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FLUID CONTROL SYSTEMS

# LFC Liquid Flow Controller

- High dynamic control through fast flow measurement
- Applicable for liquid dosing up to 600 ml/min (36 l/h)
- No moving parts in medium
- Fieldbus optional

Type 8719 can be combined with…

**Type 1150**
Multi-channel program controller

**Type 6606**
2/2-way Solenoid Valve

**Type 6011**
2/2-way Solenoid Valve

Type 8719 is an instrument for liquid flow control in process technology. The measured value provided by the sensor will be compared in the digital control electronics with the predefined set point according to the signal; if a control difference is present, the control value output to the proportional valve will be modified using a PI-control algorithm. In this way, the flow can be maintained at a fixed value or a predefined profile can be followed, regardless of pressure changes or other disturbances in the system.

As a control element, a proportional valve working at low friction guarantees the high sensitivity and good control characteristics of the unit. MassFlowCommunicator software can be used for parameterisation and diagnosis. Typical application areas of liquid dosing are:

- Heat treatment,
- Machine tools,
- Fuel cell technology,
- Packaging technology,
- Material coating,
- Bio reactors.

In particular, the Type 8719 meets the requirement of IP65.

| Technical data | | | |
|---|---|---|---|
| **Full scale range ($Q_{nom}$)** | 0.9 to 36 l/h (15 to 600 ml/min) re. water | **Input impedance** | >20 kΩ (voltage), <300 Ω (current) |
| **Operating medium** | Clean and low viscous liquids | **Output signal** (actual value) | 0-5 V, 0-10 V, 0-20 mA or 4-20 mA |
| **Viscosity** | 0.4 to 4 cSt | **Max. voltage current output** | 10 mA |
| **Max. operating pressure** (at inlet) | Measurement range: up to max. 10 barg; typical max. 2 barg | **Max. burden current output** | 600 Ω |
| **Calibration medium** | Water (conversion to operating medium with correcting function) | **Alternative Input and output signal** | Digital with fieldbus: ▪ PROFIBUS DP ▪ DeviceNet ▪ CANopen |
| **Medium temperature** | 10 to + 40 °C | | |
| **Ambient temperature** | 0 to + 55 °C | **Protection class** | IP65 |
| **Accuracy** | ±1.5 % o.R. ±0.5 % F.S. | **Dimensions [mm]** (without compression fittings) | 115 x 137.5 x 37 (WxHxD) |
| **Repeatability** | ±0.5 % F.S. | | |
| **Turn-down ratio** | 1:10 | **Total weight** | Approx. 1200 g |
| **Settling time($t_{95\%}$)** | < 500 ms | **Mounting position** | Horizontal or vertical |
| **Body material** | Stainless steel | **Light emitting diodes** (default functions, other functions programmable) | Indication for: 1. Power 2. Communication 3. Limit 4. Error |
| **Housing** | PBT | | |
| **Sealing material** | FKM, EPDM, FFKM | | |
| **Port connection** | G 1/8, NPT 1/8, G 1/4, NPT 1/4 | | |
| **Control valve** Valve orifices | Proportional valve; normally closed; depending on flow range and pressure | **Binary inputs** (default functions, other functions programmable) | Three: 1. Start Autotune 2. Open valve (for purging) 3. Not assigned |
| **Electrical Connection** | Round socket, 8-pin, Sub-HD socket, 15-pin, M12 plug or socket, 5-pin (with fieldbus) | | |
| **Operating voltage** | 24 V DC ± 10 % | **Binary outputs** (default functions, other functions programmable) | Two relay outputs for : 1. Limit (desired value can not be achieved) 2. Error (e.g. sensor failure) Capacity: max. 60 V, 1 A, 60 VA |
| **Residual ripple** | < 2 % | | |
| **Power consumption** | Max. 7.5 W (10 W with fieldbus version) | | |
| **Input signal** (set point) | 0-5 V, 0-10 V, 0-20 mA or 4-20 mA | | |

## Measurement principle

The sensor measures the flow by means of differential pressure. An orifice in the main channel causes pressure loss at liquid flow which is measured by the differential pressure sensor. The sensor feedbacks a precise and temperature compensated signal from which the electronics calculate the corresponding flow.
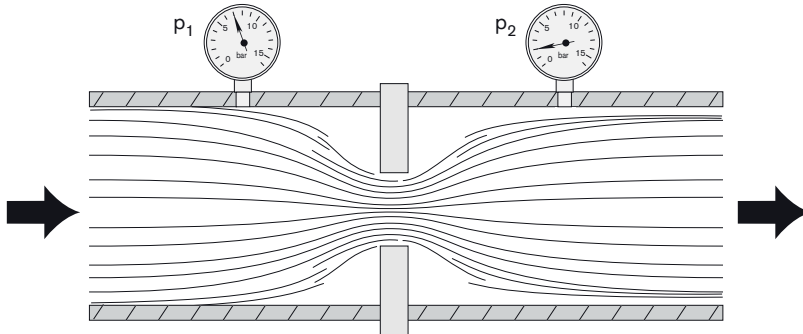


To avoid a blockage of the aperture by contaminated mediums an upstream filter is recommended.

### Notes regarding the selection of the unit

For the proper choice of the actuator orifice and differential pressure sensor within the LFC, not only is the maximum flow rate $Q_{nom}$ required, but also the pressure values directly before and after the LFC ($p_1$, $p_2$) at this flow rate $Q_{nom}$ should be known.  In general, these pressures are not the same as the overall inlet and outlet pressures of the whole plant, because usually there are additional flow resistors (tubing, additional shut-off valves, nozzles etc.) present both before and after the controller. Please use the specification sheet (p. 5) to indicate the pressures directly before and after the LFC. If these should be unknown or not accessible to a measurement, estimates are to be made by taking into account the approximate pressure drops over the flow resistors before and after the LFC, respectively, at a flow rate of $Q_{nom}$.

In addition, please quote the maximum inlet pressure $p_{1max}$ to be encountered. This data is needed to make sure the actuator is able to provide a close-tight function within all the specified modes of operation.  The knowledge of the maximum inlet pressure is also necessary to select an adequate differential pressure sensor

▶ **The request form on page 7 contains the relevant fluid specification. Please use the experience of Bürkert engineers already in the design phase and provide us with a copy of your request containing the necessary data together with your inquiry or order.**

## Ordering chart for accessories

| Article | Item no. |
|---|---|
| **Electrical. Connection** | |
| Round 8-pin binder plug (solder connection) | 918 299 |
| Round 8-pin plug with prefabricated 5m cable on one side | 787 733 |
| Round 8-pin plug with prefabricated 10m cable on one side | 787 734 |
| SUB-HD 15-pin plug with prefabricated 5m cable on one side | 787 735 |
| SUB-HD 15-pin plug with prefabricated 10m cable on one side | 787 736 |
| **Adapters** [3] | |
| RS232 adapter for connection to a computer, connection with an extension cable (item no. 917039) | 654 757 |
| PC extension cable for RS232 9-pin socket/plug 2 m | 917 039 |
| RS422 adapter (RS485 compatible) | 666 370 |
| USB adapter | 670 696 |
| USB connection cable 2 m | 772 299 |
| Adapter for manual bus adresse settings (instad of SW) | 667 525 |
| Communication software MassFlowCommunicator | Download from www.buerkert.com |

| Accessories for Fieldbus | PROFIBUS DP (B-coded) | DeviceNet/ CANopen (A-coded) |
|---|---|---|
| Plug M12 [4] | 918 198 | 917 115 |
| Socket M12 (coupling) [4] | 918 447 | 917 116 |
| Y-junction [4] | 902 098 | 788 643 |
| T-junction | 918 531 | (on request) |
| Shut-off resistor | 902 553 | (on request) |
| GSD-File (PROFIBUS), EDS-File (DeviceNet, CANopen) | Download from www.buerkert.com | |

[3] The adapters serve mainly for initial operation or diagnosis. Those are not obligatory for continuous operation.
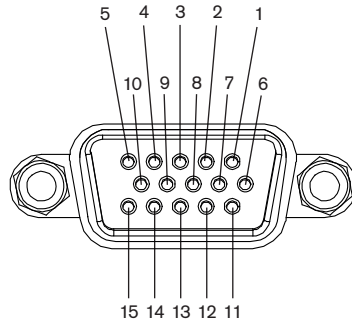
[4] The two M12 connectors as listed above cannot be used together on the same side of the Y-junction. At least one of the two M12 connection needs to be a prefabricated cable which uses typically a thinner connector.
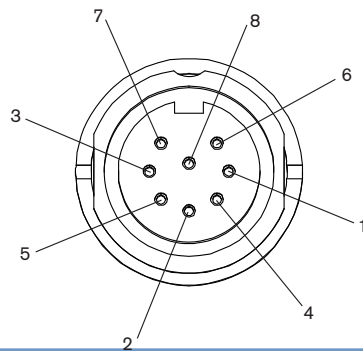
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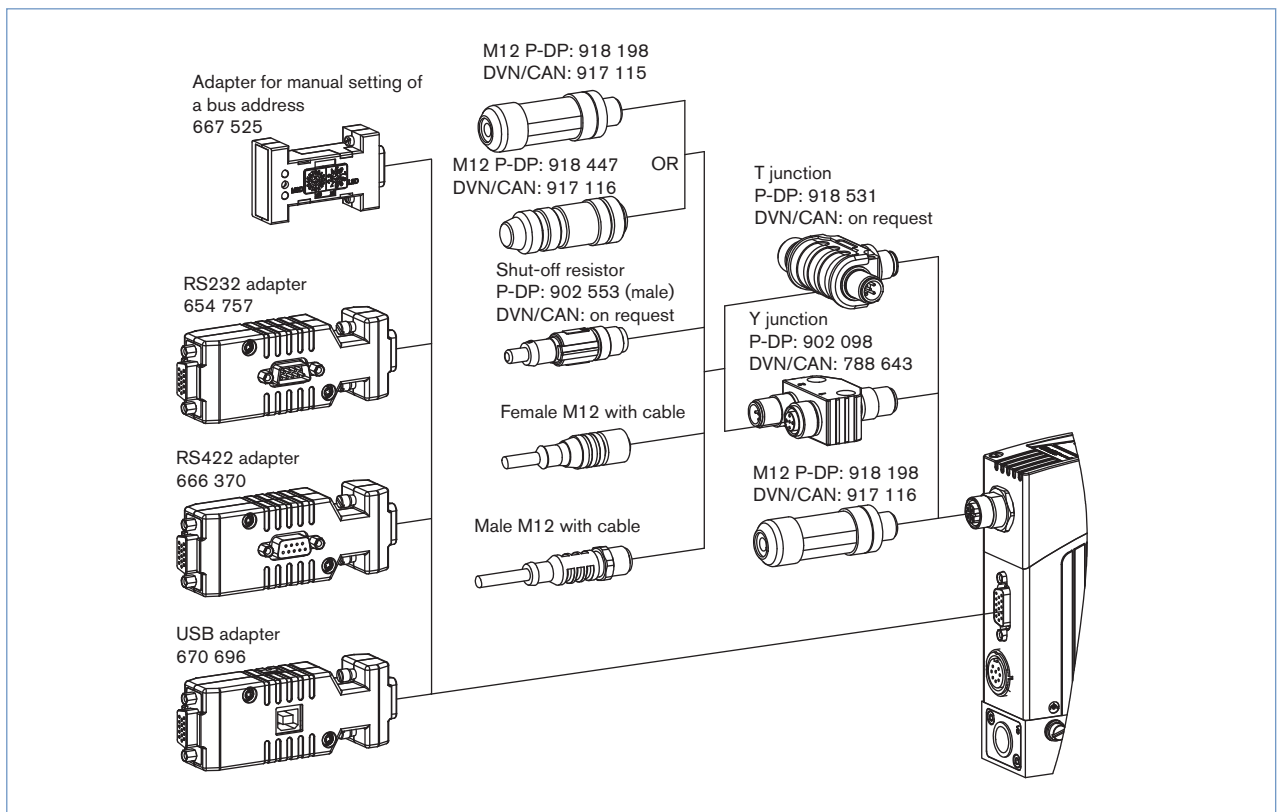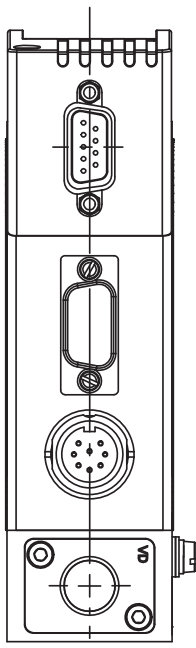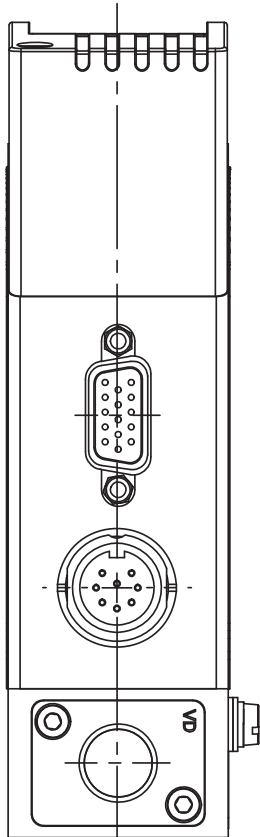
## Pin Assignment

| Socket D-Sub HD15 | Pin | Assignment | |
|---|---|---|---|
| | | **Analogue Control** | **Bus control** |
| | 1 | Set value input + | N.C.[5] |
| | 2 | Set value input GND | N.C. |
| | 3 | Actual value output + | N.C. |
| | 4 | Binary input 2 | |
| | 5 | 12V-Output (only for internal company use) | |
| | 6 | RS232 TxD (direct connection to computer) | |
| | 7 | Binary input 1 | |
| | 8 | GND (for binary inputs) | |
| | 9 | only company internal use (do not connect!) | |
| | 10 | 12V-Output (only for internal company use) | |
| | 11 | 12V-Output (only for internal company use) | |
| | 12 | Binary input 3 | |
| | 13 | Actual value output GND | N.C. |
| | 14 | RS232 RxD direct connection to computer) | |
| | 15 | DGND (for RS232-interface) | |

[5] N.C.: not connected (not used)
Note:
– Optional Pin 1 and 2 with bus version as transmitter input possible
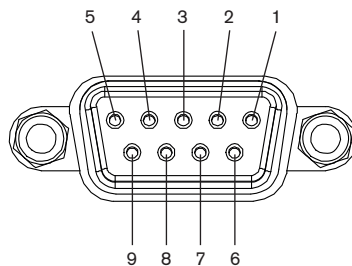– The cable length for RS232/ Setpoint and flow value signal is limited to 30 meters.

| Socket M16, round, 8-pin | Pin | Assignment |
|---|---|---|
| | 1 | 24V-Supply + |
| | 2 | Relay 1 – reference contact |
| | 3 | Relay 2 – reference contact |
| | 4 | Relay 1 – normally closed |
| | 5 | Relay 1 – normally opened |
| | 6 | 24V-Supply GND |
| | 7 | Relay 2 – normally opened |
| | 8 | Relay 2 – normally closed |

| Socket D-Sub 9-pin (only with fieldbus version) | Pin | Assignment | |
|---|---|---|---|
| | | **PROFIBUS DP** | **DeviceNet/ CANopen** |
| | 1 | Shield | Shield |
| | 2 | N.C. | CAN-L data line |
| | 3 | RxD/TxD - P (B-line) | GND |
| | 4 | RTS (control signal for repeater) | N.C. |
| | 5 | GND | N.C. |
| | 6 | VDD (only for termination resistor) | N.C. |
| | 7 | N.C. | CAN-H data line |
| | 8 | RxD/TxD - N (A-line) | N.C. |
| | 9 | N.C. | N.C. |

## Pin Assignment *(continued)*
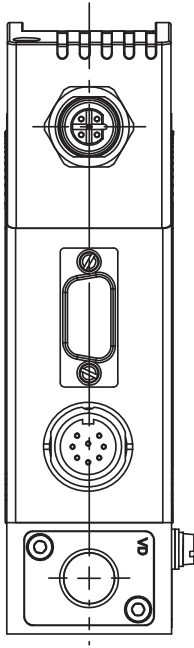


| PROFIBUS DP – socket B-coded M12 (DPV1 max. 12 Mbaud) | Pin | Assignment |
|---|---|---|
| | 1 | VDD (only for termination resistor) |
| | 2 | RxD/TxD – N (A-line) |
| | 3 | DGND |
| | 4 | RxD/TxD – P (B-line) |
| | 5 | N.C. |



| DeviceNet/ CANopen – Plug A-coded M12 | Pin | Assignment |
|---|---|---|
| | 1 | Shield |
| | 2 | N.C. [7] |
| | 3 | DGND |
| | 4 | CAN_H |
| | 5 | CAN_L |



[6] Optional configuration with 24V DC possible for power supply via fieldbus connector. With this no power supply connection on round M16 plug needed.

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## Dimensions [mm]



| Size A | |
|---|---|
| G 1/8 | G 1/4 |
| NPT 1/8 | NPT 1/4 |

M4 - 8 deep

M4 - 8 tief

23

97

137.5

QC
passed

Kalibrierung
Datum:
Druck:
Einbaulage:

A

A

10

10

16.5

115

112

71

42

12.5

37
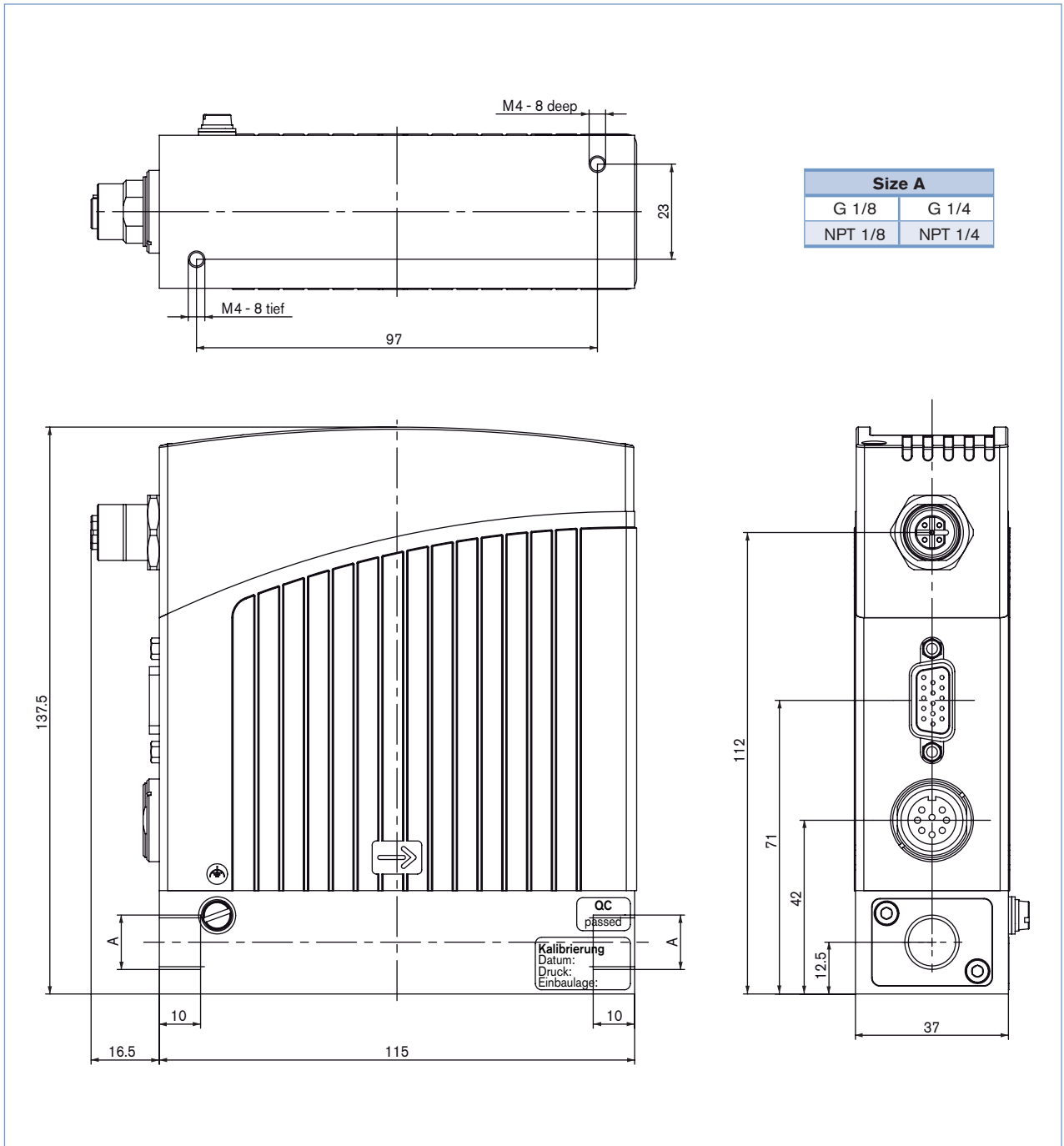
In devices without fieldbus communication there is no electrical M12 connector in the upper housing part

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## LFC/LFM applications - Request for quotation

▶ **Please fill out and send to your nearest Bürkert facility with your inquiry or order**

| Company | Contact person |
|---|---|
| Customer no. | Department |
| Street | Tel./Fax |
| Postcode/Town | E-Mail |

☐ LFC applications    ☐ LFM applications    ☐ Quantity    ☐ Required delivery date

## Medium data

| | | | |
|---|---|---|---|
| **Fluids** | | | |
| **Density [kg/m³]** | | at 20°C ☐ | at 40°C ☐ |
| **Viscosity at 5°C [cSt]** | at 5°C ☐ | at 20°C ☐ | at 40°C ☐ |
| **Medium temperature [°C or °F]** | ☐ °C | ☐ °F | |
| **Abrasive components/solid particles** | ☐ no | ☐ yes, as follows: ☐ | |

## Fluidic data

| | | |
|---|---|---|
| **Maximum flow $Q_{nom}$** | ☐ l/h | ☐ l/min |
| | ☐ kg/h | ☐ kg/min |
| | ☐ ml/h | ☐ ml/min |
| **Minimum flow $Q_{min}$** | ☐ l/h | ☐ l/min |
| | ☐ kg/h | ☐ kg/min |
| | ☐ ml/h | ☐ ml/min |
| **Inlet pressure at $Q_{nom}$**  $p_1 =$ | ☐ barg ■ | |
| **Outlet pressure at $Q_{nom}$**  $p_2 =$ | ☐ barg ■ | |
| **Max. inlet pressure $p_{1max}$** | ☐ barg ■ | |
| **Pipeline (external-Ø)** | ☐ mm | ☐ inch |

**LFC/LFM port connection**
☐ without screw-in fitting
   ☐ 1/8 G-thread      ☐ 1/4 G-thread (DIN ISO 228/1)
   ☐ 1/8 NPT-thread    ☐ 1/4 NPT-thread (ANSI B1.2)
☐ with screw-in fitting

**Installation of LFC/LFM**
☐ horizontal, valve upright (standard)    ☐ horizontal, valve to the side
☐ vertical, flow upwards      ☐ vertical, flow downwards

**Ambient temperature** ☐ °C

## Material data

**Body material** ☐ Stainless steel
**Seal material** ☐ FKM    ☐ EPDM    ☐ Other: _____

## Electrical data

| **Output/Input Signal** | **with standard signal** | | **with fieldbus** |
|---|---|---|---|
| | Output | Input | ☐ PROFIBUS-DP |
| | ☐ 0-5 V | ☐ 0-5 V | ☐ DeviceNet |
| | ☐ 0-10 V | ☐ 0-10 V | ☐ CANopen |
| | ☐ 0-20 mA | ☐ 0-20 mA | |
| | ☐ 4-20 mA | ☐ 4-20 mA | |

■ Please quote all pressure values as overpressure with respect to atmospheric pressure [barg]