

Instruction and Operation Manual

FL S200 P/FL S260 P

**Pitot Tube Flow Meter
for Wet Air
(Insertion)**



Dear Customer,

Thank you for choosing our product.

Before starting up the device please read this manual in full and carefully observe the instructions stated. 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 void and the manufacturer is exempt from liability.

The device is designed exclusively for the described application.

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

Revision: 2025-5



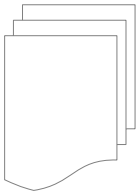
Last modifications: October, 2025

Table of contents

1 Safety Instructions.....	5
2 Registered Trademarks.....	7
3 RF Exposure Information and Statement.....	8
4 Application.....	9
5 Features.....	10
6 Technical Data.....	11
6.1 General Data.....	11
6.2 Electrical Data.....	12
6.3 Output Signals.....	12
6.4 Accuracy	12
6.5 Flow Measurement Ranges.....	13
7 Dimensional Drawing.....	15
8 Installation.....	16
8.1 Installation Requirements.....	16
8.2 Installation Considerations.....	17
8.2.1 Inlet and Outlet Sections.....	17
8.2.2 Insertion Angles.....	19
8.3 Determine the Insertion Depth.....	20
8.3.1 Center Installation.....	20
8.3.2 Off-center Installation (100 mm-Depth Installation).....	21
8.4 Install the FL S200 P/FL S260 P.....	22
8.5 Perform the Zero Flow Calibration.....	24
8.5.1 Prerequisites.....	24
8.5.2 Use SensSee.....	25
8.5.3 Use the Display.....	25
8.6 Remove the FL S200 P/FL S260 P	26
8.7 Perform Electrical Connection.....	26
8.7.1 Ethernet Connection.....	28
9 Configuration.....	30
9.1 Use SensSee	30
9.2 Use the Display.....	31
9.2.1 Start-up.....	31
9.2.2 Operations.....	33
9.2.3 Menu Map.....	34
10 Signal Outputs.....	35
10.1 Analog Output.....	35
10.2 Pulse Output.....	35
10.2.1 Pulse Connection Diagram.....	37
10.3 Modbus Output	38
10.3.1 Modbus Parameters.....	38
10.3.2 Connect Modbus/RTU Devices to a Master.....	40

10.4 Connection between Outputs and Customer Equipment.....	43
11 Calibration.....	47
12 Maintenance.....	47
13 Disposal of Waste.....	47

1 Safety Instructions

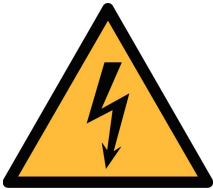


Please check if this instruction manual matches the product type.

Please observe all notes and instructions indicated in this manual. It contains essential information that must be observed before and during installation, operation, and maintenance.

Therefore this instruction manual must be read carefully by the technician and 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 work.
- Any electrical work on the 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 that the product is operated in its permitted limitations.
- Do not exceed or undercut the permitted storage and operating temperature and pressure.
- The product should be maintained and calibrated frequently, at least annually.

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.
- Always use a spanner to mount the product properly.

**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 lead to wrong results.

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

Storage and transportation

- Make sure that the transportation temperature of the flow meter is between -10 ... +60°C.
- For transportation it is recommended to use the packaging which comes with the flow meter.
- Please make sure that the storage temperature of the flow meter 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 might not cause harmful interference, and (2) this device must accept any interference received, including interference that might 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, might 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 FL S200 P/FL S260 P Pitot Tube Flow Meter is designed to measure the consumption of compressed air and a variety of industrial gases in wet or high mass flow/velocity applications. The FL S200 P/FL S260 P can even work in wet and dirty gases such as the outlet of a compressor.

The FL S200 P/FL S260 P can measure the following parameters for compressed air or gases:

Parameter	Default unit
Velocity	m/s
Volumetric flow	Sm ³ /h
Pressure	bar
Total consumption	Sm ³
Temperature	°C

Remark: You can change units using the SensSee App or the display.

The FL S200 P/FL S260 P is mainly used in compressed air systems in the industrial environment. The FL S200 P/FL S260 P is not designed for explosive areas. For the use in explosive areas, please consult the manufacturer.

5 Features

- Flow and consumption measurement in wet or high mass flow or velocity applications.
- Measurement at the compressor outlet.
- The minimum cut-off velocity reaches 5 m/s, ensuring measurement accuracy even in the low range.
- Insertion-type flow meter, facilitating installation under pressure through a ball valve.
- High-temperature applications up to 120°C.
- No mechanical wear parts.
- All parts in contact with the medium are made of stainless steel.
- Two kinds of the signal outputs: analog and pulse, Modbus/RTU, and Modbus/TCP.
- The SensSee App for monitoring and configuring flow sensors on mobile devices.
- The display for monitoring and configuring values directly on the FL S200 P/FL S260 P.

6 Technical Data

6.1 General Data

	
Parameters	Selectable flow: Volumetric Flow, Actual Flow, Dry Air Flow, Free Air Delivery (FAD), Mass Flow Consumption * Velocity (working condition) Medium temperature Medium pressure
Selectable units	Volumetric Flow: Sm ³ /h, Sm ³ /min, Sl/min, Sl/s, Scfm Mass flow: kg/h, kg/min, kg/s, t/h, lb/h Consumption: Sm ³ , Sft ³ , t, lb, Sl, kg Velocity: m/s, ft/min Temperature: °C, °F Pressure: bar, psi, kPa, MPa
Reference conditions	Selectable by users. Default ex-factory settings: compressed air: ISO1217 20°C, 1000 hPa other gas: DIN1343 0°C, 1013.25 hPa
Principle of measurement	Differential pressure with Pitot tube
Sensor	Differential pressure sensor
Measuring medium	Air, gas (non corrosive gas)
Medium temperature	-20 ... +120°C
Operating temperature	0 ... +50°C
Turndown ratio	1:40 (min/max flow ratio)
Operating pressure	0 ... 1.6 MPa(g)
Housing material	PC + ABS
Material of the probe tube, flow meter head and the screwing	Stainless steel 1.4404
Protection class	IP65

Dimensions	See dimensional drawing on page 15.
Display	2.4" colour graphics display with keypad
Tube diameter	Supports any pipe size larger than 1.25" in diameter. For larger diameters where the center cannot be reached, the 100 mm installation mode can be used.
Screwing thread	G 3/4" (ISO 228/1)
Weight	1.12 kg

* 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	16 ... 30 VDC; 90 mA, 2.2 W
--------------	-----------------------------

6.3 Output Signals

Analogue output	Signal: 4 ... 20 mA Scaling: 0 to maximum volume flow / velocity Accuracy: 0.06 mA
Pulse output	1 pulse per consumption unit Isolated switch: max. 30 VDC / 200 mA Pulse length: 30 ... 120 ms depending on the flow rate
Modbus output (default setting)	See section 10.3 on page 38.

6.4 Accuracy

Accuracy*	Flow: $\pm 1.5\%$ of RDG $\pm 0.3\%$ full scale Pressure: 0.5% full scale Temperature: 0.5°C
Stated accuracy at	Ambient/process temperature 23°C $\pm$ 3°C Ambient/process humidity <90% Process pressure at 0.6 MPa(g)

* The specified accuracy is valid only within the minimum and maximum flows that are indicated the section 6.5.

6.5 Flow Measurement Ranges

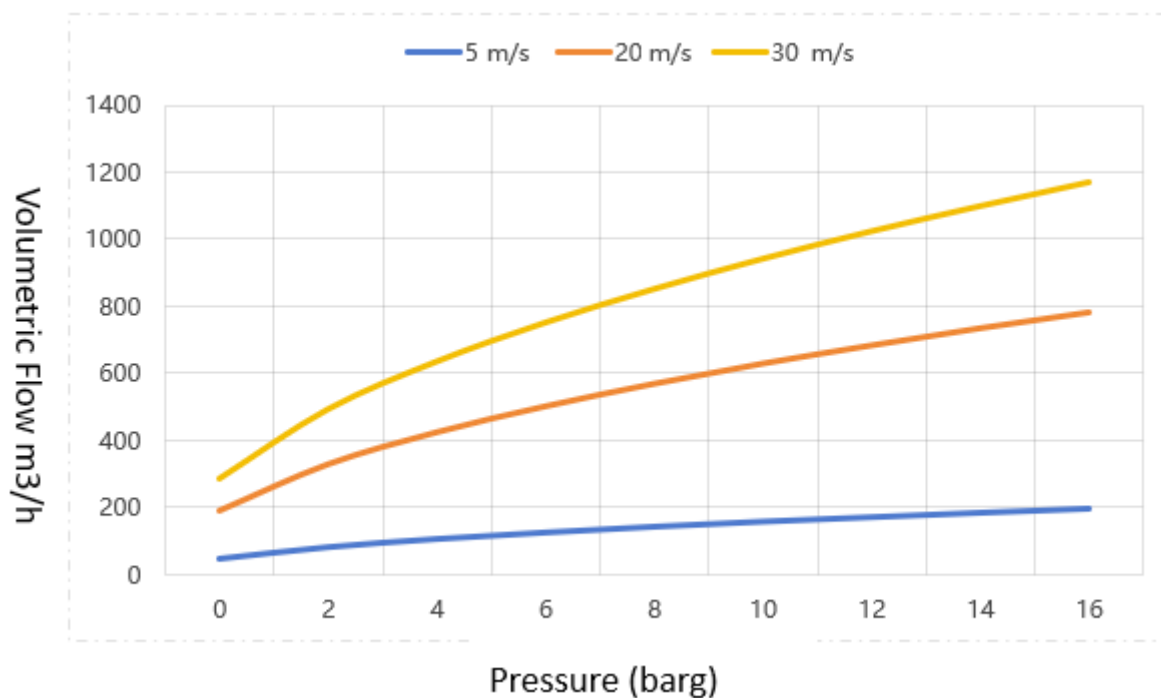
Stated measuring ranges are stated under following conditions:

- Standard flow in air
- Reference pressure: 1000 hPa
- Reference temperature: +20°C
- Cut-off velocity: 5 m/s

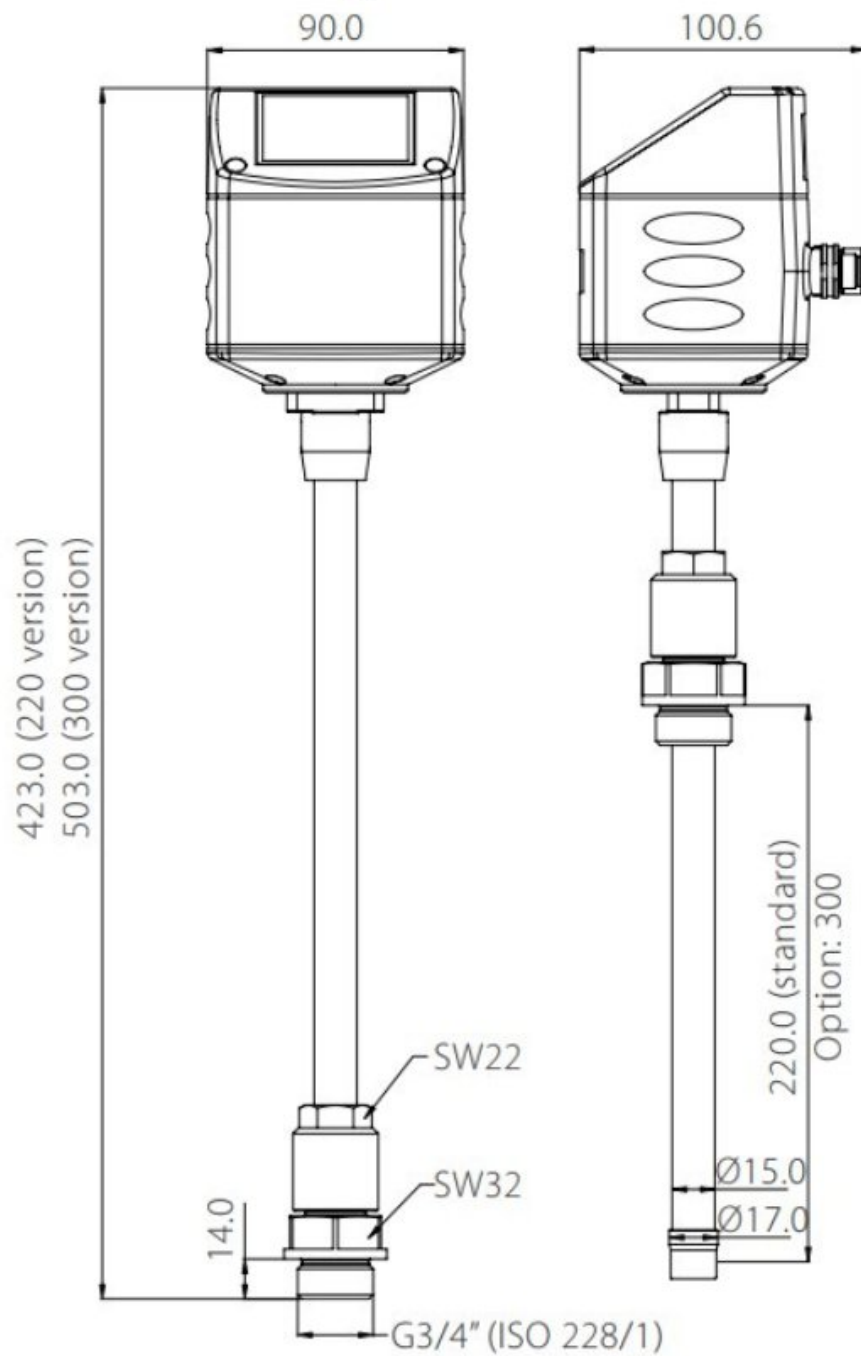
Tube			Volumetric Flow			
			Standard		High-speed	
Inch	DN	Inner diameter (mm)	Min	Max	Min	Max
			Sm ³ /h		Sm ³ /h	
1¼"	DN32	36	12.4	507	12.4	660
1½"	DN40	41.9	19	756	19	983
2"	DN50	53.1	32	1,298	32	1,687
2½"	DN65	68.9	57	2,311	57	3,004
3"	DN80	80.9	80	3,270	80	4250
4"	DN100	100	125	5,094	125	6622
5"	DN125	125	196	8,006	196	10,407
6"	DN150	150	283	11,547	283	15,011
8"	DN200	200	508	20,689	508	26,896
10"	DN250	250	793	32,338	793	42,040
12"	DN300	300	114,2	46,567	1,142	60,538

The flow range for Air at 6 bar(g), 50°C, and 90% humidity.

The minimum flow rate depends on the medium pressure and the cut-off setting. The chart below shows the relationship at 5 m/s cut-off, 20 m/s cut-off and 30 m/s cut-off. The default cut-off is 5 m/s.



7 Dimensional Drawing



8 Installation

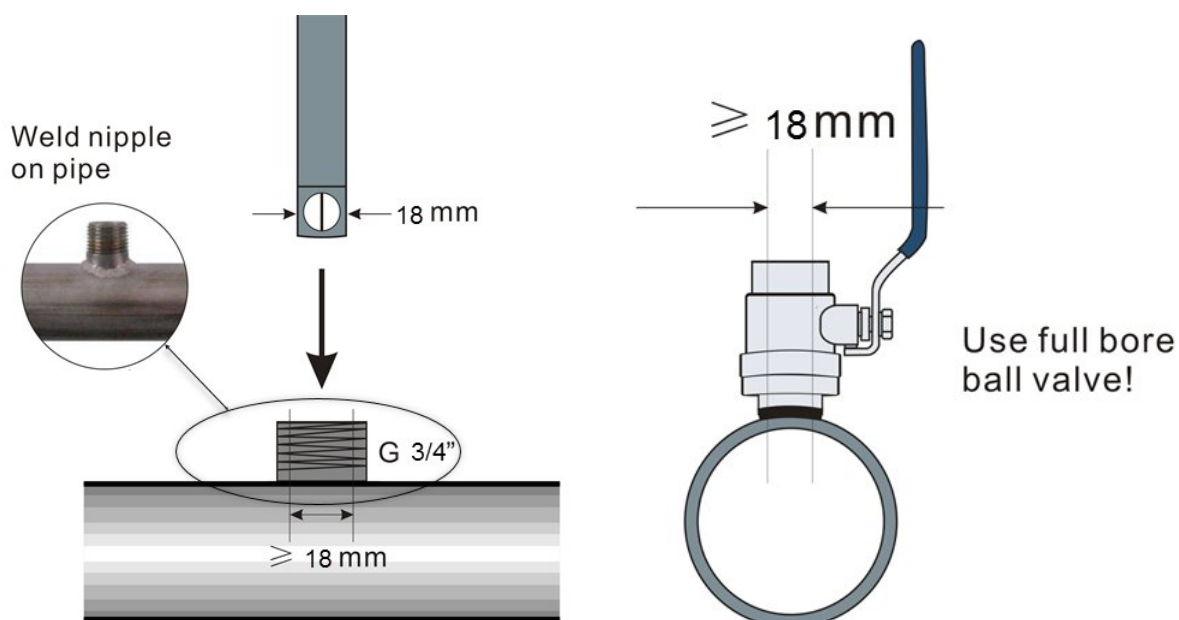
Before you install the FL S200 P/FL S260 P, make sure that all components listed below are included in your package.

Qty	Description
1	FL S200 P/FL S260 P Pitot Tube Flow Meter
1	Sealing ring
1	Alignment key
2	Depending on orders: M12 plug or M12 cable
1	Instruction manual
1	Calibration certificate

8.1 Installation Requirements

To install the FL S200 P/FL S260 P, a ball valve and a nozzle are needed with the following the requirements:

- The inner thread must be G 3/4".
- The diameter of the nozzle must be ≥ 18 mm. Otherwise the shaft can not be inserted in.



8.2 Installation Considerations

To achieve and maintain the accuracy stated in the technical data, the FL S200 P/FL S260 P must be inserted in a straight pipe section with unhindered flow characteristics.

8.2.1 Inlet and Outlet Sections

Unhindered flow characteristics are achieved if the section in front of the FL S200 P/FL S260 P (inlet) and behind the FL S200 P/FL S260 P (outlet) are sufficiently long, absolutely straight, and free of obstructions such as edges, seams, curves, and so on.

Make sure that enough space exists at your site for an adequate installation as described in this manual.



ATTENTION!

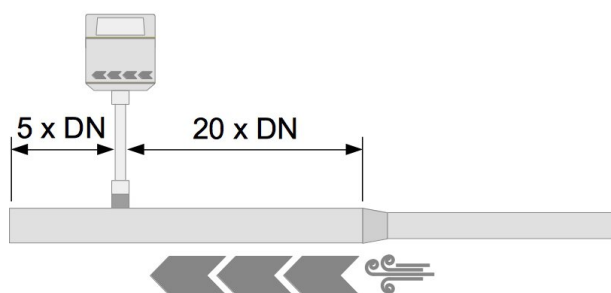
The wrong measurement might occur if the FL S200 P/FL S260 P is not installed correctly.

- Pay careful attention to the design of the inlet and outlet sections. Obstructions can cause counter-flow turbulence as well as turbulence in the direction of the flow.
- The FL S200 P/FL S260 P is for indoor use only! At an outdoor installation, the FL S200 P/FL S260 P must be protected from solar radiation and rain.

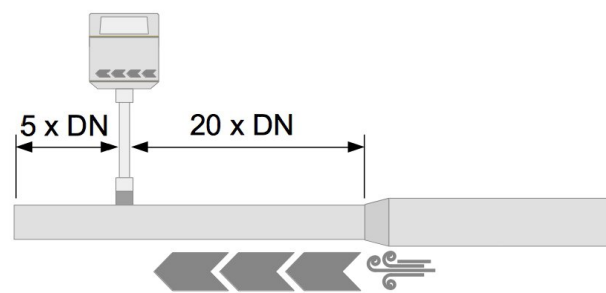
Notes:

- If there is any combination of the below situations, the longest straight inlet section must be maintained.
- The length of inlet and outlet sections depicted below are minimum requirement; longer inlet sections are preferable. That is, if it is possible to achieve a longer straight inlet section than the minimum specified during installation, this is preferable.

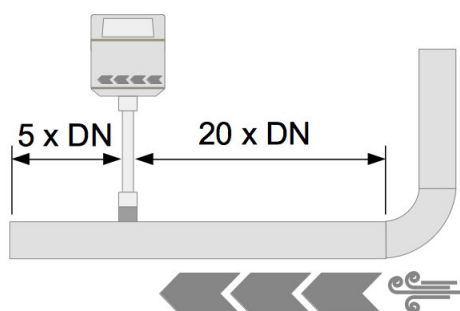
Expansion



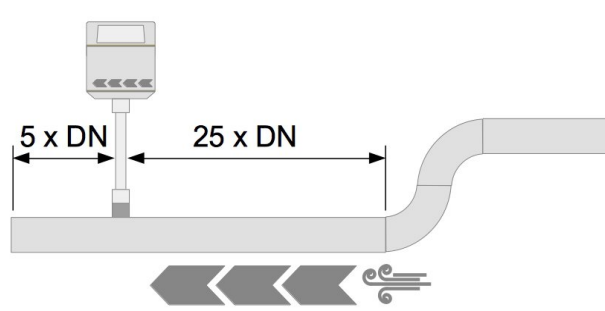
Reduction



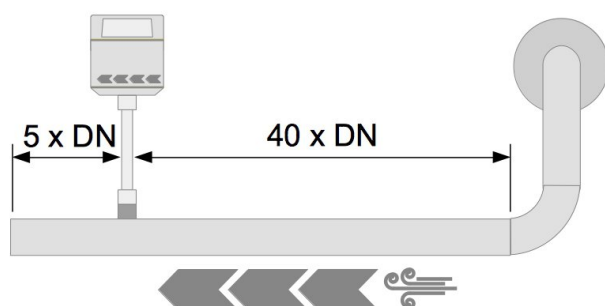
90° Bend



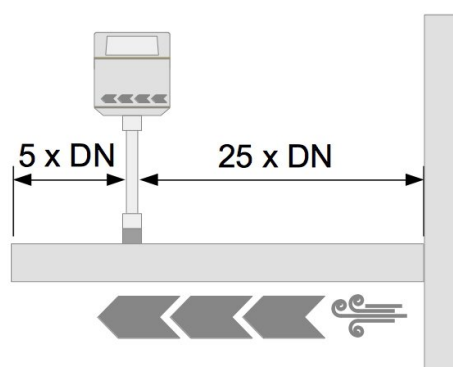
2×90° Bend



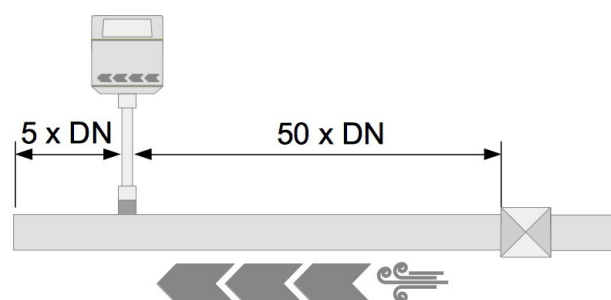
Three dimensional Bend



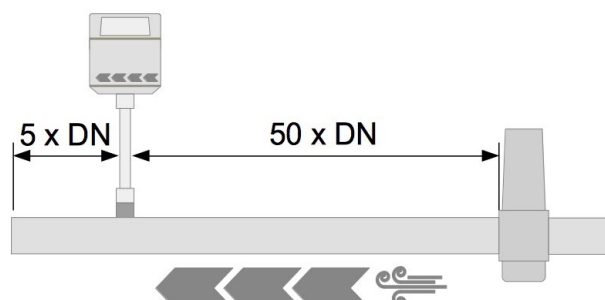
T-piece



Shut-off valve

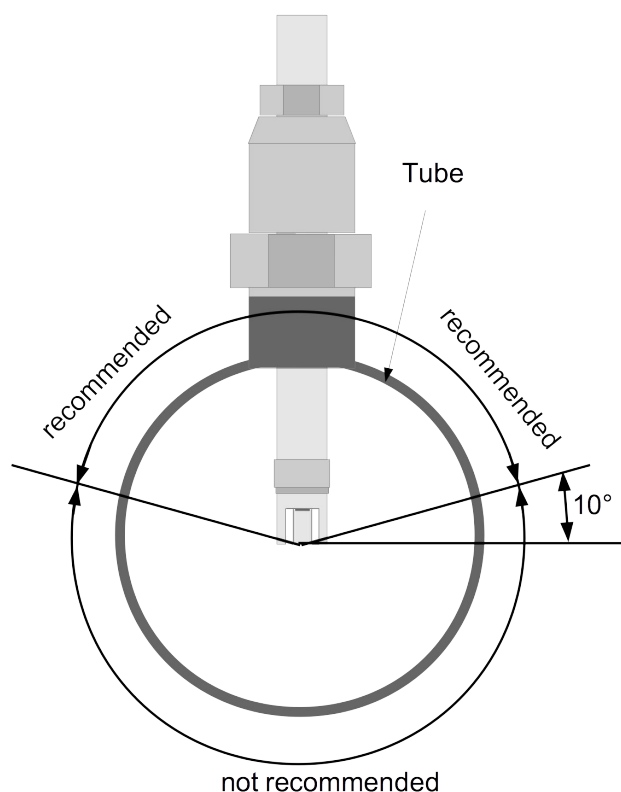


Filter or similar (unknown objects)



8.2.2 Insertion Angles

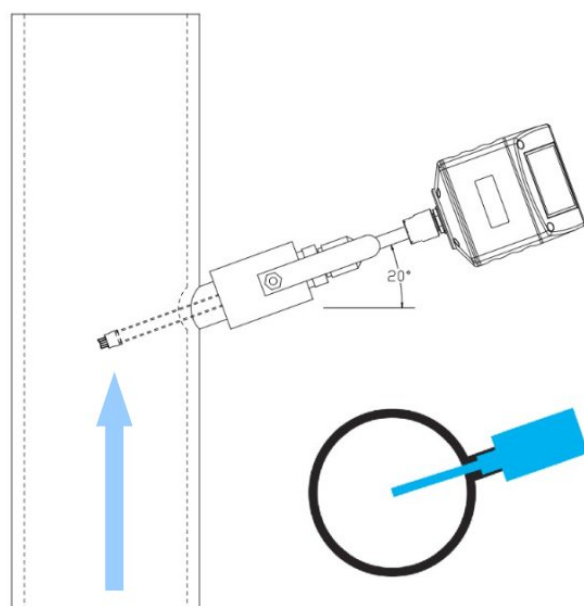
Insertion into a horizontal pipe



As shown in the left figure, the angle to the horizontal level must be $>10^\circ$. A horizontal installation is NOT permitted.

Please install the FL S200 P/FL S260 P only in the recommended area.

Insertion into a vertical pipe



As shown in the left figure, the FL S200 P/FL S260 P can be installed in a vertical pipe when the following two conditions are met:

- The flow direction is from bottom to top.
- The FL S200 P/FL S260 P is installed with a horizontal angle of at least 10-degree. (Recommended angle: 20-degree).

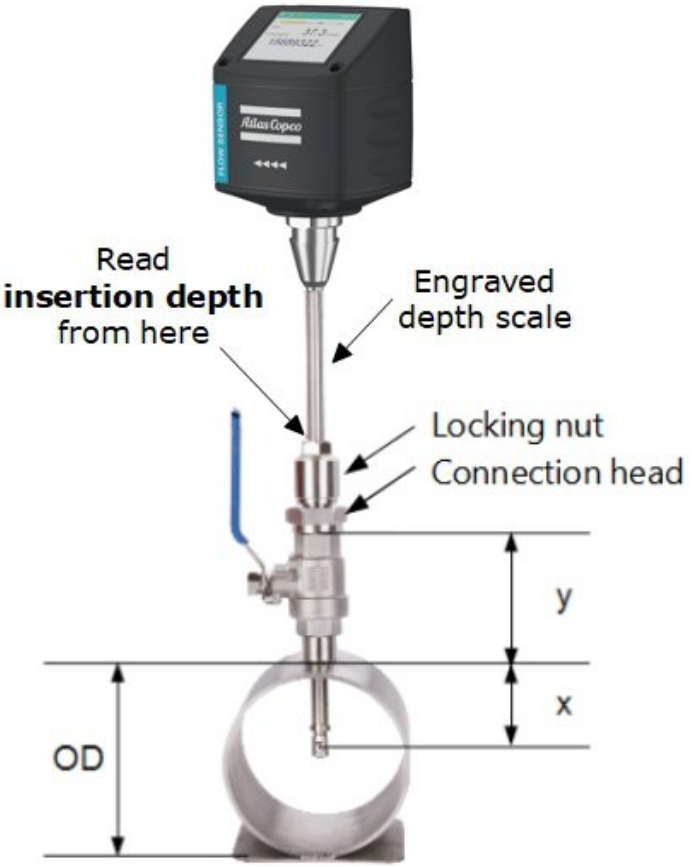
ATTENTION: Do not install the FL S200 P/FL S260 P in vertical pipes where the flow is from top to bottom.

8.3 Determine the Insertion Depth

Generally, you must insert the sensor tip in the center of the pipe with the help of the FL S200 P/FL S260 P shaft that has a scale engraved. To determine the right position, calculate the insertion depth as described below.

8.3.1 Center Installation

Center installation is the default and recommended installation type.

1. Calculate the insertion depth as below:	2. Read the insertion depth on the shaft as below:
Insertion depth = $x + y$ $x = \frac{OD}{2}$; OD is Outer Diameter of the pipe y = length of the ball valve Calculation example: A 2"-diameter, pipe and an 87 mm-height ball valve: $OD = 60.3 \text{ mm}$ $\frac{OD}{2} = \frac{60.3 \text{ mm}}{2} = 30.15 \text{ mm}$ Height of Valve = 87 mm ; Insertion depth = $30.15 \text{ mm} + 87 \text{ mm} = 117.15 \text{ mm}$	 Read insertion depth from here Engraved depth scale Locking nut Connection head y x OD

* The length of the locking nut and connection head has been deducted from the scale on the shaft.

8.3.2 Off-center Installation (100 mm-Depth Installation)

For a bigger pipe diameter (> DN150), the 100 mm-depth installation is applicable. In the 100 mm-depth installation, the FL S200 P/FL S260 P is inserted to the exact 100 mm-depth of pipes.

Note: To enable the 100 mm installation method, remember to change the installation method setting accordingly, using the SensSee App or the device display.

1. Calculate the insertion depth as below:

Insertion depth = $x + y + 100$
 x is the wall thickness of pipe
 y = Height of the ball valve

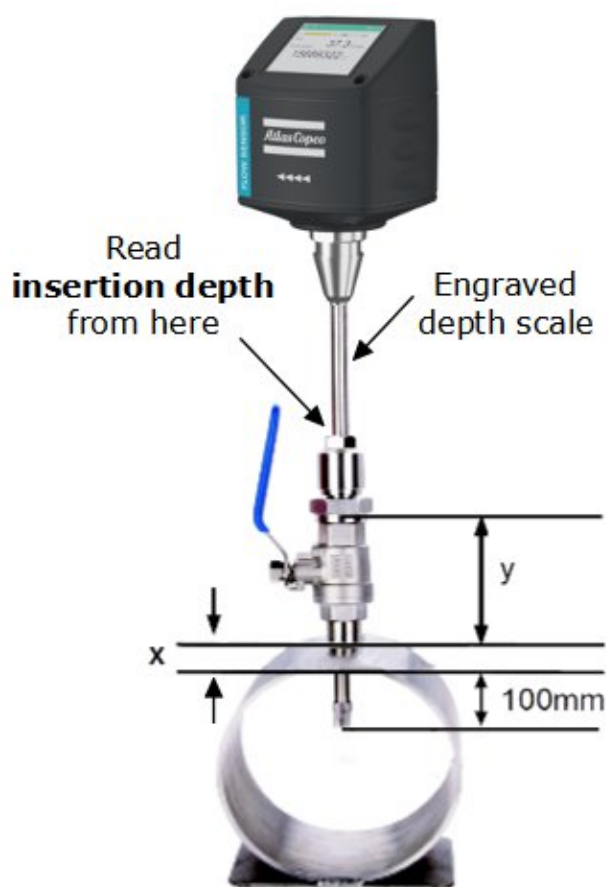
Calculation example:

A 12"-diameter pipe with the wall thickness of 9 mm and a 87 mm-height ball valve.

$x = 9 \text{ mm}$; $y = 87 \text{ mm}$

Insertion depth
 = $9 \text{ mm} + 87 \text{ mm} + 100 \text{ mm} = 196 \text{ mm}$

2. Read the insertion depth on the shaft as below:

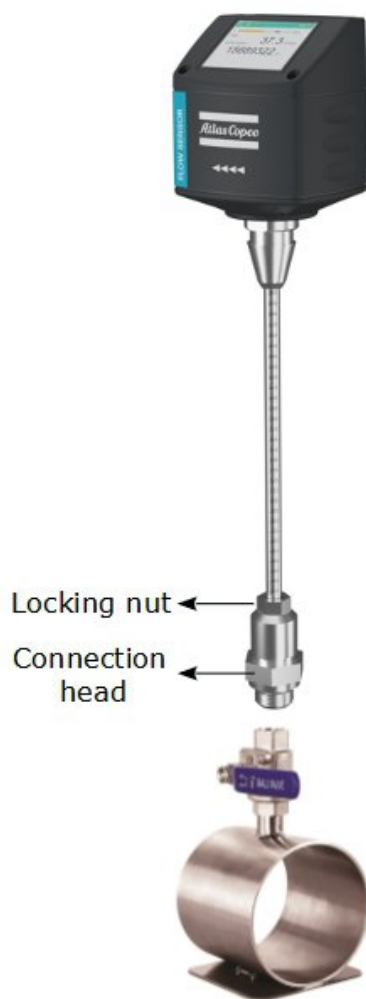


* The length of the locking nut and connection head has been deducted from the scale on the shaft.

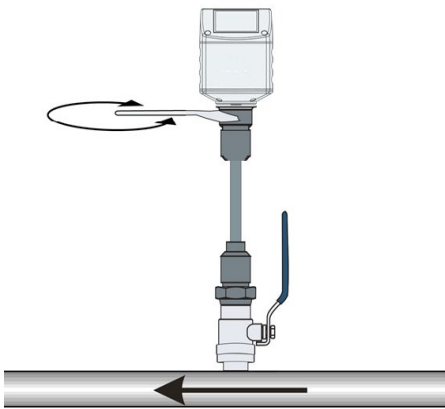
8.4 Install the FL S200 P/FL S260 P

This section describes how to install FL S200 P/FL S260 P.

First please observe the flow direction sign indicated on the FL S200 P/FL S260 P head or on the shaft. It must match the flow direction of the compressed air or gas.



1. Close the ball valve.
2. Move the connection head to keep the FL S200 P/FL S260 P tip completely covered by the connection thread (see photo on the left).
3. Embed the O-shaped sealing ring to the groove in the connection head.
4. Screw the connection head tightly to the ball valve using a spanner. And then move the FL S200 P/FL S260 P to keep the flow direction sign (on the FL S200 P/FL S260 P head) and the flow direction pointing to the same direction.
5. Open the ball valve and tighten the clamp sleeve manually.
6. Perform **zero flow calibration**. For detailed steps, see instructions described on page [24](#).
7. Move the FL S200 P/FL S260 P slightly to the determined insertion depth by means of the scale on the FL S200 P/FL S260 P shaft.
8. Tighten the clamp sleeve to the extent that the FL S200 P/FL S260 P cannot be moved by the pressure in the pipe but can be moved by hand.



9. Use the alignment key to keep the FL S200 P/FL S260 P align to the pipe and point to the flow direction. See the figure on the left.

Remark: The angle deviation must be less than $\pm 2^\circ$ to the perfect position, as shown in Figure 1.

10. Tighten the clamp sleeve using a spanner with clamping torque of 20...30 Nm.

11. Double check the installation depth because the shaft might be moved from its original position by the compressed gas.

Maximum angle deviation of a proper installation:

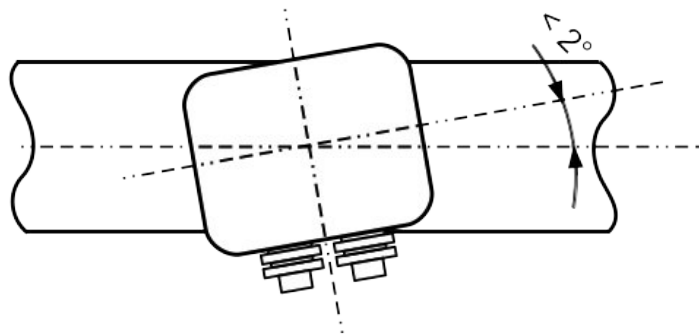


Figure 1: Top view

8.5 Perform the Zero Flow Calibration

The zero flow calibration is a compulsory operation for the FL S200 P/FL S260 P installation. Use one of the following ways to perform the calibration: the SensSee App or the display.

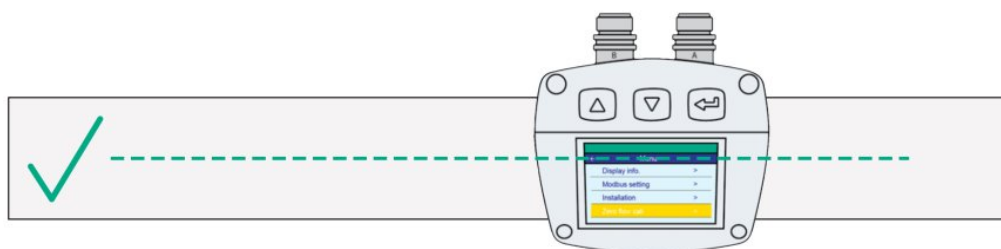
8.5.1 Prerequisites

Before starting the zero flow calibration, these conditions must be met:

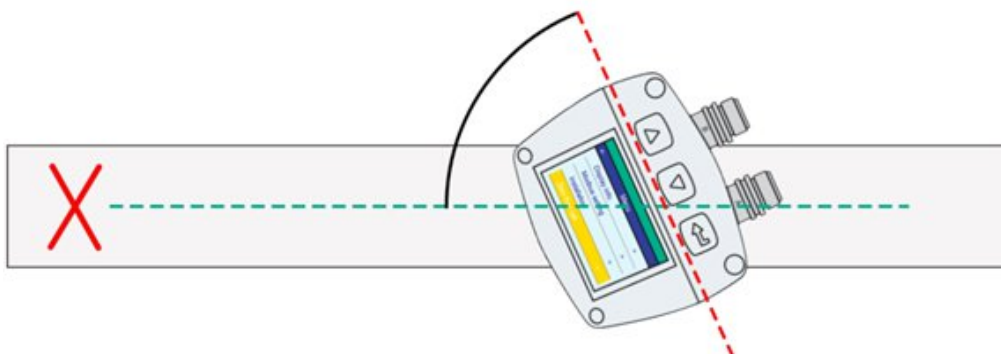
- The G 3/4" ball valve must be turned off.
- The flowmeter must be mounted on top of the G 3/4" ball valve.
- Turn on the ball valve, and keep the sensor tip on top of the ball valve, that is, the sensor tip is still in the initial installation position.

Note: Do not insert sensor tip into the ball valve and pipe, to ensure that the flowmeter is exposed to the system pressure and the flow rate is 0 during the zero flow calibration.

- During the zero flow calibration, the FL S200 P/FL S260 P must be positioned as it will be installed and in use, as shown below.



The FL S200 P/FL S260 P being rotated or incorrectly aligned during zero flow calibration will result in an incorrect measurement and zero flow reading. The figure below shows an incorrect procedure that must be avoided.



8.5.2 Use SensSee

1. On your mobile device, download **SensSee** from the App Store.
2. Install **SensSee**.
3. Launch **SensSee**, and enter **Settings** > **Calibration**.
4. Follow the onscreen instructions to perform the zero flow calibration.

8.5.3 Use the Display

See steps 4 and 5 described in Figure 3.



Figure 2: Steps to expose the FL S200 P/FL S260 P to the system pressure

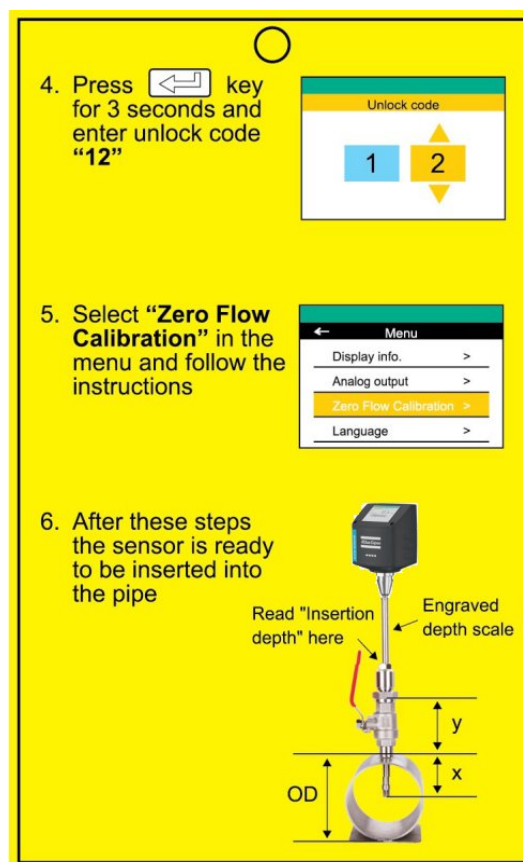
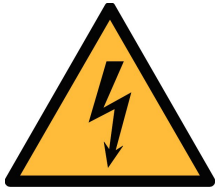


Figure 3: Steps to perform the zero flow calibration

8.6 Remove the FL S200 P/FL S260 P



WARNING!

Removing the device under pressure can be dangerous! Be aware that the FL S200 P/FL S260 P can be shot out of the ball valve if you do not carefully follow the steps described below!

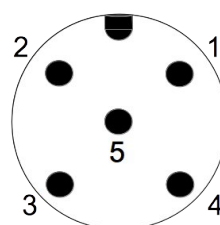
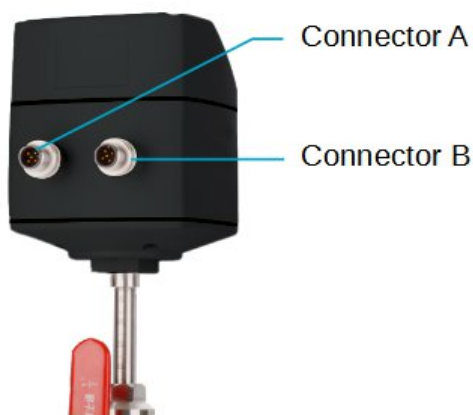
For your information: The FL S200 P/FL S260 P is exposed to a force of 18 kg at the 8-bar(g) system pressure; a force of 32 kg at 16-bar(g) system pressure!! Hold the FL S200 P/FL S260 P very tight when releasing the clamp sleeve.

1. Hold the flow FL S200 P/FL S260 P firmly.
2. Release the clamp sleeve from the connection head very slowly while keeping your hand on the top of the FL S200 P/FL S260 P head.
3. Pull out the shaft slowly until the FL S200 P/FL S260 P is fully returned into the valve.
4. Close the ball valve.
5. Unscrew the connection head and pull the FL S200 P/FL S260 P out of the ball valve.

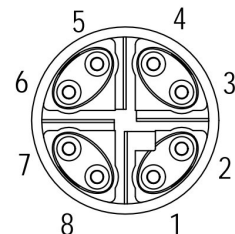
8.7 Perform Electrical Connection

The FL S200 P/FL S260 P comes with external connectors "A" and "B" through which the FL S200 P/FL S260 P is connected with external control devices such as PLC.

The "A" and "B" are M12 5-pin connectors.



M12, 6 pins



M12, 8 pins

Output option	Connector type
Modbus/RTU	A = M12 (5-pin); B = M12 (5-pin)
Pulse and analog	A = M12 (5-pin); B = M12 (5-pin)
Modbus/TCP	A = M12 (5-pin); B = M12 (8-pin X-coded)

Pin assignment

Output Type	Connector	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5
Modbus/RTU	A	SDI	-V _B	+V _B	N/A	N/A
	B	GND _M	-V _B	+V _B	D+	D-
Pulse and analog	A	SDI	-V _B	+V _B	N/A	N/A
	B	N/A	SW	SW	+I _{isolated}	-I _{isolated}
Modbus/TCP	A	SDI	-V _B	+V _B	DIR	DIR
	B	See section 8.7.1				
Wire color	/	Brown	White	Blue	Black	Gray

Legend for pin assignment

GND _M	Ground for Modbus/RTU
SDI	Digital signal (internal use)
-V _B	Negative supply voltage
+V _B	Positive supply voltage
+I _{isolated}	Positive 4 ... 20 mA signal (isolated)
-I _{isolated}	Negative 4 ... 20 mA signal (isolated)
SW	Isolated pulse output (switch)
D+	Modbus/RTU data +
D-	Modbus/RTU data -
NA	Not applicable



ATTENTION!

Do not screw the M12 connector using force. Otherwise it might damage the connection pins.

8.7.1 Ethernet Connection

The flow meter can be powered in the following ways:

- Using connector A
- Using the PoE (Power over Ethernet) function, which is integrated into the Ethernet connection on connector B.

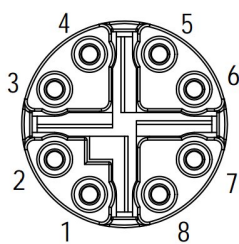
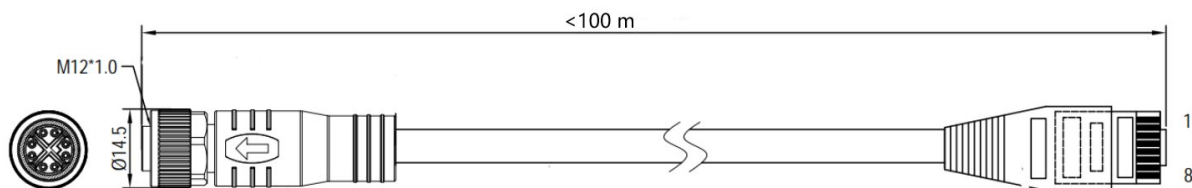
To power the unit via PoE, a network switch that supports PoE is needed. PoE comes into two standards:

- Type A: The PoE switch powers the device via Pair 2 (Pin 1 and Pin 2) and Pair 3 (Pin 3 and Pin 6)
- Type B: The PoE switch powers the device via Pair 1 (Pin 4 and Pin 5) and Pair 4 (Pin 7 and Pin 8)

This flow meter supports both types.

Connection cable – M12 X-coded to RJ45

When Modbus/TCP is chosen as the flow meter output, a 5 m 8-pore cable is supplied in the delivery package. The cable has the M12 and RJ45 plugs on the ends. RJ45 is used to connect the flow meter to a PoE switch.



Front view of the M12 connector, female

8 Installation

The 8-position pin/pair assignment on the RJ45 side must comply with the T568B wiring method. The flow meter does not support T568A wiring method.

M12 X-coded	RJ45	Signal	Color code	Pair designation
1	1	Tx+ / +V _B / -V _B	White-Orange (W-O)	Pair 2
2	2	Tx- / +V _B / -V _B	Orange (O)	
3	3	Rx+ / -V _B / +V _B	White-Green (W-G)	Pair 3
4	6	Rx- / -V _B / +V _B	Green (G)	
5	7	NA / -V _B	White-Brown (W-BR)	Pair 4
6	8	NA / -V _B	Brown (BR)	
7	5	NA/ +V _B	White-Blue (W-BL)	Pair 1
8	4	NA/ +V _B	Blue (BL)	

9 Configuration

After the installation is completed, change the device settings if needed using one of the following ways:

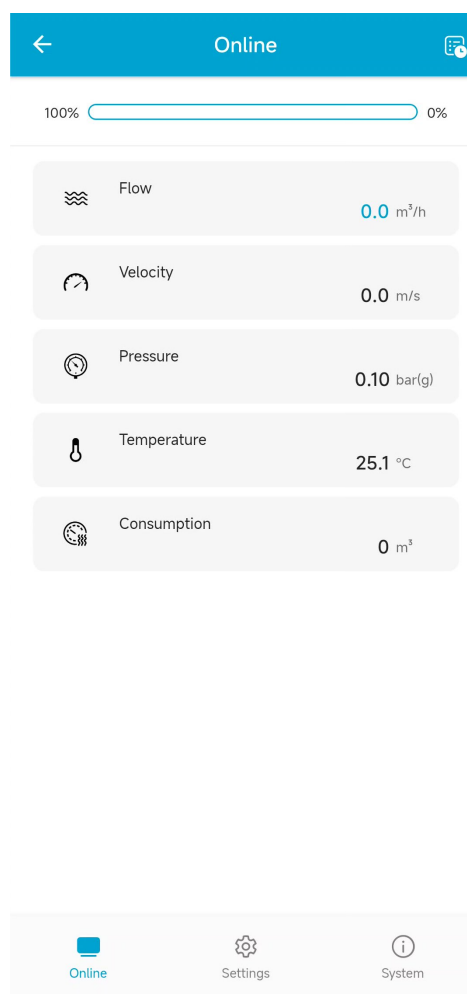
- The SensSee App, most convenient
- The device display

9.1 Use SensSee

The SensSee App is a mobile phone App that enables you to view online measurements and change settings for the FL S200 P/FL S260 P wirelessly.

Download the App from the Google Play Store or Apple App Store, and install it as you do for any apps on your mobile phone.

For more information about sensor settings, see *SensSee Instruction and Operation Manual*.



ATTENTION!

Improper changes on the settings might lead to wrong measurement results! Contact the manufacturer if you are not familiar with the settings.

9.2 Use the Display

The FL S200 P/FL S260 P comes with the display. You can use this display to view measurement values and configure the FL S200 P/FL S260 P.



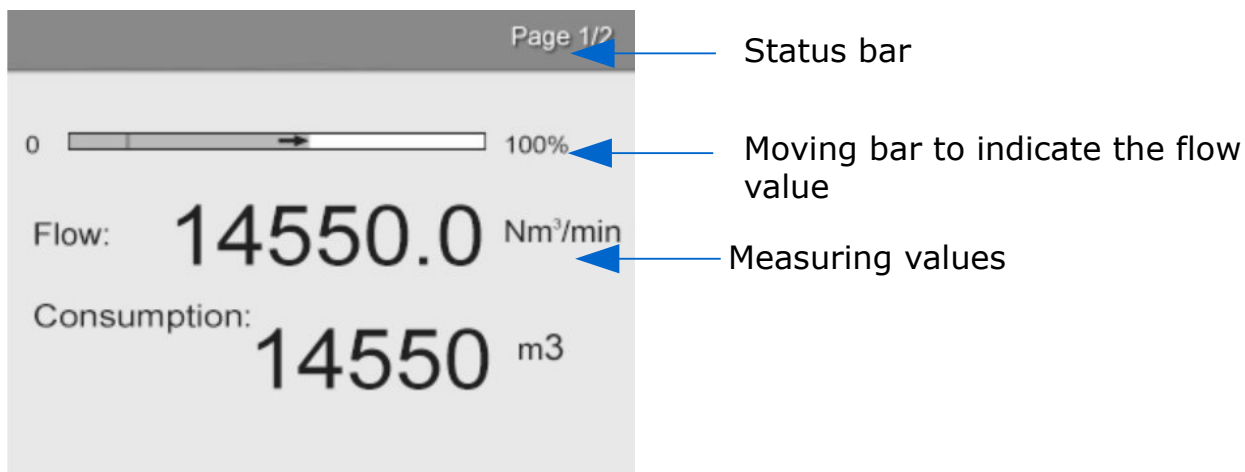
	Enter key	Press for >3 seconds to enter the configuration mode. Press to confirm your selection.
	Up key	Press to choose a parameter item, entry box, or to adjust the value.
	Down key	

9.2.1 Start-up

After the FL S200 P/FL S260 P is powered on, the display automatically starts an initialization procedure.

In the next eight seconds the display shows the current software version and set up the connection with the FL S200 P/FL S260 P. After that, the display enters the standard mode, showing the online measurement values including flow, velocity, and pressure.

Home screen and icons



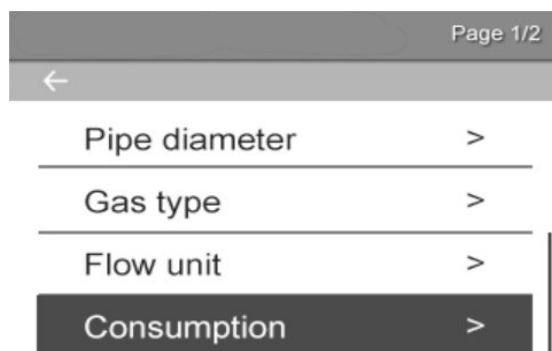
Icons shown in the status bar indicates the status or warnings for the FL S200 P/FL S260 P in service. The following table provides descriptions for these icons.

Icon	Description
	Temperature over the operating range
	Flow over measuring range
	Pressure over the operating range

Icon	Description
	Pressure sensor damaged
	Temperature sensor damaged
	Flow direction

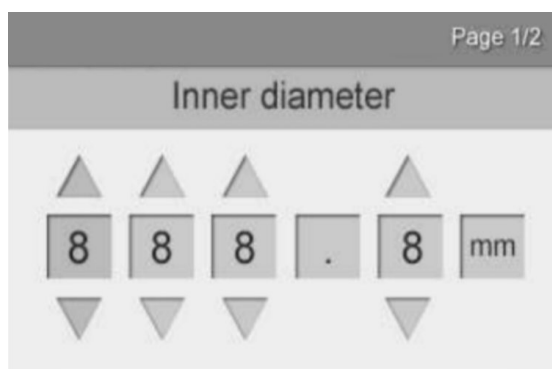
9.2.2 Operations

On the display, you can do the following settings: set the pipe diameter, select gas type, select flow unit, reset consumption value (that is, consumption counter), and more.



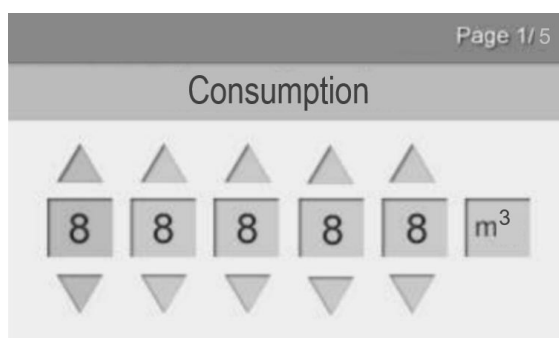
1. Press the **Enter** key (>3s).

2. Enter the unlock code (12) by using the **Up** and **Down** keys, and then press **Enter** key.



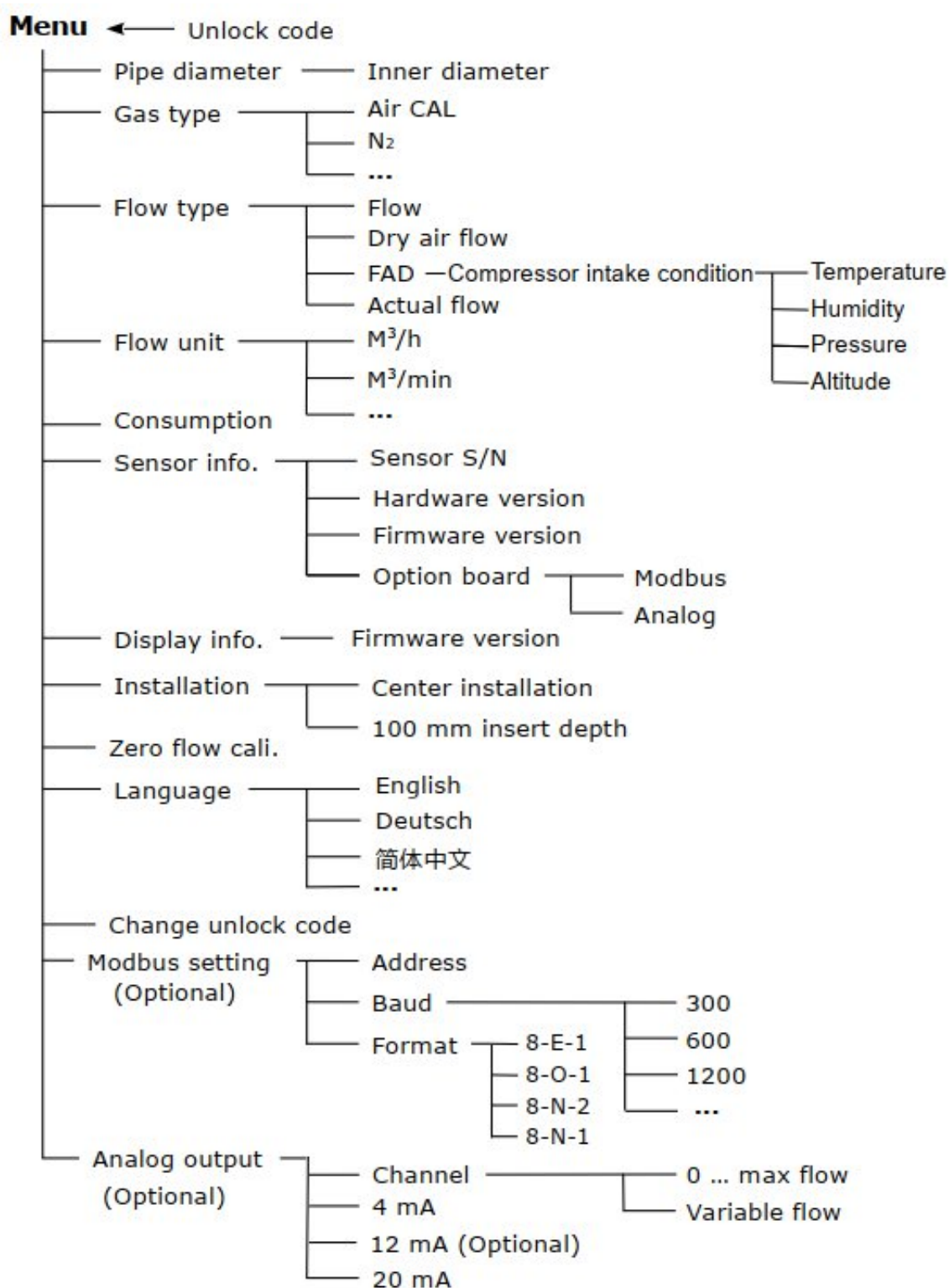
3. Use the **Up** and **Down** keys to choose the parameter that you want to change.

4. Use the **Up** and **Down** keys to select desired entry box or adjust the values.



5. Press the **Enter** key to confirm the changes.

9.2.3 Menu Map



10 Signal Outputs

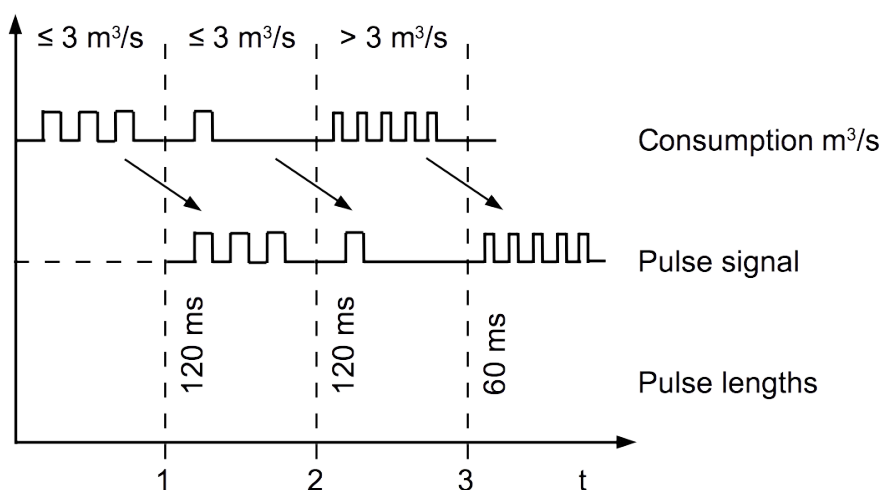
10.1 Analog Output

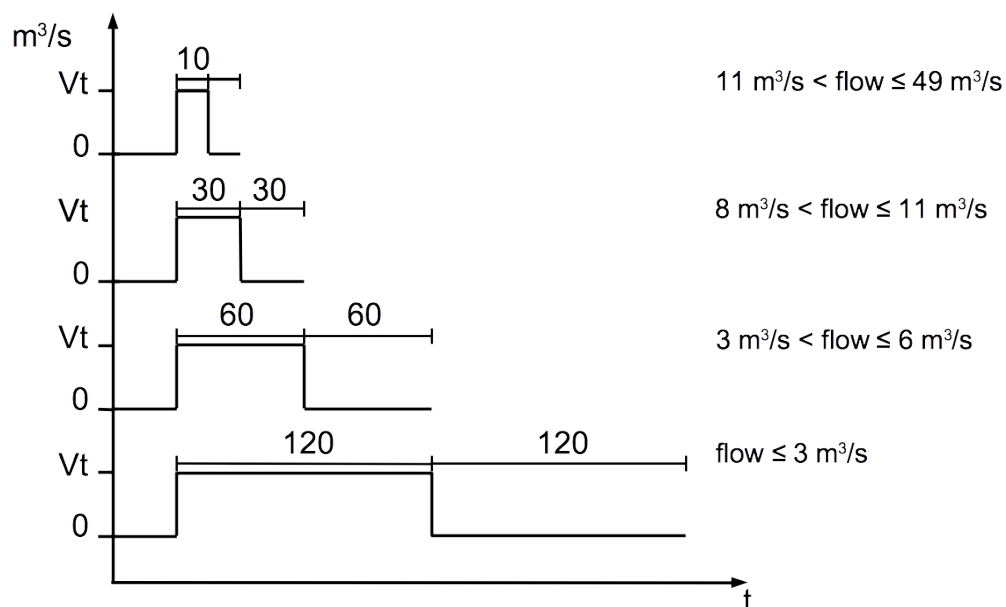
The FL S200 P/FL S260 P can provide an analogue output with the range of 4...20 mA. This output can be scaled to match a desired measuring range. Standard is the range from 0 to max.

The corresponding flow ranges to different pipe sizes can be found in section 6.5. For other ranges, please contact the manufacturer.

10.2 Pulse Output

The FL S200 P/FL S260 P sends out one pulse per a consumption unit by default. This pulse output can be connected to an external pulse counter to count the total consumption. The number of m^3 per second are accumulated and indicated after one second. The pulse length depends on consumption rate.





If the flow rate is higher than 50 m³/s, l/s of ft³/s, the FL S200 P/FL S260 P cannot output the pulses with default settings (one pulse per consumption unit).

In this case, you can set the pulse to 1 pulse per 10 consumption units or 1 pulse per 100 consumption units using by the SensSee App or the display.

Example, with the setting of 1 pulse per 10 m³, the FL S200 P/FL S260 P sends one pulse each 10 m³.

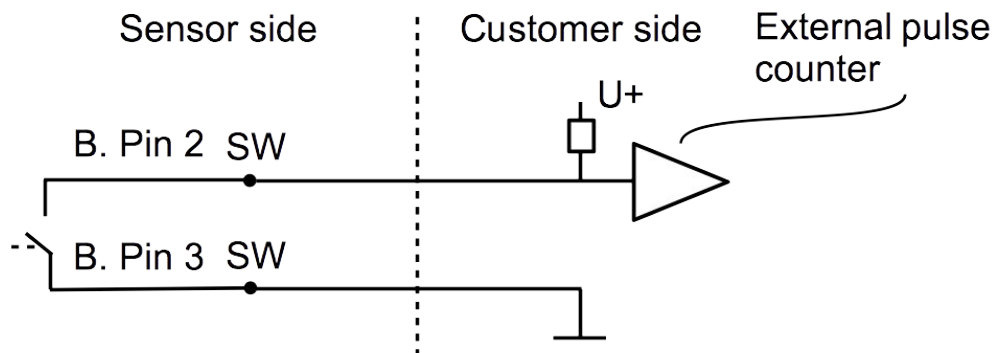
Example:

Volume flow [m³/h]	Pulse length [ms]	Max. consumption [m³]
≤ 10800	120	10800
> 10800	60	28800
> 28800	30	57600

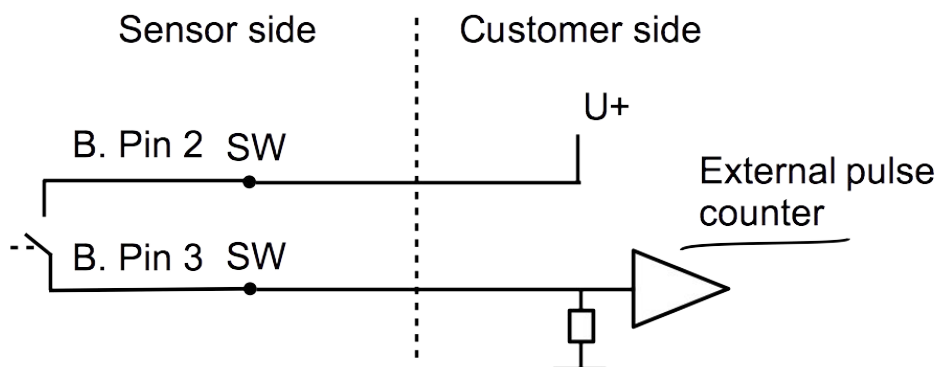
10.2.1 Pulse Connection Diagram

Using the isolated pulse switch (Connector B Pin 2 and 3)

Variant 1:



Variant 2:



10.3 Modbus Output

10.3.1 Modbus Parameters

The default settings of the Modbus interface are as follows:

Communication parameters (Modbus/RTU)

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

Communication parameters (Modbus/TCP)

DHCP	: Yes
MAC	: Set ex-factory
IP address	: Dynamic or Static
Subnet	: Dynamic or Static
Gateway	: Dynamic or Static
Timeout	: ≥ 200 ms

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.

Notes:

- Modbus communication settings as well as other settings can be changed by the SensSee App or the device display.
- In the Modbus/TCP mode, a slave device does not support concurrent connections because it can respond to only one polling message at a time.

Holding register

Register address	Data Length	Data Format	Channel name	R/W
0	4-Byte	FLOAT	Gas temperature	R
2	4-Byte	FLOAT	Pressure	R
4	4-Byte	FLOAT	Velocity	R
6	4-Byte	FLOAT	Flow	R
8	4-Byte	UINT32	Consumption	R
10	4-Byte	FLOAT	Reverse velocity	R
12	4-Byte	FLOAT	Reverse flow	R
14	4-Byte	UINT32	Reverse consumption	R
24	4-Byte	UINT32	System status	R
2100	4-Byte	FLOAT	Inner diameter (unit: mm)	R/W

2105	4-Byte	FLOAT	Reference temperature (unit: °C)	R/W
2107	4-Byte	FLOAT	Reference pressure (unit: hPa absolute)	R/W
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
2320	4-Byte	UINT32	Reverse counter at reference condition 20°C, 1000 hPa	R
2322	4-Byte	FLOAT	Pressure (unit: bar)	R
2324	4-Byte	FLOAT	Temperature (unit: °C)	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		

10.3.2 Connect Modbus/RTU Devices to a Master

Sensors and devices with a Modbus/RTU output can be connected to a Modbus master device. This master can be either display devices and gateways or any third-party Modbus/RTU master.

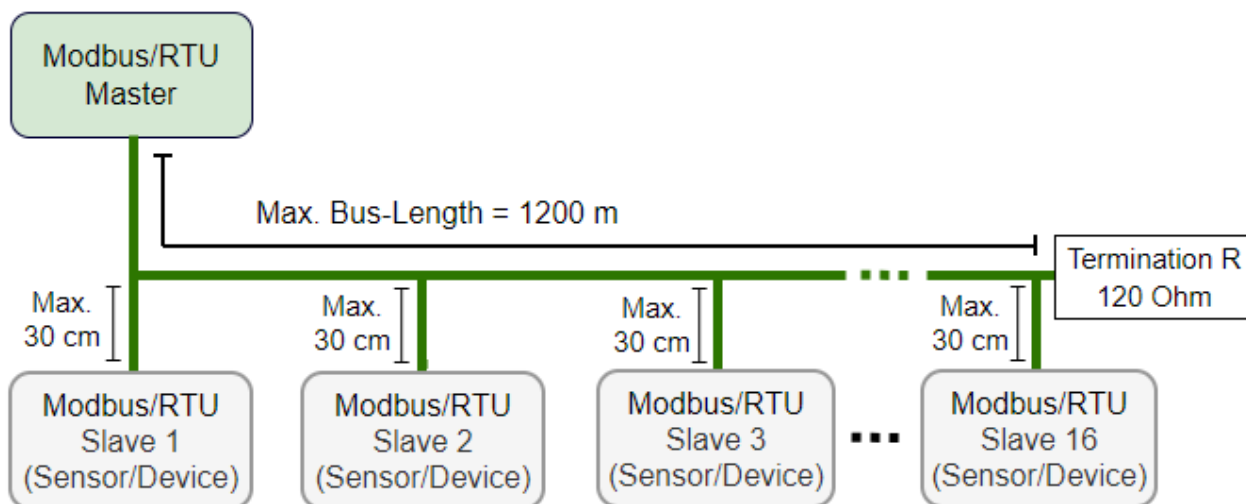
See below specifications of the Modbus/RTU connections.

10.3.2.1 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.

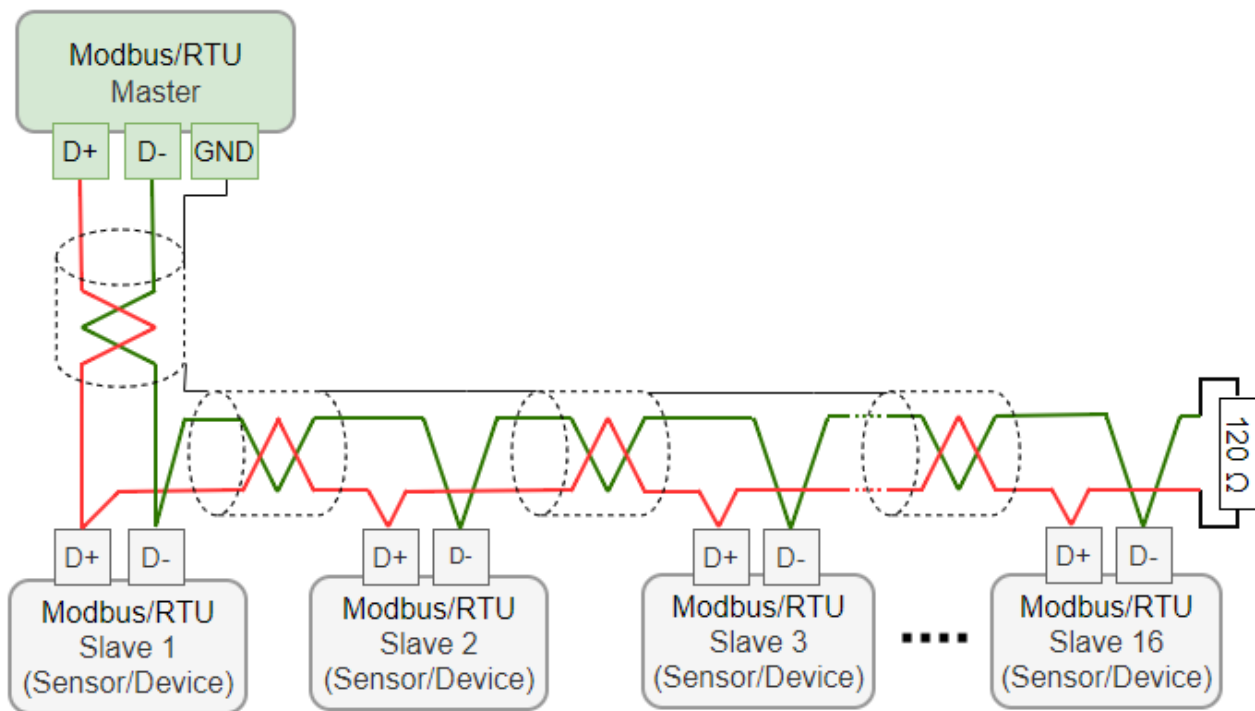


10.3.2.2 Modbus/RTU Wiring and Cable Type

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.

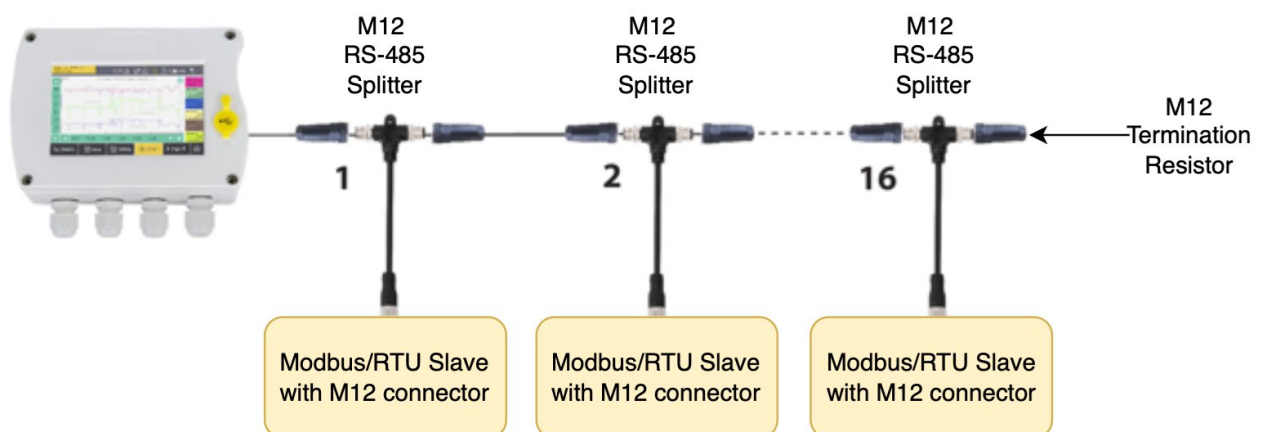
See the below picture for details.



10.3.2.3 Daisy-Chain using RS-485 Splitter

Devices with M12 connectors can be connected in a Modbus/RTU daisy-chain using a M12 RS-485 splitter. Furthermore this allows to easily place the M12 termination resistor at the last splitter in the bus-chain.

See below example for reference.



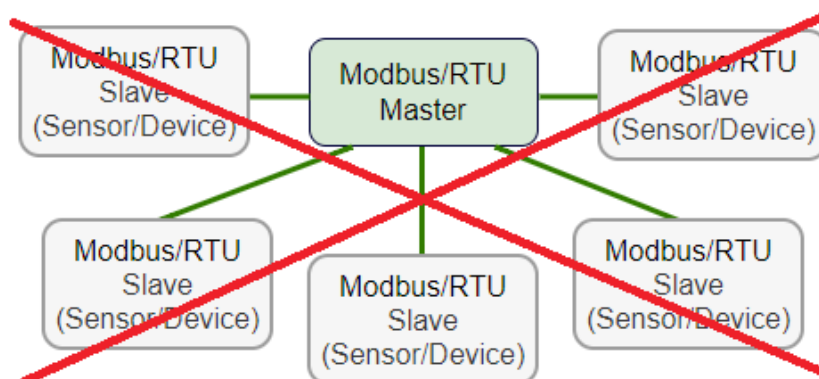
Connect Modbus/RTU slaves with M12 connectors to a daisy-chain using M12 RS-485 splitters.

The M12 RS-485 splitter comes with two M12 connectors to easily wire the chain.

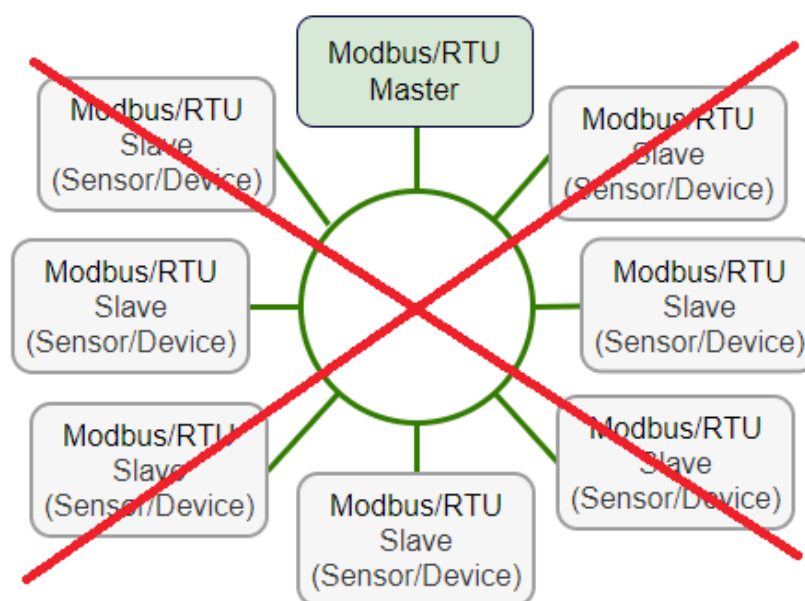
10.3.2.4 Topology of Modbus/RTU Daisy-Chain

The recommended bus topology is to connect devices as a daisy-chain, as shown in the figure in section 10.3.2.1 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



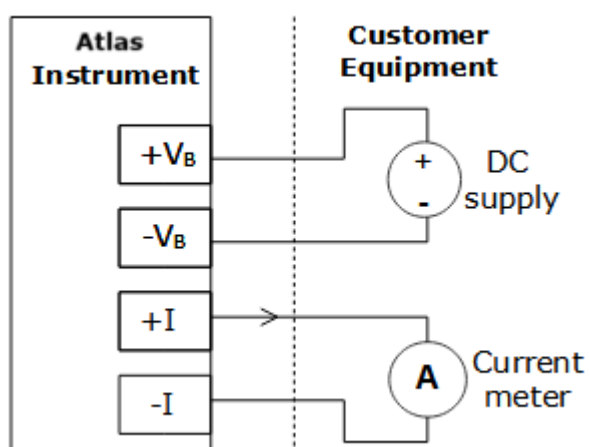
Avoid a ring topology

10.4 Connection between Outputs and Customer Equipment

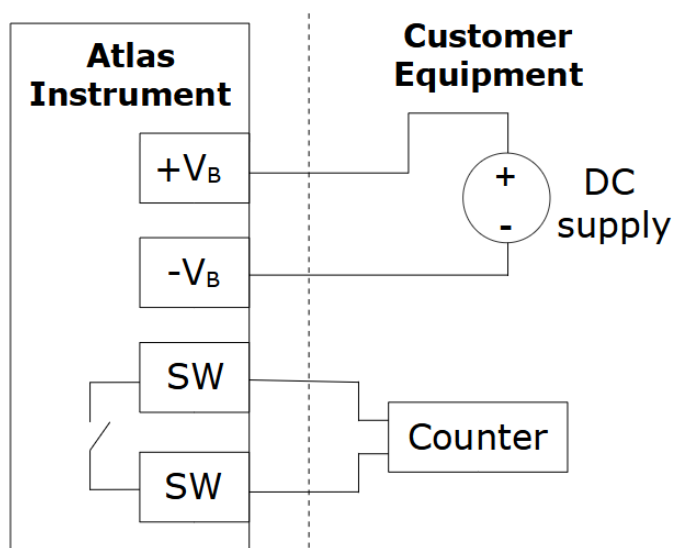
This section provides figures to show how outputs supported by the FL S200 P/FL S260 P connect with the customer equipment.

In the following figures, the **Atlas Instrument** indicates the FL S200 P/FL S260 P.

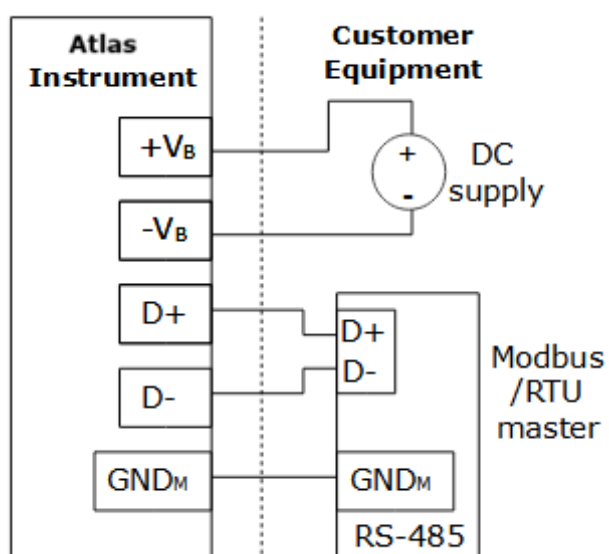
Analog output (Isolated)



Pulse output

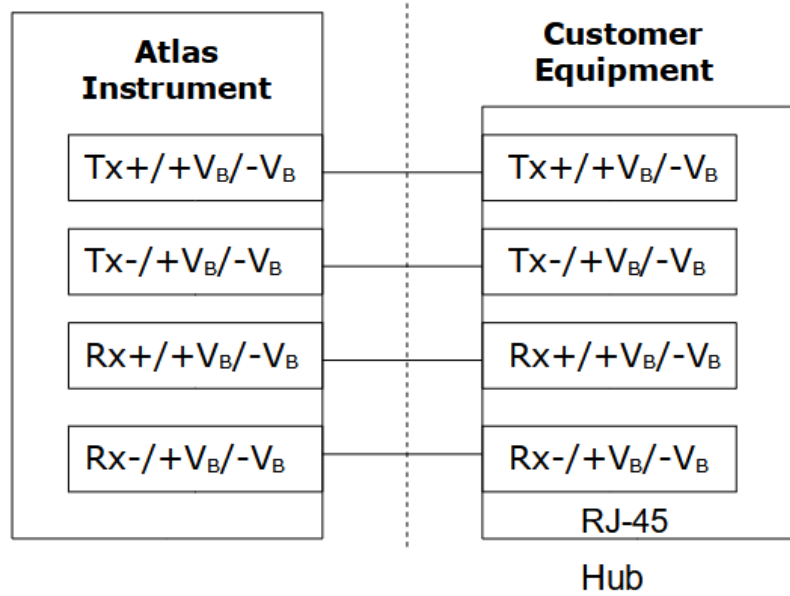


Modbus/RTU output

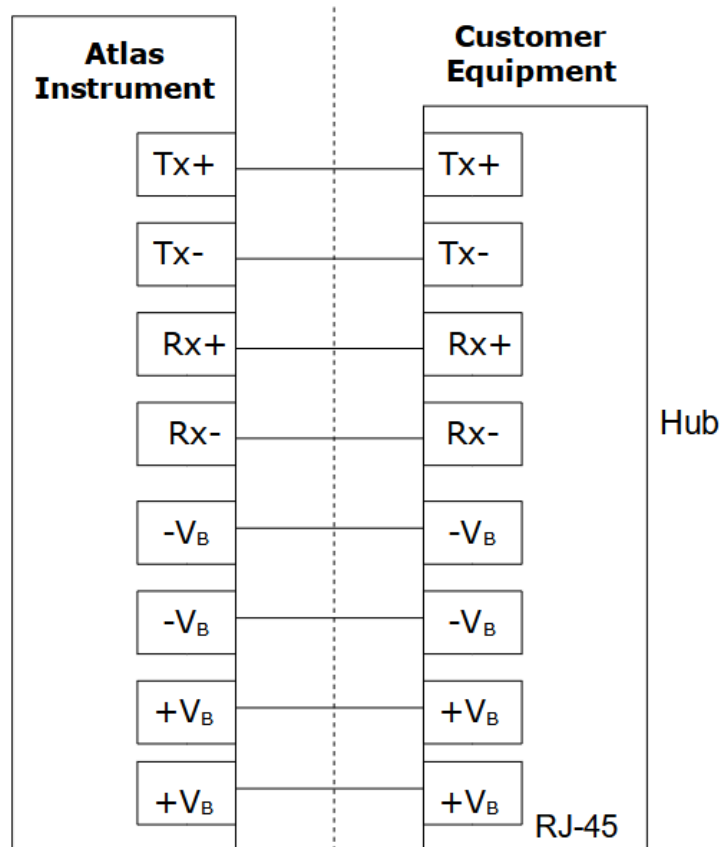


Modbus/TCP output with PoE

Class A

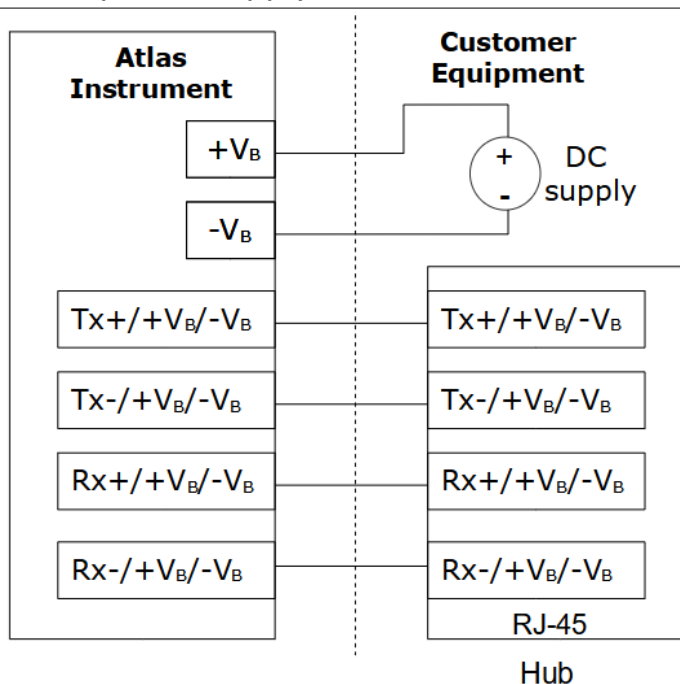


Class B

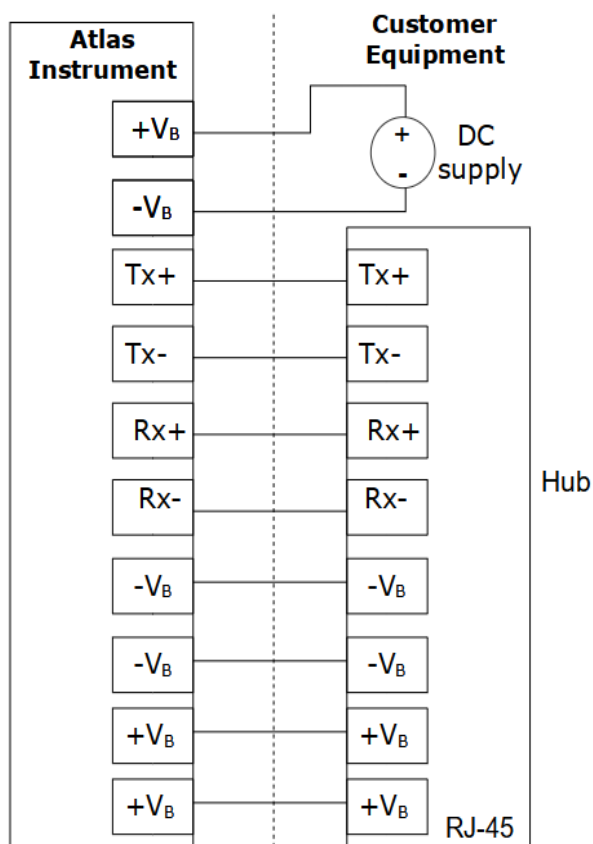


Modbus/TCP output with external power supply

Class A



Class B



11 Calibration

The FL S200 P/FL S260 P is calibrated before delivery. The calibration date is printed on the certificate which is shipped with the FL S200 P/FL S260 P. The accuracy of the FL S200 P/FL S260 P is regulated by the on-site conditions. Parameters such as oil, high humidity, or other impurities can affect the calibration and furthermore the accuracy.

The calibration is excluded from the product warranty. For more information, 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 packings must be disposed according to your local statutory requirements. The dispose can also be carried by the manufacturer of the product. Please contact the manufacturer for details.



atlascopco.com

All rights reserved ©

Modifications and errors reserved

FL S200 P_FL S260 P_IM_EN_V2025-5
