

LDM Series

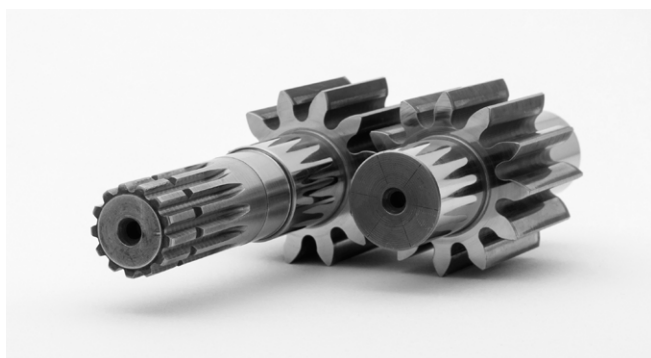
Turnkey solution for high accuracy liquid dosing

Catalysts, Colourants, Fragrants, Flavours, Vitamins and Lubricants



The benefits of Bronkhorst Flow Solutions

Bronkhorst specializes in Flow Meters and Controllers for low flow rates of liquids, ranging from 50 mg/h up to 600 kg/h. Besides these instruments, Bronkhorst also provides complete flow solutions for highly accurate and repetitive dosing of additives. For flow rates up to 30 kg/h, Bronkhorst developed a range of turnkey liquid dosing modules, boxes or cabinets, comprising all of the required components.



Pump gears: Mechanical and reliable, but a small deviation in the surface can impact pumped volume if not corrected for.

› Direct pump control

Bronkhorst flow meters have an integrated PID controller that can be used for direct pump control. The flow meters use a high frequency signal, enabling smooth up to very fast control actions.

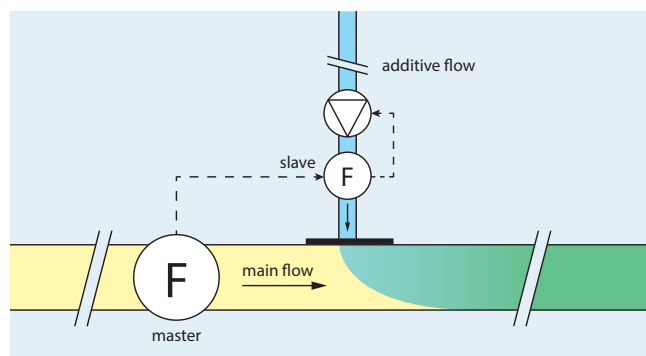
Traditional dosing pumps rely on a fixed volume displacement multiplied with the amount of displacements. This method has some important disadvantages: leakage by internal wear, and variation of external conditions can influence the pumped amount.

Using a pump in combination with a liquid flow meter with on-board PID controller makes it possible to adjust the pump speed for these conditions. This results in a consistent flow of the required amount (mass or volume) of liquid. Moreover, the output signal of the flow meter can be logged as indicator of the dosing performance and thus used for product quality monitoring.

“Measure what you pump – in real time”



Dosing the equivalent of a water droplet continuously over the period of an hour, every hour.



Maintaining the perfect mixing ratio, based on real time measurements.

› Low flow, high accuracy

Bronkhorst offers highly accurate dosing solutions up to 30 kg/h, but also ensures high accuracy for flow rates down to 50 mg/h! To give you a better idea of how small this is: this is the equivalent of one water droplet per hour, dosed at a constant speed. Due to this feature, it is no longer required in some applications to dilute highly concentrated additives with water. Other possible advantages could be the reduction of waste of expensive additives and reducing the footprint of the dosing installation.

“Diluting our colour dyes with water was required to control the dosages, but it was a time consuming and inconsistent process. Now we skip this preparation process and have a more consistent product.”

› Blending fluid in master-slave processes

With a fixed mixing ratio, the amount of dosed additive (slave) needs to be corrected when the main flow (master) changes. Characteristics hereof are:

- ◆ Real time correction and flow adjustment based on master flow signal.
- ◆ Only dose what is required, no more preventative overdosing.
- ◆ Reduction of operation cost and consumption of (potentially) harmful chemicals.
- ◆ Additive container operates at ambient pressure, allowing for refills without interrupting operation.

Bronkhorst can provide different solutions for various types of dosing



Insulation market

> Continuous dosing

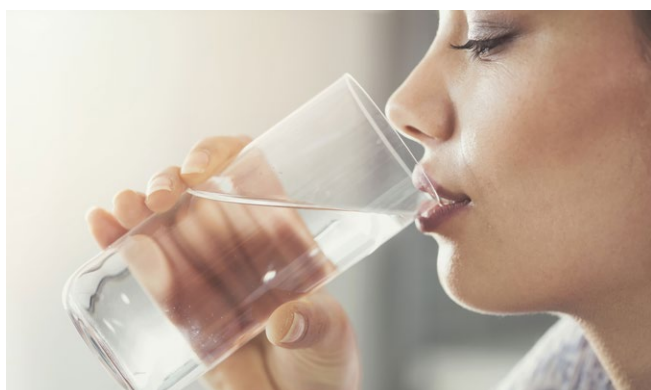
A constant flow of liquid being dosed based on a fixed setpoint. For the production of insulation panels, the manufacturer relies on the accuracy of a Coriolis Mass Flow Controller to ensure a consistent liquid flow for the duration of the entire production run. After switching to a Bronkhorst solution, the quality of the end product raised significantly and the amount of rejected end products has been decreased to a minimum.



Chemical market

> Batch dosing

A small and repeatable amount of liquid flow in a one-per-time process. Almost all household and industrial chemicals consist of a mix of different ingredients created in a large production run using batch dosing. Traditionally, weighing scales are used to sequentially dose ingredients in a production vessel or individual product packaging. The Coriolis Mass Flow Controller acts as a weighing scale for flowing mass with direct control over the amount of flow into the vessel. And by using a separate Flow Controller for each ingredient, the dosings can be done in parallel, saving process time.



Water treatment

> Ratio dosing

Combining separate liquid flows in a constant mixing ratio. For safe and clean drinking water, chemical additives are added in a specific ratio to the flow of produced drinking water. Too little additive does not give the required outcome, and too much additive is costly and can result in a chemical imbalance downstream. In addition to continuous dosing, the exact amount of dosed additive is also depending on the main flow of produced water. By using an actual measurement of the main flow and the pre-set mixing ratio, the required amount of additive is calculated in real-time and accurately dosed into the main stream.

> Customer success story

Precise dosing of undiluted dye

During production of laundry care and cleaning products, the two most important requirements are repeatability and accuracy. This is to ensure a consistent colour of the end product while minimizing waste of very expensive dyes. With a Bronkhorst compact dosing solution, this production process has optimized the dye consumption while maintaining product quality.

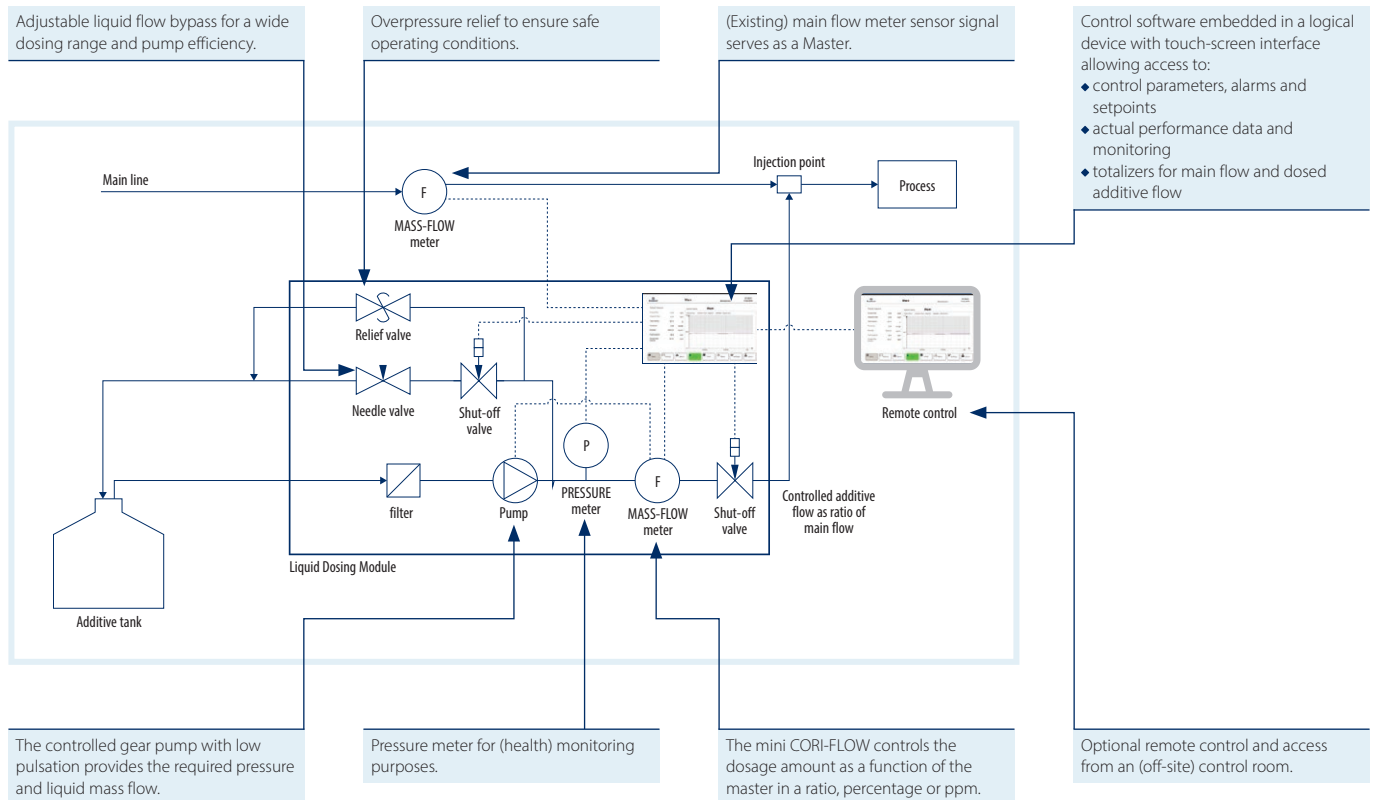
“Exact additive dosing reduces the cost of my operation without risking my product quality.”



Do you need a solution for existing production lines?

A stand-alone dosing solution

Example of a Liquid Dosing Module in ratio control mode for mixing or blending



Customer success story

Accurate ratio dosing of a fuel additive

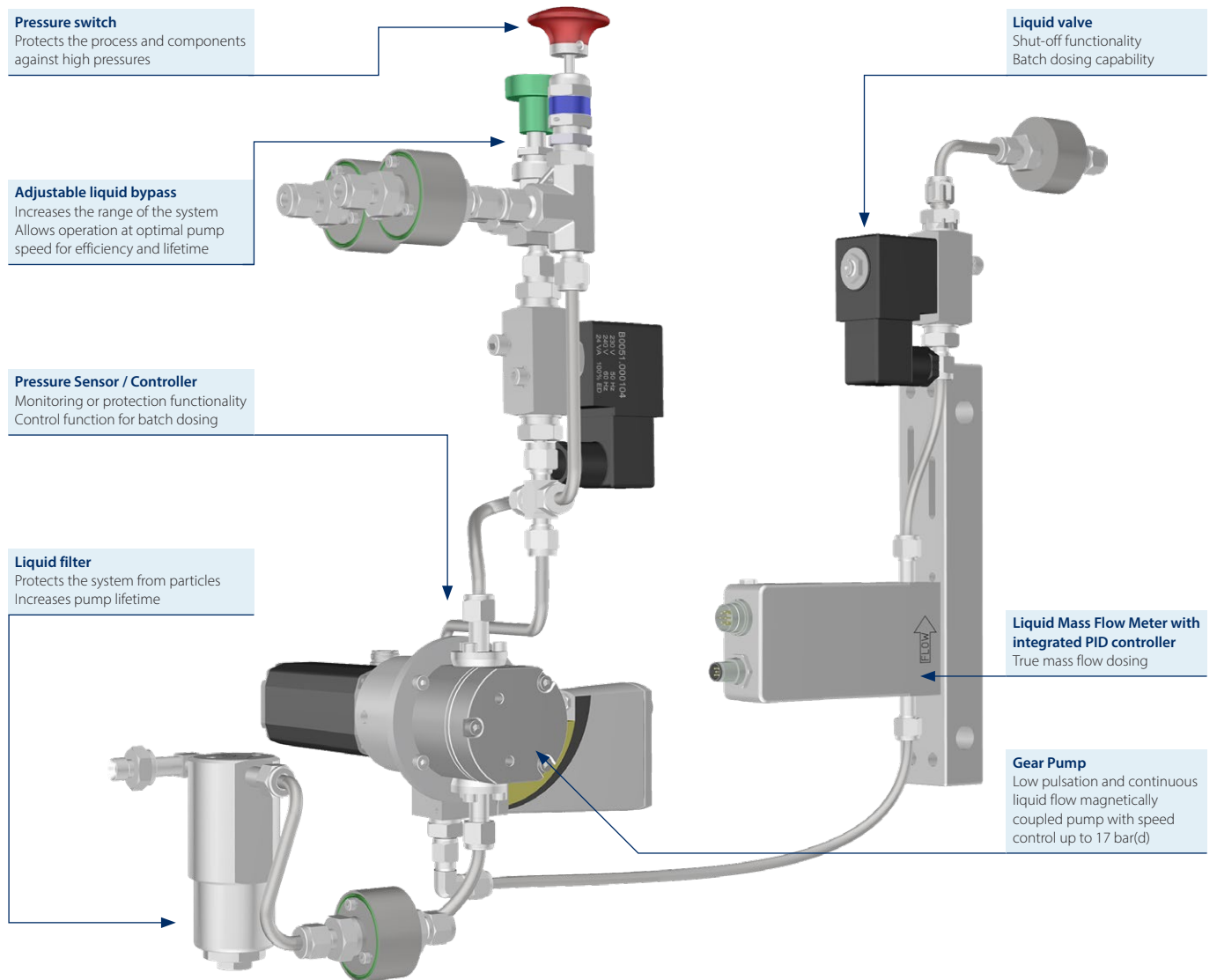
Ratio dosing solutions to ensure an optimal combustion and engine efficiency, without unnecessary waste of additives. The Liquid Dosing solution ensures remote monitoring and performance tracking including consumption data to schedule timely refills of the additive tank. The solution is IP65 and can be installed outdoors and in dusty conditions.

“The remote monitoring and control functionality saves the time and effort of visiting remote locations for a standard check-up or pump adjustment.”



What is a Liquid Dosing Module?

An overview of the fluidic system



> Customer success story

One of our customers dosed liquid additives into a main stream, but the metering pumps were located in remote areas. Once a week, these pumps were manually adjusted to compensate for deviations in the main stream. The dosing solution with remote monitoring and control capabilities completely removed the need for travel and manual interventions. With the integrated controllers, the dosed amount of additive is automatically corrected based on the measured main stream.

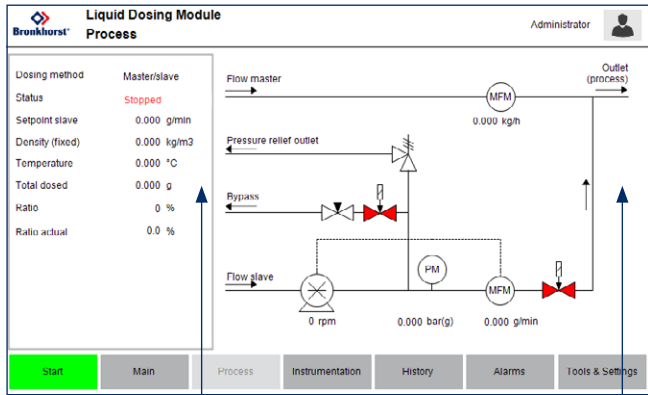
“The density measurement of the Coriolis mass flow meter can be used as an indicator for the concentration and quality of my additive.”



Functionalities of the Liquid Dosing Module

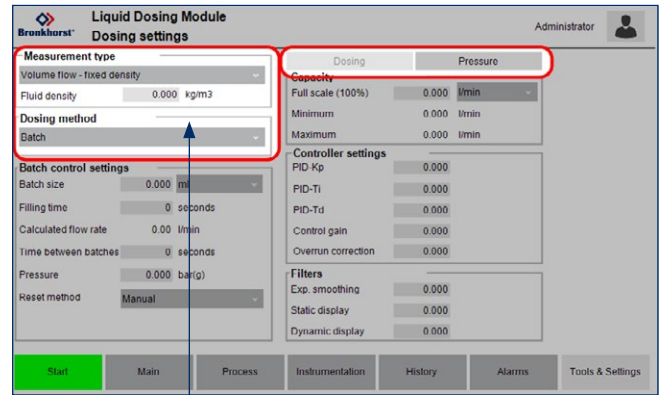
Automation and Interfacing

The integrated intelligence and touch-screen interface allows access to control parameters, real-time and historical performance data, and offers warning and alarm functionality.

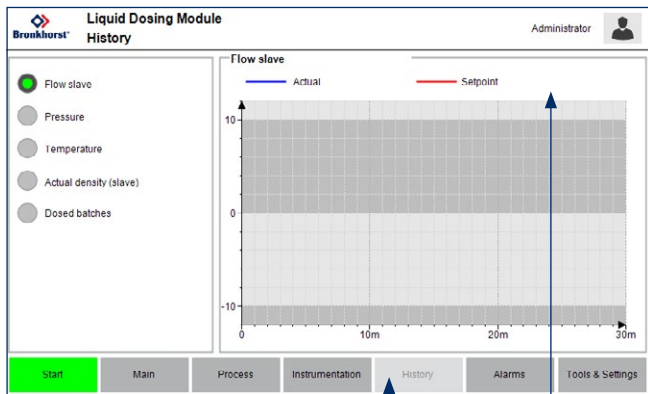


Process performance
Real-time information on dosing mode, actual setpoints and consumption

Process lay-out
Clear overview of process status

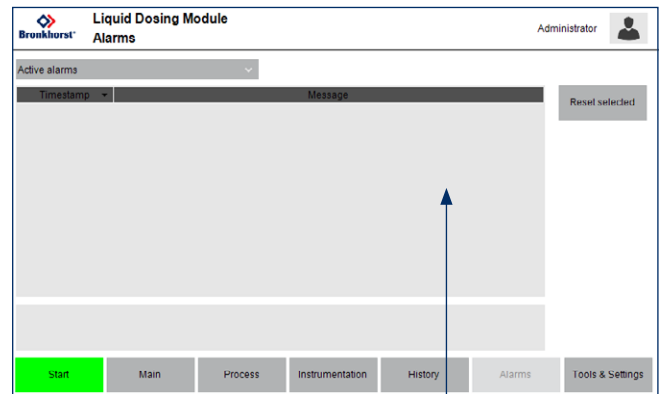


Dosing settings
Selection of dosing method, flexible selection of measurement units, easy to access controller input settings



Sub-menu's
Easy access to history, performance, alarms and settings

Historical trending data
Plotted data on reference signal (ratio control), dosed amount of liquid



Warnings and Alarms
Programmable alarms to maintain quality, protect downstream processes, and ensure availability of the dosing module

Customer success story

High speed batch dosing of fragrance

A high speed production line suffered from uncertainties on dosed fragrance, increasing the need for manual quality inspections and discarding rejected products. A fast batch dosing solution now ensures the right fragrance dosage on every passing product and logging relevant parameters for quality monitoring purposes.

“The alarm functionality is really helpful to prevent bad production runs, and to pinpoint the potential problem.”



Turnkey solution for easy integration

A Bronkhorst dosing solution with integrated automation in a stainless steel enclosure.



> Customer success story

In the food processing industry baking trays are sprayed with cooking oil before they are filled up. It results in a crispy and coloured crust and will ease the depanning of the product. The right amount of oil is essential here, otherwise the end product does not meet the high quality standards. Using a direct pump controlled solution ensures the right amount of oil being supplied to the process, while correcting over time for any wear inside the pump.

“Thanks to the liquid consumption data I can ensure my product quality, ensure timely refills, and it helps to maintain and log the quality of the production line.”



» Technical specifications

General

Power	100-240 VAC / +24 VDC
Ambient temperature	20...40 °C
Housing	IP65 Stainless Steel with IP65 rated connectors
Wetted materials (medium contact)	SS316 / Kalrez / PFA tubing
Liquid flow measurement / control	0,1 - 30 kg / hr (accuracy %)
Pressure measurement / control	0,1 - 10 bar (accuracy %)
Inlet particle filter	10 µm
Fluidic connections	¼"BSPP RS chamber (metric & inch sizes)

Intelligence, Interfacing, Control

7 inch full colour touch screen interface

Pre-programmed warnings & alarms, customizable

Parameter performance and consumption monitoring	Flows and pressures
	Totalizers
	Historical logging and trending
	Fluid density and temperature
	Configuration settings, control parameters
Remote functionality / factory integration via:	OPCUA, Modbus TCP (master/slave), Modbus RTU (master/slave), PROFINET(master), EtherNet/IP(master)

Continuous dosing mode

Flow input setpoints	mass or volume flow rates available
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Ratio dosing mode (master / slave)

Ratio setpoints available (ppm, %)	
Main flow meter signal input options	0-10 V / 4 – 20 mA, 1 Hz-20 kHz en Modbus RTU

Batch dosing mode

Batch dosing capabilities	up to 120 batches per minute
Batch trigger signal input options	low-high Volt signal

*All specifications based on H₂O and ambient conditions.
Non-standard specifications on request.*



Youtube video explaining the combined use of a Coriolis Mass Flow Meter and a gear pump.

