

## LFM Liquid Flow Meter



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

Type 8709 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 8709 is an instrument for liquid flow measurement in process technology. The actual value supplied by the sensor is transmitted through the digital electronics and over a standard signal output or a field bus interface.

In the device two calibration curves can be stored, which the user is able to switch between. MassFlowCommunicator software can be used for parameterisation and diagnosis.

Typical application areas of liquid measurements are:

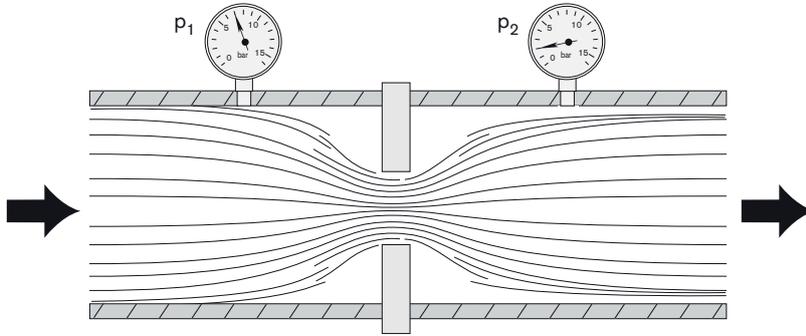
- Heat treatment,
- Machine tools,
- Fuel cell technology,
- Packaging technology,
- Material coating,
- Bio reactors.

In particular, the Type 8709 meets the requirement of IP65.

Technical data			
<b>Full scale range (<math>Q_{nom}</math>)</b>	0.9 to 36 l/h (15 to 600 ml/min) re. water	<b>Output signal</b> (actual value)	0-5 V, 0-10 V, 0-20 mA or 4-20 mA
<b>Operating medium</b>	Clean and low viscous liquids	<b>Max. current</b> (voltage output)	10 mA
<b>Viscosity</b>	0.4 to 4 cSt	<b>Max. burden</b> (current output)	600 $\Omega$
<b>Max. operating pressure</b> (at inlet)	Up to max. 10 barg; typical max. 2 barg	<b>Alternative output signal</b>	Digital with fieldbus: ▪ PROFIBUS DP V1 ▪ DeviceNet ▪ CANopen
<b>Calibration medium</b>	Water (conversion to operating medium with correcting function)	<b>Type of protection</b>	IP65
<b>Medium temperature</b>	10 to + 40 °C	<b>Dimensions [mm]</b> (without compression fittings)	115 x 137.5 x 37 (BxHxT)
<b>Ambient temperature</b>	0 to + 55 °C	<b>Total weight</b>	ca. 1100 g
<b>Accuracy</b>	$\pm 1.5$ % o.R. $\pm 0.5$ % F.S.	<b>Installation</b>	Horizontal or vertical
<b>Repeatability</b>	$\pm 0.5$ % F.S.	<b>Light emitting diodes</b> (Default function, other functions programmable)	Indication for: 1. Power 2. Communication 3. Limit 4. Error
<b>Turn-down ratio</b>	1:10	<b>Binary inputs</b> (Default function, other functions programmable)	Three: 1. not assigned 2. not assigned 3. not assigned
<b>Response time (<math>t_{95\%}</math>)</b>	< 500 ms	<b>Binary outputs</b> (Default function, other functions programmable)	Two relay outputs for: 1. Limit ( $Q_{nom}$ almost reached) 2. Error (e.g. sensor failure) Capacity: max. 60 V, 1 A, 60 VA
<b>Body material</b>	Stainless steel		
<b>Housing</b>	PBT		
<b>Sealing material</b>	FKM, EPDM, FFKM		
<b>Port connection</b>	G1/8, NPT 1/8, G1/4, NPT 1/4		
<b>Electrical Connection</b>	Round socket, 8-pin, Sub-HD socket, 15-pin, M12 plug or socket, 5-pin (with fieldbus)		
<b>Operating voltage</b>	24 V DC $\pm 10$ %		
<b>Residual ripple</b>	< 2 %		
<b>Power consumption</b>	Max. 2.5 W (5 W with fieldbus version)		

## 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

The decisive factors for the perfect functioning of an LFM within the application are the fluid compatibility, the pressure range and the correct choice of the flow meter range. The pressure loss over the LFM averages in typical applications approx. 500 mbar, with up to 2 barg inlet pressure.

The specification of the inlet pressure,  $p_{1max}$ , which can be expected is necessary for the selection of the suitable differential pressure sensor.

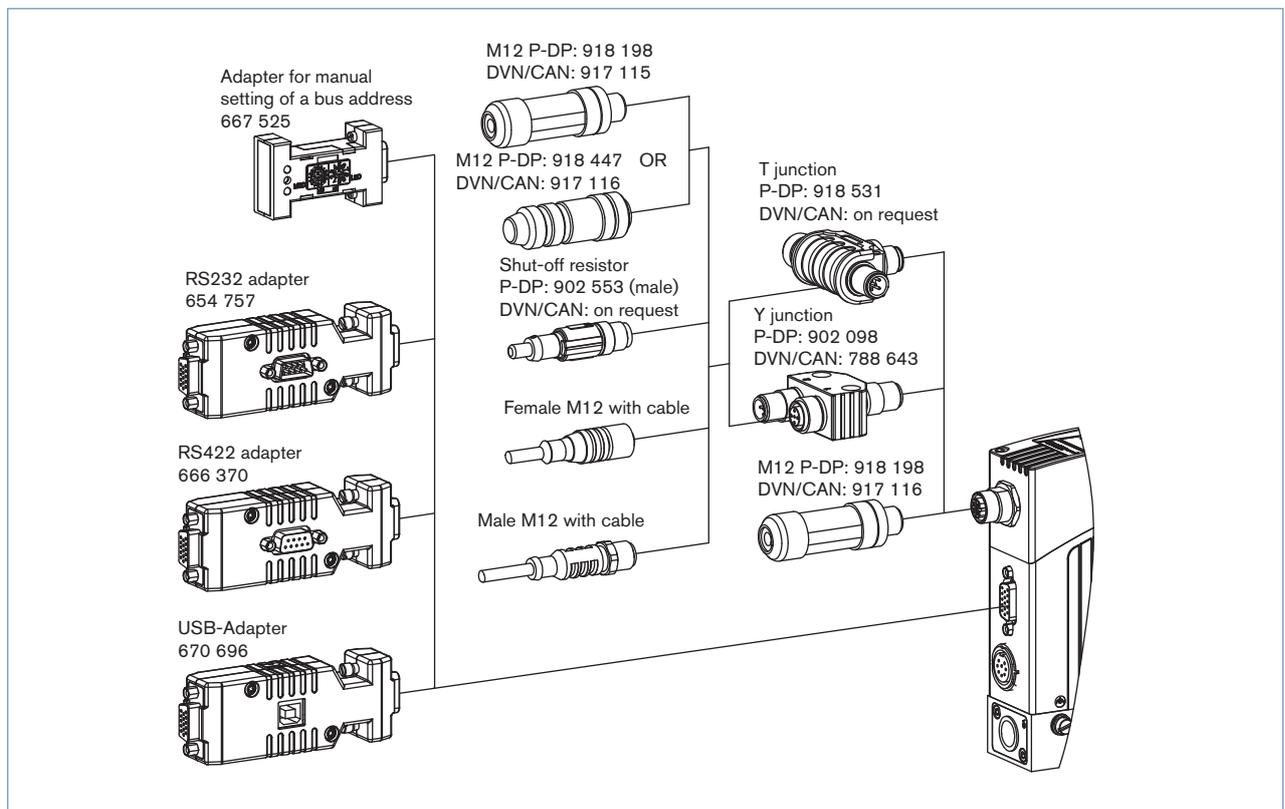
- ▶ The request form on page 5 contains the relevant fluid specification. Please use the experience of Bürkert engineers already in the design phase and provide us with a copy of your request containing the necessary data together with your inquiry or order.

Ordering Chart for Accessories

Article	Item No.
<b>Connectors/Cables</b>	
Round plug M16 8-pin (solder connection)	918 299
Round plug M16 8-pin with 5m cable	787 733
Round plug M16 8-pin with 10m cable	787 734
Plug D-Sub HD15 15-pin with 5m cable	787 735
Plug D-Sub HD15 15-pin with 10m cable	787 736
<b>Adapters <sup>3)</sup></b>	
RS232 adapter for connection to a computer, connection with an extension cable (item no. 917 039)	654 757
Extension cable for RS232 9-pin socket/plug 2 m	917 039
RS422-Adapter (RS485 compatible)	666 370
USB-Adapter (Version 1.1, USB socket type B)	670 696
USB connection cable 2 m	772 299
Adapter for manual setting of bus address	667 525
Software MassFlowCommunicator	Download from <a href="http://www.buerkert.com">www.buerkert.com</a>
<b>Accessories for Fieldbus</b>	<b>PROFIBUS DP (B-codiert)</b> <b>DeviceNet/ CANopen (A-codiert)</b>
M12-Plug <sup>4)</sup>	918 198      917 115
M12-socket (coupling) <sup>4)</sup>	918 447      917 116
Y-junction <sup>4)</sup>	902 098      788 643
T-junction	918 531      (auf Anfrage)
Shut-off resistor	902 553      (auf Anfrage)
GSD-Datei (PROFIBUS), EDS-Datei (DeviceNet, CANopen)	Download from <a href="http://www.buerkert.com">www.buerkert.com</a> (type 8712)

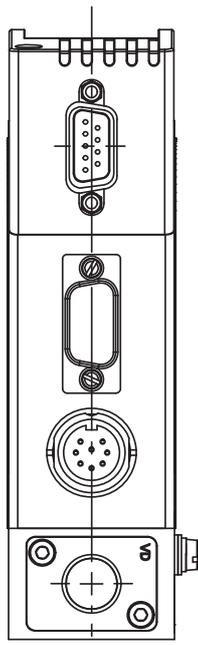
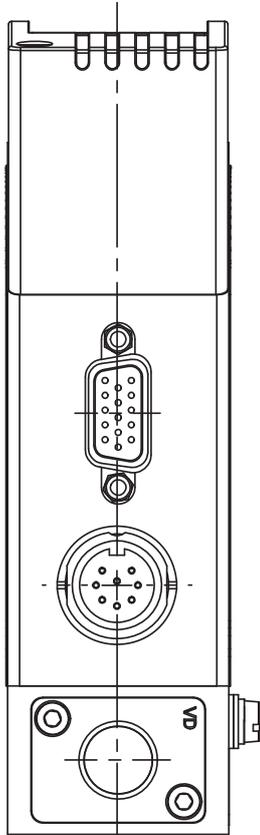
<sup>3)</sup> The adapters serve mainly for initial operation or diagnosis. Those are not obligatory for continuous operation.

<sup>4)</sup> 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.

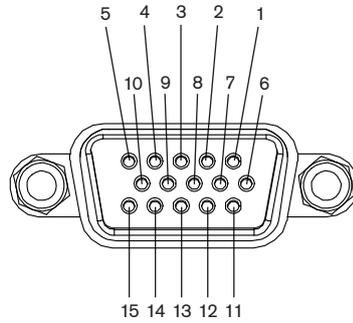


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Pin Assignment



Socket D-Sub HD15



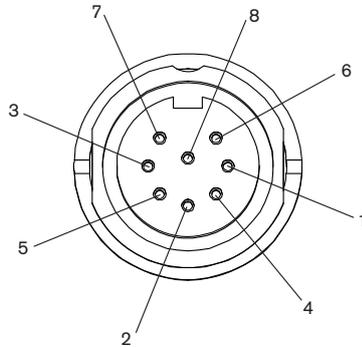
Pin	Assignment	
	Analogue Control	Bus control
1	N.C.	N.C. <sup>5)</sup>
2	N.C.	N.C.
3	Actual value output +	N.C.
4	Binary input 2	
5	12V-Output (only for internal company use)	
6	RS232 TxD (direct connection to computer)	
7	Binary input 1	
8	GND (for binary inputs)	
9	only company internal use (do not 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)	

<sup>5)</sup>N.C.: not connected (not used)

Note:

- Optional Pin 1 and 2 with bus version as transmitter input possible
- The cable length for RS232/ flow value signal is limited to 30 meters.

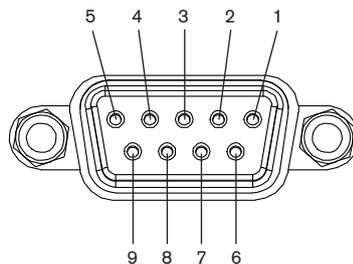
Socket M16, round, 8-pin



Pin	Assignment
1	24V-Supply +
2	Relay 1 – reference contact
3	Relay 2 – reference contact
4	Relay 1 – normally closed contact
5	Relay 1 – normally open contact
6	24V-Supply GND
7	Relay 2 – normally open contact
8	Relay 2 – normally closed contact

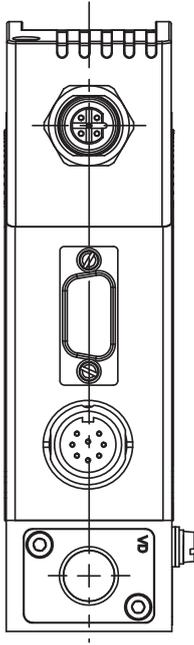
Socket D-Sub 9-pin

(only with fieldbus version)



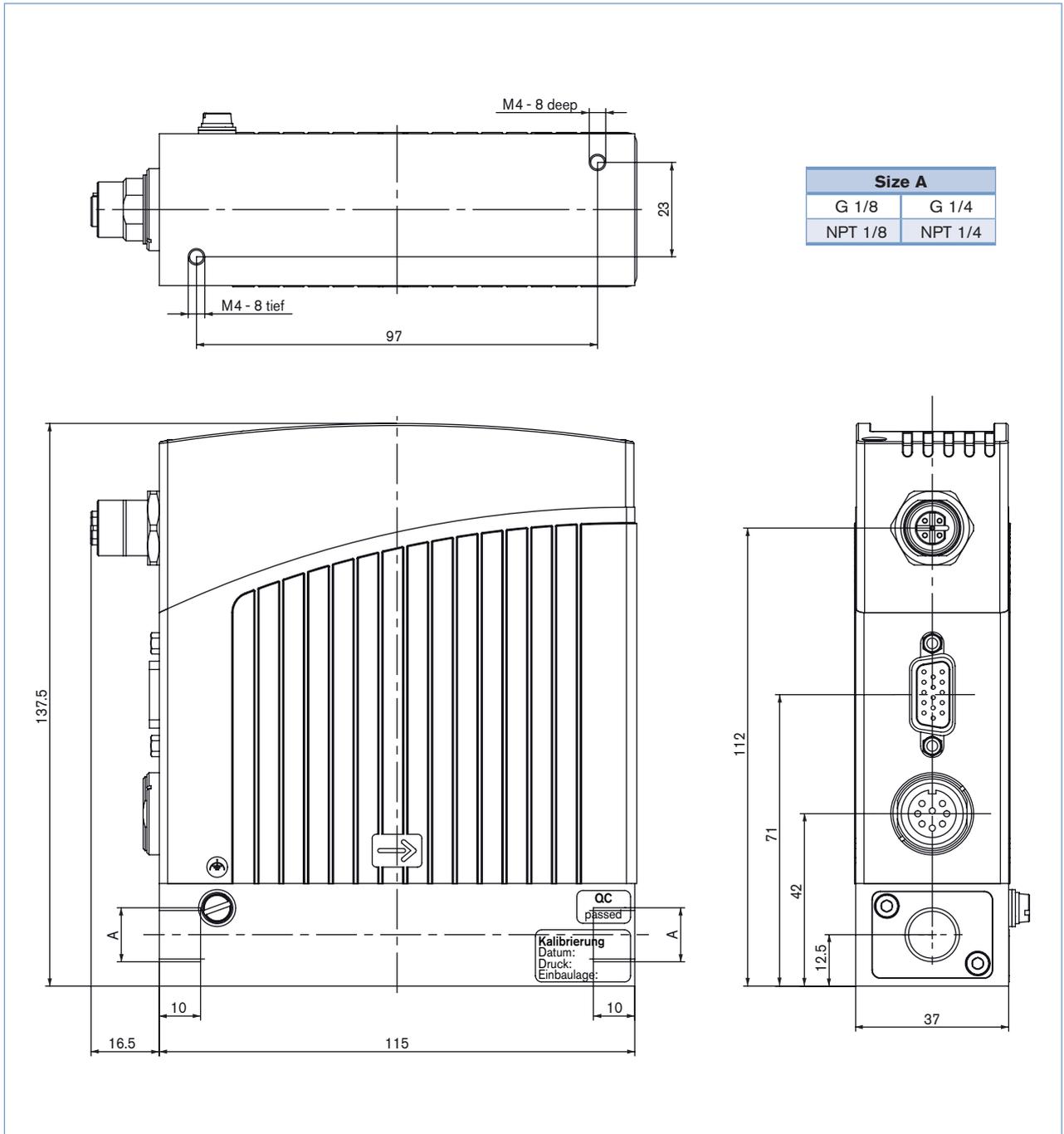
Pin	Assignment	
	PROFIBUS DP	DeviceNet/ CANopen
1	Shield	Shield
2	N.C.	CAN-L data line
3	RxD/TxD - P (B-line)	GND
4	RTS (control signal for repeater)	N.C.
5	GND	N.C.
6	VDD (only for termination resistor)	N.C.
7	N.C.	CAN-H data line
8	RxD/TxD - N (A-line)	N.C.
9	N.C.	N.C.

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. <sup>6)</sup>
	3	DGND
	4	CAN_H
	5	CAN_L
<sup>6)</sup> Optional configuration with 24V DC possible for power supply via fieldbus connector. With this no power supply connection on round M16 plug needed.		

Dimensions [mm]



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

