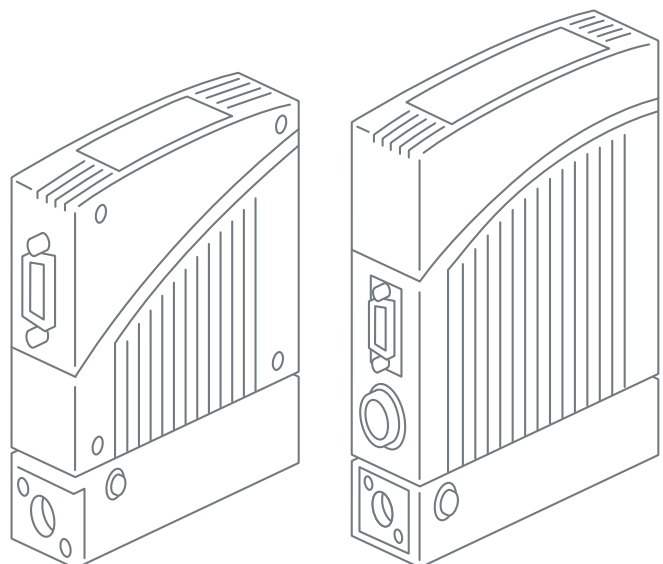




**bürkert**  
FLUID CONTROL SYSTEMS

# Liquid Flow Controller (LFC) Liquid Flow Meter (LFM)

Exact Control of Liquids up to 36 l/h



# Liquid Flow

## Integrated and Compact

The intelligent combination of accurate flow measurement and a highly precise solenoid control valve means Bürkert's Liquid Flow Controller is a perfect solution for a variety of industrial applications. The integration of sensor, control electronics and our solenoid control valve technology into a single compact device makes the Liquid Flow Controller ideally suited for applications requiring fully-automatic metering of small amounts of liquids where simple installation and use are a premium.

The Liquid Flow Controller (LFC) complements the company's portfolio of compact and integrated fluid control devices and shares a platform with the market leading Mass Flow Controllers (MFCs). Liquids like de-ionized water, methanol, diesel or low viscosity oils can now be tightly controlled in the 10-600 ml/min (0.6 to 36 l/h) range via seamless integration of differential pressure with the direct-acting solenoid control valve.

The measuring principle has no moving parts or possible erosion wear parts and when linked to advanced control algorithms plays its part in providing extremely fast response and settling times. The control valve has a simple design, works almost without friction and provides an outstanding repeatability.

This overall versatility and performance allows the Liquid Flow Controller to succeed in applications that formerly required comparatively complex installation of individual components. Such applications are areas of packaging and filling, heat treating, surface coating, machine tools and, especially, within testing facilities for quality management.



*Liquid Flow Meter Type 8709: IP65, displaying operating status and stainless steel 316L.*



*Liquid Flow Controller Type 8718 and Liquid Flow Controller Type 8719*

# Program

Liquid Flow Controller type 8718 / Liquid Flow Meter type 8708 Compact



Liquid Flow Controller type 8719 / Liquid Flow Meter type 8709 IP65



Abstract of technical data	
Full scale range	0.6 to 36 l/h (ref. to water)
Typical liquids	Methanol, diesel, DI water, etc.
Span	1:10
Operating pressure	up to 10 bar (145 psi)
Settling/Response time	< 500ms
Accuracy	+/-1.5% of rate +/-0.5% of full scale
Repeatability	+/-0.5% FS
Set point and process value	analogue with standard signal
Fieldbus communication	optional (Profibus-DP, DeviceNet, CANopen)



# Flow Control Loop

The Liquid Flow Controller is a whole control loop in a box.

When the user sets a desired flow rate via a standard electronic signal this set point ( $w$ ) is transmitted to the control electronics.

The microprocessor in the heart of the LFC compares that set point with the process value ( $x$ ) which is constantly measured by the flow sensing element.

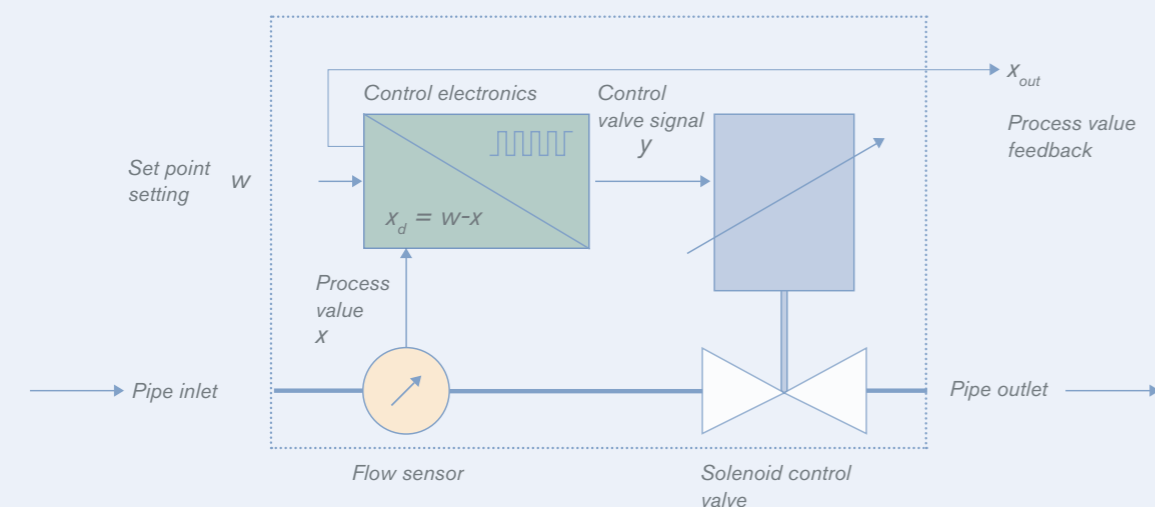
The job of the LFC is to eliminate the difference between set point and process variable, so depending on the deviation of these values a command signal ( $y$ ) is sent to the solenoid control valve.

When the set point is higher than the process value, the electronics instruct the solenoid control valve to increase the flow. When lower the controller issues the instruction to close further and reduce the flow.

All of this happens automatically and quickly. The instrument reacts immediately on disturbances, variables or transients to give reliable, true flow control.

The quality of the flow sensor and the one of the solenoid control valve are of decisive importance. Flow values must be measured accurately and valve positions adjusted repeatably.

## Basic principle closed flow control loop



# Design of Liquid Flow Controllers

Four main elements make this a formidable instrument:

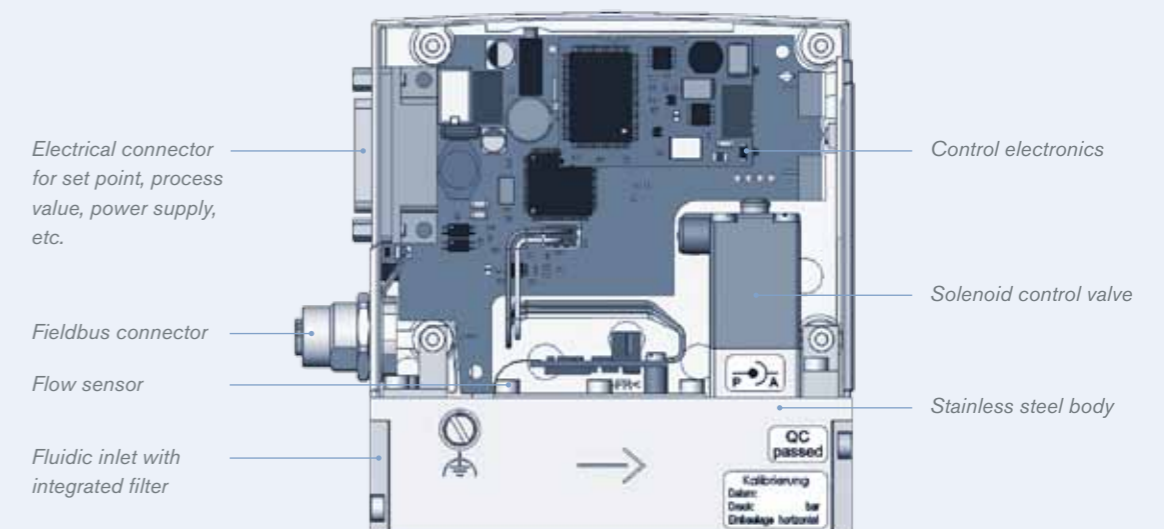
The plunger type control valve inside the LFC is controlled by a pulse width modulated (PWM) signal which in effect changes the average energy applied to the valve. Without power a spring forces the plunger downwards pushing the precision seal on the valve seat for reliable shut off. As energy is added to the circuit the plunger is raised against the spring and liquid flow is allowed to increase. The design of the control valve is optimized for friction and is sized according to the user's exact process parameters.

The differential pressure sensing cell is neatly and securely integrated in the rugged body around a precise pressure drop structure. Engineered for fast and reliable results the materials in contact with the fluid are only stainless steel.

Groundbreaking digital microelectronics provide longterm stability, unique update capability, modern control algorithms, autotune routines, storage of calibration data and programmable auxiliary functions to make this instrument think in your process world.

Our process experience led us to add a wide compliment of protocols to the architecture of the system to make communication simple.

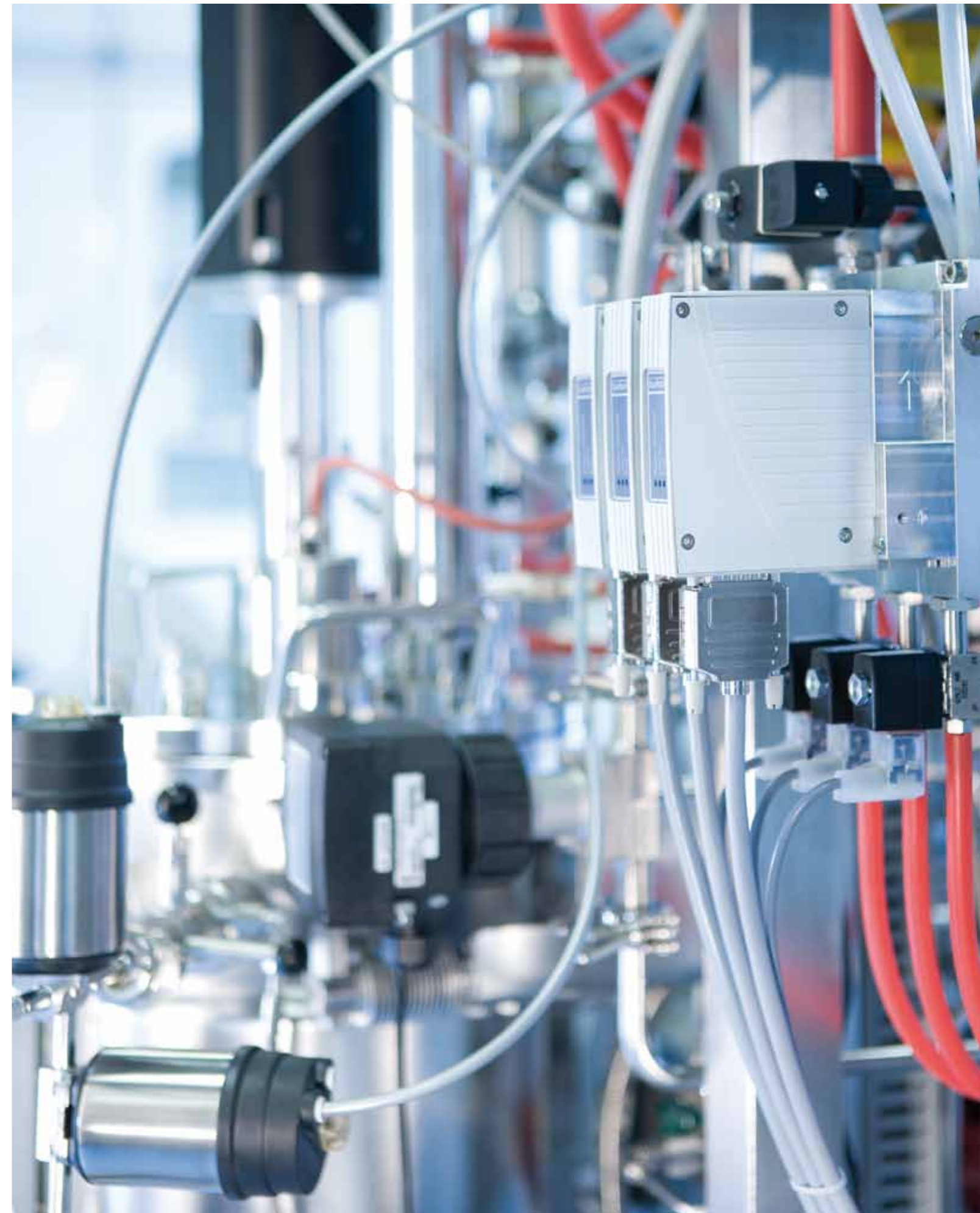
## Opened LFC type 8718



# Features and Advantages

The features of the Liquid Flow Controller and their endless possibilities are versatile, following the ones of main importance in an overview.

Feature	→	Advantage
Compact and integrated flow control loop		Reduction of electrical and mechanical interfaces, space and installation efforts
Measurement without moving parts in the liquid flow		No need for bearings which usually underlie mechanical wear, outstanding longterm stability
High quality materials which are in contact with the fluid		Excellent chemical resistance
Integrated, replaceable inlet filter and LED display		Fast recommissioning possible after filter contamination
Differential pressure measurement and direct acting solenoid control valve		Very fast response and settling, repeatable and reliable control of flow values
Parameterization of binary inputs and outputs (autotune, reset, purge mode, error feedback, totalizer, limit switch etc.) and diagnosis (analysis/ optimization of control loop, recalibration, firmware update etc.) with serial interface and communication software Mass Flow Communicator		Extensive support in setting up the process at commissioning, decentralized control functions programmable, fast diagnosis on site possible
Versatile electrical interfaces available: analogue or digital (Profibus DP, DeviceNet, CANopen, serial)		All options of common electrical interfaces, analog interfaces can be changed at any time by software
IP65 protection with types 8719/ 8709 available		Capable to use in rough environments
Optional variant as Liquid Flow Meter (LFM)		Flow measurement available for integration in present control loops
High quality calibration		Reliable application in quality ensuring equipment



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