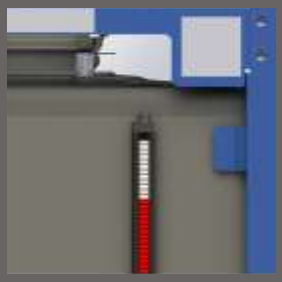
EMKOMETER

Flow Meters and Level Indicators











Product Overview

We have been here for you for 25 years

EMKOMETER Co. is the leading manufacturer of flow meters and level indicators in the Czech Republic. We specialize in developing and manufacturing various level indicators for pressure and non-pressure vessels, pressure vessel manufacture, service and consultancy. These devices can also be used in extreme environments with high temperatures, pressures, explosive atmospheres and corrosive substances. We offer a wide range of flow meters including rotameters, electromagnetic flow meters, spring flow meters, paddle type flow meters, orifice plates, nozzles, and various flow switches. Our products are used in the chemical, mining, oil, paper, food, water, automotive and metallurgical industries, sea transport, power plants and in many other branches of industry. In the past 25 years our company has successfully implemented thousands of measurements worldwide.

Do you need a customized solution or more information? Just ask one of our representatives or browse through our websites.

Recently implemented major projects:

- Flow and level measurement for Spolchemie
- Flow measurement for Orlen
- Steam flow measurement
- Flow measurement for 29.5 MWe ZEVO Chotikov
- Level indicators for 3 x 250 MWe Prunerov Coal Power Plant
- Level indicators for ORLEN - Polski Koncern Naftowy
- Flow measurement in the petrochemical industry
- Level measurement in the petrochemical industry
- Level indicators in the gas storage tanks
- Flow and level measurement for 880 MWe Pocerady Gas Steam Power Plant
- Level measurement for Ledvice Power Plant

Certificates:

- CSN EN ISO 3834-2:2006
- CSN EN ISO 9001:2009
- CSN EN ISO 140001:2005
- PED 97/23 Module H I-61-2524/15/TZ
- 2014/68/EU
- FTZU 05 ATEX 0266
- FTZU 02 ATEX 0453X
- FTZU 02 ATEX 0454X
- FTZU 02 ATEX 0455X
- FTZU 05 ATEX 0017X
- FTZU 11 ATEX 0193X
- FTZU 09 ATEX 0001X
- TCM 142/14 - 5187
- GOST, EAC Certificates

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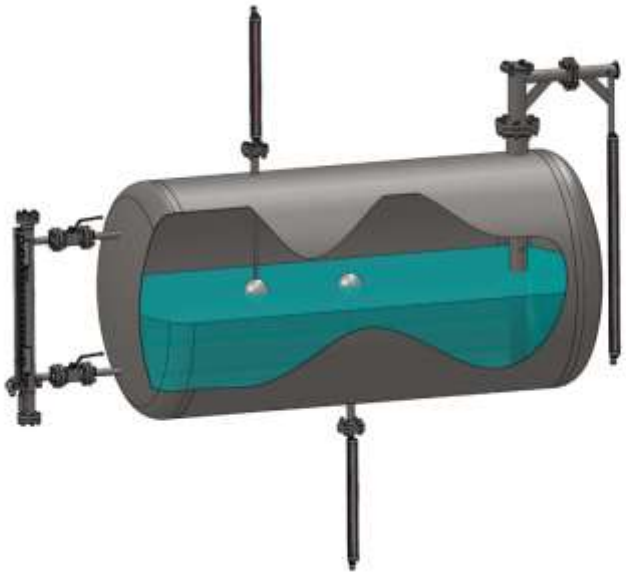
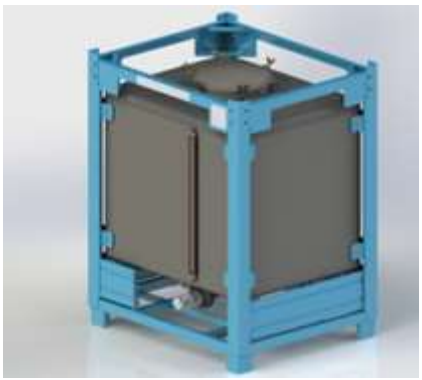
L21 Bypass Level Indicator

The L21 bypass level indicator is used to measure liquid levels or interface in both open and pressure tanks. It can also be used for applications with the formation of foam or aerosol where non-contact measurement methods fail.

The level gauge body is made of high quality stainless steel or chemically resistant materials. Local measurement is independent from any external electrical power supply unit, which allows for measurements of flammable, chemically corrosive and toxic substances in very extreme conditions such as high process temperatures and pressures.

Operating fluid temperature	from - 196 °C to + 500 °C
Ambient temperature	from - 60 °C to + 200 °C
Nominal pressure	from - 0.1 to 40 MPa g
Operating fluid density	≥ 365 kg/cm^3
Material of bypass chamber and flanges	stainless steel, Hastelloy, Monel
Max. measuring range	up to 9 m
Connection	flanged, threaded, welded
Magnetic indicator	white/red plastic or metal rollers, optional colors
Scale	mm, cm, %, or optional
Limit switch	SPJ - NAMUR, SPST, SPDT
Electrical output	SP4 - 4 ÷ 20 mA, HART, FIELDBUS, PROFIBUS, SP4/M
EEx version	yes
Optional customized modifications	





L21/C Bypass Level Indicator for Containers

There is a chamber with a float inside the tank. The float with a built-in permanent magnetic system follows the liquid level in the tank. The local indicator as well as additional sensors are magnetically coupled to the float. As the float changes its position, the magnetic rollers follow it, changing their orientation/color from white to red. If requested, the device can be equipped with a stainless steel scale and various units of length, volume, percentage etc.

HART COMMUNICATION PROTOCOL

SPJ

- Changeover contact with reed relay
- Adjustable switching level
- Ambient temperature from - 50 to + 135 °C
- Fluid temperature from - 196 to + 525 °C (thermal insulation or shield may be necessary)
- Degree of protection: IP 68
- Maximum current: 3 A
- Maximum voltage : 400 V
- Max. switching power: 100 W
- Ex d version

SP4

- Resistance sensor with reed contacts
- Intrinsically safe version
- Flameproof
- Ambient temperature from - 50 to + 135 °C
- Fluid temperature from - 196 to + 525 °C (thermal insulation or shield may be necessary)
- 5 / 10 / 15 mm resolution
- 4 ÷ 20 mA, HART, FOUNDATION FIELDBUS, PROFIBUS

Radar sensor

- Designed for continuous level measurement of various liquids, mushy, pasty and bulk-solid materials.
- Universal use, mounted directly into containers, silos, vessels, reservoirs etc.
- Stainless steel rod or rope electrode
- Measuring range up up to 40 m
- Linear measurement in non-conductive and variously shaped tanks
- Immediate data presentation on the OLED display
- Simple installation and setting
- 4 ÷ 20 mA current output with HART® protocol

Capacitive

- Mounted directly into containers, silos, vessels, basins, reservoirs etc.
- Linear measurements even in non-conductive and variously shaped containers.
- Designed for continuous measurement of fluid/bulk-solid levels
- Rope electrode or insulation for corrosive or conductive fluids
- 4 ÷ 20mA current or 0 to 10 V voltage output. High-temperature explosion–proof version.

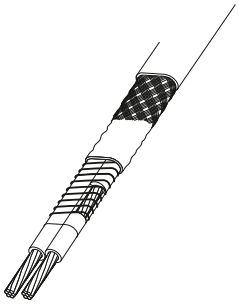
Magnetostrictive

- Easy to install and configure
- Measurement of the separation layer and the filling level via HART®
- 2-wire terminal (4 ÷ 20 mA / HART))
- Robust long life design
- Available versions from 100 mm to 10,000 mm
- Resistant to shock and vibrations (OIML D 11)
- For use in Ex zone 0 (ATEX and IECEx approval)
- Certified for SIL 2 applications

BA304D Display

for explosive environments with HART communication. In combination with an SP4 transmitter it is used to display measured values while maintaining HART communication.

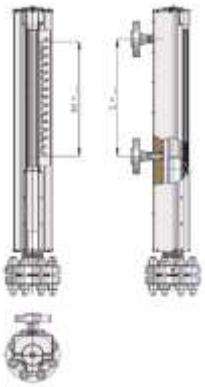
- 4 ÷ 20 mA input (1V voltage drop)
- Degree of protection: IP 66
- Ambient temperature from - 40 to + 60 °C
- M20 x 1.5 cable glands
- The display can be installed on the level indicator or on the wall
- Ex ia



Heating

Self-regulating parallel heating cables are used to maintain process temperatures of pipes and vessels. These cables can also be used as frost protection of large pipes and for applications requiring high temperature resistance.

- Max. holding or constant exposure temperature: 235 °C
- Max. intermittent exposure temperature: 260 °C
- Min. installation temperature: - 60 °C



Insulation

The insulation sheath is made of pressed stainless steel plate. The external sensors can be adjusted or replaced without damaging the insulation material. The insulation sheath is factory made for increased protection.

See pages 26 - 28 for other accessories

L11 Submersible Level Indicator

The L11 level gauge is used to measure liquid levels in open and pressure tanks. This level gauge also allows for measurements of turbulent and whirling levels of corrosive, toxic and flammable fluids. The position of a float with a magnet is transmitted via a magnetic field to the sensor in the guide tube.

Operating fluid temperature	from - 20 °C to + 150 °C
Nominal pressure	from - 0.1 to 1.6 MPa g
Operating fluid density	≥ 365 kg/cm^3
Material	stainless steel, PP, PVC
Max. measuring range	up to 16 m
Connection	flanged, threaded
Mounting position	vertical
Accuracy	± 2.5 mm
Limit switch	SPST, SPDT, NAMUR
Electrical output	4 ÷ 20 mA, HART, FIELDBUS, PROFIBUS
EEx version	yes
Optional customized modifications	

Torrix

This level gauge is easy to use in a variety of the most complicated applications. It features quick installation, field-proven reliability and easy troubleshooting. Due to a highly precise magnetostrictive measuring principle, it achieves outstanding accuracy. With its small sensor and pipe (6 mm diameter), it can be mounted anywhere.

Operating fluid temperature	from - 40 °C to + 85 °C
Ambient temperature	from - 40 °C to + 85 °C
Nominal pressure	from - 0.1 to 20 MPa g
Material	stainless steel
Connection	G 1/2”
Accuracy	± 1 mm or ± 0.025 %
Electrical connection	2-wire
Voltage	8 to 50 V DC
Electrical output	4 ÷ 20 mA, HART, FIELDBUS, PROFIBUS

L21/5 Displacer Level Gauge

This displacer level gauge uses Archemedes´ principle. The rod immersed in the liquid is lifted by a buoyant force, deforming a spring. Different levels result in different deformations of the spring. This movement is sensed and transmitted onto a scale.

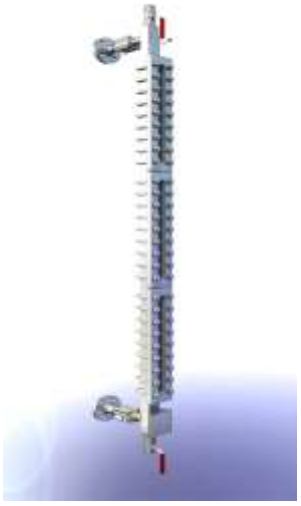
Operating fluid temperature	from - 60 °C to + 350 °C
Ambient temperature	from - 40 °C to + 85 °C
Nominal pressure	30 MPa g
Material	stainless steel, steel, aluminum, titanium
Connection	flanged, threaded, welded
Indication	angular scale
Degree of protection	IP 43
Limit switch	SPST, SPDT, NAMUR
Electrical output	4 ÷ 20 mA, HART, FIELDBUS, PROFIBUS
Optional customized modifications	

L21S Direct Level Indicator

This level indicator is vertically connected via flanges or threaded connections to the side of the tank in which the liquid level or interface is monitored. It works on the principle of communicating vessels. The level gauge is used for direct monitoring of liquid levels in pressure and non-pressure tanks. The measuring glass tube is protected by a metal safety guard. The level gauge must not be exposed to pressure surges, vibrations and shocks.

Max. measuring range	0.1 to 3 m
Maximum pressure	1.6 MPa g
Maximum operating fluid temperature	200 °C
Connection	flanged, threaded, welded
Material (parts in contact with fluid)	borosilicate glass, stainless steel, brass, rubber, teflon custom
Mounting position	vertical
Optional customized modifications	

L21SR Reflexive Level Indicator



It is designed as a direct level indicator for steam generator boilers or stationary vessels with hot water, slightly corrosive liquids or saturated steam. It must not be used to measure toxic, corrosive and crystallizing substances. The level indicator consists of upper and lower heads and a measuring chamber with reflexive glass. The level indicator is standardly equipped with vent/ drain plugs. Upon request, it can be supplied a with valve. The head consists of a valve and a safety ball cap. The drain plug (or valve) is used for venting and draining the level indicator during its shutdown. Reflexive glasses allow for contrast monitoring of fluid levels.

Max. measuring range	0.1 to 3 m
Maximum operating fluid temperature	430 °C
Maximum pressure	40 MPa g
For saturated overheated steam	unprotected glass up to 3.5 MPa g 253 °C for fluids with low load up to 10 MPa g 120 °C
Connection	flanged, threaded, welded
Material (parts in contact with liquid)	DIN 1.4541, casted, tempered reflective glass
Mounting position	vertical
Optional customized modifications	

L21ST Transparent Level Indicator

The transparent version can be used to measure the levels of corrosive liquids such as saturated steam, HPHW, caustics etc. at a maximum pressure of up to 35 bar and a temperature of up to 356 °C. For liquids with no significant glass attack, it can be used for pressures of up to 400 bar and temperatures of up to 430 °C (temperature depends on the pressure - higher temperature means lower pressure and conversely). For steam at a pressure of up to 35 bar or liquids causing rapid wear of glass, it must be used with a mica shield.

Max. measuring range	0.1 to 3 m
Maximum operating fluid temperature	430 °C
Maximum pressure	40 MPa g
For saturated overheated steam	unprotected glass up to 3.5 MPa g 356 °C glass protected by mica up to 7 MPa g 280 °C for fluids with low load up to 10 MPa g 120 °C
Connection	flanged, threaded, welded
Material (parts in contact with fluid)	DIN 1.4541, casted, tempered transparent glass
Mounting position	vertical
Optional customized modifications	

H40 Float Level Switch

This level switch is used to monitor minimum, maximum or other liquid levels in pressure and non-pressure vessels. Its compact and solid construction allows the sensor to work well in the chemical, petrochemical, food and energy industries and in other sectors. The sensor can also measure the level of flammable liquids and can be installed in explosive enviroments, exposed to high temperatures and pressures.

Type H41	contact open when flooding float
Type H42	contact closed when flooding float
Max. operating pressure for stainless steel	2.5 MPa g
Contact loading	50 W
Maximum voltage	250 V AC, 200 V DC
Max. switching current	1 A
Operating fluid temperature	- 50 to + 150 °C, optional up to 400 °C
Operating fluid density	≥ 0.4 g/cm^3
Connection	DN 50 to DN 100 flanges, threaded
Limit switch	SPST, SPDT, NAMUR
EEx version	yes
Optional customized modifications	

LP30 Float Level Switch

This switch has been designed to signalize or control liquid levels (min. - max.) in pressure and non-pressure vessels in the energy, chemical and food industries etc. It is possible to measure liquids such as water, condensates, oils, corrosive substances and many others.

Type LP31	contact opens when flooding float
Type LP32	contact closes when flooding float
Max. operating pressure for stainless steel	2.5 MPa g
Load of contacts	50 W
Maximum voltage	250 V AC 200 V DC
Max. switching current	1 A
Operating fluid temperature	- 50 to + 150 °C
Operating fluid density	≥ 0.7 g/cm^3
Connection	DN 15 to DN 50 flanges, threaded
Limit switch	SPST, SPDT, NAMUR
EEx version	yes
Optional customized modifications	

NM Float Level Switch (Replacement for Mertik Model 650.02)

The NM series float level switch has been designed to control minimum, maximum or other liquid levels in pressure and non-pressure vessels. Its compact and rigid construction allows for use in the chemical, petrochemical or food industries, power engineering and in other branches of industry.

Contact type	switching
Max. operating pressure for stainless steel	1.2 MPa g
Contact loading	60 W
Maximum voltage	400 V DC
Max. switching current	1 A
Operating fluid temperature	- 20 to + 150 °C
Operating fluid density	≥ 0.75 g/cm^3
Limit switch	SPST, SPDT, NAMUR
EEx version	yes
Optional customized modifications	

EMKOSONIC 60 Ultrasonic Level Meter

This level meter is used for continuous non-contact level measurements of liquids (even polluted), mushy and pasty materials in open or closed vessels, sumps, open channels, drains etc. It can be connected via cable glands or protective conductors. Using a horn adapter, it allows for monitoring of difficult-to-measure liquids (foamy levels, bulk-solid materials etc.).

Max. measuring range	0.15 to 20 m
Supply voltage	18 to 36 V DC
Operating fluid temperature	- 30 °C to + 70 °C
Output type	4 ÷ 20 mA (2-wire), HART, Modbus
Accuracy (from full measured range)	0.15 %
Temperature error	max. 0.04 % / °C
Sensitivity	3 levels (low - medium - high)
Degree of protection	IP 67
EEx version	yes

EMKOSONIC 43 Ultrasonic Level Meter

This level meter is used for continuous non-contact level measurements of various liquid, pasty and bulk-solid materials in closed or open vessels, sumps, reservoirs etc. It can be connected via various connectors, cable glands, or protective conductors. Using a horn adapter, it allows for monitoring of difficult-to-measure liquids (foamy surfaces, bulk-solid materials etc.).

Max. measuring range	0.1 to 20 m
Supply voltage	18 to 36 V DC
Operating fluid temperature	- 30 °C to + 70 °C
Output type	4 ÷ 20 mA (2-wire), Modbus
Accuracy (from full measured range)	0.2 %
Temperature error	max. 0.04 % / °C
Degree of protection	IP 68
EEx version	yes

SPSONIC 43 Ultrasonic Level Sensor

This level sensor is used for continuous non-contact level sensing of various liquids and bulk-solid materials in closed or open tank, vessels, sumps, reservoirs etc. It is possible to select a model with a two-button adjustment or with a magnetic pen. Available is also LED optical indicator.

Max. measuring range	0.1 to 20 m
Supply voltage	18 to 36 V DC
Operating fluid temperature	- 30 °C to + 70 °C
Output type	PNP; S (2-wire current switch)
Temperature error	max. 0.04 % / °C
Degree of protection	IP 68
EEx version	yes

Series AF & BF with a Glass Measuring Tube

Series AF and BF float flow meters are used to measure volumetric or mass fluid flow. The flow rate is read directly on the meter. Due to their high corrosion and physical resistance, they allow for a wide variety of applications in the chemical, food, paper and metallurgical industries, neutralization stations, sewage and water treatment plants and many other applications.

Water (20 °C)	min. 0.03 l/hr; max. 30,000 l/hr
Air (101.3 kPa abs, 20 °C)	min. 0.3 l/hr; max. 420,000 l/hr
Accuracy	4 %; 2.5 %; 1.6 %; every device is calibrated
Max. pressure; max. temperature	1 MPa g; 130 °C
Measuring cone	borosilicate glass
Material (parts in contact with fluid)	rubber, NBR, EPDM, FPM, PVC, PTFE, PP, titanium, stainless steel
Connection	DN 15 to DN 80 flanges
Construction height	375 to 480 mm
Limit switch	SPST, SPDT, NAMUR
Electrical output	4 ÷ 20 mA, HART, FIELDBUS, PROFIBUS
EEx version	yes
Optional customized modifications	

Series CF & DF with a Glass Measuring Tube

Series CF & DF float flow meters can be connected to a pipe using fittings, pipe thread or direct/ angular (90°) hose connections.

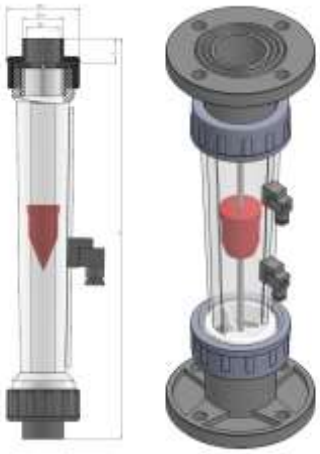
Water (20 °C)	min. 0.03 l/hr; max. 2,000 l/hr
Air (101.3 kPa abs, 20 °C)	min. 0.3 l/hr; max. 25,000 l/hr
Accuracy	4 %; 2.5 %; 1.6 %; every device is calibrated
Max. pressure; max. temperature	1 MPa g; 130 °C
Measuring cone	borosilicate glass
Material (parts in contact with fluid)	rubber, NBR, EPDM, FPM, PVC, PTFE, PP, titanium, stainless steel
Connection	threaded, internal, external G 1/4“ to G 3/4“, hose couplings, straight, elbow fitting
Construction height	415 to 460 mm
Limit switch	SPST, SPDT, NAMUR
Electrical output	4 ÷ 20 mA, HART, FIELDBUS, PROFIBUS
EEx version	yes
Optional customized modifications	

Series NF with a Glass Measuring Tube

Series NF float flow meters are used to measure the instantaneous fluid or gas flow in extreme environments. The flowmeter’s resistance to wear is enhanced by a lightweight thin-walled metal sheath. Supplied with welded, glued or optional threaded connections to plastic PP/PVC pipes.

Water (20 °C)	min. 0.03 l/hr; max. 18,500 l/hr
Air (101.3 kPa abs, 20 °C)	min. 0.3 l/hr; max. 240,000 l/hr
Accuracy	2.5 %; 1.6 %; every device is calibrated
Max. Operating fluid temperature	100 °C - PP; 60 °C - PVC
Max. pressure	1 MPa g - PP; 0.6 MPa g - PVC
Measuring cone	borosilicate glass
Connection	welded, glued, optional threaded, sleeve
Mounting position	vertical, bottom inlet
Construction height	414 to 523 mm
Limit switch	SPST, SPDT, NAMUR
Electrical output	4 ÷ 20 mA, HART, FIELDBUS, PROFIBUS
EEx version	yes
Optional customized modifications	

Series EF with a Plastic Measuring Tube



HART COMMUNICATION PROTOCOL

EF flow meters are used to measure the instantaneous fluid flow. The measuring ranges have been selected to meet our customers' requirements. These flow meters can be used for a wide variety of applications and fluids. They are supplied with welded, glued, threaded or flanged connections to plastic pipes.

Max. measuring range	min. 10 l/hr; max. 2,500 l/hr
Accuracy	4 %
Max. pressure; max. temperature	0.6 MPa g; 60 °C
Measuring cone	AS, PC, PVC, PSU
Material (parts in contact with fluid)	AS, ABS, PVC, EPDM
Connection	welded, glued, threaded, DN 100 flange
Mounting position	vertical, bottom inlet
Construction height	280 to 525 mm
Limit switch	SPST, SPDT, NAMUR
Electrical output	4 ÷ 20 mA, HART, FIELDBUS, PROFIBUS
EEx version	no

Series K All-Metal Flow Meter

HART COMMUNICATION PROTOCOL

Series K all-metal float flow meters are used to signalize and measure the instantaneous fluid or gas flow and volume. Due to their massive, all-metal stainless steel construction or PP/ PVDF/ PVC lining of their measuring part, they are highly resistant to physical and chemical agents. They are suitable for use in extreme service conditions, especially in the chemical, energy, engineering, mining, metallurgical and food-processing industries, water treatment plants etc.

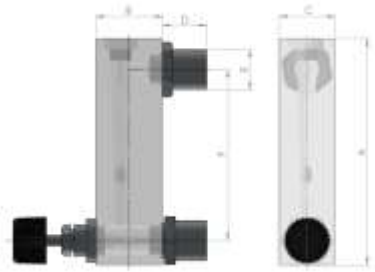
Benefits and advantages

- Measuring part in stainless steel (standard) is resistant to high pressure and temperature
- Conical measuring cone or float according to specific measuring conditions
- Magnetic transmission of float motion to the pointer through high power magnetic materials with min. ageing influence
- Dumping of float motion, special ball joint construction with min. hysteresis
- Measuring part with optional electrical or steam heating

Water (20 °C)	min. 1 l/hr; max. 250,000 l/hr
Air (101.3 kPa abs, 20 °C)	min. 18 l/hr; max. 1,300,000 l/hr
Max. / min. ratio of measured values	10 : 1
Accuracy	2.5 %; 1.6 %; 1 %; every device is calibrated
Maximum pressure	1.6 MPa g; 20 MPa g (optional)
Scale	optional flow units
Degree of protection	IP 65, IP 54 with corner connector
Connection	DN 15 to DN 200 flanges
Mounting position	vertical, bottom inlet
Limit switch	SPST, SPDT, NAMUR
Electrical output	4 ÷ 20 mA, HART, FIELDBUS, PROFIBUS
Max. operating temperature of measured fluids based on the temperature class	
Thermal class T6	85 °C
Thermal class T5	100 °C
Thermal class T4	125 °C
Thermal class T5	150 °C
EEx version	yes
Optional customized modifications	

Series EZ Plastic Flow Meter with a Control Valve

EZ flow meters are used to measure the instantaneous fluid or gas flow. They are equipped with a needle valve in brass or stainless steel. These flow meters are supplied with threaded rear connections.



Water (20 °C)	min. 6 l/hr; max. 1,000 l/hr
Air (101.3 kPa abs, 20 °C)	min. 0.1 l/hr; max. 70 l/hr
Accuracy	4 %, 2.5 %
Max. pressure; max. temperature	0.6 MPa g; 60 °C
Material (parts in contact with fluid)	ABS, PC, PP, PVC, EPDM, brass, stainless steel
Connection	rear connection, threaded
Mounting position	vertical, bottom inlet
Construction height	94 to 120 mm
Optional customized modifications	

Series Z Glass Flow Meter with a Control Valve

Series Z float flow meters are used to measure volumetric or mass fluid flow. The flow rate is read directly on the meter. It is possible to measure not very contaminated fluids and gases on condition that the flow meter materials are resistant to working temperatures and pressures.

Water (20 °C)	min. 0.7 l/hr; max. 270 l/hr
Air (101.3 kPa abs, 20 °C)	min. 15 l/hr; max. 5,100 l/hr
Accuracy	2.5 %; 1.6 %; all devices are calibrated
Max. pressure; max. temperature	1 MPa g; 100 °C
Measuring cone	borosilicate glass
Connection	rear connection, G ¼“ internal thread
Mounting position	vertical, bottom inlet
Construction height	292 mm
Optional customized modifications	

Series Z2R Glass Flow Meter with a Control Valve

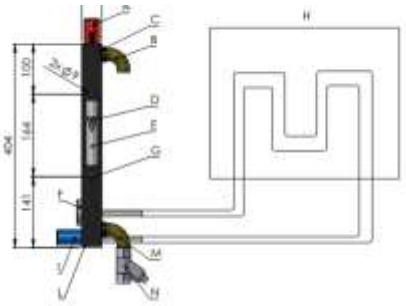
Series Z2R float flow meters with a pressure regulator at the inlet are used to measure the instantaneous volumetric or mass fluid flow (gas flow). The instantaneous flow rate is read directly on the meter. The flow meter is fitted with a pressure regulator, maintaining a constant flow rate under fluctuating service pressure conditions. It is also possible to measure not very polluted fluids and gases.

Accuracy	2 %; each device is calibrated
Max. pressure; max. temperature	1 MPa g; 100 °C
Measuring cone	borosilicate glass
Mounting position	vertical, bottom inlet
Connection	DIN 1.4541, PVDF, nickel-plated brass
Sealing elements	Viton, PTFE/FFKM
Optional customized modifications	

MRB/MRBV Press Mold Cooling Unit

The MRB press mold cooling unit is a standard accessory used to cool or heat press molds for plastics or liquid metals in closed and open systems. It allows you to improve and stabilize pressing conditions, reduce scrap, increase mold lifetime, clean a mold cooling/heating area and reduce the amount of cooling water.

Flow and temperature information is immediately and transparently available to the operator. It is possible to install a flow sensor for automatic control.



Max. measuring range	optional
	min. 5 to 50 l/hr, water
	standard MRB 50 - 360 l/hr, water
	standard MRBV : 300 - 3,000 l/hr, water
	max. 10,000 l/hr, water
Maximum operating temperature	100 °C
Maximum pressure	0.6 MPa g
Measuring tube	borosilicate glass vacuum-molded, reinforced
Material	stainless steel, brass, polypropylene, steel class. 11, rubber seal
Scale	neutral in mm on the measuring tube, calibrated on the frame, indicating actual flow rates in l/hr
Number of measuring tubes	optional
Limit switch	SPST, SPDT, NAMUR
Electrical output	4 ÷ 20 mA, HART, FIELDBUS, PROFIBUS
EEx version	yes
Optional customized modifications	

A) shut-off valve (insert and valve seat)

B) water outlet, G ¾“ inner closure

C) measuring block

D) float

E) measuring tube

F) thermometer

G) Ø 9 connection holes

H) mold

I) control valve (insert and valve seat)

L) control block

M) water inlet, G ¾“ inner closure

N) filter

Device type	**MRB2 MRBV2**	**MRB3 MRBV3**	**MRB4 MRBV4**	**MRB5 MRBV5**	**MRB6 MRBV6**	**MRB8 MRBV8**	**MRB10 MRBV10**
Number of flowmeters (optional)	2	3	4	5	6	8	10
Dimension A – MRB width MRB	180	240	300	360	420	540	660
Dimension A – MRB width MRBV	300	400	500	600	700	900	1 100

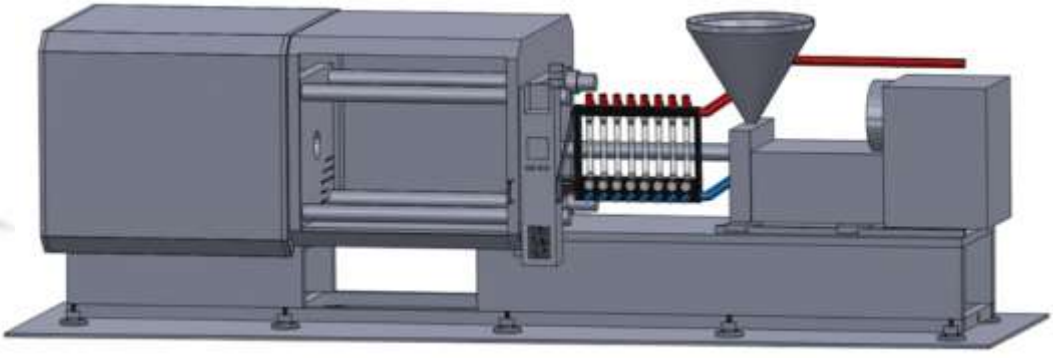
Benefits and advantages

- Glass measuring tubes
- High-temperature and high-pressure applications, also designed for aggressive fluids
- Quick clamp tubes with no need of tools
- Metal frame in stainless steel
- Special control valves for constant flow
- Individual calibration
- Fluid flow control by means of electromagnetic valves
- Optional coolant filtration
- Optional el. outputs according to fluid flow

Accessories - quick couplers and hoses

Over 50 types for quick connect couplings for tempering and cooling.

According to European, International and French standards, many modifications



RV Flow Switch

The RV flow switch is used to monitor fluid flow. The piston is fitted with a magnet that is moved by a flowing fluid. The switching point on the sensor is adjustable according to the flow rate. The sensor is closed when the flow rate is above or below the set point.

Maximum temperature	120 °C
Maximum pressure	30 MPa g
Accuracy	± 10 %
Hysteresis	10 %
Degree of protection	IP 65
Max. switching current	1 A
Maximum voltage	400 V AC
Contact Loading	50 W
Optional customized modifications	

RW Flow Indicator

The RW flow indicator works on the principle of a variable cross section between the cone and the ring the spring is connected to. Due to the spring counteracting on the float, the flow indicator can opperate in any working position. In the float there is a permanent magnet that controls the sensor or indicator box.

Contact type	SPP - switching
Maximum voltage	500 V DC
Max. switching current	1.5 A
Load of contacts	50 W
Maximum temperature	- 20 to + 125 °C
Limit switch	SPST, SPDT, NAMUR
Maximum voltage	400 V DC
Max. switching current	3 A
Load of contacts	100 W
Maximum temperature	- 40 to + 125 °C
Optional customized modifications	

RS Flow Indicator

This mechanical flow indicator includes a sight glass to monitor fluid or gas flow. The flowing medium rotates the paddle wheel, indicating the instantaneous flow. The sight glass is made of durable tempered glass. The indicator of a rugged durable design is made of SST or steel.

Maximum pressure	1.6 MPa g; 2.5MPa g (optional)
Maximum temperature	200 °C
Connection	internal thread (BSPP / NPT)
Size	DN 6 to DN 100; 1/8“ to 4“
Material	304/316 stainles steel, steel
Sight glass	tempered glass
Paddle wheel, sealing	PTFE
Mounting position	optional
Optional customized modifications	

Series P/ PP / PPP Paddle Flow Meters

Paddle flow meters are used to indicate the instantaneous fluid flow in all industries. In connection with an SPS switch they can be used as flow indicators of pre-set flow rates. These flow meters can be fitted with a SP6 switch and ECLM, DMK, ERT 50000, PAX-D evaluation devices for continuous indication of the instantaneous flow or flow volume (optional analog output).

Water (20 °C)	min. 2 m^3/hr; max. 2,000 m^3/hr
Air (101.3 kPa abs, 20 °C)	min. 20 m^3/hr; max. 4,500 m^3/hr
Max. and min. ratio of measured values	7 : 1; 10 : 1 (optional)
Accuracy	2.5 %; 1.6 %; 1 %; all devices are calibrated
Maximum pressure	1.6 MPa g; 20 MPa g (optional)
Scale	optional flow units
Connection	DN 25 to DN 400 flanges
Mounting position	horizontal
Limit switch	SPST, SPDT, NAMUR
Electrical output	4 ÷ 20 mA, HART, FIELDBUS, PROFIBUS
EEx version	yes

Series P Paddle High Flow Meter

Paddle flow meters are designed to monitor fluid or gas flow in cooling or heating circuits, pumps, ventilators etc. The function of stream gauges consists in deflecting their reaction paddle by a flowing fluid, overcoming the pre-load of a torsion spring. Using a magnetic coupling, the paddle‘s deflection is transmitted from a hermetical chamber onto the indicator´s pointer.

Water (20 °C)	min. 500 l/hr; max. 600,000 l/hr
Max. and min. ratio of measured values	7 : 1; 10 : 1 (optional)
Accuracy	2.5 %; 1.6 %; 1 %; every device is calibrated
Maximum pressure	4 MPa g; 20 MPa g (optional)
Scale	Optional flow units
Degree of protection	IP 65, IP 54 with corner connector
Connection	DN 50 to DN 600 flanges
Mounting position	optional
Limit switch	SPST, SPDT, NAMUR
Electrical output	4 ÷ 20 mA, HART, FIELDBUS, PROFIBUS
EEx version	yes

Series PPV Flow Indicator

Paddle flow meters are designed to monitor fluid or gas flow in cooling or heating circuits, pumps, ventilators etc. The function of stream gauges consists in deflecting their reaction paddle by a flowing fluid, overcoming the pre-load of a torsion spring. Using a magnetic coupling, the paddle‘s deflection is transmitted from a hermetical chamber onto the indicator´s pointer, actuating a limit contact.

Water (20 °C)	min. 500 l/hr; max. 600,000 l/hr
Max. and min. ratio of measured values	7 : 1; 10 : 1 (optional)
Accuracy	2.5 %; 1.6 %; 1 %; every device is calibrated
Max. pressure	4 MPa g; 20 MPa g (optional)
Scale	optional flow units
Degree of protection	IP 65, IP 54 with corner connector
Connection	DN 50 to DN 600 flanges
Mounting position	optional
Limit switch	SPST, SPDT, NAMUR
Electrical output	4 ÷ 20 mA, HART, FIELDBUS, PROFIBUS
EEx version	yes

Series F2, F3, AF3, EMKO E Electromagnetic Flow Meters

HART COMMUNICATION PROTOCOL

These flow gauges are based on the principle of electromagnetic induction. They are designed to measure the flow rates of electrically conductive liquids. They are especially suitable where traditional mechanical gauges are not sufficiently reliable and accurate due to a measurement principle. The limiting factor for use of an electromagnetic flow meter is virtually only its compliance with the minimum electrical conductivity of measured fluids and the low content of ferromagnetic particles.

Features	flanged model steel sensor design, optional stainless steel lining economical, for a wide variety of applications and flow measurement of conducting materials in filled piping	
Accuracy	up to 0.2 % of measured value	
Excitation	DC pulse field	
Electrical conductivity of fluid	≥ 5 micro S/cm	
Measuring range	50 l/hr up to 8,200 m^3/hr	
Nominal pressure	standard special model	1.6 MPa g 4 MPa g (up to 50 MPa g)
Operating fluid temperature	- 5 to + 150 °C - acc. to lining	
Connection	DN 10 to DN 1200	
Degree of protection	acc. CSN 34 1010, IP 65, IP 68	
Materials **lining** **electrodes**	polypropylene, hard rubber, PTFE standard in 17.348 steel titanium, platinum — resistant to chemicals	
Construction height	215 to 515 mm	
Outputs	0/4 ÷ 20 mA current output, HART, RS485 slow pulse, 10 ms offset or binary, e.g. comparison, flow direction, relays, dose	
Special models	optional: EX; IP 68; electrolytic cleaning of electrodes; authorized measuring instrument	
Approval / certificate	TCM 142/94-1932, FTZU 99 Ex 0090 Approval Statement, Certificate No. 202/P/94 by the Technical Ispection Institute	
Use	food-processing industry water supply paper industry mining industry chemical industry metallurgy special applications	beer, vine, milk, cream, vinegar, fruit juice, sugar and starch solutions, chocolate cream etc. water, waste water, sewage cellulose hydro-mixtures, waste liquors, dyes slurry, coal hydro-mixtures, mining water most of strong aggressive chemical solutions cooling water, waste water to be discussed with the manufacturer
Optional customized modifications		

HC2 Electromagnetic Heat Meter

- Authorised measuring instrument
- High accuracy of bi-directional flow and energy metering
- Data backup in case of blackout
- Easy selection of displayed data, modes and parameters
- Energy and volume dosing
- Periodical self-cleaning of electrodes
- Real-time clock
- Surge damping of sudden flow changes
- Easy calibration
- Protection against unauthorized manipulation
- Analogue, frequency, multifunctional and data outputs
- Selectable communication mode
- Up to 500 real-time data storage
- Special use for electromagnetic flow meters to measure fluid temperature

Power supply	230 V (+ 10 %, - 15 %), 50 Hz
Power consumption	max. 12 VA
Degree of protection	IP 66
Operating fluid temperature	- 5 °C to + 45 °C (protect from direct sunshine)
Storage temperature	- 20 °C to + 80 °C (max. relative humidity 85 %)
Measuring range	0.1 to 10 m/s
Measurement error	≤ 0.5 % of measured value within the range of 5 ÷ 100 %
Indication	two-line alphanumeric display, 2 x 16 characters
Manual control	five buttons
Isolated input	Start of dosing: max. 10 mA, diode
Isolated output	24 V DC power supply, non-stabilised (Ri = 470Ω; C = 470µF) analogue current, active (0 ÷ 20 mA or 4 ÷ 20 mA, load ≤ 800 Ω) frequency (user defined range) 2 Hz to 20 kHz, max. 30 V/5 mA; max. 50 kHz, 30 V/1 mA; open collector 2 x multifunctional volume impulses single or double level comparison start/stop of dosing (open collector max. 30 V/20 mA ; max. 120 V/800 mA open/close contact
Isolated serial ports	current loops TxD output, max. 30 V/20 mA RxD input, max. 10 mA, diode RS 232 interface on Canon 9 collector optional RS 485 bus
Housing material	ABS
Weight	2 kgs

HART COMMUNICATION PROTOCOL

Coriolis Flow Meter

Coriolis mass flow meters are designed for direct and continuous measurements of fluid flow and volume in the chemical, petrochemical and food industries regardless of fluid conductivity, density, temperature, pressure and viscosity. Mass flow meters are ideal for measuring chemicals, liquid food products, suspensions, molasses, paints, varnishes, pastes etc.

Water (20 °C)	Up to 230,000 kg/hr flow
Density measurement range	0 to 2,500 kg/m^3
Accuracy	0.1 %
Max. pressure; max. temperature	34.5 MPa g; 200 °C
Material (parts in contact with fluid)	stainless steel, Hastelloy
Connection	flanged, threaded or optional
Mounting position	horizontal, side inlet
Limit switch	yes, optional dosing
Electrical output	4 ÷ 20 mA, HART, FIELDBUS, PROFIBUS, RS485
EEx version	yes
Optional customized modifications	

Features

- All-in-one instrument, direct measurement of mass flow, density and temperature, calculated measurements of volumetric flow
- No moving parts, maintenance-free, no need of recalibration
- Easy to install, no straight pipes required, multiple mounting options
- Mechanically balanced tubes and superior mechanical design for best-in-class density measurements
- Exceptional mechanical design resistant to external interference
- Exceptionally easy to use and fast setup time. We can preprogram your process parameters and reporting preferences.
- Frequency output resolution up to 10,000 Hz
- Superior meter calibration. DAkkS-Accreditation as per DIN EN ISO/IEC 17025 : 2005
- Easily accessible, integrated meter diagnostics to verify the flowmeter´s conditon and performance
- ATEX, IECEx, CSA Hazardous Area Certifications, customized process connections available

Ultrasonic Flow Meter

Ultrasonic flowmeters are used to measure all fluids including non-conductive liquids. Their advantage is the absence of moving parts, independence from the Reynolds number and optional use in all modes of flow (laminar, turbulent and transient).

Long-term, stable and maintenance free-measurements.

Measuring range	0.001 - 15 m/s
Pipe diameter	DN 15 to DN 2000
Accuracy	0.3 % to 0.6 %
Max. pressure; max. temperature	4 MPa g; - 40 to + 150 °C
Material (parts in contact with fluid)	P355, P265GH, SST 304, 316L
Connection	flanged, threaded, optional
Electrical output	4 ÷ 20 mA, RS485-Modbus RTU
Optional customized modifications	

Series OOK 4 / OOK 7 Flow Meters with Oval Gears

The design of a volumetric OOK flow meter is based on the principle of rotating oval gears. It has proven to be a reliable and highly accurate method of fluid flow measurement. Series OOK flow meters feature high accuracy in measuring a wide range of fluid viscosities and flow rates. These flow meters are suitable for gravity applications and devices fitted with pumps.

Flow range under 5 mPas	180 to 4,200 l/hr
Flow range under 5 mPas	60 to 4,500 l/hr
Accuracy	± 0.5 %
Max. pressure; max. temperature	5.5 MPa g; 120 °C
Scope of pulses	52 or 224 PPL
Impulse transmitter	reed relay
Connection	DN 15, DN 25
Fittings	R 1/2“, R 1“
Housing material	Alu/316 SS
Oval gear material	PPS/316 SS
Optional customized modifications	

Vortex and Turbine Flow Meters

Vortex and turbine flow meters belong to the group of flow meters that evaluate volumetric flow by measuring a fluid flow rate provided the pipe cross-section is known. During flow measurements, the frequency of vortices generated by a fluid flowing around a solid body is measured. The fluid passing through the flow meter turns the turbine rotor and this motion is mechanically or electronically transmitted for further processing.

Water (20 °C)	min. 6 l/hr; max. 250,000 l/hr
Accuracy	0.25 %
Max. pressure; max. temperature	4 MPa g; 350 °C
Material (parts in contact with fluid)	stainless steel
Connection	DN 10 to DN 500 flanges
Mounting position	horizontal, side inlet
Limit switch	SPST, SPDT, NAMUR
Electrical output	4 ÷ 20 mA, HART, FIELDBUS, PROFIBUS
EEx version	yes

Thermal Flow Meters

Thermal flow meters are based on the exchange of heat between the heat source (resistance heater) and flowing fluids depending on the mass flow rate. They are suitable for measuring pure gases and fluids of known compositions, properties, low density and particularly for low gas flow.

Measuring range	9 to 2 750 Nm³/hr
Accuracy	A): ± (3 % MW + 0,3 % MEW) B): ± (6 % MW + 0,6 % MEW)
Application	compressed air air quality (ISO 8573-1): class 141 (measuring error: see above, value A) class 344 (measuring error: see above, value B)
Max. pressure	1.6 MPa g
Operating fluid temperature	0 to 60 °C
Voltage	19 to 30 V DC
Electrical output	4 ÷ 20 mA , pulse, switch

PFU-300 Flow Control Unit

This unit is used to measure the instantaneous volumetric flow in open channels and drains. It has been designed for use with an EMKOSONIC-43L ultrasonic level meter and an RS 485/ Modbus RTU output (max. 4 sensors).

- Data storage in the internal memory and/or on a USB flash disc
- Built-in web server
- Displaying data on a large OLED matrix display
- Wide choice of flow rate units
- 230 V AC or 24 V DC power supply

Enclosure material	ABS
Dimensions	160 x 166 x 106 mm
Degree of protection	IP 65
Operating fluid temperature	- 30 °C to + 60 °C
Maximum voltage	100 - 240 V AC (9 - 36 V DC)
Power supply	10 VA (8 VA)
Outputs	0.2 or 4 SSR relays, max. 250 V AC / 100 mA RS 485/Modbus RTU-Slave, optional isolated current output optional Ethernet / RJ45
Inputs	RS 485 / Modbus RTU - Master, isolated (max. 4 sensors) binary input to reset the user´s flow meter USB
Internal power supply for sensors	Us = 24 V DC / I max. 120 mA
Display type	Matrix OLED display, 128 x 64 dots
Control	4-key membrane keyboard
Size of internal memory for data storage	continuous storage of average 5-minute flow rates for at least 15 months
Totalizer function	2 flow totalizers on each channel
Motor hours function	measuring time of faultless operation and time of failure state
Web server function	displaying currently measured values and total flow volume on all channels
Language	English
Weight	820 grams

PFU-300-0
with no web server and current output.

PFU-300-W
with a web server.

PFU-300-I
with a current output.

Differential Pressure Sensors

Measurement principle

The classical way of measuring fluid flow using primary elements is based on a quadratic relationship between a fluid flowing through a closed pipeline (fully filled with a measured medium) and differential pressure in the primary element built into that pipeline.

Remarkable results of this long-term assessed method of measuring fluid flow were described in the 20th and in the early 21st century in international and national standards (ISO, EN, AGA = ANSI / API, ASME, BS, CSN, DIN and GOST).

Main advantages of measuring fluid flow using primary elements

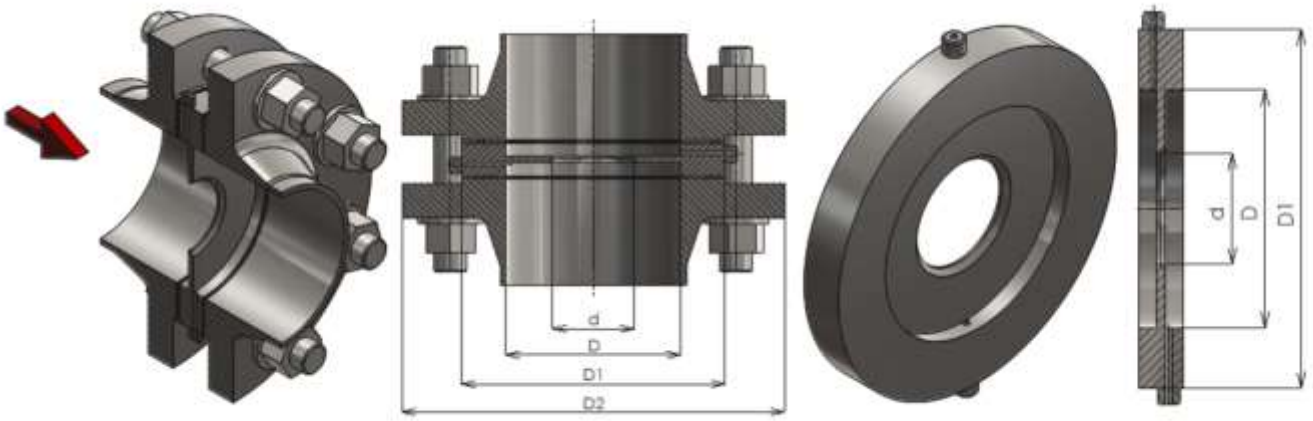
- Wide range of applications
- Permanent measurement accuracy
- Experimental certified standardized measurement method
- Cost-effective solutions
- High operational reliability
- Rugged construction of primary element with no moving parts
- Construction materials in compliance with NACE requirements

EMKOMETER Co. complies with all CMI regulations and relevant standards, ensuring precision manufacturing of primary elements in thousandths of a millimeter.

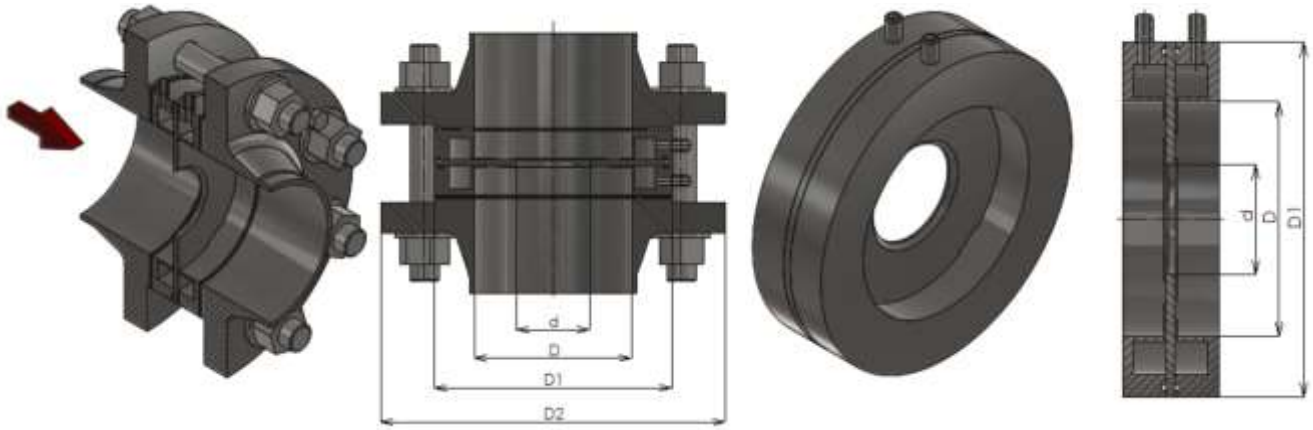
Orifice Plates

Centric orifice plates are used in various industrial applications (according to CSN EN ISO 5167). They are manufactured within a range of DN 15 to DN 1000 nominal sizes for pressures of up to PN 320, depending on the differential pressure sensor. These are the most applicable centric orifice plates, even in comparison with technical information reported for other primary elements.

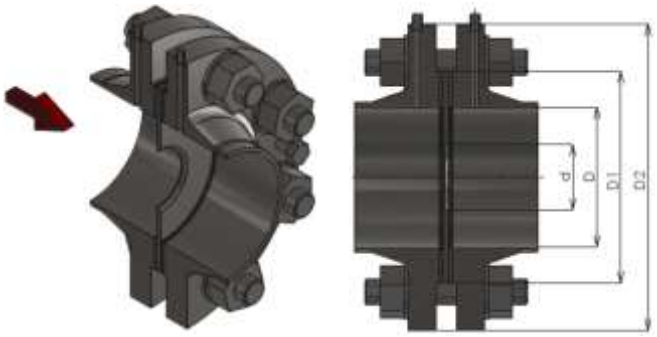
Centric circular orifice plate with a pressure tapping fillet



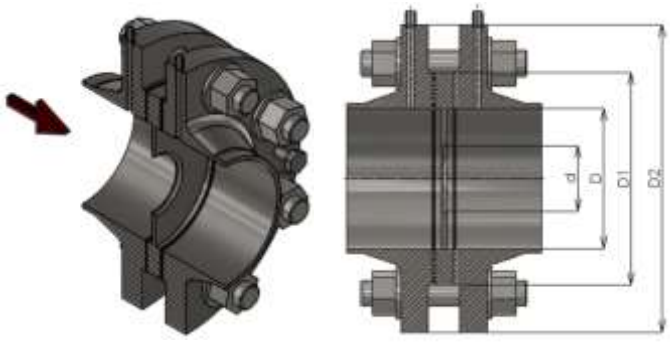
Orifice plate with a chamber tapping fillet and two gaskets



Orifice plate with flange tappings – simple disc



Orifice plate with flange tappings



We also supply centric rectangular, square, bidirectional, restricting and inlet orifice plates.

Centric square and rectangular orifice plates

Centric orifice plates with a square or rectangular cross-section are used in square or rectangular pipelines. Calculations, design and installation regulations applicable to a centric circular aperture also apply to centric rectangular and square orifice plates.

Bidirectional orifice plates

Meeting specific construction requirements, these orifice plates are used to measure fluid flow in both directions.

Restricting orifice plates

In this case, centric orifice plates are used to ensure a required permanent pressure loss. Therefore, when calculating the diameter of an orifice plate (d), it is necessary to calculate differential pressure Δp (Pa) from the required permanent pressure loss.

Inlet orifice plates

The properties of inlet orifice plates, definition of their flow coefficient and space limited before them are different from centric circular orifice plates. Inlet orifice plates have not been described in any applicable standards. Nevertheless, they are used at the pipeline inlet in compliance with the results of Makarov and Seman´s extensive theoretical and experimental works.

Segmental orifice plates

Segmental orifice plates are circular segments used where sediments, tarry build-up or condensates may be formed, for example for flow measurement of heterogeneous mixtures (mechanically polluted liquids, gases containing solid or fluid components) in horizontal and inclined pipes. See CSN 25 7711.

Quarter-circle orifice plates

Quater-circle orifice plates feature the widest range of applications in measuring the flow rate of viscous fluids (according to CSN 25 7712). They are particularly used for measuring the flow of heating oil.

Four-hole orifice plates

These orifice plates are easy to use in irregular pipe sections, even if irregular fluid streams arise before the primary element.

A four-hole orifice plate is a modification of a centric orifice plate. However, there are more holes in the orifice plate disc. Flanged connections are frequently used. The sealing surfaces on these orifice plates can be manufactured according to the relevant CSN, EN, DIN, GOST, ASME and ANSI standards or at the request of customers. Four-hole orifice plates have not been included in European standards yet. See CSN EN ISO 5167.

Segmental orifice plate

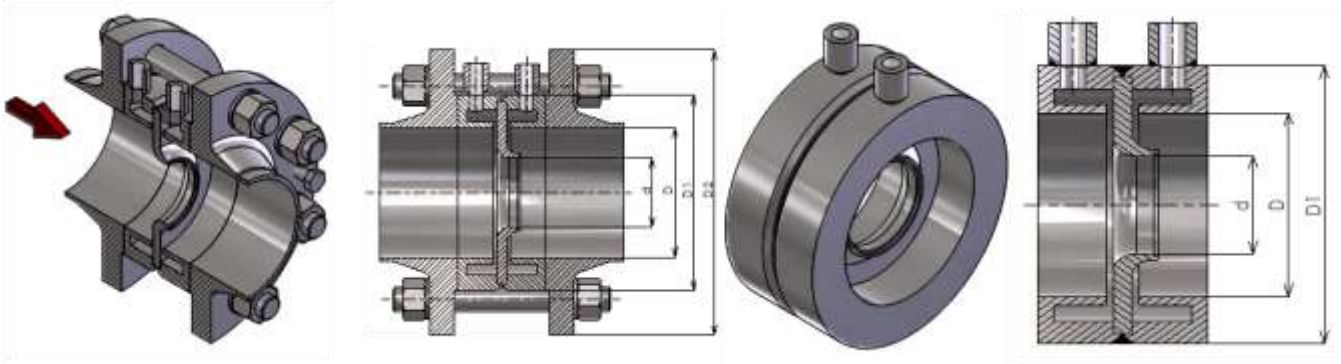
Quarter-circle orifice plate

Multi-hole orifice plate

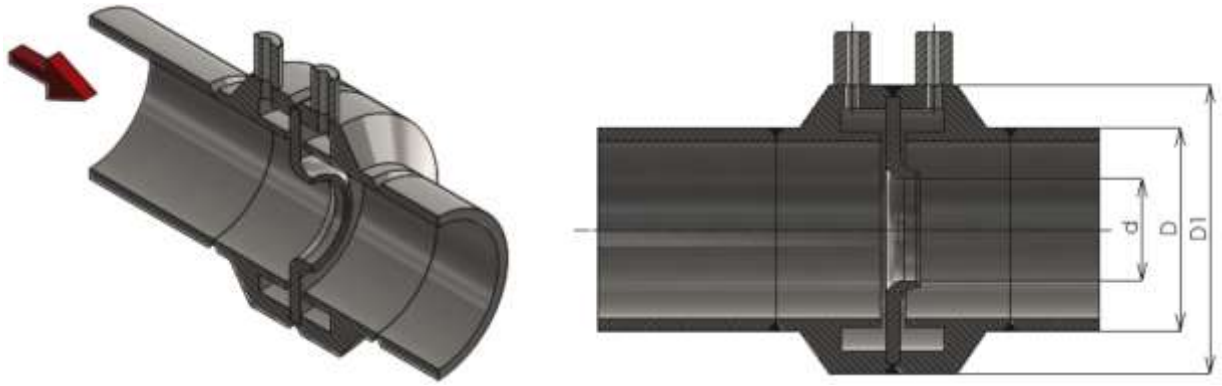
Nozzles

ISA 1932 nozzles and nozzles with a long radius (according to CSN EN ISO 5167) feature long-term operational reliability, especially in measuring overheated steam. In specific cases, ISA 1932 nozzles are preferred.

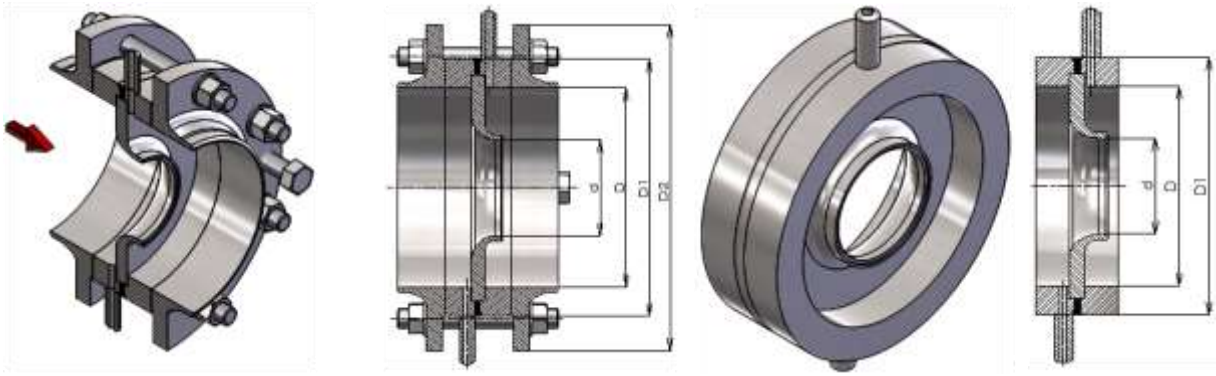
Nozzle with chamber tappings between flanges



Nozzle with chamber tappings – welded



Nozzle with pressure tappings between flanges



Nozzle with pressure tappings – welded

Venturi Nozzles and Classical Venturi Tubes

These devices are used for specific applications to minimize a permanent pressure loss caused by primary elements. See CSN EN ISO 5167.

Venturi Nozzle

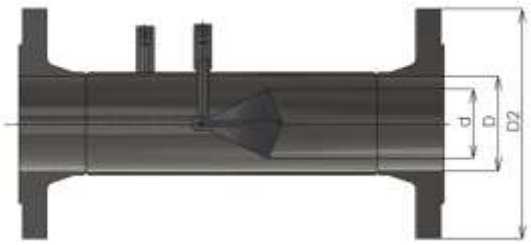
The inlet part of a Venturi nozzle is basically an ISA 1932 nozzle. Therefore, a Venturi nozzle offers the same advantages as an ISA 1932 nozzle. Moreover, it features a lower permanent pressure loss. In fact, the outlet part of a Venturi nozzle is a conical diffuser, reducing a permanent pressure loss. The Venturi nozzle is called "shortened" if the outlet diameter of the divergent section is less than the pipe diameter and "unshortened" if the outlet diameter is equal to the pipe diameter. The divergent part can be shortened by about 35 % of its length without any permanent pressure loss caused by a Venturi nozzle.

Classical Venturi Tube

Classical Venturi tubes are used to measure gas/fluid flow where a special emphasis is placed on a low pressure loss. They are used in the plants where energy savings outweigh the higher purchase price of a primary element. Depending on the method of manufacture, we offer classical Venturi tubes with cast, machined or welded sheet confusors.

V - Cone

The V - Cone is a flow rate sensor used to measure fluid/gas flow in extreme environments with considerable demands on straight pipeline sections, maintenance and costs. The flow coefficient accuracy of a calibrated V - cone is ± 0.5% (5 % for uncalibrated).



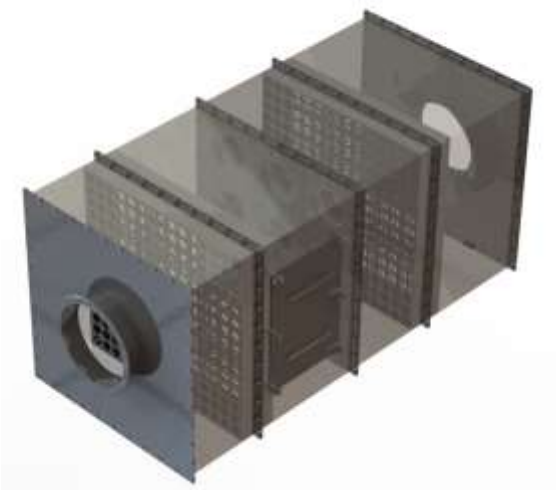
Meter Tubes

Measuring tubes are complete systems formed by primary elements and straight pipes at the inflow and outflow sides. Regarding its design, this meter tube is divided into three sections: an inlet part (10D), in which the flowing fluid is smoothed out, a measuring part (primary element) and an outlet part (4D). The straight pipe sections of measuring tubes meet all requirements for geometric accuracy as defined in CSN EN ISO 5167 for pipe sections adjacent to orifice plates. Meter tubes are used to smooth out the fluid flow before primary elements and in DN ≤ 50 mm pipes, eliminating a negative impact of pipeline roughness on measurement accuracy.

Measuring tubes are delivered in either a version between flanges or prepared to be welded. They can also be calibrated by any accredited laboratories. The accuracy of calibrated measuring tubes ranges from 0.15 to 0.25%. EMKOMETER gauges are supplied with a TCM 142/14 - 5187 Approval.

ISO 5801 : 2007 Multi Nozzles and Multi Nozzle Chambers

Several nozzles even of different diameters are mounted to a common board. This configuratin is used for special testing equipment where the range of flow measurement can be adjusted by a number of open (non-blind) nozzles. The advantage of these meters is a wide measuring range, using only one measuring chamber. ISO 5801 : 2007 is used to rate the performance of industrial fans of all types, except those designed solely for air circulation (ceiling and table fans).



Impulse Piping

All the fitings below can be connected to impulse pipe-lines by a flange, weld joint or pressure coupling (according to PN).

Impulse pipe-lines consist of pipes usually welded to each other. The quality of steel pipes in the impulse pipe-lines has to conform to the operating temperature and pressure of process fluids. The biggest difficulty is caused by fully overheated steam under short-time pressures.

Fittings, Flanges and Pipes

Our valve manufacture is governed by EN (DIN), API 602, API 600, BS 5352, BS 1873, GOST, or other standards depending on the specific requirements of customers. Different types of flanges are made to order or according to ASA/ANSI/ASME (USA), EN/DIN (Europe), BS10 (UK/Australia), JIS/KS (Japan/Korea) GOST (Russia) standards.

- PN 6 - PN 500 pressure class, DN 6 - DN 1600 diameter
- Material: stainless steel, carbon steel, duplex and super duplex stainless steel
- Neck, shut, slip-on and special types
- 150, 300, 400, 600, 900, 1500 a 2500 lbs, PN 6 - 1600, DN 5 - 1000 pressure classes

We also supply:

boiler tubes as per DIN/EN, fittings as per DIN/EN, pipes as per ASTM, 04 - fittings as per ASTM, 05 - weldless/welded stainless steel pipes, 06 - fittings in stainless steel, flanges as per ASTM and DIN, 07 - carbon steel, alloy flanges as per ASTM and DIN, weldless and welded precision tubes as per DIN/EN, HPL pipes, weldless and welded structural pipes as per DIN/EN, fluid distribution pipes as per DIN/EN, pipes for pressure purposes as per DIN/EN.

Condensation Vessels

Condensation vessels are used to measure steam flow. They ensure that impulse pipes are permanently full of steam condensate at the same height. For this reason, condensation vessels are placed as close as possible to the outlets of measuring orifice plates. Condensation vessels installed at the same height eliminate false additional differential pressure caused by different fluid levels.

Valves

Shut-off valves are normally supplied as part of our devices. We offer ball and needle valves. Depending on various applications, we manufacture both shut-off and control valves. The material of construction depends on process conditions.

- Standard materials: stainless steel, steel, brass, plastics
- Threaded, welded or flanged connections
- DN 5 - 500, PN 6 - 400

As components of flow measuring circuits, shut-off valves and taps are isolated from measuring circuits (especially for emergencies or reconstruction). Shut-off valves are used for gas flow measurement. To connect more devices to a single primary element, we recommend modifying separate closing pressure outlets for each device. Separate outlets are used so a pressure drop in one pair of piping (e.g. when purging) cannot affect the measurement by another device.

Manifolds

Manifolds have been designed for use with differential pressure transmitters to measure fluid flow using primary elements and fluid levels on the principle of differential pressure. 5-way valve sets (for water or steam) or 3-way valve sets (for air and gases) allow for easy connections to pressure outlets, simplifying continuous cleaning of impulse pipelines. Manifolds are available in stainless steel, brass, steel, Monel, bronze, Hastelloy C, Incoloy, and Inconel 600.

- Compact design
- Protective cover with color resolution
- T-bar metal (standard) or circular plastic handle (optional)
- Dust cap provided
- All valves are factory tested.
- High pressure rating up to 15,000 psi

HART COMMUNICATION PROTOCOL

Pressure Gauges

incl. dif. pressure sensors

- Ranges from 0 - 75 mbar to 0 - 400 bar
- Ex ia version = intrinsically safe version
- 130 bar static overload
- 1.4401 stainless steel diaphragm
- 0.1 % FSO accuracy
- High overload

We use sensors from the world's leading manufacturers. These differential pressure transmitters allow for transmission defined by TC 0.1. 4 ÷ 20 mA standard output. Optional digital communication (HART, Fieldbus, Modbus ...), local indication etc.

Thermometers

- 1x / 2x Pt100 measuring resistance, e 1x / 2x "J", "K", "N" thermocouple
- Measuring range from 200 to + 600 °C Pt 100, - 200 to + 800 °C "J", - 200 to + 1100 °C "K", "N"
- A, B Accuracy acc. CSN EN 60751, 1, 2 acc. CSN IEC 584-2
- Degree of protection: IP 65, IP 68
- Optional converter with 4 ÷ 20 mA output, HART, Profibus, Fieldbus in the head, including circuit isolation and intrinsically safe construction
- (Ex) II 1/2G Ex ia IIC T6 ... Tx °C Ga/Gb intrinsic safety

Power Supply Units

These reliable power supply units have been designed to supply electric power to sensors in demanding industrial applications. Unlike switching power supply units, these devices prevent the penetration of network interference to the electronic circuits of measuring devices.

- Resistant to short circuits and current overloading
- Output isolated from the mains supply
- Rugged construction, high-quality terminals
- Polycarbonate enclosure
- Mounted to a DIN 35 mm rail, 230 V AC or 24 V DC power supply
- Optional location of connected sensors in Zone 0 hazardous areas
- LED status indication

Isolation Transducers

Designed to isolate current signals from transducers in explosive areas to transducers in non-explosive areas.

- Input/output signal isolation
- Optional bi-directional transmission of HART® communication signals
- Supply voltage for sensors, LED status indication
- Integrated auxiliary voltage supply
- Mounted to a DIN 35 mm rail, 230 V AC or 24 V DC power supply

EML-420 Local Display Unit

Designed for local indications of measured physical values.

- local level indications directly on level indicators
- 2-keypad programming
- Programmable unit, arbitrarily adjustable decimal point
- Mounted between CLM or ULM level indicators and connectors

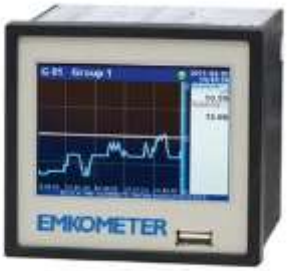
EPD Programmable Display Units

Designed to measure and display physical values.

- Suitable for connecting level indicators to current or voltage outputs
- 4-digit LED display
- Up to 4 relay outputs, acoustic ALARM signalization
- Auxiliary voltage supply for a 4 ÷ 20 mA current loop
- Front panel performance (IP40) or wall-mounted case (IP 65)
- RS-485 / Modbus RTU communication interface
- 230 V AC or 24 V DC power supply, sensor power supply

EMD-1500 Multifunction Graphical Unit

Designed to display, record and evaluate physical values (level, flow, temperature, pressure etc.).



- 3.5” TFT display, multi-language menu
- Modular conception, a variety of optional I/O module configurations
- Measured data recordable into a 1.5 GB internal memory
- Extensive ways of data communication (RS232/485, USB, LAN)
- Data processing and evaluation on PC
- 230 V or 24 V power supply
- Front panel mounted installation

Multifunction Touch Screen MTD-43, MTD-70

4.3" or 7.0“ capacitive touch display with microprocessor

- 4.3” TFT display (480 x 272 px resolution) or 7“ TFT display (1024 x 600 px resolution)
- Measured data recordable into a 1 GB internal memory (2 GB SD card)
- Communication interface (RS232/485, SPI, I2C, Ethernet)
- Data processing and evaluation on a PC
- Dimensions: 120 x 80 x 20 mm (MTD-43) / 186 x 122 x 21mm (MTD-70)
- 0 to 40 °C operating temperature
- 5 to 30 V DC power supply
- 4 x analog input
- 2 x relay
- 8 x digital input / output, 4x PWM output

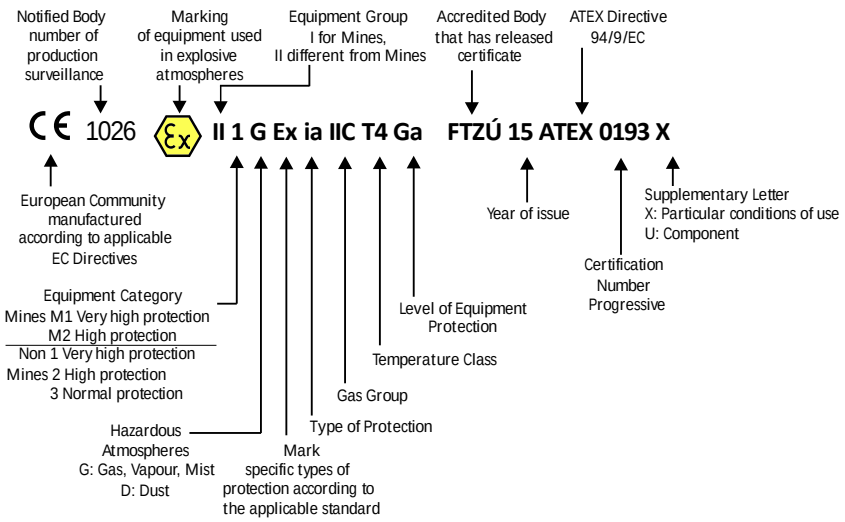
Pressure and Non-Pressure Vessels, Special Pressure Elements

Pressure and non-pressure vessels are designed and manufactured according to our customers´ specifications and requirements. All products are made in compliance with applicable standards and government regulations or according to our customers´ other requirements (e.g. ASME design code). We also supply accessories for these vessels, ventilation/exhaustion systems, pipelines, steel structures, mixers, sight glasses, level gauges, level switches, heating and insulation systems. All production processes are in compliance with PED 97/23 EC and 2014/68/EU requirements and manufacturing standards, e. g. CSN EN 13445-3, 13480, 12952 etc. Our company is certified to manufacture under the supervision of a notified body. Commonly used materials are 1.4301, 1.4571 stainless steel and P235GH, 16Mo3, P91 carbon steel. Other materials or teflon lining can also be used to ensure chemical resistance.

Plastic Storage Tanks

These tanks are mostly used for storing various liquids or as process vessels in production processes. The tanks have been designed to store aggresive materials such as fertilizers, raw materials for food production or drinking water. Materials, volume, shape, connection fittings and other features are always specified to meet our customers´ requirements and to satisfy all local conditions.

Marking according to ATEX 94/9/EC



ATEX and IECEx: Groups, Categories, Zones and EPLs							
Protection Level	Definition	Explosive atmosphere	94/9/EC (ATEX)		94/9/EC (ATEX)	IECEx	
			Group	Equip-ment Category	Area Classifi-cation	Group	EPL
Very High two independent modes of protection or one mode of protection allowing two inde-pendent faults	Explosive atmosphere is present frequently, for long periods or conti-nuously	Coal Mine	I	M1	-	I	Ma
		Gas	II	1G	Zone 0	II	Ga
		Dust	II	1D	Zone 20	III	Da
High one mode of protection allowing only one fault	Explosive atmosphere is occasionally present during normal operati-on	Coal Mine	I	M2	-	I	Mb
		Gas	II	2G	Zone 1	II	Gb
		Dust	II	2D	Zone 21	III	Db
Normal normal safe operation	Explosive atmosphere is not present during normal operation or only for short periods	Gas	II	3G	Zone 2	II	Gc
		Dust	II	3D	Zone 22	III	Dc

Field Equipment:

Simple Apparatus:

Less than 1.5 V; 0.1A; 20 ц; 25 mW (Tc, RTD, pot, switch...).

A simple apparatus is considered not to require a certificate by a notified body. Certification as per the ATEX Directive is not required because of low levels of energy added to the intrinsically safe circuit of this apparatus. A simple apparatus has to be clearly identified when installed. A simple apparatus has to conform to all relevant standard requirements.

Intrinsically Safe Apparatus:

Certification is required.

Safety parameters in compliance with **Assosiated Apparatus:**

Ui/Vmax (max. input voltage); **II/Imax** (max. input current); **PI** (max. input power); **CI** (internal in-ductance)

Control Room Equipment:

Associated Apparatus:

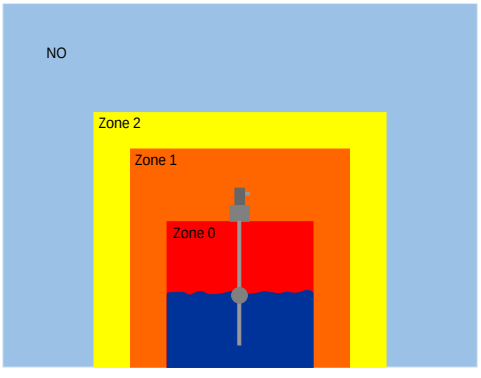
Certification is required.

Safety parameters in compliance with **Intrinsically Safe Apparatus:**

Uo/Voc (open circuit voltage), Io/Isc (short circuit current); Po (max. output power), Co/Ca (allowed capacitance); Lo/La (allowed inductance)

Non Intrinsically Safe Apparatus:

No approval is required.



Zones		
Atmosphere	Zone	Area Classification
Gas	Zone 0	Continuous Hazard
	Zone 1	Intermittent Hazard
	Zone 2	Infrequent Hazard
Dust	Zone 20	Continuous Hazard
	Zone 21	Intermittent Hazard
	Zone 22	Infrequent Hazard
Fiber	Zone 20	Continuous Hazard
	Zone 21	Intermittent Hazard
	Zone 22	infrequent Hazard

Temperature class	Max. surface temperature
T1	450 °C
T2	300 °C
T3	200 °C
T4	135 °C
T5	100 °C
T6	85 °C

Groups		
Atmosphere	Group	Representative Element
Gas	Group I	Methane
	Group IIA	Propane
	Group IIB	Ethylene
	Group IIC	Hydrogen
	Group IIC	Acetylene
Dust	Group IIIB	Non-conductive dust
	Group IIIB	Carbonaceous dust
	Group IIIC	Metal dust
Fiber	Group IIIA	Fibers or flyings

Electrical Apparatus for Gas and Dust Explosive Atmospheres				
Type of Protection	Concept	Code	EPL	IEC / CENELEC standard
Gas				
General Requirements		-	-	60079-0
Intrinsic Safety	Energy limitation	Ex ia Ex ib Ex ic	Ga or Ma Gb or Mb Gc	60079-11
Intrinsically Safe Systems	Energy limitation	Ex ia Ex ib Ex ic	Ga Gb Gc	60079-25
Increased Safety	Non sparking	Ex e	Gb or Mb	60079-7
Type n (non sparking/non incendive)	Non sparking	Ex nA Ex nC	Gc	60079-15
Flameproof / Expl. proof	Explosion containment	Ex d	Gb or Mb	60079-1
Powder Filling	Explosion containment	Ex q	Gb or Mb	60079-5
Type n (enclosed-break)	Explosion containment	Ex nC	Gc	60079-15
Encapsulation	Separation of explosive atmosphere from sparking elements	Ex ma Ex mb Ex mc	Ga or Ma Gb or Mb Gc	60079-18
Type n (sealed/hermetically sealed)	Separation of explosive atmosphere from sparking elements	Ex nC	Gc	60079-15
Pressurization	Separation of explosive atmosphere from sparking elements	Ex pv Ex px ex py Ex pz	Ga or Ma Gb or Mb Gb Gc	60079-2
Oil Immersion	Separation of explosive atmosphere from sparking elements	Ex o	Gb	60079-6
Type n (restricted breathing)	Separation of explosive atmosphere from sparking elements	Ex nR	Gc	60079-15
Special Requirements		-	Ga	60079-26
Dust				
Intrinsic Safety	Energy limitation	Ex ia Ex ib Ex ic	Da Db Dc	60079-11
Dust flamenproof	Separation of explosive atmosphere from sparking elements	Ex ta Ex tb	Da Db	60079-31
Dust tight	Separation of explosive atmosphere from sparking elements	Ex tc	Dc	60079-31
Encapsulation	Separation of explosive atmosphere from sparking elements	Ex ma Ex mb Ex mc	Da Db Dc	60079-18
Pressurization	Separation of explosive atmosphere from sparking elements	Ex pD	Db or Dc	61241-4

Protection Degree			
First number: protection from solids		Second number: protection from water	
0	No protection	0	No protection
1	Greater than 50 mm	1	Vertical dripping
2	Greater than 12.5 mm	2	Angled dripping (15°)
3	Greater than 2.5 mm	3	Spraying
4	Greater than 1 mm	4	Splashing
5	Dust protected	5	Jetting
6	Dust tight	6	Powerful jetting
		7	Temporary immersion
		8	Continuous immersion

EMKOMETER

Flow Indicators and Level Meters

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