

Instruction and Operation Manual

**FLI D08 C/FLI D15 C/FLI D20 C
/FLI D25 C/FLI D32 C**

Compact Thermal Mass Flow Meter



Dear Customer,

Thank you for choosing our product.

Before you start up the device please read the operating instructions in full and carefully observe them. The manufacturer cannot be held liable for any damage which occurs as a result of non-observance or non-compliance with this manual.

Should the device be tampered with in any manner other than a procedure which is described and specified in the manual, the warranty is canceled and the manufacturer is exempt from liability.

The device is destined exclusively for the described application.

Atlas Copco offers no guarantee for the suitability for any other purpose. Atlas Copco is also not liable for consequential damage resulting from the delivery, capability or use of this device.

Revision: 2025-4

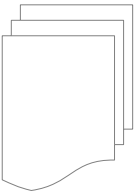


Last modifications: July, 2025

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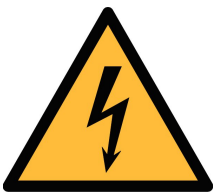
1 Safety Instructions



Please check if this instruction manual matches the product type.

Please observe all notes and instructions indicated in this manual. It contains essential information which must be observed before and during installation, operation, and maintenance. Therefore this instruction manual must be read carefully by the technician as well as by the responsible user / qualified personnel.

This instruction manual must be available at the operation site of the flow meter at any time. In case of any obscurities or questions, regarding this manual or the product, please contact the manufacturer.

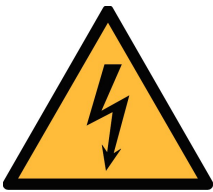


WARNING!

Compressed air!

Any contact with quickly escaping air or bursting parts of the compressed air system can lead to serious injuries or even death!

- Do not exceed the maximum permitted pressure range (see sensors label).
- Only use pressure tight installation material.
- Avoid that persons get hit by escaping air or bursting parts of the instrument.
- The system must be pressureless during maintenance work.



WARNING!

Voltage used for supply!

Any contact with energized parts of the product might lead to an electrical shock which can lead to serious injuries or even death!

- Consider all regulations for electrical installations.
- The system must be disconnected from any power supply during maintenance.
- Any electrical work on system is only allowed by authorized qualified personal.

**ATTENTION!****Permitted operating parameters!**

Observe the permitted operating parameters. Any operation exceeding this parameters can lead to malfunctions and might lead to damage on the instrument or the system.

- Do not exceed the permitted operating parameters.
- Make sure the product is operated in its permitted limitations.
- Do not exceed or undercut the permitted storage and operating temperature and pressure.

General safety instructions

- It is not allowed to use the product in explosive areas.
- Please observe the national regulations before/during installation and operation.

Remarks

- It is not allowed to disassemble the product.

**ATTENTION!****Measurement values can be affected by malfunction!**

The product must be installed properly and frequently maintained. Otherwise it might lead to wrong measurement values, which can result in wrong results.

- Always observe the direction of the flow when installing the device. The direction is indicated on the housing.
- Do not exceed the maximum operating temperature at the sensors tip.
- Avoid condensation on the sensor element as this will affect accuracy enormously.

Storage and transportation

- Make sure that the transportation temperature is between -30 ... +70°C.
- For storage and transportation it is recommended to use the packaging which comes with the device.
- Make sure that storage temperature of the device is between -10 ... +50°C.
- Avoid direct UV and solar radiation during storage.
- For the storage the humidity must be <90% with no condensation.

2 Registered Trademarks

Trademark	Trademark owner
MODBUS®	Modbus Organization, Hopkinton, USA
Android™, Google Play	Google LLC

3 RF Exposure Information and Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body.

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help
- This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

4 Application

The FLI D08 C/FLI D15 C/FLI D20 C/FLI D25 C/FLI D32 C is a Thermal Mass Flow Meter that is designed to measure the volumetric flow and consumption of compressed air and nitrogen within the permitted operating parameters. (See [Technical Data](#) on the next page.)

The default unit settings are: volumetric flow in l/min and total Consumption in m³. Other units can be configured using the mobile App SensSee, which can be downloaded from the Google Play store or Apple App Store. For more information, see chapter [10](#) on page 28.

The FLI D08 C/FLI D15 C/FLI D20 C/FLI D25 C/FLI D32 C is hereinafter referred to as "the device".

5 Features

- Inline thermal mass flow meter virtually independent of pressure and temperature changes
- Process connection G-type thread, DN8 (FLI D08 C), DN15 (FLI D15 C), DN20 (FLI D20 C), DN25 (FLI D25 C), DN32 (FLI D32 C)
- Integrated flow conditioner, no need of straight inlet sections
- Very short response time
- Particularly suitable for measuring at point-of-use flow and consumption of compressed air or N₂
- Integrated display showing volumetric flow
- Options of output signals:
 - Analogue 4 ... 20 mA and pulse
 - Modbus/RTU
- Wireless interface for device settings
- Configurable through the mobile App SensSee

6 Technical Data

6.1 General Data

 	
Parameters	Standard unit flow: l/min (default) Consumption units: m ³ (default)
Reference conditions	ISO1217 20°C, 1000 hPa (Standard-Unit) DIN1343 0°C, 1013.25 hPa (Norm-Unit)
Measurement principle	Thermal mass flow
Sensor	Glass coated resistive sensor
Ambient temperature /Transport temperature	0 ... +50°C / -30 ... +70°C
Medium conditions	0 ... +50°C, rH<90% no condensation
Operating pressure	0 ... 1.6 MPa
Pressure drop	Maximum pressure drop at the maximum flow of the Standard (S) flow range: • FLI D08 C type: 30 hPa • FLI D15 C type: 100 hPa • FLI D20 C type: 100 hPa • FLI D25 C type: 200 hPa • FLI D32 C type: 170 hPa
Casing	Process connection: Aluminum alloy Contact parts: aluminum alloy or stainless steel Top casing: PC + ABS
Protection class	IP54
Dimensions	See dimensional drawing on page 12 .
Display	4-digit LED display
Tube diameter	DN8, DN15, DN20, DN25, DN32
Process connection	G inner thread ISO 228-1 Thread adapter, NPT1/2" inner thread to G1/2" outer thread
Weight	0.45 kg (FLI D08 C), 0.44 kg (FLI D15 C), 0.97 kg (FLI D20 C), 0.94 kg (FLI D25 C), 1.7 kg (FLI D32 C)

Note: The total consumption value is saved to the permanent memory every 5 minutes. If within these 5 minutes the device is powered off, it will restore the last consumption value which was saved in the last cycle.

6.2 Electrical Data

Power supply	15 ... 30 VDC, 120 mA @ 24 VDC
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6.3 Output Signals

Analogue output	Signal: 4 ... 20 mA, isolated Scaling: 0 to max flow Max load: 250R
Pulse output	1 pulse per m ₃ , isolated switch, max. 30 VDC, 200 mA (pulse length: 10 ... 120 ms, depends on flow rate)
Modbus output	See section 9.3 on page 21.

6.4 Accuracy

Accuracy*	±3.0% of RDG ± 0.3% Full Scale
Temperature coefficient	< 0.1%/K Full Scale
Pressure coefficient	<5% / 1 MPa
Turndown ratio	50 : 1
Stated accuracy at	Ambient/process temperature 23°C ± 3°C Ambient/process humidity <90% Process pressure at 0.6 MPa
Repeatability	±1% of reading
Sampling rate	3 samples per second

* The specified accuracy is valid only within the minimum and maximum flow rates that are stated in section [6.5](#).

6.5 Flow Ranges

The measuring ranges of air are stated under the following conditions:

- Standard flow in air
- Reference pressure: 1000 hPa
- Reference Temperature: +20°C

Unit: **l/min**

FLI D08 C		FLI D15 C		FLI D20 C		FLI D25 C		FLI D32 C	
Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
50	250	20	1000	40	2000	70	3500	120	6000

The measuring ranges of **N₂** are stated under the following conditions:
0°C and 1013.25 hPa

Unit: **l/min**

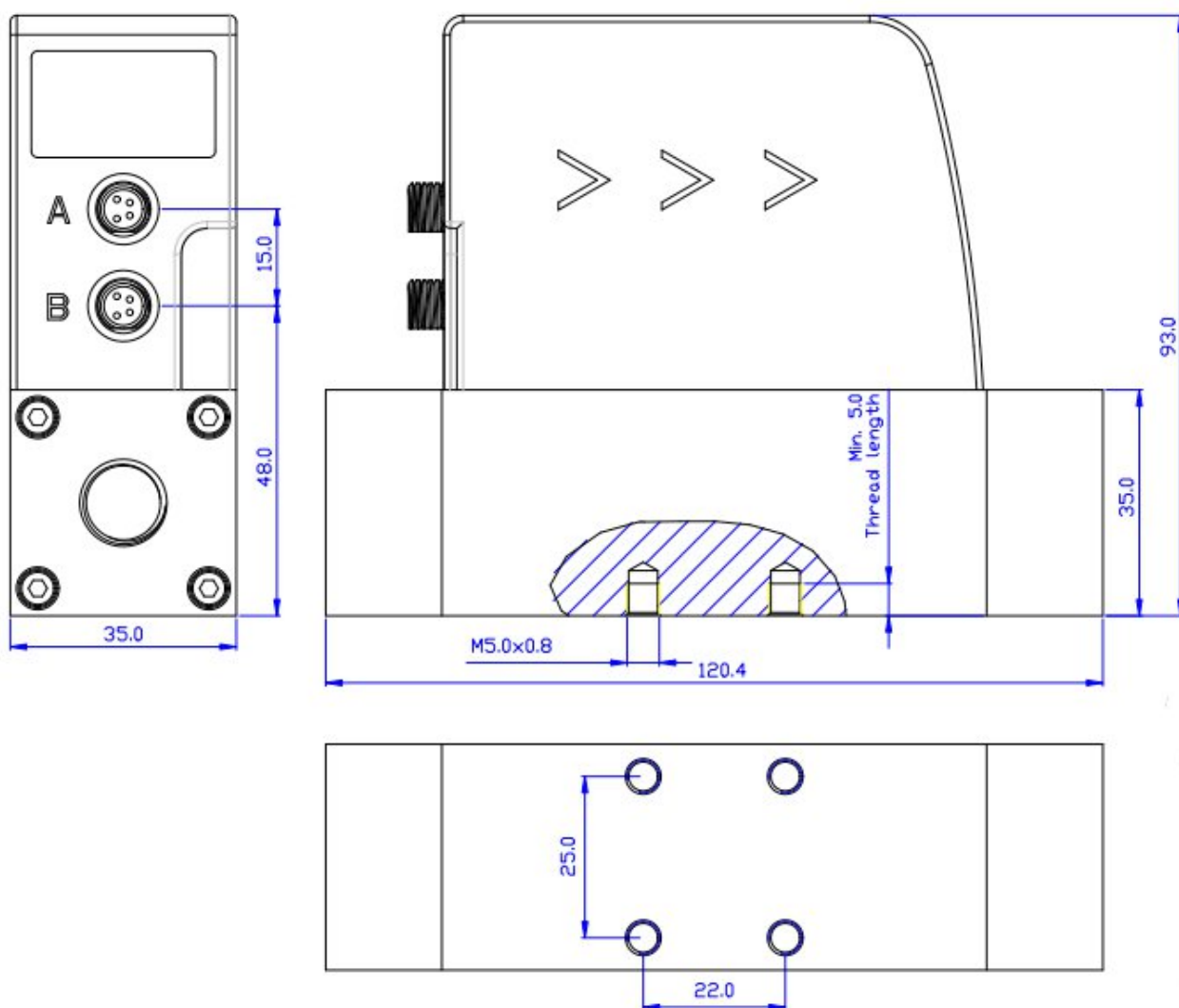
FLI D08 C		FLI D15 C		FLI D20 C		FLI D25 C		FLI D32 C	
Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
4.44	222	17.8	890	35.6	1780	62.2	3110	107	5335

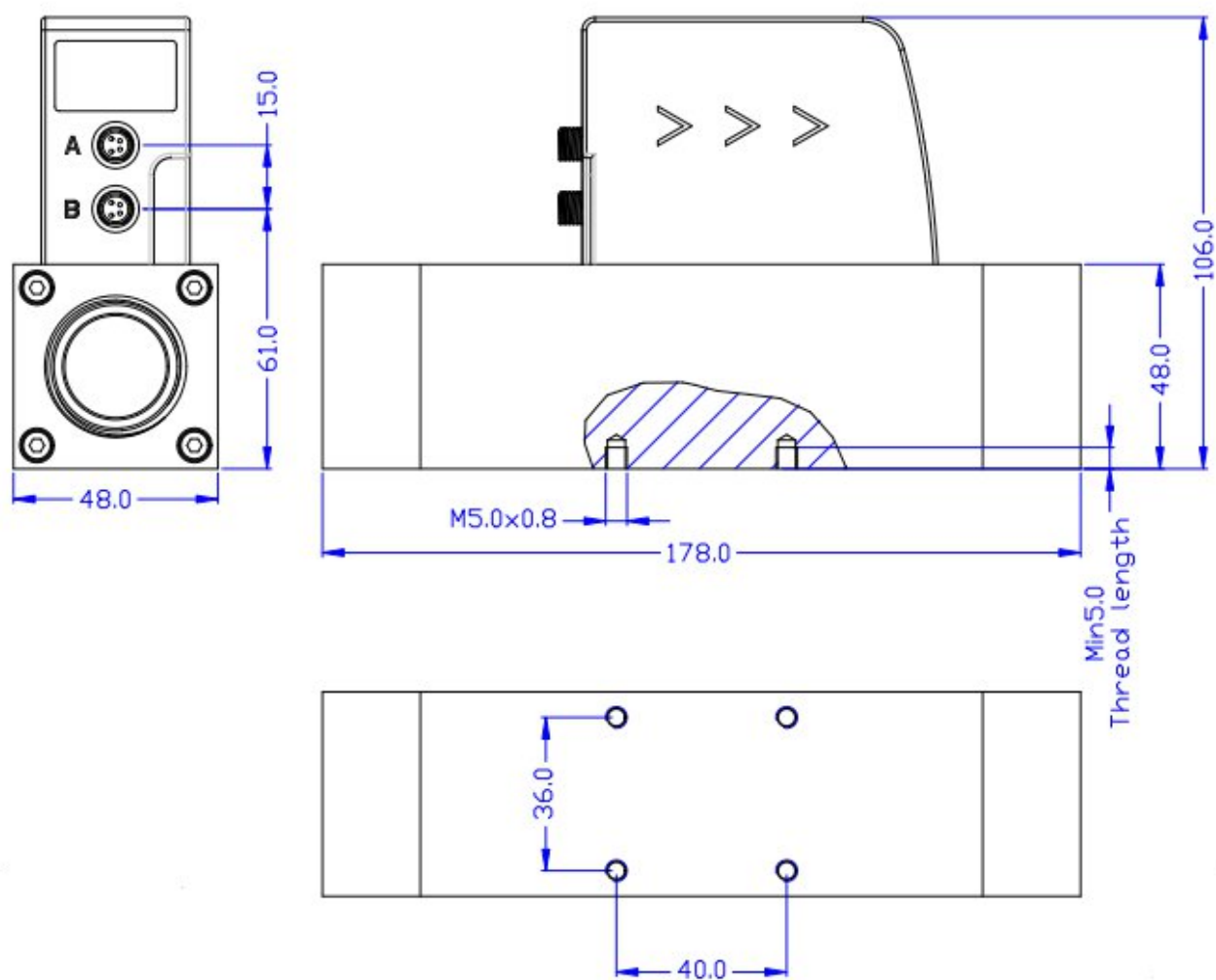
7 Dimensional Drawing

Unit: mm

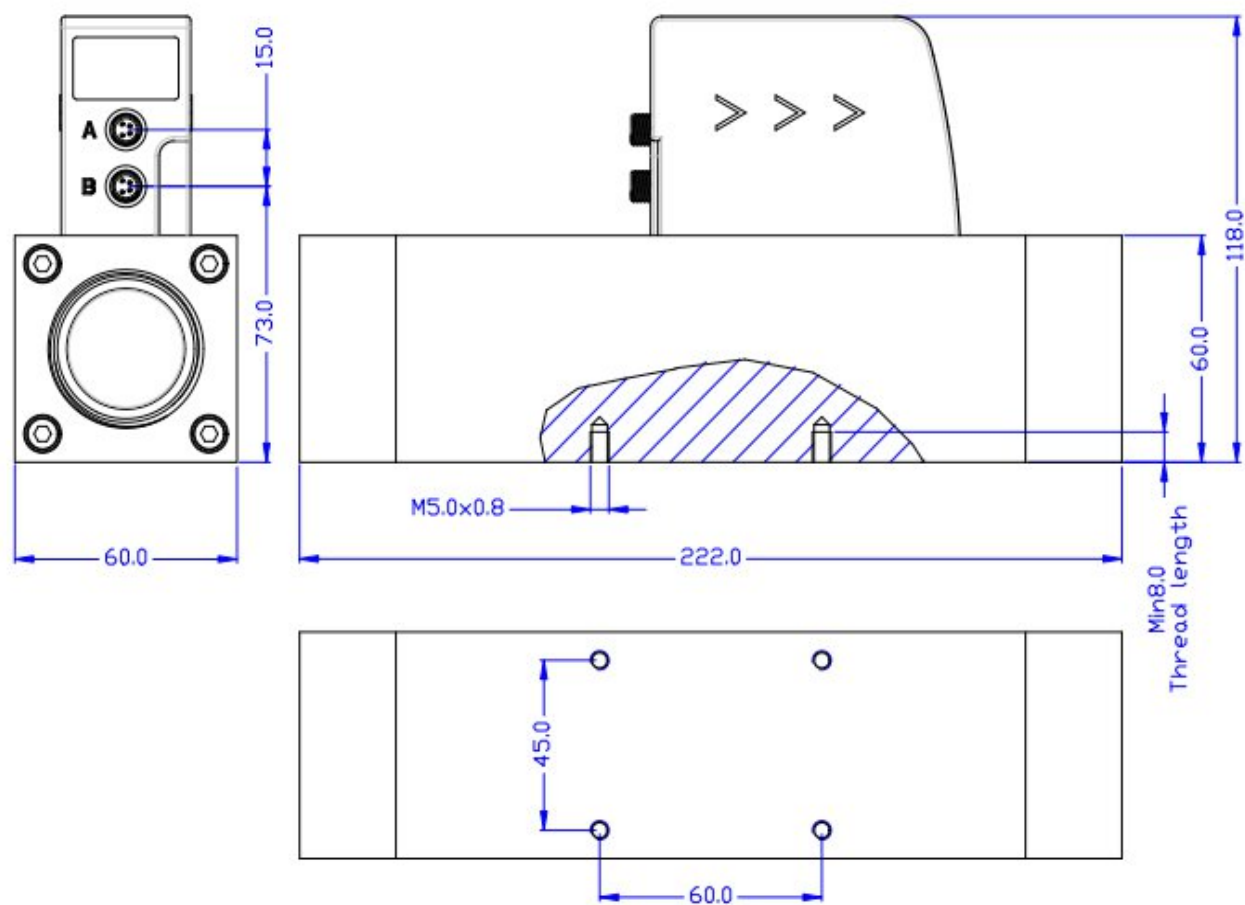
7.1 Flow Meter Dimension

DN8/DN15

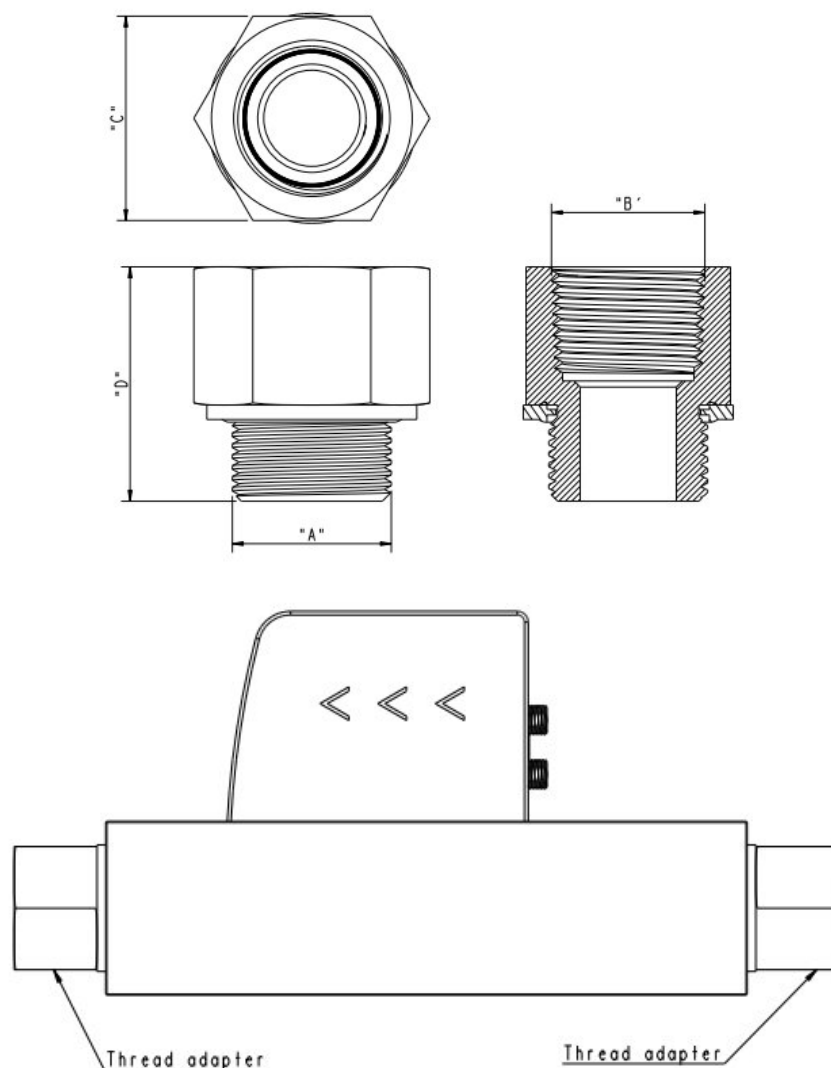


DN20/DN25

DN32



7.2 Thread Adapter Dimension



"A" (Outer thread)	"B" (Inner thread)	"C"	"D"
G1/4"	NPT1/4"	20.0	29.5
G1/2	NPT1/2"	26.0	35.5
G3/4"	NPT3/4"	34.0	39
G1"	NPT1"	40.0	44
G1-1/4"	NPT1-1/4"	52.0	48
G1-1/2"	NPT1-1/2"	60.0	49
G2"	NPT2"	72.0	52

8 Installation

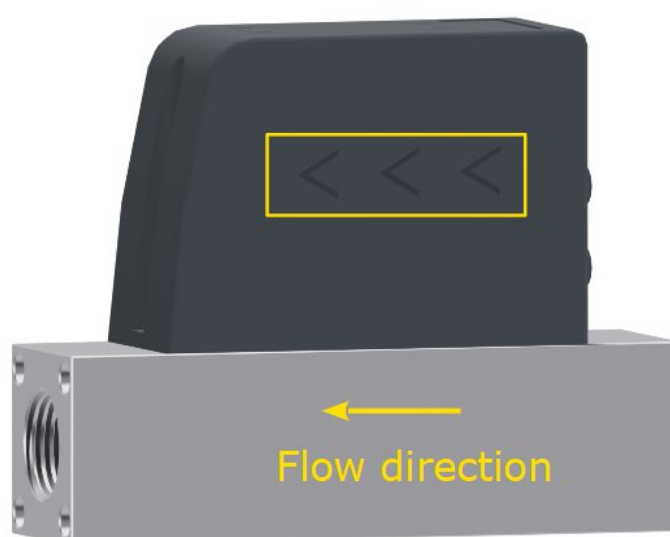
The the device is delivered with following components:

Qty. Description

1	FLI D08 C/FLI D15 C/FLI D20 C/FLI D25 C/FLI D32 C Compact Thermal Mass Flow Meter
1	5 m cable with M8 connector and open ends
1	Instruction manual
1	Calibration certificate

8.1 Installation Considerations

- When installing the device, always observe the arrows on the housing showing the flow direction. The air/gas flow direction must always be in line with the arrows on the housing.



- Due to the integrated flow conditioner, there are no additional straight pipe requirements for good measurement. However for best measurement, it is recommended 3-5 times inner diameter straight pipe at the inlet.
- The the device can be installed in horizontal or vertical pipes.

Note:

- The device is for indoor use only! For outdoor applications, ensure a protection from solar radiation and rain. Always observe operating temperature and humidity as stated in the technical data.

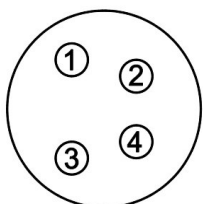
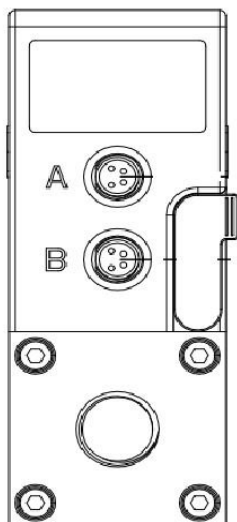
- It is strongly recommend not to install the device permanently in wet air/gas conditions, which exists usually right after a compressor outlet.

8.2 Electrical Connection

The device comes with two connector plugs "A" and "B". By default the device is delivered with one 5 m cable with a M8 connector on one side and open wires on the other side. To make the device work, one cable connection is sufficient. However, if the pulse output is to be used or the supply and the signal need to be on separate cables, a second connection cable must be ordered.

Pin assignment connector plug M8

Output type	Connector	Pin 1	Pin 2	Pin 3	Pin 4
Modbus	A	D-	-V _B	+V _B	D+
	B	D-	GND _M	NA	D+
Pulse and analog	A	-I	-V _B	+V _B	+I
	B	-I	SW	SW	+I
Wire color		Brown	White	Blue	Black



Legend to pin assignment

GND _M	Ground for Modbus
-V _B	Negative supply voltage
+V _B	Positive supply voltage
+I	Positive 4 ... 20 mA signal (isolated)
-I	Negative 4 ... 20 mA signal (isolated)
D+	Modbus data +
D-	Modbus data -
SW	Isolated pulse output (switch)
NA	Not Applicable



ATTENTION!

Do not screw the M8 plug using force. Otherwise, it may damage the connecting pins.

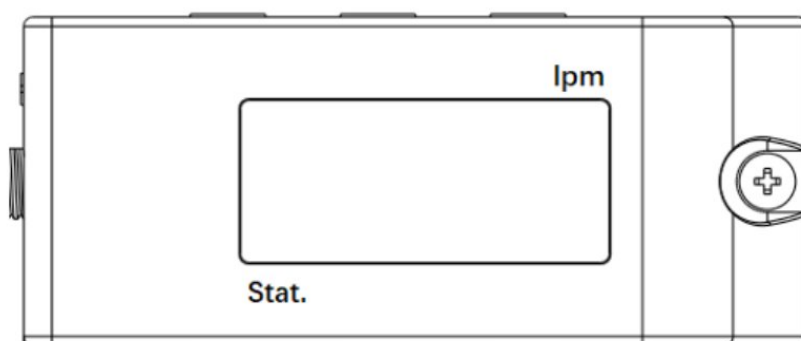
8.3 Information on the Display

8.3.1 Measurement Data on the Display

The screen can display the volumetric flow in l/min.

8.3.2 LED Indicators

The the device provides two LED indicators on the display panel, which indicate the status of display and wireless connection separately.



LED	Function	Status
lpm	Indicator for the display state (volumetric flow)	On: The display is showing the volumetric flow. Flashing: N/A
stat.	Indicator for the wireless connection state	On: The wireless is connected. Flashing: N/A

8.3.3 Error Code

When an error code shows on the LED display, use the following table to identify the error cause.

Error code	Description
Er. 01	Real time clock failure
Er. 02	ADC failure
Er. 04	EEPROM failure
Er. 08	NAND flash failure
Er. 20	Flow sensor failure
Er. 30	Temperature sensor failure
Er. 40	Wireless connection failure

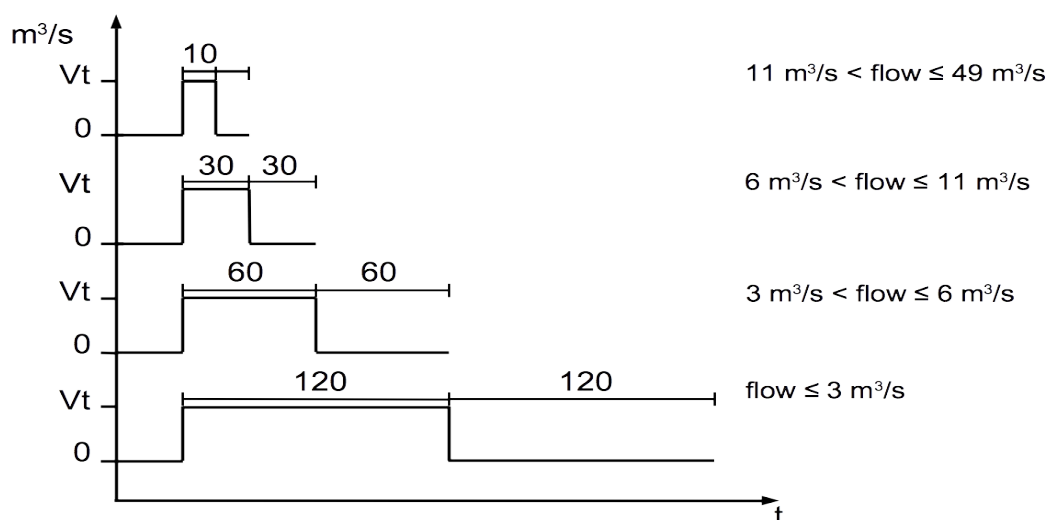
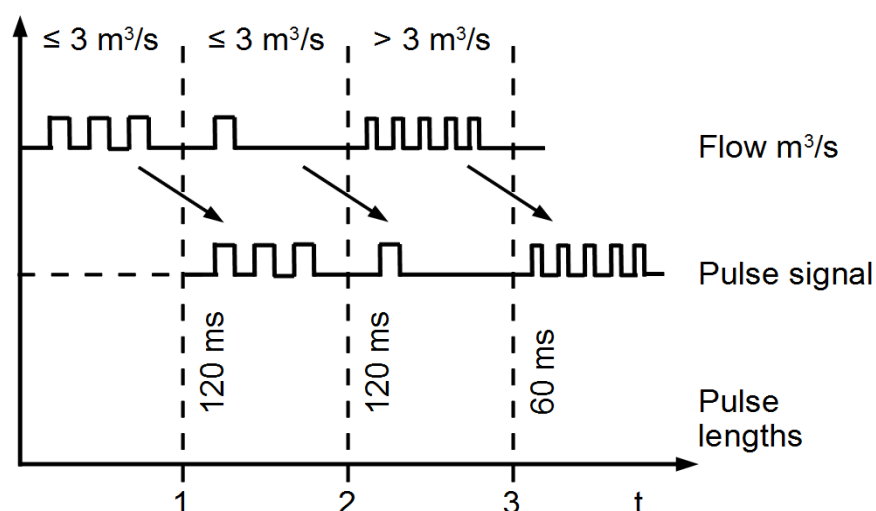
9 Signal Outputs

9.1 Analog Output

The device has an analog output of 4 ... 20 mA. This output can be scaled to match a desired measuring range. Standard scaling is from 0 to the max flow. The corresponding flow in different pipe sizes can be found in section [6.5 Flow Ranges](#).

9.2 Pulse Output

The device outputs one pulse per a consumption unit. This pulse output can be connected to an external pulse counter to count the total consumption. The number of m^3 per second are summed up and indicated after one second. Pulse length depends on flow rate.



Volumetric flow [m³/s]	Volumetric flow [m³/h]	Pulse length [ms]	Max. pulse output per hour
≤ 3	≤ 10800	120	1080
> 3	> 10800	60	2880
> 6	> 21600	30	3960

9.3 Modbus Interface

9.3.1 Modbus Information

The default settings of the Modbus interface are as follows:

Mode	RTU
Baud rate	19200
Device address	Last two digits of the serial number
Framing / parity / stop bit	8, N, 1
Response timeout	1 second
Response delay	0 ms
Inter-frame spacing	7 char

Response message that the device returns to the master:

- Function code: 03

The information of the byte order is shown in the table below:

Byte Order	Sequence				Data Type
	1st	2nd	3rd	4th	
1-0-3-2	Byte 1 (MMMMMMMM*)	Byte 0 (MMMMMMMM *)	Byte 3 (SEEEEEEE)	Byte 2 (EMMMMMMM *)	FLOAT
1-0-3-2	Byte 1	Byte 0 LSB	Byte 3 MSB	Byte 2	UINT32 INT32
1-0	Byte 1 MSB	Byte 0 LSB	---	---	UINT16 INT16
1-0	Byte 1 XXX *	Byte 0 DATA	---	---	UINT8 INT8

* S: Sign, E: Exponent, M: Mantissa, XXX: no value

Explanations of MSB and LSB

MSB MSB refers to Most Significant Byte first, which follows the Big-Endian byte order.
For example, if the main system follows the MSB first order:
When the 4-byte floating number, in the order of Byte1-Byte0-Byte3-Byte2, is received from the slave (sensor), the master must change the byte order to Byte3-Byte2-Byte1-Byte0 for the correct display of the value.

LSB LSB refers to Least Significant Byte first, which follows the Little-Endian byte order.
For example, if the main system follows the LSB first order:
When the 4-byte floating number, in the order of Byte1-Byte0-Byte3-Byte2, is received from the slave (sensor), the master must change the byte order to Byte0-Byte1-Byte2-Byte3 for the correct display of the value.

Note: Modbus communication settings as well as other settings can be changed by the SensSee App or through the windows based Service Software.

Available measurement channels

Register address	Length	Format	Channel name	R/W
6	4-Byte	FLOAT	Flow	R
8	4-Byte	UINT32	Consumption	R
24	4-Byte	UINT32	System status	R
2316	4-Byte	FLOAT	Flow at reference condition 20°C, 1000 hPa	R
2318	4-Byte	UINT32	Counter at reference condition 20°C, 1000 hPa	R

System status

The device provides the device statuses via Modbus as well. The 32-bit data information is read as single bits. The meanings of these bits are described as follows.

Bit	Description	Bit	Description
2	Measurement over range	9	Pressure sensor broken
3	Temperature over range	10	Temperature sensor broken
4	Pressure over range	11	NTC broken
5	Pulse over range	15	Flow direction: 0: standard; 1: reverse
6	Calibration overdue	16	BT module connected
8	Differential pressure sensor broken		

9.3.2 Connect the device to Modbus Master

The flow meter with Modbus/RTU interface can be easily daisy-chained to a Modbus Master device. This master can be either displays and gateways or any third-party Modbus/RTU master.

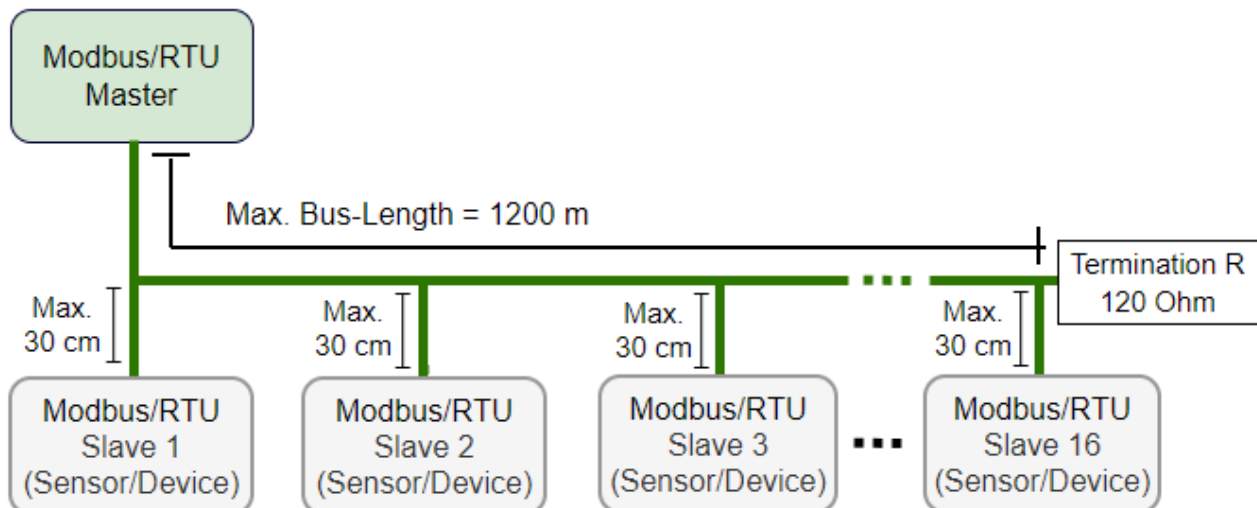
Through this method you can add up to 16 devices to the master device.

9.3.2.1 Modbus/RTU Cable Length

A Modbus/RTU bus line has limitations which shall not be exceeded, otherwise the communication might not be stable.

- The maximum total bus length must not exceed 1200 m.
- The stub length to each node must not exceed 30 cm.

See the picture below for details.

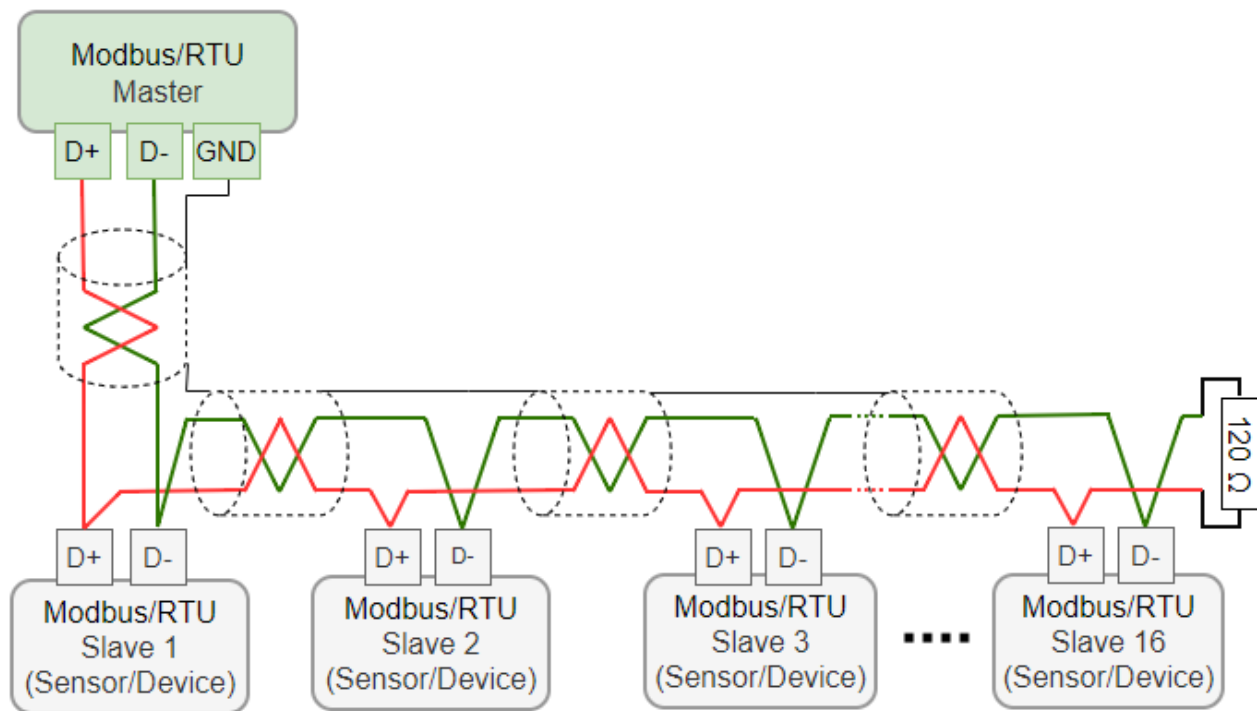


9.3.2.2 Modbus/RTU Wiring and Cable Type

To ensure a stable communication a twisted-pair bus cable must be chosen to set up the Modbus/RTU communication.

- Bus-cable specifications must follow the EIA485 Standard, and must be twisted pair and shielded, for example 2 x 2 x 0.22 mm², Li-2YCY.
- The shield must be connected at one end to the master GND connection.
- At the end of the bus, a 120 Ohm resistor should be placed a termination resistor.

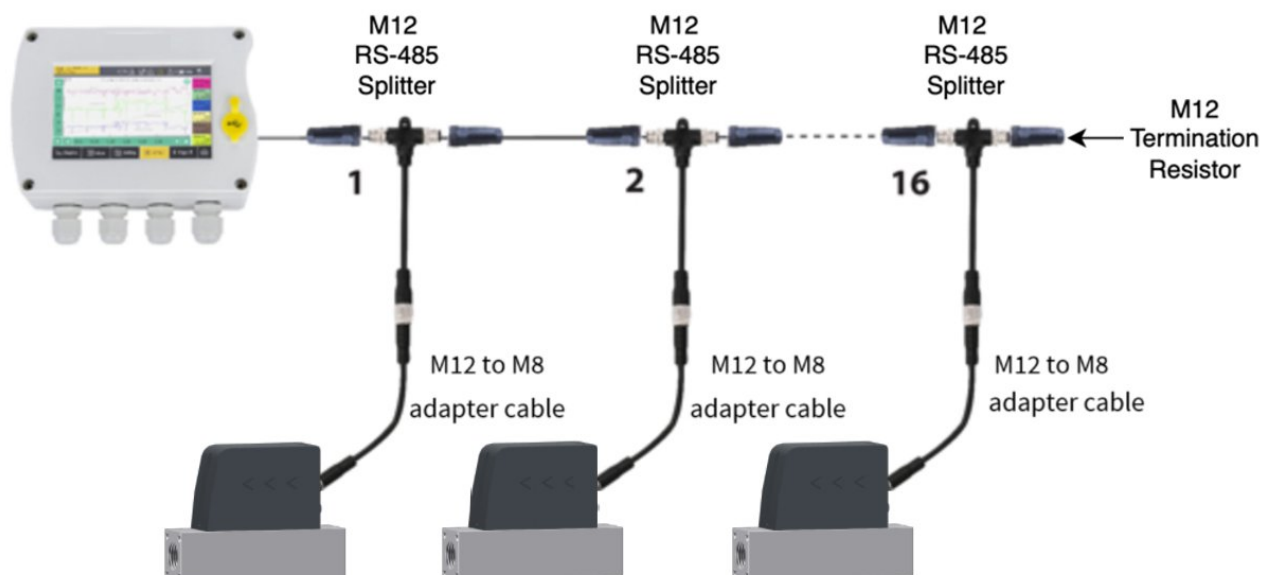
See the below picture for details.



9.3.2.3 Create Daisy-Chain using RS-485 Splitter

To connect the the flow meter to the daisy-chain, the RS-485 splitter and the M8 to M12 converter cable are needed.

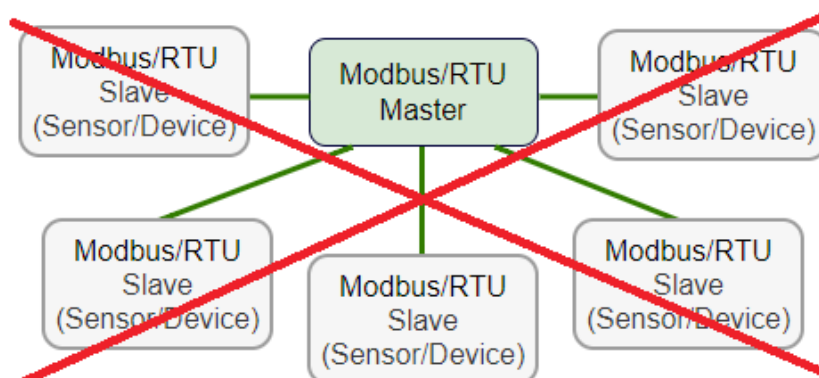
Furthermore place a M12 termination resistor at the last splitter in the daisy-chain, as show in the figure below.



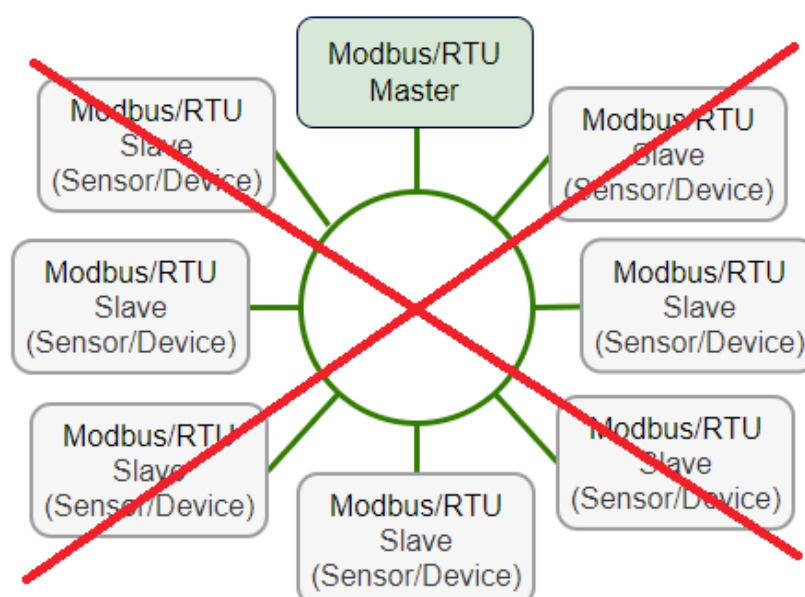
9.3.2.4 Topology of Modbus/RTU Daisy-Chain

The recommended bus topology is to connect devices as a daisy-chain, as shown in the figure in section 9.3.2.1 Modbus/RTU Cable Length. Other connection topologies are not recommended and should be avoided.

Avoid a connection of slaves to the master in ring or star topology.



Avoid a star topology



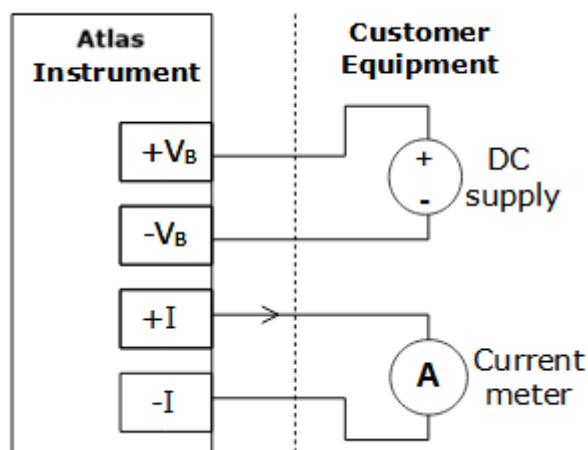
Avoid a ring topology

9.4 Connection between Outputs and Customer Equipment

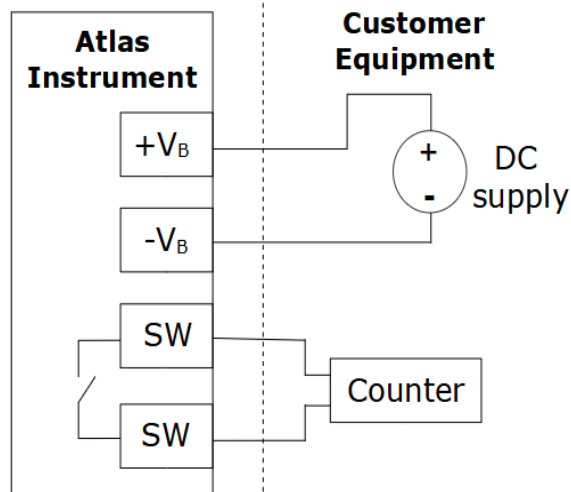
This section provides figures to show how outputs supported by the the device connect with the customer equipment.

In the following figures, the **Atlas Instrument** indicates the FLI D08 C/FLI D15 C/FLI D20 C/FLI D25 C/FLI D32 C.

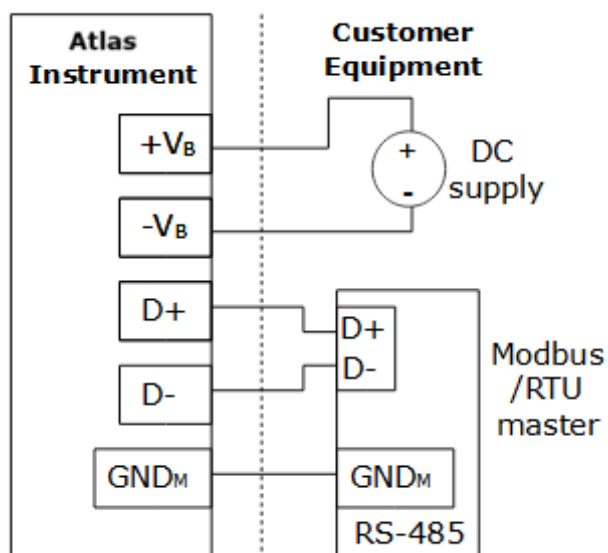
Analog output (Isolated)



Pulse output (passive)

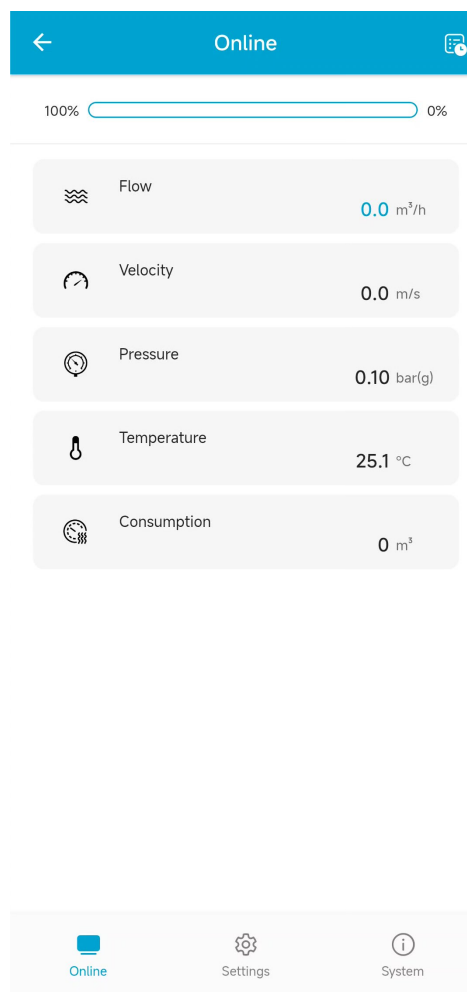


Modbus/RTU output



10 Configuration

To change any settings on the the device, download and install the mobile App SensSee from the Google Play store or Apple App Store. This App works on any mobile phone with wireless connection supported. For more information about sensor settings, see *SensSee Instruction and Operation Manual*.



To change settings, you need to use SensSee to scan the QR code attached on the side of the device head or on the calibration certificate. This ensures that only authorized users can access the device settings.



ATTENTION!

Changes on the settings may lead to wrong measurement results! Contact manufacturer in case you are not familiar with the settings.

11 Calibration

The instrument is calibrated ex work. The exact calibration date is printed on the certificate which is supplied together with the instrument. The accuracy of the instrument is regulated by the on site conditions, parameters like oil, high humidity or other impurities can affect the calibration and furthermore the accuracy.

The calibration is excluded from the instruments warranty. For this please contact the manufacturer.

12 Maintenance

To clean the instrument it is recommended to use distilled water or isopropyl alcohol only. If the contamination can not be removed the instrument must be inspected and maintained by the manufacturer.

13 Disposal of Waste



Electronic devices are recyclable material and do not belong in the household waste.

The device, the accessories and its packing must be disposed according to your local statutory requirements. The dispose can also be carried by the manufacturer of the product, for this please contact the manufacturer.



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Modifications and errors reserved

FLI D08_D15_D20_D25_D32 C_IM_EN_V2025-4
