

# Cori-Flow Dosing Box

Fuel Additive Dosing  
&  
Ballast Water Treatment



**INSA**  
Tech

## Bronkhorst Cori-Tech

Bronkhorst Cori-Tech specializes in compact Mass Flow Meters/Controllers and Dosing assemblies, based on the Coriolis principle. These instruments are able to measure and control mass flow of 0.05 g/h up to 600 kg/h. They are suitable for numerous marine or automotive applications. Combined with a (gear) pump or (shut-off) valve, compact liquid mass flow dosing units can be offered as an alternative to gravimetric or volumetric filling and dosing methods.

## Flow solutions



Next to instruments, Bronkhorst Cori-Tech can also provide total flow solutions.

Our global perspective with local focus ensures that our international network of Bronkhorst offices, distributors and other partners is able to provide on-site support and discuss the best solution to any given application. This approach also includes product adjustments or customized solutions to ensure that the finer details of your application will always be covered.

## CORI-FLOW Dosing Box for additive dosing into fuel lines and ballast water on ships

The system is based on a fuel flow or water meter combined with an additive dosing unit, consisting of a second flow meter directly controlling a pump, dosing an additive. These flow instruments function as a master-slave system with ratio control. The fuel flow / water meter will be the master and the additive dosing box will follow the master with a certain ratio, where the additive will be injected into the fuel/water line according to the required rate of ppm's/percentages. The modular assembly of components has been integrated in a robust enclosure as a complete unit with fluid inlet and outlets, power supply, local HMI/PLC operation with touch panel and optionally remote access. In most cases the fuel oil / water meter will be mounted in existing fuel/water lines of the ship.

### Basic functionality:

- *Dosing:*  
Continuous additive dosing into fuel/water flow line, based on ratio control on preset ppm's
- *Reading:*  
Fuel (water) flow, additive flow, (pressure), density, temperature, setpoint, ratio control (input slave factor and connection to external master signal), totalizers for consumption monitoring, alarms, configuration settings
- *Trending (graph with time on x-axis):*  
Flows, pressure, density, temperature, PID-controller output
- *Adjustable:*  
Setpoints (ratio), reset batch counter, (reset) alarms, instruments configuration settings (master + slave)
- *Main menu:*  
With trends and soft-buttons to activate screens for parameter change

### Special functionality:

- *Redundancy handling*
- *Additional alarming, inputs, outputs*
- *Remote access*



# Cori-Flow Dosing Box for fuel/water additive dosing



The pressure relief output can be either connected to:

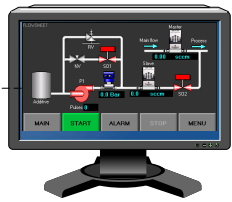
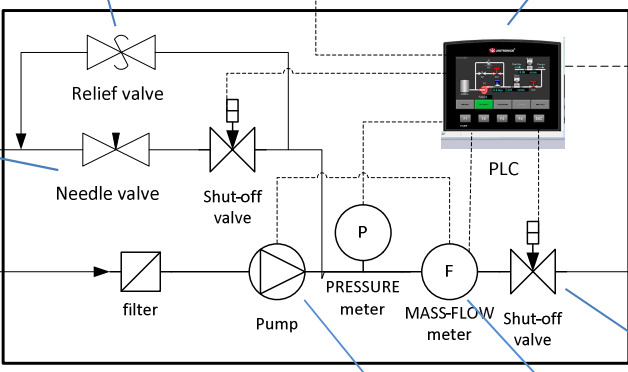
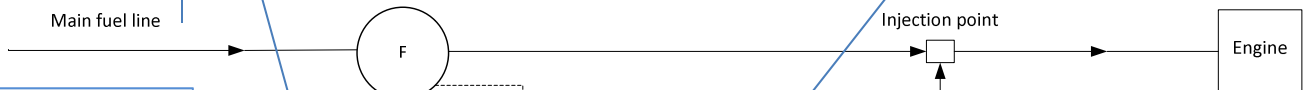
1. The fluid inlet of the unit
2. Back to the additive storage tank
3. Waste

The master flow meter will be connected to the additive dosing unit with the control PLC via either analog input (e.g. 0-5 Vdc / 4-20 mA) or via Modbus.  
The ratio for the slave unit to follow the master will be set at the HMI/PLC of the additive dosing box.

To take care of all the control software, an HMI/PLC touch panel is used. This PLC can be optionally connected to other remote control systems via e.g. Modbus or Ethernet. The software will take care of safe operation and will monitor several signals. Several alarms can be pre-set and will be handled by the unit, with remote indication and reset facility.

In case of (ballast) water treatment applications:  
Main fuel line = water line  
Engine = Ballast water tank

For very low flow rates a bypass with adjustable needle valve can be activated. Thus a very wide flow range for additive dosing can be achieved.



Remote control

E.g. for remote control at the ship's bridge or command control room.

The magnetically coupled gear pump with low pulsation is speed controlled by the Coriolis MFM to meet pressure and mass flow requirements for the process.

Shut-off valve for fast batching and to avoid back flow.

If extra safety is required, the system can be made redundant. Hereby the output of master flow meter 1 is compared with the output of master flow meter 2 by the active additive dosing unit. The other additive dosing unit is stand-by. At the slave unit the displaced pump flow will be compared to the flow of the Coriolis flow meter.  
In case of crossing preset limits of deviation between the two master flow meters an alarm will occur. In case of deviation between pump- and Coriolis flow in the slave dosing box, next to an alarm, a spare dosing unit can be activated.

The (mini) CORI-FLOW Coriolis instrument in the box is mounted using a special vibration insensitive construction for optimal functionality

## Your advantages:

- High accuracy dosing of additive: thus less waste and maximal performance of additive
- Complete additive dosing solution (master fuel/water flow meter and additive dosing slave unit)
- Easy installation and operation by HMI/PLC touch panel
- Can also be connected to existing fuel/water flow meters through analog signal
- Optimal safety and monitoring of alarms and trends
- Fuel/water & additive consumption monitoring
- Wide range of additive flow possible
- Low maintenance
- Remote access (e.g. via Ethernet/Internet)
- Easy integration into vessel management systems



## Technical specifications:

- Power: 100...240 Vac / +24Vdc.
- Ambient temperature: 20...40°C
- Fuel line temperature: 90...120°C (fuel line and fuel flow meters need to be isolated and/or traced)
- Wetted materials: SS316 metal / Kalrez seals
- Housing: IP-66/IP-67
- 4.3" 65,536 (16-bit) Color, Touch panel, TFT, LCD display
- Electrical connections: screw terminals (inside) and cable glands
- Connection to master flow meters/controllers via: 4...20mA/0...10V
- Multiple programmable alarms on flow, pressure, temperature, density
- Self-test functionality
- Pump and filter monitoring
- Remote readout and operation e.g. from the bridge or central command room (via TCP/IP Ethernet/Internet)
- Totalizers for fuel oil/water and additive consumption (day, week, month, total)
- Alarm output via potential free contacts or remotely via Ethernet/Internet or GPRS/GSM (text messages)
- Alarm and counter reset via HMI/PLC touch panel or switch (external/remote)
- Optional extra alarms and redundancy
  - 2 master flow meters (one is guarding the other one); alarm when difference is too high
  - 2 slave dosing boxes (displaced pump flow is measured and compared with Coriolis flow meter)

The flowmeters below can be used in the Industrial box:

	Unit	M13	M14	M15
<b>Minimum full scale</b>	[g/h]	50	1000	5000
<b>Nominal flow</b>	[g/h]	1000	10000	100000
<b>Maximum full scale</b>	[g/h]	2000	30000	300000
<b>Minimum flow</b>	[g/h]	1	30	200
<b>Rangeability controller</b>	[g/h]	≥1:2000	≥1:1000	≥1:1500

A suitable gear pump, fitting to the flow range, will be speed controlled by the selected flow meter.