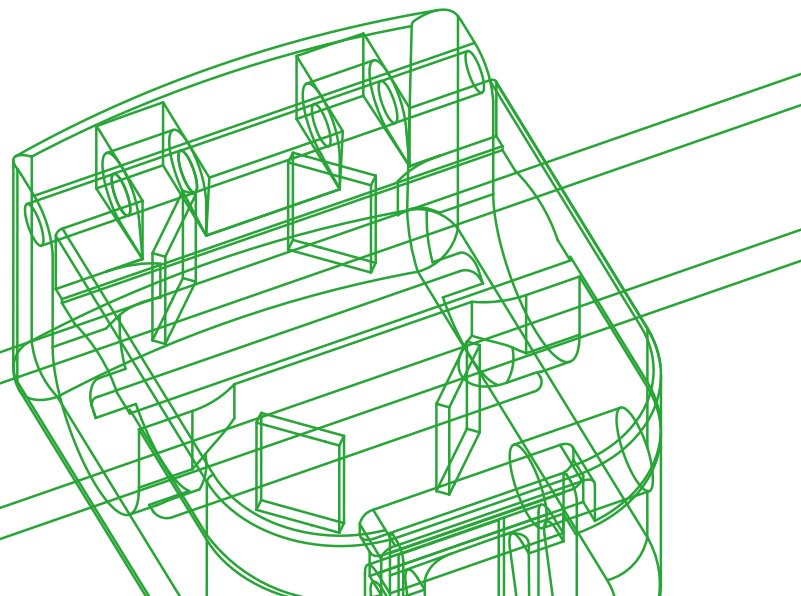
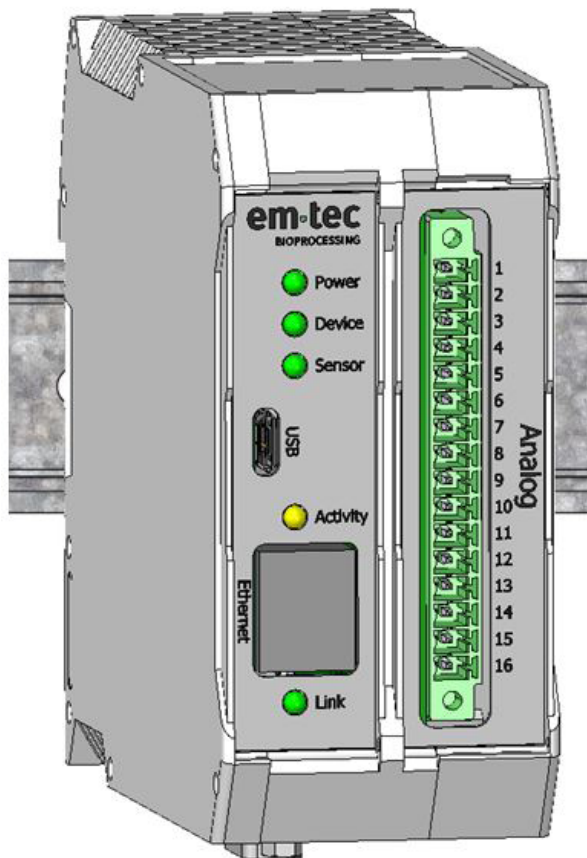


Additional Integration Information: BioProTT™ FlowMCP

Exchanging the BioProTT™ FlowTrack DINrail
with the BioProTT™ FlowMCP-a



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Subject to Technical Changes

Owing to our policy of continuous product improvement, the illustrations and technical data contained in this document may differ slightly from the current version of the device.

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em-tec BIOPROCESSING

Based on proven know-how and years of expertise in medical engineering, em-tec BIOPROCESSING offers their own range of products specialized for the specific requirements of bioprocess engineering.

Whether for use in upstream or downstream, the laboratory or on an industrial scale, em-tec BIOPROCESSING provides optimal solutions for measuring flow in tubing systems based on the ultrasonic transit time method.

BioProTT™ FlowMeasurement System for Industrial Applications

Industrial and GMP-oriented bioprocesses require automation as well as high hygienic standards with a reliable measurement of flow rates at many different stages within the process flow.

em-tec's multi-channel platform BioProTT™ FlowMCP-a, which is available with 1 or 2 channels, is ideal for multiple and simultaneous flow measurements within the bioprocessing industry.

Not only does the BioProTT™ FlowMCP-a come with a new and improved measurement electronic and software update, it also enables an easy switch from the analog interface to Modbus TCP. In addition, the digital Modbus TCP provides more data and information regarding the measurement and enables a broader data logging, ensuring a smooth and steady process.

Every BioProTT™ FlowMCP-a works in combination with our full range of BioProTT™ Clamp-On SLs.



- Read this document carefully before installing and starting up the device! Also follow the instructions and heed the warnings in the BioProTT™ FlowMCP User Manual, which is available at em-tec GmbH upon request.
- The user (= the person who integrates the BioProTT™ FlowMCP-a into a control cabinet) is responsible for any risks resulting from an incorrect or incomplete integration of the BioProTT™ FlowMCP-a.
- The customer must ensure that the persons involved in the integration of the BioProTT™ FlowMCP-a are adequately qualified in regard to the integration of industrial and process measurement transmitters. In addition, the information in this document must be followed.
- If the used BioProTT™ Clamp-On SL is switched to another flow channel, if another BioProTT™ Clamp-On SL is used, or if the BioProTT™ Clamp-On SL is unplugged and reconnected, it must be reconfigured prior to the measurement (e.g. zero flow adjustment).
- The BioProTT™ FlowMCP-a, the BioProTT™ Clamp-On SL(s), and sensor lines are part of a sensitive sensor system. Electromagnetic fields can lead to interferences affecting the measurements or the accurate function of the system.

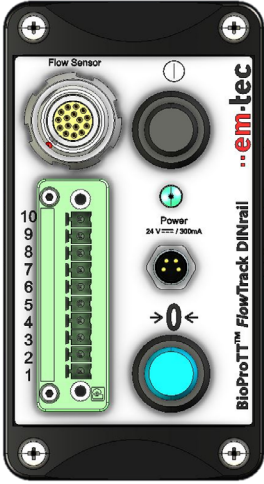
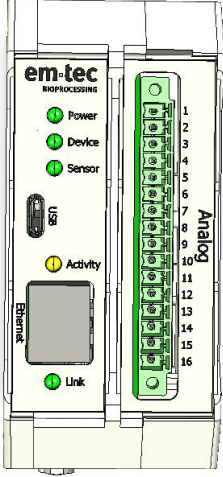
Although the BioProTT™ FlowMeasurement System represents a state-of-the-art technology, the user may be put at risk if the device is operated incorrectly. You should therefore read the user manual carefully before use. Inspect your equipment for completeness and damage after unpacking.

This additional document contains important information on the safe handling of the BioProTT™ FlowMeasurement System and its accessories and should be kept in an easily accessible location alongside the full BioProTT™ FlowMCP User Manual. Familiarize yourself with, and observe all warning and safety information.

It is the responsibility of the operator (=the person carrying out the flow measurement and/or the person operating the system the BioProTT™ FlowMCP-a is part of) of the device to ensure it is used, inspected and maintained in accordance with the user manual. Subsequent revisions or instructions from the manufacturer must also be taken into account in this regard.

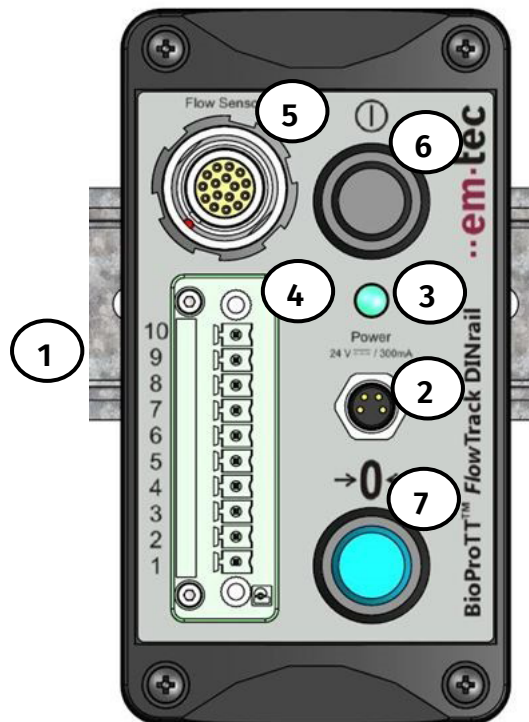
The manufacturer reserves the right to modify technical data without prior notice. Your local distributor will supply you with current information and updates to this document as well as with the full user manual.

1 Device Overview

BioProTT™ FlowTrack DINrail		BioProTT™ FlowMCP-a	
			
DINrail Mounting			
✓		✓	
Available Flow Channels			
1		2	
Interfaces			
Analog: 4-20 mA Digital: RS-232		Analog: (0) 4-20 mA Digital: Modbus TCP	
Web Interface			
X		✓	
Option to Adjust the Analog Interface			
X		✓	
Option to Switch from Analog Interface to Digital Interface			
✓		✓	
Size (H x W x D)			
110 x 65 x 150 mm	1 channel		2 channels
	99 x 45 x 115 mm		99 x 68 x 115 mm
Weight			
635 g	1 channel		2 channels
	200 g		300 g

2 Device Description

2.1 BioProTT™ FlowTrack DINrail



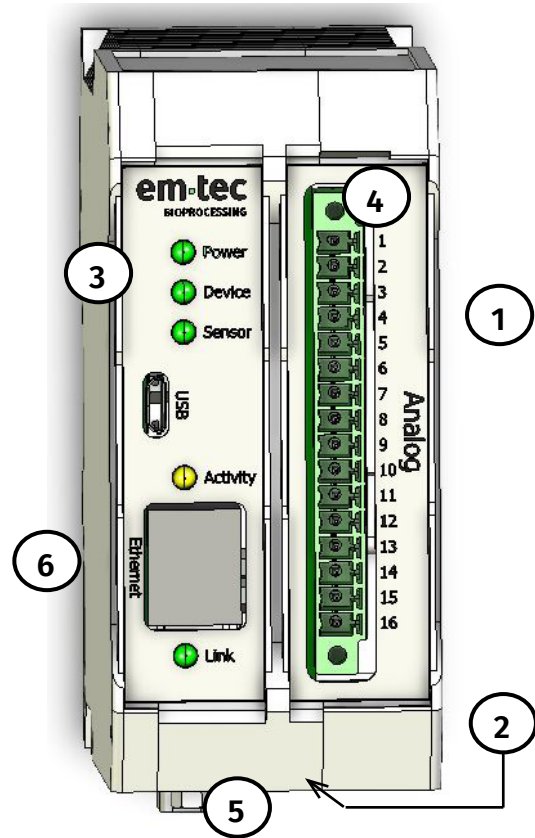
No.	Description
1	DINrail Mounting
2	Power Connection
3	Power LED
4	Terminal Block
5	Sensor Connection
6	On/Off Button
7	Zero Adjustment Push Button

4 Terminal Block (Analog Signals)		
Connector	Pin	Description
	10	Remote Zero +
	9	RS-232
	8	RS-232 RXD
	7	RS-232 TXD
	6	RSS Current Loop GND (-)
	5	RSS Current Loop +
	4	Flow Current Loop GND (-)
	3	Flow Current Loop +
	2	Power Supply GND
	1	Power Supply +24V DC

2.2 BioProTT™ FlowMCP-a

No.	Description
1	DINrail Mounting (at the back of the device)
2	Power Connection (at the bottom of the device, not visible here)
3	LEDs
4	Terminal Block
5	Sensor Connection
6	Ethernet Connection

2 Power Connection			
	1	+ 24V DC max 2A	
	2	GND	
	3	n/c	
	4	n/c	



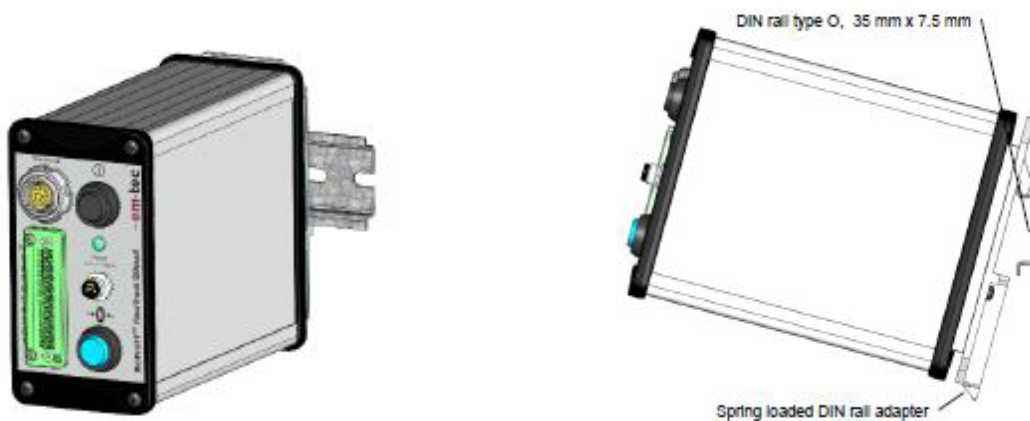
4 Terminal Block (Analog Signals)		
Connector	Pin	Description
	1	RSS Channel 1 Current Loop +
	2	RSS Channel 1 Current Loop GND
	3	Flow Channel 1 Current Loop +
	4	Flow Channel 1 Current Loop GND
	5	*RSS Channel 2 Current Loop +
	6	*RSS Channel 2 Current Loop GND
	7	*RSS Channel 2 Current Loop +
	8	*RSS Channel 2 Current Loop GND
	9	Remote Zero Channel 1 +
	10	Remote Zero Channel 1 GND
	11	*Remote Zero Channel 2+
	12	*Remote Zeor Channel 2 GND
	13	n/c
	14	n/c
	15	n/c
	16	n/c

* Only available for BioProTT™ FlowMCP 2-a

3 Exchanging the BioProTT™ Flow Track DINrail with the BioProTT™ FlowMCP-a

3.1 Removing the BioProTT™ FlowTrack DINrail

BioProTT™ FlowTrack DINrail is equipped with a mounting adapter for DIN rail type 35 mm x 7.5 mm or other compatible adapters. To remove the device, push down the spring-loaded bracket using a flat-blade screwdriver and pull the BioProTT™ FlowTrack DINrail forward.



3.2 Mounting the BioProTT™ FlowMCP-a

As is the case with the BioProTT™ FlowTrack DINrail, the BioProTT™ FlowMCP-a supports DINrail mounting for the use in cabinets of process controls (IP20) and can thus be mounted only on a standard mounting rail (DIN-rail to EN 50022, TH 35/7,5 or TH 35/15). Consequently, the devices can be exchanged quickly and easily without having to make any changes to the control cabinet. Since the BioProTT™ FlowMCP-a is quite a bit smaller than the BioProTT™ FlowTrack DIN rail (99 x 68 x 115 mm for the BioProTT™ FlowMCP 2-a compared to 110 x 65 x 150 mm for the BioProTT™ FlowTrack DINrail) as well as lighter (300 g for the two-channel version compared to 635g for the one-channel BioProTT™ FlowTrack DINrail), the exchange should not cause any problems when it comes to control-cabinet space.

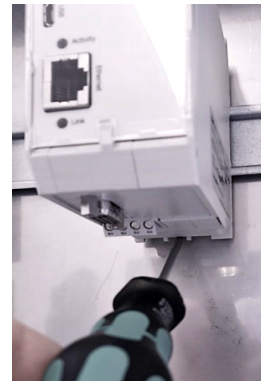
- Engage the module from the top in the top-hat rail and swivel it down so that the module slides into position.
- There is only one correct mounting position for the device. The sensor connections are on the device bottom.
- Please ensure that the BioProTT™ FlowMCP-a is firmly mounted onto the rail before setting up any connections.
- Other modules may be rowed up to the left and right of the device.
- There must be at least 5 cm clearance for heat dissipation above and below the module to ensure sufficient cooling of the device.
- The standard mounting channel must be connected to the equipotential bonding strip of the switch cabinet. **The connection wire must feature a cross-section of at least 10 mm².**



Assembly, mounted position

3.3 Removing the BioProTT™ FlowMCP-a

- To successfully remove the BioProTT™ FlowMCP, one needs a screwdriver with a 3-3.5 mm blade.
- First disconnect the power supply, the sensor, and the signal lines.
- Then disconnect and remove the sensor extension cables and the Ethernet connection and/or analog connection.
- Last, pull the DINrail fixing bracket downwards e.g. by using a screwdriver.



Disassembly

4 Extension Cables

4.1 BioProTT™ FlowTrack DINrail

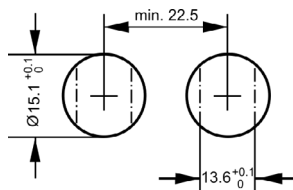
The shipment of the BioProTT™ FlowTrack DINrail includes a sensor extension cable with female plug (Lemo Type PFG.2B.316.CLLD72), which can be mounted in the cabinet wall with a thickness of up to 6.5 mm (0.26 inch). The male plug on the cable's other end is inserted in the **sensor port of the BioProTT™ FlowTrack DINrail**. **This can be found at the front panel of the device** (see chapter 2.1 for more information).



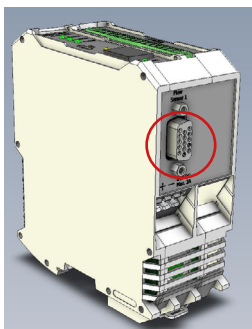
Red mark: sensor port

4.2 BioProTT™ FlowMCP-a

As is the case with the BioProTT™ FlowTrack DINrail, the BioProTT™ FlowMCP-a is shipped with sensor extension cables (ID13065) for the use inside the control cabinet with a length of max. 1.1 m as well.



Panel cut out in cabinet; numbers refer to mm



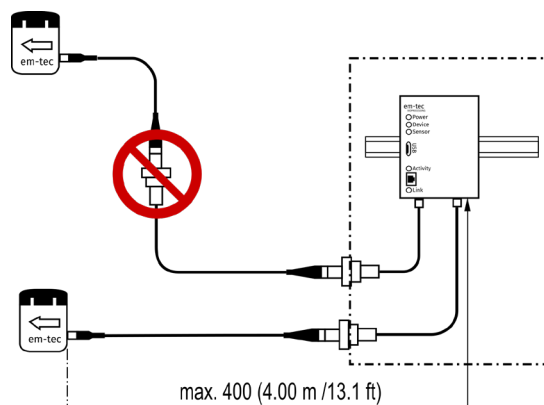
Red mark: sensor port

The female plug of the sensor extension cable can be mounted on the cabinet wall with a thickness of up to 6.5 mm (for panel cut-out refer to figure on the right) (0.26 inch). Please note that the panel cut-out is the same for both devices.

It is important, that the device connection to the control cabinet wall is tight. The male plug (D-Sub) of the sensor extension cable is inserted in the sensor port of the BioProTT™ FlowMCP-a and needs to be secured by the screws. Other than the BioProTT™ FlowTrack DINrail, **the sensor connection of the BioProTT™ FlowMCP-a is at the bottom of the device**, not at the back (see chapter 2.2 for more information). The cut-out panel with its dimensions and distances is indicated in the figure on the right. The red marks on the socket and the plug indicate the correct orientation for inserting the plug.



- It is recommended that only one extension cable is used when connecting a BioProTT™ Clamp-On-SL.
- The total length of cable between sensor and flow meter must not exceed 4 m.



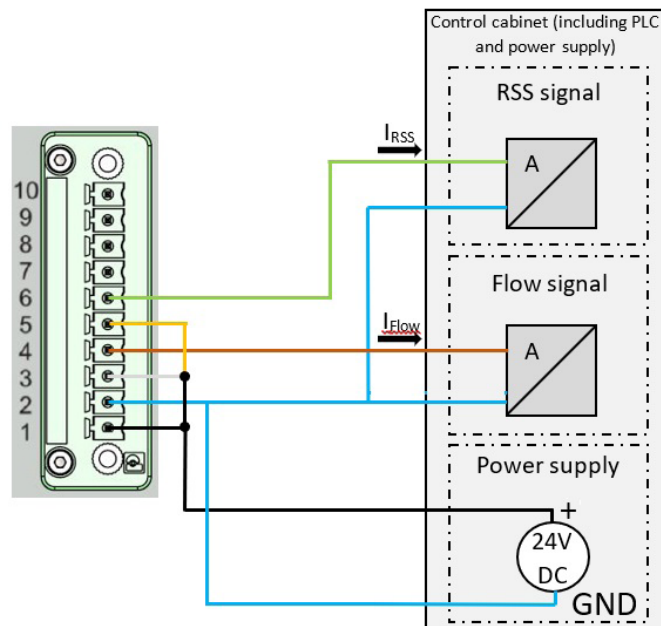
Cable Length and Connection
Copyright em-tec GmbH

5 Exchanging the BioProTT™ FlowTrack DINrail with the BioProTT™ FlowMCP-a

The following image shows a possible connection plan of the analog interface of the BioProTT™ FlowTrack DINrail as described in chapter 6.4, page 22ff of the user manual of the BioProTT™ FlowTrack Series (available upon request from em-tec GmbH).

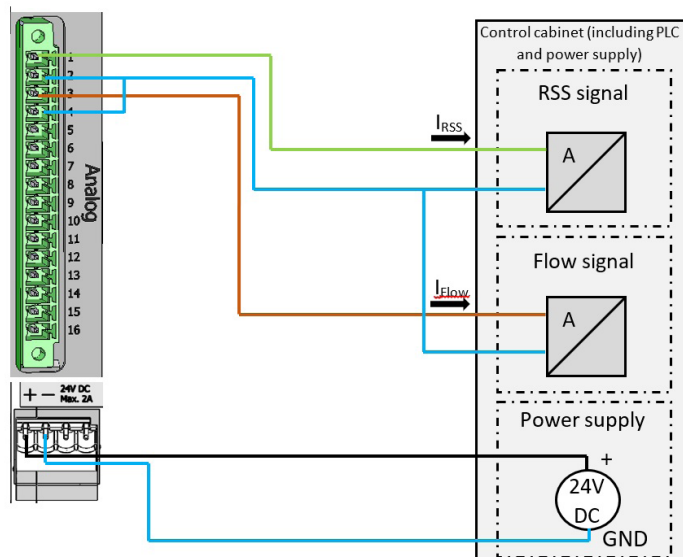
To exchange the BioProTT™ FlowTrack DINrail with the BioProTT™ FlowMCP-a, follow these steps:

1. Turn off the power supply and disconnect all cables attached to the device.
2. Remove the device as described in chapter 3.1.
3. Take the RSS cable (connected to Pin 6 on the BioProTT™ FlowTrack DINrail) and connect it to Pin 1 on the BioProTT™ FlowMCP-a.
4. Take the Flow cable (connected to Pin 4 on the BioProTT™ FlowTrack DINrail) and connect it to Pin 3 on the BioProTT™ FlowMCP-a.
5. Take the analog grounding cable which was connected to Pin 2 on the BioProTT™ FlowTrack DINrail and connect it to Pin 2 and 4 on the BioProTT™ FlowMCP-a.



Please note:

The cables and cable bridges which were connected to Pin 1, 3, and 5 on the BioProTT™ FlowTrack DINrail are no longer necessary for the BioProTT™ FlowMCP-a. This is due to the fact that the BioProTT™ FlowMCP-a supplies the power port internally. Consequently, the BioProTT™ FlowMCP-a is connected to the power supply (located at the bottom of the device) but does not need any additional power supply.



6 Switching from the BioProTT™ Flow Track DINrail to the BioProTT™ FlowMCP-a

To set the analog output range of the BioProTT™ FlowMCP-a to the same range as the BioProTT™ FlowTrack DINrail, follow these steps:

- Open the web interface of the BioProTT™ FlowMCP-a.
For more information regarding the web interface (access, settings, etc.) please refer to chapter 6 "Web Interface of the BioProTT™ FlowMCP" in the main user manual.
- Set the field "Flow value at 20 mA [ml/min]" to $1.5 * Q_{max}$ of the sensor that is currently used
Please note: The Q_{max} of the sensor is indicated in the Calibration Information Sheet or on the web interface.
- Set the field "Flow value at 4 mA [ml/min]" to 0 (zero).

With this setting, the analog output range of the BioProTT™ FlowMCP-a is identical to the output range of the BioProTT™ FlowTrack DINrail.



A zero flow adjustment must be carried out before each measurement.

7 Zero Flow Adjustment

To ensure the highest possible accuracy of the measured flow values and to avoid any possible offsets, a zero flow adjustment must be carried out

- before each measurement
- when reclamping the BioProTT™ Clamp-On SL
- when exchanging the BioProTT™ Clamp-On SL
- when changing the calibration table (i.e. if any of the application parameters change)

In addition, em-tec GmbH recommends carrying out a zero flow adjustment whenever possible without disturbing the ongoing process.

For the zero flow adjustment

- the sensor must be clamped in the correct installation position at the location intended for it.
- the tube must be filled with liquid, but the liquid must not move.
- you should allow sufficient time for the system to adapt to ambient conditions.
- you should ensure that no air bubbles are in the tube during the zero flow adjustment.

Only after the zero flow adjustment as carried out is the system ready for measurement.

7.1 Zeroing the BioProTT™ FlowTrack DINrail

The BioProTT™ FlowTrack DINrail can be zeroed

- by pushing the zero button on the device
- via the analog interface by generating a direct voltage pulse using a switch
- via the digital interface by sending a Z-command (Z<CR>)

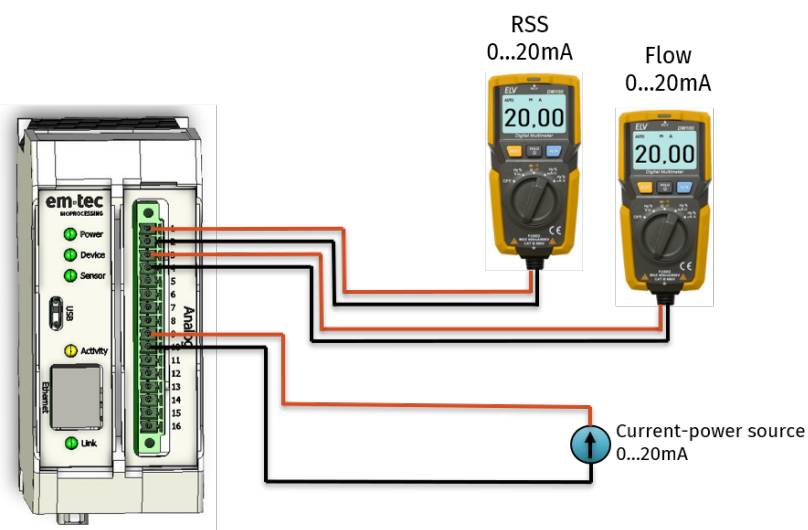
For more information regarding the BioProTT™ FlowTrack DINrail, please refer to the respective user manual.

7.2 Zeroing the BioProTT™ FlowMCP-a

The BioProTT™ FlowMCP-a can be zeroed

- via the analog interface by generating a direct voltage pulse on the terminal block
- via the digital interface by sending the respective command over the Modbus TCP interface
- via the web interface

Zeroing the BioProTT™ FlowMCP-a over the analog interface, can be done either by a push button or by generating a direct voltage pulse on the terminal block.



Please note:

- To be able to carry out a zero flow adjustment over the analog interface, the "zero flow adjustment over analog input" function must be enabled on the web interface.
- To zero over the analog interface by using a push button or a direct voltage pulse, the "undo zeroing" function on the web interface must be set to "off"

For more information regarding the installation and use of the BioProTT™ FlowMCP-a, please refer to the respective user manual.

About em-tec GmbH

em-tec has been a specialist for flow measurement systems in the medical and bioprocessing technology sector for over 30 years. The company's core competence is the non-invasive flow measurement using the ultrasonic transit-time method, that is used for applications in extracorporeal circulation systems of life-sustaining systems as well as in biopharma applications that use flexible tubes. Headquartered in Finning, Germany, em-tec is part of PSG®, a Dover company.

For more information about em-tec, please visit em-tec.de. For more information about PSG®, please visit psgdover.com.

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Dover is a diversified global manufacturer and solutions provider with annual revenue of approximately \$7 billion. We deliver innovative equipment and components, consumable supplies, aftermarket parts, software and digital solutions, and support services through five operating segments: Engineered Products, Fueling Solutions, Imaging & Identification, Pumps & Process Solutions and Refrigeration & Food Equipment. Dover combines global scale with operational agility to lead the markets we serve. Recognized for our entrepreneurial approach for over 60 years, our team of over 23,000 employees takes an ownership mindset, collaborating with customers to redefine what's possible. Headquartered in Downers Grove, Illinois, Dover trades on the New York Stock Exchange under "DOV." Additional information is available at dovercorporation.com.

