

Armored Purgemeter FAM3200 (10A3200)

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Product Designation
FAM3200 (10A3200)

Operating Instruction

Part No. D184B003U33

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1 Standard Safety Information
1.1 Instrument Safety Standards

- This instrument satisfies the safety requirements defined in the Pressure Equipment Guideline and is designed using the latest state of the art technology. It was tested at the factory, based on the safety requirements, and was shipped in proper working order. In order to maintain this condition over the expected life of the instrument the requirements described in this Operating Instruction must be observed.
- Please observe the special information for starting-up the instrument in the explosion protected areas.

**1.2 Regulated Usage of Pressure Equipment
„Variable Area Flow Measurement Principle"**

This instrument is designed to

- transport liquids, gases (including unstable gases) and steam (fluids)
- measure the actual volume flowrate at constant operating conditions (pressure, temperature, density). An output of the flowrate in normal or mass units is possible.

Included in the Regulated Usage requirements are:

- installation compatible within the specified limits
- observing and following the information relative to allowable fluids
- observing and following the information in this Operating Instruction
- observing and following the information in the accompanying documents (Specification sheet, Diagrams, Dimension Drawings)

The following uses of the instrument are prohibited:

- installation as an elastic compensation piece in a pipeline, e.g. for compensating pipeline misalignment, pipeline vibrations, pipeline expansions, etc.
- use as a step ladder, e.g. for assembly purposes.
- use as a support for external loads, e.g. as a bracket for pipelines etc.
- material removal by drilling the housing or the addition of materials or parts by painting (covering the Name Plate), welding or soldering.
- repairs, modifications and additions and the use of replacement parts are only permitted as described in this Operating Instruction. Additional tasks must be approved by ABB. We accept no liability for unauthorized tasks.

The operation, service and maintenance requirements in this Operating Instruction must be observed. The manufacturer assumes no responsibility for damages resulting from improper or prohibited use.

1.3 Specification Limits

The instrument is designed exclusively for use within the specifications listed on the Name Plate and in the Operating Instruction. The following limits must be observed:

- the **allowable pressure (PS)** and the **allowable fluid temperature (TS)** must be \leq less than the pressure-temperature values (p/T-Ratings) listed in this Operating Instruction. The specifications of the Factory Tag / Instrument Tag must be observed.
- the maximum and minimum operating temperatures .
- the allowable ambient temperature range specified in the instrument Data sheet not be exceeded
- The Protection Class of the housing is IP 65 per EN60529

1.4 Allowable Fluids









Caution

- Only fluids may be metered for which assurance is available, either from technical information or operational experience of the user, that the chemical and physical properties of the fluid wetted parts in the flowmeter (process connections, meter tube and float) will not be adversely affected during the expected life of the flowmeter.
- Fluids with unknown characteristics may only be metered if the user performs periodic inspections to assure that the safety parameters of the flowmeter have not been compromised.

1.5 Safety Signs, Symbols, Name and Factory Plates and CE-Mark

All safety signs, symbols and the Name and Factory Plates are to maintained in a readable condition and replaced if damaged or lost. Observe the following general information:

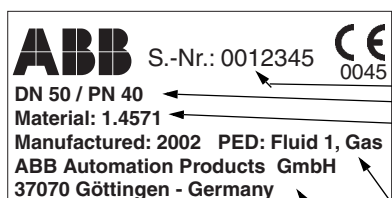
	Warning	Information indicating a risk or dangerous situation which could result in serious injury or even death to personnel.
	Caution	Information indicating a dangerous situation or unsafe procedure which could result in injury to personnel or damage to property.
	Attention	Information indicating a situation which may cause damage to the product or something in its vicinity if it is not corrected.
	Information	Information („Important“) indicating user tips or other important information which, if ignored, may result in a loss of comfort or influence the function of the instrument. (Not an indication of a dangerous/harmful situation).
	Ex-Protection	This symbol defines an instrument with Ex-Protection. For use in Ex-Areas the applicable specifications in the Chapter „Ex-Protection“ must be observed.
	CE-Mark	<p>Die CE-Mark symbolizes the compliance of the instrument with the following guidelines and the fulfillment of the their basic safety requirements:</p> <ul style="list-style-type: none"> • CE-Mark on the Name Plate (on the converter) <ul style="list-style-type: none"> – Compliance with EMC-Guideline 89/336/EWG – Compliance with Ex-Guideline 94/9/ EG (only for instruments with Ex-Protection) • CE-Mark on the Factory Plate (on the flowmeter primary) <ul style="list-style-type: none"> – Compliance with the Pressure Equipment Directive (PED) 97/23/EG <p>A CE-Mark is not present on the Factory Plate for pressure equipment if:</p> <ul style="list-style-type: none"> – the max. allowable pressure (PS) is less than 0.5 bar. – a minimum pressure risk exists (meter sizes ≤ DN 25 [1“]), a certification procedures are not required.

1.6 Specifications on the Factory Plate

The Factory Plate is mounted on the housing of the flowmeter primary. The CE-Mark is used on two differing Factory Plates as a function of the size of the pressure equipment ($> \text{DN } 25 [1"]$ or $\leq \text{DN } 25 [1"]$) (see also Art.3 Par. 3 PED/DGRL 97/23/EG):

a) Pressure Equipment for Sizes $> \text{DN } 25 [1"]$

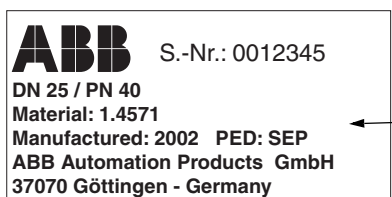
The Factory Plate includes the following specifications:



- CE-Mark (with the Number of the issuing Agency) to certify compliance of the instrument (pressure equipment) with the requirements in PED.
- Manufacturer's Serial number for identification of the pressure equipment.
- Meter size and pressure rating of the pressure equipment
- Material used to manufacture the pressure equipment and gasket material (fluid wetted).
- Year of manufacture and specification of the applicable fluid group per PED (Pressure Equipment Directive [DGRL]) Fluid Group 1 = hazardous fluids, liquid, gas (including unstable gases)
- Pressure equipment manufacturer's name.

b) Pressure Equipment for Sizes $\leq \text{DN } 25$

This Factory Plate contains most of the same specifications included on the plate described above a) with the following differences:



- There is no CE-Mark on the pressure vessel per Art. 3 Par. 3 of PED/DGRL.
- The the reason for the exception is described in Art. 3 Par. 3 of PED/DGRL. The pressure equipment is categorized as SEP (= Sound Engineering Practice).

1.7 Personnel Qualifications

The mechanical and electrical installation, start-up and maintenance of the instrument should only be carried out by trained technicians who have been authorized to perform these tasks by the system operator. The technicians must have read and understood this Operating Instruction and follow its instructions.

1.8 User Responsibilities

- Prior to use for metering corrosive or aggressive fluids the user must consider the resistance of the fluid wetted parts. ABB will gladly provide assistance in their selection, however cannot not accept any liability for their selection.
- Observe the National Codes in your country relative to the installation, functional tests, repair and maintenance of electrical equipment.

1.9 Possible Dangers During Transport

Note during transport of the instrument to the installation site:

- that the center of gravity may be off-center
- possible obstacles into which the instrument may bump and
- secure meter during transport

1.10 Possible Dangers During Installation

Before installing assure that:

- the flow direction agrees with the direction arrow .
- the instrument is installed in a stress free manner (parallel mating flanges) and that gaskets suitable for the operating conditions are used.
- the pipeline up- and downstream from the flowmeter is supported (see Information in the main portion of this Operating Instruction).

1.11 Possible Dangers During Use in Ex-Areas

Special requirements apply in Ex-Areas for connecting the alarm signals. Observe the requirements listed in the Ex-Chapter in this Operating Instruction.

1.12 Possible Dangers During Operation

- When metering hot fluids, touching the flowmeter surface could cause burns.
- Aggressive fluids can cause corrosion and/or abrasion and cavitation when fluids are under a vacuum, due to premature vaporization.

1.13 Possible Dangers During Inspection and Maintenance

- Prior to working on the instrument (opening, removal) assure that the instrument and the adjacent pipeline or reservoir are depressurized.



Attention

- Before opening the instrument ascertain whether hazardous material had been present in the flowmeter. Hazardous residues may still be present in the flowmeter and exit when it is opened.
- If pipeline vibrations are present, it is recommended that the flange bolts and nuts be secured to prevent their loosening.
- Within the framework of operator responsibilities, perform a regular periodic inspection to check:
 - flowmeter operation
 - seal integrity
 - wear (corrosion, abrasion, cavitation)

1.14 Returns

If it is necessary to return the instrument for repair or recalibration to the ABB factory in Göttingen, Germany, use the original packaging material or a suitable protective packing material. Please indicate the reason for the return.



Information! In Accordance with EU Hazardous Materials Guidelines

The owner of special wastes is responsible for its decontamination and must observe the following regulations when shipping it:

- All flowmeter primaries and/or flowmeter transmitters which are returned to ABB Automation Products for repair are to be free of any hazardous materials (acids, bases, solvents, etc.). Any hazardous material in any cavities, e.g. between the meter tube and the housing, is to be flushed and neutralized. Written confirmation that these measures have been carried out should accompany the flowmeter.
- If the user cannot completely remove the hazardous materials, then appropriate documents should accompany the shipment acknowledging this condition. Any costs incurred by ABB to remove and decontaminate the hazardous materials during the repair will be billed to the owner of the instrument.



Attention

This Operating Instruction contains instructions for the start-up and testing of the flowmeter as well specifications for the flowmeter design. The manufacturer reserves the right to make hardware changes which represent technological advances. Information about updates and possible expansions may be obtained from the ABB factory in Göttingen, Germany or from your ABB Sales Office.

1.15 Material Loads

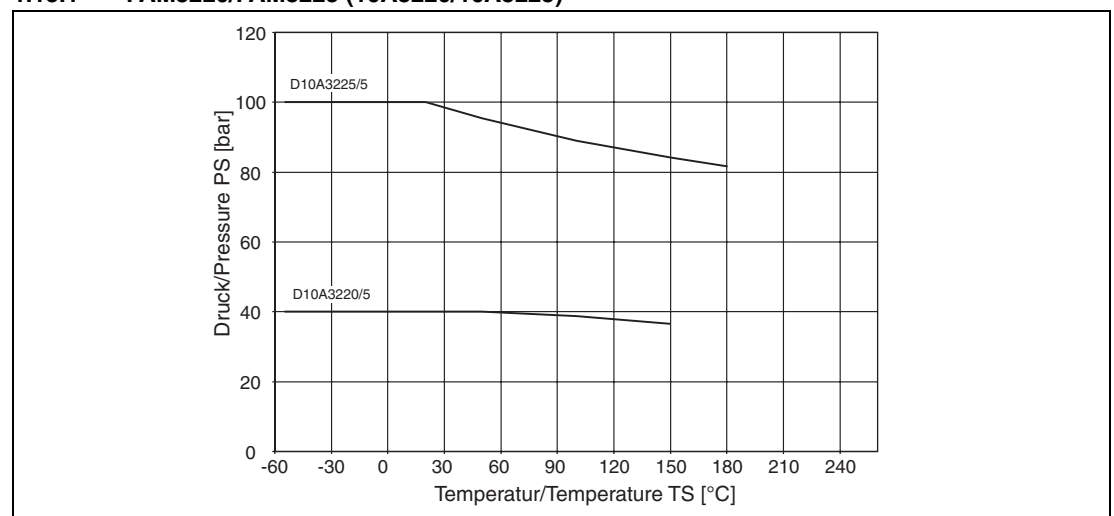


Attention

The limitations for the allowable fluid temperatures (TS) are a function of the gasket material used. See Factory and Instrument Plates.

Non-observance may lead to destruction of the gaskets and the flowmeter.

1.15.1 FAM3220/FAM3225 (10A3220/10A3225)



2 Functional Description

2.1 Metal Tube Flowmeter Series FAM3200

The Series FAM3220 flowmeters are metal tube flowmeters in which a float moves in a tapered, vertical meter tube. These flowmeters provide a local indication of the instantaneous flowrate value and incorporate built-in alarm switches for monitoring the flowrate value. They are also available with a differential pressure regulator for flow control.



Fig. 1: FAM3200

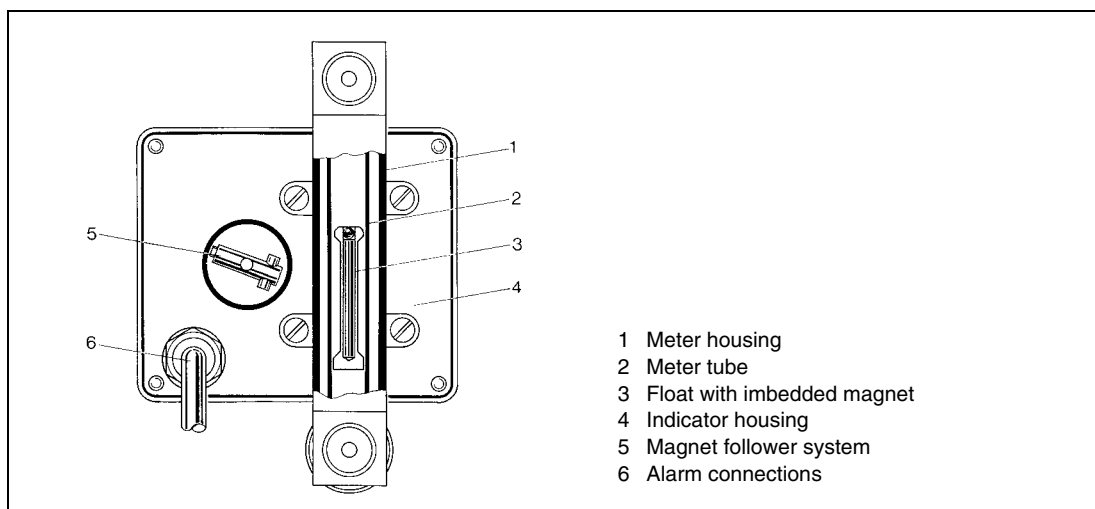


Fig. 2: Cross Section, Tapered Tube Concept

3 Installation

3.1 Installation Conditions



Caution

- Remove the shipping protection.
- The installation orientation must be vertical.
- The flowmeter should be isolated from pipeline vibrations. Pipeline supports are sufficient in normal situations.
- Unobstructed in- and outlet sections are not required. Valves or elbows may be connected directly to the flowmeter.
- Observe the limits listed in the Specification sheet.
- Take care to avoid stray magnetic fields which could affect the metering results.
- When the flowmeter is to be installed in a pipeline in which interruption of service is undesirable or impossible, a bypass line should be installed as shown in Fig. 3.
- See also VDE/VDI Guideline 3513 Sheet 3 "Selection and Installation Recommendations for Variable Area Flowmeters".
- Use slow opening valves.
- Pulsating flows should be avoided.
- Gas inclusions when metering liquids should be avoided.
- A float damping option is available.
- Sudden pressure shocks should be avoided.

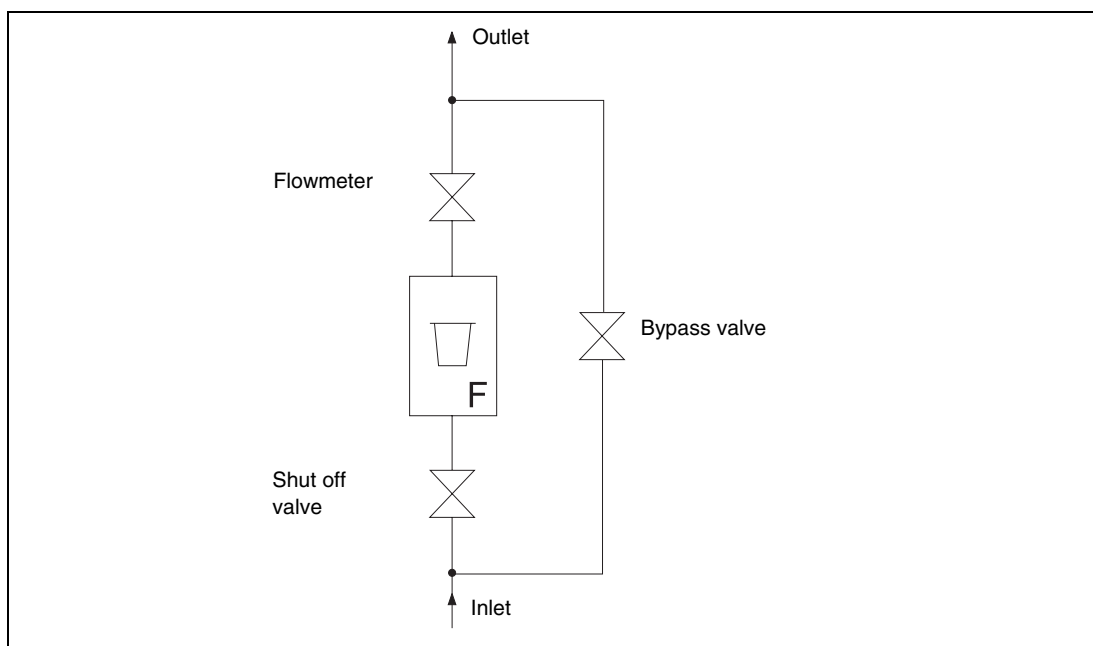


Fig. 3: Installation Example

3.2 Pressure Drop

The pressure which exists at the flowmeter must be sufficient to satisfy the pressure drop through the flowmeter primary. This pressure drop is made up of the constant pressure drop at the float and the pressure drop through the fittings and the flowmeter. The latter increases as the square of the flow velocity. The pressure drop values are listed in the Data sheet.

3.3 Minimum Required Pressure Drop for Gas

Even with pulsation free flows, spontaneous pulsations of the float are possible (float bounce). These pulsations generally occur when the critical volume before and after the float to the nearest throttle point up- or downstream from the flowmeter is exceeded and when both the pressure and flowrate are low. If the operating pressure is below the minimum value listed in the Specification sheet, it is possible to provide a design with gas damping to eliminate the pulsations.

To eliminate the self-induced compression pulsations the following measures can be employed:

- Select a flowmeter with the lowest pressure drop.
- Utilize short pipe sections between the flowmeter and the up- or downstream throttling locations.
- The inside diameter of the pipeline should not be larger than the flowmeter connection size.
- Reduce the flowrate range from the usual 10 % - 100 % to 25 % - 100 %.
- Set the flowrate by approaching the required value from a higher flowrate.
- Increase the operating pressure while taking into account the increase in the flowrate indication due to the increase in the gas density at the new operating conditions.

3.4 Fluids Containing Solids

For fluids which contain magnetic particles, such as iron filings, etc., the danger exists that these magnetic particles may become attached to the float. The accuracy will be affected in an adverse manner.

Caution

Corrosive metal particles are not allowed in Ex-Applications.




In such applications we recommend the use of a magnetic separator. During installation of the flowmeter it is positioned between the flanges of the pipeline and the meter.

In general, solid particles in the fluid cause increased mechanical friction and thereby increased wear on the float metering edge. In such installations an appropriate filter should be provided.

4 Warning Information



Attention

-  When cleaning the sight window, electrostatically charging of the window should be avoided.
Use a damp rag.
- Assure that the flowmeter is only operated with fluids for which either technical information or operational experience of the user is available, which indicates that the chemical and physical properties of the gaskets and the fluid wetted parts in the flowmeter will not be adversely affected during the expected life of the flowmeter.
- A connection is located on the base plate for connection to the Potential Equalization.
- When Zone 0 exists in the meter tube the flowmeters may only be installed in an area where sufficient air flow exists to assure a Zone 1 environment.
- During installation and maintenance the requirements in Standards EN 50281-1-2 and EN 60079-14 are to be observed.

5 Specifications

O-Ring

Viton A:	-20 °C – +180 °C
Buna N:	-20 °C – +100 °C
Kalrez:	-20 °C – +180 °C

Insulating the flowmeter primary does not increase the housing temperature if the indicator housing continues to be exposed to the ambient temperature.

If additional external heating of the flowmeter primary is to be installed by the user, assure that no additional temperature increase occurs in the indicator housing. The max. allow. temperature of the supplementary heating may not exceed the allowable fluid temperature.

When using external electrical heating the possible interaction from the electromagnetic field should be evaluated.

5.1 Additional Specifications for Instruments with Slot Initiators

Electrical Specifications		Allow. Max. Fluid Temperature = f (T _{Ambient} , T _{Fluid})					
		Ambient Temperature 40 °C		Ambient Temperature 50 °C		Ambient Temperature 60 °C	
I _i [mA]	P _i [mW]	Buna N	Viton A Kalrez	Buna N	Viton A Kalrez	Buna N	Viton A Kalrez
25	34	100	180	100	165	100	155
25	64	100	180	100	165	100	155
52	169	100	130	100	115	100	100
76	242	80	80	65	65	50	50

6 Specifications Ex-Design

Identification

TÜV 03 ATEX 2151

II 1/2G c T6 or II 2D T115 °C (secondary instrument without Slot Initiator)

II 1/2G EEx c ia IIC T6 or II 2D T115 °C (secondary instrument with Slot Initiator)

Ambient temperature -20 °C ... +60 °C

The fluid temperature specifications are listed in Fig. 5.1.

The temperatures for the Dust-Ex are a function of the max. possible surface temperature of Slot Initiators, (T115 °C) or of the fluid temperature. The higher of the 2 values is to be used.

O-Ring

Viton A: -20 °C – +180 °C

Buna N: -20 °C – +100 °C

Kalrez: -20 °C – +180 °C

Insulating the flowmeter primary does not increase the housing temperature if the indicator housing continues to be exposed to the ambient temperature.

An external additional heating of the flowmeter primary is to be installed by the user in such a manner that no additional temperature increase occurs in the indicator housing. The max. allow. temperature of the supplementary heating may not exceed the allowable fluid temperature.

The Slot Initiators may only be connected to certified intrinsically safe circuits.

When using external electrical heating the possible interaction of electromagnetic fields should be evaluated. The requirements in EN 60079-14 are to be observed.

6.1 Additional Safety Ex-Specifications for Flowmeters with Slot Initiators

Category 2

The following safety specifications apply to the Armored Purgemeters 10A323.. and. FAM322.. as Category 2 (Zone 1) equipment: $T_{FLUID} = T_{AMBIENT} \geq -20\text{ °C}$

Safety Specifications for Designs with Slot Initiators					Allow. Max. Fluid Temperature = f (T _{Ambient} , T _{Fluid})											
					Ambient Temperature 40 °C				Ambient Temperature 50 °C				Ambient Temperature 60 °C			
U _i	I _i	P _i	C _i	L _i	T6	T5	T4	T3	T6	T5	T4	T3	T6	T5	T4	T3
16 V	25 mA	34 mW	30 nF	100 µH	85 °C	100 °C	135 °C	180 °C	85 °C	100 °C	135 °C	165 °C	85 °C	100 °C	135 °C	155 °C
	25 mA	64 mW			85 °C	100 °C	135 °C	180 °C	85 °C	100 °C	135 °C	165 °C	70 °C	100 °C	135 °C	155 °C
	52 mA	169 mW			50 °C	85 °C	130 °C	130 °C	35 °C	70 °C	115 °C	115 °C	25 °C	60 °C	100 °C	100 °C
	76 mA	242 mW			10 °C	50 °C	80 °C	80 °C	–	35 °C	65 °C	65 °C	–	25 °C	50 °C	50 °C

Category 1

Armored Purgemeters 10A322.. and FAM322.. as Category 1 (Zone 0) equipment:

$T_{FLUID} = T_{AMBIENT} \geq -20\text{ °C}$; atmospheric conditions 0.8 bar to 1.1 bar

Safety Specifications for Designs with Slot Initiators					Allow. Max. Fluid Temperature = f (T _{Ambient} , T _{Fluid})								
					Ambient Temperature 40 °C			Ambient Temperature 50 °C			Ambient Temperature 60 °C		
U _i	I _i	P _i	C _i	L _i	T6	T5	T4	T6	T5	T4	T6	T5	T4
16 V	25 mA	34 mW	30 nF	100 µH	60 °C	60 °C	60 °C	60 °C	60 °C	60 °C	60 °C	60 °C	60 °C
	25 mA	64 mW			60 °C	60 °C	60 °C	60 °C	60 °C	60 °C	60 °C	60 °C	60 °C
	52 mA	169 mW			50 °C	60 °C	60 °C	35 °C	60 °C	60 °C	25 °C	60 °C	60 °C
	76 mA	242 mW			10 °C	50 °C	60 °C	–	35 °C	60 °C	–	25 °C	50 °C

Caution



Category 1 refers to the interior of the meter tube. In such installations the Armored Flowmeter must be installed so that its ambient environment corresponds to Zone 1.

7 Specifications for Optional Accessories

7.1 Alarm Contacts for Model FAM3220/25¹⁾ (10A3220/25)

Alarm contacts can be installed in the housing which respond to max. and/or min. flowrates. They can be utilized to switch pumps, magnet valves etc. (Fig. 4).

The alarm transmitter consists of a slot initiator and a switch amplifier. The switch amplifier is installed separately outside of the indicator housing. A control vane actuates the alarm circuit when it enters the slot initiator. The slot initiator position can be set using a screwdriver.

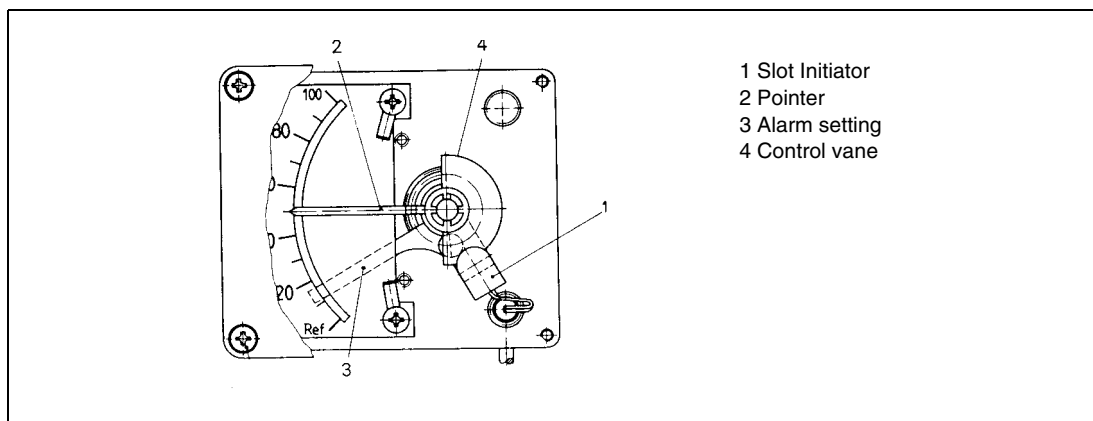


Fig. 4: Armored Purgemeter FAM3220 (10A3220), Indicator with Single Alarm

Setting Switch Point

Single Alarm min. 0 to 60 %, max. 40 to 100 %

Double alarm min. range setting approx. 5 %

Setting Accuracy

± 2 % of rate

7.2 Electrical Transmitter¹⁾ Model FAM3250/55 (10A3250/55)

Attention

The Models FAM3250/55 (10A3250/55) are flowmeters with an integral Angular Rotation Transmitter. The transmitter is mounted on the indicator shaft and converts the pointer indication into a proportional 4-20 mA current output signal. The models with the Angular Rotation Transmitter **may not be installed in Ex-Areas**.

Output signal 4-20 mA/-2-Wire

U_{max} 30 V
 I_{max} 30 mA

Ambient temperature

-20 °C to +40 °C

1) Available as an option



Setting Zero

Position the pointer of the magnet follower system at the lowest scale graduation (e.g. percent scale=10 %, direct reading scale 30 - 300 l/h = 30 l/h). The output signal for this pointer setting can be calculated as follows:

$$\text{Percent scale: } I[mA] = \left(16mA \cdot \frac{\%min}{100} \right) + 4mA$$

$$\text{D.R. scale: } I[mA] = \left(16mA \cdot \frac{Q_{vmin}}{Q_{vmax}} \right) + 4mA$$

The output signal, if necessary, can be adjusted with the "ZERO" potentiometer.

Setting Span

Position the pointer at the 100 % scale graduation or at the highest graduation on a direct reading scale. The potentiometer "SPAN" should be adjusted so that the output signal value is exactly 20 mA. It is recommended that the zero setting be rechecked.



Attention

For non-linear scales, e.g. due to viscosity effects, a linearization unit is required. In many situations an adjustment made at a single point is satisfactory. If required, please contact the factory.

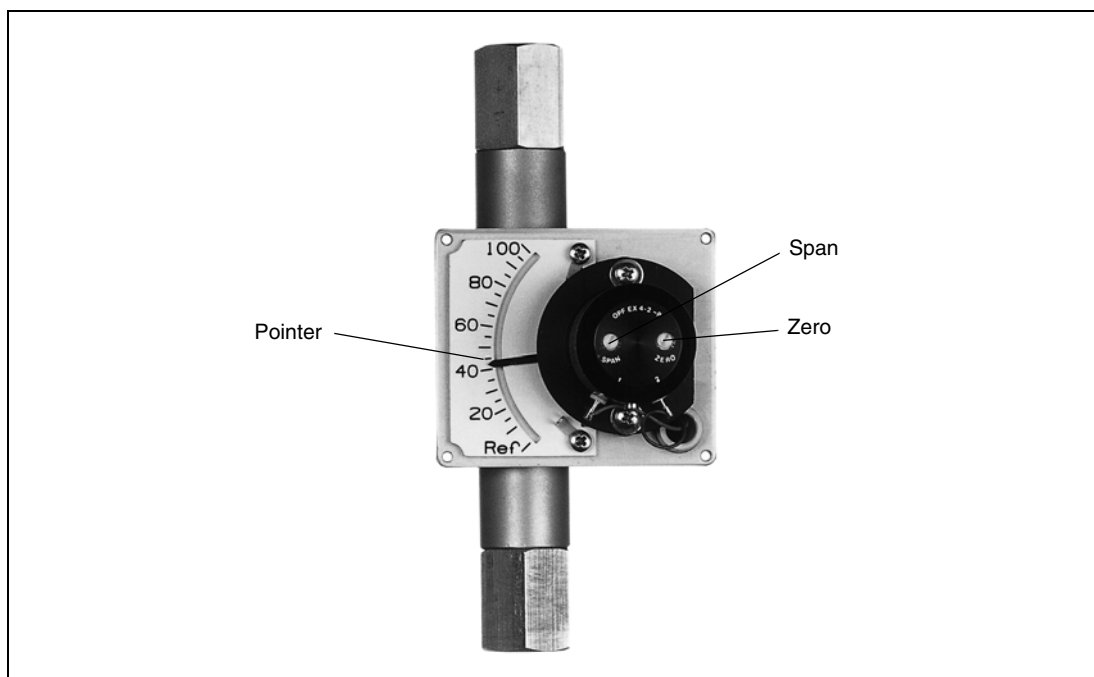


Fig. 5:

Differential Pressure Regulator Model FAM3220 (10A3220)

The differential pressure regulator is used in conjunction with the Armored Purgemeter. It maintains a constant flowrate through the flowmeter whose value is set using the needle valve.

Max. allow. Differential Pressure

7 bar

Connection Size

R1/4"

Materials
Housing

Stn. stl. 1.4571 [316Ti]

Diaphragm

Viton A (max. 180 °C)

O-Rings

Viton A

Springs

Stn. stl. 1.4401 [316]

Valve seat and shaft

Stn. stl. 1.4401 [316]

Connecting pipe

Stn. stl. 1.4301 [304]

Pipe coupling

Stn. stl. 1.4301 [304]



Fig. 6: Differential Pressure Regulator

8 Maintenance

8.1 Cleaning

The meter tube and float should be cleaned as frequently as necessary to maintain the accuracy of the flowmeter. Generally the flowmeter is removed from the pipeline for cleaning, inspection or repair of the meter tube or float.

8.2 Removal of the Float and Metering Tube (see Parts List D184B127U01)

8.2.1 Vertical Connections

Loosen outlet fitting (2). Follow the instructions for horizontal connections

8.2.2 Horizontal Connections

Loosen threaded rod (16). Remove safety retainer ring (17). Remove pressure ring (14) and pressure piece (13).

8.2.3 Horizontal and Vertical Connections

Remove and clean meter tube holder (5), meter tube (6) and float (7). Check O-Ring (15) for possible damage and replace if necessary. Reassemble flowmeter in the reverse order

8.3 Replacement Part Orders

Please include the Instrument Serial No. when ordering replacement parts. The Serial No. may be found on the Instrument Plate which is attached to the housing cover.

Caution



In order to assure proper operation and to avoid dangers, only original replacement parts obtained from the manufacturer should be used. The requirements in ATEX 137 are to be observed during maintenance operations.

8.4 Recommended Switch Amplifier for Alarm Signal Transmitter

A switch amplifier is required for the Alarm Signal Transmitter.

Amplifier	Supply Power	Channels
KFD2-SR2-Ex1.W No. D163A011U03	24 V DC	1
KFA5-SR2-Ex1.W No. D163A011U01	115 V AC	1
KFA6-SR2-Ex1.W No. D163A011U02	230 V AC	1
KFD5-SR2-Ex2.W No. D163A011U06	24 V DC	2
KFA5-SR2-Ex2.W No. D163A011U04	115 V AC	2
KFA6-SR2-Ex2.W No. D163A011U05	230 V AC	2

These Switch Amplifiers from Pepperl & Fuchs are examples. Others can be used equally as well.

9 Certifications

9.1 EU-Certificate of Compliance



EG-Konformitätserklärung
EC-Certificate of Compliance

Hiermit bestätigen wir die Übereinstimmung der
Herewith we confirm that our

Ganzmetall-Durchflussmesser
Armored-Flowmeter

Modell 10A322.. / FAM322..
Model

mit den grundlegenden Sicherheits- und Gesundheitsanforderungen gem. der Richtlinie 94/9/EG des Rates der Europäischen Gemeinschaft. Die Sicherheits- und Installationshinweise der Produktdokumentation sind zu beachten.
are in compliance with the Essential Health and Safety Requirements with refer to the council directives 94/9/EC of the European Community. The safety and installation requirements of the product documentation must be observed.

Die Ganzmetall-Durchflußmesser dienen zur Messung des Durchflusses von Gasen und Flüssigkeiten.
The Armored Flowmeters are utilized to meter the flowrate of gases or liquids.

EG-Baumusterprüfbescheinigung: TÜV 03 ATEX 2151
EC-Type Examination Certificate:

Benannte Stelle: TÜV Hannover/Sachsen-Anhalt e.V., Kennnummer 0032
Notified Body:

Geräte-Kennzeichnung: II 1/2 G c T6 bzw. II 1/2 G EEx c ia IIC T6 bzw. II 2 D T115°C
Apparatus code:

Sicherheitstechnische Daten: siehe EG-Baumusterprüfbescheinigung TÜV 03 ATEX 2151
Safety values:

Angewandte Normen: EN 13 463-1:2001
Standards:

Göttingen, 16. Juni 2003



Unterschrift / Signature




ABB Automation Products GmbH

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9.2 EU-Type Examination Certificate

Translation of German Original



EC-Type Examination Certificate

- (1)
- (2) Equipment or Protective Systems intended for use in potentially explosive atmospheres - Directive 94/9/EC.
- (3) EC-Type Examination Certificate No



TÜV 03 ATEX 2151

- (4) Instrument: Variable Area Flowmeter Models 10A322. and FAM322.
- (5) Manufacturer: ABB Automation Products GmbH
- (6) Address: D-37079 Göttingen, Dransfelder Straße 2, Germany
- (7) The equipment and any acceptable variation thereto is specified in the schedule to this certificate and documents therein referred to.
- (8) The TÜV NORD CERT GmbH & Co. KG, TÜV Certification Body No. 0032 in accordance with Article 9 of the Council Directive of the European Community of 23 March 1994 (94/9/EC) certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II of the directive.

The examination and test results are recorded in the confidential Report No. 03YEX550611.
- (9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with
EN 13 463-1:2001
- (10) If the sign "X" is placed after the certification number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.
- (11) With refer to Directive 94/9/EC this EC-Type Test Examination Certificate relates only to the design and construction of the specified equipment. Further requirements of this Directive apply to the manufacture and supply of these equipment. This requirements are not part of this certificate.
- (12) The markings for the equipment shall include the following specifications:



II 1/2 G c T6 or II 1/2 G EEx c ia IIC T6 or II 2 D T115°C

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Hannover, 13 June 2003

p.p. Schwedt

Head of the Certification Body

This EC-Type Examination Certificate may only be reproduced without any changes.
Excerpts or changes require the approval of TÜV NORD CERT GmbH & Co. KG

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(13)

SCHEDULE

(14) **EC-Type Examination Certificate No. TÜV 03 ATEX 2151**

(15) Description of the Equipment

The Variable Area Flowmeter Models 10A322.and FAM322. in meter sizes 1/4", 3/8", 1/2" and 1" are none electrical apparatus and are used to measure the flowrates of gases and liquids.
The Variable Area Flowmeter Models 10A322.and FAM322. may be installed and operate in hazardous areas defined for Category 2-Equipments (Gas and Dust). The internal volume of the metering tube corresponds to Category 1 (Gas).
Separate certified electrical apparatus (Initiators) according to EC-Type Examination Certificate PTB 99 ATEX 2219 X or PTB 00 ATEX 2049 X may be installed inside of the indicator housing for limit detection.

Electrical Specifications

Initiator Circuits
(cable junction)

Ignition Class Intrinsically Safe EEx ia IIC
Only for connection to a certified Intrinsically Safe circuit with the following maximum values:
 $U_i = 16V$
 I_i see table
 P_i see table
Effective internal capacitance: 30 nF
Effective internal inductance: 0,1 mH

The relationship between the maximum allowable Fluid Temperature, Ambient Temperature T_{AMB} , Temperature Classes and Electrical Data of the Initiators are listed in the table below:

Electrical Data		Maximum allowable Fluid Temperature [°C]								
I_i [mA]	P_i [mW]	$T_{AMB} = 40^{\circ}C$			$T_{AMB} = 50^{\circ}C$			$T_{AMB} = 60^{\circ}C$		
		T6	T5	T4	T6	T5	T4	T6	T5	T4
25	34	60	60	60	60	60	60	60	60	60
25	64	60	60	60	60	60	60	60	60	60
52	169	50	60	60	35	60	60	25	60	60
76	242	10	50	60	--	35	60	--	25	50
		Minimum allowable Fluid Temperature							-20°C	
		Allowable Process Pressure inside the Metering Tube							0,8 to 1,1bar	

Translation of German Original

Schedule to EC-Type Examination Certificate No. TÜV 03 ATEX 2151

The information in the manufacturer instruction manual obtain in addition to this table.

With refer to the Dust Ignition Proof the temperature is $T_{115}^{\circ}\text{C}$ or T_{MEDIUM} .
The highest temperature is relevant.

(16) Test documents are listed in the Test Report No. 03 YEX 550611

(17) Special Conditions

none

(18) Essential Health and Safety Requirements

none additionally

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