

VA Master FGM1190 Glass tube variable area flowmeter

Measurement made easy



Short product description

Glass tube variable area flowmeter for flow measurement of fluids and gases.

Further information

Additional documentation on VA Master FGM1190 is available to download free of charge at www.abb.com/flow.

Alternatively simply scan this code:



Manufacturer

ABB Automation Products GmbH

Measurement & Analytics

Dransfelder Str. 2

37079 Göttingen

Germany

Tel: +49 551 905-0

Fax: +49 551 905-777

Customer service center

Tel: +49 180 5 222 580

Mail: automation.service@de.abb.com

Contents

1	Safety	4	9	Maintenance / Repair	12
1.1	General information and instructions	4	9.1	Spare parts.....	12
1.2	Warnings	4	9.2	Cleaning	12
1.3	Intended use.....	4	9.2.1	Disassembly of the meter tube	12
1.4	Improper use	5	9.3	Returning devices	13
1.5	Warranty provisions	5	10	Recycling and disposal	13
2	Use in potentially explosive atmospheres	5	10.1	Dismounting	13
2.1	Flowmeter Ex-marking	5	10.2	Disposal.....	13
2.1.1	Surface temperature	5	11	Specifications	14
2.2	D55AX alarm signaling unit ex-marking	5	11.1	Temperature limits °C (°F)	14
2.2.1	Electrical connection for the alarm signaling unit... ..	5	11.2	Operating pressure	15
2.3	Information for safe operation in potentially explosive atmospheres	5	11.3	Material load	15
3	Functional description	6	12	Appendix	17
4	Product identification	6	12.1	Return form	17
4.1	Device identification plate.....	6	12.2	Declarations of conformity.....	17
4.2	Factory plate.....	7			
5	Transport and storage	7			
5.1	Inspection.....	7			
5.2	Transport.....	7			
5.3	Storage	7			
5.4	Returning devices	7			
6	Installation	8			
6.1	Safety instructions	8			
6.2	Installation conditions.....	8			
6.2.1	General.....	8			
6.2.2	Installation recommendations.....	9			
6.2.3	Pressure chambers and collecting tanks	9			
6.3	Operating conditions.....	9			
6.3.1	Pressure loss	9			
6.3.2	Prevention of compression oscillations when measuring gases	9			
6.3.3	Pressure shocks	9			
6.3.4	Solids content in the measuring medium.....	9			
6.4	Installation	10			
6.4.1	General information.....	10			
6.4.2	Flowmeter installation.....	10			
7	Commissioning	10			
8	Alarm signalling unit	11			
8.1	General remarks	11			
8.1.1	Switching amplifier	11			

1 Safety

1.1 General information and instructions

These instructions are an important part of the product and must be retained for future reference.

Installation, commissioning, and maintenance of the product may only be performed by trained specialist personnel who have been authorized by the plant operator accordingly. The specialist personnel must have read and understood the manual and must comply with its instructions.

For additional information or if specific problems occur that are not discussed in these instructions, contact the manufacturer.

The content of these instructions is neither part of nor an amendment to any previous or existing agreement, promise or legal relationship.

Modifications and repairs to the product may only be performed if expressly permitted by these instructions.

Information and symbols on the product must be observed.

These may not be removed and must be fully legible at all times.

The operating company must strictly observe the applicable national regulations relating to the installation, function testing, repair and maintenance of electrical products.

1.2 Warnings

The warnings in these instructions are structured as follows:

DANGER

The signal word "DANGER" indicates an imminent danger. Failure to observe this information will result in death or severe injury.

WARNING

The signal word "WARNING" indicates an imminent danger. Failure to observe this information may result in death or severe injury.

CAUTION

The signal word "CAUTION" indicates an imminent danger. Failure to observe this information may result in minor or moderate injury.

NOTE

The signal word "NOTE" indicates useful or important information about the product.

The signal word "NOTE" is not a signal word indicating a danger to personnel. The signal word "NOTE" can also refer to material damage.

1.3 Intended use

This device is intended for the following uses:

- To convey liquids, gases (including unstable liquids and gases) and vapors.
- To measure the flow of the operating volume under constant operating conditions (pressure, temperature, density). An output of the flow is also possible in standard or mass units.

The device has been designed for use exclusively within the technical limit values indicated on the name plate and in the data sheets.

The following technical limit values must be observed:

- The permissible pressure (PS) in the permissible measuring medium temperature (TS) may not exceed the pressure-temperature ratings.
- The maximum or minimum operating temperature must not be exceeded or undershot.
- The permissible ambient temperature must not be exceeded.

When using media for measurement the following points must be observed:

- Measuring media may only be used if, based on the state of the art or the operating experience of the user, it can be assured that the chemical and physical properties necessary for safe operation of the materials of flowmeter sensor components coming into contact with these will not be adversely affected during the operating period.
- Media containing chloride in particular can cause corrosion damage to stainless steels which, although not visible externally, can damage wetted parts beyond repair and lead to the measuring medium escaping. It is the operator's responsibility to check the suitability of these materials for the respective application.
- Measuring media with unknown properties or abrasive measuring media may only be used if the operator can perform regular and suitable tests to ensure the safe condition of the meter.

The operator bears sole responsibility for the use of the devices in relation to suitability, intended use and corrosion resistance of the materials in relation to the measuring medium.

The manufacturer is not liable for damage arising from improper or non-intended use.

Repairs, alterations, and enhancements, or the installation of replacement parts, are only permissible insofar as these are described in this manual. Approval by ABB Automation Products GmbH must be sought for any activities beyond this scope. Repairs performed by ABB-authorized specialist shops are excluded from this.

1.4 Improper use

The following are considered to be instances of improper use of the device:

- For operating as a flexible adapter in piping, e.g. for compensating pipe offsets, pipe vibrations, pipe expansions, etc.
- For use as a climbing aid, e.g. for mounting purposes
- For use as a support for external loads, e.g. as a support for piping, etc.
- Material application, e.g. by painting over the name plate or welding/soldering on parts
- Material removal, e.g. by spot drilling the housing

1.5 Warranty provisions

Using the device in a manner that does not fall within the scope of its intended use, disregarding this manual, using underqualified personnel, or making unauthorized alterations releases the manufacturer from liability for any resulting damage. This renders the manufacturer's warranty null and void.

2 Use in potentially explosive atmospheres

The glass tube variable area flowmeter can be used without further restrictions in the hazardous area of Zone 2 and Zone 22.

2.1 Flowmeter Ex-marking

II 3G Tx Gc
II 3DTx Dc

2.1.1 Surface temperature

Notice: The maximum surface temperature of the device corresponds to the maximum measuring medium temperature (if this is higher than the ambient temperature). If there are uncertainties regarding the maximum measuring medium temperature, the corresponding security surcharges for the maximum surface temperature when using the device are included in the calculations.

2.2 D55AX alarm signaling unit ex-marking

II 3G Ex nA IIC T6 Gc

The rated voltage of the alarm signaling unit is $U_M = 60 \text{ V}$.

2.2.1 Electrical connection for the alarm signaling unit

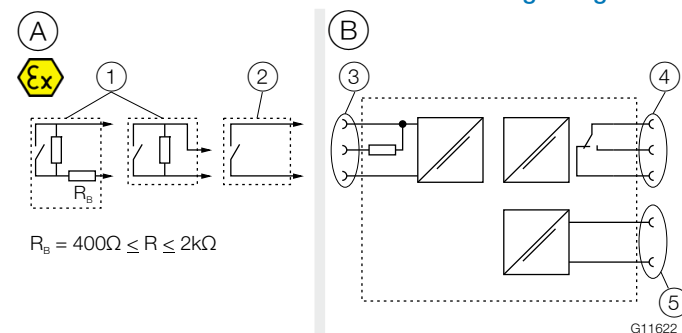


Fig. 1: Connection of alarm signaling unit to a switching amplifier (example)

- (A) Hazardous area (B) Non-hazardous area
- (1) Alarm signaling unit in NAMUR wiring
- (2) D55AX alarm signaling unit (3) Switching amplifier input
- (4) Switching amplifier output (5) Switching amplifier power supply

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

2.3 Information for safe operation in potentially explosive atmospheres

When operating in hazardous areas, observe the following points and instructions.

Assembly / Commissioning

When installing the flowmeter, ensure that there are no external mechanical influences on the flowmeter.

Operation

- Ensure that the chemical resistance and temperature resistance of the gaskets are observed.
- Ensure that the permissible operating conditions and ambient conditions are observed.
- Ensure that the measuring medium does not contain any corrosive metal particles.
- Ensure that liquid measuring media do not contain any gas inclusions.
- Avoid pulsating flow of the measuring media.
- Avoid compression oscillations, see chapter "Prevention of compression oscillations when measuring gases" on page 9.

Maintenance / Repair

Ensure that only original parts are used during maintenance and repair work.

- Ensure that there are no solid particles or loose parts in the piping.
- When cleaning the plastic protective pipe, only use moist cloths to avoid the risk of explosion due to electrostatic charging.

3 Functional description

The VA Master FGM1190 series flowmeters work according to the float principle.

The position of the float in the conical glass meter tube is proportional to the flow. It can be read on the scale fitted to the meter tube.

Four different types of scale can be used:

- Directly readable scale in flow units
- Percent scale
- DK/DS scale
- Millimeter scale

When using the DK/DS scale a flow rate table is available for the flowmeter. For other operating conditions, the user can create additional tables.

Flowmeters in sizes 1/2" to 2" are provided with a percentage scale in the standard design. The device has a factory plate indicating the flow rate for the display of 100 %.

The other scale values can be linearly converted. A special reading curve is therefore not required.

On request, conversion equations for flow calculation for other operating conditions will be made available.

4 Product identification

4.1 Device identification plate

The name plate is located on the flowmeter.

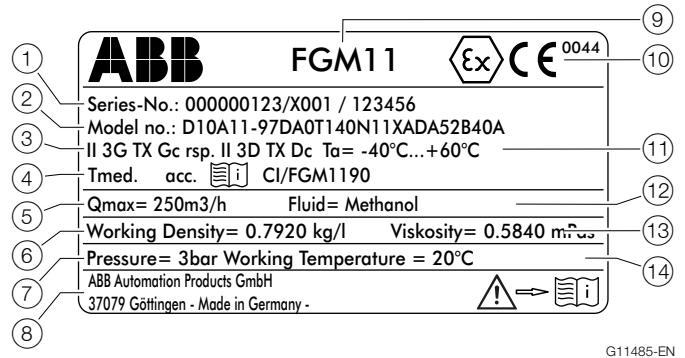


Fig. 2: Name plate for devices with directly readable scale (example)

- ① Serial number
- ② Model number
- ③ ATEX marking
- ④ Permissible measuring medium temperature with reference to the commissioning instruction for
- ⑤ Maximum flow rate
- ⑥ Operating density
- ⑦ Operating pressure
- ⑧ Address of the manufacturer
- ⑨ Type designation
- ⑩ CE mark
- ⑪ Ambient temperature
- ⑫ Measuring medium
- ⑬ Viscosity of the measuring medium
- ⑭ Operating temperature

NOTE

The information on the permissible measuring medium temperature (T_{med}) can be found in chapter "Specifications" on page 14.

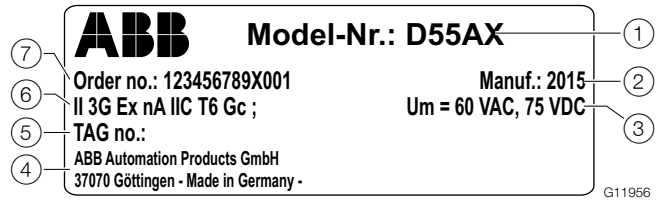


Fig. 3: Name plate, alarm signaling unit

- ① Model number
- ② Year of manufacture
- ③ Operating voltage
- ④ Manufacturer's address
- ⑤ TAG number
- ⑥ ATEX marking
- ⑦ Order number

4.2 Factory plate

The factory plate is on the flowmeter in addition to the name plate. Depending on the nominal size of the flowmeter (> DN 25 or ≤ DN 25), it is identified with two different factory plates (also refer to article 4, paragraph 3 Pressure Equipment Directive 2014/68/EU):

Pressure equipment within the scope of the Pressure Equipment Directive

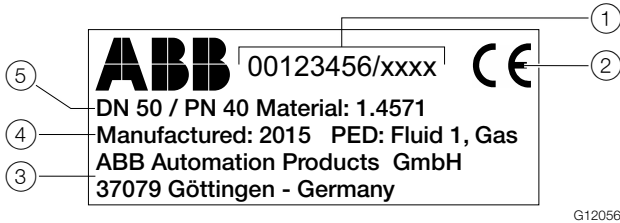


Fig. 4: Factory plate for nominal diameter > DN 25 (example)
① Serial number of the sensor ② CE mark ③ Manufacturer address ④ Year of manufacture and specification of the fluid group in accordance with the PED ⑤ Nominal diameter / nominal pressure rating and material of the pressure bearing part (wetted part)

Below the CE mark, the number of the designated authority to confirm that the device meets the requirements of Pressure Equipment Directive is specified.

The respective fluid group in accordance with the Pressure Equipment Directive is indicated under PED.

Example: Fluid group 1 = hazardous fluids, gaseous.

Pressure equipment within the scope of the Pressure Equipment Directive



Fig. 5: Factory plate for nominal diameter ≤ DN 25 (example)
① Serial number of the sensor ② Reason for exception under article 4, paragraph 3 of the Pressure Equipment Directive ③ Manufacturer address ④ Year of manufacture ⑤ Nominal diameter / nominal pressure rating and material of the pressure bearing part (wetted part)

Under PED, the reason for the exception in article 4, paragraph 3 of the Pressure Equipment Directive is specified. The pressure equipment is classified in the SEP (= Sound Engineering Practice) "Good Engineering Practice" category.

5 Transport and storage

5.1 Inspection

Check the devices immediately after unpacking for possible damage that may have occurred from improper transport. Details of any damage that has occurred in transit must be recorded on the transport documents.

All claims for damages must be submitted to the shipper without delay and before installation.

5.2 Transport

- The center of gravity of some devices is not at the center of the equipment.
- Use the any available attachment points on the device for transport.
- Ensure that all transport locking devices are available and correctly installed.
- Transport packaging marked visibly with the note "Caution Glass".

5.3 Storage

Bear the following points in mind when storing devices:

- Store the device in its original packaging in a dry and dust-free location.
- Observe the permitted ambient conditions for transport and storage.
- Avoid storing the device in direct sunlight.
- In principle, the devices may be stored for an unlimited period. However, the warranty conditions stipulated in the order confirmation of the supplier apply.

The ambient conditions for the transport and storage of the device correspond to the ambient conditions for operation of the device.

Adhere to the device data sheet!

5.4 Returning devices

For the return of devices, follow the instructions in the chapter "Maintenance / Repair" on page 12.

6 Installation

6.1 Safety instructions

⚠ WARNING

Risk of injury due to process conditions.

The process conditions, e.g. high pressures and temperatures, toxic and aggressive measuring media, can give rise to hazards when working on the device.

- Before working on the device, ensure that the process conditions do not pose any safety risks.
- If necessary, wear suitable personal protective equipment when working on the device.
- Depressurize and empty the device / piping, allow to cool and purge if necessary.

⚠ WARNING

Risk of fire due to non-permissible slip additives for oxygen applications.

Only use permissible slip additives for oxygen applications (e.g. Arkema Voltaelf).

⚠ CAUTION

Risk of injury due to breaking of the meter tube.

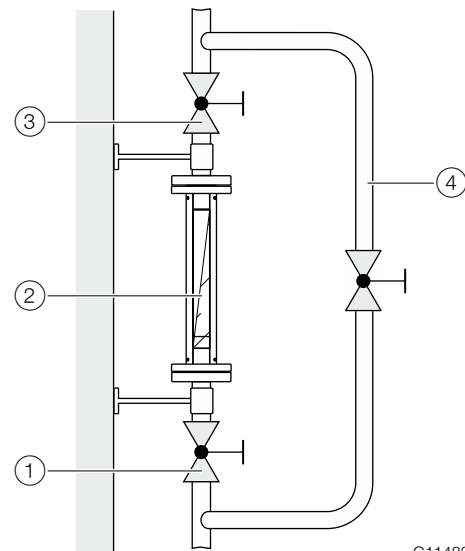
- Ensure that the technical limit values for the operation are complied with.
- Equip the device with an additional splinter guard if necessary.
- The flow direction must correspond to the direction indicated on the device (if labeled).
- The maximum torque must not be exceeded for all flange connections.
- The devices must be installed without mechanical tension (torsion, bending)
- Install flange devices with plane parallel counter flanges.
- Devices must only be installed for the intended operating conditions and with suitable gaskets.
- Flange bolts and nuts must be secured to provide protection against pipe vibrations.
- Protect device against external mechanical shock and impacts. Do not drop.

6.2 Installation conditions

6.2.1 General

The following points are to be considered during installation:

- Prior to installation in the pipeline, remove the wooden stick serving as a transportation lock from the meter tube.
- The glass tube 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 and powerful magnetic fields.
- The piping should be the same size as the connection size of the flowmeter.
- Inlet and outlet sections are not required.
- 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 measurement media, the nominal diameter of the pipeline should be measured as large as possible (as far as economically viable).



G11482

Fig. 6: Installation of the flowmeter

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

6.2.2 Installation recommendations

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

6.2.3 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.

6.3 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.

6.3.1 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.

6.3.2 Prevention of compression oscillations when measuring gases

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

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.

6.3.3 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.

Avoid pressure shocks when operating the devices.

6.3.4 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.

6.4 Installation

6.4.1 General information

The flowmeters of the FGM1190 series are intended for the vertical cable mounting.

The following points must be observed during installation in the pipeline:

- The flow of the measurement media must be from bottom to top.
- The pipeline must not exert any non-permissible forces and moments on the device. The installation must be carried out without tension.
- Install flange devices with coplanar counter flanges and only use appropriate gaskets.
- The maximum torque must not be exceeded for all flange connections.

- Only gaskets made from a material which is compatible with the measurement media and its temperature may be used.
- Gaskets must not extend into the flow area since possible turbulence could influence the device accuracy.

The flowmeters with smaller meter tube sizes are generally sufficiently supported by the pipeline. If this is not ensured (e.g. in the case of plastic pipes or larger nominal sizes), the flowmeters and pipelines must be secured by wall or mounting clips.

6.4.2 Flowmeter installation

Install the flowmeter in the center of pipeline at the required position using the respective threaded connections or flanges.

7 Commissioning

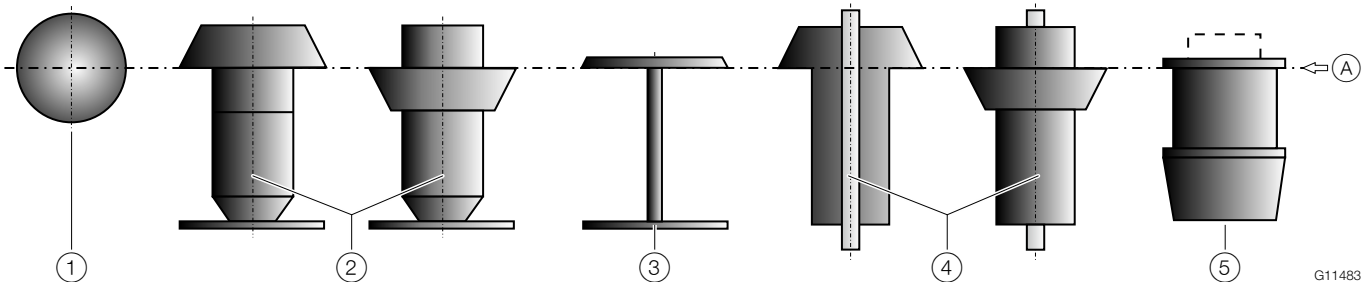


Fig. 7: Index markers on the floats

(A) Index markers

(1) Ball float (2) Float with guide ring (3) Float with low pressure loss (4) Guided float (5) Float type BL

⚠ CAUTION

Risk of burns due to hot measuring media.

The device surface temperature may exceed 70 °C (158 °F), depending on the measuring medium temperature!

Before starting work on the device, make sure that it has cooled sufficiently.

During commissioning of the flowmeter, observe the following points:

- Open the shut-off valves slowly in order to prevent pressure surges that can damage the flowmeter.
- For liquid measurement media, vent the pipeline if necessary.
- For devices with limit switches, set these to the required values.

The flow can now be read from the scale line on the scale, which coincides with the index marker of the float.

During operation if there are strong vibrations of the float during the measurement, observe the following points:

- If the part of the scale where the vibrations occur is not used, an extended floatstop in the inlet can help. The lower measurement range of the scale can no longer be used.
- As an alternative, a flowmeter with a larger nominal diameter or using a float with a low pressure loss can help.

8 Alarm signalling unit

8.1 General remarks

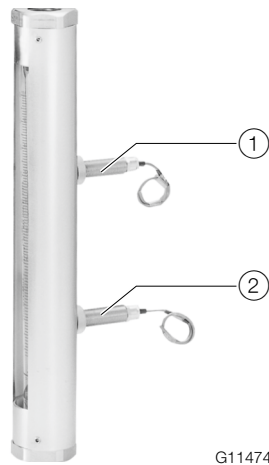


Fig. 8: Alarm signaling unit 55AX1000
 ① Max. alarm signaling unit ② Min. alarm signaling unit

One or two 55AX1000 type alarm signaling units can optionally be attached to the flowmeter housing. The alarm signaling unit is designed as a potential-free contact, actuated by a magnet in the float. An external one or two-channel switching amplifier is required to operate the alarm signaling unit.

i NOTE

- The alarm signaling unit is suitable only in connection with flowmeters of Type FGM1190 with a meter tube size > 1/4".
- The alarm signaling unit is suitable only in connection with float types G(N)SVT, (N)SVP and BL.

The alarm signaling unit is used in a guide slot in the flowmeter housing and can be adjusted across the entire measuring range.

Specifications	
Operating mode	Inert gas switch (reed contact, bistable switching behavior)
Switching behavior	<ul style="list-style-type: none"> – Lower limit value Contact closes in the event of a falling float – Upper limit value Contact closes in the event of a rising float
Switching capacity	Maximum 10 VA, $U_B = 30 \text{ V}$, 50 / 60 Hz
Permissible ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Connection type	Silicone cable SIHF-I 2 x 0.5 mm ² , length 1.75 m (5.74 ft)
IP rating	IP 65 (in accordance with DIN EN 60529)
Material	<ul style="list-style-type: none"> – Alarm signaling unit Brass, nickel-plated – Housing Polyamide
Weight	Approx. 0.7 kg (1.54 lb)

8.1.1 Switching amplifier

Model KF_SR2-Ex1W: 1-channel

Model KF_SR2-Ex2W: 2-channel

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)

i NOTE

See the switching amplifier data sheets for information on Ex-marking and the Ex relevant specifications for the switching amplifiers.

9 Maintenance / Repair

⚠ WARNING

Risk of injury due to process conditions.

The process conditions, e.g. high pressures and temperatures, toxic and aggressive measuring media, can give rise to hazards when working on the device.

- Before working on the device, ensure that the process conditions do not pose any safety risks.
- If necessary, wear suitable personal protective equipment when working on the device.
- Depressurize and empty the device / piping, allow to cool and purge if necessary.

⚠ WARNING

Risk of fire due to non-permissible slip additives for oxygen applications.

Only use permissible slip additives for oxygen applications (e.g. Arkema Voltaelf).

⚠ CAUTION

Risk of burns due to hot measuring media.

The device surface temperature may exceed 70 °C (158 °F), depending on the measuring medium temperature!

Before starting work on the device, make sure that it has cooled sufficiently.

i NOTE

Loss of CE conformity!

For pressure equipment consisting of assemblies, CE conformity is only for devices in the factory-supplied state. Components should only be replaced by the manufacturer's service personnel or an authorized specialist workshop. Replacing components yourself will render the CE conformity invalid.

9.1 Spare parts

Repair and maintenance activities may only be performed by authorized customer service personnel.

When replacing or repairing individual components, use original spare parts.

i NOTE

Spare parts can be ordered from ABB Service: Please contact Customer Center Service acc. to page 2 for nearest service location.

9.2 Cleaning

Soiling of the meter tube and the float will impair the measuring accuracy of the device. The necessary cleaning interval is dependent on the operating conditions and must be set individually.

The meter tube and the float must be removed in order to clean the device.

i NOTE

Damage to float!

Damage to the float due to incorrect disassembly.

Observe the following points when disassembling the meter tube and the float!

- The float is precision made. During assembly/disassembly, ensure that the guide ring and the measuring edge are not damaged. A damaged float causes inaccuracies in the measurement and can cause damage to the meter tube under certain circumstances.
- Ensure that the meter tube is not exposed to impacts or mechanical loads during disassembly.
- When taking out the meter tube, note where the float stops are installed. Ensure that the float stops are installed in their original positions again during assembly.

9.2.1 Disassembly of the meter tube

To disassemble the meter tube and the float, proceed as follows:

1. Loosen process connections and remove the flowmeter from the pipeline. For devices of the FGM1190-87 series, loosen the upper and lower union nut and remove the flowmeter laterally from the pipeline.
2. Carefully loosen the hexagon screws present on the upper connection fitting and remove the connection fitting.
3. Carefully remove the meter tube upward from the housing. While doing so, make sure that the float does not fall out or is damaged.
4. Remove float from the housing.

Assembly is carried out in reverse order to disassembly, observing the following points:

- Ensure that the guide ring of the float (if present) points toward the inlet.
- Replace damaged O-rings and grease with silicone grease or another lubricant prior to installation of the meter tube.
- Secure the hexagon screws on the upper connection fitting using a suitable screw lock lacquer during assembly.

9.3 Returning devices

Use the original packaging or a secure transport container of an appropriate type if you need to return the device for repair or recalibration purposes. Fill out the return form (see the Appendix) and include this with the device.

According to the EU Directive governing hazardous materials, the owner of hazardous waste is responsible for its disposal or must observe the following regulations for shipping purposes: All devices delivered to ABB must be free from any hazardous materials (acids, alkalis, solvents, etc.).

Please contact Customer Center Service acc. to page 2 for nearest service location.

10 Recycling and disposal

10.1 Dismounting

WARNING

Risk of injury due to process conditions.

The process conditions, e.g. high pressures and temperatures, toxic and aggressive measuring media, can give rise to hazards when dismantling the device.

- If necessary, wear suitable personal protective equipment during disassembly.
- Before disassembly, ensure that the process conditions do not pose any safety risks.
- Depressurize and empty the device / piping, allow to cool and purge if necessary.

Bear the following points in mind when dismantling the device:

- Switch off the power supply.
- Disconnect electrical connections.
- Allow the device / piping to cool and depressurize and empty. Collect any escaping medium and dispose of it in accordance with environmental guidelines.
- Use appropriate tools to dismantle the device, taking the weight of the device into consideration.
- If the device is to be used at another location, the device should preferably be packaged in its original packing so that it cannot be damaged.
- See the information in chapter "Returning devices" on page 13.

10.2 Disposal

This product and its packaging are manufactured from materials that can be recycled by specialist recycling companies.

Bear the following points in mind when disposing of them:

- This product is not subject to WEEE Directive 2012/19/EU or relevant national laws (e.g. ElektroG in Germany).
- The product must be surrendered to a specialist recycling company. Do not use municipal garbage collection points. According to WEEE Directive 2012/19/EU, only products used in private applications may be disposed of at municipal garbage collection points.
- If it is not possible to dispose of old equipment properly, ABB Service can take receipt of and dispose of returns for a fee.

NOTE



Products that are marked with this symbol may not be disposed of through municipal garbage collection points.

11 Specifications

11.1 Temperature limits °C (°F)

Ambient temperature T_{amb} .

Permissible ambient temperature range:

- Liquid measuring media: -40 ... 60 °C (-40 ... 140 °F)
- Gas measuring media: -40 ... 40 °C (-40 ... 104 °F)

Measuring medium temperature T_{medium}

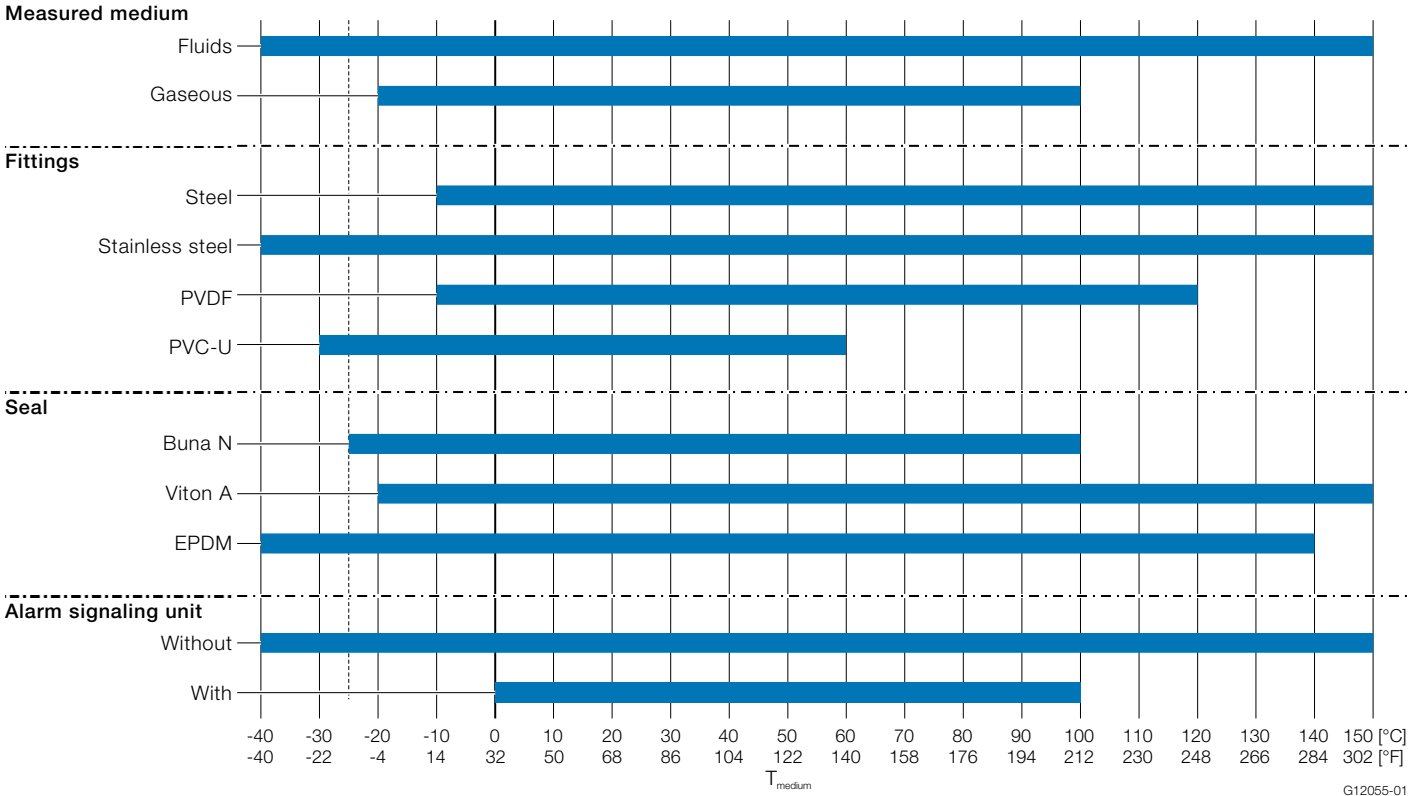


Fig. 9: Measured medium temperature permitted depending on the measured medium and equipment

For more information about the maximum measuring medium temperature, see chapter "Material load" on page 15.

11.2 Operating pressure

Maximum permissible operating pressure		
Meter tube size	Fluids	Gases
1/16", 1/8", 1/4"	30 bar (3 MPa / 435.1 psi)	30 bar (3 MPa / 435.1 psi)
1/2"	21 bar (2.1 MPa / 304.6 psi)	17 bar (1.7 MPa / 246.5 psi)
3/4"	17 bar (1.7 MPa / 246.5 psi)	13 bar (1.3 MPa / 188.6 psi)
1"	14 bar (1.4 MPa / 203 psi)	10 bar (1 MPa / 145 psi)
1 1/2"	9 bar (0.9 MPa / 130.5 psi)	4 bar (0.4 MPa / 58 psi)
2"	7 bar (0.7 MPa / 101.5 psi)	2 bar (0.2 MPa / 29 psi)

With meter tube sizes 1" ... 2", the maximum permissible operating pressure decreases by 1 % per 2 °C (3.6 °F) at operating temperatures above 95 °C (203 °F) (for liquids). The reduced pressures for gas applications result from safety considerations.

The strength of the polycarbonate protective tube reduces at increasing temperatures. Therefore, the following must be heeded for gas measurements:

- The specified maximum permissible operating pressure applies up to a measuring media temperature of 30 °C (86 °F) and ambient temperature of 30 °C (86 °F).
- With measuring medium or ambient temperatures above 30 °C (86 °F), the maximum permissible operating pressure decreases by 1.05 % per 1 °C (1.8 °F) (for gases).

11.3 Material load

Metal fitting with internal thread

Metal fitting with thread DIN 11851

Types FGM1190-87, -95, -97

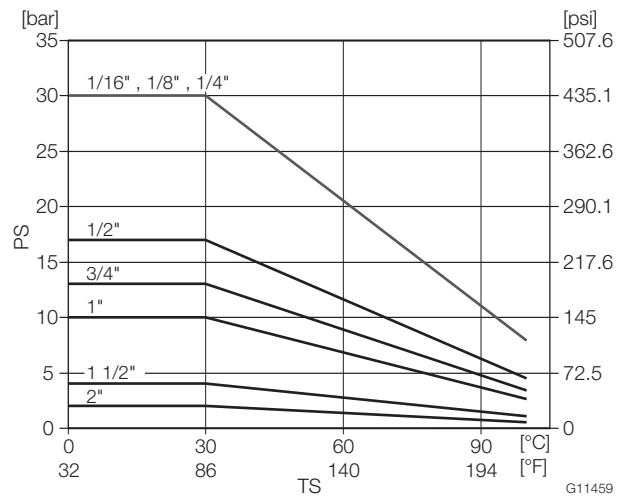


Fig. 10: Material load graph for gas

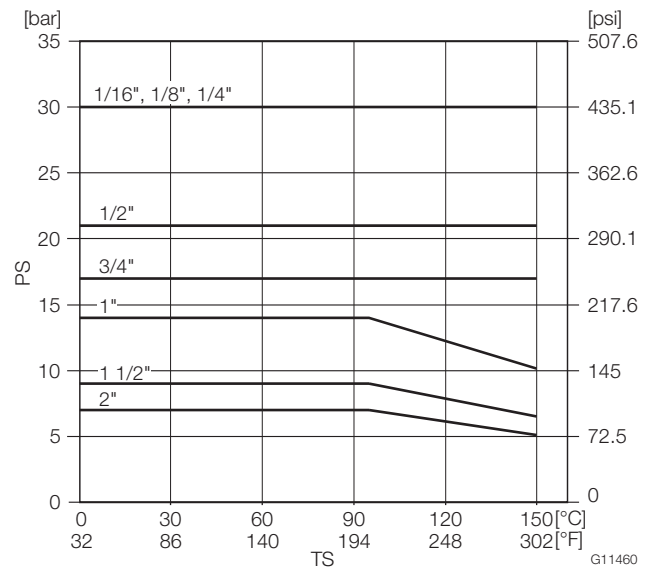


Fig. 11: Material load graph for liquids

Plastic fitting

Types FGM1190-95, -97, -98

Plastic fitting with flange PN 40, PN 16, Class 150, 300

Metal fitting with flange PN 40, PN 16, Class 300

Type FGM1190-98

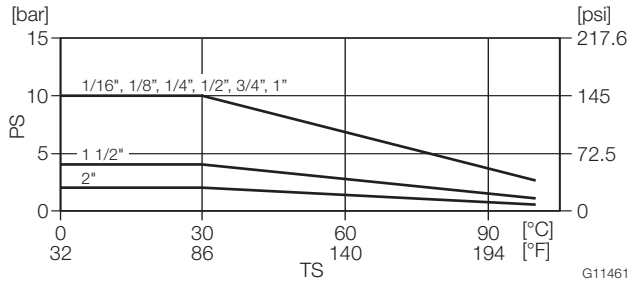


Fig. 12: Material load graph for gas

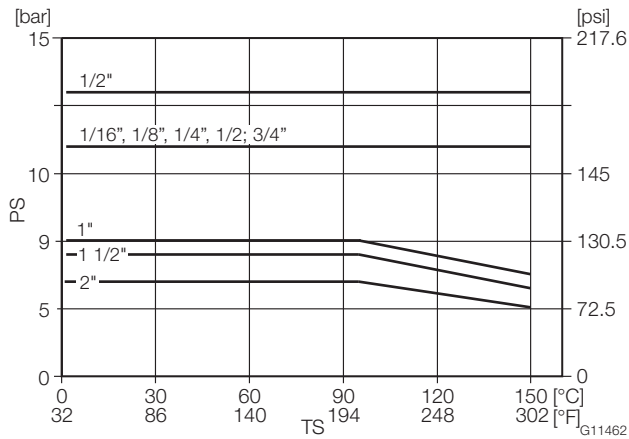


Fig. 13: Material load graph for liquids

Metal fitting with flange PN 40, PN 16, CL 300

Type FGM1190-98

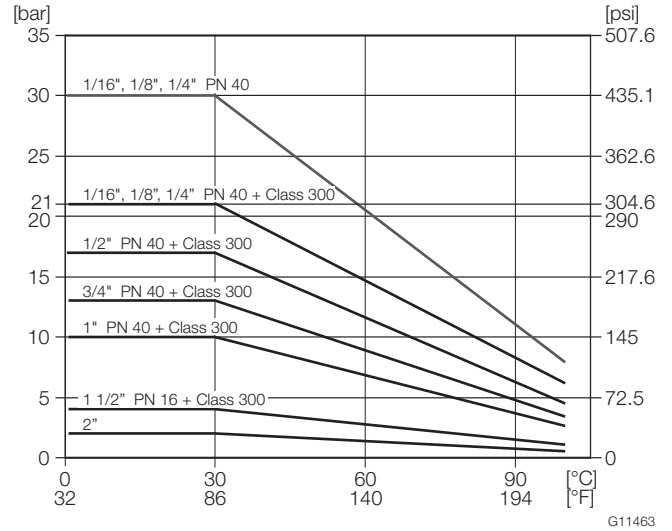


Fig. 14: Material load graph for gas

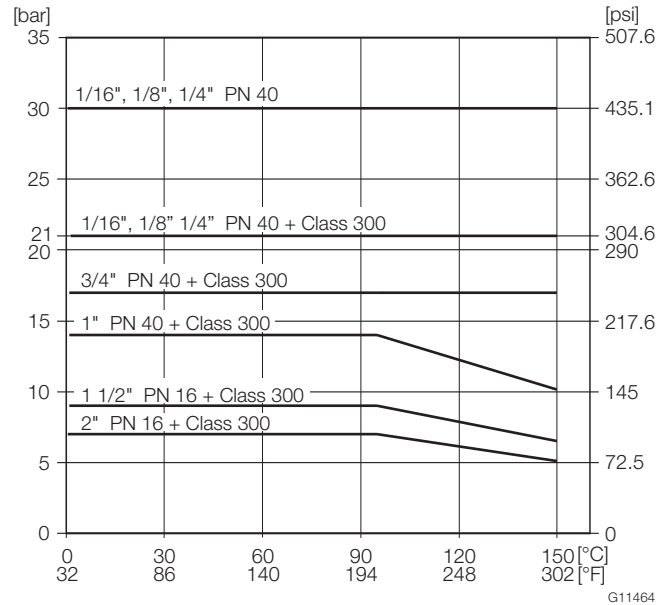


Fig. 15: Material load graph for liquids

Trademarks

® Buna-N is a registered trademark of DuPont Dow Elastomers.
 ™ Hastelloy B-3 is a Haynes International trademark
 ™ Viton is a DuPont de Nemours trademark

Notes

Notes

Contact us

ABB Limited

Measurement & Analytics

Howard Road, St. Neots
Cambridgeshire, PE19 8EU
UK

Tel: +44 (0)870 600 6122

Fax: +44 (0)1480 213 339

Mail: enquiries.mp.uk@gb.abb.com

ABB Inc.

Measurement & Analytics

125 E. County Line Road
Warminster, PA 18974
USA

Tel: +1 215 674 6000

Fax: +1 215 674 7183

ABB Automation Products GmbH

Measurement & Analytics

Dransfelder Str. 2
37079 Goettingen
Germany

Tel: +49 551 905-0

Fax: +49 551 905-777

Mail: [vertrieb.messtechnik-
produkte@de.abb.com](mailto:vertrieb.messtechnik-produkte@de.abb.com)

www.abb.com/flow

Note

We reserve the right to make technical changes or modify the contents of this document without prior notice.

With regard to purchase orders, the agreed particulars shall prevail. ABB does not accept any responsibility whatsoever for potential errors or possible lack of information in this document.

We reserve all rights in this document and in the subject matter and illustrations contained therein. Any reproduction, disclosure to third parties or utilization of its contents – in whole or in parts – is forbidden without prior written consent of ABB.

Copyright© 2017 ABB

All rights reserved

3KXF121100R4401

Original instruction