

FAM3200

Armored Variable Area Purgemeter

Measurement made easy



Armored variable area purgemeters for measuring small flows of gases and liquids

The device is particularly suitable for cloudy, opaque, or aggressive measuring media.

For use in the chemical, petrochemical and pharmaceutical industries, in gas analysis plants, process engineering, well construction and all applications where glass meter tubes cannot be used.

Options

- With needle valve in the inlet / outlet
- Minimum and / or maximum alarm signalling unit
- Analog output 4 ... 20 mA
- Differential pressure regulator
- Stainless steel housing

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The ABB logo consists of the letters 'ABB' in a bold, red, sans-serif font.

FAM3200

Armored Variable Area Purgemeter

Overview

Model	FAM3220, FAM3250	FAM3225, FAM3255
	Horizontal process connection  G11957	Vertical process connection  G11958
Measured error in accordance with VDE / VDI 3513	6 % qg = 50 %	6 % qg = 50 %
Reproducibility	±0.5 % of measured value	±0.5 % of measured value
Process connection	NPT female thread	NPT or pipe female thread
Nominal connection diameters	1/4" NPT	1/4 ... 1" NPT, G 1/4 ... G 1"
Maximum measuring medium temperature	-50 ... 180 °C (-58 ... 356 °F)	-50 ... 180 °C (-58 ... 356 °F)
Maximum pressure rating	PN 40 (other ratings available on request)	PN 100 (other ratings available on request)
Wetted material	Stainless steel 1.4571 (316Ti), Viton A, Buna N, Kalrez, PVDF, PTFE	
Needle valve	In inlet or outlet	—

Indicator / transmitter

IP degree of protection in accordance with EN 60529	IP 64
Mechanical indicator / transmitter	Analog indicator with or without alarm signalling unit (FAM3220 / FAM3225) Analog indicator with transmitter 4 ... 20 mA (FAM3250 / FAM3255)
Power supply	Without alarm signalling unit: no power supply Analog indicator with alarm signalling unit: 8 V DC via switching amplifier Analog indicator with transmitter: 10 ... 30 V DC
Indicator housing material	Housing cover: Polycarbonate or stainless steel with fiberglass window Base and cover plate: Anodized aluminum, stainless steel available as an option

Functional description

The flowmeters in the FAM3200 work according to the float principle.

The position of the float in the conical meter tube is proportional to the flow.

A magnet in the float translates the height of the float as a measurement for the flow to the decouple-proof magnet follower system of the flowmeter.

The flow rate value is indicated on a scale by a pointer mounted on a rotating shaft.

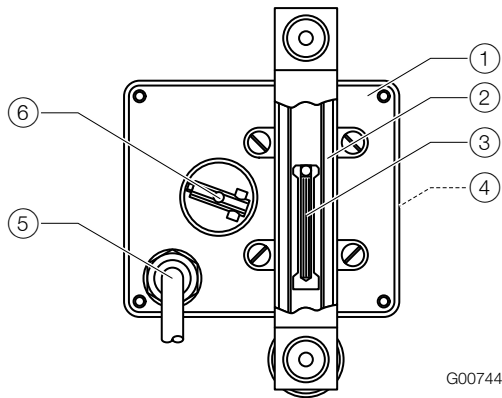


Fig. 1: Structure (example)

- ① Meter housing ② Meter tube ③ Float with magnet
④ Indicator housing ⑤ Magnet follower system ⑥ Cable entry

The devices are used for local indication of the current flow rate with integrated alarm signalling units as flow rate monitors or with differential pressure regulators.

The devices are also available with an angular position transmitter with 4 ... 20 mA output signal as an option.

Introduction and basics

Installation conditions

General

The following points are to be considered during installation:

- The armored variable area flowmeter is installed vertically in piping. The measuring media must flow from bottom to top.
- Keep the device as far as possible from pipe vibrations. Fastening the piping is normally sufficient.
- Keep the device as far as possible from powerful magnetic fields. Magnetic fields that are required for operating reasons must not influence the measurement result.
- The piping should be the same size as the connection size of the flowmeter.
- Inlet and outlet sections are not required. Valves and pipe bends can be screwed on directly.
- Avoid pulsating flows and sudden pressure surges.
- Use slow opening valves.
- If the flowmeter is installed in a pipeline where decommissioning is impossible or inexpedient, a bypass line should be provided.
- For gaseous measurement media, the flowmeter should be installed as close as possible to the pipe constrictions. The nominal diameter of the piping at the outlet of the flowmeter should be measured as small as possible.
- Shut-off and throttle valves should preferably be attached to the outlet of the flowmeter.
- For liquid measuring media, the nominal size of the piping should be dimensioned as large as possible (if economically viable).

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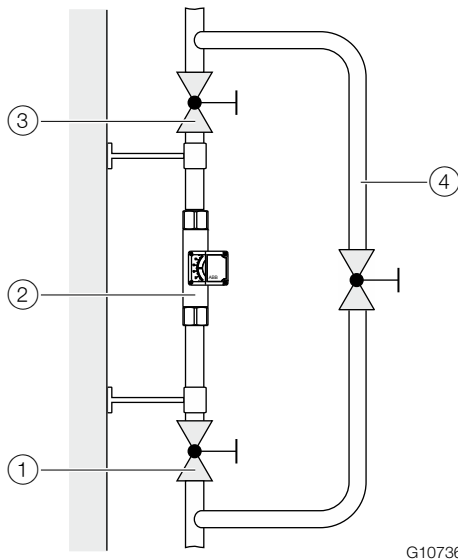


Fig. 2: Installation of the flowmeter

- ① Shut-off valve in the inlet
- ② Flowmeter
- ③ Shut-off valve in the outlet
- ④ Bypass line

Installation recommendations

Refer to VDI / VDE Directive 3513 sheet 3, Selection and Installation Recommendations for Variable Area Flowmeters.

Pressure chambers and collecting tanks

If piston pumps or compressors are used for the transport of the measuring media, a pulsating flow of the measurement media must be expected.

In order to reduce the pulsating of the float, the installation of pressure chambers or collecting tanks in the piping before the flowmeter is recommended.

Sensor insulation

If the flowmeter needs to be insulated, only the meter tube must be included in the pipe insulation. The indicator housing must not be insulated.

This prevents the temperature in the device from rising beyond permitted limits.

Heat tracing

Trace heating may be used under the following conditions:

- The heat tracing must be installed in a way that ensures there is no temperature increase in the indicator housing.
- The maximum permitted temperature of the heat tracing must not exceed the permitted measuring medium temperature.
- When using electrical heat tracing, attention must be paid to potential functional impairment by electromagnetic fields.

Operating conditions

A variable area flowmeter is specified for a defined set of operating conditions of the measuring medium. For liquids and gases, these are pressure and temperature-related properties (density and viscosity) under operating conditions.

For gases, in particular, this means operating at a specific operating pressure and operating temperature. The specified accuracy of the device always refers to the operating conditions underlying the specification.

Pressure loss

The available operating pressure at the measuring point must be higher than the pressure loss listed for the flowmeter in the specifications.

It is important to also consider the pressure loss downstream from the flowmeter due to losses in the piping and other fittings.

For information on pressure loss, see chapter "Measuring range table" on page 10.

Prevention of compression oscillations when measuring gases

With low flow amounts and low operating pressure, so-called compression oscillations of the float can occur.

If the maximum upstream pressure listed in the specifications is not reached, the flowmeter can optionally be equipped with a mechanical float damper.

Damping is available for the device types FAM3225 and FAM3255 with a process connection size $> 1/4"$.

To prevent self-generated compression oscillations, note the following information from VDI / VDE 3513 Sheet 3:

- Select a flowmeter with the lowest possible pressure loss.
- Minimize the piping length between the flowmeter and the closest up or downstream throttling location.
- Restrict the usual measuring range from the usual 10 ... 100 % to 25 ... 100 %.
- When setting the flow rate value, always start assuming larger values.
- Increase the operating pressure and consider its effect on the flow rate values due to the change in gas density at the new operating conditions.
- Minimize non-throttled, free volumes upstream and downstream of the device.

Pressure shocks

Especially when measuring gases, it is possible that pressure or shock waves can occur when fast opening solenoid valves are employed and the piping cross-sections are not throttled, or if there are gas bubbles in liquids.

As a result of the sudden expansion of the gas in the piping, the float is forcibly driven against the upper floatstop.

Under certain conditions, this can lead to destruction of the device.

The mechanical float damping is not suitable for the compensation of pressure shocks!

Solids content in the measuring medium

Variable area flowmeters have only limited suitability for measuring media containing solids.

Depending on the concentration, particle size and type of solid, increased mechanical abrasion may occur, especially at the critical measuring edge of the float.

In addition, solidified deposits on the float can change its weight and shape.

These effects can lead to erroneous measurement results, depending on the float type.

In general, the use of appropriate filters is recommended in such applications.

For the flow measurement of measuring media containing magnetic particles, we recommend the installation of a magnetic separator upstream of the variable area flowmeter.

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Specifications

Scale

Design optionally with percentage scale or product scale.
Scale length: Quadrant 60 mm (2.36 inch)

Mechanical float damper

Option available with FAM3225 / FAM3255 from 1/4" for preventing compression oscillations in gas measurements with a low operating pressure.

Measuring accuracy

6 % qg = 50 % in accordance with VDE / VDI 3513, sheet 2

Reproducibility

±0.5 % of final value

Measuring range limits and span limits

Measuring span: 1:10
For gas applications up to 3200 l/h air, less than 1:10
For detailed information about measuring ranges, see chapter "Measuring range table" on page 10.

Temperature limits

Maximum permissible ambient temperature:
— Standard version: -25 ... 80 °C (-13 ... 176 °F)
— Low temperature version: -50 ... 80 °C (-58 ... 176°F)

For use in potentially explosive atmospheres, observe the temperature values in chapter "Use in potentially explosive atmospheres" on page 17!

For devices with alarm signalling units, observe the temperature data in chapter "Alarm signalling unit" on page 8!

IP rating

IP 64

Materials

Materials for wetted parts

Component	Material
Variable area	Stainless steel 1.4571 (316 Ti)
Orifice plate / cone	Stainless steel 1.4571 (316 Ti)
O-rings	Viton A, Buna N, Kalrez, EPDM
Fittings	Stainless steel 1.4571 (316 Ti)
Meter tube holder	PVDF or PTFE (only with 1/4" device connection)

Materials for the indicator housing

Component	Material
Case cover	Polycarbonate or stainless steel with fiberglass window
Base plate	Anodized aluminum Option: stainless steel
Protective cap	Anodized aluminum Option: stainless steel

Material load

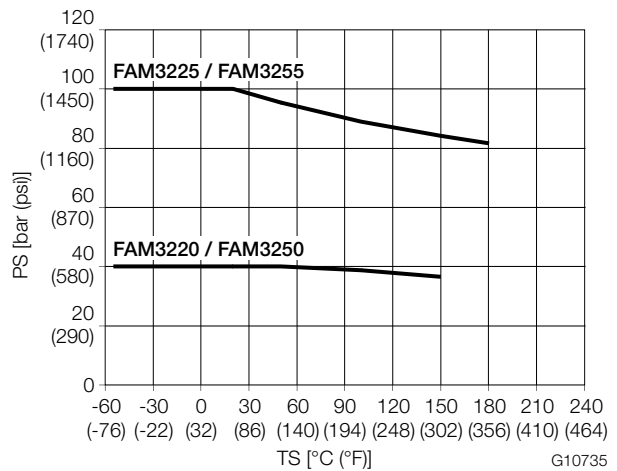


Fig. 3: PS: Pressure, TS: Temperature

Maximum permissible operating pressure

The permissible operating pressure is dependent on the optional device equipment.

Model	Option	Max. permissible operating pressure
FAM3225 / FAM3255	Without	100 bar (1450.38 psi)
FAM3220 / FAM3250	With needle valve	40 bar (580.15 psi)
	With differential pressure regulator	14 bar (203.05 psi) (Standard, higher pressures available on request)

Permissible measuring medium temperature

Permissible measuring medium temperature depending on gasket material.

Gasket materials	
O-ring / meter tube holder	T _{medium} min / max
Viton A / PVDF	-20 ... 100 °C (-4 ... 212 °F)
Buna N / PVDF	-30 ... 100 °C (-22 ... 212 °F)
Kalrez / PTFE	-40 ... 180 °C (-40 ... 356 °F)
Viton A / PTFE	-20 ... 180 °C (-4 ... 356 °F)
Buna N / PTFE	-20 ... 100 °C (-4 ... 212 °F)
EPDM / PVDF	-50 ... 100 °C (-58 ... 212 °F)
Viton / none	-20 ... 180 °C (-4 ... 356 °F)
Buna N / none	-30 ... 100 °C (-22 ... 212 °F)
Kalrez / none	-40 ... 180 °C (-40 ... 356 °F)

NOTE

The permissible measuring medium temperature range is dependent on which gasket material is used.

The details on the factory and name plate of the flowmeter must be strictly observed.

Failure to comply with this information can result in destruction of the gasket and the flowmeter.

Analog indicator with or without alarm signaling unit

A magnet in the float translates the height of the float as a measurement for the flow to the decouple-proof magnet follower system of the flowmeter, which is directly connected to the indicator pin.

For analog indicators, the flow value is shown by the indicator on the scale. For analog indicators with an angular position transmitter, the indicator position is also measured directly at the axis.

The optional alarm signalling units can be integrated into the flowmeter housing.

The alarm signalling units are available as single (minimum or maximum alarm) or double alarms minimum and maximum alarm).

The switching points are adjustable.

The alarm signalling units can be used for switching pumps, solenoid valves, etc..

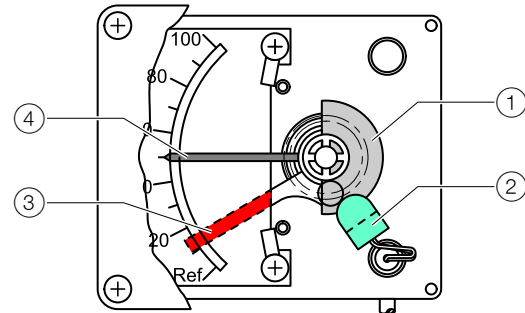


Fig. 4: Single alarm (example)

- ① Metal tag
- ② Alarm signalling unit (proximity switch)
- ③ Alarm adjustment
- ④ Indicator

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Alarm signaling unit

Specifications	
Operating mode	bistable
Switching function	NAMUR contact
Nominal voltage	8 V DC (Ri approx. 1 kΩ)
Operating voltage	5 ... 25 V DC
Switching frequency	Maximum 5 kHz
Connection type	Cable, 2-wire, brown (+) / blue (-), length 1.75 m (5.74 ft) ¹⁾
Switching point single alarm	Minimum 0 ... 60 % Maximum 40 ... 100 %
Switching point double alarm	Minimum setting range approx. 5 %
Setting accuracy	±2 % of measured value
Reproducibility	±0.5 % of scale end value

1) Other cable lengths available on request.

Temperature and electrical data

The following table shows the maximum permitted measuring medium temperature T_{medium} and the permitted electrical data depending on the ambient temperature T_{ambient} and the gasket material.

		Ambient temperature T_{ambient}					
		40 °C (104 °F)		50 °C (122 °F)		60 °C (140 °F)	
Electrical data		T_{medium} maximum [°C (°F)]					
I_i [mA]	P_i [mW]	(A)	(B)	(A)	(B)	(A)	(B)
25	34	100 (212)	180 (356)	100 (212)	165 (329)	100 (212)	155 (311)
25	64	100 (212)	180 (356)	100 (212)	165 (329)	100 (212)	155 (311)
52	169	100 (212)	130 (266)	100 (212)	115 (239)	100 (212)	100 (212)
76	242	80 (176)	80 (176)	65 (149)	65 (149)	50 (122)	50 (122)

(A) Gasket material Buna N (B) Gasket material Viton A / Kalrez

Switching amplifier

Additional switching amplifiers are needed to operate the alarm signaling units.

See chapter "Ordering information switching amplifier" on page 23 for further information.

Specifications	
Power supply	230 V AC, +10 % / -15 %, 45 ... 60 Hz 115 V AC, +10 % / -15 %, 45 ... 60 Hz 24 V DC, +10 % / -15 %
Output	One or two switching relays with potential-free changeover contacts
Switching capacity	Maximum 250 V, maximum 4 A, maximum 500 VA
Maximum permissible cable length	Between switch amplifier and alarm signaling unit: 300 m (984 ft)
Permissible ambient temperature range	-20 ... 60 °C (-4 ... 140 °F)
Electrical connection	Screw terminals, maximum 2.5 mm ² (14 AWG)
Type of assembly	35 mm top-hat rail in accordance with EN 60715:2001
IP rating	IP 20 in accordance with EN 60529
Weight	Approx. 150 g (0.3 lb)

Analog indicator with transmitter

The models FAM3250 / FAM3255 have an integrated angular position transmitter.

The angular position transmitter is installed on the indicator axis of the analog indicator and transforms the indicator position into a 4 ... 20 mA output signal proportional to the measured value.



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Fig. 5: Flowmeter with angular position transmitter (example)

Specifications	
Output signal	4 ... 20 mA, two-wire technology
Power supply	maximum 30 V DC
Power consumption	Maximum 30 mA
Connection type	Cable, 2-wire, brown (+) / blue (-), length 1.75 m (5.74 ft) ¹⁾
Ambient temperature range	-20 ... 40 °C (-4 ... 104 °F)
Version	Angular position transmitter in two-wire technology

1) Other cable lengths available on request.

Differential pressure regulator

The optional differential pressure regulator is used in connection with the flowmeter.

The differential pressure regulator has the task of halting the flow that is adjusted using the needle valve of the purgometer.



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Fig. 6: Flowmeter with differential pressure regulator

Maximum permissible operating pressure

14 bar (203 psi)

Maximum permissible differential pressure

7 bar (101.5 psi)

Required upstream pressure

≥ 0.2 bar

Maximum flowrate

Water: approx. 75 l/h

Air: Qn approx. 2000 l/h

Weight

1.2 kg (2.5 lb) including flowmeter

Materials

Component	Material
Housing	Stainless steel 1.4571
Diaphragms	Viton A ¹⁾ (maximum 180 °C (356 °F))
O-rings	Viton A ¹⁾
Springs	Stainless steel 1.4401
Valve seat and pin	Stainless steel 1.4401
Connecting pipe	Stainless steel 1.4301
Pipe fitting	Stainless steel 1.4301

1) For ammonia, Buna N is required (maximum 120 °C (248 °F))

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Measuring range table

NOTE

The "FlowCalc" program, which is available as a free download from www.abb.com/flow, can be used to calculate flow rates, pressure losses, and upstream pressure requirements.

Model FAM3220 / FAM3250 / FAM3225 / FAM3255, variable area and armored

The data listed applies to water at 20 °C (68 °F), 1 kg/dm³ (62.43 lb/ft³), 1 mPas (1 cP) and to air at 0 °C (32 °F), 1013 mbar (14.7 psia). To set up devices for different measurement media or operating conditions please check the ABB Product Selection Assistant, available at www.abb.com/flow.

Process connection ¹⁾	Maximum flowrate		V _{std} ²⁾ [mPas (cp)]	P _{dif} ³⁾ [bar (psi)]	P _{sta} ⁴⁾ [bar (psi)]	D _p ⁵⁾ [mbar (psi)]	Order code ⁶⁾
	Water [l/h (USgal/h)]	Air [m ³ /h (scfh)]					
1/4"	1 (0.26)	35 (1.24)	4 (4)	0.7 (10.15)	1.0 (14.5)	8 (0.12)	01H
	1.6 (0.42)	54 (1.91)	4 (4)	0.7 (10.15)	1.0 (14.5)	8 (0.12)	02H
	2.5 (0.66)	100 (3.53)	6 (6)	0.7 (10.15)	1.0 (14.5)	8 (0.12)	03H
	4 (1.06)	160 (5.65)	6 (6)	0.7 (10.15)	1.0 (14.5)	8 (0.12)	04H
	6 (1.59)	230 (8.12)	18 (18)	0.7 (10.15)	1.0 (14.5)	8 (0.12)	05H
	10 (2.64)	350 (12.36)	18 (18)	0.7 (10.15)	1.0 (14.5)	8 (0.12)	06H
	16 (4.23)	540 (19.07)	18 (18)	0.7 (10.15)	1.0 (14.5)	8 (0.12)	07H
	25 (6.6)	850 (30.02)	18 (18)	0.7 (10.15)	1.0 (14.5)	9 (0.13)	08H
	40 (10.57)	1250 (44.14)	18 (18)	0.7 (10.15)	1.0 (14.5)	10.5 (0.15)	09H
	60 (15.85)	1900 (67.1)	18 (18)	0.7 (10.15)	1.0 (14.5)	12.5 (0.18)	10H
100 (26.42)	3100 (109.48)	12 (12)	— ⁷⁾	1.0 (14.5)	17.0 (0.25)	11H	

1) Connection nominal size

2) V_{std}: Maximum permissible viscosity without calibration.

3) P_{dif}: Minimum required differential pressure for operation with a differential pressure regulator (FAM3220 / FAM3250 only).

4) P_{sta}: Minimum required static pressure to prevent compression oscillations. For lower pressures, consult ABB.

5) Total pressure loss with stainless steel float at maximum flow.

6) Order code of the meter tube-float construction. See chapter "Main ordering information FAM3220 and FAM3250" on page 19 for further information.

7) Not available with differential pressure regulator.

Model FAM3225 / FAM3255, conical float and orifice plate

The data listed applies to water at 20 °C (68 °F), 1 kg/dm³ (62.43 lb/ft³), 1 mPas (1 cP) and to air at 0 °C (32 °F), 1013 mbar (14.7 psia). To set up devices for different measurement media or operating conditions please check the ABB Product Selection Assistant, available at www.abb.com/flow.

Process connection ¹⁾	Maximum flowrate		V _{std} ²⁾ [mPas (cp)]	P _{dif} ³⁾ [bar (psi)]	P _{sta} ⁴⁾ [bar (psi)]	D _p ⁵⁾ [mbar (psi)]	Order code ⁶⁾
	Water [l/h (USgal/h)]	Air [m ³ /h (scfh)]					
3/8" or 1/2"	100 (26.42)	3200 (113.01)	8 (8)	4.0 (58.02)	0.3 (4.35)	60 (0.87)	20H
	160 (42.27)	5000 (176.57)	8 (8)	4.0 (58.02)	0.3 (4.35)	70 (1.02)	21H
	200 (52.83)	6000 (211.89)	8 (8)	4.0 (58.02)	0.3 (4.35)	80 (1.16)	22H
	250 (66.04)	8000 (282.52)	8 (8)	4.0 (58.02)	0.3 (4.35)	90 (1.31)	23H
	300 (79.25)	9000 (317.83)	8 (8)	4.0 (58.02)	0.3 (4.35)	160 (2.32)	24H
1/2"	400 (105.67)	12000 (423.78)	8 (8)	4.0 (58.02)	0.3 (4.35)	75 (1.09)	30H
	500 (132.09)	15000 (529.72)	8 (8)	4.0 (58.02)	0.3 (4.35)	85 (1.23)	31H
	600 (158.5)	18000 (635.66)	8 (8)	4.0 (58.02)	0.3 (4.35)	95 (1.38)	32H
	700 (184.92)	21000 (5547.61)	8 (8)	4.0 (58.02)	0.3 (4.35)	105 (1.53)	33H
	800 (211.34)	24000 (847.55)	8 (8)	4.0 (58.02)	0.3 (4.35)	130 (1.89)	34H
1"	800 (211.34)	23800 (840.49)	3 (3)	16 (232.06)	0.4 (5.8)	60 (0.87)	40H
	1000 (264.17)	29700 (1048.85)	3 (3)	16 (232.06)	0.4 (5.8)	62 (0.9)	41H
	1600 (422.68)	47600 (1680.98)	3 (3)	16 (232.06)	0.4 (5.8)	74 (1.07)	42H
	2000 (528.34)	59500 (2101.22)	3 (3)	16 (232.06)	0.4 (5.8)	85 (1.23)	43H
	2500 (660.43)	74400 (2627.41)	3 (3)	16 (232.06)	0.4 (5.8)	105 (1.52)	44H
	3000 (792.52)	89300 (3153.6)	3 (3)	16 (232.06)	0.4 (5.8)	130 (1.89)	45H

1) Connection nominal size

2) V_{std}: Maximum permissible viscosity without calibration.

3) P_{sta}: Minimum required static pressure for preventing compression oscillations. At low pressure, the use of the float damper is required.

4) P_{min}: Minimum required static pressure in the device when using the optional float damper (Wendel).

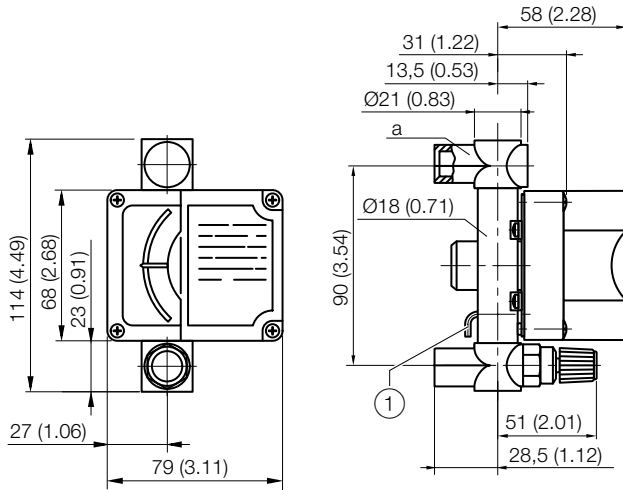
5) Total pressure loss with stainless steel float at maximum flow.

6) Order code of the meter tube-float construction. See chapter "Main ordering information FAM3225 and FAM3255" on page 21 for further information.

Model FAM3250 / FAM3255

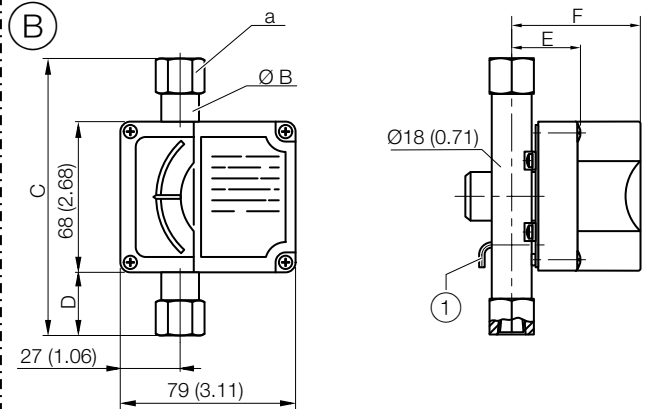
FAM3250 (with angular position transmitter)

(A)



FAM3255 (with angular position transmitter)

(B)



(C)

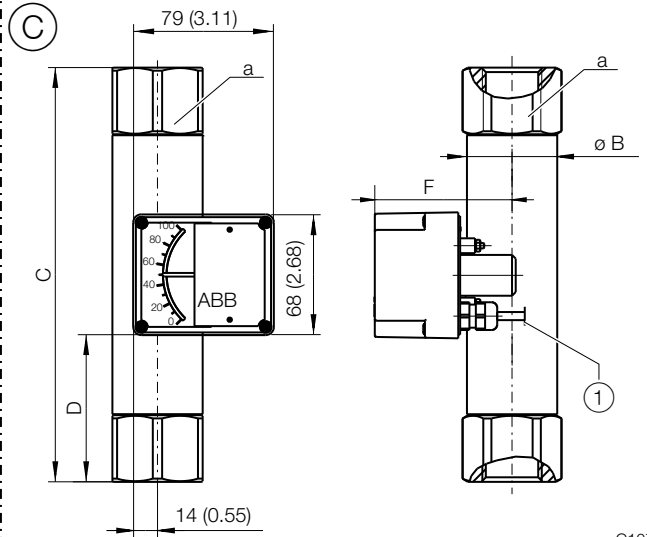


Fig. 8: Dimensions in mm (inch), projection in accordance with ISO method E, SW width across flats in mm

(A) FAM3250, meter size 1/4" (B) FAM3255, meter size 1/4" ... 1/2" (C) FAM3255, meter size 1"

(1) connection cable 1750 mm (5.74 ft) long (other cable lengths available on request)

Model	Meter size	a	Ø B [mm (inch)]	Ø C [mm (inch)]	Ø D [mm (inch)]	Ø E [mm (inch)]	Ø F [mm (inch)]	Weight [kg (lb)]
FAM3250	1/4"	SW22	18 (0.71)	125 (4.92)	29 (1.14)	31 (1.22)	58 (2.28)	0.5 (1.1)
FAM3255	1/4"	SW19						0.4 (0.88)
FAM3255	3/8"	SW24	25 (0.98)	164 (6.46)	48.5 (1.91)	34.5 (1.36)	61.5 (2.42)	0.6 (1.32)
FAM3255	1/2"	SW27	25 (0.98)	164 (6.46)	48.5 (1.91)	34.5 (1.36)	61.5 (2.42)	0.7 (1.54)
FAM3255	1"	SW50	50 (1.97)	230 (9.06)	81 (3.19)	—	74 (2.91)	2.3 (5.07)

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Model FAM3220 / FAM3250, with differential pressure regulator for wall mounting

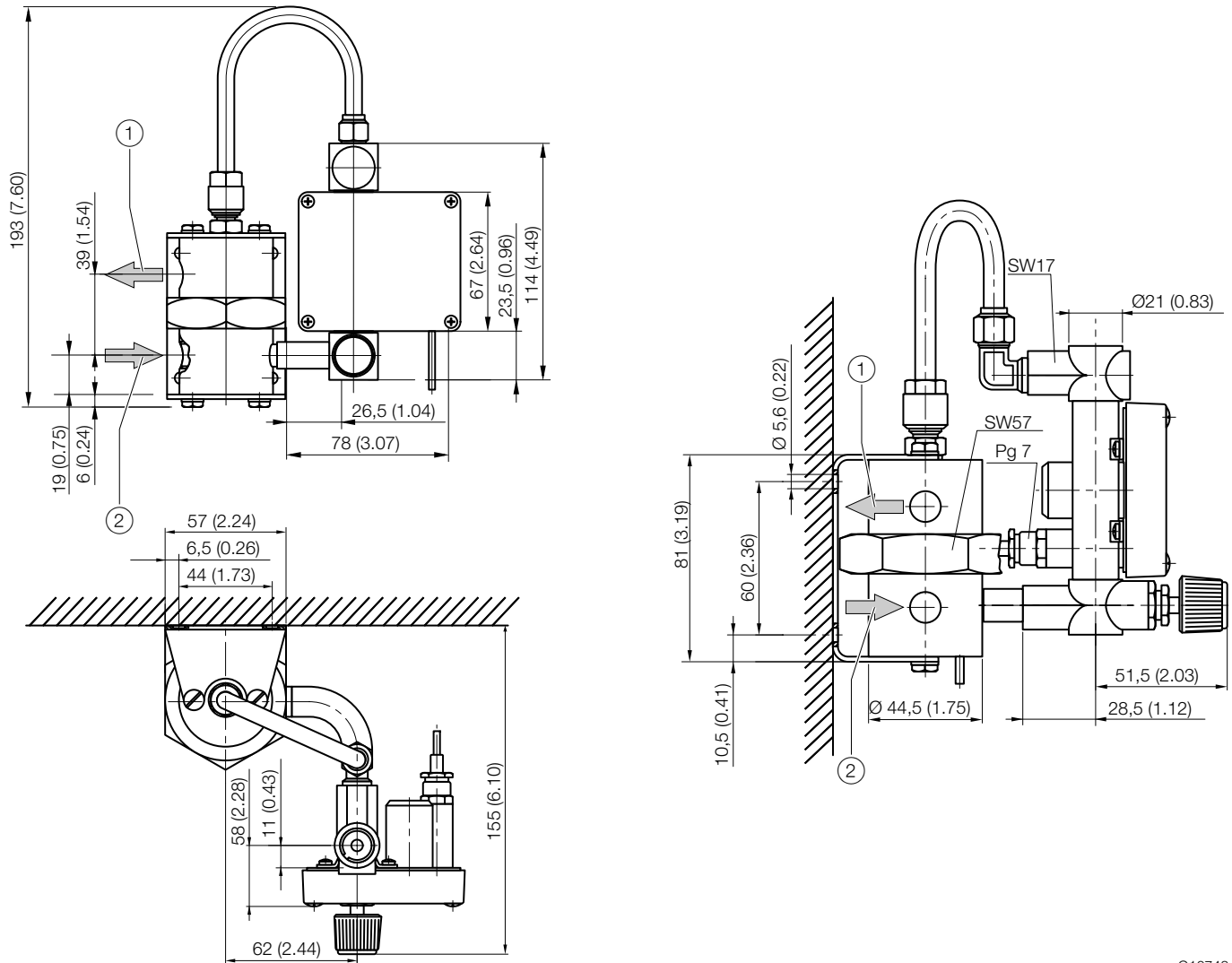


Fig. 9: Dimensions in mm (inch), projection in accordance with ISO method E
 ① medium inlet, female thread 1/4" NPT ② medium outlet, female thread 1/4" NPT

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Accessories

Needle valves

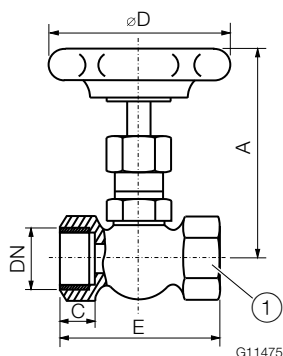


Fig. 11: Brass needle valve

Needle valves for installation in the piping before or after the flowmeter. Valves in the in-line housing with female thread connections. For ordering information, see chapter "Ordering information needle valves" on page 23.

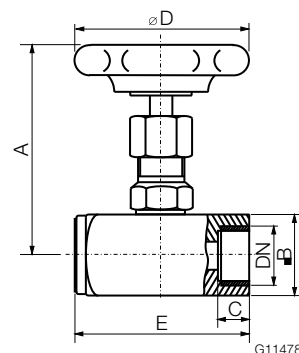


Fig. 12: Stainless steel needle valve

Drawing	Material	Pressure rating	Temperature
Fig. 11	Brass	PN 100	maximum 100 °C (212 °F)
Fig. 12	Stainless steel 1.4571 (AISI 316Ti)	PN 200	maximum 180 °C (356 °F)

Brass needle valve Fig. 11

DN	$\varnothing D$ mm (inch)	A mm (inch)	C mm (inch)	E mm (inch)	Width across flats mm
G 1/4"	50 (1.97)	72 (2.83)	10 (0.39)	50 (1.97)	22
G 1/2"	63 (2.48)	72 (2.83)	12 (0.47)	55 (2.17)	25
G 3/4"	63 (2.48)	95 (3.74)	14 (0.55)	67 (2.64)	32
G 1"	90 (3.54)	130 (5.12)	17 (0.67)	74.5 (2.93)	40

Stainless steel needle valve Fig. 12

DN	$\varnothing D$ mm (inch)	A mm (inch)	B mm (inch)	C mm (inch)	E mm (inch)
G 1/4"	50 (1.97)	72 (2.83)	25 (0.98)	13 (0.51)	50 (1.97)
G 1/2"	63 (2.48)	72 (2.83)	30 (1.18)	16 (0.63)	60 (2.36)
G 3/4"	63 (2.48)	95 (3.74)	35 (1.38)	18 (0.71)	75 (2.95)
G 1"	90 (3.54)	130 (5.12)	45 (1.77)	22 (0.87)	100 (3.94)
1/4" NPT	50 (1.97)	72 (2.83)	25 (0.98)	13 (0.51)	50 (1.97)
3/8" NPT	50 (1.97)	72 (2.83)	25 (0.98)	13 (0.51)	55 (2.17)
1/2" NPT	63 (2.48)	72 (2.83)	30 (1.18)	16 (0.63)	60 (2.36)

Use in potentially explosive atmospheres

Ex-marking

ATEX	
Type examination certificate	TÜV 03 ATEX 2151
FAM3220 and FAM3225 (device without alarm signalling unit)	
II 1/2 G c Tx Ga/Gb	
II 2D T115°C Db	
FAM3220 and FAM3225 (device with alarm signalling unit)	
II 1/2 G c ia IIc T6 Ga/Gb	
II 2D T115°C Db	

The FAM3250 / FAM3255 models with angular position transmitters are not approved for use in potentially explosive atmospheres!

Temperature data

Maximum permissible ambient temperature

T_{ambient} : -20 ... 60 °C (-4 ... 140 °F)

Maximum permissible measuring medium temperature

For the maximum measuring medium temperature, refer to the tables in chapter "Limit value tables" on page 18.

The maximum permissible measuring medium temperature for dust explosion protection is derived from the possible surface temperature of the flowmeter.

The higher value must be used.

Installation

Observe the following points when installing the devices in potentially explosive atmospheres:

- The alarm signalling units must only be connected to certified intrinsically safe circuits.
- When using electrical heat tracing, attention must be paid to potential functional impairment by electromagnetic fields. The specifications of EN 60079-14 must be observed.
- Use with zone 0 in the meter tube. Ensure that the ambient conditions are suitable for devices in zone 1 (e.g. through ensuring sufficient ventilation).

Electrical connections

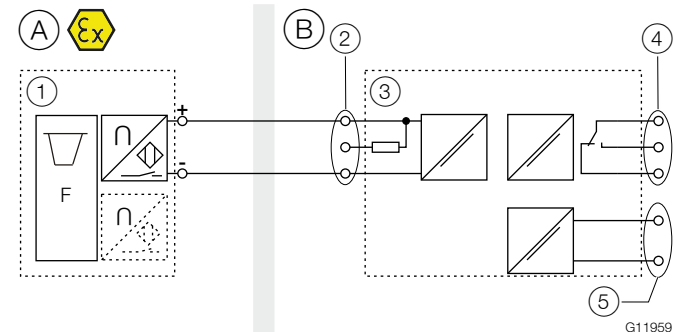


Fig. 13: Electrical connection of an alarm signalling unit to a switching amplifier (example)

- (A) Hazardous area
- (B) Non-hazardous area
- (1) FAM3200 flowmeter with alarm signalling unit
- (2) NAMUR input switching amplifier (3) Switching amplifier
- (4) Switching amplifier output
- (5) Switching amplifier power supply

The circuits (between the alarm signalling units and the switching amplifier) are intrinsically safe. The switching amplifier itself must be mounted outside the hazardous area.

FAM3200

Armored Variable Area Purgemeter

Limit value tables

Devices for use in category 1 (zone 0 in meter tube)

Equipment: $T_{\text{medium}} = T_{\text{ambient}} \geq -20\text{ °C}$ (-4 °F)

Atmospheric conditions: 0.8 ... 1.1 bar (11.6 ... 15.95 psi)

Category 1 refers to the interior of the meter tube. Ensure that the ambient conditions are suitable for devices in zone 1 (e.g. by ensuring sufficient ventilation).

Electrical data					Permissible ambient temperature T_{ambient}										
					40 °C (104 °F)			50 °C (122 °F)			60 °C (140 °F)				
					Permissible measuring medium temperature T_{medium} in the relevant temperature class [°C (°F)]										
U_i [V]	I_i [mA]	P_i [mW]	C_i [nF]	L_i [μH]	T6	T5	T4	T6	T5	T4	T6	T5	T4		
16	25	34	30	100	60	60	60	60	60	60	60	60	60	60	
					(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)
	25	64			60	60	60	60	60	60	60	60	60	60	60
					(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)
	52	169			50	60	60	35	60	60	25	60	60		
					(122)	(140)	(140)	(95)	(140)	(140)	(77)	(140)	(140)		
	76	242			10	50	60	—	35	60	—	25	50		
					(50)	(122)	(140)		(95)	(140)		(877)	(122)		

Devices for use in category 2 (zone 1)

Equipment: $T_{\text{medium}} = T_{\text{ambient}} \geq -20\text{ °C}$ (-4 °F)

Electrical data					Permissible ambient temperature T_{ambient}											
					40 °C (104 °F)				50 °C (122 °F)				60 °C (140 °F)			
					Permissible measuring medium temperature T_{medium} in the relevant temperature class [°C (°F)]											
U_i [V]	I_i [mA]	P_i [mW]	C_i [nF]	L_i [μH]	T6	T5	T4	T3	T6	T5	T4	T3	T6	T5	T4	T3
16	25	34	30	100	85	100	135	180	85	100	135	165	85	100	135	155
					(185)	(212)	(275)	(356)	(185)	(212)	(275)	(329)	(185)	(212)	(275)	(311)
	25	64			85	100	135	180	85	100	135	165	70	100	135	155
					(185)	(212)	(275)	(356)	(185)	(212)	(275)	(329)	(158)	(212)	(275)	(311)
	52	169			50	85	130	130	35	70	115	115	25	60	100	100
					(122)	(185)	(266)	(266)	(95)	(158)	(239)	(239)	(77)	(140)	(212)	(212)
	76	242			10	50	80	80	—	35	65	65	—	25	50	50
					(50)	(122)	(176)	(176)		(95)	(149)	(149)		(77)	(122)	(122)

Ordering Information

Main ordering information FAM3220 and FAM3250

FAM3220: Analog indicator with / without alarm, horizontal screw connection

FAM3250: Analog indicator with angular position transmitter, horizontal screw connection

Base model

FAM3200 Armored Variable Area Purgemeter	D10A32	X	X	XX	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Secondary													Continued see next page					
Indicator		1)	2															
Indicator with electronic converter		2)	5															
Meter Construction																		
Fitting design (horizontal)			0															
Design Level																		
(Specified by ABB)																		
Needle Valve Position																		
Without valve																		A
Inlet fitting																		N
Outlet fitting																		M
Material of Adapter / Sealing																		
PVDF / Viton A (1/4 in.)																		1
PVDF / Buna N (1/4 in.)																		2
PVDF / EPDM (1/4 in.) (Low Temperature -50 °C)																		A
Fitting Material																		
AISI 316Ti SST (1.4571)																		T
Tube Material																		
AISI 316Ti SST (1.4571)																		T
Certificates																		
Standard																		A
Inspection certificate 3.1 acc. EN 10204																		B
Pressure test acc. AD2000																		C
Material certificate 3.1 acc. EN 10204 with pressure test acc. AD2000																		D
Float Construction																		
Standard, without twisted guide rod																		0
Housing																		
Polycarbonate																		1) A
Frame AISI 316Ti SST (1.4571), window of glass																		1) C
AISI 316Ti SST (1.4571) (deep)																		2) D
Frame AISI 316Ti SST (1.4571), window of glass + base plate and cover AISI 316Ti SST (1.4571)																		1) E
AISI 316Ti SST (1.4571) (deep) plus base plate and cover AISI 316Ti SST (1.4571)																		2) F

FAM3200

Armored Variable Area Purgemeter

Main ordering information

FAM3200 Armored Variable Area Purgemeter	X	X	X	X	X
Signal Output					
Indicator without output signal	1)	0			
Indicator with Min. Alarm	1)	1			
Indicator with Max. Alarm	1)	2			
Indicator with Min. / Max. Alarm	1)	3			
Indicator with analog output 4 ... 20 mA / 2-wire (not for Ex)	2)	4			
Differential Regulator					
Without			A		
Model 53RT2110, AISI 316Ti SST (1.4571)	3)	T			
Mounting					
Inline mounting				1	
Wall mounting (only with differential pressure regulator)				2	
Connection Type					
1/4 in. NPT					A
Name Plate					
ABB Standard					1

Additional ordering information FAM3220 and FAM3250

FAM3200 Armored Variable Area Purgemeter	XXX	X	XXX
Tube / Float Combination			
(Specified by ABB, for possible order codes, see chapter "Measuring range table" on page 10)	XXX		
Scale			
Percentage scale	4)	X	
Direct reading	4)	X	
Special Options			
With 5 m signal cable		1) 5)	W01
Ambient temperature -50 ... 80 °C		1) 6)	W02

- 1) Only with FAM3220
- 2) Only with FAM3250
- 3) With inlet needle valve only
- 4) The scale design must be specified when ordering. The relevant order code is defined by ABB depending on the application.
- 5) Indicator with Alarm only
- 6) Indicator without output signal only

Main ordering information FAM3225 and FAM3255

FAM3225: Analog indicator with / without alarm, vertical screw connection

FAM3255: Analog indicator with angular position transmitter, vertical screw connection

Base model

FAM3200 Armored Variable Area Purgemeter	D10A32	X	X	XX	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
Secondary													Continued see next page									
Indicator	1)	2																				
Indicator with electronic converter	2)	5																				
Meter Construction																						
Tube construction (vertical)																						
Design Level																						
(Specified by ABB)																						
Needle Valve Position																						
Without valve																						
Material of Adapter / Sealing																						
PVDF / Viton A (1/4 in.)																						
PVDF / Buna N (1/4 in.)																						
PTFE / Kalrez (1/4 in.)																						
Without / Viton A (> 1/4 in.)																						
Without / Buna N (> 1/4 in.)																						
Without / Kalrez (> 1/4 in.)																						
PVDF / EPDM (1/4 in.) (Low Temperature -50 °C)																						
Without / EPDM (> 1/4 in.) (Low Temperature -50 °C)																						
Fitting Material																						
AISI 316Ti SST (1.4571)																						
Tube Material																						
AISI 316Ti SST (1.4571)																						
Certificates																						
Standard																						
Inspection certificate 3.1 acc. EN 10204																						
Pressure test acc. AD2000																						
Material certificate 3.1 acc. EN 10204 with pressure test acc. AD2000																						
Float Construction																						
Standard, without twisted guide rod																						
With twisted rod (> 1/4 in.)																						
Housing																						
Polycarbonate																						
Frame AISI 316Ti SST (1.4571), window of glass																						
AISI 316Ti SST (1.4571) (deep)																						
Frame AISI 316Ti SST (1.4571), window of glass + base plate and cover AISI 316Ti SST (1.4571)																						
AISI 316Ti SST (1.4571) (deep) plus base plate and cover AISI 316Ti SST (1.4571)																						

FAM3200

Armored Variable Area Purgemeter

Main ordering information

FAM3200 Armored Variable Area Purgemeter	X	X	X	X	X
Signal Output					
Indicator without output signal	1)	0			
Indicator with Min. Alarm	1)	1			
Indicator with Max. Alarm	1)	2			
Indicator with Min. / Max. Alarm	1)	3			
Indicator with analog output 4 ... 20 mA / 2-wire (not for Ex)	2)	4			
Differential Regulator					
Without			A		
Mounting					
Inline mounting					1
Connection Type					
1/4 in. NPT (1 ... 100 l/h water)					A
G 1/4 in. (1 ... 100 l/h water)					B
3/8 in. NPT (100 ... 300 l/h water)					K
G 3/8 in. (100 ... 300 l/h water)					L
1/2 in. NPT (400 ... 800 l/h water)					M
G 1/2 in. (400 ... 800 l/h water)					N
1 in. NPT (800 ... 3000 l/h water)					P
G 1 in. (800 ... 3000 l/h water)					Q
Male connector 6CM8					S
Name Plate					
ABB Standard					1

Additional ordering information FAM3225 and FAM3255

FAM3200 Armored Variable Area Purgemeter	XXX	X	XXX
Tube / Float Combination			
(Specified by ABB, for possible order codes, see chapter "Measuring range table" on page 10)	XXX		
Scale			
Percentage scale	3)	X	
Direct reading	3)	X	
Special Options			
With 5 m signal cable		1) 4)	W01
Ambient temperature -50 ... 80 °C		1) 5)	W02

- 1) Only with FAM3225
- 2) Only with FAM3255
- 3) The scale design must be specified when ordering. The relevant order code is defined by ABB depending on the application.
- 4) Indicator with Alarm only
- 5) Indicator without output signal only

Certificates

Description	Order number
Works Certificate per EN 10204 2.1	BZ-11-0001-SDM
Works Certificate per EN 10204 2.2	BZ-11-0002-SDM
Color Penetration Test Report DIN 54152	BZ-11-0010-00-SDM
Certificate of Compliance for Repaired Apparatus for Ex Atmospheres	BZ-13-1006-SDM
Calibration Certificate plus Certificate of Compliance for Accuracy (not DN 100)	BZ-15-0016-SDM
Certificate of Compliance for Accuracy	BZ-15-0018-01-SDM
Certificate of Compliance of Visual and Dimensional Inspection	BZ-15-0040-SDM
Certificate acc. to NACE MR 0175 (FAM54x, FAM3200)	BZ-15-0042

Accessories

Ordering information switching amplifier

Description	Order number
Amplifier Model KFA5-SR2-Ex1.W, Single Alarm, 115 V 50 / 60 Hz	D163A011U01
Amplifier Model KFA6-SR2-Ex1.W, Single Alarm, 230 V 50 / 60 Hz	D163A011U02
Amplifier Model KFD2-SR2-Ex1.W, Single Alarm, 24 V DC	D163A011U03
Amplifier Model KFA5-SR2-Ex2.W, Double Alarm, 115 V 50 / 60 Hz	D163A011U04
Amplifier Model KFA6-SR2-Ex2.W, Double Alarm, 230 V 50 / 60 Hz	D163A011U05
Amplifier Model KFD2-SR2-Ex2.W, Double Alarm, 24 V DC	D163A011U06

Ordering information needle valves

Description	Order number
Needle Valve, Brass	
Needle Valve, Brass, 1/4 in., separate	1D125D1004
Needle Valve for oxygen applications, Brass, 1/4 in., separate	D125D001U01
Needle Valve, Brass, 1/2 in., separate	1D125D1005
Needle Valve for oxygen applications, Brass, 1/2 in., separate	D125D001U02
Needle Valve, Brass 3/4 in., separate	1D125D1006
Needle Valve for oxygen applications, Brass 3/4 in., separate	D125D001U03
Needle Valve, Brass 1 in., separate	1D125D1017
Needle Valve for oxygen applications, Brass 1 in., separate	D125D001U04
Needle Valve, stainless steel	
Needle Valve, AISI 316Ti SST (1.4571), 1/4 in., separate	1D125D1001
Needle Valve, AISI 316Ti SST (1.4571), 1/2 in., separate	1D125D1002
Needle Valve, AISI 316Ti SST (1.4571), 3/4 in., separate	1D125D1003
Needle Valve, AISI 316Ti SST (1.4571), 1 in., separate	1D125D1019
Needle Valve, AISI 316Ti SST (1.4571), 3/8 in. NPT, separate,	D125D003U01
Needle Valve, AISI 316Ti SST (1.4571), 1/4 in. NPT, separate	D125D003U02
Needle Valve, AISI 316Ti SST (1.4571), 1/2 in. NPT, separate	D125D003U03

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