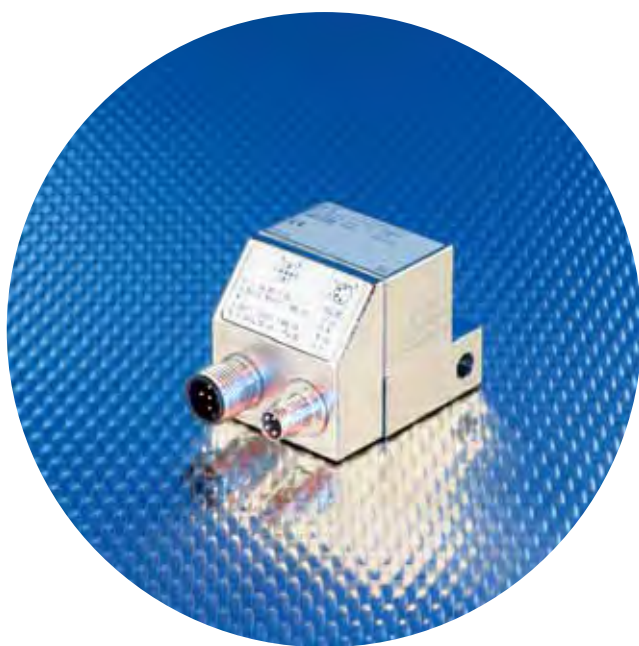


Common technical data

Sensing principle: micromechanical accelerometer / capacitive measuring principle / one measurement axis
Connection: M12 connector; recommended max. cable length 30 m

You can find scale drawings from page 252

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- Type VE with RS-485 communication interface.
- Interference immune data transfer.
- Transmission up to 200 m.
- Detects unbalance, damage to rolling element bearings, alignment errors.
- Internal history memory.



efector
octavis

Accessories

Type	Description	Order no.
	Expert software for efector octavis	VES001
	USB/RS485 adapter cable ifm electronic straight / straight	E30098
	Pulse generator	E30082
	Power supply	E30080
	Securing clip for M12 connectors with potted cable	E11532

Connectors and splitter boxes

Type	Description	Order no.
	Socket, M12 2 m black, PUR cable	EVC070
	Socket, M12 5 m black, PUR cable	EVC071
	Socket, M12 2 m, PUR cable, LED	E10854
	Socket, M8 2 m black, PUR cable	E11196
	Socket, M8 5 m black, PUR cable	E11197
	Socket, M8 10 m black, PUR cable	E11198

Further accessories are available starting on page 217

Further connectors and splitter boxes are available starting on page 191

	For industrial applications	VB / VE with RS-232 interface and LED diagnosis	VE with RS-485 interface	VSE / VSA diagnostic electronics and vibration sensor	For hazardous areas	VE with RS-485 interface	
Systems for vibration diagnosis							
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Up to 20 frequencies in the spectrum, freely selectable, diagnostic level adjustable

Frequency range [Hz]	Spectral resolution [Hz]	Monitoring rang [U/min]	Ub [V]	Operating temperature [°C]	Minimum measuring time [s]	Draw-ing no.	Order no.
Connection via M12 x 1 and M8 x 1 connectors							
3...6000	1.25	120...12000	10...32	-20...60	0.8	3	VE111A
0.125...500	0.125	12...1500	10...32	-20...60	8	3	VE112A

Networkable decentralised machine diagnosis

efector octavis detects unbalance, damage to rolling element bearings, alignment errors and meshing in good time. This allows optimisation of the uptime of plant parts such as gears, electric motors, ventilators and spindles and increasing the efficiency in production.

The compact diagnostic system analyses the vibration signals according to the methods of frequency analysis. A micromechanical accelerometer acts as the sensing element. The data is recorded, analysed and assessed by the system in a decentralised way. Expert knowledge is not required for this. The RS-485 communication interface allows transferring diagnostic values and calculated spectra to central control systems. Machine damage is detected as it arises. Maintenance measures can thus be planned and efficiently implemented.

Common technical data

Current consumption: 100 (24 V DC) mA
 Overload protection: 100 g
 Measuring range ± 25 g (nominal ± 20 g)
 Housing material: diecast zinc
 EMV IEC 1000-4-2/3/4/6
 Approvals: Ex II 3D IP69K T = 90°C X -20°C
 $\leq T_a \leq 60^\circ\text{C}$,
 Ex II 3G EEx nA II T4 X
 Spectral analysis / FFT,
 Envelope-curve FFT, Trend analysis
 Protection: IP 69K, III

You can find scale drawings from page 252

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Evaluation systems, power supplies

ecomat200®

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Amplifiers, transformer and switched-mode power supplies

System description
Selection chart

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Amplifiers for industrial applications

Standard signal evaluation and display

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Transformer and switched-mode power supplies for industrial applications

Transformer power supplies
Switched-mode power supplies

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Universal application

Introduction

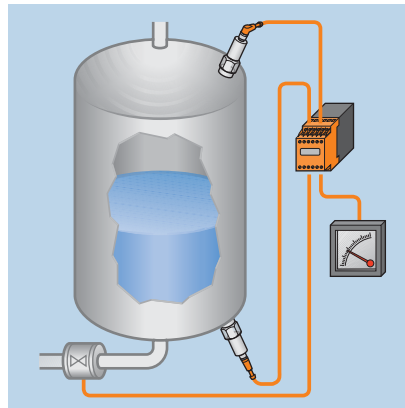
Evaluation systems for analogue standard signals, for example for monitoring and displaying process values such as pressure, flow rate, temperature and volume, are available for rail and panel mounting.

High reliability and easy handling distinguish all units. Independent of the PLC they indicate operating states or signal faults and machinery states. They help to reduce downtimes and production loss.

AL-3: Analogue threshold relays for analogue standard signals

With two analogue inputs, one analogue output and four operating modes the AL-3 offers various possibilities to monitor physical units which can be converted into analogue standard signals. Subtraction and summation is possible by means of signal combination. The differential values or total values are also available as an analogue output signal 0/4...20 mA.

Setting of the switch points and display of the measured values can be adapted to the measuring range of the connected sensor. A combined relay-transistor output switches in accordance with the set switching function. In addition the signal monitoring indicates wire break and a too high input signal. As a special feature the AL-3 provides monitoring of the input signal, for example to detect and signal wire break.



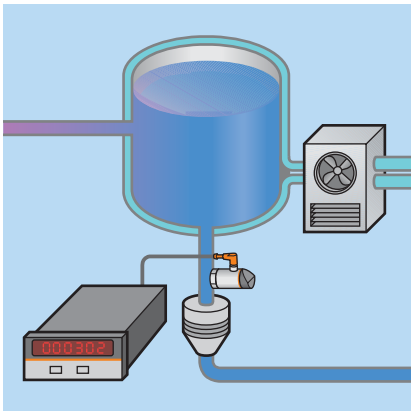
Level monitoring and display on a tank with the analogue threshold relay AL-3.

AX360: Display for analogue signals

In process technology local visualisation and monitoring of current process values, e.g. flow, pressure or temperature may be important for the machine operator. These are to be displayed and monitored.

Typical sensors for these applications supply a digital switched signal informing whether limit values have been reached or are above or below preset values. The pressure or temperature values measured by a sensor or a transmitter can be directly shown on these scaleable displays using the linear output signal, which is proportional to the measured quantity. With suitable flow sensors it is possible to indicate flow velocities or quantities, e.g. in litres per minute.

The display AX360 can measure analogue standard signals on two inputs and display them by means of the scaling function as pressure, temperature or flow rate value. Different functions allow the unit to be operated as a one-channel or two-channel unit or as a differential display. The unit is also available with a transistor output option. The displays can be conveniently read due to the large character height.



Analogue value display AX360: By means of a flow sensor the programmable display directly indicates the flow in "litres / minute".

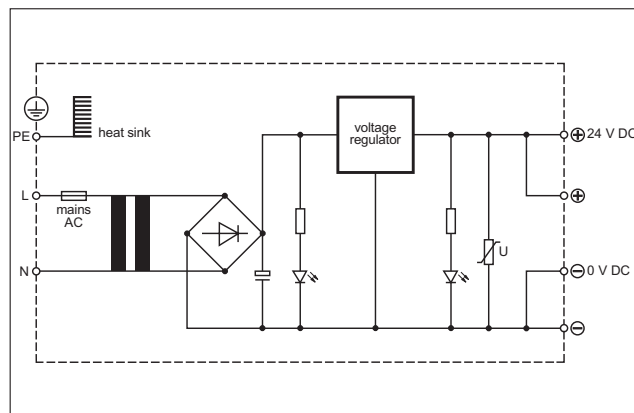
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Introduction

They may be unglamorous and unobtrusive, but without them it would not be possible to operate an electronic system. Power supplies are essential. They provide the voltage supply for sensors, actuators, controllers and other electrical loads. ifm offers powerful switch-mode power supplies for different applications but also combinations of switching amplifiers with integrated transformer power supplies.

Transformer power supplies

Transformer power supplies provide a low voltage, normally 24 V DC to supply PLCs, sensors or evaluation electronics. A transformer according to DIN 0551 ensures a safe electrical separation from mains voltage and low voltage. The output voltage can be regulated ($\pm 5\%$) or smoothed by means of capacitors. The different designs and output powers allow adaptation to diverse operating conditions.



*Circuit diagram
of a conventional
transformer
power supply.*

Switched-mode power supplies

Primary switched-mode power supplies are a compact and economical solution to supply sensors, actuators and sensitive electronic components and are gaining more and more acceptance.

As opposed to conventional transformer power supplies with regulated output voltage primary switched-mode power supplies need no heavy transformers so that there are fewer iron and copper losses. They are therefore distinguished by a very high degree of efficiency of up to 92 %. Due to the operating principle by means of high frequency transformers switched-mode power supplies are much smaller and lighter than transformer power supplies with identical power. Nevertheless they guarantee an electrical separation which is equivalent to that of transformer power supplies according to VDE 0551. Furthermore, they offer a wide input voltage range as standard, e.g. 340 to 576 V AC. This makes them fit for worldwide use.

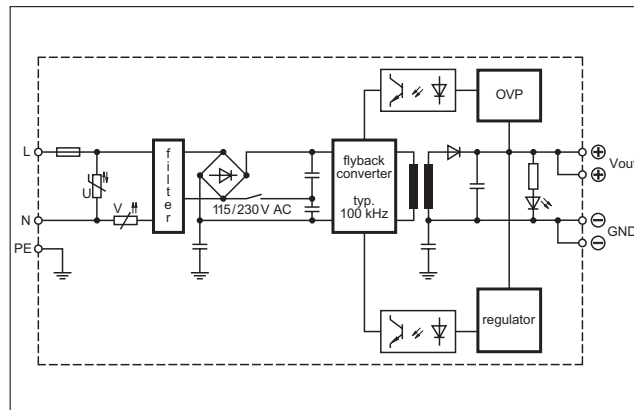
ifm switched-mode power supplies have a regulated output voltage of typ. 24 V DC with a tolerance of $\pm 2\%$. Apart from few exceptions the output voltage can be set between 24 V and 28 V to compensate for example for a voltage drop on long cables. Between no load and full load they ensure a stable supply voltage and thus operational reliability in case of supply voltage fluctuations. Mains fluctuations up to $\pm 15\%$ and mains interference are compensated for and not passed on to the load.

Even mains voltage dips of a few milliseconds are compensated for, the output voltage is completely maintained.

An active inrush current limitation reduces the inrush current by means of a fixed resistor which is bridged after start up.

Visit our website: www.ifm-electronic.com

*Circuit diagram
of a primary
switched-mode
power supply.*



Compared to the normal NTC resistors this has the advantage of a better warm and cold start action, e.g. after short power failures or extremely low operating temperatures.

Output response

The outputs are protected against short circuits and overload. Special output characteristics allow a current which can be up to 1.7 higher than the nominal current without switch-off with the voltage being reduced at the same time. Only with few power supplies the output begins to cycle (hiccup mode at < 14 V). The outputs are also protected against no load operation, i.e. they need no minimum load at the output.

Power supplies of the latest generation have two selectable output responses, the "overload mode" as described above and the "switch-off mode" where the output is switched off after a few seconds in case of a short circuit.

Power reserves

The dimensioning of the components allows a 20 to 25 % higher output current for a short time. This power reserve is provided by all power supplies as from 2.5 A for a period of one minute. At an operating temperature of up to 45°C this power is available continuously.

Mounting and connection

By means of the new mounting technology all power supplies can be safely and tightly mounted on a TS 35 DIN rail which is 7.5 or 15 mm high. They can be removed without a tool. For the electrical connection stable screw terminals are used for cables up to 6 mm² or 2 x 2.5 mm² with a 1 A power supply.

Important: EMC

All switched-mode power supplies of 2.5 to 40 A comply with EN 50081 (noise emission) and EN 50082 (noise immunity) in the severest class. Furthermore, they are fitted with a radio interference suppressor in the output so that even long, unscreened cables do not radiate.

The more powerful power supplies have an active transient filter to make voltage spike on the side of the mains harmless. Thanks to the active inrush current limitation which is also effective for warm units common circuit-breakers can be used for protection. The integrated phase monitoring for three-phase inputs prevents the unit and mains from being overloaded if one phase fails. With these features it is ensured that the CE certification also covers EMC. Concerning the international approvals EN 60950, UL1950, CUL CSA-C22.2 the power supplies already comply with the future standard EN 50178.



*Suitable for
the application:
ifm provides
power supplies
in different
power classes.*

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Housing	Description		Appli- cation / Page
Standard signal evaluation and display			
 type AL	monitor	programmable threshold relay for standard signals with integrated comparator	● 182
 type AX	LED display	display of physical quantities from analogue standard signals	● 184
 type LC	LCD display	display of physical quantities from analogue standard signals via 3 1/2-digit LCD display	● 184

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applications



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Housing		Nominal voltage AC [V]	Output voltage DC [V]	Output current [A]		Application / Page
Transformer power supplies / Switching amplifiers						
 type N 600	1 channel	110 / 230	24	0.1	●	186
 type N 600	2 channels	110 / 230	24	0.3	●	186
 type T 700	1 channel with timer function	110 / 230	24	0.04	●	186
Switched-mode power supplies single phase						
 type DN	1~	100...240	24...28	1.3 or 2.1	●	188
 type DN	1~	100...240	24...28	4.1	●	188
 type DN	1~	115 / 230 selectable	24	2.5	●	188
 type DN	1~	115 / 230 selectable	12...15	3	●	188
 type DN	1~	115 / 230 selectable	24	5	●	188

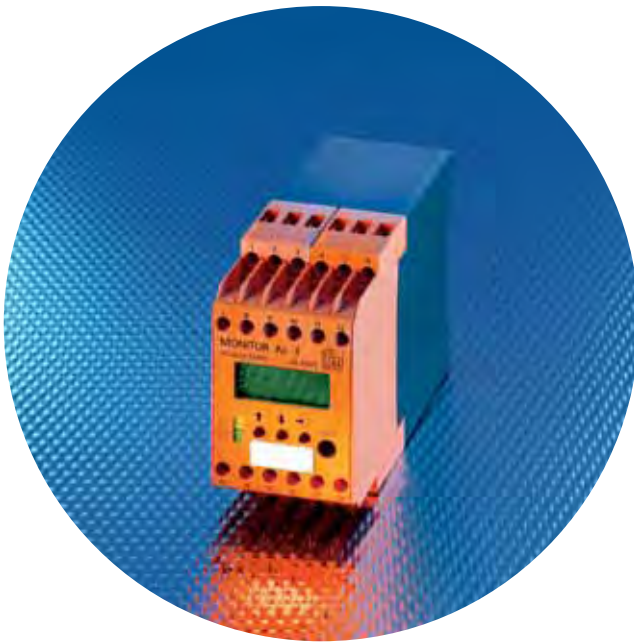
*For industrial
applications*



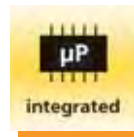
Housing		Nominal voltage AC [V]	Output voltage DC [V]	Output current [A]	Application / Page	
Switched-mode power supplies single phase						General information
	1~	115 / 230 selectable	24...28 adjustable	10	● 188	List of articles
	1~	115 / 230 or 230	24...28 adjustable	20	● 188	Level sensors
Switched-mode power supplies three-phase						Flow sensors
	3~	3 x 400...500	24...28 adjustable	5	● 188	Pressure sensors
	3~	3 x 400...500	24...28 adjustable	10	● 188	Temperature sensors
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	3~	3 x 400...500	24...28 adjustable	40	● 188	Connection technology
						Accessories
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For industrial
applications





- Two analogue inputs for 0/4...20 mA.
- Scaleable display of the actual values.
- Analogue output 0/4...20 mA.
- Formation of the signal difference, e.g. for differential pressure monitoring.
- RS-232 interface for parameter setting and communication.



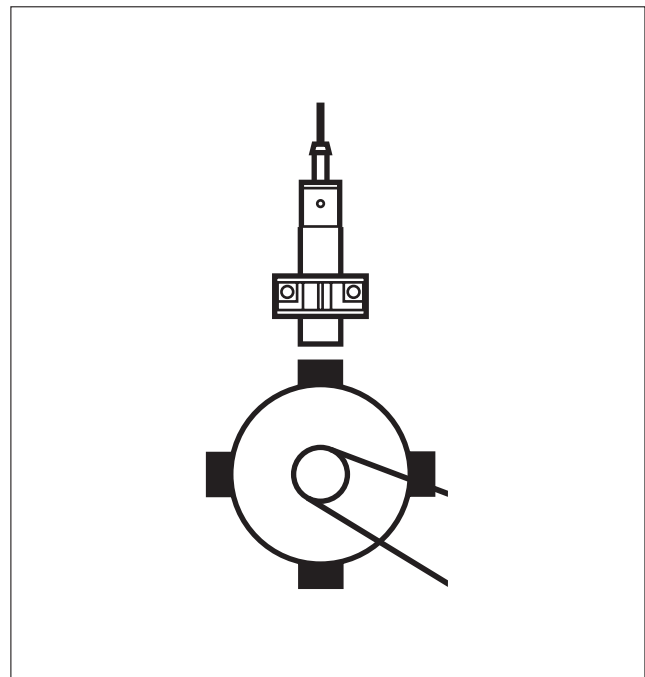
2-channel threshold relay for standard signals

The Monitor AL-3 is a programmable, analogue threshold relay for the evaluation of physical values derived from analogue standard signals.

The analogue current signals at both inputs can be scaled, displayed and monitored independently of each other. The start and end values of the current signal can be assigned any numerical value, corresponding to the measuring range of the sensor (e.g. 4...20 mA corresponding to 0...250 bar). The setting of the limit values is supported by the teach function.

The monitor compares the actual values with the set limit values and switches the assigned outputs depending on the set parameter values and functions. At the same time the analogue output provides the input signal IN 1 unchanged or scaled for further use. The differential or the total value from the two input signals can also be displayed, evaluated, compared with the set limit values, and provided as analogue signal.

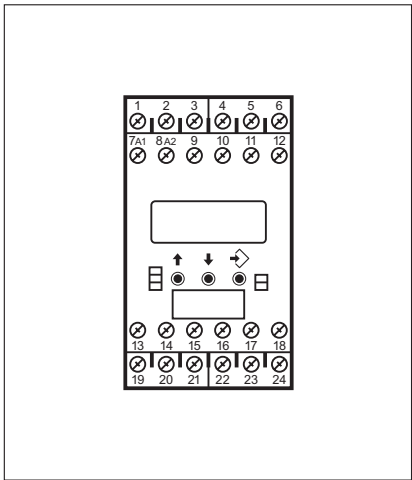
Application



Monitor AL-3
2-channel analogue threshold relay for standard signals
with integrated comparator

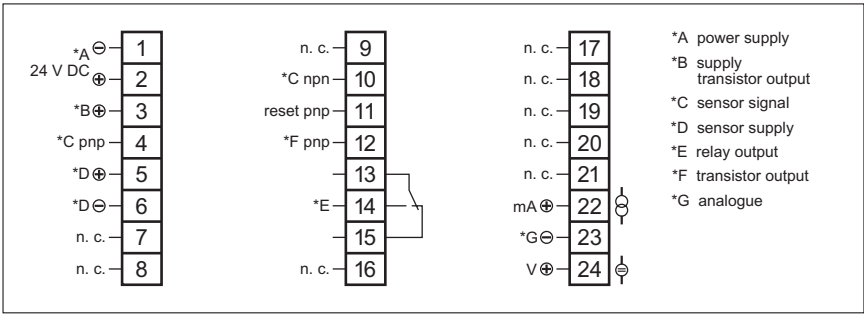
U _b [V]	In- puts	Input function	Setting range	Out- puts analog	Out- puts relays	Out- puts transist.	Out- puts faults	Draw- ing no.	Order no.
110...240 AC/DC / 24 DC	2	0/4...20	-9999.0...9999.0	1	2	2	1	1	DL2003

Front view



The monitor AL-3 can be parameterised via programming cable or software via Internet Explorer by means of a PC. To do so, the RS-232 interface is accessible at the front via a 3.5 mm jack socket. For series applications the user can “copy” a parameter setting once set into any number of units. The values of the input signals can be read via PC with an online connection by means of a serial interface.

Terminal connection

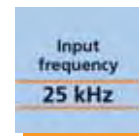
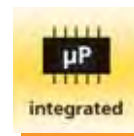


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- For the display of process quantities.
- Input for analogue standard signals 0/4...20 mA / 0...10 V.
- LED display, programmable, with switching output.
- LCD display supplied from a current loop.
- Display and monitoring of e. g. pressure differences (diff. pressure).

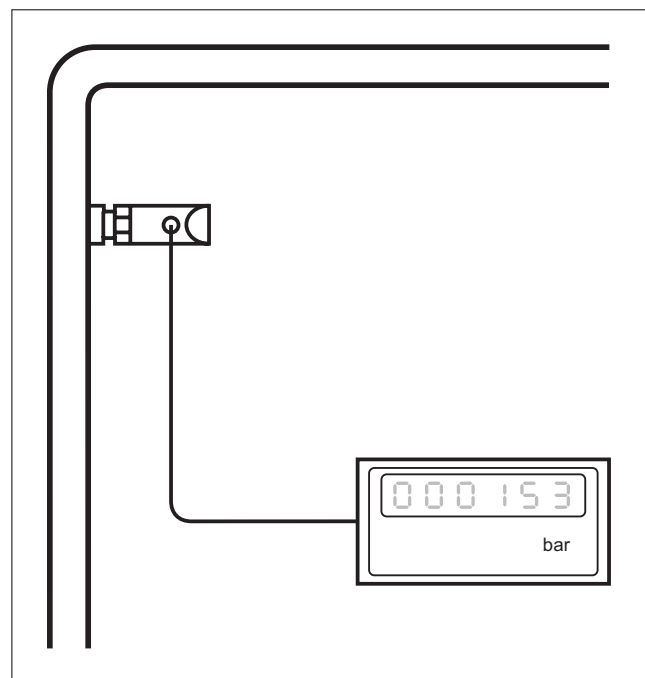


Indication of physical process values.

In process technology local visualisation of current process values, e.g. flow, pressure or temperature may be important for the operator of an installation. Typical sensors for these applications supply a digital switched signal informing whether limit values have been reached or are above or below preset values. Other sensors or transmitters supply a standard analogue signal which can be used by digital displays and indicated as current or voltage value.

But when pressure or temperature sensors supply a linear output signal proportional to the measured quantity this scaleable display can directly indicate the measured pressure or temperature values. Thus two pressure sensors can also display and monitor pressure differences. With the suitable flow sensors it is possible to display flow velocities or quantities (e.g. litres per minute) or the difference of volume flows.

Application

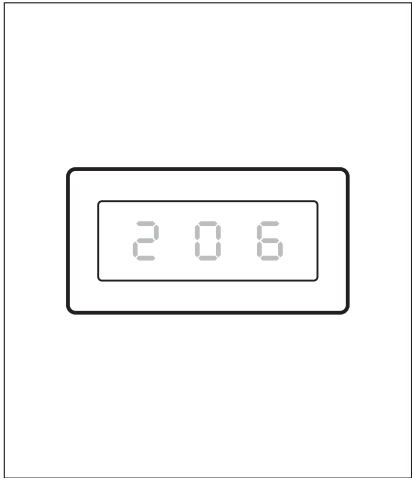


Digital displays

AX360: DX2011, DX2012; 6-digit LED display with 15 mm character height, switching output
LCD display, 3 1/2-digit, without auxiliary energy, supply from the 4...20 mA current loop

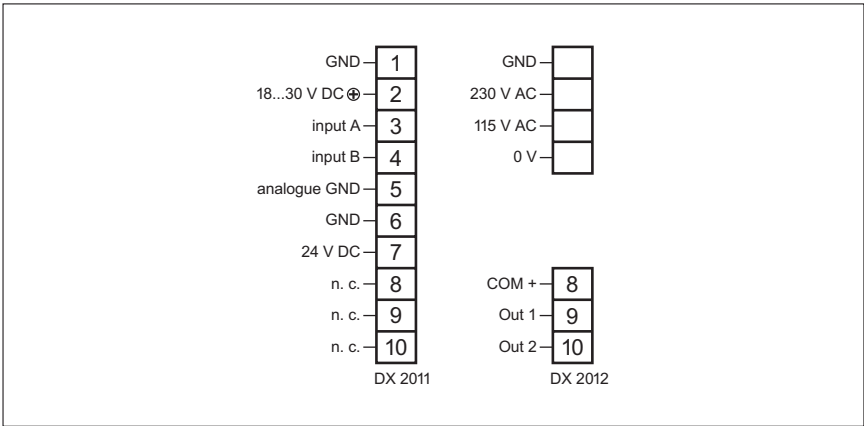
U _b [V]	In- puts	Input function	Display range	Out- puts analog	Out- puts relays	Out- puts transist.	Out- puts faults	Draw- ing no.	Order no.
Digital display									
115 / 230 AC; 24 DC	2	0/4...20mA, 0...10V	-999999...999999	–	–	–	–	2	DX2011
115 / 230 AC; 24 DC	2	0/4...20mA, 0...10V	-999999...999999	–	–	2	–	2	DX2012
LC display									
from the current loop	1	4...20mA	-1999...1999	–	–	–	–	3	E89150

Front view E89150



The parameters of the AX 360 are set by means of a display and 2 buttons on the front panel. Standard parameters like scaling factor, averaging and switch points can be set as well as operating modes like "input A – input B" or "input A + input B". The LCD display is set using potentiometers for course and fine setting of the initial and final values.

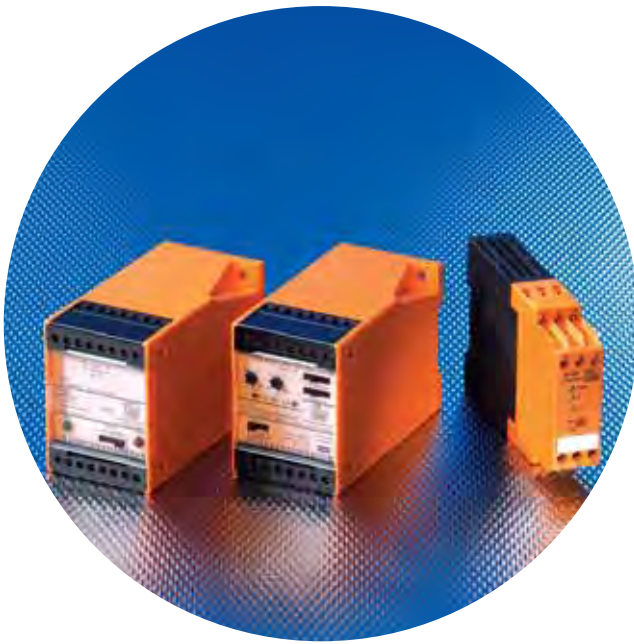
Terminal connection DX2011, DX2012



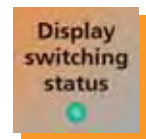
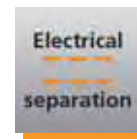
For other terminal connections see www.ifm-electronic.com

You can find scale drawings from page 253

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- One- and two-channel versions.
- Regulated 24 V DC output voltage.
- Suitable for pnp or npn switching sensors.
- Output short-circuit protected.
- Also available with integrated timer function.

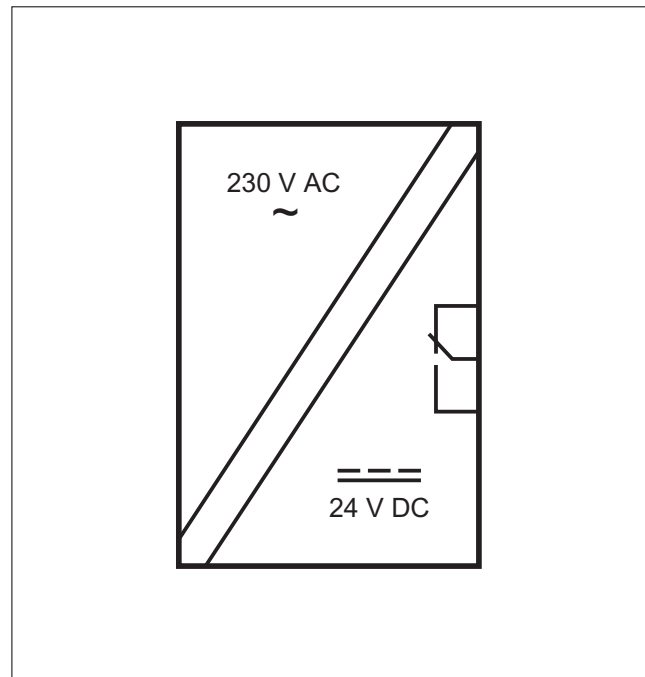


Power supplies for sensors / switching amplifiers.

Transformer power supplies provide a low voltage (normally 24 V DC) to supply PLC, sensors or evaluation electronics. A transformer according to DIN 0551 ensures a safe electrical separation from mains voltage and low voltage. The output voltage can be regulated or smoothed by means of capacitors.

The switching amplifiers have a transformer power supply with a 24 V DC output voltage. This voltage is used to supply a sensor. Since sensors normally have solid-state outputs with typically 24 V DC and approx. 250 mA, they cannot switch high loads. If the outputs of the sensors are connected to the input of the switching amplifiers, a relay with a potential-free change-over contact is switched. This allows switching of higher loads or AC voltages. One-channel switching amplifiers are suitable for a sensor with one output, the two-channel types are suitable for a sensor with two outputs or two sensors with one output each. Current consumption must be taken into account.

Schematics



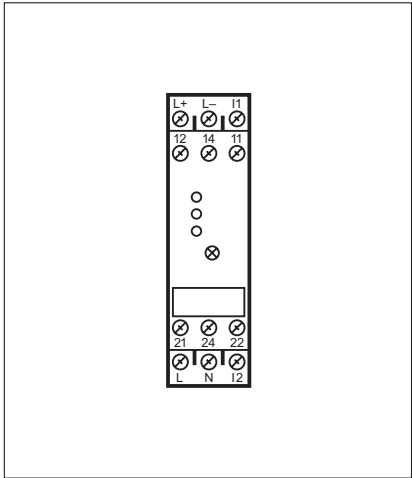


Switching amplifier 1-channel (DN0001, DN0012)
Switching amplifier 1-channel with timer function (DT0001, DT0012)
Switching amplifier 2-channel (DN0200)

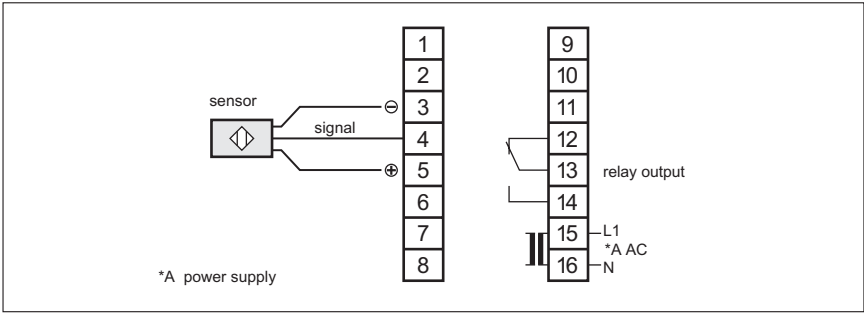
Current [mA]	Output voltage [V]	Nominal voltage [V]	Output	Draw- ing no.	Order no.
max. 100 mA	24 DC; $\pm 5\%$	230 AC	Relais	1	DN0001
max. 100 mA	24 DC; $\pm 5\%$	110 AC	Relais	1	DN0012
max. 300 mA	24 V DC; $\pm 3\%$	110...240 AC	Relais	2	DN0200
max. 40 mA	24 DC; $\pm 5\%$	230 AC / 24 DC	Relais	1	DT0001

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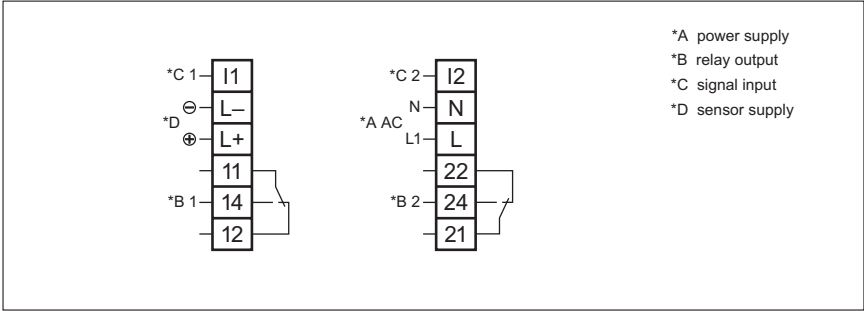
Front view DN0200



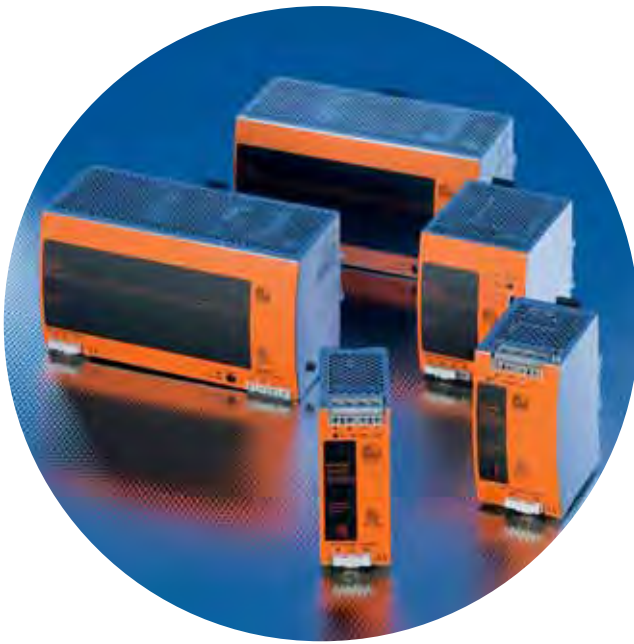
Terminal connection DN0001, DN0012, DT0001, DT0012



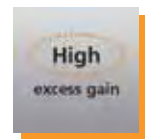
Terminal connection DN0200



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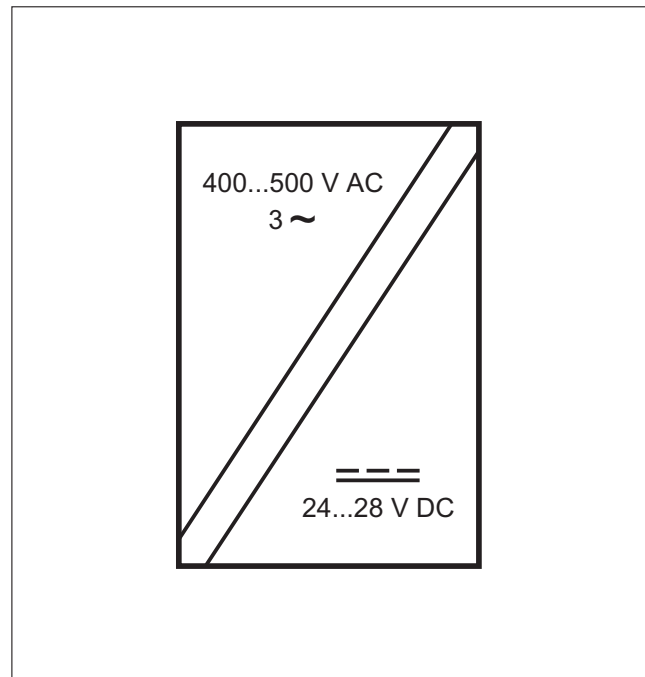
- Regulated 24 V DC output voltage.
- Wide input voltage range.
- High efficiency.
- Output short-circuit and overload protected.
- Robust metal housing, secure fixing.



Switched-mode power supplies.

Primary switched-mode power supplies are a compact and economical solution to supply sensors, actuators and sensitive electronic components in machines and installations and are gaining more and more acceptance. As opposed to conventional transformer power supplies with regulated output voltage primary switched-mode power supplies need no heavy 50 Hz transformers so that there are fewer iron and copper losses – just a small high frequency power transformer is needed. Between no load and full load switched-mode power supplies ensure a stable supply voltage and thus operational reliability even in case of supply voltage fluctuations, for mains fluctuations up to $\pm 15\%$ and mains interference are compensated for and not passed on to the load. Even mains voltage dips of a few milliseconds are compensated for so that the output voltage is completely maintained. All types are electronically protected against overvoltage (OVP) and permanent short circuit. The electrical design is equivalent to that of safety transformers according to VDE 0551.

Schematics



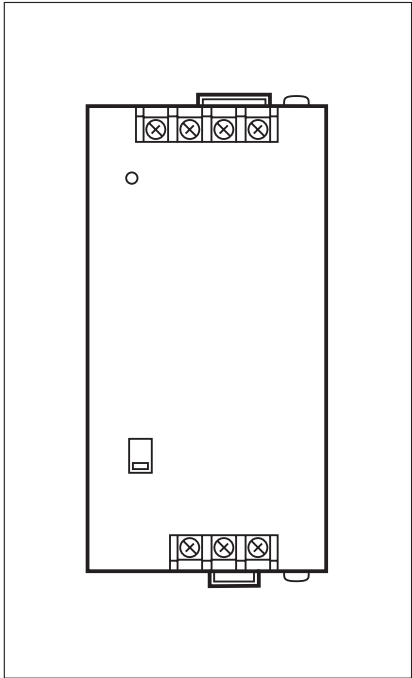
	For industrial applications	Standard signal evaluation and display	For industrial applications	Transformer power supplies	Switched-mode power supplies	
Amplifiers						
Power supplies						
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Power supplies single-phase
Power supplies three-phase

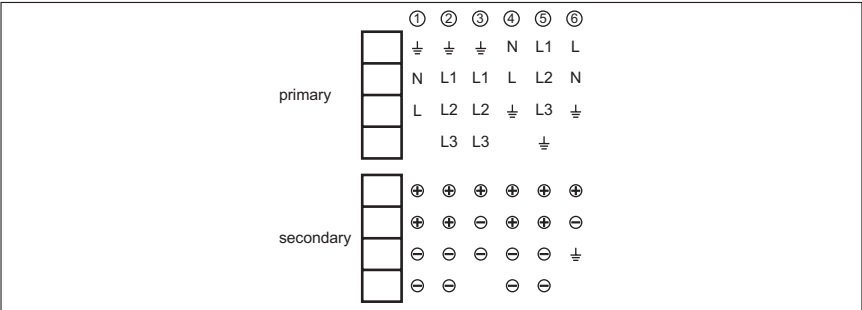
Current [A]	Output voltage [V]	Nominal voltage [V]	Efficiency typ. [%]	Terminal connection Nr.	Draw- ing no.	Order no.
2.5	24 DC (+5% / -1%)	115 / 230 AC	87.5	4	3	DN2011
1.3	24...28 DC ($\pm 2\%$)	115 / 230 AC	87.5	4	4	DN1020
2.1	24...28 DC ($\pm 2\%$)	115 / 230 AC	88.5	4	4	DN1021
3	12...15 DC ($\pm 2\%$)	115 / 230 AC	87	4	5	DN2021
4	24 DC (+5% / -1%)	115 / 230 AC	90	4	6	DN2112
4.1	24...28 DC ($\pm 2\%$)	115 / 230 AC	90	4	7	DN1022
5	24 DC (+5% / -1%)	115 / 230 AC	90	4	6	DN2012
10	24...28 DC ($\pm 2\%$)	115 / 230 AC	90	4	8	DN2013
20	24...28 DC ($\pm 2\%$)	230 AC	91	4	9	DN2014
20	24...28 DC, $\pm 2\%$	115 / 230 AC	90	4	9	DN2114
5	24...28 DC ($\pm 2\%$)	3 x 400...500 AC	89	4	10	DN2032
10	24...28 DC ($\pm 2\%$)	3 x 400...500 AC	90	4	11	DN2033
20	24...28 DC ($\pm 2\%$)	3 x 400 AC	92	4	12	DN2034
20	24...28 DC ($\pm 2\%$)	3 x 400...500 AC	92	4	13	DN2134
30	24...28 DC ($\pm 2\%$)	3 x 400...500 AC	93	4	14	DN2036
40	24...28 DC ($\pm 2\%$)	3 x 400...500 AC	92.5	4	15	DN2035

Front view DN2012

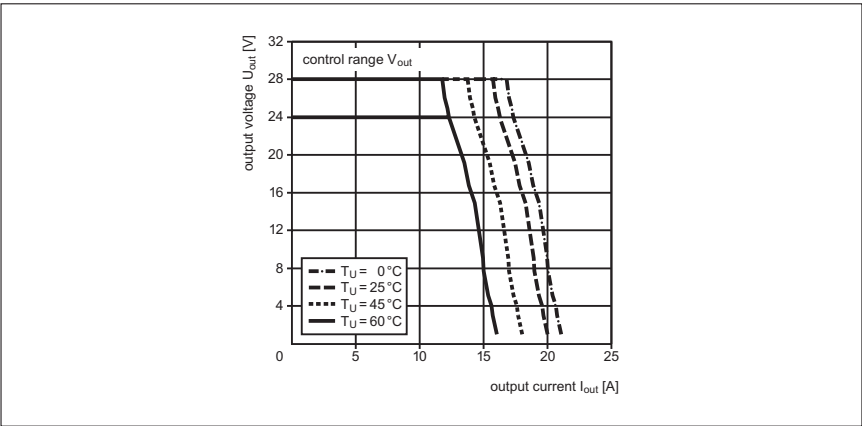


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Terminal connection



Terminal connection



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Complete ifm product range

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Connectors and splitter boxes for industrial applications

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Universal application



Connectors for oils and coolants

Sockets

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Special application



Connectors and splitter boxes for hygienic and wet areas

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Connectors for hazardous areas

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Cable plugs
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Introduction

The electrical connection of the sensors via connectors has become more and more important in the last few years. Easy handling and high uptime of the machines are of prime importance for the customer. This requires extremely reliable products.

With a wide variety of different sensor designs ifm electronic offers a wide range of high quality connectors. The choice of types covers common M8, M12, M18 types through to solenoid connectors.

In addition to the sockets the basic range covers connection cables (jumpers) and splitter boxes. These are used where several sensors are mounted close together and must then be connected to the panel across longer distances.

The M12 design in particular has become firmly established on the sensor market for many years and is therefore the preferred choice for extremely harsh applications.

To be able to meet the different application requirements three product series have been developed with the following application focus.

M12 series with cable for factory automation:

The ifm standard series for industrial use. Halogen-free PUR cable with high resistance to alternate bending stress, PUR housing material, gold-plated contacts and protection rating IP 68 guarantee long life in an oily and greasy environment. The international UL and CSA approval means these units are accepted anywhere in the world market.



M12 series with cable for the food industry:

This series is specially designed for hygienic areas in food manufacture. High quality PVC cable and housing materials, coupling nuts of high-grade stainless steel (316S12) as well as gold-plated contacts are ideal features for use in wet areas. The high protection ratings IP 67, IP 68 and IP 69K withstand high-pressure steam cleaning. They are chemically resistant to most common cleaning agents. The UL / CSA approval is a matter of course for these units.



M12 series with cable for hazardous areas:

When using sockets in explosion-protected areas to 94/9/EC (ATEX) there are special requirements for wiring. The requirements of the applicable installation regulations must be absolutely adhered to by the user on his own responsibility. More information is given in the EC type test certificate, operating instructions and the technical data sheet of the corresponding units.



*ifm plug and socket connections:
the right connection for every
application.*

Visit our website: www.ifm-electronic.com

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Socket M12, 2-pole, for AS-i isolation displacement connector	4			
Socket M12, 2-pole + PE, 3-wire	5			
Socket M12, 5 / 4-pole, 2-wire, for quadronorm units	6			
Socket M12, 4-pole, 4-wire	7	55		65
Socket M12, 4-pole	8		58	
Socket M12, 4-pole, 4-wire, LED, PNP	9	56		
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Socket M12, 5-pole			62	
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Socket M12, 8-pole, 6-wire	12 / 13			
Socket M12, 8-pole, 7-wire	14			
Socket M12, 8-pole, 8-wire, for temperature sensors TR 8...	15			
Socket M16, 14-pole, 10-wire	16			
Socket M16, 14-pole, 12-wire	17			
Socket M18, 4-pole	18			
Socket M18, 12-pole	19			
Socket M23, 12-pole, pin numbering anticlockwise, for splitter boxes	20			
Socket M23, 12-pole, external thread, pin numbering clockwise, for encoders	21			
Socket M23, 12-pole, pin numbering clockwise, for encoders	22			
Cable plug M23, 12-pole, pin numbering anticlockwise, for encoders	23			
Socket M23, 17-pole, pin numbering clockwise, for encoders	24			
Socket M23, 21-pole, pin numbering clockwise, for encoders	25			
Socket M23, 12-pole for splitter boxes	26			
Socket M23, 19-pole for splitter boxes	27			

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Description	For industrial applications For oils and coolants For hygienic and wet areas For hazardous areas			
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Type	Cable	Core specification	Material housing / nut	U [V]	T _a [°C]	Pro-tection	Gold-contacts	LEDs	Draw-ing no.	Order no.
Group 1 · Socket M8, 3-pole, 3-wire										
	2 m black PUR cable	3 x 0.25 mm ² Ø 4.1 mm	PUR / brass	60 AC 75 DC	-25...85	IP 68	•	–	1	E11486
	5 m black PUR cable	3 x 0.25 mm ² Ø 4.1 mm	PUR / brass	60 AC 75 DC	-25...85	IP 68	•	–	1	E11487
Group 2 · Socket M8, 3-pole, 3-wire, LED, PNP										
	2 m black PUR cable	3 x 0.25 mm ² Ø 4.1 mm	PUR / brass	10...30 DC	-25...85	IP 68	•	green / yellow	2	E11492
	5 m black PUR cable	3 x 0.25 mm ² Ø 4.1 mm	PUR / brass	10...30 DC	-25...85	IP 68	•	green / yellow	2	E11493
Group 3 · Socket M8, 4-pole, 4-wire										
	2 m black PUR cable	4 x 0.25 mm ² Ø 5 mm	PUR / brass	60 AC 75 DC	-25...80	IP 68	•	–	3	E11199
	5 m black PUR cable	4 x 0.25 mm ² Ø 5 mm	PUR / brass	60 AC 75 DC	-25...80	IP 68	•	–	3	E11200
	10 m black PUR cable	4 x 0.25 mm ² Ø 5 mm	PUR / brass	60 AC 75 DC	-25...80	IP 68	•	–	3	E11201
	2 m black PUR cable	4 x 0.25 mm ² Ø 5 mm	PUR / brass	60 AC 75 DC	-25...80	IP 68	•	–	4	E11196
	5 m black PUR cable	4 x 0.25 mm ² Ø 5 mm	PUR / brass	60 AC 75 DC	-25...80	IP 68	•	–	4	E11197
	10 m black PUR cable	4 x 0.25 mm ² Ø 5 mm	PUR / brass	60 AC 75 DC	-25...80	IP 68	•	–	4	E11198
Group 4 · Socket M12, 2-pole for AS-i isolation displacement connector										
	–	–	NBR	–	-25...70	IP 67	–	–	5	E70271
Group 5 · Socket M12, 2-pole + PE, 3-wire										
	2 m orange PVC cable	3 x AWG 22 (3 x 0.34 mm ²)	TPU / brass	250 AC 300 DC	-25...90	IP 67	–	–	6	E10865
	5 m orange PVC cable	3 x AWG 22 (3 x 0.34 mm ²)	TPU / brass	250 AC 300 DC	-25...90	IP 67	–	–	6	E10866
	2 m orange PVC cable	3 x AWG 22 (3 x 0.34 mm ²)	TPU / brass	250 AC 300 DC	-25...90	IP 67	–	–	7	E10867
	5 m orange PVC cable	3 x AWG 22 (3 x 0.34 mm ²)	TPU / brass	250 AC 300 DC	-25...90	IP 67	–	–	7	E10868
Group 6 · Socket M12, 5/4-pole, 2-wire										
	2 m orange PUR / PVC cable	2 x 0.34 mm ² Ø 5 mm	TPU / brass	250 AC 300 DC	-25...90	IP 67	–	–	8	E10188
	5 m orange PUR / PVC cable	2 x 0.34 mm ² Ø 5 mm	TPU / brass	250 AC 300 DC	-25...90	IP 67	–	–	8	E10214

	For industrial applications	Sockets	Cable plugs	Cables	Splitter boxes	For oils and coolants	For hygienic areas and viscous media	For hazardous areas
Complete ifm product range								
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Type	Cable	Core specification	Material housing / nut	U [V]	T _a [°C]	Pro-tection	Gold-con-tacts	LEDs	Drawing no.	Order no.	General information
Group 6 · Socket M12, 5/4-pole, 2-wire											
	2 m black PUR / PVC cable	2 x 0.34 mm ² Ø 5 mm	TPU / brass	250 AC 300 DC	-25...90	IP 67	–	–	9	E10216	List of articles
	5 m orange PUR / PVC cable	2 x 0.34 mm ² Ø 5 mm	TPU / brass	250 AC 300 DC	-25...90	IP 67	–	–	9	E10215	
Group 7 · Socket M12, 4-pole, 4-wire											Level sensors
	2 m black PUR cable	4 x 0.34 mm ² Ø 4.9 mm	TPU / brass	250 AC 300 DC	-25...90	IP 68 / IP 69K	•	–	10	EVC004	
	5 m black PUR cable	4 x 0.34 mm ² Ø 4.9 mm	TPU / brass	250 AC 300 DC	-25...90	IP 68 / IP 69K	•	–	10	EVC005	
	10 m black PUR cable	4 x 0.34 mm ² Ø 4.9 mm	TPU / brass	250 AC 300 DC	-25...90	IP 68 / IP 69K	•	–	10	EVC006	Flow sensors
	2 m black PUR cable	4 x 0.34 mm ² Ø 4.9 mm	TPU / brass	250 AC 300 DC	-25...90	IP 68 / IP 69K	•	–	11	EVC001	Pressure sensors
	5 m black PUR cable	4 x 0.34 mm ² Ø 4.9 mm	TPU / brass	250 AC 300 DC	-25...90	IP 68 / IP 69K	•	–	11	EVC002	
	10 m black PUR cable	4 x 0.34 mm ² Ø 4.9 mm	TPU / brass	250 AC 300 DC	-25...90	IP 68 / IP 69K	•	–	11	EVC003	Temperature sensors
Group 8 · Socket M12, 4-pole											Diagnostic systems
	wirable	–	PA / brass	125 AC 150 DC	-25...90	IP 68 / IP 69 K	–	–	12	E11302	
	wirable	...0.75 mm ² (Ø 4...6 mm)	PA / brass	250 AC/DC	-25...100	IP 68	•	–	13	E11509	Evaluation systems, power supplies
	wirable	...0.75 mm ² (Ø 4...6 mm)	PA / brass	250 AC/DC	-25...100	IP 68	•	–	14	E11508	Connection technology
Group 9 · Socket M12, 4-pole, 4-wire, LED, PNP											Accessories
	2 m black PUR cable	4 x 0.34 mm ² Ø 4.9 mm	TPU / brass	10...36 DC	-25...90	IP 68 / IP 69K	•	green / 2 x yel.	15	EVC007	
	5 m black PUR cable	4 x 0.34 mm ² Ø 4.9 mm	TPU / brass	10...36 DC	-25...90	IP 68 / IP 69K	•	green / 2 x yel.	15	EVC008	
	10 m black PUR cable	4 x 0.34 mm ² Ø 4.9 mm	TPU / brass	10...36 DC	-25...90	IP 68 / IP 69K	•	green / 2 x yel.	15	EVC009	Technical information and customer service
Group 10 · Socket M12, 4-pole, LED, PNP											
	wirable	...0.75 mm ² (Ø 4...6 mm)	PA / brass	10...30 DC	-25...100	IP 68	•	green / yellow	16	E11510	

Complete ifm product range

For industrial applications



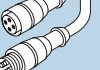
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Cable plugs



Cables



Splitter boxes



For oils and coolants



For hygienic areas and viscous media



For hazardous areas



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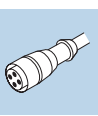
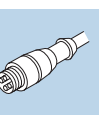
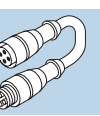
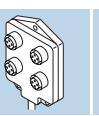
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Type	Cable	Core specification	Material housing / nut	U [V]	T _a [°C]	Pro-tection	Gold-contacts	LEDs	Drawing no.	Order no.
Group 10 · Socket M12, 4-pole, LED, PNP										
	wirable	...0.75 mm ² (Ø 4...6 mm)	PA	10...30 DC	-40...85	IP 67	–	green / yellow	17	E10136
Group 11 · Socket M12, 5-pole										
	2 m black PUR cable	5 x 0.34 mm ² Ø 4.9 mm	TPU / brass	30 AC 36 DC	-25...90	IP 68 / IP 69K	•	–	18	EVC073
	5 m black PUR cable	5 x 0.34 mm ² Ø 4.9 mm	TPU / brass	30 AC 36 DC	-25...90	IP 68 / IP 69K	•	–	18	EVC074
	10 m black PUR cable	5 x 0.34 mm ² Ø 4.9 mm	TPU / brass	30 AC 36 DC	-25...90	IP 68 / IP 69K	•	–	18	EVC075
	2 m black PUR cable	5 x 0.34 mm ² Ø 4.9 mm	TPU / brass	30 AC 36 DC	-25...90	IP 68 / IP 69K	•	–	19	EVC070
	5 m black PUR cable	5 x 0.34 mm ² Ø 4.9 mm	TPU / brass	30 AC 36 DC	-25...90	IP 68 / IP 69K	•	–	19	EVC071
	10 m black PUR cable	5 x 0.34 mm ² Ø 4.9 mm	TPU / brass	30 AC 36 DC	-25...90	IP 68 / IP 69K	•	–	19	EVC072
Group 12 · Socket M12, 8-pole, 6-wire										
	5 m black PUR / PVC cable	6 x 0.34 mm ² Ø 6 mm	TPU / brass	30 AC 36 DC	-25...90	IP 67	–	–	20	E10976
Group 13 · Socket M12, 8-pole, 6-wire										
	10 m black PUR / PVC cable	6 x 0.34 mm ² Ø 6 mm	TPU / brass	30 AC 36 DC	-25...90	IP 67	–	–	20	E10977
Group 14 · Socket M12, 8-pole, 7-wire + screen										
	2 m orange PUR cable	7 x 0.25 mm ² + screen	TPU / brass	30 AC 36 DC	-25...90	IP 67	–	–	20	E20738
Group 15 · Socket M12, 8-pole, 8-wire, for temperature sensors TR 8...										
	2 m black PUR cable	8 x 0.25 mm ² Ø 6.2 mm	PUR / brass	30 AC 36 DC	-25...80	IP 68	•	–	21	E11231
	5 m black PUR cable	8 x 0.25 mm ² Ø 6.2 mm	PUR / brass	30 AC 36 DC	-25...80	IP 68	•	–	21	E11232
	10 m black PUR cable	8 x 0.25 mm ² Ø 6.2 mm	PUR / brass	30 AC 36 DC	-25...80	IP 68	–	–	22	E11311

	For industrial applications	Sockets	Cable plugs	Cables	Splitter boxes	For oils and coolants	For hygienic areas and viscous media	For hazardous areas
Complete ifm product range								
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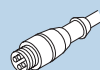
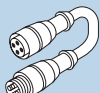


Type	Cable	Core specification	Material housing / nut	U [V]	T _a [°C]	Pro-tection	Gold-con-tacts	LEDs	Draw-ing no.	Order no.
Group 16 · Socket M16, 14-pole, 10-wire										
	5 m black PUR cable	8 x 0.34 mm ² + 2 x 0.75 mm ²	PUR / brass	30 DC	-25...90	IP 68	–	–	23	E11226
	10 m black PUR cable	8 x 0.34 mm ² + 2 x 0.75 mm ²	PUR / brass	30 DC	-25...90	IP 68	–	–	23	E11227
Group 17 · Socket , 14-pole, 12-wire										
	2 m black PUR cable	10 x 0.25 mm ² + 2 x 0.34 mm ²	PUR / brass	30 DC	-25...90	IP 67	–	–	24	E11645
	5 m black PUR cable	10 x 0.25 mm ² + 2 x 0.34 mm ²	PUR / brass	30 DC	-25...90	IP 67	–	–	24	E11697
Group 18 · Socket M18, 4-pole										
	wirable	...0.75 mm ² (Ø 6...8 mm)	PA	20...250 AC/DC	-40...85	IP 65	–	–	25	E10013
	wirable	...0.75 mm ² (Ø 6...8 mm)	PA / ULTRAMID	20...250 AC/DC	-40...85	IP 65	–	–	26	E10137
Group 19 · Socket M18, 12-pole										
	soldering	...0.25 mm ² (Ø 6...8 mm)	brass	4.5...30 DC	-40...85	IP 67	–	–	27	E60174
	soldering	...0.25 mm ² (Ø 6...8 mm)	brass	4.5...30 DC	-40...85	IP 67	–	–	28	E60175
Group 20 · Socket M23, 12-pole, numbering anticlockwise										
	soldering	...1 mm ² (Ø 10...14 mm)	brass	10...30 DC	-25...90	IP 65	–	–	29	E10447
	soldering	...1 mm ² (Ø 10...14 mm)	brass	10...30 DC	-25...90	IP 65	–	–	30	E10448
Group 21 · Socket M23, 12-pole, numbering clockwise										
	soldering	...1 mm ² Ø 8 mm	brass	4.5...30 DC	-40...125	IP 67	–	–	31	E60124
Group 22 · Socket M23, 12-pole, numbering clockwise, for encoders										
	soldering	...1 mm ² Ø 8 mm	brass	4.5...30 DC	-40...125	IP 67	–	–	32	E60122

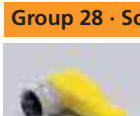
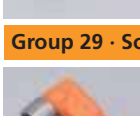
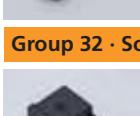
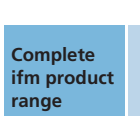
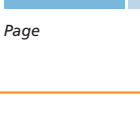
General information
List of articles
Level sensors
Flow sensors
Pressure sensors
Temperature sensors
Diagnostic systems
Evaluation systems, power supplies
Connection technology
Accessories
Technical information and customer service

	For industrial applications	Sockets	Cable plugs	Cables	Splitter boxes	For oils and coolants	For hygienic areas and viscous media	For hazardous areas
Complete ifm product range								
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Type	Cable	Core specification	Material housing / nut	U [V]	T _a [°C]	Pro-tection	Gold-con-tacts	LEDs	Draw-ing no.	Order no.
Group 22 · Socket M23, 12-pole, numbering clockwise, for encoders										
	soldering	...1 mm ² (Ø 4.5...6 mm)	brass	4.5...30 DC	-40...125	IP 67	–	–	33	E60136
	5 m PUR cable	8 x 0.14 mm ² + 4 x 0.5 mm ²	brass	4.5...30 DC	-25...80	IP 67	–	–	34	E60144
	10 m PUR cable	8 x 0.14 mm ² + 4 x 0.5 mm ²	brass	4.5...30 DC	-25...80	IP 67	–	–	34	E60147
Group 23 · Plug M23, 12-pole, numbering anticlockwise										
	soldering	...1 mm ² Ø 8 mm	brass	4.5...30 DC	-40...125	IP 67	–	–	35	E60141
Group 24 · Socket M23, 17-pole, numbering clockwise										
	Soldering/crimping connection	...0.5 mm ² Ø 8 mm	brass	4.5...30 DC	-40...125	IP 67	–	–	36	E60157
Group 25 · Socket M23, 21-pole, numbering clockwise										
	Soldering/crimping connection	...0.5 mm ² Ø 8 mm	brass	4.5...30 DC	-40...125	IP 67	–	–	37	E60146
Group 26 · Socket , 12-pole										
	5 m black PUR cable	8 x 0.5 mm ² + 3 x 1.0 mm ²	PUR / brass	250 AC/DC	-25...80	IP 67	–	–	38	E11736
	10 m black PUR cable	8 x 0.5 mm ² + 3 x 1.0 mm ²	PUR / brass	250 AC/DC	-25...80	IP 67	–	–	38	E11737
	15 m black PUR cable	8 x 0.5 mm ² + 3 x 1.0 mm ²	PUR / brass	250 AC/DC	-25...80	IP 67	–	–	38	E11738
	5 m black PUR cable	8 x 0.5 mm ² + 3 x 1.0 mm ²	PUR / brass	250 AC/DC	-25...80	IP 67	–	–	39	E11739
	10 m black PUR cable	8 x 0.5 mm ² + 3 x 1.0 mm ²	PUR / brass	250 AC/DC	-25...80	IP 67	–	–	39	E11740
	15 m black PUR cable	8 x 0.5 mm ² + 3 x 1.0 mm ²	PUR / brass	250 AC/DC	-25...80	IP 67	–	–	39	E11741
Group 27 · Socket , J-pole										
	5 m black PUR cable	16 x 0.5 mm ² + 3 x 1.0 mm ²	PUR / brass	160 AC/DC	-25...80	IP 67	–	–	40	E11742
	10 m black PUR cable	16 x 0.5 mm ² + 3 x 1.0 mm ²	PUR / brass	160 AC/DC	-25...80	IP 67	–	–	40	E11743

	For industrial applications	Sockets	Cable plugs	Cables	Splitter boxes	For oils and coolants	For hygienic areas and viscous media	For hazardous areas
Complete ifm product range								
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Type	Cable	Core specification	Material housing / nut	U [V]	T _a [°C]	Pro-tection	Gold-con-tacts	LEDs	Draw-ing no.	Order no.	General information
Group 27 · Socket , J-pole											List of articles
	15 m black PUR cable	16 x 0.5 mm ² + 3 x 1.0 mm ²	PUR / brass	160 AC/DC	-25...80	IP 67	–	–	40	E11744	
	5 m black PUR cable	16 x 0.5 mm ² + 3 x 1.0 mm ²	PUR / brass	160 AC/DC	-25...80	IP 67	–	–	41	E11745	Level sensors
	10 m black PUR cable	16 x 0.5 mm ² + 3 x 1.0 mm ²	PUR / brass	160 AC/DC	-25...80	IP 67	–	–	41	E11746	
	15 m black PUR cable	16 x 0.5 mm ² + 3 x 1.0 mm ²	PUR / brass	160 AC/DC	-25...80	IP 67	–	–	41	E11747	Flow sensors
	5 m black PUR cable	16 x 0.5 mm ² + 3 x 1.0 mm ²	PUR / brass	160 AC/DC	-25...80	IP 67	–	–	41	E11748	
Group 28 · Socket 1/2", 2-pole + PE, 3-wire											Pressure sensors
	2 m yellow PVC cable	3 x AWG22 Ø 5.2 mm	TPU / brass	250 AC 300 DC	-25...90	IP 67	–	–	42	E10190	
	5 m yellow PVC cable	3 x 0.34 mm ² Ø 5.2 mm	TPU / brass	250 AC 300 DC	-25...90	IP 67	–	–	42	E10200	Temperature sensors
	2 m yellow PVC cable	3 x AWG22 Ø 5.2 mm	TPU / brass	250 AC 300 DC	-25...90	IP 67	–	–	43	E10189	
	5 m yellow PVC cable	3 x AWG22 Ø 5.2 mm	TPU / brass	250 AC 300 DC	-25...90	IP 67	–	–	43	E10191	Diagnostic systems
	2 m black PUR cable	4 x 0.34 mm ² Ø 4.7 mm	TPU / brass	300 AC	-25...90	IP 67	–	–	44	E11248	
	10 m black PUR cable	4 x 0.34 mm ² Ø 4.7 mm	TPU / brass	300 AC	-25...90	IP 67	–	–	44	E11249	Evaluation systems, power supplies
	5 m black PUR cable	4 x 0.34 mm ² Ø 4.7 mm	TPU / brass	300 AC	-25...90	IP 67	–	–	45	E11250	
	10 m black PUR cable	4 x 0.34 mm ² Ø 4.7 mm	TPU / brass	300 AC	-25...90	IP 67	–	–	45	E11251	Connection technology
	2 m orange PVC cable	3 x 0.75 mm ² Ø 5.2 mm	TPU	250 AC	-40...90	IP 68	–	–	46	E20428	
Group 30 · Socket 7/8", 2-pole + PE, 3-wire											Accessories
	2 m orange PVC cable	3 x 0.75 mm ² Ø 5.2 mm	TPU	250 AC	-40...90	IP 68	–	–	46	E20430	
Group 31 · Socket 7/8", 3-pole, 3-wire											Technical information and customer service
	2 m orange PVC cable	3 x 0.75 mm ² Ø 5.2 mm	TPU	10...30 DC	-40...90	IP 68	–	–	46	E20430	
Group 32 · Socket DIN A (DIN 43650)											Technical information and customer service
	wirable	...1.5 mm ² (Ø 6...8 mm)	PA	... 250 AC ...300 DC	-40...125	IP 65	–	–	47	E10058	
	...	...	...	...	...	...	...	...	...	...	

Complete ifm product range

For industrial applications

Sockets

Cable plugs

Cables

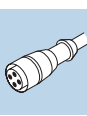
Splitter boxes

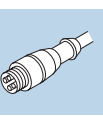
For oils and coolants

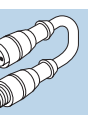
For hygienic areas and viscous media

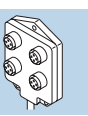
For hazardous areas

















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Type	Cable	Core specification	Material housing / nut	U [V]	T _a [°C]	Pro-tection	Gold-con-tacts	LEDs	Draw-ing no.	Order no.
Group 33 · Socket Rd24, 6-pole + PE										
	wirable	...2.5 mm ² (Ø 10...12 mm)	PBT	250 AC 300 DC	-40...100	IP 67	•	–	48	E70142
	wirable	...2.5 mm ² (Ø 6...8 mm)	PBT / PA	250 AC 300 DC	-40...100	IP 67	•	–	49	E11043
Group 34 · Socket bayonet, for pressure sensors type PP...										
	2 m black PUR cable	4 x 0.5 mm ²	Hytrel G-4774	9.6...30 DC	-40...85	IP 67 / IP 69K	–	–	50	E11273

	For industrial applications	Sockets	Cable plugs	Cables	Splitter boxes	For oils and coolants	For hygienic areas and viscous media	For hazardous areas
Complete ifm product range								
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Type	Cable	Core specification	Material housing / nut	U [V]	T _a [°C]	Pro-tection	Gold-con-tacts	LEDs	Draw-ing no.	Order no.
Group 35 · Plug M12, 2-pole + PE, 3-wire										
	0.6 m PUR cable	3 x 0.5 mm ² Ø 4.8 mm	PUR / stainless steel (316S12)	24 AC/DC	-25...90	IP 67	–	–	51	E10838
Group 36 · Plug M12, 4-pole										
	wirable	...0.75 mm ² (Ø 4...6 mm)	PA / brass	250 AC/DC	-25...100	IP 68	•	–	52	E11504
	wirable	...0.75 mm ² (Ø 4...6 mm)	PA / brass	250 AC/DC	-25...100	IP 68	•	–	53	E11505
Group 37 · Plug M12, 5-pole										
	wirable	...0.75 mm ² (Ø 4...6 mm)	PA / brass	125 AC/DC	-25...100	IP 68	•	–	54	E11506
	wirable	...0.75 mm ² (Ø 4...6 mm)	PA / brass	125 AC/DC	-25...100	IP 68	•	–	55	E11507
Group 38 · Plug M23, 12-pole, numbering clockwise										
	soldering	...1 mm ² Ø 6 mm	brass	4.5...30 DC	-40...125	IP 67	–	–	56	E60123
	soldering	...1 mm ² Ø 4.5 mm	brass	4.5...30 DC	-40...125	IP 67	–	–	56	E60128

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sensors

Temperature
sensors

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systems

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systems
power supplies

Connection
technology

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information
and customer
service

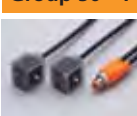
	For industrial applications	Sockets	Cable plugs	Cables	Splitter boxes	For oils and coolants	For hygienic areas and viscous media	For hazardous areas
Complete ifm product range								
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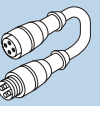
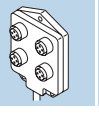


Type	Cable	Core specification	Material housing / nut	U [V]	T _a [°C]	Pro-tection	Gold-contacts	LEDs	Draw-ing no.	Order no.
Group 39 · Jumper M8 plug, 4-pole / M8 socket, 3-pole										
	1 m black PUR cable	3 x 0.25 mm ² Ø 4.1 mm	PUR / brass	60 AC 75 DC	-25...85	IP 68	•	–	57	E11267
	2 m black PUR cable	3 x 0.25 mm ² Ø 4.1 mm	PUR / brass	60 AC 75 DC	-25...85	IP 68	•	–	57	E11268
Group 40 · Jumper M8 plug, 3-pole / M8 socket, 4-pole										
	1 m black PUR cable	3 x 0.25 mm ² Ø 4.1 mm	PUR / brass	60 AC 75 DC	-25...85	IP 68	•	–	58	E11202
	2 m black PUR cable	3 x 0.25 mm ² Ø 4.1 mm	PUR / brass	60 AC 75 DC	-25...85	IP 68	•	–	58	E11203
	1 m black PUR cable	3 x 0.25 mm ² Ø 4.1 mm	PUR / brass	60 AC 75 DC	-25...85	IP 68	•	–	59	E11204
	2 m black PUR cable	3 x 0.25 mm ² Ø 4.1 mm	PUR / brass	60 AC 75 DC	-25...85	IP 68	•	–	59	E11205
Group 41 · Jumper M8 plug, 4-pole / M8 socket, 4-pole										
	1 m black PUR cable	4 x 0.25 mm ² Ø 4.4 mm	PUR / brass	60 AC 75 DC	-25...80	IP 68	•	–	60	E11206
	2 m black PUR cable	4 x 0.25 mm ² Ø 4.4 mm	PUR / brass	60 AC 75 DC	-25...80	IP 68	•	–	60	E11207
	1 m black PUR cable	4 x 0.25 mm ² Ø 4.4 mm	PUR / brass	60 AC 75 DC	-25...80	IP 68	•	–	61	E11208
	2 m black PUR cable	4 x 0.25 mm ² Ø 4.4 mm	PUR / brass	60 AC 75 DC	-25...80	IP 68	•	–	61	E11209
Group 42 · Jumper M12 plug, 4-pole / M8 socket, 4-pole										
	1 m black PUR cable	4 x 0.25 mm ² Ø 4.4 mm	PUR / brass	60 AC 75 DC	-25...85	IP 68	•	–	62	E11210
	2 m black PUR cable	4 x 0.25 mm ² Ø 4.4 mm	PUR / brass	60 AC 75 DC	-25...85	IP 68	•	–	62	E11211
	1 m black PUR cable	4 x 0.25 mm ² Ø 4.4 mm	PUR / brass	60 AC 75 DC	-25...85	IP 68	•	–	63	E11212
	2 m black PUR cable	4 x 0.25 mm ² Ø 4.4 mm	PUR / brass	60 AC 75 DC	-25...85	IP 68	•	–	63	E11213
Group 43 · Jumper M12, 3-pole, 3-wire, LED										
	0.6 m black PUR cable	3 x 0.34 mm ² Ø 4.9 mm	TPU / brass	10...36 DC	-25...90	IP 68 / IP 69K	•	green / yellow	64	EVC051
	1 m black PUR cable	3 x 0.34 mm ² Ø 4.9 mm	TPU / brass	10...36 DC	-25...90	IP 68 / IP 69K	•	green / yellow	64	EVC052
	2 m black PUR cable	3 x 0.34 mm ² Ø 4.9 mm	TPU / brass	10...36 DC	-25...90	IP 68 / IP 69K	•	green / yellow	64	EVC053
	5 m black PUR cable	3 x 0.34 mm ² Ø 4.9 mm	TPU / brass	10...36 DC	-25...90	IP 68 / IP 69K	•	green / yellow	64	EVC054
Group 44 · Jumper M12, 4-pole, 4-wire										
	0.6 m black PUR cable	4 x 0.34 mm ² Ø 4.9 mm	TPU / brass	250 AC 300 DC	-25...90	IP 68 / IP 69K	•	–	65	EVC011
	1 m black PUR cable	4 x 0.34 mm ² Ø 4.9 mm	TPU / brass	250 AC 300 DC	-25...90	IP 68 / IP 69K	•	–	65	EVC012

	For industrial applications	Sockets	Cable plugs	Cables	Splitter boxes	For oils and coolants	For hygienic areas and viscous media	For hazardous areas
Complete ifm product range								
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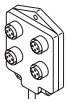


Type	Cable	Core specification	Material housing / nut	U [V]	T _a [°C]	Pro-tection	Gold-con-tacts	LEDs	Draw-ing no.	Order no.	
Group 44 · Jumper M12, 4-pole, 4-wire											General information
	2 m black PUR cable	4 x 0.34 mm ² Ø 4.9 mm	TPU / brass	250 AC 300 DC	-25...90	IP 68 / IP 69K	•	–	65	EVC013	
	5 m black PUR cable	4 x 0.34 mm ² Ø 4.9 mm	TPU / brass	250 AC 300 DC	-25...90	IP 68 / IP 69K	•	–	65	EVC014	
	0.6 m black PUR cable	4 x 0.34 mm ² Ø 4.9 mm	TPU / brass	250 AC 300 DC	-25...90	IP 68 / IP 69K	•	–	66	EVC031	Level sensors
	1 m black PUR cable	4 x 0.34 mm ² Ø 4.9 mm	TPU / brass	250 AC 300 DC	-25...90	IP 68 / IP 69K	•	–	66	EVC032	
	2 m black PUR cable	4 x 0.34 mm ² Ø 4.9 mm	TPU / brass	250 AC 300 DC	-25...90	IP 68 / IP 69K	•	–	66	EVC033	Flow sensors
	5 m black PUR cable	4 x 0.34 mm ² Ø 4.9 mm	TPU / brass	250 AC 300 DC	-25...90	IP 68 / IP 69K	•	–	66	EVC034	
Group 45 · Jumper M12 / DIN A, 3/4-pole, 3-wire, LED											Pressure sensors
	0.3 m black PUR cable	3 x 0.5 mm ² Ø 5 mm	PUR / brass	24 AC/DC	-25...80	IP 67	–	yellow	67	E11416	
	0.6 m black PUR cable	3 x 0.5 mm ² Ø 5 mm	PUR / brass	24 AC/DC	-25...80	IP 67	–	yellow	67	E11417	
Group 46 · Jumper M12 / DIN B, 3-pole, 3-wire, LED											Temperature sensors
	0.3 m black PUR cable	3 x 0.5 mm ² Ø 5 mm	PUR / brass	24 AC/DC	-25...80	IP 67	–	yellow	68	E11421	
	0.6 m black PUR cable	3 x 0.5 mm ² Ø 5 mm	PUR / brass	24 AC/DC	-25...80	IP 67	–	yellow	68	E11422	
Group 47 · Jumper M12 / DIN C, 3/4-pole, 3-wire, LED											Diagnostic systems
	0.3 m black PUR cable	3 x 0.5 mm ² Ø 5 mm	PUR / brass	24 AC/DC	-25...80	IP 65	–	yellow	69	E11426	
	0.6 m black PUR cable	3 x 0.5 mm ² Ø 5 mm	PUR / brass	24 AC/DC	-25...80	IP 65	–	yellow	69	E11427	
Group 48 · Jumper M12 / Indu.Std. B, 3-pole, 3-wire, LED											Evaluation systems, power supplies
	0.3 m black PUR cable	3 x 0.5 mm ² Ø 5 mm	PUR / brass	24 AC/DC	-25...80	IP 67	–	yellow	70	E11431	
	0.6 m black PUR cable	3 x 0.5 mm ² Ø 5 mm	PUR / brass	24 AC/DC	-25...80	IP 67	–	yellow	70	E11432	
Group 49 · Jumper M12 plug, 4-pole / socket bayonet											Connection technology
	2 m black PUR cable	4 x 0.5 mm ² Ø 6 mm	PA / stainless steel (320S31)	9.6...30 DC	-40...85	IP 67	–	–	71	E11274	
Group 50 · Y-jumper M12 plug / 2 x valve plug type A (to DIN 43650)											Accessories
	1 m black PUR cable	3 x 0.5 mm ² Ø 4.8 mm	TPU / brass	10...30 DC	-25...90	IP 67	–	2 x yellow	72	E70203	
											Technical information and customer service

Complete ifm product range	For industrial applications	Sockets	Cable plugs	Cables	Splitter boxes	For oils and coolants	For hygienic areas and viscous media	For hazardous areas
								
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Type	Cable	Core specification	Material housing / nut	U [V]	T _a [°C]	Pro-tection	Gold-contacts	LEDs	Draw-ing no.	Order no.
Group 51 · Splitter box M8, 3-pole										
	5 m black PUR cable	8 x 0.34 mm ² + 2 x 0.75 mm ²	PBT-GF 20	10...30 DC	-25...90	IP 68	•	green / 8 x yel.	73	E11214
	10 m black PUR cable	8 x 0.34 mm ² + 2 x 0.75 mm ²	PBT-GF 20	10...30 DC	-25...90	IP 68	•	green / 8 x yel.	73	E11215
	M12 connector	–	PBT-GF 20	10...30 DC	-25...90	IP 68	•	green / 4 x yel.	74	E11216
Group 52 · Splitter box M8, 4-pole										
	5 m black PUR cable	16 x 0.34 mm ² + 2 x 0.75 mm ²	PBT-GF 20	10...30 DC	-25...90	IP 68	•	green / 16x yel.	75	E11217
	10 m black PUR cable	16 x 0.34 mm ² + 2 x 0.75 mm ²	PBT-GF 20	10...30 DC	-25...90	IP 68	•	green / 16x yel.	75	E11218
	M16 connector	–	PBT-GF 20	10...30 DC	-25...90	IP 68	•	green / 8 x yel.	76	E11219
Group 53 · M12 splitter box for 1 signal										
	5 m black PUR cable	4 x 0.25 mm ² Ø 5 mm	TPU / brass	10...55 DC	-25...90	IP 67	•	–	77	E10437
	5 m black PUR cable	4 x 0.34 mm ² + 3 x 0.75 mm ²	TPU	60 AC 75 DC	-15...80	IP 67	•	–	78	E11717
	10 m black PUR cable	4 x 0.34 mm ² + 3 x 0.75 mm ²	TPU	60 AC 75 DC	-15...80	IP 67	•	–	78	E11718
	5 m black PUR cable	4 x 0.34 mm ² + 3 x 0.75 mm ²	TPU	10...30 DC	-15...80	IP 67	•	green / 4 x yel.	78	E10278
	10 m black PUR cable	4 x 0.34 mm ² + 3 x 0.75 mm ²	TPU	10...30 DC	-15...80	IP 67	•	green / 4 x yel.	78	E10279
	5 m black PUR cable	6 x 0.34 mm ² + 3 x 0.75 mm ²	TPU	60 AC 75 DC	-15...80	IP 67	•	–	79	E11720
	10 m black PUR cable	6 x 0.34 mm ² + 3 x 0.75 mm ²	TPU	60 AC 75 DC	-15...80	IP 67	•	–	79	E11721
	5 m black PUR cable	6 x 0.34 mm ² + 3 x 0.75 mm ²	TPU	10...30 DC	-15...80	IP 67	•	green / 6 x yel.	80	E10280
	10 m black PUR cable	6 x 0.34 mm ² + 3 x 0.75 mm ²	TPU	10...30 DC	-15...80	IP 67	•	green / 6 x yel.	80	E10281
	5 m black PUR cable	8 x 0.34 mm ² + 3 x 0.75 mm ²	TPU	60 AC 75 DC	-15...80	IP 67	•	–	81	E11723
	10 m black PUR cable	8 x 0.34 mm ² + 3 x 0.75 mm ²	TPU	60 AC 75 DC	-15...80	IP 67	•	–	81	E11724
	5 m black PUR cable	8 x 0.34 mm ² + 3 x 0.75 mm ²	TPU	10...30 DC	-15...80	IP 67	•	green / 8 x yel.	82	E10282
	10 m black PUR cable	8 x 0.34 mm ² + 3 x 0.75 mm ²	TPU	10...30 DC	-15...80	IP 67	•	green / 8 x yel.	82	E10283

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Type	Cable	Core specification	Material housing / nut	U [V]	T _a [°C]	Pro-tection	Gold-con-tacts	LEDs	Draw-ing no.	Order no.
Group 53 · M12 splitter box for 1 signal										
	M23 connector	–	TPU	60 AC 75 DC	-15...80	IP 67	•	–	83	E11719
	M23 connector	–	TPU	10...30 DC	-15...80	IP 67	•	green / 4 x yel.	84	E11735
	M23 connector	–	TPU	60 AC 75 DC	-15...80	IP 67	•	–	85	E11722
	M23 connector	–	TPU	10...30 DC	-15...80	IP 67	•	green / 6 x yel.	86	E10445
	M23 connector	–	TPU	60 AC 75 DC	-15...80	IP 67	•	–	87	E11725
	M23 connector	–	TPU	10...30 DC	-15...80	IP 67	•	green / 8 x yel.	88	E10446
Group 54 · M12 splitter box for 2 signals										
	5 m black PUR cable	8 x 0.5 mm ² + 3 x 1.0 mm ²	TPU	60 AC 75 DC	-15...80	IP 67	•	–	89	E11726
	10 m black PUR cable	8 x 0.5 mm ² + 3 x 1.0 mm ²	TPU	60 AC 75 DC	-15...80	IP 67	•	–	89	E11727
	5 m black PUR cable	8 x 0.5 mm ² + 3 x 1.0 mm ²	TPU	10...30 DC	-15...80	IP 67	•	green / 8 x yel.	90	E11017
	10 m black PUR cable	8 x 0.5 mm ² + 3 x 1.0 mm ²	TPU	10...30 DC	-15...80	IP 67	•	green / 8 x yel.	90	E11018
	5 m black PUR cable	12 x 0.5 mm ² + 3 x 1.0 mm ²	TPU	60 AC 75 DC	-15...80	IP 67	•	–	91	E11729
	10 m black PUR cable	12 x 0.5 mm ² + 3 x 1.0 mm ²	TPU	60 AC 75 DC	-15...80	IP 67	•	–	91	E11730
	5 m black PUR cable	12 x 0.5 mm ² + 3 x 1.0 mm ²	TPU	10...30 DC	-15...80	IP 67	•	green / 12 x yel.	92	E11019
	10 m PUR cable	12 x 0.5 mm ² + 3 x 1.0 mm ²	TPU	10...30 DC	-15...80	IP 67	•	green / 12 x yel.	92	E11020
	5 m black PUR cable	16 x 0.5 mm ² + 3 x 1.0 mm ²	TPU	60 AC 75 DC	-15...80	IP 67	•	–	93	E11732
	10 m black PUR cable	16 x 0.5 mm ² + 3 x 1.0 mm ²	TPU	60 AC 75 DC	-15...80	IP 67	•	–	93	E11733
	5 m black PUR cable	16 x 0.5 mm ² + 3 x 1.0 mm ²	TPU	10...30 DC	-15...80	IP 67	•	green / 16 x yel.	94	E11021

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Type	Cable	Core specification	Material housing / nut	U [V]	T _a [°C]	Pro-tection	Gold-con-tacts	LEDs	Draw-ing no.	Order no.
Group 54 · M12 splitter box for 2 signals										
	10 m PUR cable	16 x 0.5 mm ² + 3 x 1.0 mm ²	TPU	10...30 DC	-15...80	IP 67	•	green / 16 x yel.	94	E11022
	M23 connector	–	TPU	60 AC 75 DC	-15...80	IP 67	•	–	95	E11728
	M23 connector	–	TPU	10...30 DC	-15...80	IP 67	•	green / 8 x yel.	96	E10945
	M23 connector	–	TPU	60 AC 75 DC	-15...80	IP 67	•	–	97	E11731
	M23 connector	–	TPU	10...30 DC	-15...80	IP 67	•	green / 12 x yel.	98	E10946
	M23 connector	–	TPU	60 AC 75 DC	-15...80	IP 67	•	–	99	E11734
	M23 connector	–	TPU	10...30 DC	-15...80	IP 67	•	green / 16 x yel.	100	E10659

For industrial
applications

Sockets

Cable plugs

Cables

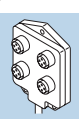
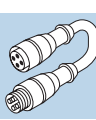
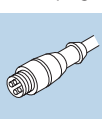
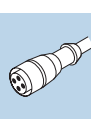
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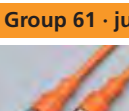
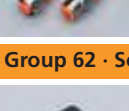
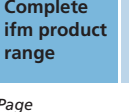
Type	Cable	Core specification	Material housing / nut	U [V]	T _a [°C]	Pro-tection	Gold-con-tacts	LEDs	Draw-ing no.	Order no.
Group 55 · Socket M12, 4-pole, 4-wire										
	2 m black PUR cable	4 x 0.34 mm ² Ø 4.9 mm	TPU / brass	250 AC 300 DC	-25...90	IP 68 / IP 69K	•	–	10	EVC004
	5 m black PUR cable	4 x 0.34 mm ² Ø 4.9 mm	TPU / brass	250 AC 300 DC	-25...90	IP 68 / IP 69K	•	–	10	EVC005
	10 m black PUR cable	4 x 0.34 mm ² Ø 4.9 mm	TPU / brass	250 AC 300 DC	-25...90	IP 68 / IP 69K	•	–	10	EVC006
	2 m black PUR cable	4 x 0.34 mm ² Ø 4.9 mm	TPU / brass	250 AC 300 DC	-25...90	IP 68 / IP 69K	•	–	11	EVC001
	5 m black PUR cable	4 x 0.34 mm ² Ø 4.9 mm	TPU / brass	250 AC 300 DC	-25...90	IP 68 / IP 69K	•	–	11	EVC002
	10 m black PUR cable	4 x 0.34 mm ² Ø 4.9 mm	TPU / brass	250 AC 300 DC	-25...90	IP 68 / IP 69K	•	–	11	EVC003
Group 56 · Socket M12, 4-pole, 4-wire, LED, PNP										
	2 m black PUR cable	4 x 0.34 mm ² Ø 4.9 mm	TPU / brass	10...36 DC	-25...90	IP 68 / IP 69K	•	green / 2 x yel.	15	EVC007
	5 m black PUR cable	4 x 0.34 mm ² Ø 4.9 mm	TPU / brass	10...36 DC	-25...90	IP 68 / IP 69K	•	green / 2 x yel.	15	EVC008
	10 m black PUR cable	4 x 0.34 mm ² Ø 4.9 mm	TPU / brass	10...36 DC	-25...90	IP 68 / IP 69K	•	green / 2 x yel.	15	EVC009

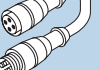
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Type	Cable	Core specification	Material housing / nut	U [V]	T _a [°C]	Pro-tection	Gold-contacts	LEDs	Drawing no.	Order no.
Group 57 · Socket M8, 4-pole, 4-wire										
	5 m orange PVC cable	4 x 0.25 mm ² Ø 5 mm	PVC / stainless steel (316S12)	60 AC 75 DC	-25...90	IP 68	–	–	101	E11220
	10 m orange PVC cable	4 x 0.25 mm ² Ø 5 mm	PVC / stainless steel (316S12)	60 AC 75 DC	-25...90	IP 68	–	–	101	E11221
	25 m orange PVC cable	4 x 0.25 mm ² Ø 5 mm	PVC / stainless steel (316S12)	60 AC 75 DC	-25...90	IP 68	–	–	101	E11222
	5 m orange PVC cable	4 x 0.25 mm ² Ø 5 mm	PVC / stainless steel (316S12)	60 AC 75 DC	-25...90	IP 68	–	–	102	E11223
	10 m orange PVC cable	4 x 0.25 mm ² Ø 5 mm	PVC / stainless steel (316S12)	60 AC 75 DC	-25...90	IP 68	–	–	102	E11224
	25 m orange PVC cable	4 x 0.25 mm ² Ø 5 mm	PVC / stainless steel (316S12)	60 AC 75 DC	-25...90	IP 68	–	–	102	E11225
Group 58 · Socket M12, 4-pole										
	5 m orange PVC cable	4 x 0.34 mm ² Ø 4.9 mm	PVC / stainless steel (316S12)	250 AC 300 DC	-25...100	IP 68 / IP 69K	•	–	103	EVT004
	10 m orange PVC cable	4 x 0.34 mm ² Ø 4.9 mm	PVC / stainless steel (316S12)	250 AC 300 DC	-25...100	IP 68 / IP 69K	•	–	103	EVT005
	25 m orange PVC cable	4 x 0.34 mm ² Ø 4.9 mm	PVC / stainless steel (316S12)	250 AC 300 DC	-25...100	IP 68 / IP 69K	•	–	103	EVT006
	5 m orange PVC cable	4 x 0.34 mm ² Ø 4.9 mm	PVC / stainless steel (316S12)	250 AC 300 DC	-25...100	IP 68 / IP 69K	•	–	104	EVT001
	10 m orange PVC cable	4 x 0.34 mm ² Ø 4.9 mm	PVC / stainless steel (316S12)	250 AC 300 DC	-25...100	IP 68 / IP 69K	•	–	104	EVT002
	25 m orange PVC cable	4 x 0.34 mm ² Ø 4.9 mm	PVC / stainless steel (316S12)	250 AC 300 DC	-25...100	IP 68 / IP 69K	•	–	104	EVT003
	wirable	...0.75 mm ² (Ø 4...8 mm)	PBT / stainless steel	240 AC/DC	-25...90	IP 67 / IP 69K	•	–	105	E11862
	wirable	...0.75 mm ² (Ø 4...8 mm)	PBT / stainless steel	240 AC/DC	-25...90	IP 67 / IP 69K	•	–	106	E11861
	5 m orange PVC cable	4 x 0.34 mm ² Ø 4.9 mm	PVC / stainless steel (316S12)	10...36 DC	-25...100	IP 68 / IP 69K	•	green / 2 x yel.	107	EVT007
	10 m orange PVC cable	4 x 0.34 mm ² Ø 4.9 mm	PVC / stainless steel (316S12)	10...36 DC	-25...100	IP 68 / IP 69K	•	green / 2 x yel.	107	EVT008
	25 m orange PVC cable	4 x 0.34 mm ² Ø 4.9 mm	PVC / stainless steel (316S12)	10...36 DC	-25...100	IP 68 / IP 69K	•	green / 2 x yel.	107	EVT009

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Type	Cable	Core specification	Material housing / nut	U [V]	T _a [°C]	Pro-tection	Gold-con-tacts	LEDs	Draw-ing no.	Order no.
Group 59 · Socket M12, 4-pole, LED, PNP										
	wirable	...0.75 mm ² (Ø 4...8 mm)	PBT / stainless steel	10...30 DC	-25...90	IP 67 / IP 69K	•	green / yellow	105	E11863
	5 m orange PVC cable	5 x 0.25 mm ² Ø 4.9 mm	PVC / stainless steel (316S12)	30 AC 36 DC	-25...100	IP 68 / IP 69K	•	–	108	EVT013
	10 m orange PVC cable	5 x 0.25 mm ² Ø 4.9 mm	PVC / stainless steel (316S12)	30 AC 36 DC	-25...100	IP 68 / IP 69K	•	–	108	EVT014
	25 m orange PVC cable	5 x 0.25 mm ² Ø 4.9 mm	PVC / stainless steel (316S12)	30 AC 36 DC	-25...100	IP 68 / IP 69K	•	–	108	EVT015
	5 m orange PVC cable	5 x 0.25 mm ² Ø 4.9 mm	PVC / stainless steel (316S12)	30 AC 36 DC	-25...100	IP 68 / IP 69K	•	–	109	EVT010
	10 m orange PVC cable	5 x 0.25 mm ² Ø 4.9 mm	PVC / stainless steel (316S12)	30 AC 36 DC	-25...100	IP 68 / IP 69K	•	–	109	EVT011
	25 m orange PVC cable	5 x 0.25 mm ² Ø 4.9 mm	PVC / stainless steel (316S12)	30 AC 36 DC	-25...100	IP 68 / IP 69K	•	–	109	EVT012
Group 60 · Plug M12, 4-pole										
	wirable	...0.75 mm ² (Ø 4...8 mm)	PBT / stainless steel	240 AC/DC	-25...90	IP 67 / IP 69K	•	–	110	E11858
	wirable	...0.75 mm ² (Ø 4...8 mm)	PBT / stainless steel	240 AC/DC	-25...90	IP 67 / IP 69K	•	–	111	E11857
	1 m orange PVC cable	4 x 0.34 mm ² Ø 4.9 mm	PVC / stainless steel (316S12)	250 AC 300 DC	-25...100	IP 68 / IP 69K	•	–	112	EVT042
	2 m orange PVC cable	4 x 0.34 mm ² Ø 4.9 mm	PVC / stainless steel (316S12)	250 AC 300 DC	-25...100	IP 68 / IP 69K	•	–	112	EVT043
	5 m orange PVC cable	4 x 0.34 mm ² Ø 4.9 mm	PVC / stainless steel (316S12)	250 AC 300 DC	-25...100	IP 68 / IP 69K	•	–	112	EVT044
	10 m orange PVC cable	4 x 0.34 mm ² Ø 4.9 mm	PVC / stainless steel (316S12)	250 AC 300 DC	-25...100	IP 68 / IP 69K	•	–	112	EVT045
Group 61 · jumper M12 plug, 4-pole / M12 socket, 4-pole, 4-wire										
	10 m orange PVC cable	4 x 0.34 mm ² Ø 5.3 mm	PVC / stainless steel (316S12)	250 AC 300 DC	-25...100	IP 67 / IP 69K	•	–	113	E70189
Group 62 · Socket M12, 5-pole										
	wirable	...0.75 mm ² (Ø 4...8 mm)	PBT / stainless steel	60 AC/DC	-25...90	IP 67 / IP 69K	•	–	114	E11865

Complete ifm product range	For industrial applications	Sockets	Cable plugs	Cables	Splitter boxes	For oils and coolants	For hygienic areas and viscous media	For hazardous areas
								
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Type	Cable	Core specification	Material housing / nut	U [V]	T _a [°C]	Pro-tection	Gold-con-tacts	LEDs	Draw-ing no.	Order no.
Group 62 · Socket M12, 5-pole										
	wirable	...0.75 mm ² (Ø 4...8 mm)	PBT / stainless steel	60 AC/DC	-25...90	IP 67 / IP 69K	•	–	115	E11864
Group 63 · Plug M12, 5-pole										
	wirable	...0.75 mm ² (Ø 4...8 mm)	PBT / stainless steel	60 AC/DC	-25...90	IP 67 / IP 69K	•	–	116	E11860
	wirable	...0.75 mm ² (Ø 4...8 mm)	PBT / stainless steel	60 AC/DC	-25...90	IP 67 / IP 69K	•	–	117	E11859
	0.6 m orange PVC cable	5 x 0.25 mm ² Ø 5.3 mm	PVC / st. steel (316S12)	30 AC 36 DC	-25...100	IP 68 / IP 69K	•	–	118	E11641
	1 m orange PVC cable	5 x 0.25 mm ² Ø 5.3 mm	PVC / st. steel (316S12)	30 AC 36 DC	-25...100	IP 68 / IP 69K	•	–	118	E11642
	2 m orange PVC cable	5 x 0.25 mm ² Ø 5.3 mm	PVC / st. steel (316S12)	30 AC 36 DC	-25...100	IP 68 / IP 69K	•	–	118	E11643
	5 m orange PVC cable	5 x 0.25 mm ² Ø 5.3 mm	PVC / st. steel (316S12)	30 AC 36 DC	-25...100	IP 68 / IP 69K	•	–	118	E11644
Group 64 · Splitter box M12										
	10 m black PUR / PVC cable	3 x 0.75 mm ² + 16 x 0.34 mm ²	high-grade stainless steel	10...36 DC	-5...70	IP 69K	–	green / 16 x yel.	119	E11775

	For industrial applications	Sockets	Cable plugs	Cables	Splitter boxes	For oils and coolants	For hygienic areas and viscous media	For hazardous areas
Complete ifm product range								
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Type	Cable	Core specification	Material housing / nut	U [V]	T _a [°C]	Pro-tection	Gold-con-tacts	LEDs	Draw-ing no.	Order no.
Group 65 · Socket M12, 4-pole, 4-wire										
	2 m blue PUR / PVC cable	4 x 0.34 mm ² Ø 5 mm	TPU / brass	...15 DC	-25...90	IP 67	–	–	120	E10355
	5 m blue PUR / PVC cable	4 x 0.34 mm ² Ø 5 mm	TPU / brass	...15 DC	-25...90	IP 67	–	–	120	E10356
	2 m blue PUR / PVC cable	4 x 0.34 mm ² Ø 5 mm	TPU / brass	...15 DC	-25...90	IP 67	–	–	121	E10357
	5 m blue PUR / PVC cable	4 x 0.34 mm ² Ø 5 mm	TPU / brass	...15 DC	-25...90	IP 67	–	–	121	E10358
Group 66 · Socket M12, 5-pole, 5-wire										
	2 m blue PUR / PVC cable	5 x 0.34 mm ² Ø 5 mm	TPU / brass	...15 DC	-25...90	IP 67	–	–	8	E11693
	5 m blue PUR / PVC cable	5 x 0.34 mm ² Ø 5 mm	TPU / brass	...15 DC	-25...90	IP 67	–	–	8	E11694
Group 67 · Socket M12, 5-pole, 5-wire										
	2 m blue PUR / PVC cable	5 x 0.34 mm ² Ø 6 mm	TPU / brass	10...30 DC	-25...90	IP 67	–	–	8	E40075
	5 m blue PUR / PVC cable	5 x 0.34 mm ² Ø 6 mm	TPU / brass	10...30 DC	-25...90	IP 67	–	–	8	E40076
Group 68 · Plug M12, 5-pole, 2-wire										
	0.6 m blue PVC cable	2 x 0.5 mm ² Ø 5.5 mm	TPU / stainless steel (316S12)	...15 DC	-25...90	IP 67	–	–	122	E10853
Group 69 · Jumper M12 plug / valve plug type A (to DIN 43650)										
	0.3 m blue PVC cable	2 x 0.5 mm ² Ø 5 mm	TPU / stainless steel (316S12)	...15 DC	-25...90	IP 67	–	–	123	E10821
	0.6 m blue PVC cable	2 x 0.5 mm ² Ø 5 mm	TPU / stainless steel (316S12)	...15 DC	-25...90	IP 67	–	–	123	E10822
Group 70 · Jumper M12 plug / valve plug type B (to DIN 43650)										
	0.3 m blue PVC cable	2 x 0.5 mm ² Ø 5 mm	TPU / stainless steel (316S12)	...15 DC	-25...90	IP 67	–	–	124	E10823
Group 71 · Jumper M12 plug / valve plug type C (to DIN 43650)										
	0.3 m blue PVC cable	2 x 0.5 mm ² Ø 5 mm	TPU / stainless steel (316S12)	...15 DC	-25...90	IP 67	–	–	125	E10846
	0.6 m blue PUR / PVC cable	2 x 0.5 mm ² Ø 5 mm	TPU / stainless steel (316S12)	...15 DC	-25...90	IP 67	–	–	125	E10847
Group 72 · Jumper M12 plug / valve plug type B (industrial standard)										
	0.3 m blue PVC cable	2 x 0.5 mm ² Ø 5 mm	TPU / stainless steel (316S12)	...15 DC	-25...90	IP 67	–	–	126	E10825
	0.6 m blue PVC cable	2 x 0.5 mm ² Ø 5 mm	TPU / stainless steel (316S12)	...15 DC	-25...90	IP 67	–	–	126	E10826

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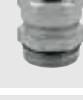
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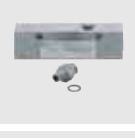
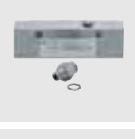
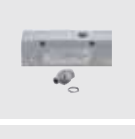
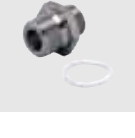
Connection
technology

Accessories

Technical
information
and customer
service

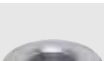
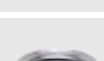
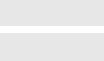
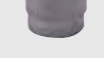
Type	Description	Order no.
Level sensors		
	Mounting clamp, Ø 16 mm	E43000
	Mounting set Ø 16 mm for capacitive level sensors LK, LI, LT, LL	E43016
	Flange plate 73-90 D16 for capacitive level sensors LK, LI, LT, LL	E43001
	Flange plate 100-125 D16 for capacitive level sensors LK, LI, LT, LL	E43005
	Flange plate 65-80 D16 for capacitive level sensors LK, LI, LT, LL	E43006
	Flange plate 54-52X52 D16 for capacitive level sensors LK, LI, LT, LL	E43007
	Flange plate 73-90 / G 3/4 for level sensors LR	E43201
	Flange plate 73-90 / 3/4" NPT for level sensors LR	E43206
	Flange plate 65-80 / G 3/4 for level sensors LR	E43202
	Welding adapter Ø 50 D16 for capacitive level sensors LK, LI, LT, LL	E43002

Type	Description	Order no.
Level sensors		
	Mounting adapter G 3/4 D16 for capacitive level sensors LK, LI, LT, LL	E43003
	Mounting adapter G 1 D16 for capacitive level sensors LK, LI, LT, LL	E43004
	Mounting adapter, G 3/4 D22	E43008
	Mounting adapter, G 1 D22	E43009
	Mounting adapter 3/4" NPT D16 for capacitive level sensors LK, LI, LT, LL	E43012
	Mounting adapter 1" NPT D16 for capacitive level sensors LK, LI, LT, LL	E43013
	Mounting adapter, 3/4" NPT D22	E43014
	Mounting adapter, 1" NPT D22	E43015
	Mounting adapter G 3/4 D16 for capacitive level sensors LI	E43019
	Climatic tube, 264 mm	E43100

Type	Description	Order no.	Type	Description	Order no.	General information
Level sensors			Flow sensors			List of articles
	Climatic tube, 472 mm	E43101		Progressive ring T-piece DIN 2353, QL 28-18-28	E40080	Level sensors
	Climatic tube, 728 mm	E43102		Progressive ring T-piece DIN 2353, QL 18-18-18	E40081	Flow sensors
	Climatic tube, 132 mm	E43103		Progressive ring T-piece DIN 2353, QL 22-18-22	E40082	Pressure sensors
	Probe for level sensors LR	E43203		Progressive ring T-piece DIN 2353, QL 28-18-28	E40083	Temperature sensors
	Probe for level sensors LR	E43204		Progressive ring T-piece DIN 2353, QL 18-18/G 1/2	E40102	Diagnostic systems
	Probe for level sensors LR	E43205		Adapter block D10 / G 1/4 for flow sensors type SID, SF5	E40161	Evaluation systems, power supplies
	Protective cover for LK / LL / LR / LT sensors	E43910		Adapter block D15 / G 1/2 for flow sensors type SID, SF5	E40162	Connection technology
Flow sensors				Adapter block D22 / G 3/4 for flow sensors type SID, SF5	E40163	Accessories
	Mounting clamp Ø 23 mm for air flow monitor SLG	E40048		Adapter block D27 / G 1 for flow sensors type SID, SF5	E40164	Technical information and customer service
	Progressive ring T-piece DIN 2353, QL 18-18-18	E40078		Adapter, M18 x 1.5 - G 1/2	E40114	
	Progressive ring T-piece DIN 2353, QL 22-18-22	E40079				

Type	Description	Order no.
Flow sensors		
	Adapter, M18 x 1.5 - G 1/4	E40115
	Adapter, M18 x 1.5 - M12 x 1	E40128
	Adapter M18 x 1.5 - L18 for mounting in T-pieces	E40104
	Adapter, M18 x 1.5 - M12 x 1	E40101
	Adapter, M18 x 1.5 - M12 x 1	E40100
	Adapter, M18 x 1.5 - G 1/4	E40099
	Adapter, M18 x 1.5 - G 1/4	E40098
	Adapter, M18 x 1.5 - G 1/2	E40096
	Adapter, M18 x 1.5 - G 1/2	E40097
	Adapter G 3/4 I - R1/2 for flow monitor type SU7	E40151

Type	Description	Order no.
Flow sensors		
	Adapter G 1 - R1/2 for flow monitor type SU8	E40152
	Adapter G 1 - R3/4 for flow monitor type SU8	E40153
	Aseptoflex adapter, DIN 11864-1A DN50	E33103
	Welding adapter, Ø 50 mm	E30052
	Aseptoflex adapter, Quick Connect DN40	E33100
	Aseptoflex adapter, DIN11851 - 1.25" / DN32	E33011
	Aseptoflex adapter, SMS 2" GWD	E33072
	Aseptoflex adapter, IDF 2"	E33082
	Aseptoflex adapter, RJT 2"	E33092
	Aseptoflex adapter, APV	E33025

Type	Description	Order no.	Type	Description	Order no.	General information
Flow sensors			Flow sensors			List of articles
	Aseptoflex adapter, SMS 2" / DN 50	E33032		Aseptoflex adapter, Varivent D50	E33021	Level sensors
	Aseptoflex adapter, SMS 2.5" / DN 65	E33033		Aseptoflex adapter, Varivent D68	E33022	Flow sensors
	Aseptoflex adapter with clamping flange, Brewery D48	E33043		Aseptoflex adapter with clamping flange, DRD D65	E33042	Pressure sensors
	Aseptoflex adapter, SMS 1.5" GWD	E33071		Aseptoflex adapter, Suedmo DN25	E33051	Temperature sensors
	Aseptoflex adapter, DIN11851 - 1.5" / DN40	E33012		Aseptoflex adapter Suedmo DN25 with O-ring	E33061	Diagnostic systems
	Aseptoflex adapter, DIN11851 - 2" / DN50	E33013		Welding adapter, M18 x 1.5 - Ø 23 mm	E40138	Evaluation systems, power supplies
	Aseptoflex adapter, DIN11851 - 2.5" / DN65	E33014		Welding adapter, M18 x 1.5 - Ø 24 mm	E40124	Connection technology
	Aseptoflex adapter, DIN11851 - 3" / DN80	E33015		Flow adapter (for low flow rates), M12 x 1 - G 1/8	E40129	Accessories
	Aseptoflex adapter, Clamp 1.5"	E33001		Flow adapter (for low flow rates), M12 x 1 - G 1/8	E40130	Technical information and customer service
	Aseptoflex adapter, SMS 1.5" / DN 40	E33031		Flow adapter (for low flow rates), G * - G 1/8	E40057	

Type	Description	Order no.
Pressure sensors		
	Mounting clamp, Ø 34 mm	E10017
	Mounting clamp, Ø 34 mm	E10193
	Mounting device 2 way	E30078
	Mounting device 3 way	E30079
	Flange adapter, G 1/4	E30004
	Flange adapter, G 1/4	E30003
	Adapter, G 1/4 - G 1/2	E30000
	Adapter, G 1/4 - G 1/4	E30007
	Adapter, G 1/4 - M20 x 1.5	E30010
	Adapter, G 1/4 - G 1/2	E30050

Type	Description	Order no.
Pressure sensors		
	Adapter, 1/4" NPT - G 1/4	E30058
	Adapter, 1/4" NPT - G 1/2	E30059
	Adapter G 1/4 - DN16 G1/4 small flange DIN 28403 DN16	E30065
	Adapter, G 1 - Varivent D68	E33622
	Adapter, G 3/4 - Varivent D68	E33922
	Adapter, G 3/4 - DIN11851/1.5" / DN 40	E33912
	Adapter, G 3/4 - DIN11851/1" / DN 25	E33910
	Adapter, G 3/4 - Clamp 2"	E33902
	Adapter, G 3/4 - Clamp 1.5"	E33901
	Adapter, G 1 - DIN11851/1.5" / DN 40	E33612

Type	Description	Order no.	Type	Description	Order no.	
Pressure sensors			Pressure sensors			General information
	Adapter, G 1 - Clamp ISO2852/1-1.5	E33601		Aseptoflex adapter, Clamp 1.5"	E33001	List of articles
	Aseptoflex adapter, APV	E33025		Aseptoflex adapter, SMS 1.5" / DN 40	E33031	Level sensors
	Aseptoflex adapter, SMS 2" / DN 50	E33032		Aseptoflex adapter, Varivent D50	E33021	Flow sensors
	Aseptoflex adapter, SMS 2.5" / DN 65	E33033		Aseptoflex adapter, Varivent D68	E33022	Pressure sensors
	Aseptoflex adapter with clamping flange, Brewery D48	E33043		Aseptoflex adapter with clamping flange, DRD D65	E33042	Temperature sensors
	Aseptoflex adapter, SMS 1.5" GWD	E33071		Aseptoflex adapter, Suedmo DN25	E33051	Diagnostic systems
	Aseptoflex adapter, DIN11851 - 1.5" / DN40	E33012		Aseptoflex adapter Suedmo DN25 with O-ring	E33061	Evaluation systems, power supplies
	Aseptoflex adapter, DIN11851 - 2" / DN50	E33013		Welding adapter, G 3/4 - Ø 50 mm	E30009	Connection technology
	Aseptoflex adapter, DIN11851 - 2.5" / DN65	E33014		Welding adapter, G 1 - Ø 50 mm	E30013	Accessories
	Aseptoflex adapter, DIN11851 - 3" / DN80	E33015		Welding adapter, G 1 - Ø 50 mm	E30072	
						Technical information and customer service

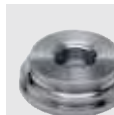
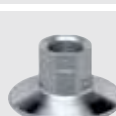
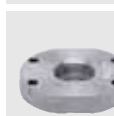
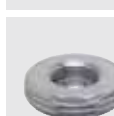
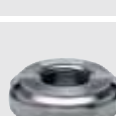
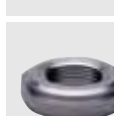
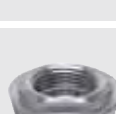
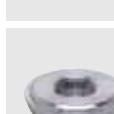
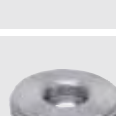
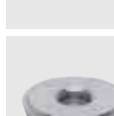
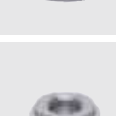
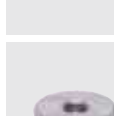
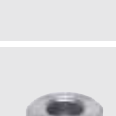
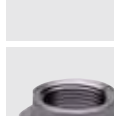
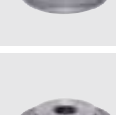
Type	Description	Order no.	Type	Description	Order no.
Pressure sensors			Temperature sensors		
	Adapter plug for welding adapter with Aseptoflex thread For order No. E30052	E30064		Mounting device 3 way	E30079
	Adapter plug, G 1	E30070		Thread cover for types TA	E30090
	Adapter plug, G 3/4	E30071		Thread cover for types TR	E30091
	Protective cover For order No. PP2000, PB5020, PB5021, PB5022, PB5023, PB5024, PB5026, PB5027	E30006		Mounting set for direct connection of temperature sensors TT to control monitors TR	E30017
	Teach button for EPS sensors	E30051		Mounting set, G 1/2	E30089
	Protective cover, O-ring: EPDM	E30104		Clamp fitting Ø 6/8/10 mm - G 1/2 for temperature sensors TS / TT	E30018
	Protective cover, O-ring: Viton	E30101		Clamp fitting Ø 6/8/10 mm - 1/2" NPT for temperature sensors TS / TT	E30025
Temperature sensors				Clamp adapter Ø 10 mm for temperature sensors Ø 10 mm	E34110
	Mounting clamp, Ø 34 mm	E10017		Clamp adapter, Ø 10 mm - G 1/2	E34410
	Mounting clamp, Ø 34 mm	E10193		Mounting adapter, M18 x 1.5 - Ø 23 mm	E40148
	Mounting device 2 way	E30078			

Type	Description	Order no.	Type	Description	Order no.	General information
Temperature sensors			Temperature sensors			List of articles
	Adapter, G 1/4 - G 1/4	E30107		Progressive ring fitting for temperature sensors, Ø 10 mm - 1/2" NPT	E30024	Level sensors
	Adapter, M18 x 1.5 - G 1/2	E30073		Progressive ring fitting for temperature sensors, Ø 8 mm - G 1/2	E30046	Flow sensors
	Welding adapter, M18 x 1.5 - Ø 24 mm	E40124		Progressive ring fitting for temperature sensors, Ø 6 mm - G 1/2	E30047	Pressure sensors
	Welding adapter G 1/2 - Ø 35 mm ball	E30055		Progressive ring fitting for temperature sensors, Ø 6 mm - 1/4" NPT	E30049	Temperature sensors
	Welding adapter G 1/2 - Ø 45 mm collar	E30056		Progressive ring fitting for temperature sensors, Ø 8 mm - G 1/4	E30061	Diagnostic systems
	Welding adapter Ø 24.7 mm ball for temperature sensors Ø 6 mm	E30108		Hygienic thermowell Ø 10 mm for temperature sensors Ø 10 mm	E34005	Evaluation systems, power supplies
	Welding adapter Ø 24.8 mm collar for temperature sensors Ø 6 mm	E30109		Thermowell for temperature sensors for types TA	E30393	Connection technology
	Welding adapter, Ø 50 mm	E30052		Thermowell for temperature sensors Ø 10 mm for temperature sensors Ø 10 mm	E34010	Accessories
	Welding thermowell, Ø 10 mm	E35220		Thermowell for temperature sensors, Ø 10 mm - G 1/2	E35010	Technical information and customer service
	Progressive ring fitting for temperature sensors, Ø 10 mm - G 1/2	E30016		Thermowell for temperature sensors, Ø 10 mm - G 1/2	E35020	

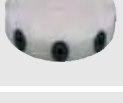
Type	Description	Order no.
Temperature sensors		
	Thermowell for temperature sensors, Ø 10 mm - G 1/2	E35030
	Thermowell for temperature sensors, Ø 10 mm - G 1/2	E35050
	Thermowell for temperature sensors, Ø 10 mm - 1/2" NPT	E35110
	Thermowell for temperature sensors, Ø 10 mm - 1/2" NPT	E35120
	Thermowell for temperature sensors, Ø 8 mm - G 1/2	E36010
	Thermowell for temperature sensors, Ø 8 mm - G 1/2	E36020
	Thermowell for temperature sensors, Ø 8 mm - G 1/2	E36030
	Thermowell for temperature sensors, Ø 6 mm - G 1/2	E37010
	Thermowell for temperature sensors, Ø 6 mm - G 1/2	E37020
	Thermowell for temperature sensors, Ø 6 mm - G 1/2	E37030

Type	Description	Order no.
Temperature sensors		
	Adapter, M18 x 1.5 - G 1/2	E40114
	Adapter, M18 x 1.5 - M12 x 1	E40128
	Adapter M18 x 1.5 - L18 for mounting in T-pieces	E40104
	Adapter, M18 x 1.5 - M12 x 1	E40101
	Adapter, M18 x 1.5 - M12 x 1	E40100
	Adapter, M18 x 1.5 - G 1/4	E40099
	Adapter, M18 x 1.5 - G 1/4	E40098
	Adapter, M18 x 1.5 - G 1/2	E40096
	Adapter, M18 x 1.5 - G 1/2	E40097
	Adapter, M18 x 1.5 - 1/2" NPT	E40107

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Type	Description	Order no.	Type	Description	Order no.	General information
Temperature sensors			Temperature sensors			List of articles
	Adapter, M18 x 1.5 - G 1/2	E30073		Aseptoflex adapter, SMS 2" / DN 50	E33032	Level sensors
	Adapter, G 1/2 - Clamp 1" / 1.5"	E33401		Aseptoflex adapter, SMS 2.5" / DN 65	E33033	Flow sensors
	Adapter, G 1/2 - Clamp 2"	E33402		Aseptoflex adapter with clamping flange, Brewery D48	E33043	Pressure sensors
	Adapter, G 1/2 - SMS DN25	E33430		Aseptoflex adapter, SMS 1.5" GWD	E33071	Temperature sensors
	Aseptoflex adapter, DIN 11864-1A DN50	E33103		Aseptoflex adapter, DIN11851 - 1.5" / DN40	E33012	Diagnostic systems
	Aseptoflex adapter, DIN11851 - 1.25" / DN32	E33011		Aseptoflex adapter, DIN11851 - 2" / DN50	E33013	Evaluation systems, power supplies
	Aseptoflex adapter, SMS 2" GWD	E33072		Aseptoflex adapter, DIN11851 - 2.5" / DN65	E33014	Connection technology
	Aseptoflex adapter, IDF 2"	E33082		Aseptoflex adapter, DIN11851 - 3" / DN80	E33015	Accessories
	Aseptoflex adapter, RJT 2"	E33092		Aseptoflex adapter, Clamp 1.5"	E33001	Technical information and customer service
	Aseptoflex adapter, APV	E33025		Aseptoflex adapter, SMS 1.5" / DN 40	E33031	

Type	Description	Order no.
Temperature sensors		
	Aseptoflex adapter, Varivent D50	E33021
	Aseptoflex adapter, Varivent D68	E33022
	Aseptoflex adapter with clamping flange, DRD D65	E33042
	Aseptoflex adapter, Suedmo DN25	E33051
	Aseptoflex adapter Suedmo DN25 with O-ring	E33061
Diagnostic systems		
	Expert software for efector octavis	VES001
	Parameter setting software for VSExxx	VES003
	Parameter setting cable for efector octavis ifm electronic straight / straight	E11572
	USB/RS485 adapter cable ifm electronic straight / straight	E30098
	Power supply	E30080

Type	Description	Order no.
Diagnostic systems		
	Pulse generator	E30082
	Y connection cable ifm electronic 2 way	E11664
	Ø 8.4 / 15 mm for efector octavis	E30115
Evaluation systems and power supplies		
	Angle bracket for types M18	E10736
	Angle bracket for types M30	E10737
	Mounting clamp for types M18	E10076
	Mounting clamp for types M30	E10077
	Target wheel	E89010
	Target for pulse pickups	E89013

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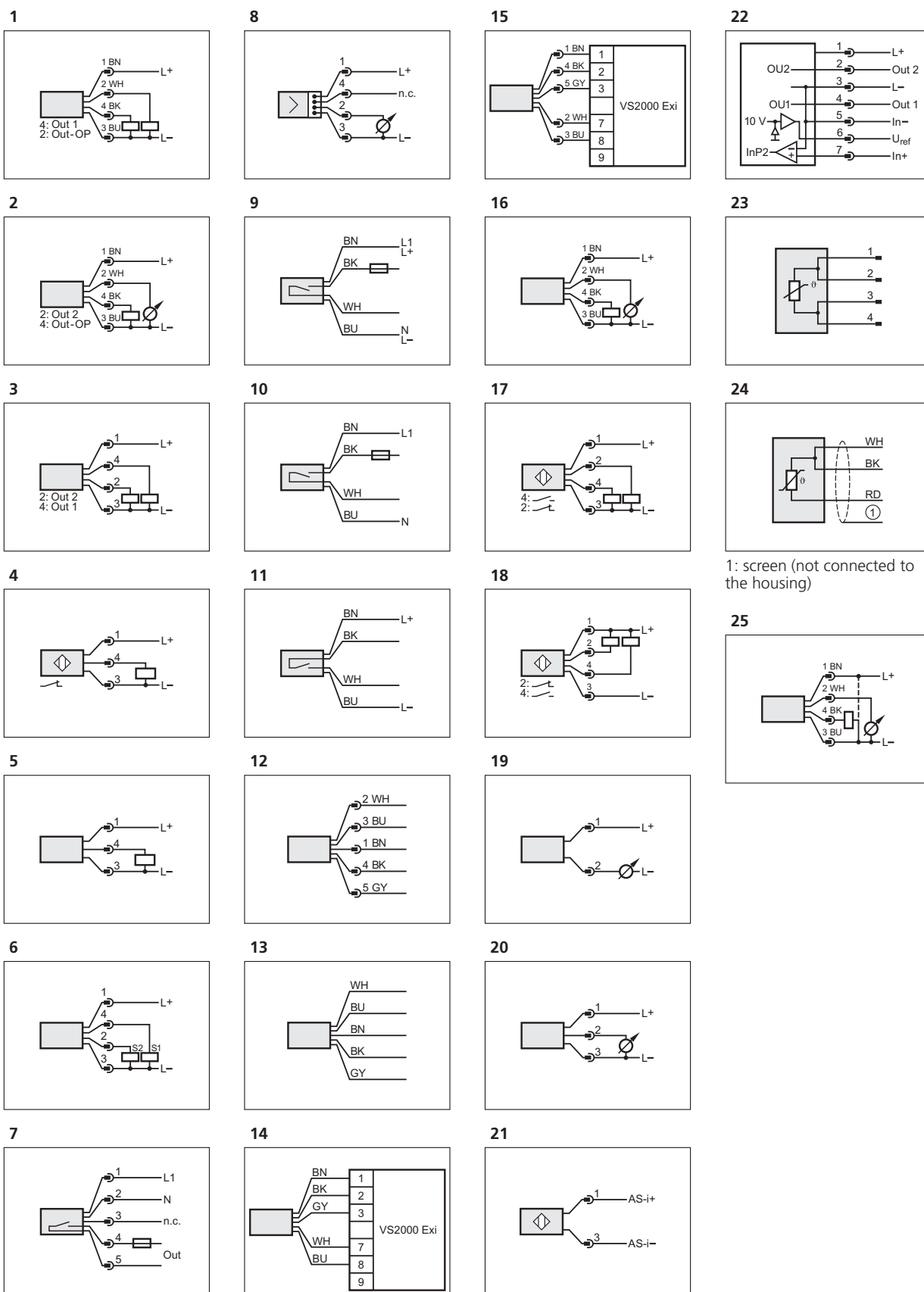
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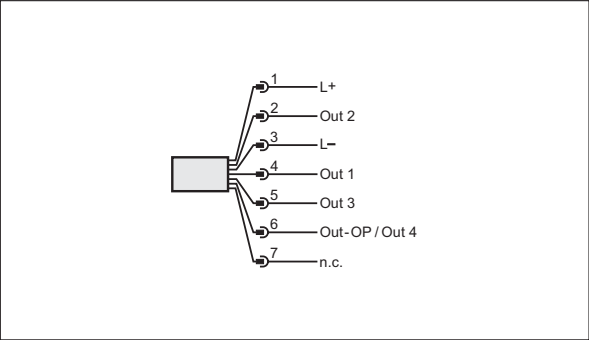
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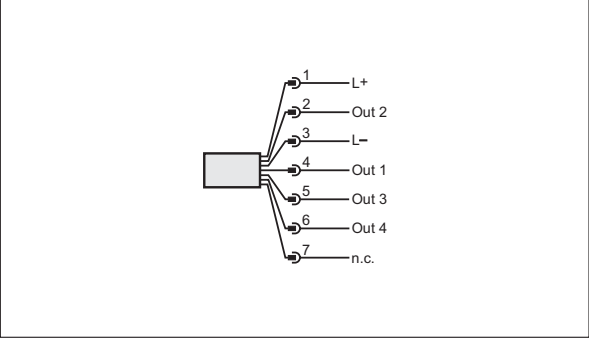


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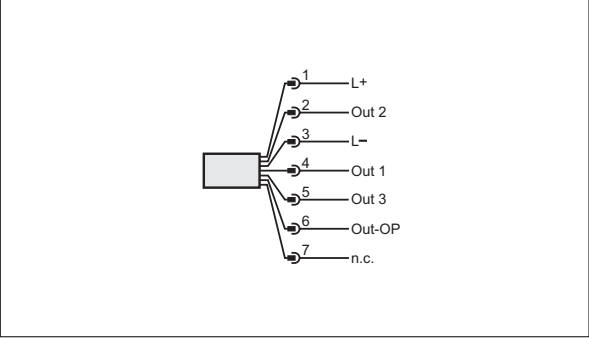
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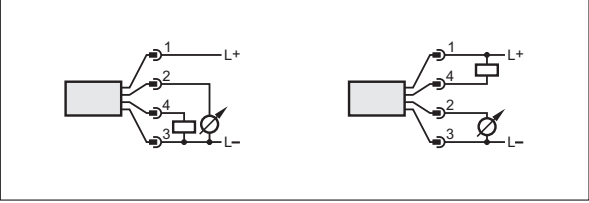
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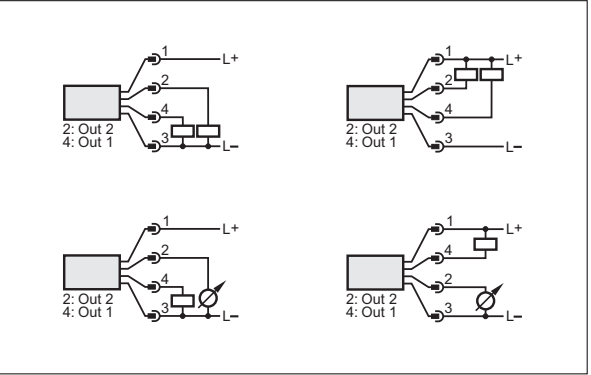
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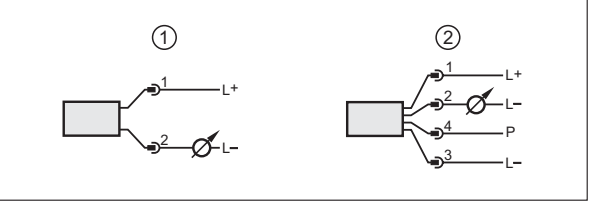
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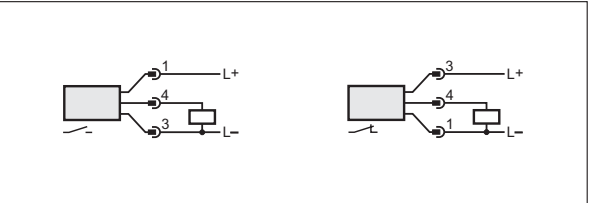


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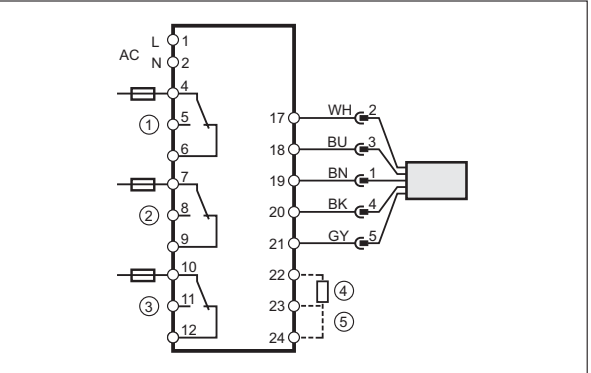


1: Normal operation
2: Programming operation
(P = communication via EPS / FDT interface)

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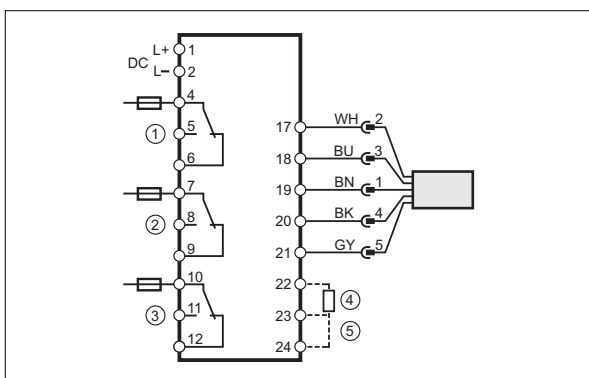


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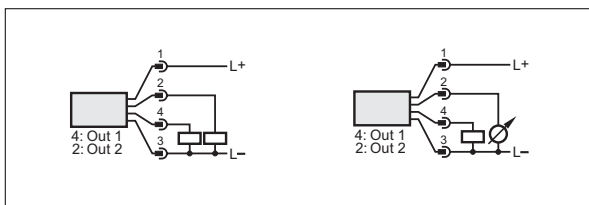
1: Flow monitoring
2: Wire break monitoring
3: Temperature monitoring
4: Power-on delay time
5: Selection liquid / gas

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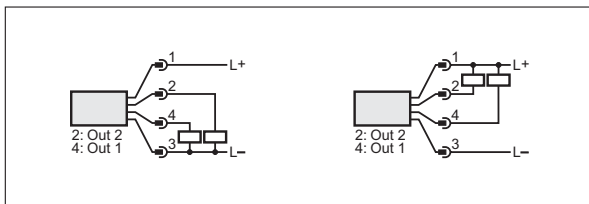


- 1: Flow monitoring
- 2: Wire break monitoring
- 3: Temperature monitoring
- 4: Power-on delay time
- 5: Selection liquid / gas

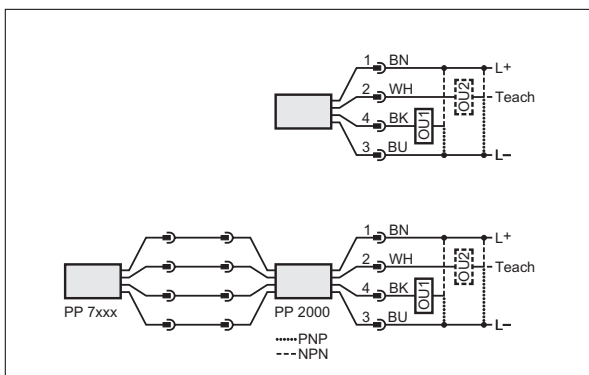
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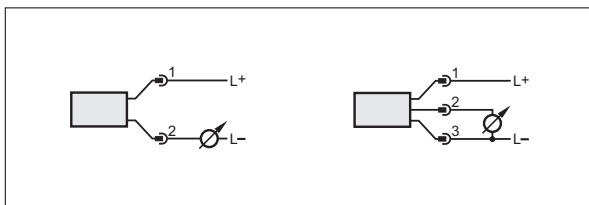
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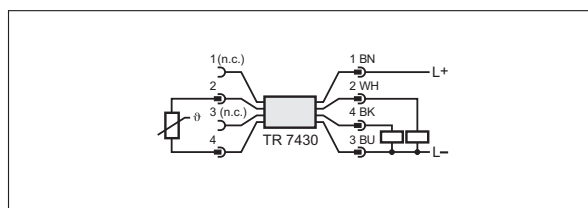
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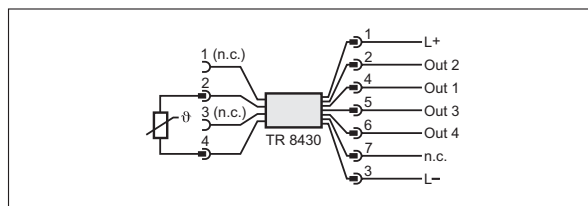
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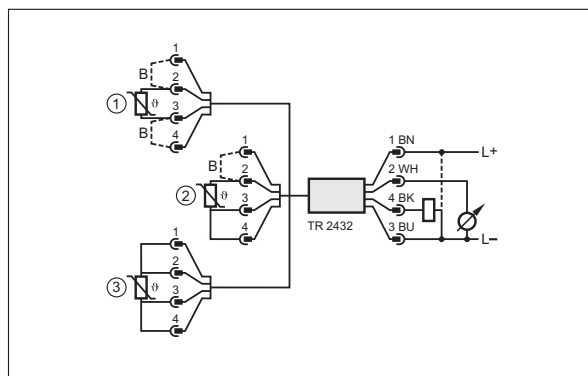
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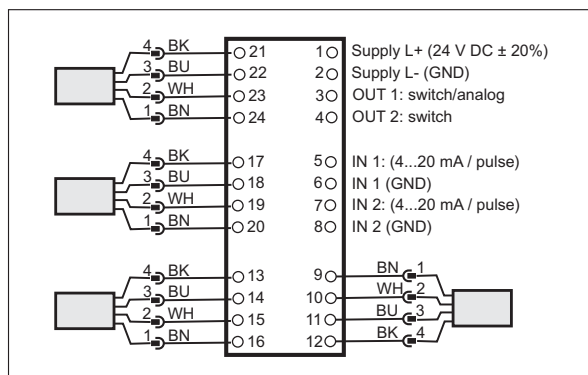


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- 1: Two-wire sensor
- 2: Three-wire sensor
- 3: Four-wire sensor
- B: link

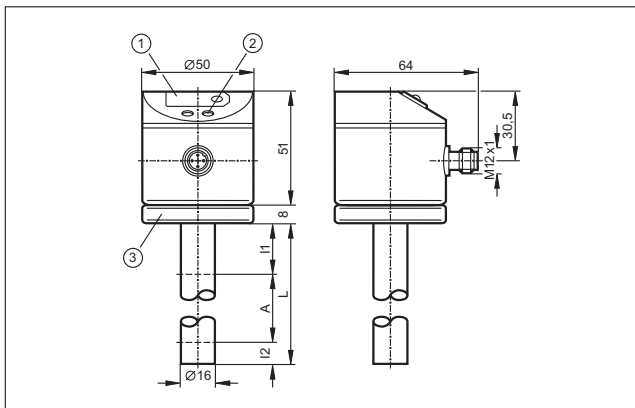
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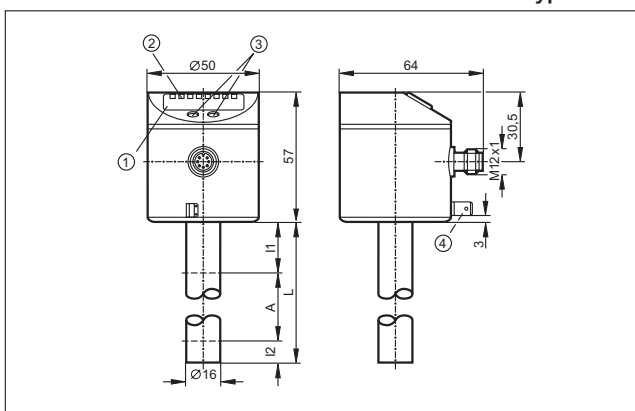
Continuous

1 type LK



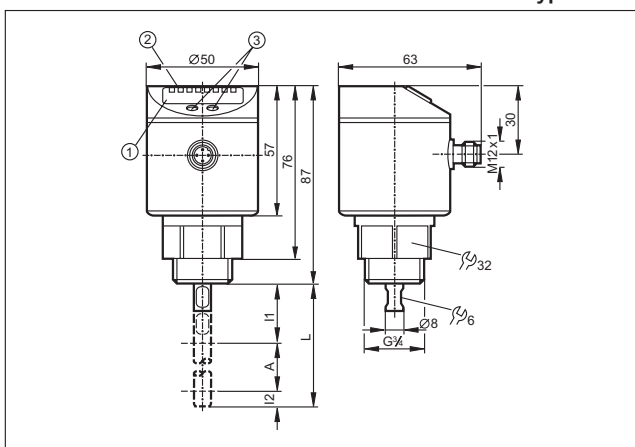
1: 7-segment LED display, 2: Programming buttons, 3: Housing connection with cable lug for cable 1.5 - 2.5 mm , Page 23

2 type LK



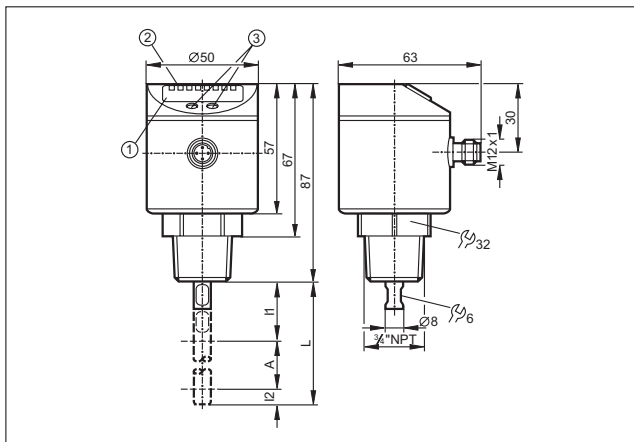
1: 4-digit alphanumeric display, 2: LEDs, 3: Programming buttons, 4: Housing connection (flat-pin connector 6.3 mm following DIN 46244), Page 23

3 type LR



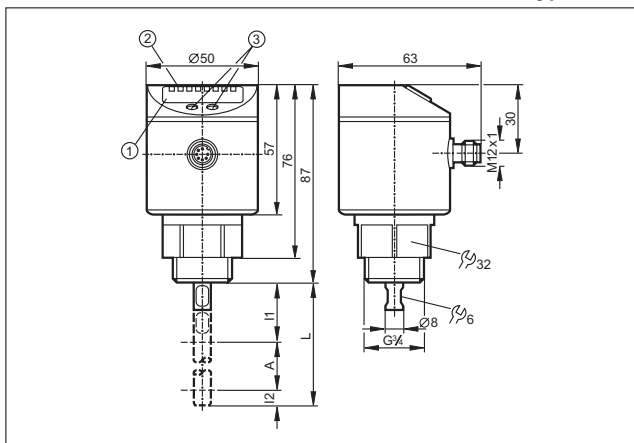
1: 4-digit alphanumeric display, 2: LEDs (display unit / switching status), 3: Programming buttons, Page 25

4 type LR



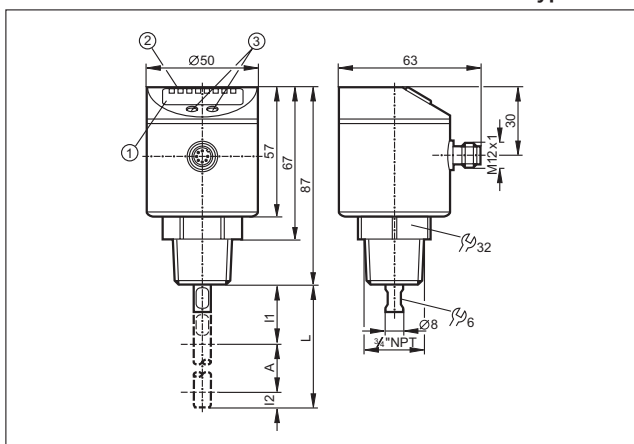
1: 4-digit alphanumeric display, 2: LEDs (display unit / switching status), 3: Programming buttons, Page 25

5 type LR



1: 4-digit alphanumeric display, 2: LEDs (display unit / switching status), 3: Programming buttons, Page 25

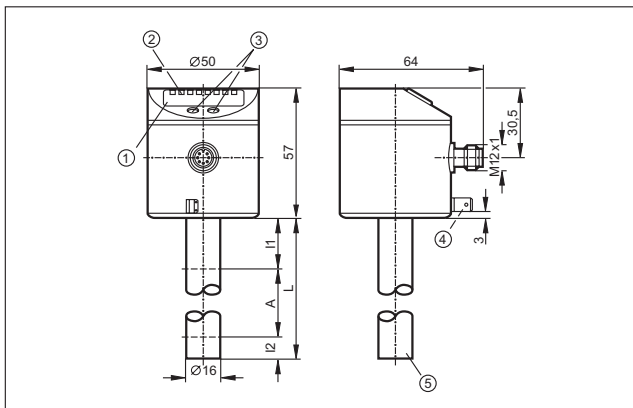
6 type LR



1: 4-digit alphanumeric display, 2: LEDs (display unit / switching status), 3: Programming buttons, Page 25

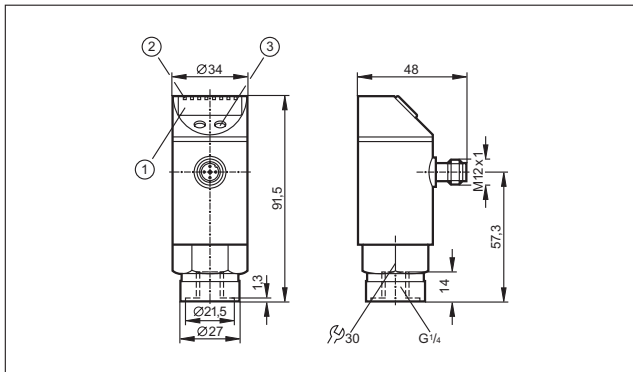
Continuous

7 type LL, LT



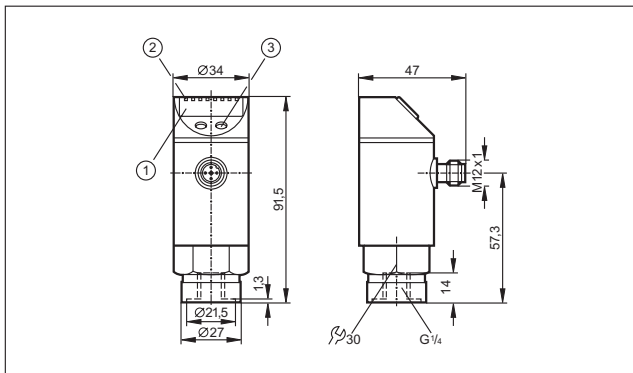
1: 4-digit alphanumeric display, 2: LEDs, 3: Programming buttons, 4: Housing connection (flat-pin connector 6.3 mm following DIN 46244), 5: Position of the temperature measuring element, Page 27, 29

8 type PE, PN, PY



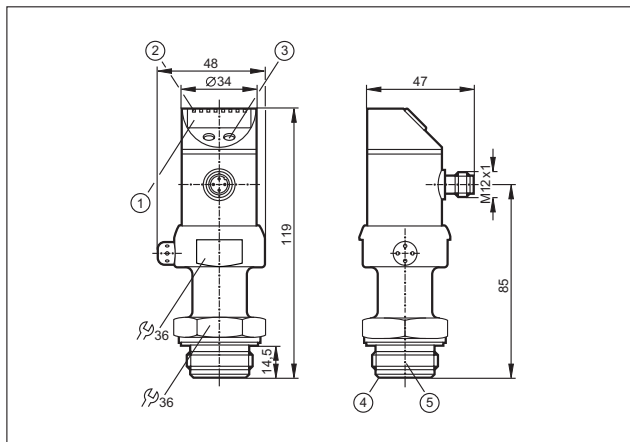
1: 4-digit alphanumeric display, 2: LEDs (display unit / switching status), 3: Programming button, Page 31

9 type PN



1: 4-digit alphanumeric display, 2: LEDs (display unit / switching status), 3: Programming button, Page 31

10 type PI



1: 4-digit alphanumeric display, 2: LEDs (display unit / switching status), 3: Programming button, 4: Aseptoflex sealing edge, 5: Aseptoflex thread, Page 33

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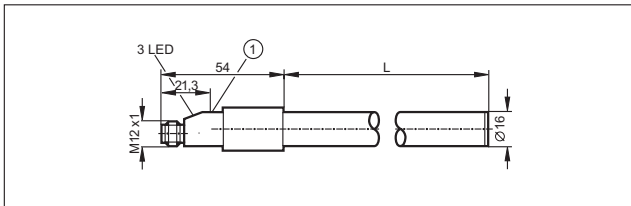
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Point level

1

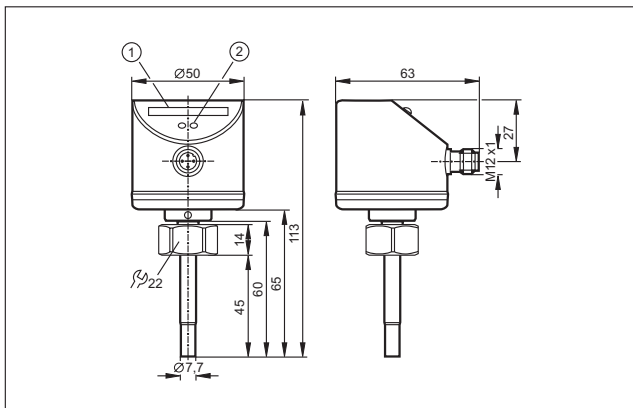
type LI



1: Programming button, Page 35

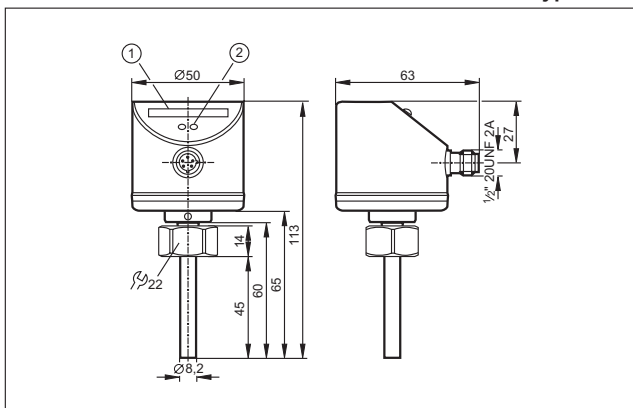
Flow sensors and transmitters

1 type SI



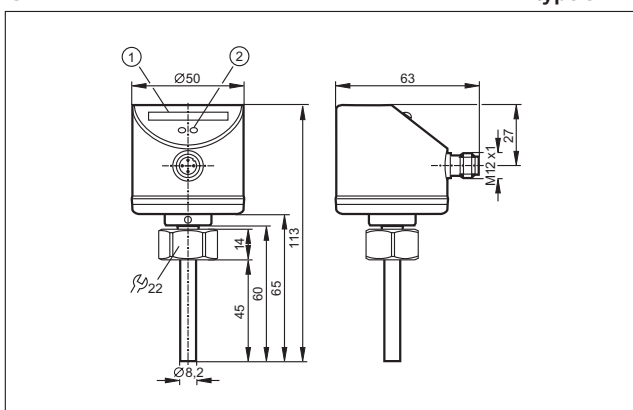
1: LED display, 2: setting pushbutton, Page 53, 57

2 type SI



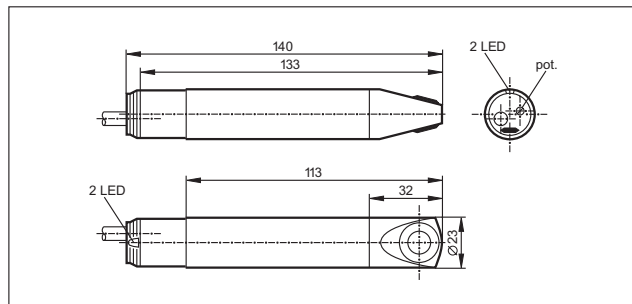
1: internal thread M18 x 1.5, 2: setting pushbuttons, Page 53

3 type SI



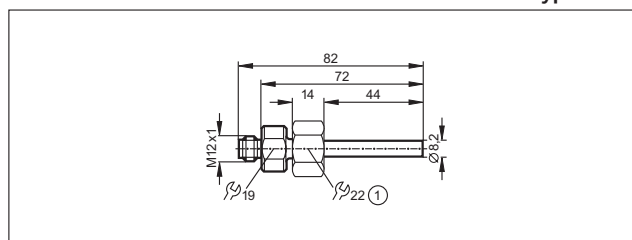
1: LED display, 2: setting pushbutton, Page 55

4 type SL



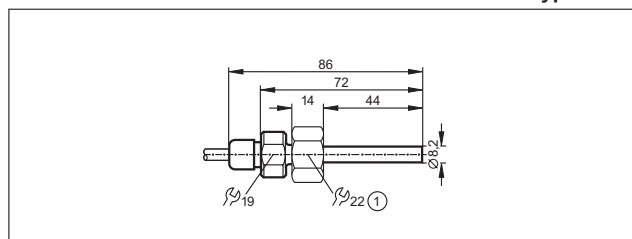
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5 type SF



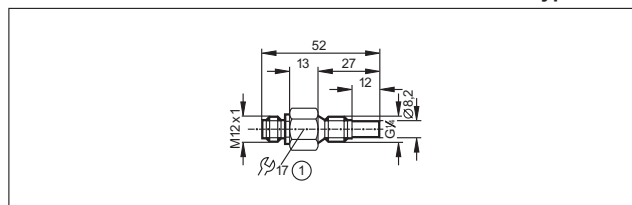
1: internal thread M18 x 1.5, Page 61

6 type SF



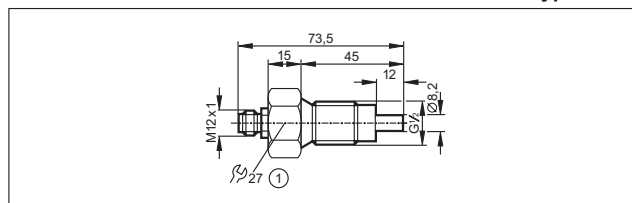
1: internal thread M18 x 1.5, Page 61

7 type SF



1: tightening torque max. 8 Nm, Page 63

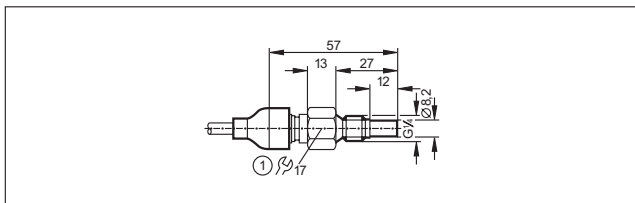
8 type SF



1: tightening torque max. 30 Nm, Page 63

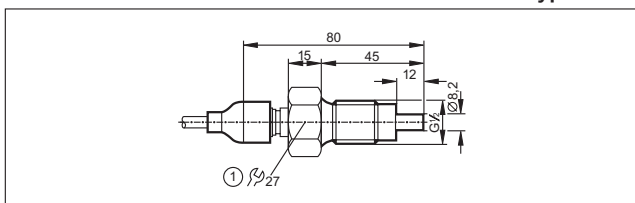
Flow sensors and transmitters

9 type SF



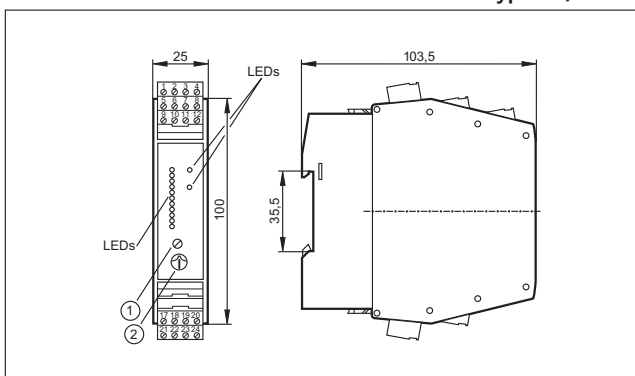
1: tightening torque max. 8 Nm, Page 63, 69

10 type SF



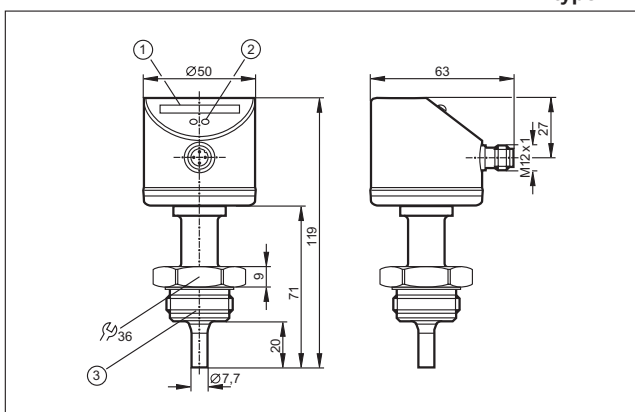
1: tightening torque max. 30 Nm, Page 63, 69

11 type SN, SR



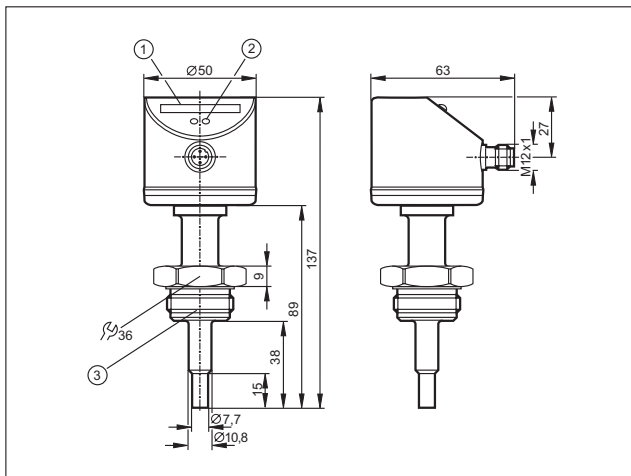
1: Potentiometer (switch point flow), 2: Potentiometer (switch point temperature), Page 65

12 type



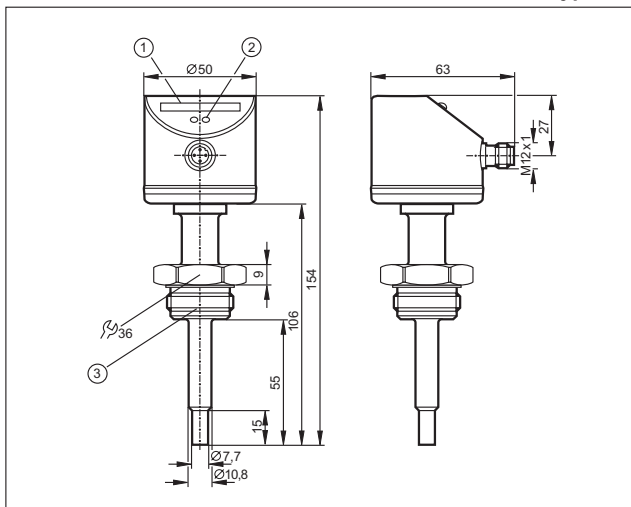
1: LED display, 2: setting pushbutton, 3: Aseptoflex thread, Page 67

13 type



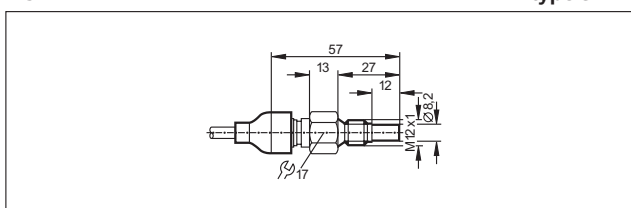
1: LED display, 2: setting pushbutton, 3: Aseptoflex thread, Page 67

14 type



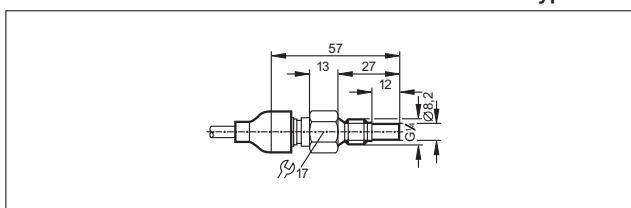
1: LED display, 2: setting pushbutton, 3: Aseptoflex thread, Page 67

15 type SF



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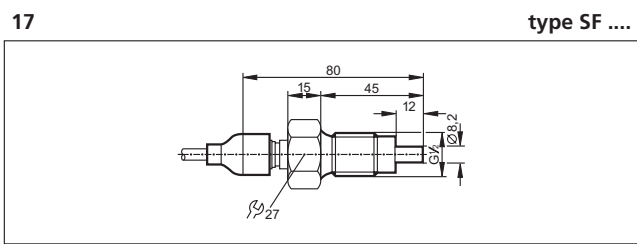
16 type SF



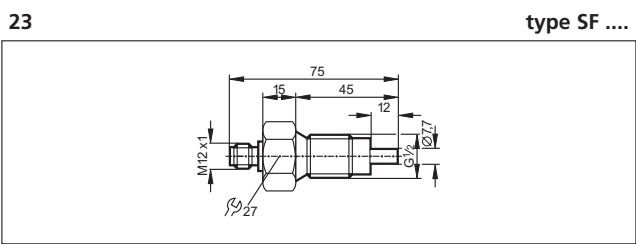
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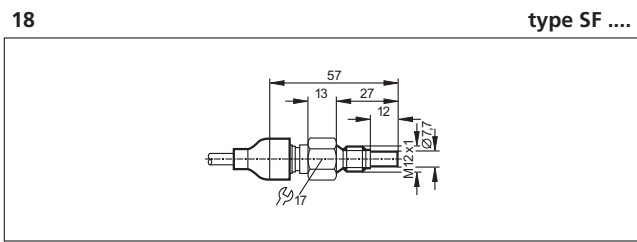
Flow sensors and transmitters



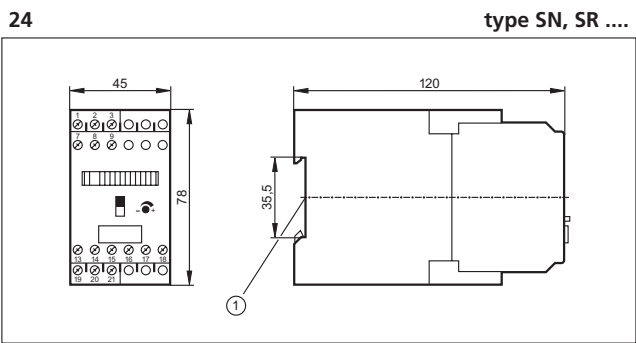
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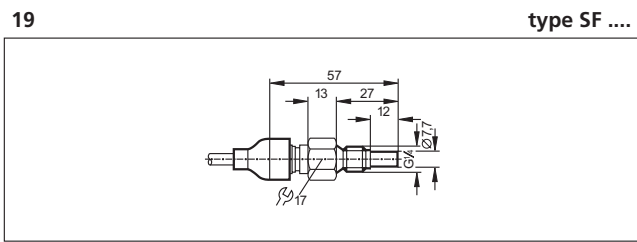
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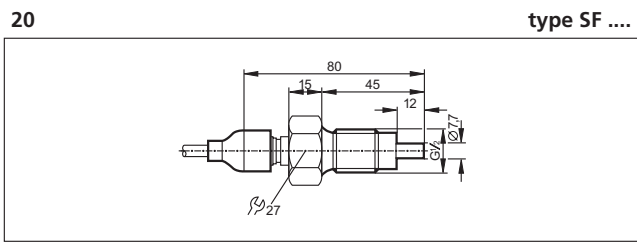
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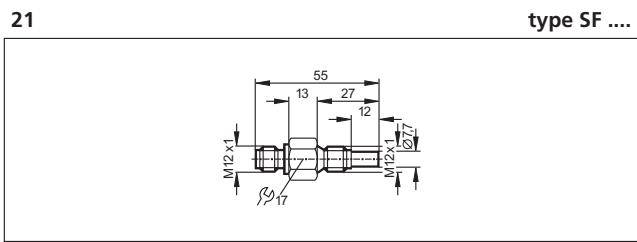
1: mounting on DIN rail, Page 71



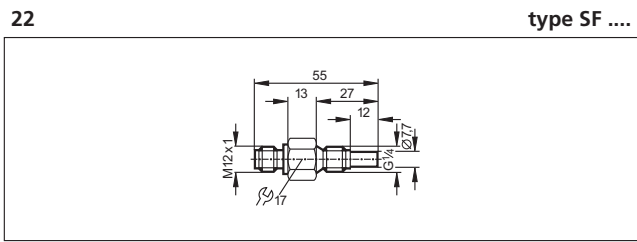
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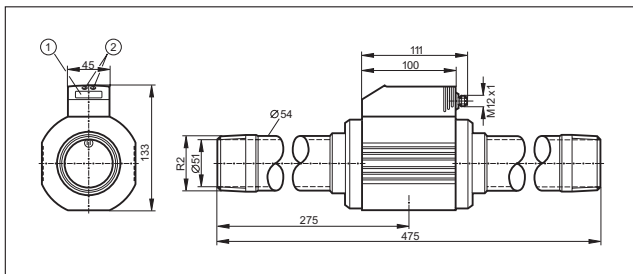


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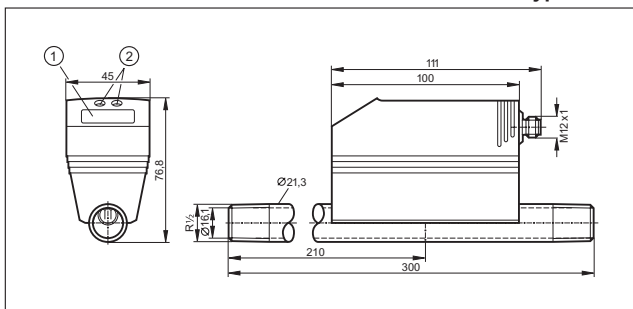
Flow meters

1 type SD



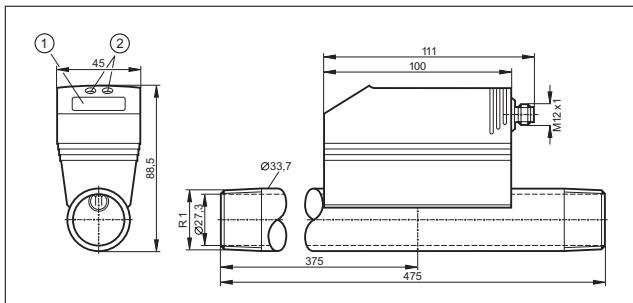
1: 4-digit alphanumeric display, 2: Programming buttons, Page 73

2 type SD



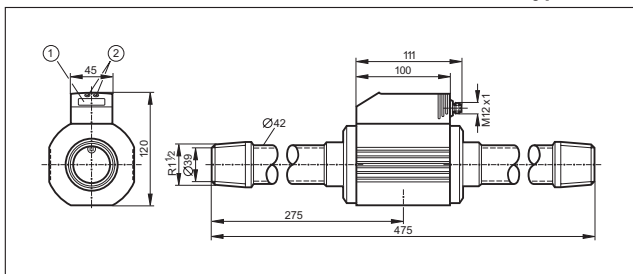
1: 4-digit alphanumeric display, 2: Programming buttons, Page 73, 75

3 type SD



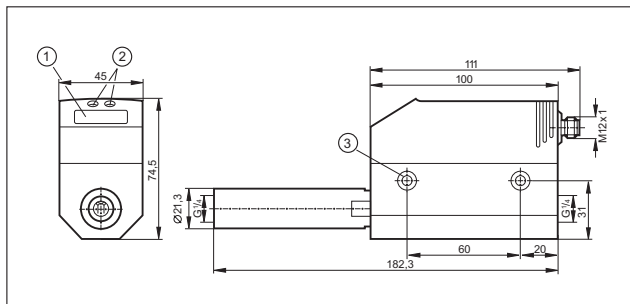
1: 4-digit alphanumeric display, 2: Programming buttons, Page 73

4 type SD



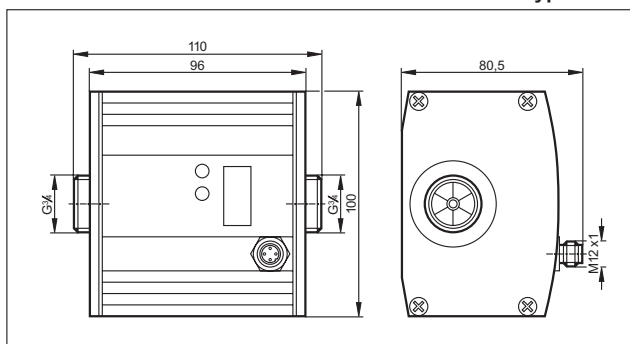
1: 4-digit alphanumeric display, 2: Programming buttons, Page 73

5 type SD



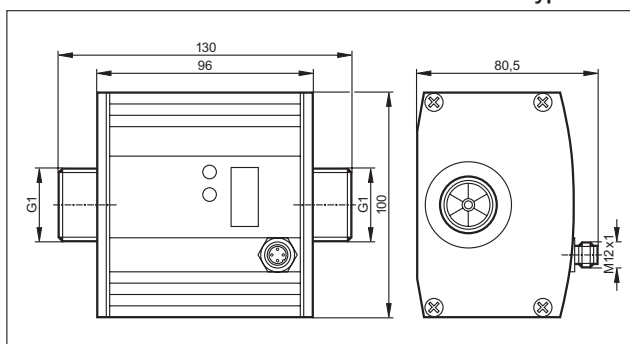
1: 4-digit alphanumeric display, 2: Programming buttons,
3: hole for M5 fixing screw, Page 75

6 type SU



installation length with pipe adapter E40151 / E40154: 185 mm,
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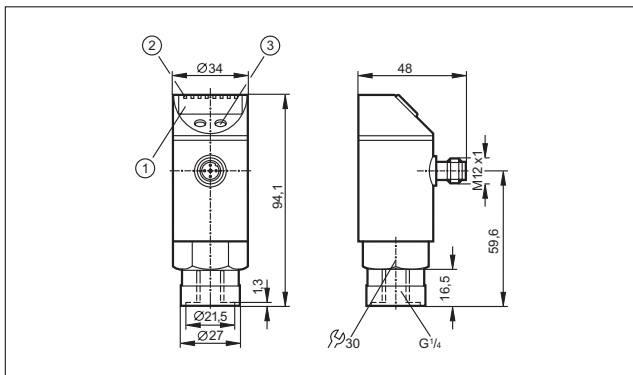
7 type SU



installation length with pipe adapter E40152 / E40155: 205 mm,
installation length with pipe adapter E40153 / E40156: 215 mm,
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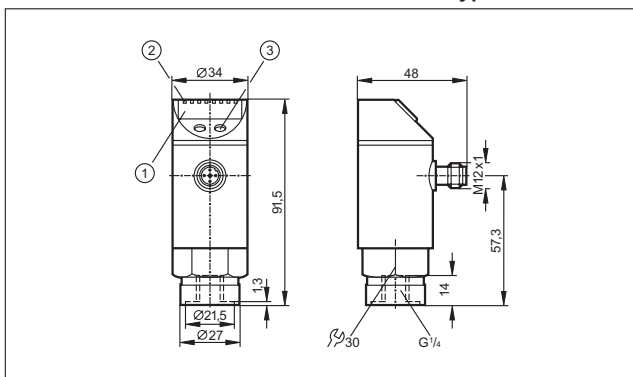
Pressure sensors and transmitters

1 type PE, PN



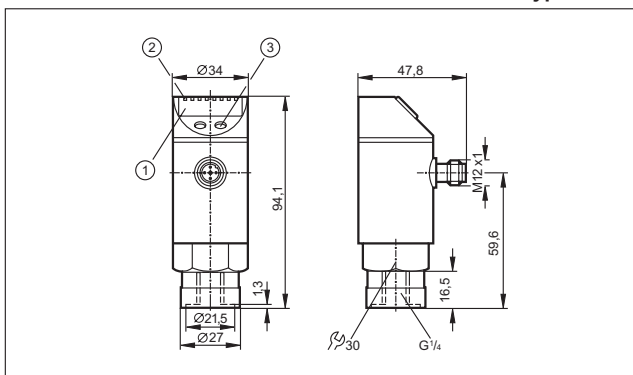
1: 4-digit alphanumeric display, 2: LEDs (display unit / switching status), 3: Programming button, Page 91, 93, 97

2 type PE, PN, PY



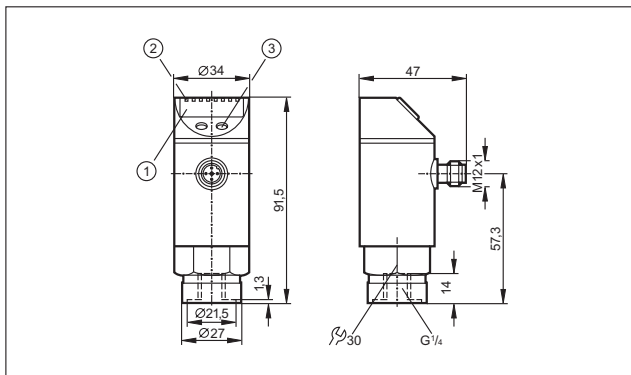
1: 4-digit alphanumeric display, 2: LEDs (display unit / switching status), 3: Programming button, Page 91, 93, 95, 97, 109

3 type PN



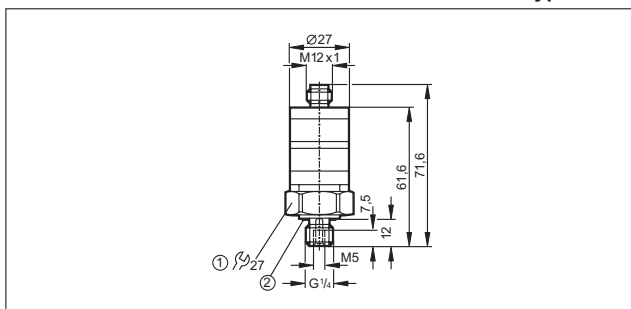
1: 4-digit alphanumeric display, 2: LEDs (display unit / switching status), 3: Programming button, Page 95

4 type PN



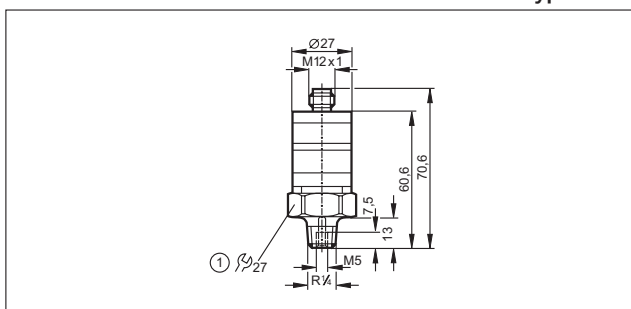
1: 4-digit alphanumeric display, 2: LEDs (display unit / switching status), 3: Programming button, Page 95, 127

5 type PK



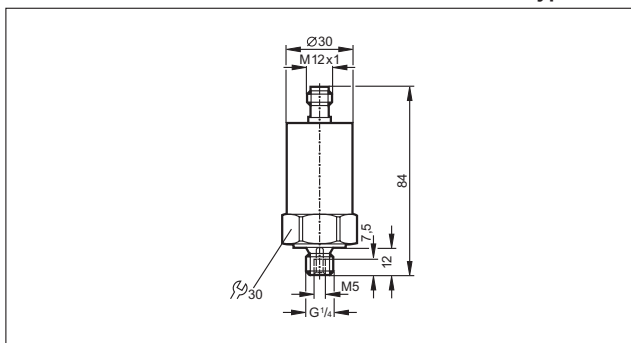
1: tightening torque 25 Nm, 2: sealing FPM / DIN 3869-14, Page 99

6 type PK



1: tightening torque 25 Nm, Page 99

7 type PP



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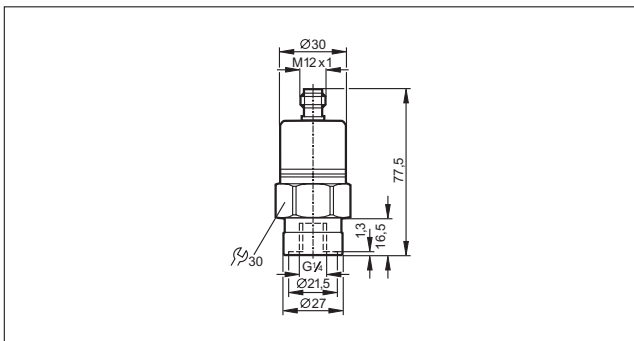
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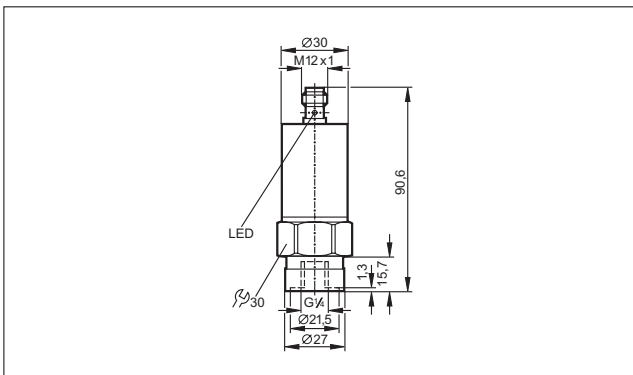
Pressure sensors and transmitters

8 type PA



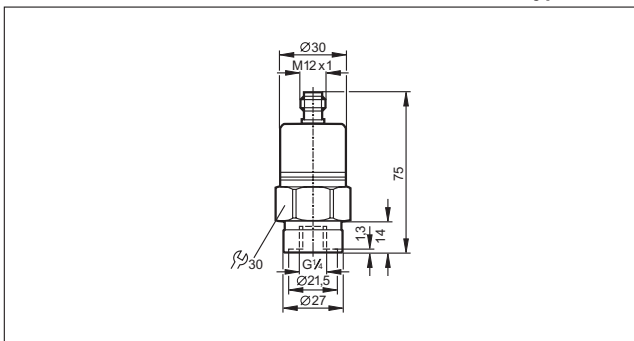
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12 type PP



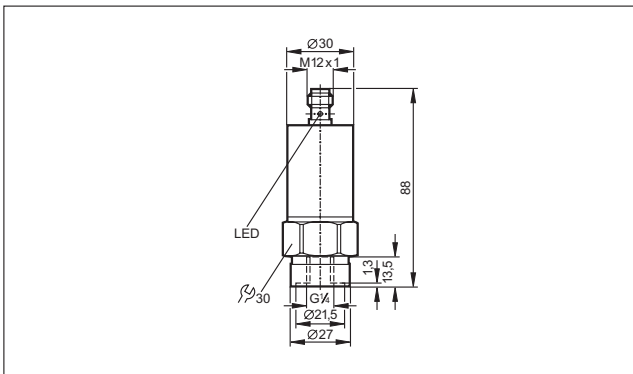
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9 type PA



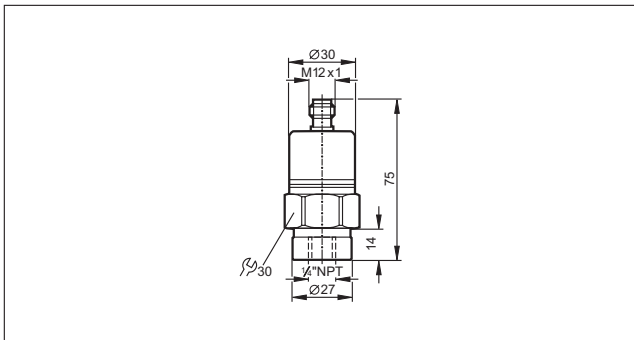
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13 type PP



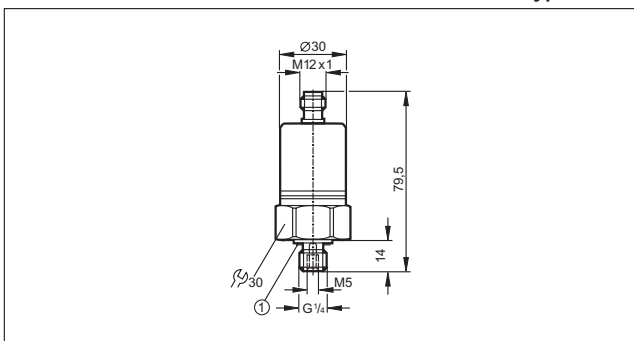
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10 type PA



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11 type PA

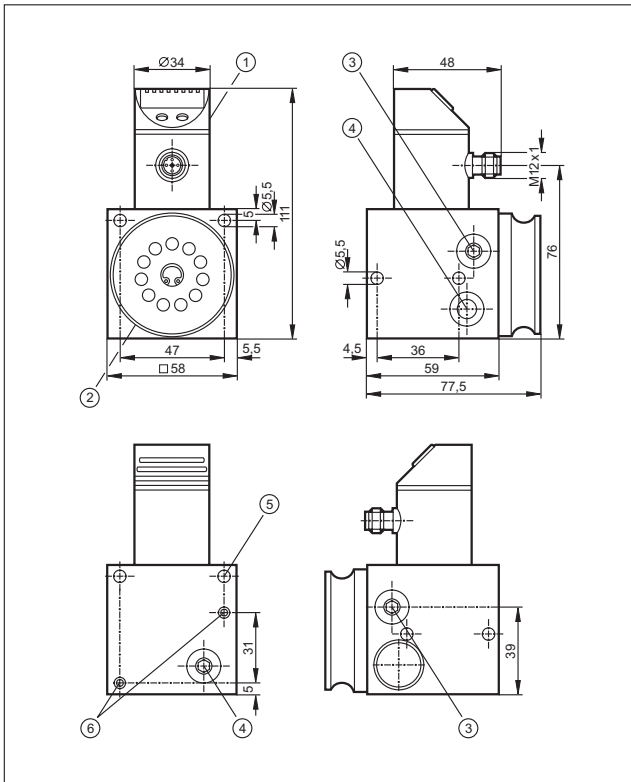


1: sealing FPM / DIN 3869-14, Page 103

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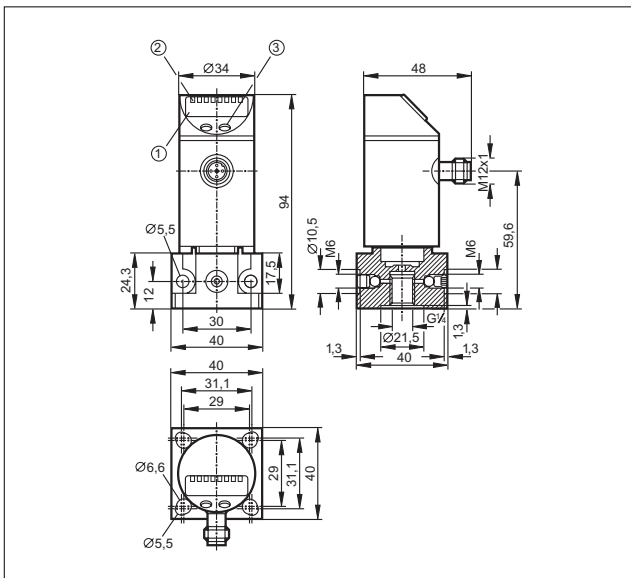
Pressure sensors and transmitters

14 type PS



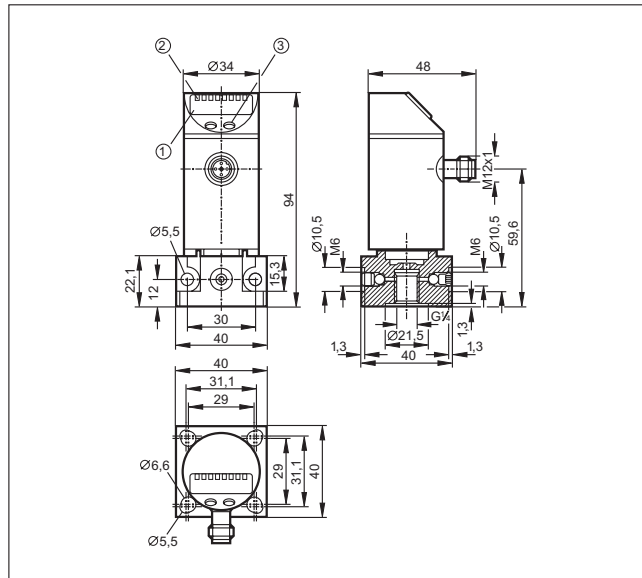
1: pressure sensor, 2: setting dial for adjusting the pneumatic bridge, 3: supply pressure, 4: measuring branch, 5: mounting hole, 6: thread M5, Page 105

15 type PY



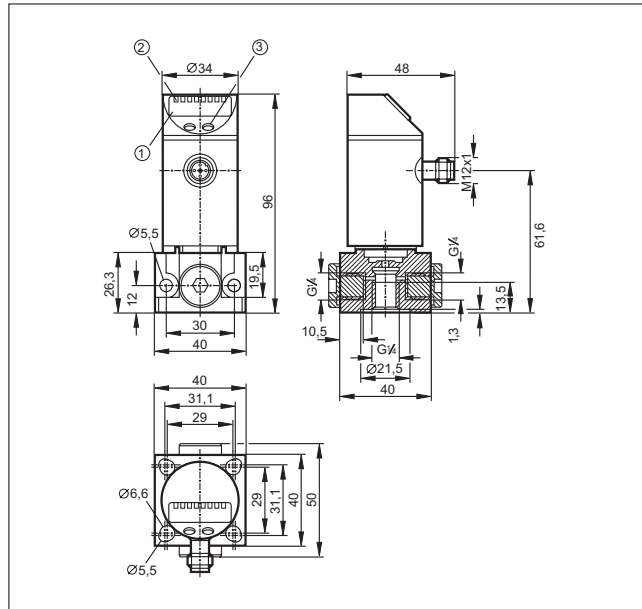
1: 4-digit alphanumeric display, 2: LEDs (display unit / switching status), 3: Programming button, Page 107

16 type PY



1: 4-digit alphanumeric display, 2: LEDs (display unit / switching status), 3: Programming button, Page 107

17 type PY

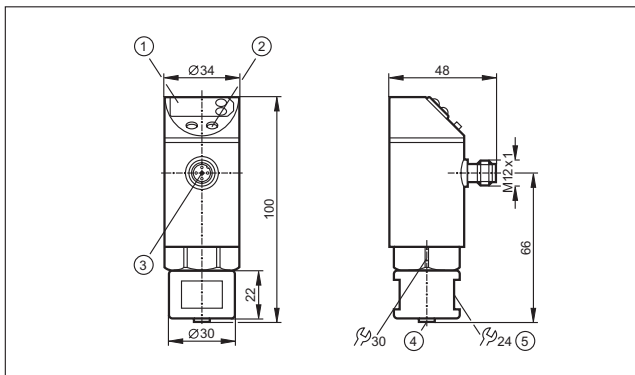


1: 4-digit alphanumeric display, 2: LEDs (display unit / switching status), 3: Programming button, Page 107

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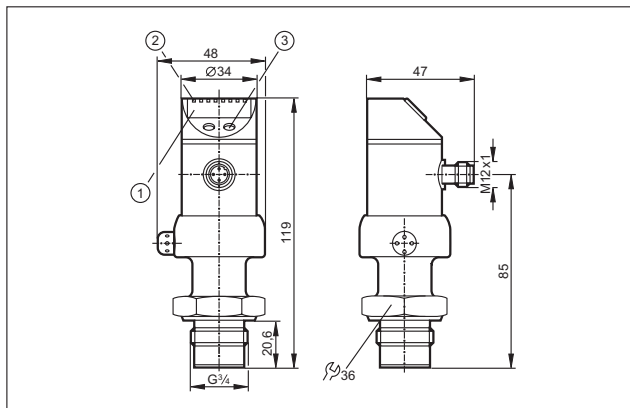
type PP



1: 7-segment LED display, 2: Programming button, 3: connection for voltage supply and output signals, 4: connection for EPS sensor, 5: Mounting nut, Page 113

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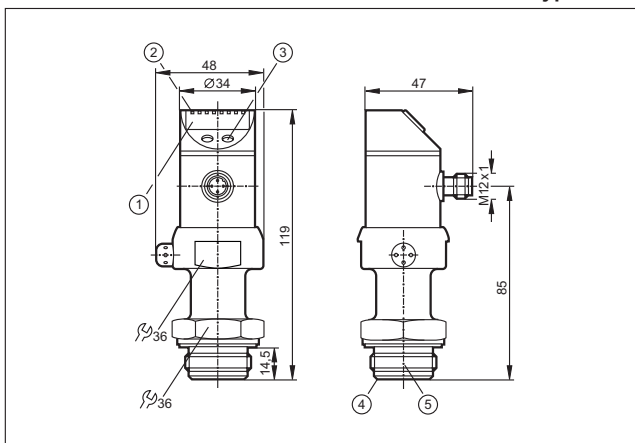
type PI



1: 4-digit alphanumeric display, 2: LEDs (display unit / switching status), 3: Programming button, Page 115, 119

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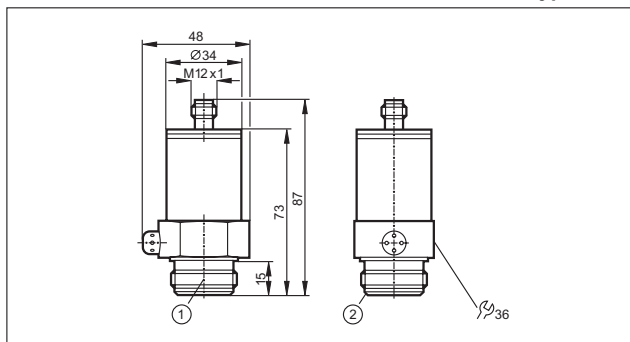
type PI



1: 4-digit alphanumeric display, 2: LEDs (display unit / switching status), 3: Programming button, 4: Aseptoflex sealing edge, 5: Aseptoflex thread, Page 115, 117, 119, 121

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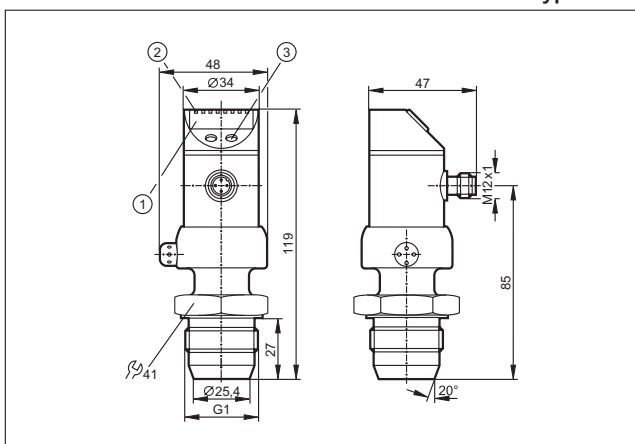
type PL



1: Aseptoflex thread, 2: Aseptoflex sealing edge, Page 123

20

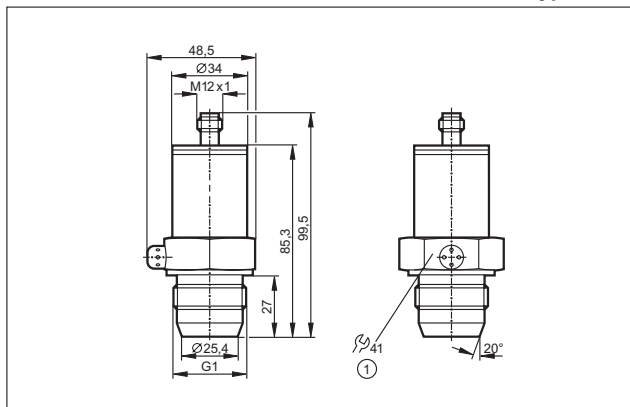
type PI



1: 4-digit alphanumeric display, 2: LEDs (display unit / switching status), 3: Programming button, Page 115, 117, 121

23

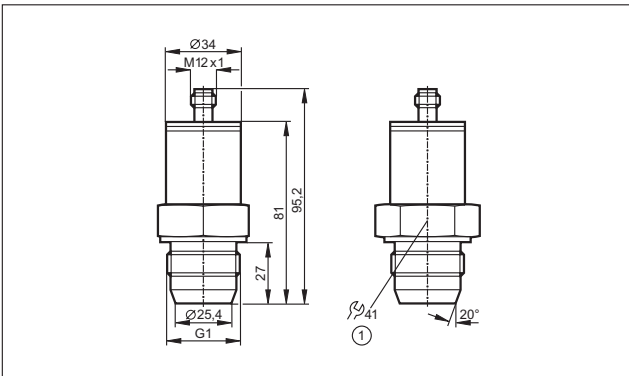
type PL



1: tightening torque 20 Nm, Page 123

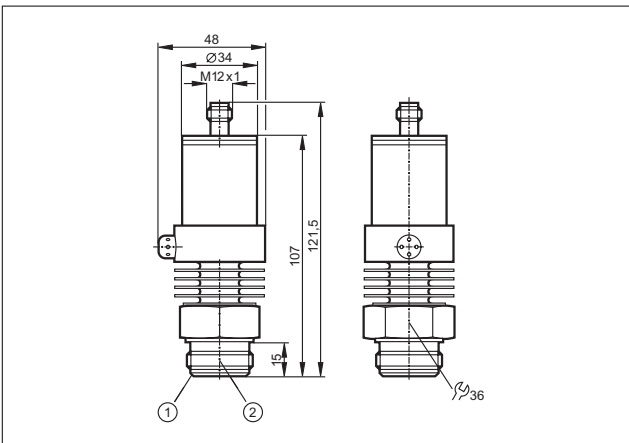
Pressure sensors and transmitters

24 type PL



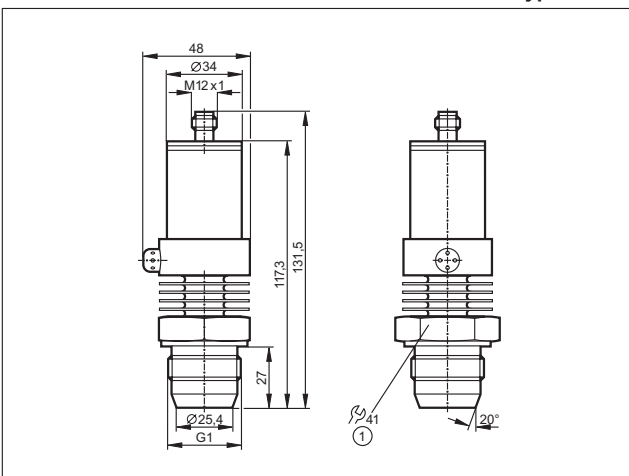
1: tightening torque 20 Nm, Page 123

25 type PM



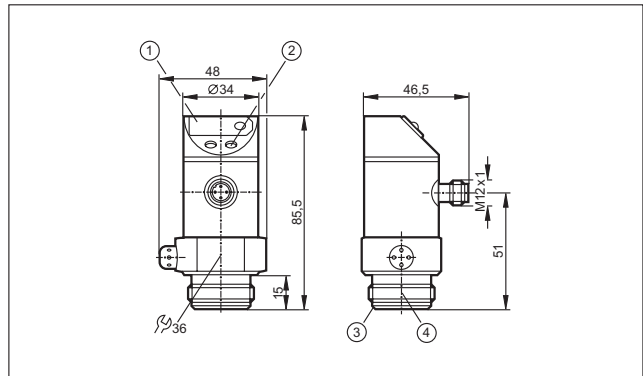
1: Aseptoflex sealing edge, 2: Aseptoflex thread, Page 123

26 type PM



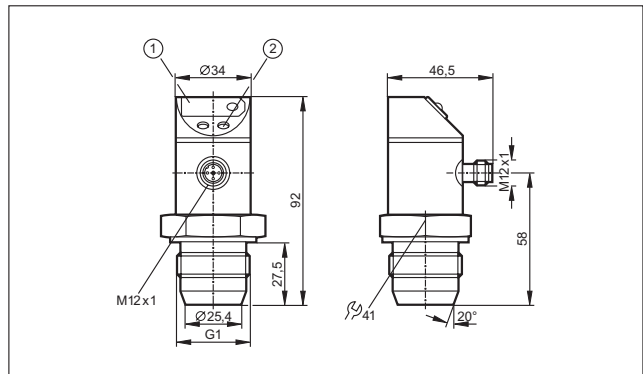
1: tightening torque 20 Nm, Page 123

27 type PF



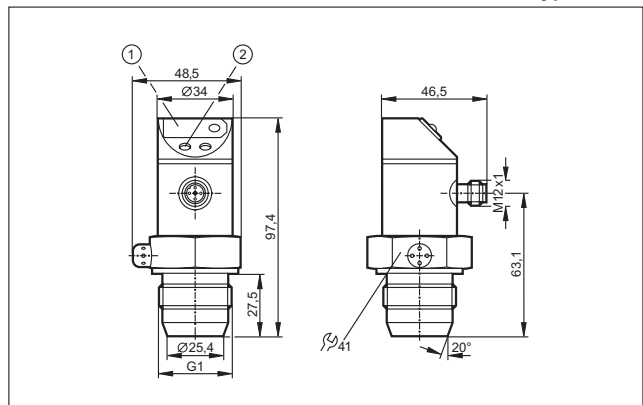
1: 7-segment LED display, 2: Programming button, 3: Aseptoflex sealing edge, 4: Aseptoflex thread, Page 125

28 type PF



1: 7-segment LED display, 2: Programming button, Page 125

29 type PF



1: 7-segment LED display, 2: Programming button, Page 125, 127

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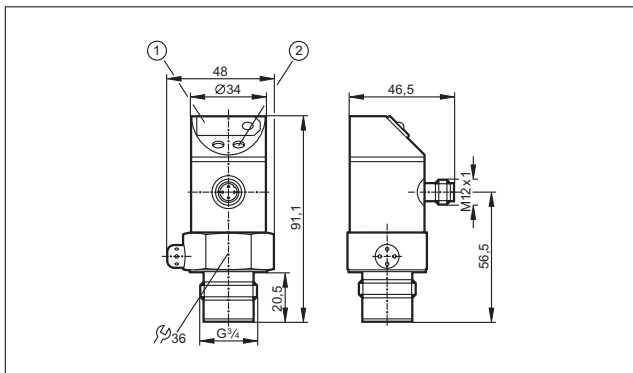
Accessories

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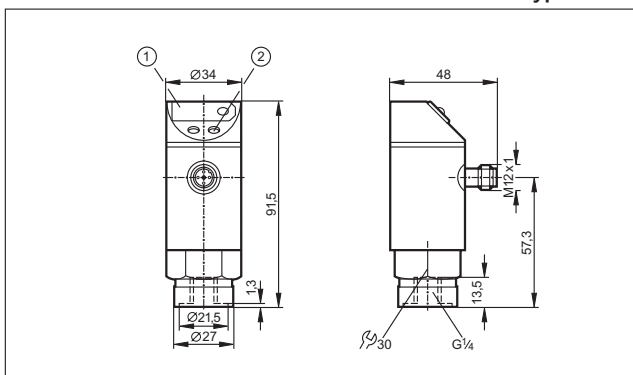
type PF



1: 7-segment LED display, 2: Programming button, Page 125

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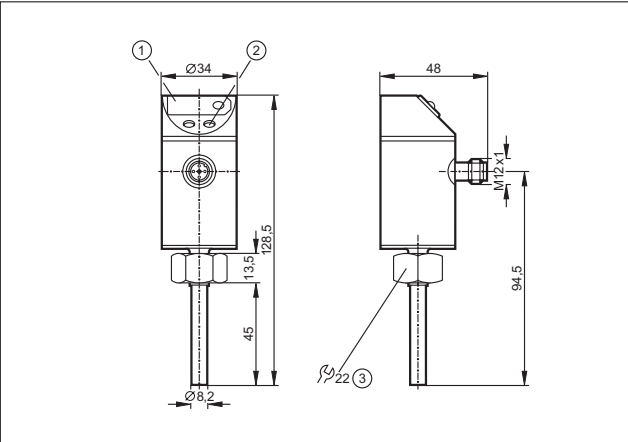
type PN



1: 7-segment LED display, 2: Programming button, Page 127

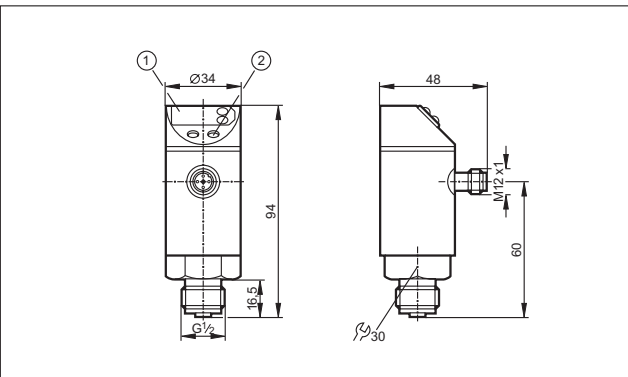
Temperature sensors and transmitters

1 type TN



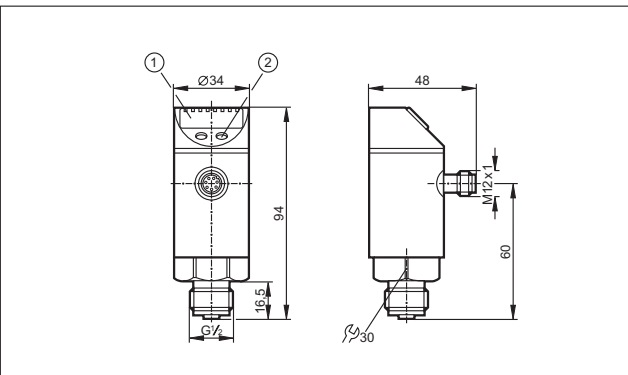
1: 7-segment LED display, 2: Programming button, 3: internal thread M18 x 1.5, Page 137

2 type TR



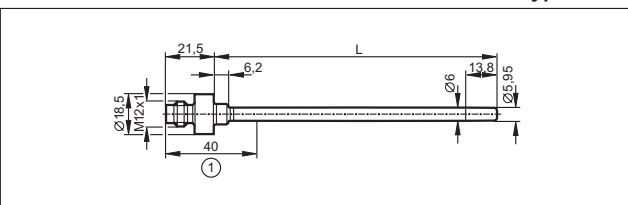
1: 7-segment LED display, 2: Programming button, Page 139

3 type TR



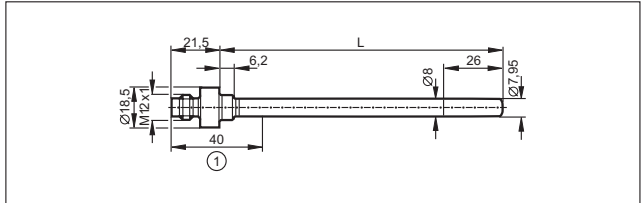
1: 4-digit alphanumeric display, 2: Programming button, Page 139

4 type TT



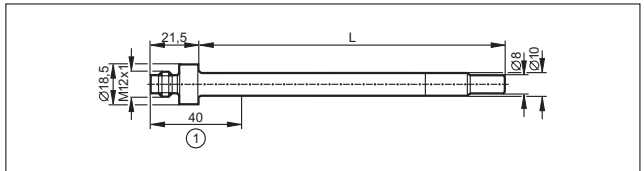
1: plug area, Page 141

5 type TT



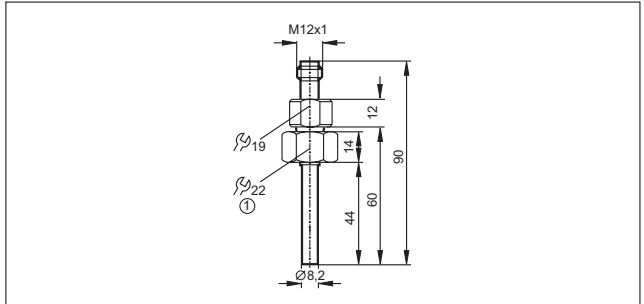
1: plug area, Page 141

6 type TT



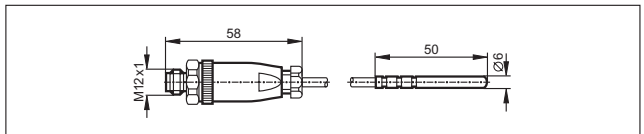
1: plug area, Page 141, 147

7 type TM



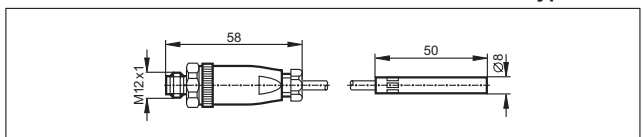
1: internal thread M18 x 1.5, Page 141

8 type TS



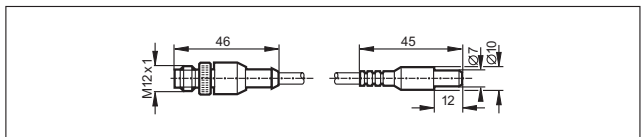
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9 type TS



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10 type TS



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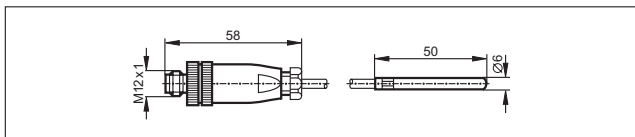
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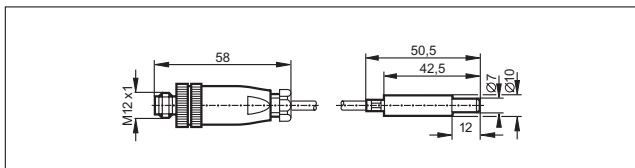
Temperature sensors and transmitters

11 type TS



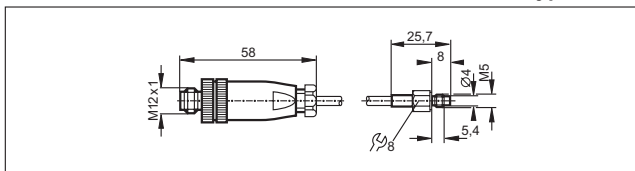
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12 type TS



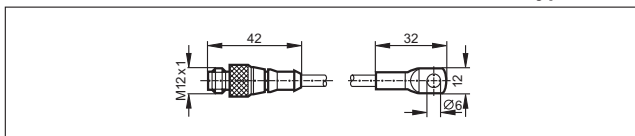
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13 type TS



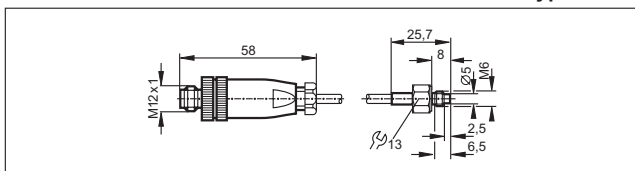
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14 type TS



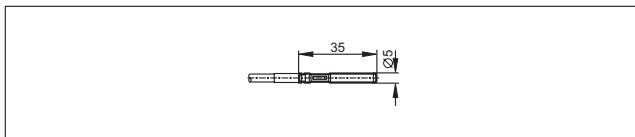
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15 type TS



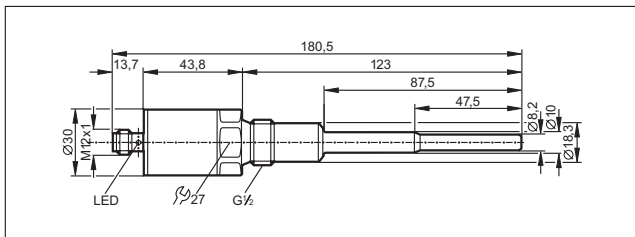
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16 type TS



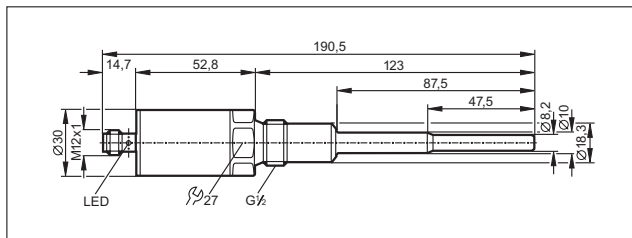
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17 type TA



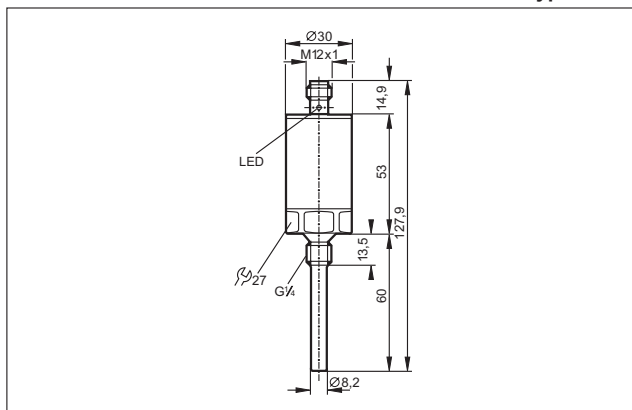
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18 type TA



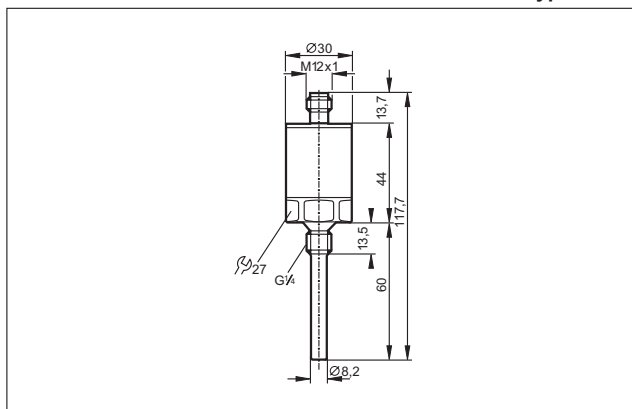
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19 type TA



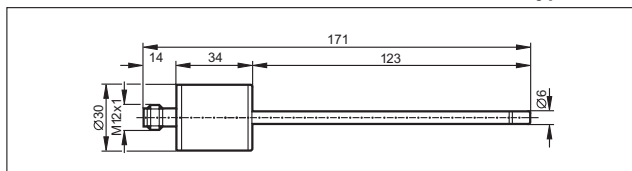
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20 type TA



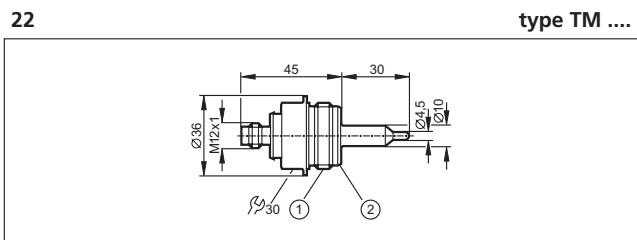
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21 type TA

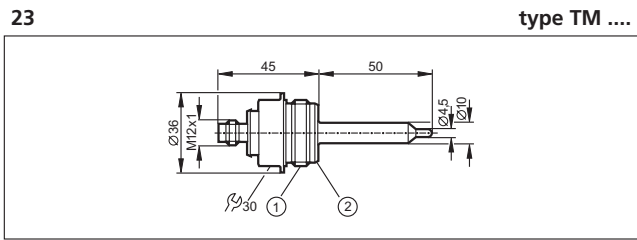


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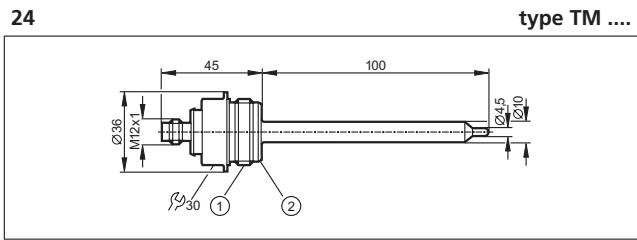
Temperature sensors and transmitters



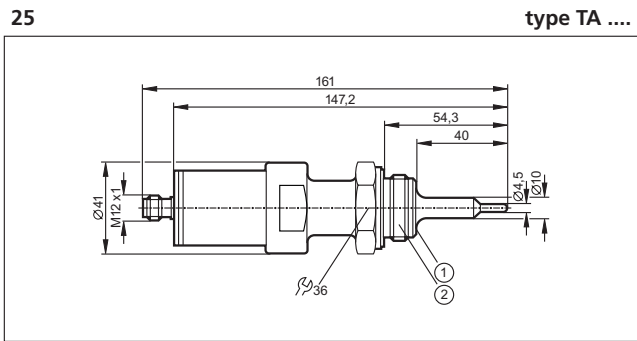
1: Aseptoflex thread, 2: Aseptoflex sealing edge, Page 147



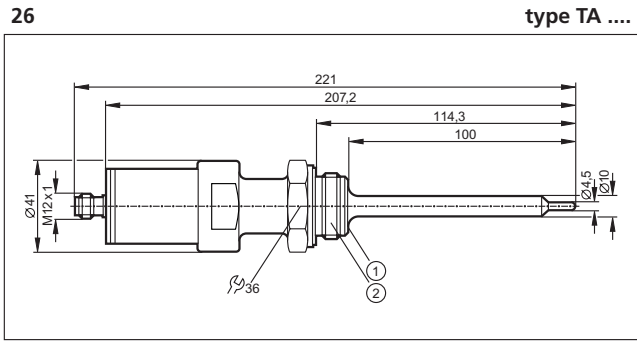
1: Aseptoflex thread, 2: Aseptoflex sealing edge, Page 147



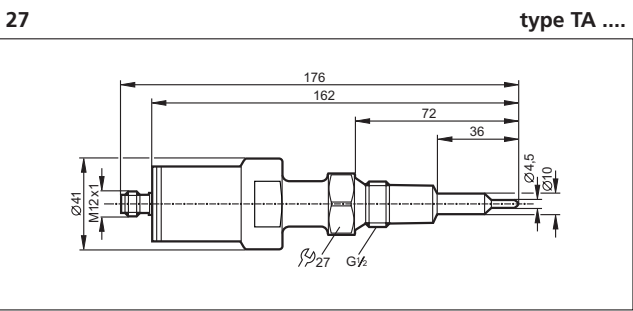
1: Aseptoflex thread, 2: Aseptoflex sealing edge, Page 147



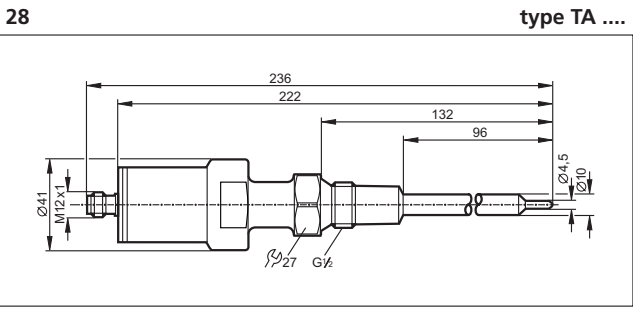
1: sealing chamfer, 2: Aseptoflex thread, Page 153



1: sealing chamfer, 2: Aseptoflex thread, Page 153



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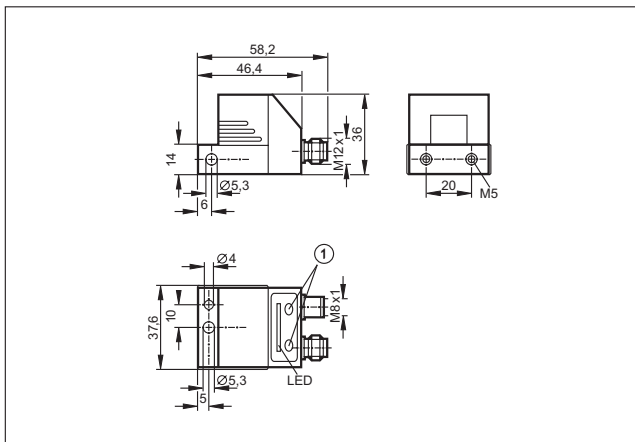


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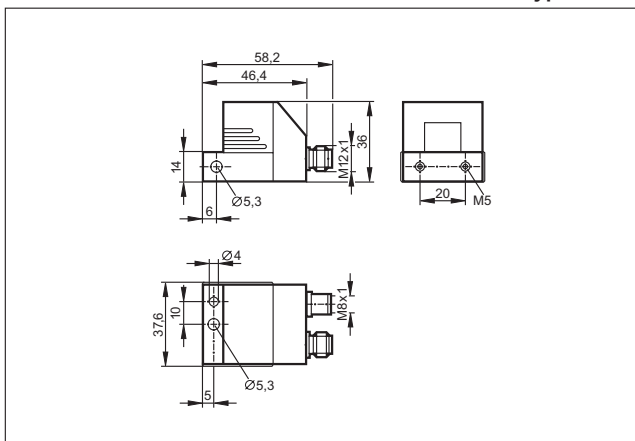
Systems for vibration diagnosis

1 type VB, VE



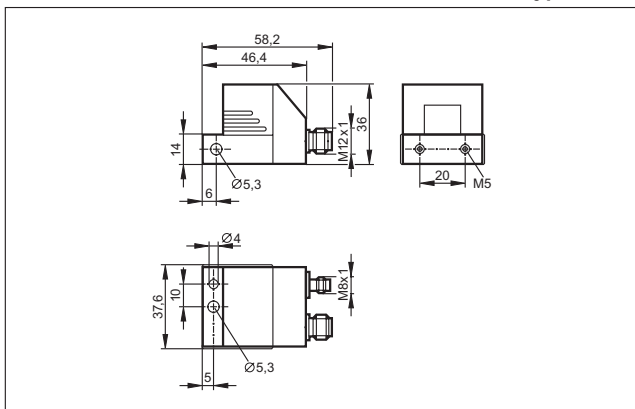
1: Programming buttons, Page 163

2 type VE



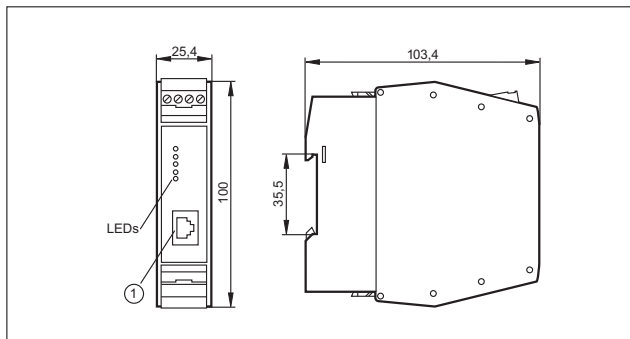
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3 type VE



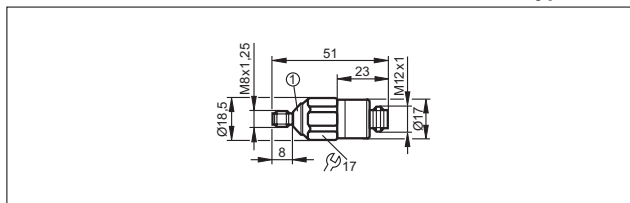
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4 type VS



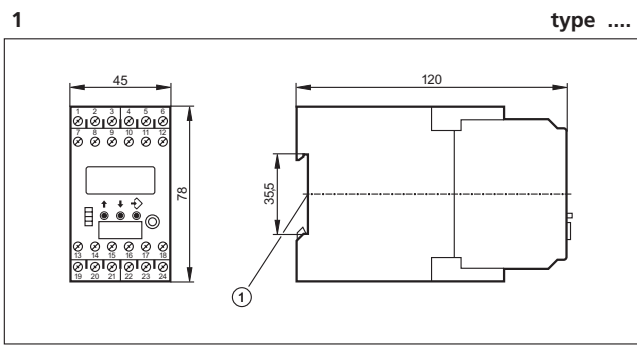
1: Ethernet interface, Page 167

5 type VS

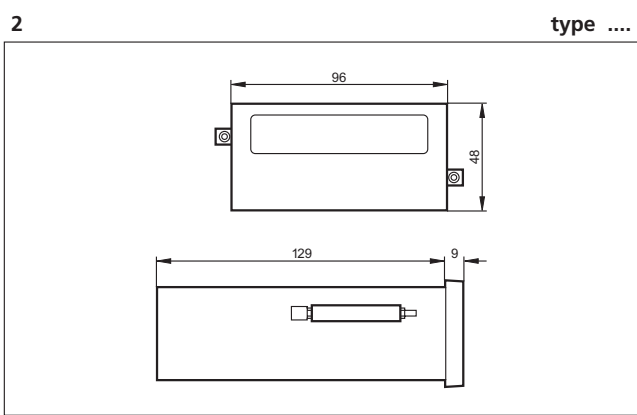


1: Conical angle = 90°, Page 169

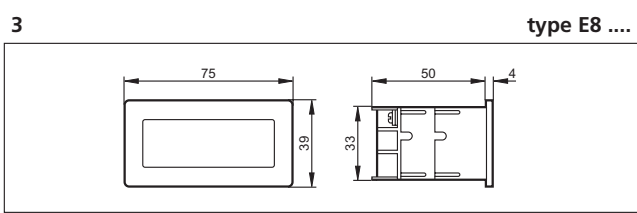
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1: mounting on DIN rail, Page 183



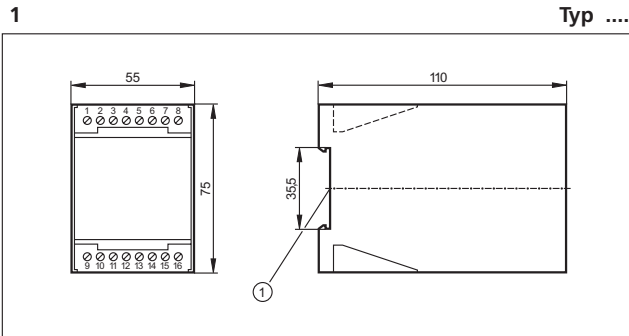
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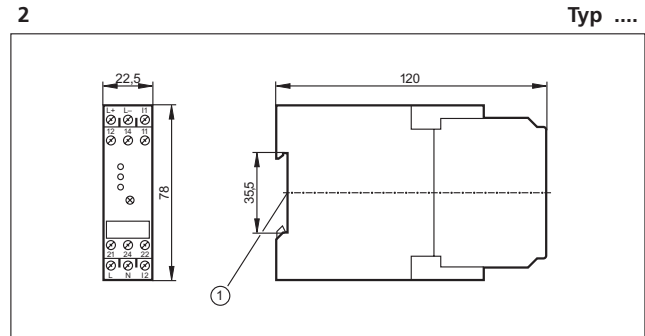
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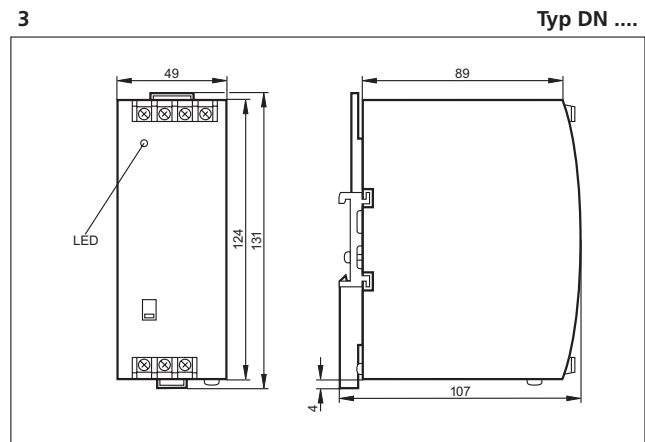
Transformer and switched-mode power supplies



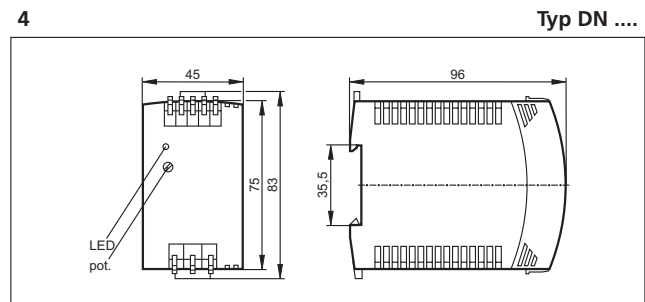
1: mounting on DIN rail, Page 165



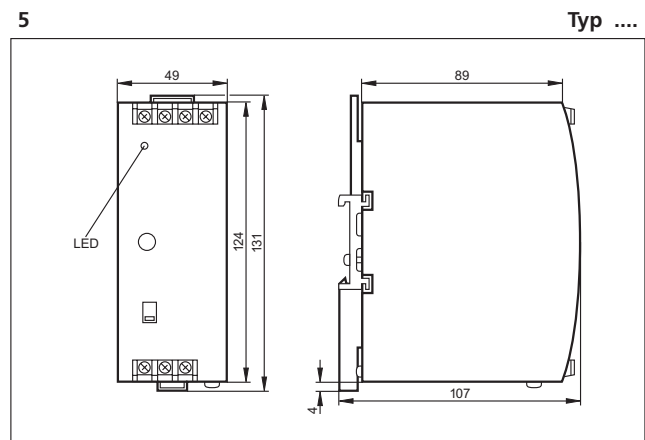
1: mounting on DIN rail, Page 165



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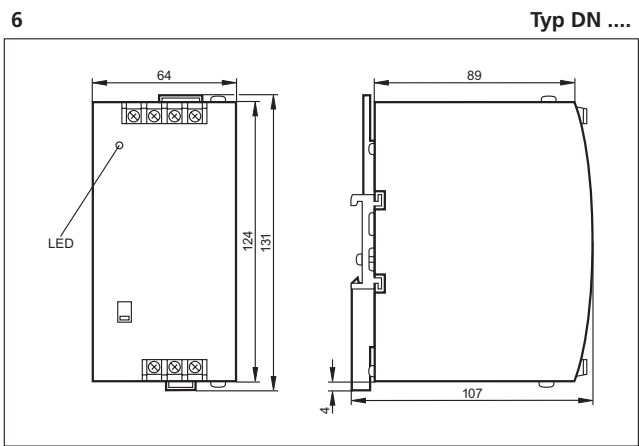
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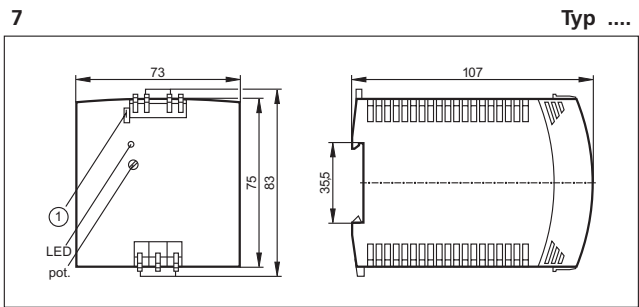
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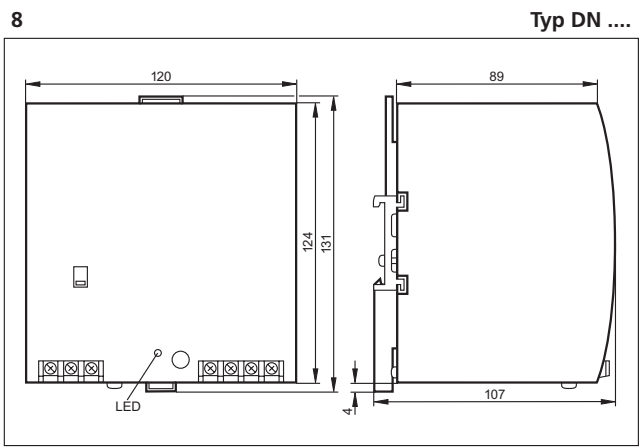
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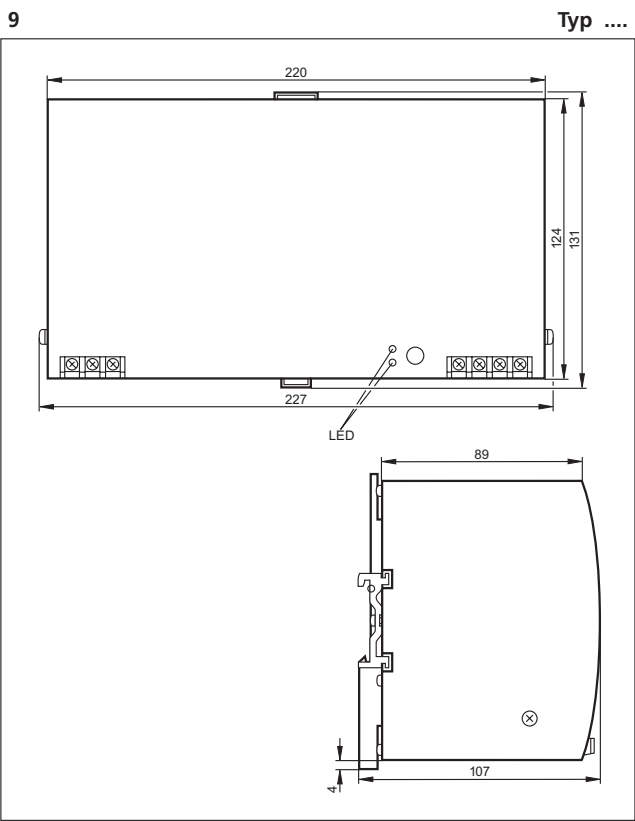
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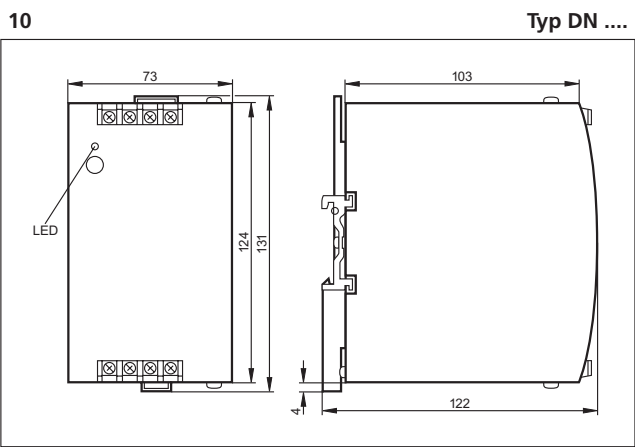
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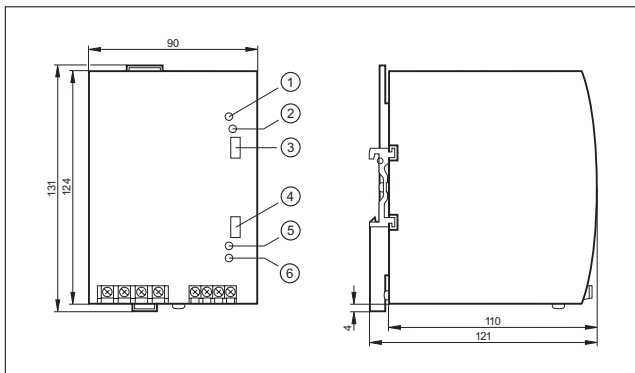
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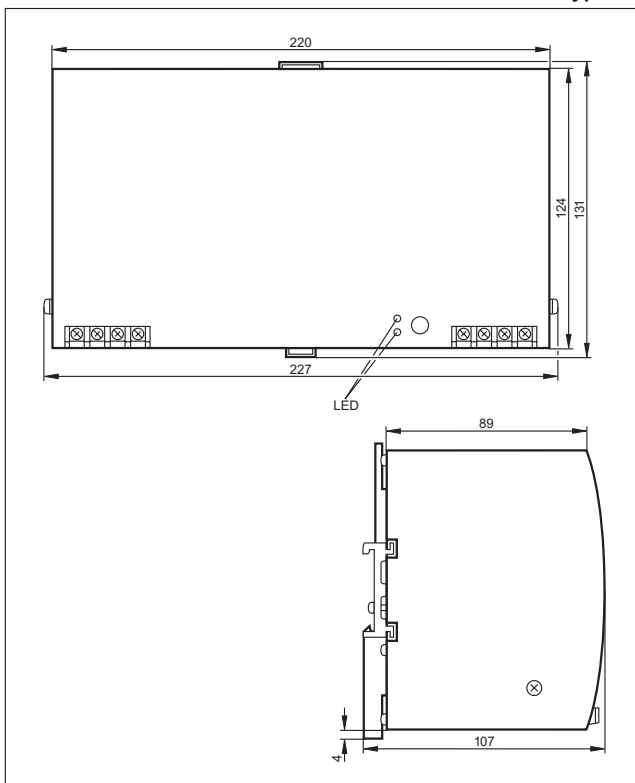
Typ DN



1: LED red, 2: reset push button, 3: jumper "overload performance",
4: jumper "single / parallel operation", 5: with pot., 6: LED green,
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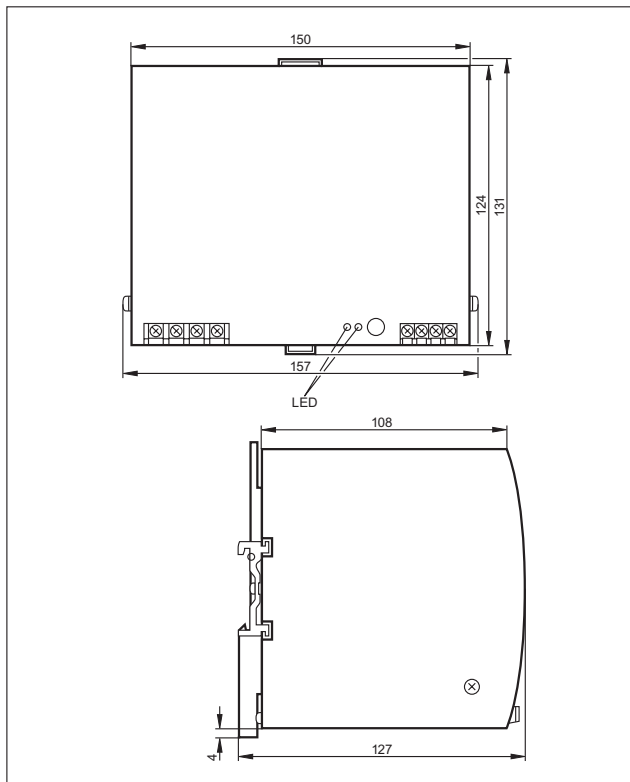
Typ



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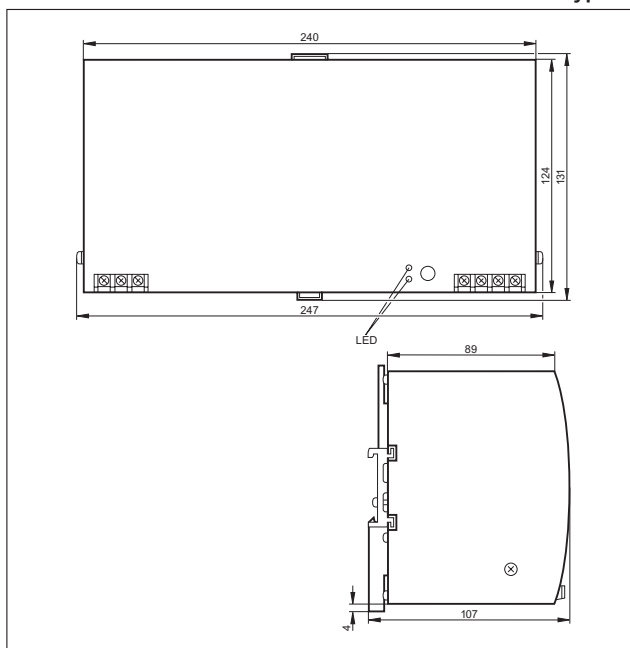
Typ



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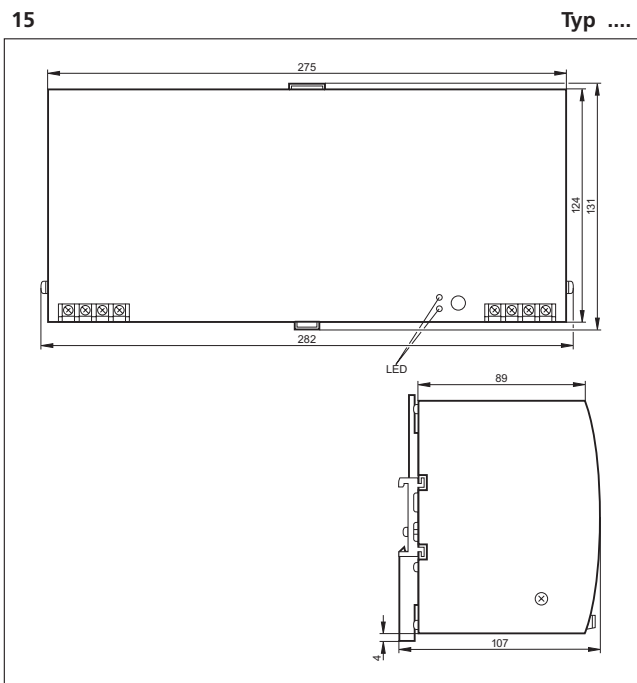
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Typ



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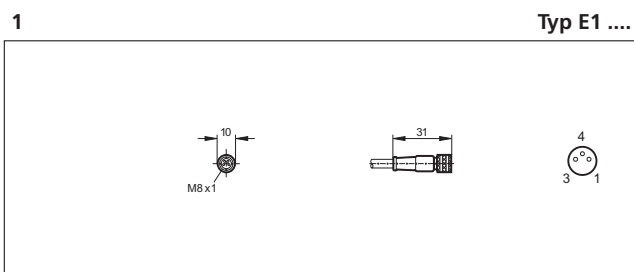
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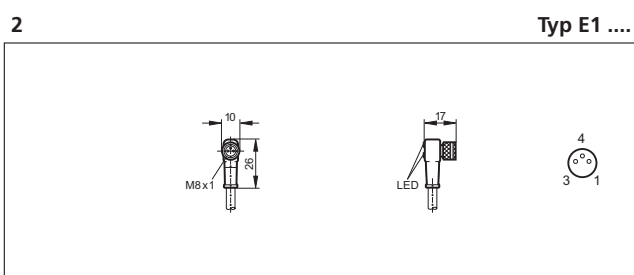
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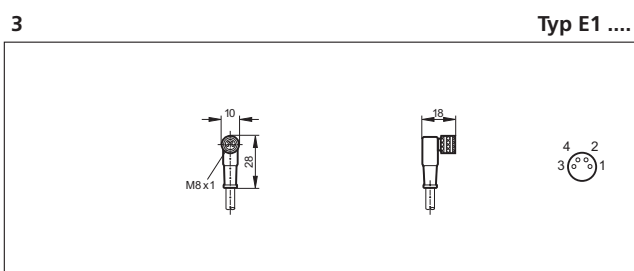
Complete ifm product range



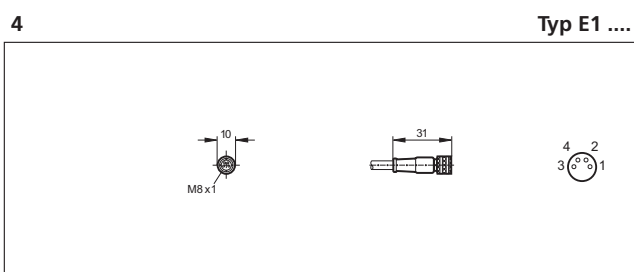
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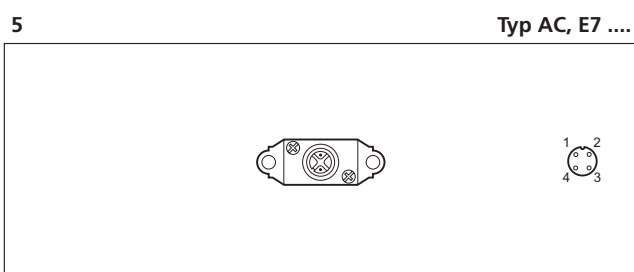
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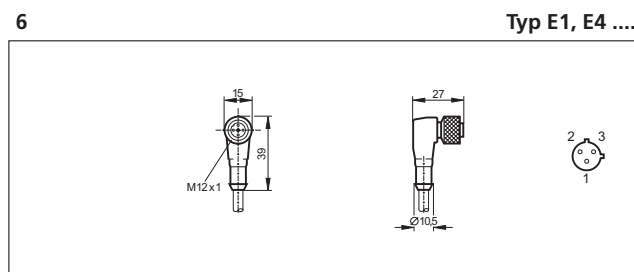
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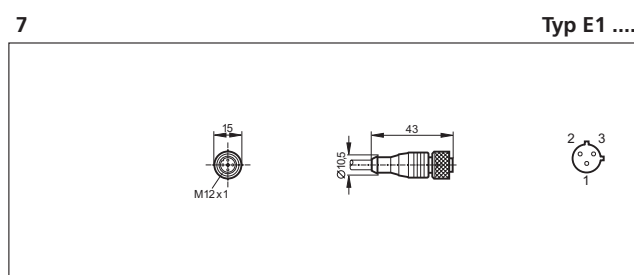
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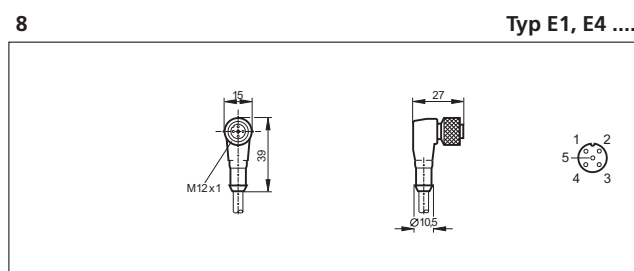
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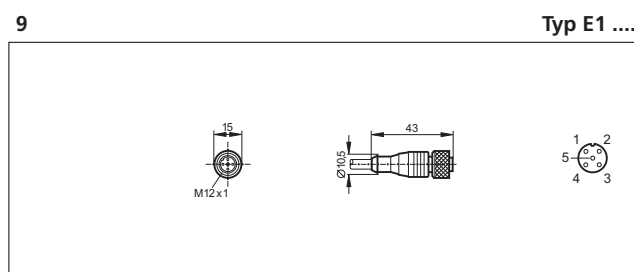
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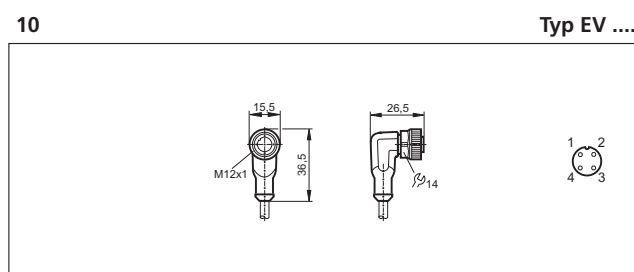
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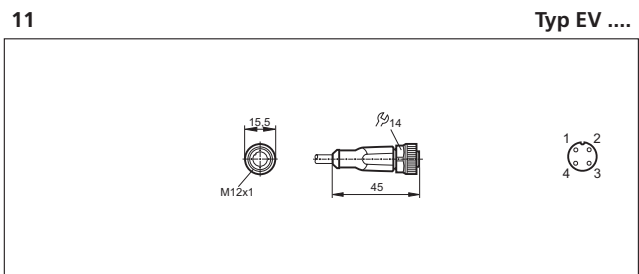
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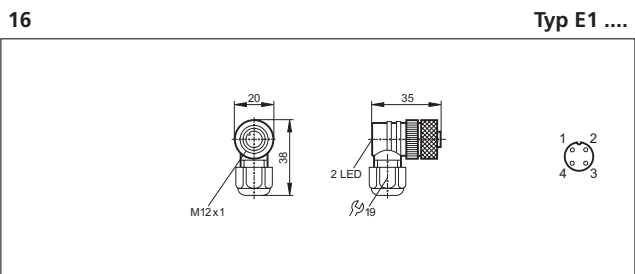
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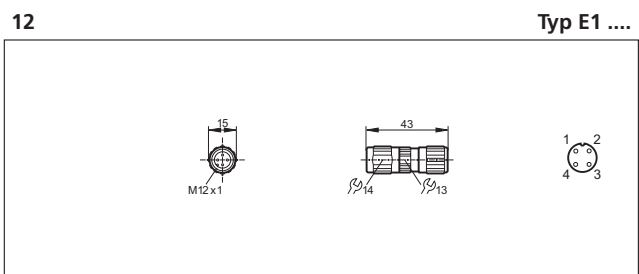
Complete ifm product range



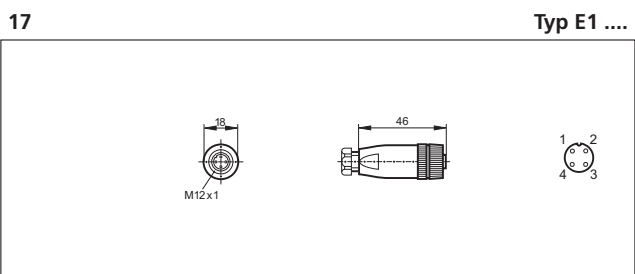
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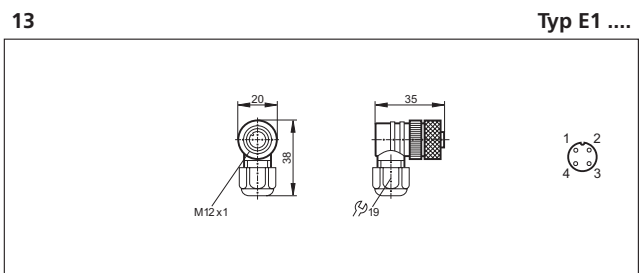
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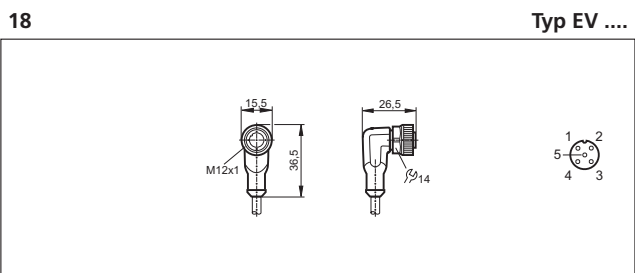
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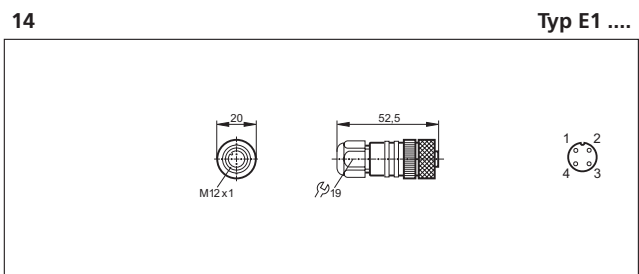
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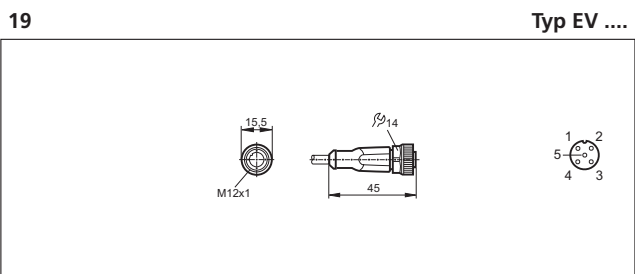
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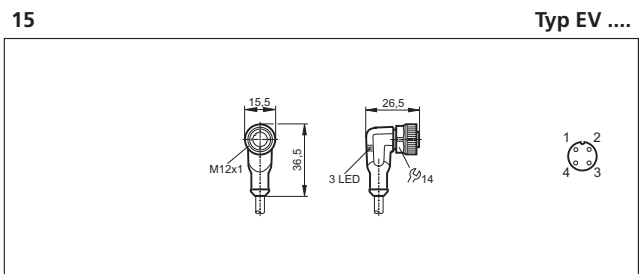
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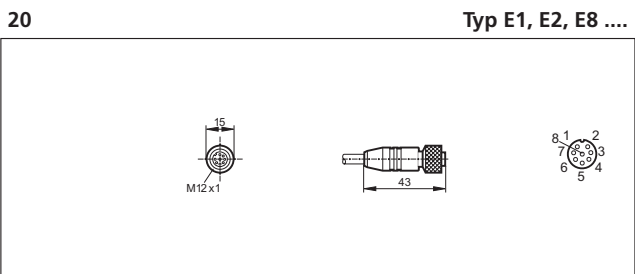
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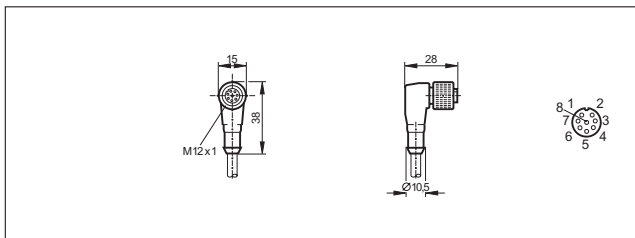
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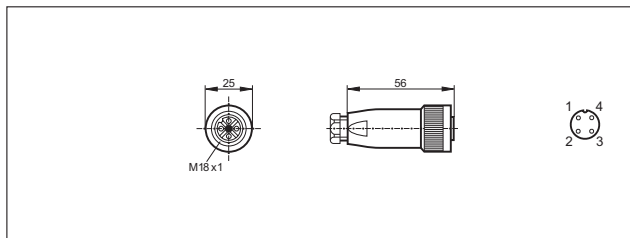
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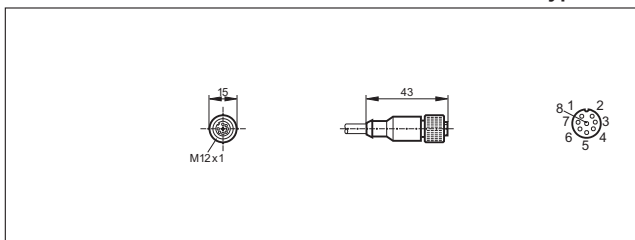
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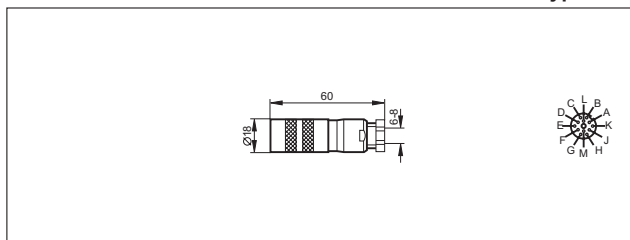
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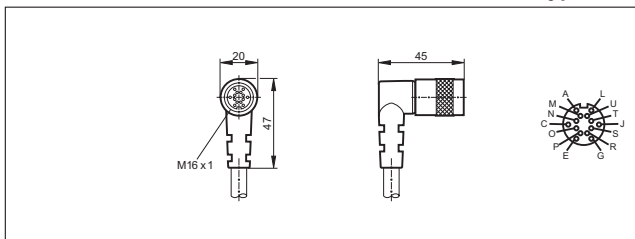
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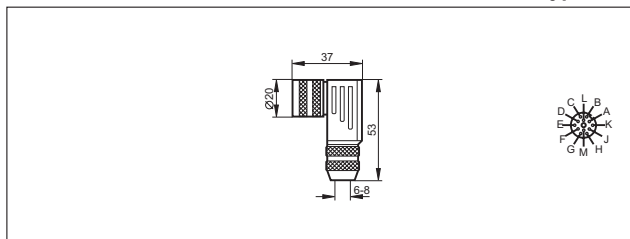
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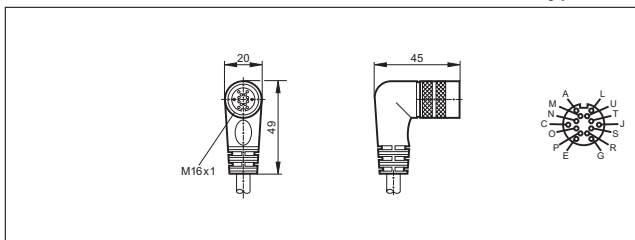
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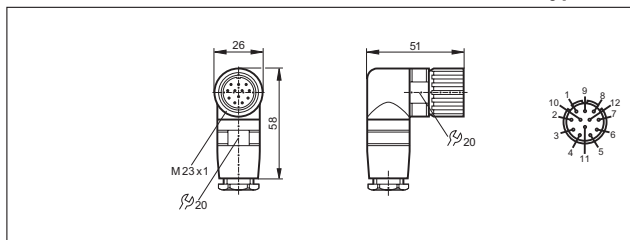
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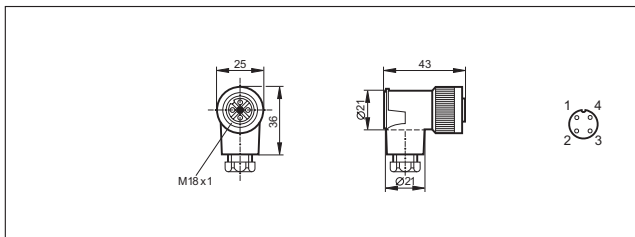
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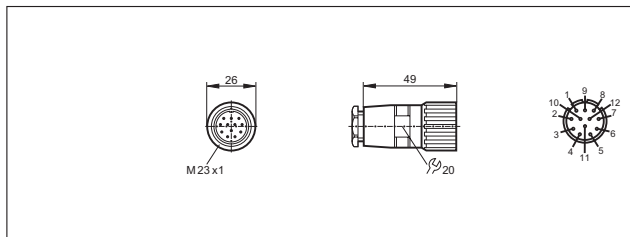
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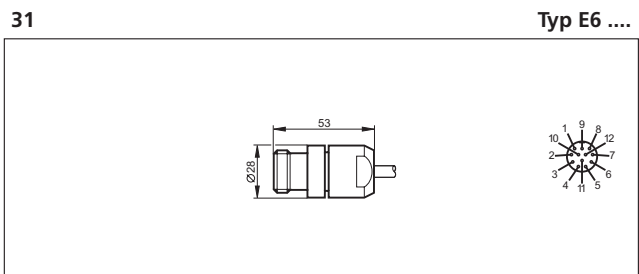
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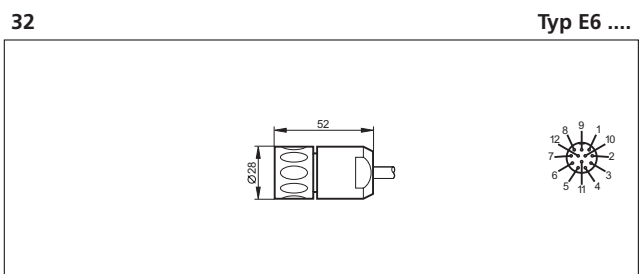


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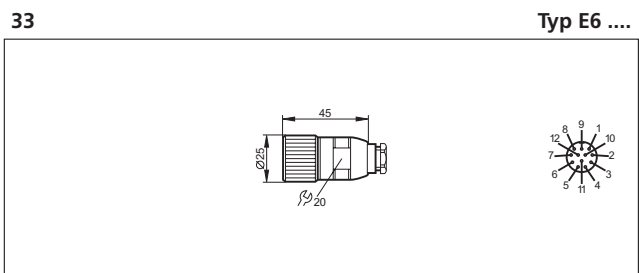
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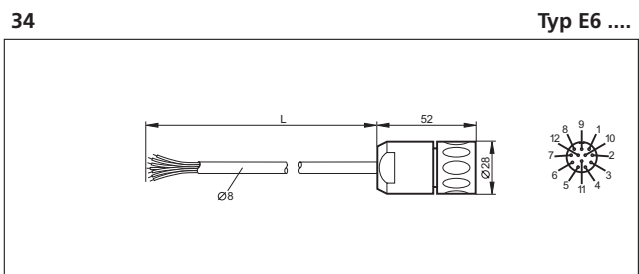
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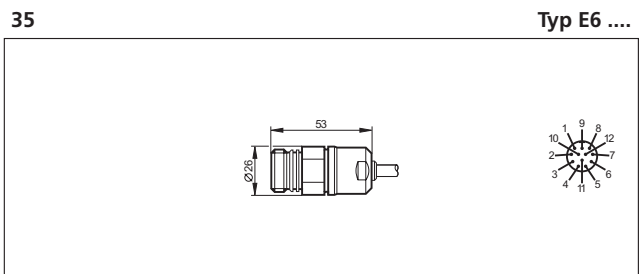
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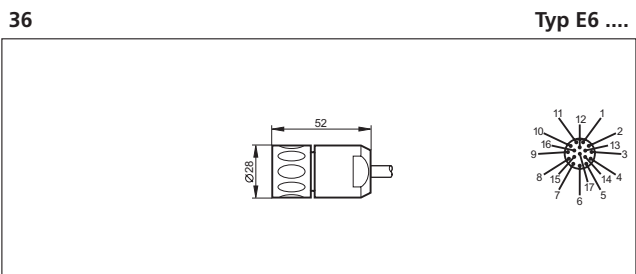
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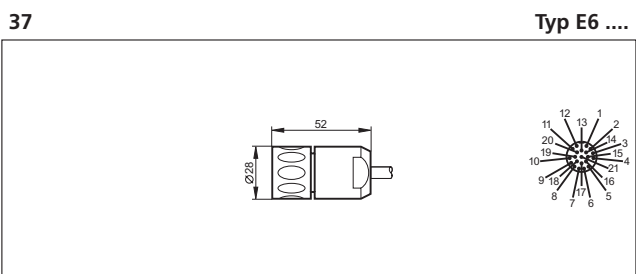
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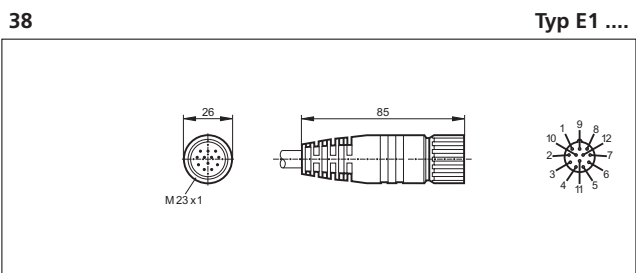
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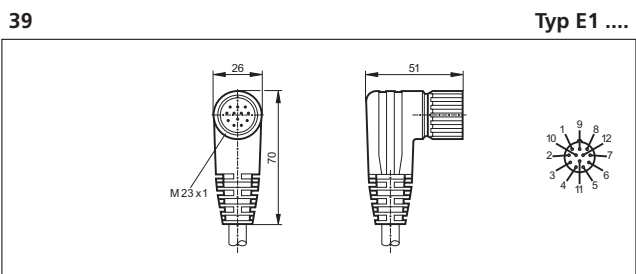
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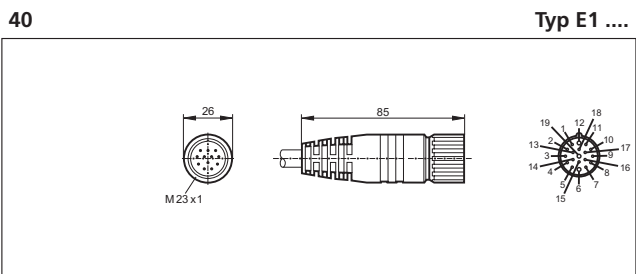
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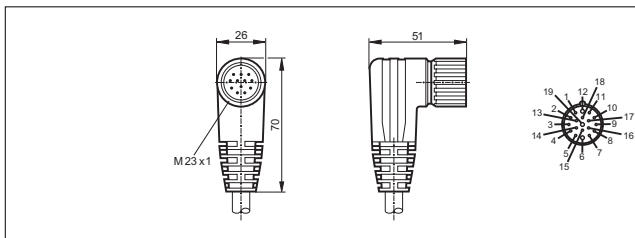
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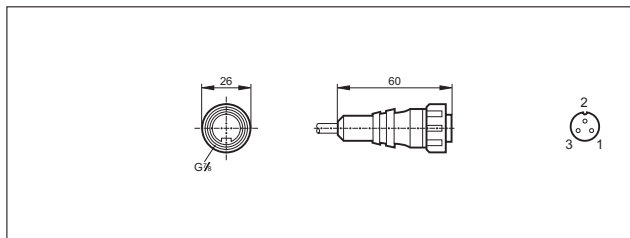
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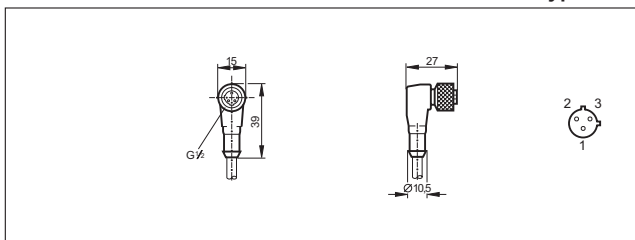
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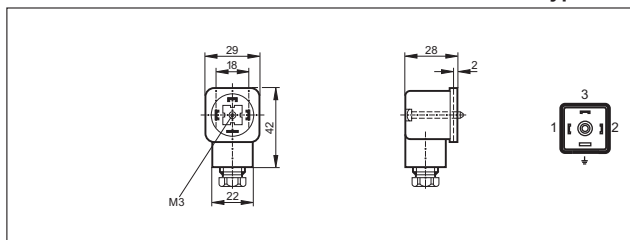
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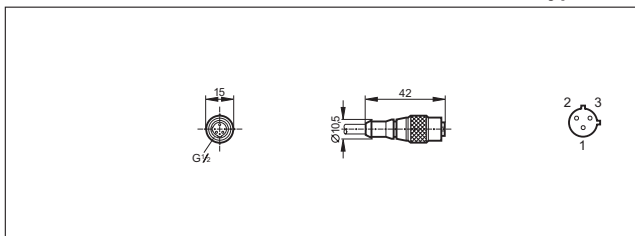
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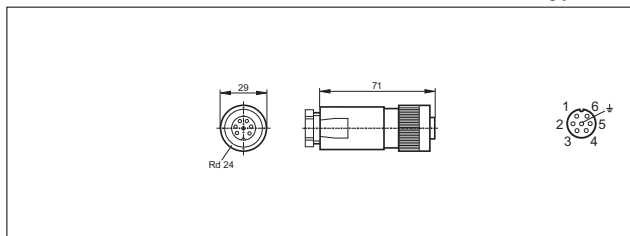
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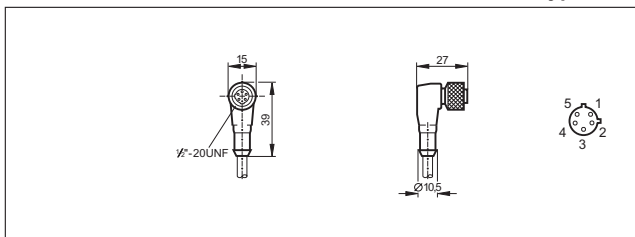
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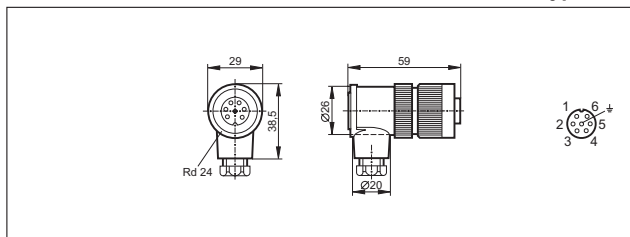
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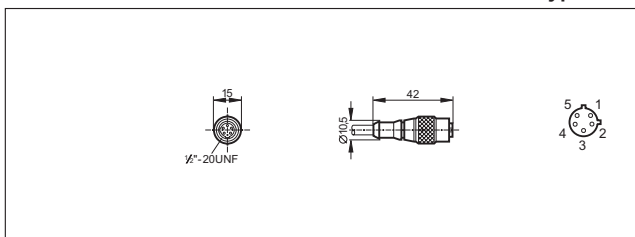
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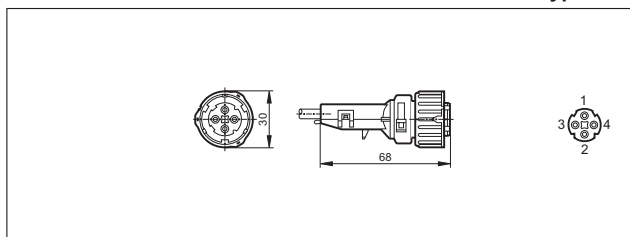
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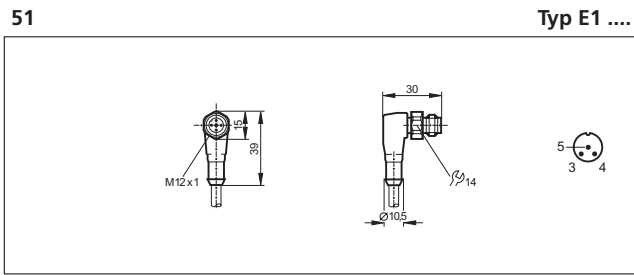
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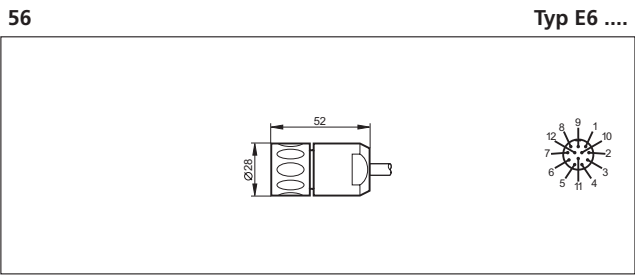


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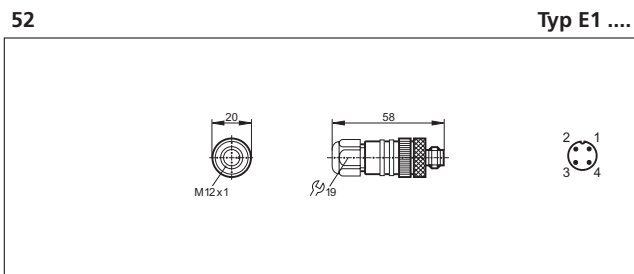
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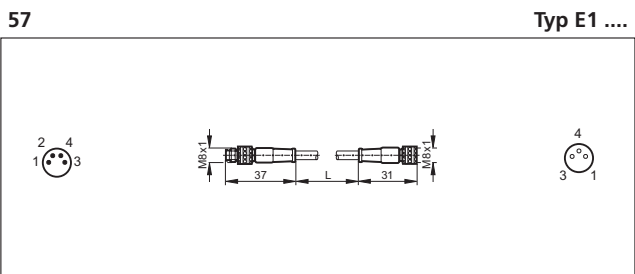
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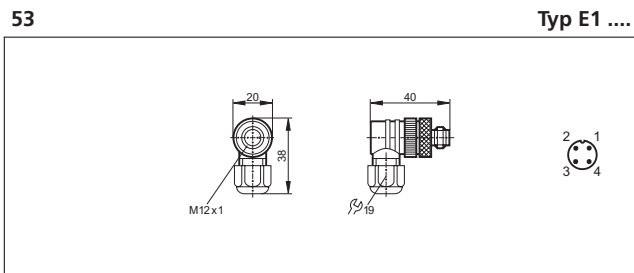
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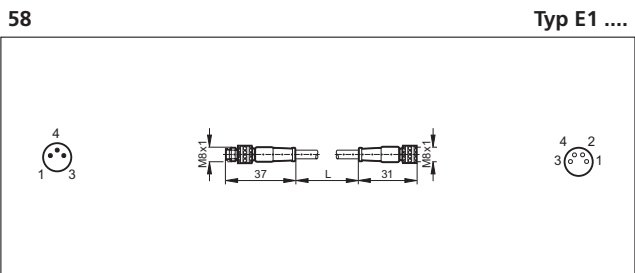
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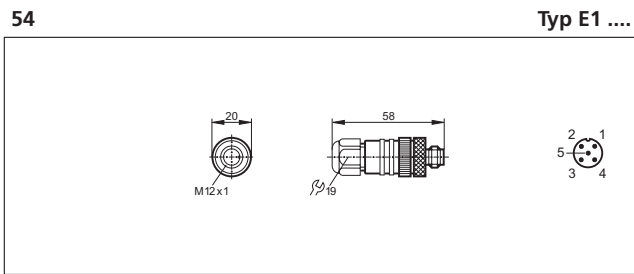
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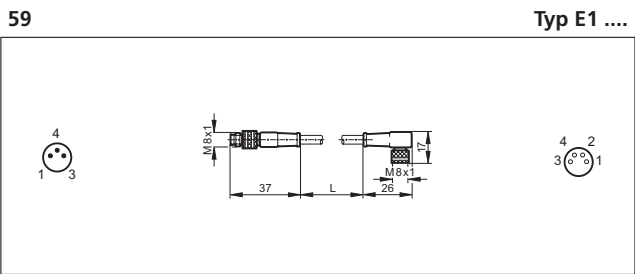
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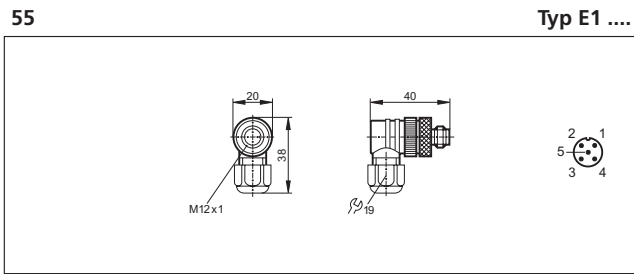
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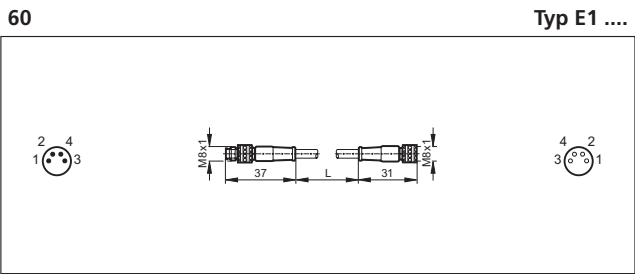
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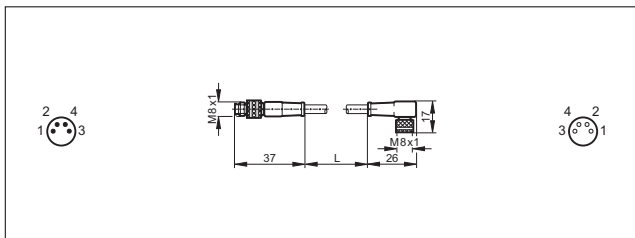
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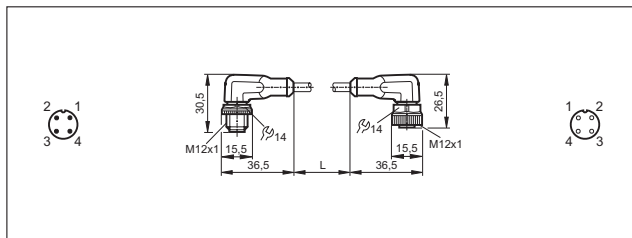
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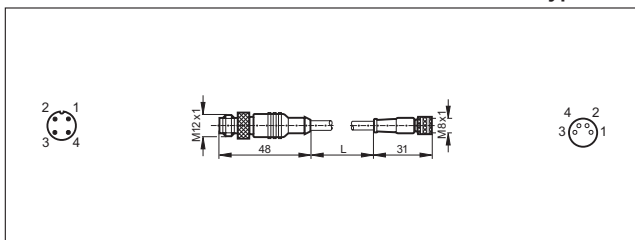
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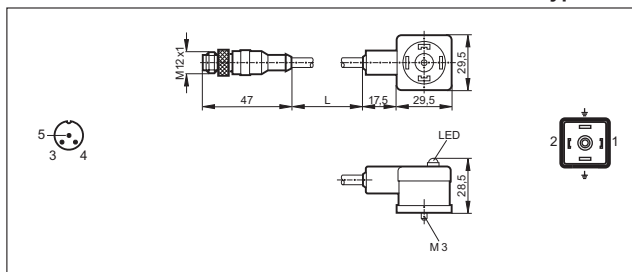
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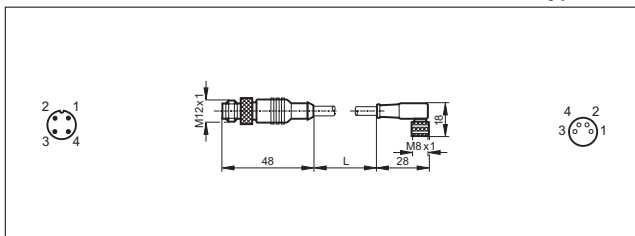
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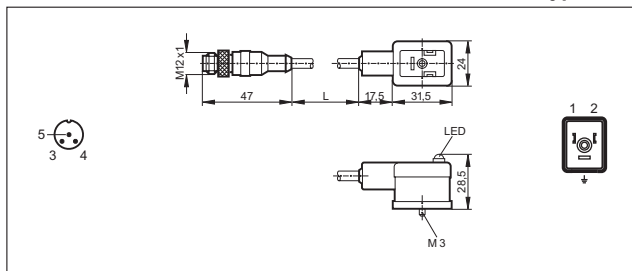
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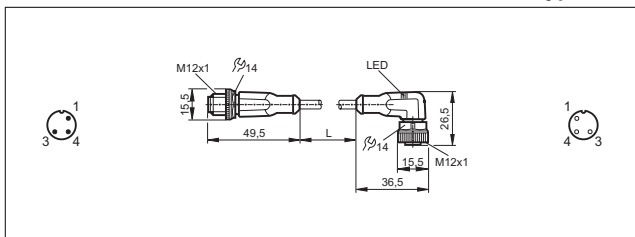
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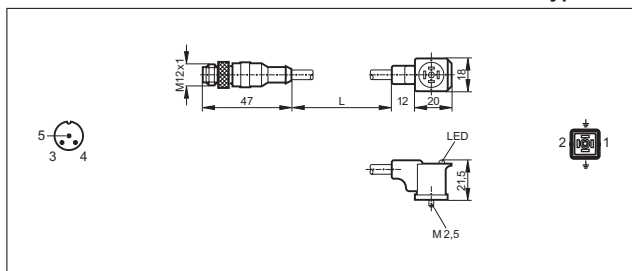
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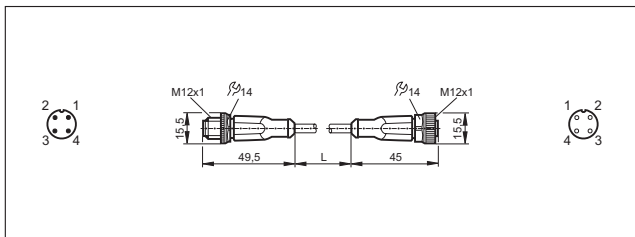
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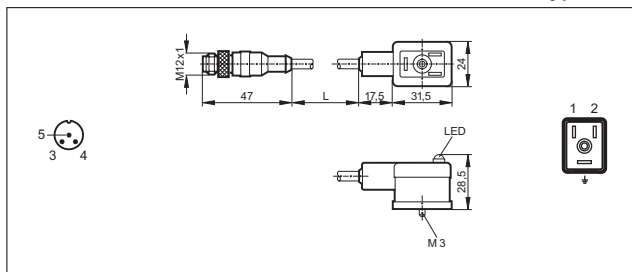
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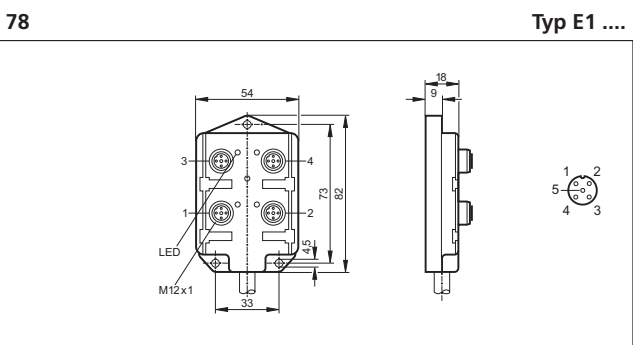
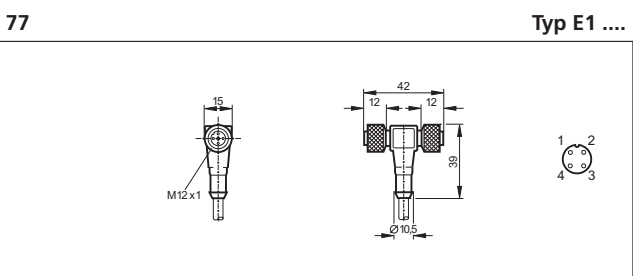
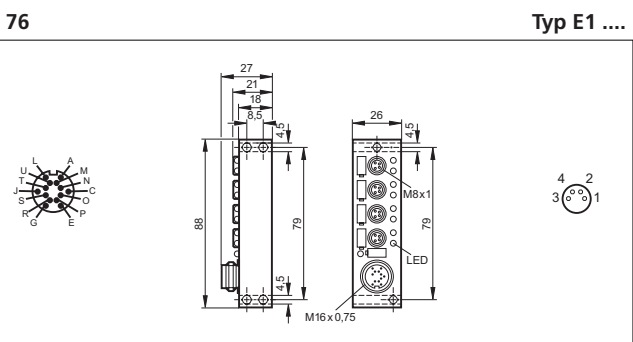
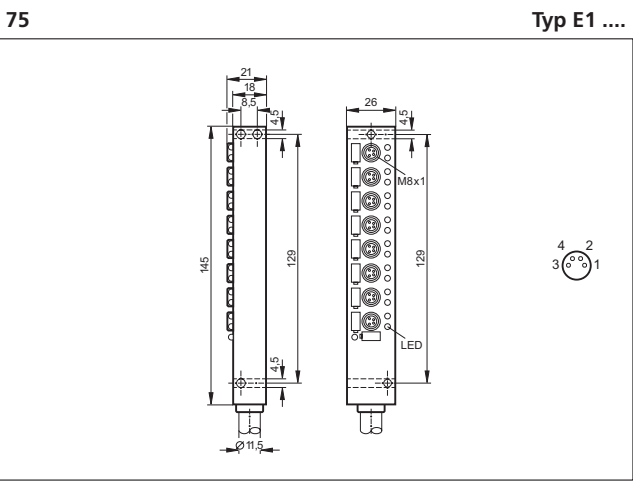
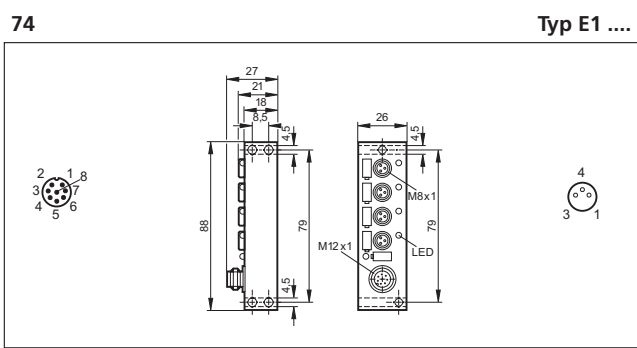
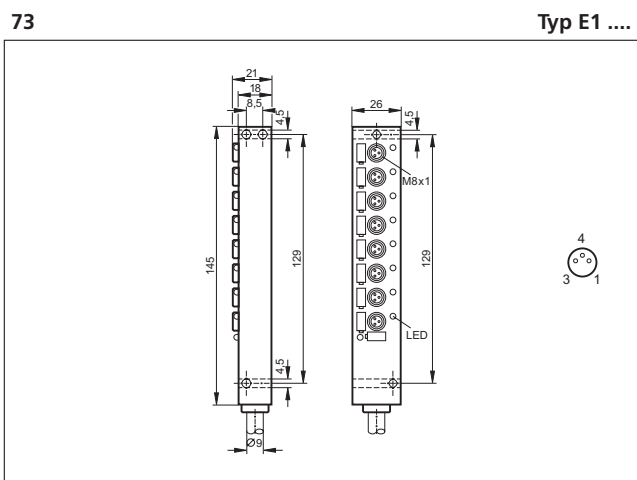
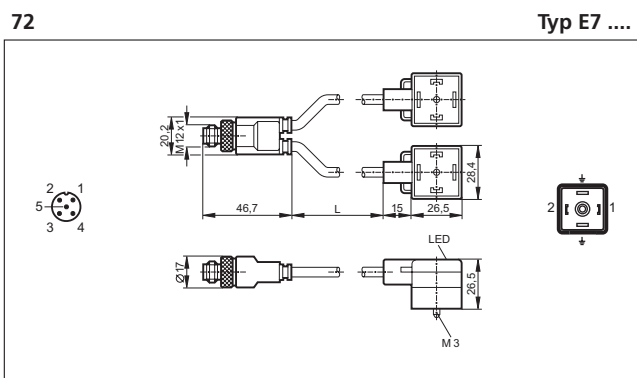
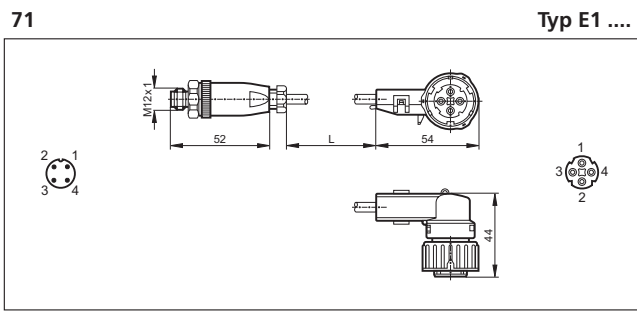
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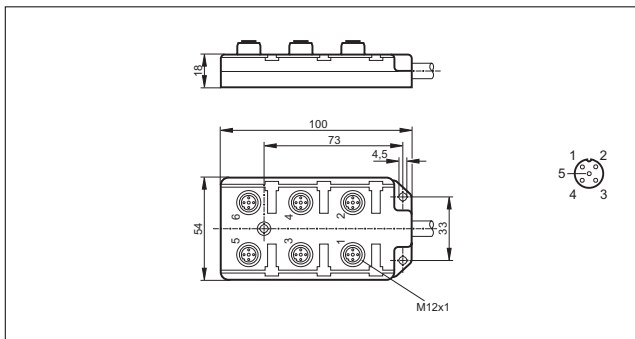


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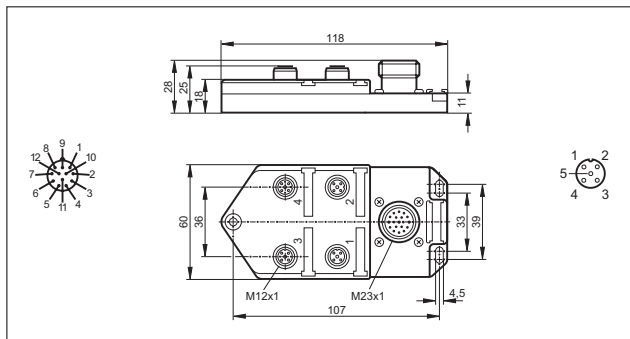
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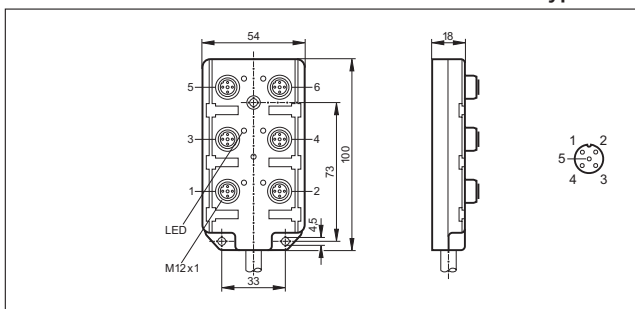
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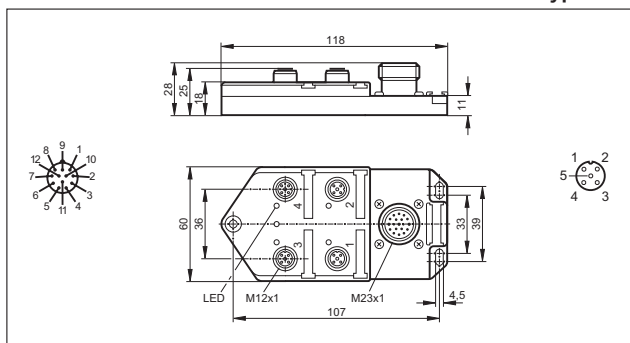
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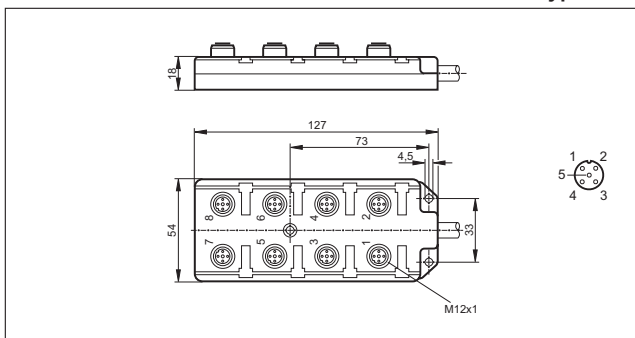
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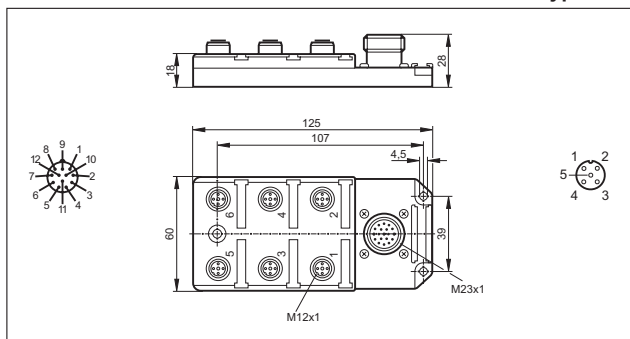
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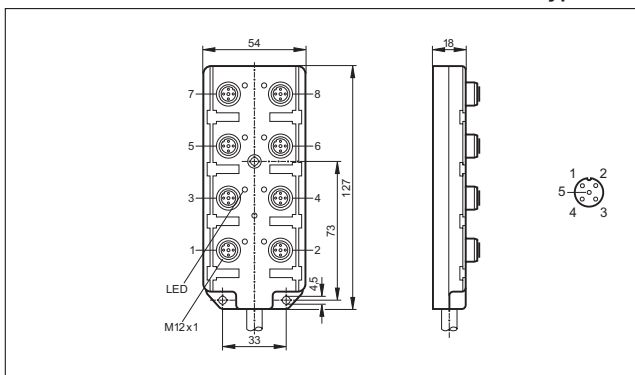
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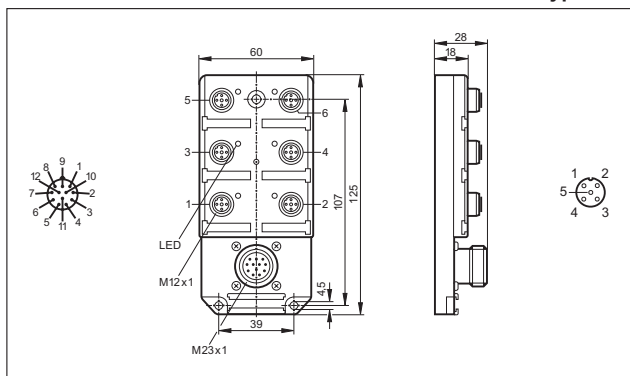
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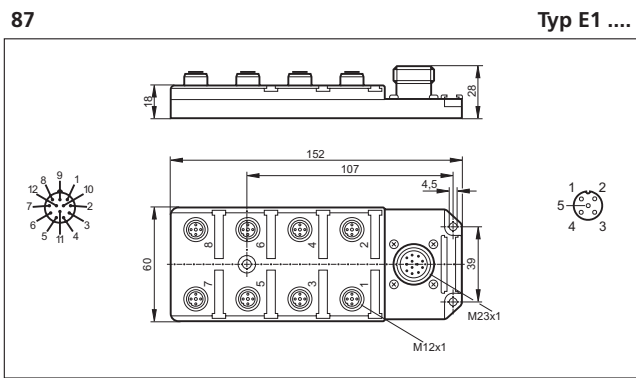
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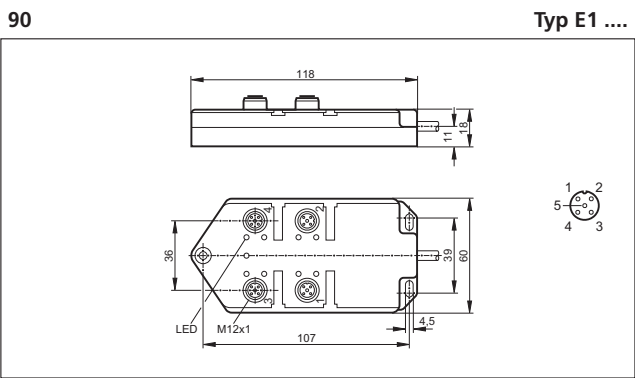
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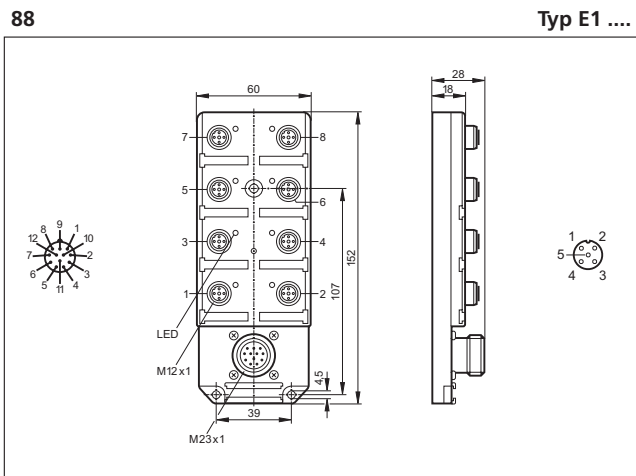
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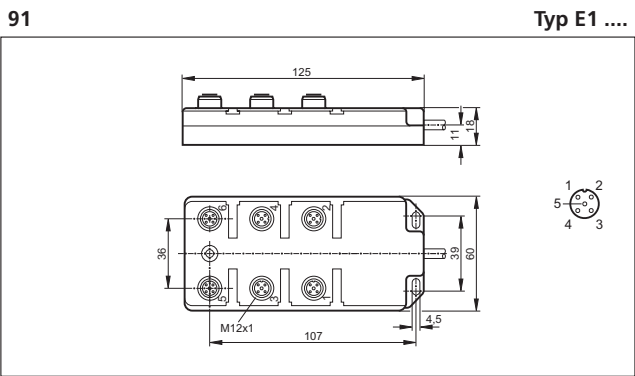
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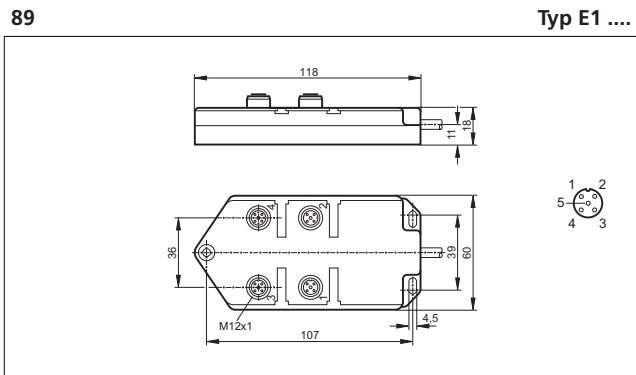
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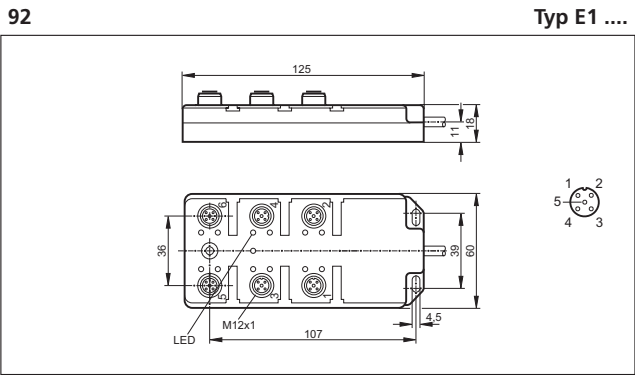
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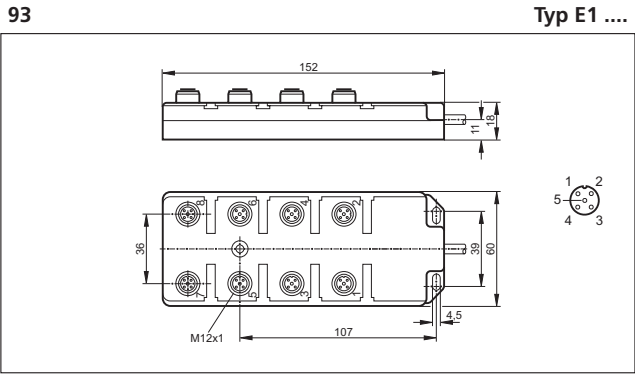
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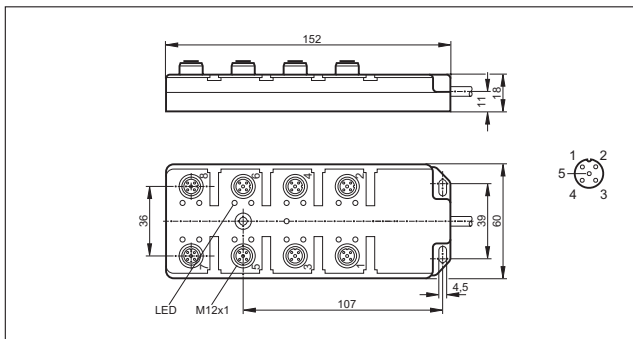
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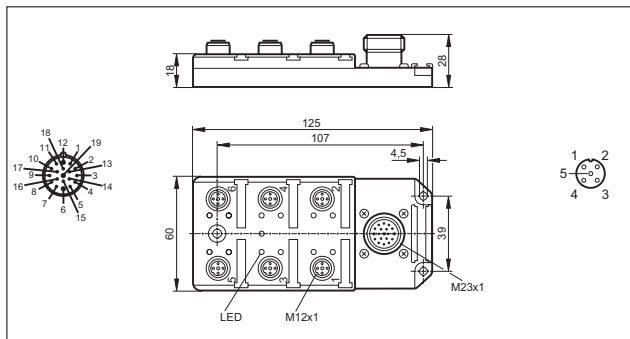
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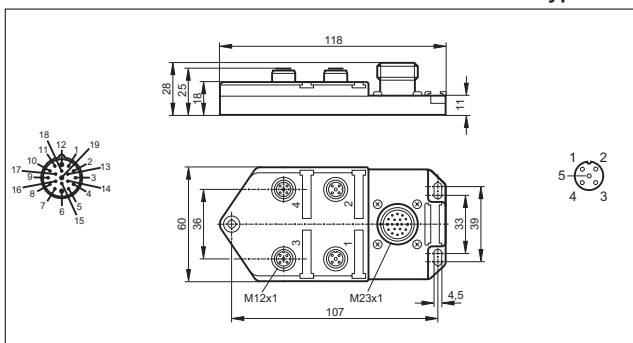
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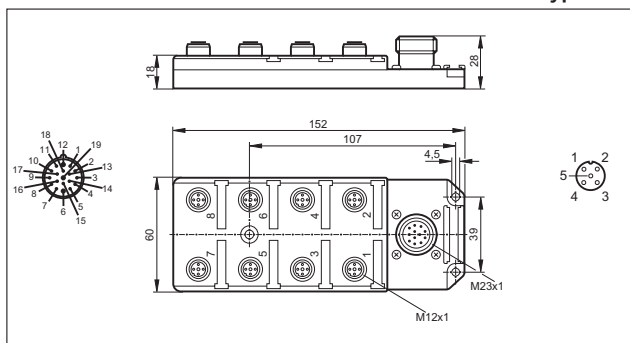
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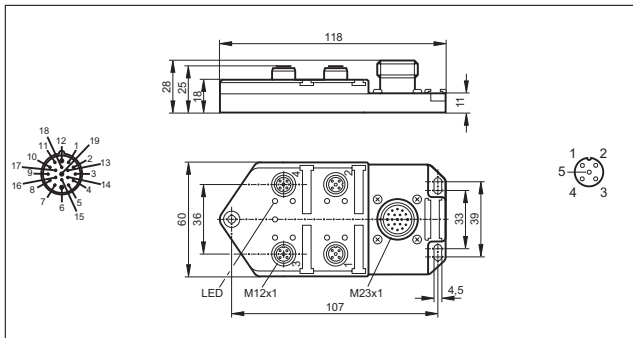
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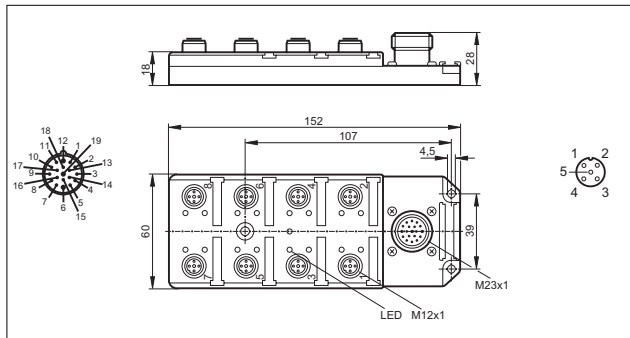
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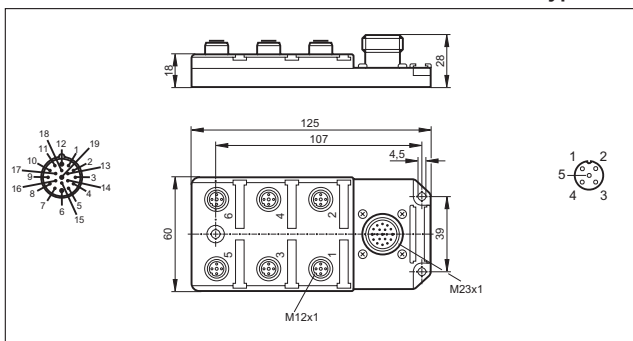
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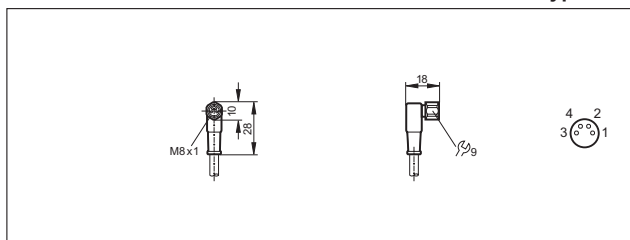
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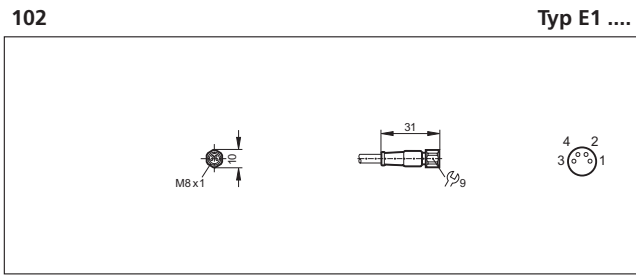
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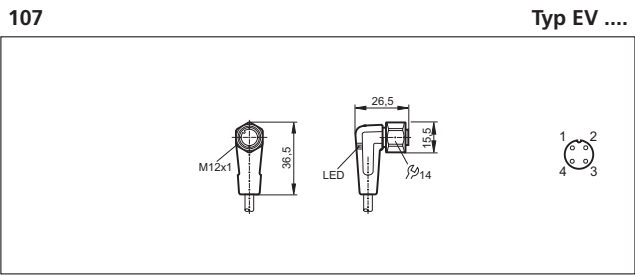
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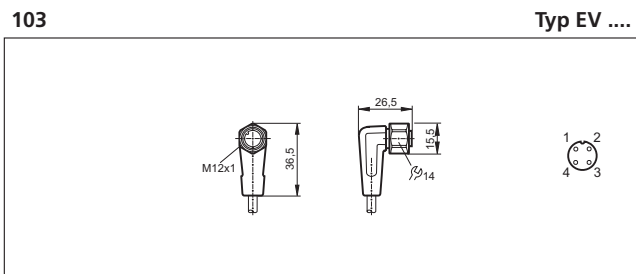
Complete ifm product range



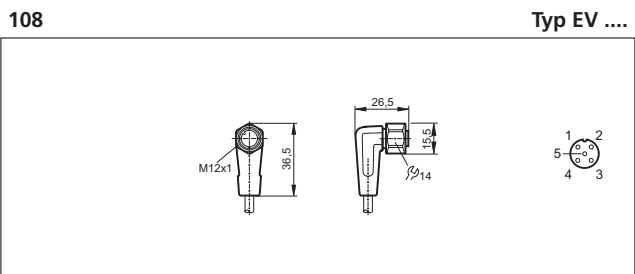
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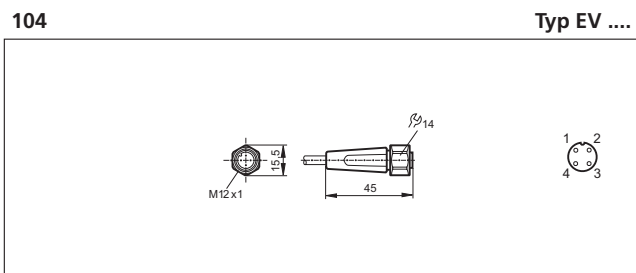
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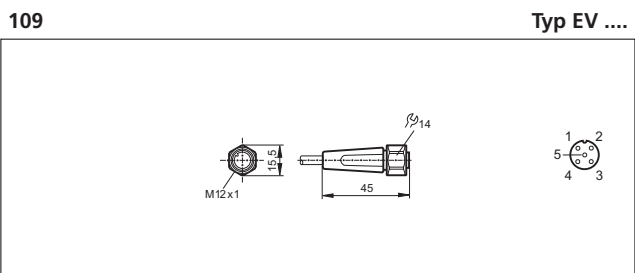
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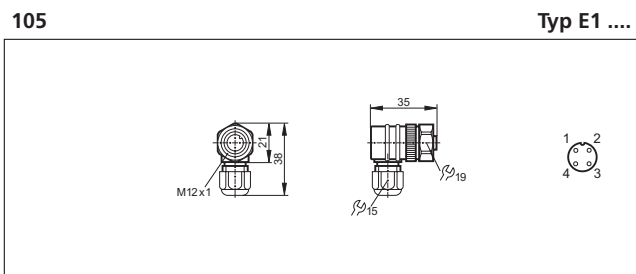
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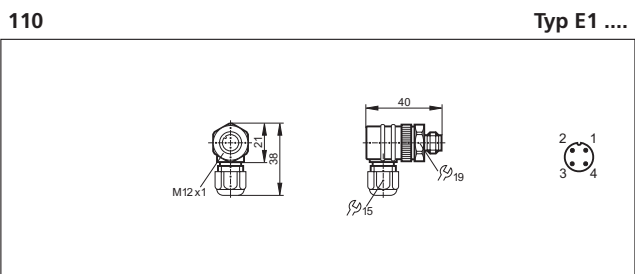
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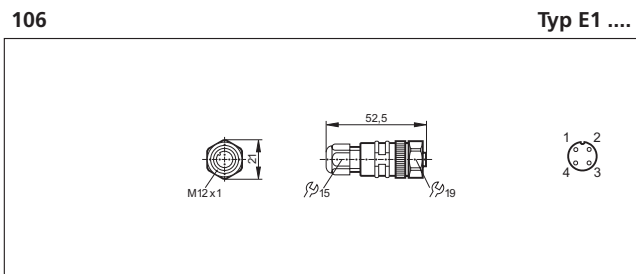
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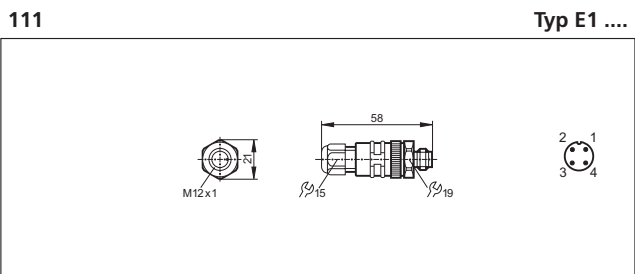
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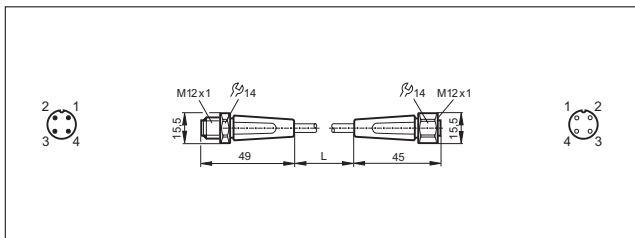
Accessories

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Complete ifm product range

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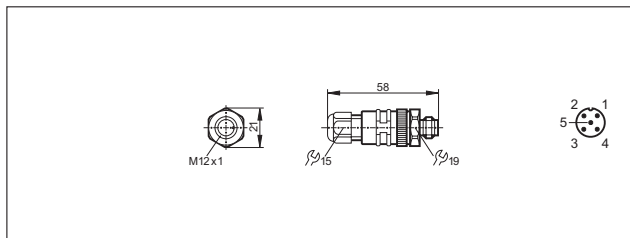
Typ EV



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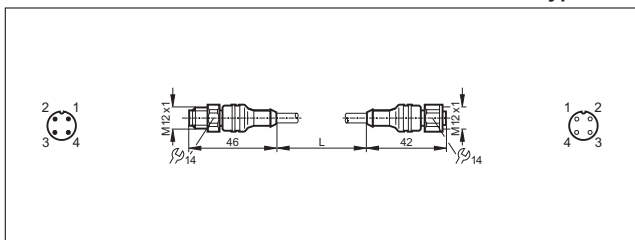
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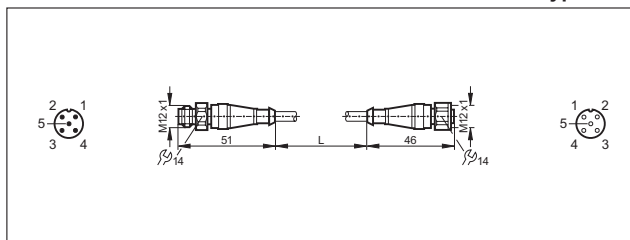
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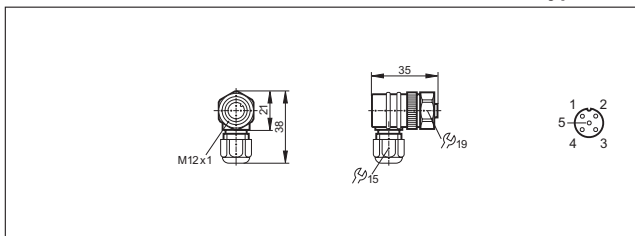
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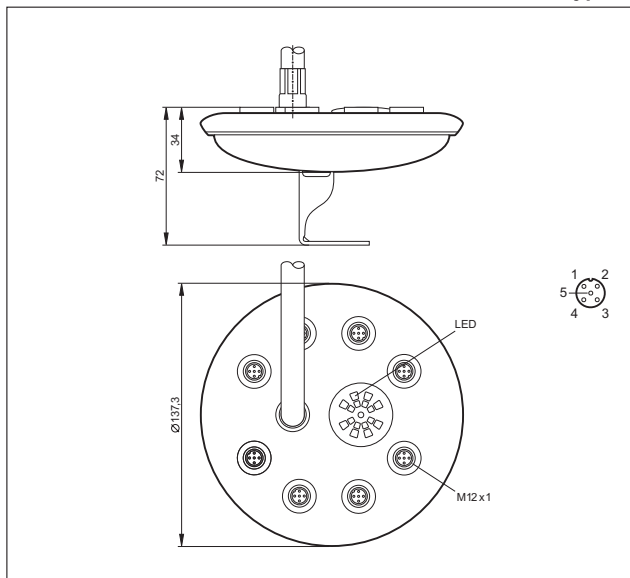
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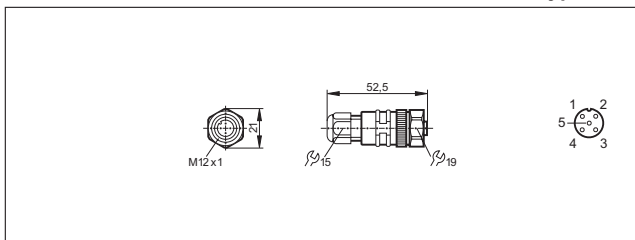
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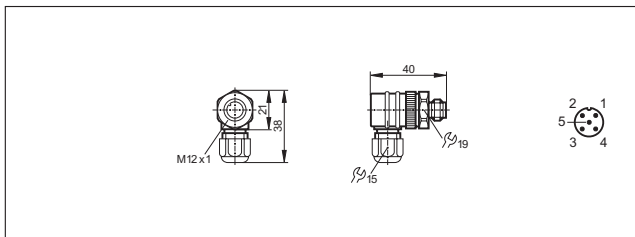
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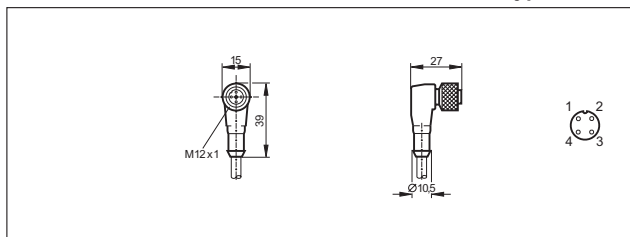
Typ E1



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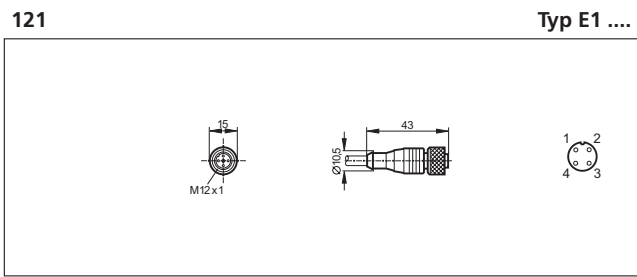
Typ E1, E4



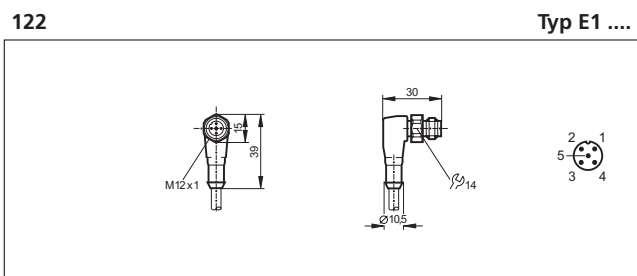
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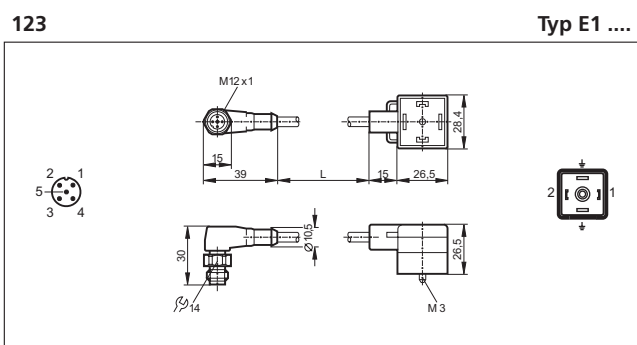
Complete ifm product range



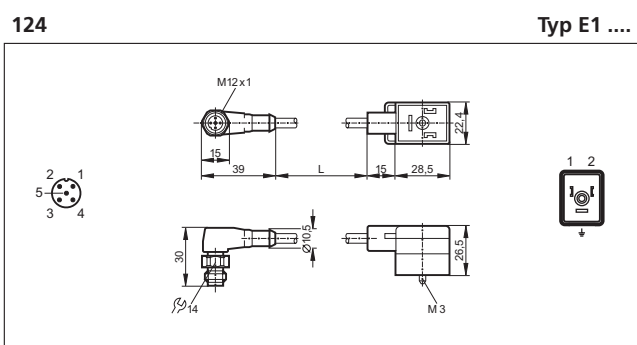
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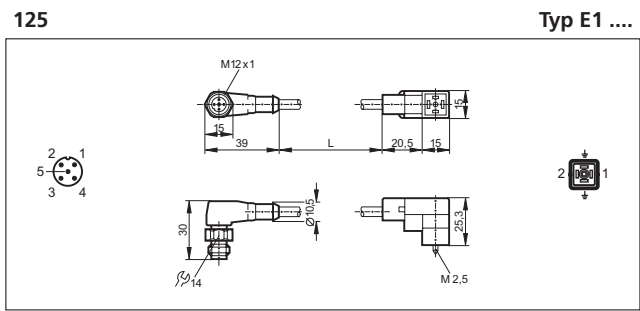
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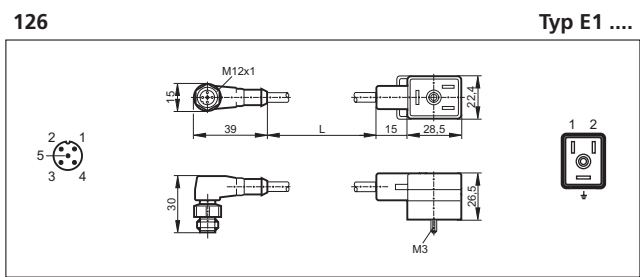
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Active zone / sensing face	The active zone is the area over the sensing face in which a proximity switch reacts to the approach of damping material, i.e. where it changes its switching status.
adjustable	The output function is activated if the measured value is between the set switch-on and switch-off point.
ATEX	ATEX (AT mosphère EX plosible) is an abbreviation for uniform EU directives for explosion protection in the industry (hazardous areas). Units for hazardous areas have to be approved according to these guidelines if they are launched after 30 June 2003.
Bursting pressure	The pressure at which the pressure-bearing parts burst or measured medium leaks out.
Cable length	To avoid voltage drops the maximum cable length indicated in the data sheet has to be adhered to.
Cable sheath materials	Depending on environment and application the materials show different resistances. Therefore certain properties or the suitability for a certain application cannot be guaranteed. Concerning the specific resistances we refer you to the explanations under "PUR cable", "PVC cable" and "PPU cable". The general notes given there do not exempt from any tests.
CIP / SIP	Common abbreviations in the food industry: CIP = Cleaning in place. SIP = Sterilisation in place. They identify cleaning and sterilisation processes within closed installations with cleaning / disinfecting solutions circulating in the circuit. Temperatures up to 140 °C may occur for a short time.
Correction factors	The correction factors (K) indicate the reduction of the real sensing range if a different material other than mild steel (Fe360) is used. The change of the real sensing range depends on the type, internal structure, size and geometry of the material to be sensed. <u>Typical correction factors for inductive units:</u> steel = 1, stainless steel approx. 0.7, brass approx. 0.4, aluminium approx. 0.3, copper approx. 0.2 <u>Typical correction factors for capacitive units:</u> water = 1, glass approx. 0.4, ceramics approx. 0.2, PVC approx. 0.2 Some inductive proximity switches use a constant correction factor (K=1) for all metals.
Current consumption	Current for the internal consumption of the unit. The value specified in the data sheet applies to the switched unit without load.

Current rating / continuous	The current at which units can be continuously operated. The units are protected against short circuits, overload and reverse polarity. In the case of a short circuit the output transistor is blocked immediately. When the short circuit has been rectified, the unit is ready again for operation.	General information
Current rating / peak	The maximum current which may flow for a short time when power is applied without influencing the functioning of the sensor.	List of articles
Deviation of the characteristics	The highest deviation of the characteristics from a straight line in the case of setting the limit values of the pressure sensors is defined by the characteristics deviation. For characteristics deviation for setting of limit values see DIN 16086.	Level sensors
Dynamic response	The dynamic response is the time between the change in temperature in the medium and the moment when the sensor has reached the new medium temperature. So t_{05} or t_{09} correspond to 50 % or 90 % of the final value (to DIN EN 60751, IEC 751).	Flow sensors
Electrical design	<u>DC PNP</u> : DC unit with positive output signal (sourcing). <u>DC NPN</u> : DC unit with negative output signal (sinking). <u>AC/DC dual voltage</u> : connection either to DC or AC voltage.	Pressure sensors
Flow adapter	In conjunction with flow sensors flow adapters can be used for detecting small flow rates lower than specified for the individual sensors. The medium and ambient temperatures should be approximately the same.	Temperature sensors
Flush mounting	The active face of a proximity switch can be mounted flush with the damping material.	Diagnostic systems
greatest	The measuring range where temperature, heat capacity or viscosity etc. of the medium have the least influence on the switch point.	Evaluation systems, power supplies
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Housing materials

Metal housing:

aluminium, galvanised steel, Optalloy-plated brass, Teflon-plated brass,

stainless steel (rustfree 303S22, acid-resistant 320S31):

stainless steel material no. 303S22 (X10 Cr NiS 18 9)

stainless steel material no. 316S12 (X2 Cr Ni Mo 1713 2)

316S12 (X2 Cr Ni Mo 18 14 3)

320S31 (X6 Cr Ni Mo Ti 17 12 2)

Plastic housing:

PBT (polybutyleneterephthalate)

The housing is largely resistant to aliphatic and aromatic hydrocarbons, oils, greases, hydraulic fluids, fuels; no stress cracking when exposed to air.

The housing is not resistant to hot water, hot steam, acetone, halocarbons, concentrated acids and alkalis.

Modified PPO:

The housing is largely resistant to diluted mineral acids, weak alkalis, some alcohols, oils and greases depending on additives; resistant to hydrolysis in hot and cold water.

The housing is not resistant to aromatic hydrocarbons and hydrocarbons containing chlorine, petrol, oils and greases depending on additives.

Chemically resistant fluoroplastics:

PTFE (polytetrafluoroethylene), LCP, PEEK, PEI, PA, mod. PC

Depending on environment and application plastics show different resistances. Therefore certain properties or the suitability for a certain application cannot be guaranteed.

For frequent or permanent exposure to chemicals all housing materials require testing prior to use.

Housing materials in contact with the medium

The materials of the sensors are adapted to the requirements of industrial hydraulic and pneumatic applications or to the requirements of hygienic applications. The resistance of the materials must be checked for other applications.

Hysteresis

The difference between the switch-on and the switch-off point.

Hysteresis of the switching output

Flow monitor:

Flow difference between the switch-on and switch-off points of the flow monitor in % of the switch point.

Pressure sensors:

The difference between the switch-on point and switch-off point is called hysteresis of the switching output. The hysteresis of the pressure sensor (without PB 7...) can be set between 2 % and 97 % of the value of the measuring range.

Temperature sensors:

The difference between the setpoint and reset point is called hysteresis of the switching output. The hysteresis of the temperature sensor can be set between 0.5 °C up to 190 °C (TR) or between 0.5 °C up to 165 °C (TN).

Measuring error

It indicates the deviation of the displayed value from the final value in %.

Measuring range

The measuring range is the range of the measured quantity for which the measurement deviations of a measuring instrument are to be within the defined error limits. The limits of the measuring range are the initial and final value.

Medium temperature

The medium temperature specifies up to what temperatures the sensors can be used.

Noise immunity

To avoid malfunction as a result of too high voltage peaks which might occur in critical applications, we recommend laying the cables of sensors separately from other cables (e.g. motors, solenoid valves). In especially difficult cases it might be necessary to lay screened cables. If in doubt please contact our engineers.

Nominal pressure

The pressure up to which the wetted parts can be operated.

Operating temperature

Temperature range which guarantees a safe functioning of the device. The operating temperature of the unit must be within the range indicated in the data sheet and must not be above or below this range.

Operating voltage

The voltage range for which the device is rated. The stated nominal voltage and the tolerance result in the operating voltage range in which the device functions safely. Exceeding or falling below the maximum or minimum values is only allowed within the limits specified in the data sheets.

Output function

Normally open: object within the active zone – output closed / high signal.

Normally closed: object within the active zone – output open / low signal.

Programmable: choice between normally closed or normally open.

Complementary: normally open and normally closed outputs available simultaneously.

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Overload protected	The response threshold for the short circuit protection is above the value specified for the continuous current rating. Units protected against overload are protected against destruction in this range as well.
PELV	PELV (Protective Extra Low Voltage) describes an electrical system in which the voltage cannot exceed the value of 60 V DC. It also includes a protective measure against direct and indirect contact with dangerous voltage, the so-called "safe isolation" from the supply system. Circuits and/or bodies in a PELV system can be connected to ground - in contrast to the SELV system.
Power-on delay time	The power-on delay time is the time which elapses between the application of the operating voltage and the readiness of the device to generate the correct switching signal.
Pressure range	The mechanical design of the sensor housings enables use of the flow monitors in different pressure ranges.
Programmable output function	The switching output can be programmed as normally open or normally closed (for photoelectric proximity switches light-on or dark-on) by means of the choice of the wire connection or via programming buttons.
Protection classes	Protection class 1 (I): units with protective wire connection Protection class 2 (II): units with protective insulation (double insulation) Protection class 3 (III): units for connection to protective extra-low voltage Voltage supply to EN 50178, PELV, SELV All units marked protection class III or all units without protective wire connection or protective insulation mark must be connected to protective extra-low voltage (max. 60 V DC). For inductive proximity switches this can be SELV or PELV.

Protection rating	The protection rating (to IEC 529 / DIN 40 050) defines the degree of protection from ingress of dust and moisture.	General information
	<u>IP 65</u> Complete protection against contact with dangerous parts; protection against ingress of dust; protection against water jets.	List of articles
	<u>IP66</u> Complete protection against contact with dangerous parts; protection against ingress of dust. Protection against strong water jets.	Level sensors
	<u>IP 67</u> Complete protection against contact with dangerous parts; protection against ingress of dust; protection when immersed temporarily in water. 1 m depth of water for 30 minutes.	Flow sensors
	<u>IP 68</u> (ifm-specific definition) Complete protection against contact with dangerous parts; protection against ingress of dust; protection when permanently immersed in water. According to ifm factory standard: 1 m depth of water for 7 days.	Pressure sensors
	<u>IP 69K</u> Complete protection against contact with dangerous parts, protection against ingress of dust, protection against ingress of water during high-pressure steam cleaning	Temperature sensors
Protective insulation	Protection is achieved not only through basic insulation but by means of a double or enhanced insulation that meets the requirements of the protective insulation.	Diagnostic systems
PTB / INERIS	National bodies testing electrical equipment and approving it for hazardous areas.	Evaluation systems, power supplies
	PTB = Physikalisch-Technische Bundesanstalt Braunschweig und Berlin. INERIS = Institut National de L'Environnement Industriel et de Risques (France).	Connection technology
PUR cable	Oil-resistant cable. Not resistant to hydrolysis, therefore not suited for permanent contact with water. In order to avoid breakage the cables should not be moved if the temperature falls below -5 °C.	Accessories
PUR/PVC cable (PPU cable)	PVC cable with additional PUR sheathing. Oil-resistant cable. Not resistant to hydrolysis, therefore not suited for permanent contact with water. In order to avoid breakage the cables should not be bent if the temperature falls below -5 °C (-> plastics).	Technical information and customer service
PVC cable	Tried-and-tested standard cable. In order to avoid breakage the cables should not be moved if the temperature falls below -5 °C. PVC cables are not designed for continuous operation in oily environments. They are neither resistant to ozone nor to ultra-violet light.	

Range of destruction	The range of destruction is the pressure range in which changes to the measuring characteristics of the pressure sensor are permanent and mechanical destruction of the pressure sensor is possible. It starts at the end of the overload range.
Repeatability	The repeatability of two measurements under standard conditions. The difference of the measured values must not exceed 10 %.
Response time	<u>Flow monitor:</u> The response time is the time period the adjusted flow monitor needs to detect and indicate flow or no flow. For control monitors with wire monitoring, a wire break or a short circuit is detected and signalled within this time. <u>Pressure sensors:</u> The response time is the time between the pressure change and the change in the output stage at the switching output. Conditions: Sudden rise or fall of the pressure from 0 % to 100 % of the final value of the measuring range (VMR). Value of the switch point: 70 % of VMR, value of the reset point: 30 % of VMR. <u>Temperature sensors:</u> The dynamic response is the time between the change in temperature in the medium and the moment when the sensor has reached the new medium temperature. t_{05} or t_{09} correspond to 50 % or 90 % of the final value (to DIN EN 60751, IEC 751).
SELV	SELV (Safe Extra Low Voltage) describes an electrical system in which the voltage does not exceed the value of 60 V DC. It includes a protective measure against direct and indirect contact with dangerous voltage, the so-called "safe isolation" from the supply system. In contrast to a PELV system a SELV system must not be grounded.
Sensitivity	The measuring range where temperature, heat capacity or viscosity etc. of the medium have the least influence on the switch point.
Setting range	Within the setting range the flow monitors can be adjusted to any switch point. It is recommended to select the switch point if possible within the area of the greatest sensitivity.

Shock and vibration resistance

The shock and vibration resistance of all sensors is tested.

Vibration

According to EN 60068-2-6 under the following conditions:
along 3 mutually perpendicular axes,
Frequency range: 10 Hz to 55 Hz

Example proximity switches:

Amplitude: 1 mm for inductive and capacitive proximity switches. 0.5 mm for photoelectric sensors.

Vibration duration: 5 min.

Duration of the time of exposure at resonant frequency or at 55 Hz: 30 min in each axis (at total of 90 min.).

Shock resistance

According to EN 60068-2-27 under the following conditions:
6 shocks in each direction along axes perpendicular to each other (6 individual tests).

Example proximity switches:

Pulse shape: half-sine.

Peak acceleration: 30 g.

Pulse duration: 11 ms.

Short-circuit protection

Most ifm sensors are protected against excessive current by means of a pulsed short-circuit protection.

Switch point accuracy

The possible deviation of the set value from the real value of the switch point.

System pressure

The pressure of the measured medium to which the pressure sensor is subjected.

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Temperature classifications

Temperature classifications to DIN VDE 0165, classification of the equipment by the permissible surface temperature:

Temperature classification T1:

Maximum permissible surface temperature of the equipment: 450 °C, ignition temperatures of the combustible materials: > 450 °C

Temperature classification T2:

Maximum permissible surface temperature of the equipment: 300 °C, ignition temperatures of the combustible materials: > 300 °C < 450 °C

Temperature classification T3:

Maximum permissible surface temperature of the equipment: 200 °C, ignition temperatures of the combustible materials: > 200 °C < 300 °C

Temperature classification T4:

Maximum permissible surface temperature of the equipment: 135 °C, ignition temperatures of the combustible materials: > 135 °C < 200 °C

Temperature classification T5:

Maximum permissible surface temperature of the equipment: 100 °C, ignition temperatures of the combustible materials: > 100 °C < 135 °C

Temperature classification T6:

Maximum permissible surface temperature of the equipment: 85 °C, ignition temperatures of the combustible materials: > 85 °C < 100 °C

Temperature gradient

The temperature gradient indicates the permissible temperature fluctuation of the medium per time unit without causing any change of the output signal when the switch point is properly set within the range of the greatest sensitivity. The temperature gradients stated in the data sheets were determined in water at a nominal flow of 60cm/s and a switch point set at 50 % of the nominal flow. Other conditions could result in other temperature gradients.

TPR cable

Cable for operating temperatures from -40 °C to 150 °C. Good resistance to oils, fuels, acids and alkalies.

Vibration resistance

The pressure and temperature sensors are tested according to DIN/IEC 67-2-6 in the frequency range of 10 to 2000 Hz. They are resistant to vibration up to 20 g.

Voltage drop

As the switching output consists of a semiconductor (transistor, thyristor or triac), in the switched state a (small) drop in the voltage in series to the load occurs. In two-wire technology the voltage drop also serves to provide energy to the electronics of the sensor. The voltage drop is measured across the sensor in its switched state at max. current load. EN 50008 - 025, 036, 038.

Window	The output function is activated if the measured value is between the set switch-on and switch-off point.
Wire monitoring	Control monitors with the option wire monitoring monitor the cable between sensor and control monitor with regard to wire break or short circuit. A failure is indicated by a red LED and an additional output relay.

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Position sensors and object recognition

Inductive sensors

Electromagnetic field immune and temperature shock resistant sensors · High-grade stainless steel housings · Protection up to IP 69 K · Versions with increased sensing range · Analogue output · Use e.g. in hazardous areas, in the food industry and in mobile machines · Sensors with correction factor 0 or 1

Capacitive sensors

High operational reliability by increased noise immunity · Adjustable sensing ranges · Variable connection options by cable, connector or terminals · Versions for industrial applications and use in hazardous areas

Magnetic sensors, cylinder sensors

Cylinder sensors: For robust industrial applications · For position detection of pistons in pneumatic cylinders · Versions with ATEX approval · Accessories for all common cylinder types · Magnetic sensors: For position detection · Polarity independent · Ingress resistant to high-pressure cleaning

Safety technology

Sensors in compliance with the machinery directive · All four control categories available · Direct connection to PLCs and logic modules · Sensors operating without coded target · Enable zone monitored for target position and dwell time

Valve sensors

Absolutely safely with no wear at all · Protection rating IP 67 · Resistant to mechanical stress such as shock or vibration · Special versions for AS-interface and hazardous areas · Quick and easy mounting

Photoelectric sensors

Infrared and red light sensors: Through-beam, retro-reflective and retro-reflective sensors with polarisation filter · Diffuse reflection sensors · Fibre optics · Laser sensors · Colour and contrast detection · Glass and film detection · Laser distance sensors with PMD technology: 10 m range · Background suppression

Object recognition

Object recognition for assembly and manufacturing tasks and quality control · Orientation-independent recognition of contour and orientation · Ultra-flat back-lights for 4 times higher luminous power

Encoders

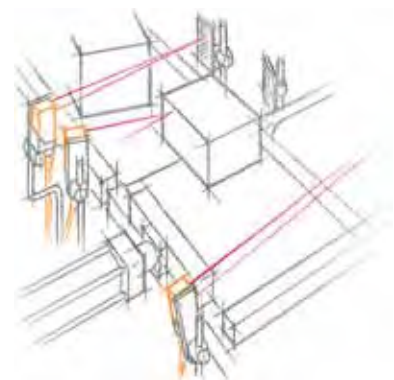
Incremental encoders: Solid shaft encoders · Hollow shaft encoders with integrated stator coupling · Absolute encoders: Singleturn and multiturn · SSI interface · Profibus DP gateway

Evaluation systems, power supplies

Pulse processing and display: Monitors with various pulse evaluation functions · Speed monitors · Programmable counters · Digital displays · Hazardous dust areas · Transformer and switched-mode power supplies: Versions from 1 to 40 A

Connection technology

High-quality connectors · From M8, M12, M18 standard versions to the valve plug · For different applications: Industrial applications, oils and coolants, electromagnetic fields, robotics, hygienic and wet areas as well as explosive atmospheres



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Level sensors

Capacitive level sensors: For liquids and dry bulk material · Increased noise immunity · Level sensors: Local level indication · Point level sensors: Versions with approvals to the German overspill standard WHG section 19

Flow sensors

Flow sensors with integrated control monitor or external amplifier · Flow sensors for hazardous areas · Flow rate sensor for industrial applications · Airflow sensor · Thermal compressed air meter for leakage monitoring · Consumed quantity meter for special gases

Pressure sensors

High overload resistance · Universal process fitting via adapter · Alphanumeric LED display · Maintenance-free and with longterm stability · Setting of the switch points possible without system pressure · Special versions for process technology and integration into hydraulic / pneumatic networks

Temperature sensors

Control monitors with integrated sensor or for the connection of probe / cable sensors · Pt100 / Pt1000 versions · Universal process connection via adapter · Alphanumeric LED display · Analogue and / or switching outputs

Diagnostic systems

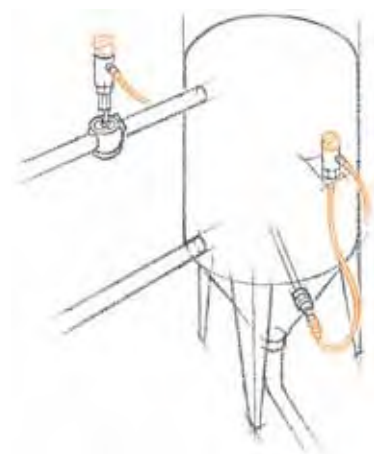
Rolling element bearing diagnosis: Rolling element bearing damage can be detected as it arises · Increased uptime of plants and machines · Real-time maintenance: Sensors with serial or Ethernet interface · Visualisation software · Diagnostic electronics for vibration sensors

Evaluation systems, power supplies

Switching amplifiers: Threshold relay for standard signals with RS-232 interface · Digital displays with LED or LCD display · Transformer / switched-mode power supplies: Transformer power supply with 1 or 2 channels · Integrated sensor supply · Switched-mode power supplies with a stable supply voltage

Connection technology

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Power supplies

AS-i switched-mode power supplies · PELV requirements to EN 50178 and EN 60204 · Voltage selector for 230 V or 115 V networks · One-phase or three-phase versions · Regulated DC output voltage between 29.5 V und 31.6 V · Rail mounting

Connection technology

High-quality connectors · From M8, M12, M18 standard versions to the valve plug · For different applications: Industrial applications, oils and coolants, electromagnetic fields, robotics, hygienic and wet areas as well as explosive atmospheres

Bus systems



Identification systems



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Power supplies

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Connection technology

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Connection technology

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Control systems



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power supplies

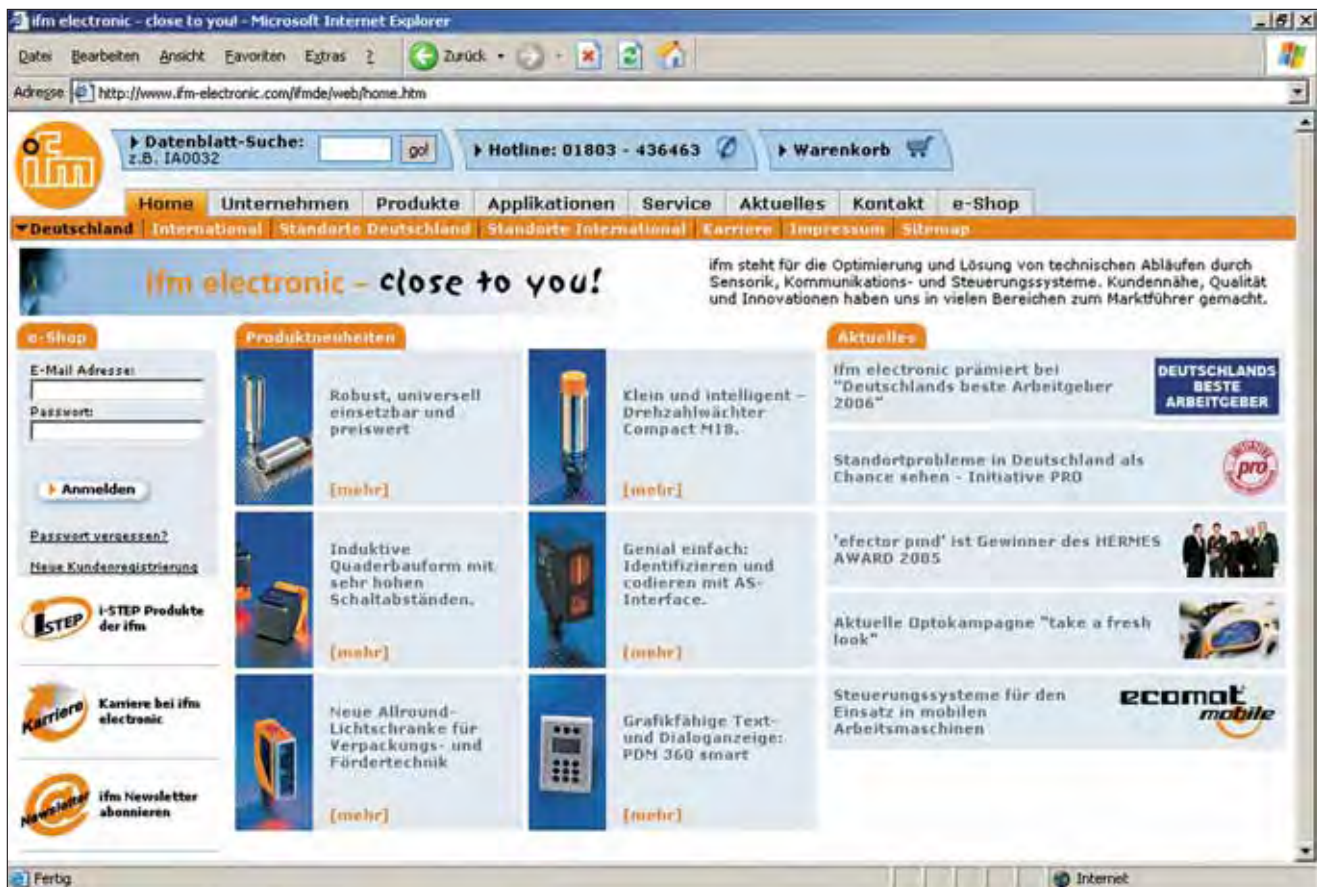
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5	E10900	Zubehör, Kabeldose, abgewinkelt, ifm electronic, 4-Leiter, AC/DC, 250V AC / 300V DC, Für Sensoren mit M12-Steckverbindung, 2m, PUR-Kabel, 4 x 0,34 mm², Silikonfrei, Halogenfrei, Kontakte vergoldet, TARIC-Code: '85445190'	02 Mrz 2006	Prüfen	7,12 €	35,62 €	Löschen

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Asunción 2130
1419 - Buenos Aires
Argentina
Phone +54 / 11 / 45 74 1555
Fax +54 / 11 / 45 74 2400
robertomoriones@aea.com.ar
www.aea.com.ar

Australia

ifm efector Pty Ltd.
P.O. Box 4084
Suite 3, 745 Springvale Road
Mulgrave VIC 3170
Phone 1300 365 088
Fax 1300 365 070
sales.au@ifm-electronic.com
www.ifmefector.com.au

Austria

ifm electronic gmbh
Wienerbergstraße 41
Gebäude E
1120 Vienna
Phone +43 / 1 / 617 45 00
Fax +43 / 1 / 617 45 00 10
info.at@ifm-electronic.com
www.ifm-electronic.at

Bangladesh

Sensotec Automation
Red Crescent Chamber
87, Motijheel Commercial
Area
Dhaka 1000
Bangladesh
Phone +880 171 546 890
sensotec@agni.com

Belarus

DEPOSIT INVEST
Joint-Stock Company
Block 2,
27 Zheleznodorovhnaya street
220089 Minsk
Republic of Belarus
Phone +375-17-270 75 06
Fax +375-17-270 75 07
george_ozervov@infonet.by

**Belgium
and Luxembourg**

ifm electronic n.v./s.a.
Zuiderlaan 91
1731 Zellik
België
Tel. +32 2 481 0220
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info.be@ifm-electronic.com
www.ifm-electronic.be

Brazil

ifm electronic Ltda.
Rua Eleonora Cintra, 140
Jardim Analia Franco
03337-000 São Paulo/SP
Phone +55-11-6672-1730
Fax +55-11-6673-3501
info.br@ifm-electronic.com
www.ifm-electronic.com.br

Bulgaria

ANIPAL
Vranja Str. 30
1233 Sofia
Phone +359-2-33 32 37
Fax +359-2-931 15 11
anipal@mail.orbitel.bg

Canada

ifm efector Canada Inc.
700 Dorval Drive/Corporate
Centre
Oakville; L6K3V3 Ontario
Phone +1-800-441-8246
Fax +1-800-329-0436
info@ifmefector.ca
www.ifmefector.ca

Chile

**Electronica Industrial
Schädler y Cia. Ltda.**
Av. Antonio Varas 1871
Providencia
6641545 Santiago
Phone +56 / 2 / 274 74 30
Fax +56 / 2 / 204 93 38
info@schadler.com
www.schadler.com

China

**ifm electronic (Shanghai)
Co., Ltd**
Building 4 56 Meisheng Road
Waigaoqiao Free Trade Zone
Shanghai
People's Republic of China
Phone +86-21-51 17 27 18
Fax +86-21-51 17 27 19
info.cn@ifm-electronic.com
www.ifm-electronic.com.cn

ifm electronic (HK) Ltd

Units 1103-1104, 11/F.
Tower 2, Metroplaza
No. 223 Hing Fong Road
Kwai Chung
N.T., HONG KONG
Phone +852 9457-0360
Fax +852 3697-0222
www.ifm-electronic.hk
**Everharmony-
Enterprise, Inc.**
26, Lane 63
Tung Hwa South Road, Sec. 2
P.O. Box 96-47
Taipei
Phone +886 / 2 / 270 700 69
Fax +886 / 2 / 270 247 23
info@everharmony.com.tw

Czech Republic

ifm electronic spol.s.r.o.
U Krízku 571
252 43 Prague
Phone +420 / 2 / 67 990 211
Fax +420 / 2 / 67 750 180
info.cz@ifm-electronic.com
www.ifm-electronic.cz

Denmark

ifm electronic a/s
Ringager 4A, 1.sal tv.
2605 Brøndby
Phone +45 70 20 11 08
Fax +45 70 20 11 09
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www.ifm-electronic.dk

Dominican Republic

**WECH
AUTOCOTROLES S. A.**
Ave. Romulo Betancourt 2158
Edificio Wech
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Santo Domingo
Dominican Republic
Phone: + 1 809-531-0550
Fax: + 1 809-531-9175
wech@verizon.net.do
www.wechautocontroles.
com.do

Egypt

**Egyptian Establishment for
Electromechanical Supplies**
Mr. Ahmed Gouda
27 Al-Salam Street
Al Arezona, Al Haram Road
Giza 12111, Cairo
Phone +20 / 2 / 586 49 49
Fax +20 / 2 / 586 49 49
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ahgouda@hotmail.com

Estonia

Pesmel Estonia LTD
Segu 4
76505 Saue
Estonia
Phone: +372 674 73 30
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Finland

ifm electronic oy
Vaakatie 5
00440 Helsinki
Phone +358 / 9 / 751 777 00
Fax +358 / 9 / 751 777 10
info.fi@ifm-electronic.com
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France

ifm electronic
Siège :
Savoie Technolac BP226
73374 Le Bourget du Lac
Agence commerciale :
Immeuble Uranus
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Tél: 0820 22 30 01
Fax: 0820 22 22 04
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Germany

ifm electronic gmbh
Teichstraße 4
45127 Essen
Phone +49 201 2 42 20
Fax +49 201 2 42 22 00
info@ifm-electronic.com
www.ifm-electronic.de

Greece

**ifm electronic
monoprosopi E.P.E.**
27, Andrea Papandreou Street
15125 Amaroussi
Greece
Tel.: +30 210 61 800 90
Fax.: +30 210 61 994 00
info.gr@ifm-electronic.com
www.ifm-electronic.gr

Hungary

ifm electronic kft.
Közép u. 16.
II.em. 208. iroda
H-9024 Győr
Phone +36-96 / 518-397
Fax +36-96 / 518-398
www.ifm-electronic.hu

India

**ifm electronic
India Branch Office**
Plot No. P-39/1
MIDC Gokul Shirgaon
Kolhapur – 416234
Maharashtra State, India
Phone +91 / 231 / 267 27 70
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info@ifm-electronic.in
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Indonesia

PT Indoserako Sejahtera
Jl. P. Jayakarta 121 No. 59
10730 Jakarta Pusat
Phone +62 / 21 6 24 8923
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iso297@dnnet.net.id

Iran

MEHR KANAZ Co.
No. 31, Koosha St.
Shariati Ave.
P.O. Box 19395 - 4481
Teheran
Phone +98 / 21 / 2222 6994
Fax +98 / 21 / 2222 7851
info@mehr-kanaz.com
www.mehr-kanaz.com

Ireland

ifm electronic (Ireland) Ltd.
No. 7, The Courtyard
Kilcarbery Business Park
New Nangor Road
Clondalkin
Dublin 22
Phone +353 / 1 / 413 60 66
Fax +353 / 1 / 457 38 28
sales_ie@ifm-electronic.com
www.ifm-electronic.ie

Israel

Astragal Ltd.
3, Hashikma Str.
Azur 58001
P.O. Box 99
Azur 58190
Phone +972 / 3 / 5 59 16 60
Fax +972 / 3 / 5 59 23 40
astragal@astragal.co.il
www.astragal.co.il

Italy

ifm electronic
Centro Direzionale Colleoni
Palazzo Andromeda 2
Via Paracelso No. 18
20041 Agrate-Brianza (Milan)
Phone +39 / 68 99 982
Fax +39 / 68 99 995
info.it@ifm-electronic.com
www.ifm-electronic.it

Japan

efector co. ltd.
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Techno Green Park
2-9-20 Okayamadai
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ifm-j@efector.co.jp
www.efector.co.jp

Jordan

**Al Mashreqan
Trading Supplies**
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11185 Swaifieh
Amman - Jordan.
Phone +962 6 581 8841
Fax +962 6 581 8892
info@mashreqan.com

Korea

ifm electronic Inc.
2F Hyundai Liberty House 201
Hannam-Dong 258
Yongsan-Gu, Seoul
Phone +82 2-790-5610
Fax +82 2-790-5613
kr@ifm-electronic.com
www.ifm-electronic.kr
KC Enterprises Co., Ltd.
Suite 404 Royal Plaza 864-1
Jnaghang, Ilson
410-837 Goyang, Gyeonggi-Do
Phone +82 31 903 3731
Fax +82 31 908 3731
port@kcent.co.kr
www.kcent.co.kr

Latvia

EC Systems
Katlakalna Str. 4A
1073 Riga
Latvia
Phone: +371 724 1231
Fax: +371 724 8478
aln@ecsystems.lv
www.ecsystems.lv

Lebanon

**Middle East Development
Co. SAL (MEDEVCO)**
Medevco Building
Jeita Main Road
Jeita - Kesrouan
Lebanon
Mail address :
P.O.Box 67
Jounieh
Lebanon
Tel + 961-9-233550
Fax + 961-9-233554
info@medevco-lebanon.com

Lithuania

Elinta UAB
Pramones pr. 16E
51187 Kaunas
Lithuania
Phone: +370 37 351 987
Fax: +370 37 452 780
info@elinta.lt
www.elinta.lt

Malaysia

ifm electronic Pte. Ltd
Malaysian Branch Office
No. 21, Jalan Kemuning
Taman Kebun The
80250 Johor Bahru
Johor, West Malaysia
Phone +60 / 7 / 332 5022
Fax +60 / 7 / 332 1577
sales_my@ifm-electronic.com

ifm electronic

Asia Regional Office
No. 21, Jalan Kemuning,
Taman Kebun The
80250 Johor Bahru
Johor, West Malaysia
Phone +60 / 7 / 332 5022
Fax +60 / 7 / 332 1577
sales_my@ifm-electronic.com

Mexico

**ifm efector S. de R.L.
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Anillo Periférico, 1816-1
Col. Hacienda San Jerónimo
Monterrey, N.L.
Mexico 64630
Phone +52-81-8040-3535
Fax +52-81-8040-2343
www.ifmefector.mx

Netherlands

ifm electronic b.v.
Deventerweg 1 E
3843 GA Hardervijk
Phone +31 / 341 438 438
Fax +31 / 341 438 430
info.nl@ifm-electronic.com
www.ifm-electronic.nl

New Zealand

ifm efector pty Ltd.
Unit B, 20 Cain Road
Penrose, Auckland
Phone +64 / 95 79 69 91
Fax +64 / 95 79 92 82
sales.nz@ifm-electronic.com

Nigeria

Automated Process Ltd
3rd Floor, 32 Lagos Abeokuta
Expressway
Near Cement Bus Stop
Dopemu, Agege
Lagos State, Nigeria
Phone + 234 / 01 / 4729 967
Fax + 234 / 01 / 4925 865
sales@automated-process.com
www.automated-process.com

Norway

Siv.Ing. J.F.Knudtzen AS
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1396 Billingstad
Postboks 160
1378 Nesbru
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firmapost@jfk.no
www.jfk.no

Oman

**Technical Engineering
Company LLC.**
P.O.Box. 59
Madinat Al Sultan Qaboos
Postal Code 115
Sultanate of Oman
Tel. + 968 24503593
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tecoman@omantel.net.om

Pakistan

AB Automation
Shop No.2. Rubab Chamber
M.A. Jinnah Road
Off Sarai Road
Karachi
Phone +92 / 21 / 2412 278
Fax +92 / 21 / 2422 277
abauto@cyber.net.pk

Peru

dekatec s.a.c.
Los Calderos 188
Urb. Vulcano, Ate
Lima / Peru
Phone +511 / 348 0293
Phone +511 / 348 0458
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Fax +511 / 349 0110
info@dekatec.com.pe
www.dekatec.com.pe

Philippines

Gram Industrial, Inc.
Unit 410 Common Goal
Tower
Finance cor. Industry St.,
Madrigal Business Park,
Ayala Alabang, Muntinlupa
City
1770 Philipines
Telefax: (+632) 850-8496
Phone: (+632) 850-2218
efector@gram.com.ph

Poland

ifm electronic Sp.z o.o.
ul. Kosciuszki 175
PL 40-524 Katowice
Phone +48 / 32 / 60 87 454
Fax +48 / 32 / 60 87 455
info.pl@ifm-electronic.com
www.ifm-electronic.pl

Portugal

**ifm electronic –
Sucursal em Portugal**
Avenida da Republica 2503
4430-208 Vila Nova de Gaia
Phone +351 / 22 / 37 17 108
Fax +351 / 22 / 37 17 110
info.pt@ifm-electronic.com
www.ifm-electronic.pt

Romania

ifm electronic s.r.l.
Str. Cristian Nr. 5
550073 Sibiu
Phone: 0040 269 224550
Fax: 0040 269 224766
info.ro@ifm-electronic.com

Russia

ifm electronic
Ibragimova, 31, k.50
office 607
105318 Moscow
Tel.: +7 (095) 101-44-14
Fax: +8 (501) 415-38-04
info.ru@ifm-electronic.com
www.ifm-electronic.ru

Saudi Arabia

**Noor Al-Shomoe for
Electric & Maintenance**
King Khalid Street, Cross 5
P.O. Box 2571
Al-Khobar 31952
Kingdom of Saudi Arabia
Phone +9 663 864 49 58
Fax +9 663 894 63 41
h.o.info@nooralshomoe.com

Singapore

ifm electronic Pte. Ltd.
25, Intern. Business Park
#03-104 German Center
609 916 Singapore
Phone +65 / 6 / 5 62 86 61
Fax +65 / 6 / 5 62 86 60
sales_sg@ifm-electronic.com
www.ifm-electronic.com.sg

Slovakia

ifm electronic spol. s.r.o.
Rybníčna 40
835 54 Bratislava
Phone +421 / 2 / 44 87 23 29
Fax +421 / 2 / 44 64 60 42
info.sk@ifm-electronic.com
www.ifm-electronic.sk

South Africa

**Shorrock Automation
(Pty) Ltd.**
Postnet Suite
Private Bag X8
Elardus Park 219
0047 Pretoria
For Visitors and mail-order
address:
Shorrock House
44 Sovereign Drive
Route 21, Corporate Park
Irene Ext. 30
Centurion, Pretoria
Phone +27 / 12 / 345 44 49
Fax +27 / 12 / 345 51 45
sales@shorrock.co.za
www.shorrock.co.za

Spain

**ifm electronic –
Sucursal en España**
Edificio Prima Muntadas A
Parc Mas Blau
C/Berguedà 1
08820 El Prat de Llobregat
Phone +34 / 93 / 479 30 80
Fax +34 / 93 / 479 30 86
info.es@ifm-electronic.com
www.ifm-electronic.es

Sweden

ifm electronic ab
Hallavägen 10
512 60 Överlida
Office Gothenburg:
Drakegatan 6
41250 Gothenburg
Phone +46 / 325 / 66 15 00
Phone +46 / 325 / 66 15 50
Fax +46 / 325 / 66 15 90
info.se@ifm-electronic.com
www.ifm-electronic.se

Switzerland

ifm electronic ag
Altgraben 27
4624 Härkingen
Phone +41 / 62 / 388 80 30
Fax +41 / 62 / 388 80 39
info.ch@ifm-electronic.com
www.ifm-electronic.ch

Syria

**I.E.C. Industrial Engineering
Center**
P.O. Box 15
Sehnaya, Damascus
Syria
Tel. + 963 11 532 13 19
Fax. + 963 11 442 12 27
info@iec-automation.com

Thailand

Sang Chai Meter Co., Ltd.
694/23-26 Phaholyothin Road
Samsen Nai, Phayathai
Bangkok 10400
Phone +66 / 2 / 616 8031
Fax +66 / 2 / 616 8050
scmth@ksc9.th.com

Turkey

ifm electronic Ltd. Sti.
Perpa Ticaret
Merkezi Elektrokent
A Blok Kat:11 NO: 1557/1559
34384 Okmeydanı/ Istanbul
Telefon +90 / 212 / 210 5080
Faks +90 / 212 / 221 7159
info.tr@ifm-electronic.com

Ukraine

ifm electronic
Mariny Raskovoj 11
02660 Kiev
Ukraine
Phone +380 44 501 8543
Fax +380 44 501 8543
info.ua@ifm-electronic.com
www.ifm-electronic.ua

United Arab Emirates – Dubai

**Noor Al-Shomoe Electrical
Equipments Est.**
P.O.Box. 64052
Unit no. 36
Reef Real Estate
Jebel Ali Industrial Area no. 3
Dubai
United Arab Emirates.
Phone. + 971 4 880 3838
Fax.+ 971 4 880 3883
Mobile: + 971 505084834
alshomoe@emirates.net.ae
www.nooralshomoe.com

United Arab Emirates –
Abu Dhabi
**Al Injazat Technical Trading
Services**
P.O. Box 42895
Abu Dhabi
United Arab Emirates
Phone +971 2 622 6030
Fax +971 2 622 3050
kamran@injazat.ae

United Kingdom

ifm electronic Ltd.
efector House
Kingsway Business Park
Oldfield Road
Hampton
Middlesex TW12 2HD
Phone +44 / 20 / 8213 0000
Fax +44 / 20 / 8213 0001
enquiry_gb@ifm-
electronic.com
www.ifm-electronic.co.uk

USA

efector inc.
805 Springdale Drive
Exton, PA 19341
Phone +1 / 610 524 2000
Fax +1 / 610 524 2010
info@ifmefector.com
www.ifmefector.com

Venezuela

Petrobornas, C.A.
Zona Industrial Los Pinos
Avda. Principal UD 304
C. C. Los Pinos - Local "E"
(8015) - Puerto Ordaz - Edo.
Bolívar
Venezuela
Phone +58 / 286 / 717 31 52
Fax +58 / 286 / 717 31 34
tyagem@cantv.net

Vietnam

**Thien Viet Electrical Service
and Trading Co., Ltd.**
784 Dien Bien Phu Str.
Ward 11, Dist. 10
Ho-Chi-Minh-City, Viet Nam
Phone +84 / 8 / 830 9916
Fax +84 / 8 / 830 9915
thivictoldt@hcm.vnn.vn

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Level sensors
Flow sensors
Pressure sensors
Temperature sensors
Diagnostic systems
Evaluation systems, power supplies
Connection technology
Accessories
Technical information and customer service

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power supplies
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and diagnostic systems**

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Flow sensors
Pressure sensors
Temperature sensors
Diagnostic systems
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