



User Manual

Flow Meter – Pitot Tube (Insertion)

Model: FLP



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Notices

Please read this manual in full and carefully observe the notes and instructions before and during installation, operation and maintenance. The manufacturer cannot be held liable for any damage which occurs as a result of noncompliance with this manual.

Do not tamper with device. Should the device be tampered with in any manner other than a procedure which is described and specified in this manual, the warranty is cancelled and the manufacturer is exempt from liability.

The product is designed exclusively for the described application. Use of this product in conditions not specified in this manual or, contrary to the instructions provided by the manufacturer, is considered improper handling of the product and will void your warranty. The manufacturer will not be held liable for any damages resulting from improper use of the product.

This manual should be read carefully by relevant personnel and the end user. This manual should be kept with the product and be made available as needed. **Once you install or use the product, you accept that you have read, understood and complied with this manual.**

Compressed Air Alliance endeavours to make the content of this manual correct, but is not responsible for omissions or errors and the consequences caused. In case of any doubts or questions regarding this manual or the product, please contact Compressed Air Alliance.



Warnings

Ignoring the warnings can lead to serious injury and/or cause damage!

When handling, operating or carrying out maintenance on this product, personnel must employ safe working practices and observe all local health & safety requirements and regulations.

Improper operation or maintenance of this product could be dangerous and result in an accident causing damage to machinery or injury or death.

The manufacturer cannot anticipate every possible circumstance which may represent a potential hazard. The warnings in this manual cover the most common potential hazards and are therefore not all-inclusive. If the user employs an operating procedure, an item of equipment or a method of working which is not specifically recommended by the manufacturer they must ensure that the product will not be damaged or made unsafe and that there is no risk to persons or property.

NEVER CHANGE ORIGINAL COMPONENTS WITH ALTERNATIVES.



Compressed Air / Gas Safety

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

- Do not exceed the maximum permitted pressure.
- Only use pressure rated installation materials and parts.
- Avoid getting hit by escaping air / gas or bursting parts.
- The system must be pressure-less during maintenance work.



Electrical Safety

Any contact with energised parts of the product may lead to an electrical shock which can lead to serious injuries or death. The user shall take all measures necessary to protect against electrical shock.

Consider all local and national 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 authorised qualified personal.

Storage and transportation

- The temperature range for transporting the sensor is between -10°C to 60°C (14°F to 140°F).
- The temperature range for storing the sensor is between -10°C to 50°C (14°F to 122°F) and the humidity is <90%, no condensation. Avoid direct UV and solar radiation during storage.

Cleaning

If you need to clean the sensor it is recommended to use a clean, dry cloth. For stubborn marks, use distilled water or isopropyl alcohol only.

Please note: contamination on the sensor tip will affect calibration and accuracy of the sensor. Removal of the contamination may not fix the issue. Contact Compressed Air Alliance or your local dealer for calibration.

Disposal

Electronic devices are recyclable material and do not belong in the household waste. The product, accessories and its packing material must be disposed according to local statutory requirements.

About Flow Meters

Flow meters are very popular for measuring compressed air and gas systems. They provide real time information to help keep your system under control and highlight any unusual activity.

Benefits of monitoring flow include:

- Improve system efficiency
- Reduce system maintenance
- Reduce operating and energy costs
- Increase system understanding and operation
- Identify changes in system performance
- Identify non-productive air demand and leakage
- Identify peak and average demand.

Types of Flow Meters

There are a variety of flow meter technologies including thermal mass, pitot tube, vortex and venturi.

In compressed air and gas systems it is important to avoid creating pressure drops or restrictions that will decrease system performance and increase operating costs. Examples of flow meters that cause pressure drops are differential pressure plate, vortex and venturi meters.

Pitot Tube Flow Meters

Pitot tube flow meters are ideally suited to wet, dirty and high velocity gases.

The sensor measures upstream dynamic pressure and downstream static pressure. The pressure differential is a measure of the velocity and flow rate.

Compressed Air Alliance's pitot tube flow meter has an extremely sensitive differential pressure measurement which allows the sensor to be used over a wide flow range. The patented anti condensation technology enables the sensor to be used under saturated conditions and ensures the sensor will perform stable accurate measurements for years to come.

Thanks to the online auto-calibration technology, high reliability, long-term measurement and accuracy can be guaranteed.

Pitot Tube flow meters are ideal for both temporary or permanent installations.

Specifications

Pitot Tube Flow Meter - Insertion		
Technology	Anti-condensation	
Application	Manufacturing and Industrial use	
Gas	Air, Argon, Carbon Dioxide, Helium, Hydrogen, Natural Gas, Nitrogen, Nitrous Oxide, Oxygen	
Gas Quality	Wet and dry gas, High velocities	
Accuracy	Flow: $\pm(1.5\% \text{ reading} + 0.3\% \text{ full scale})$ Pressure: $\pm 0.5\% \text{ full scale}$ <i>Accuracy is affected by the installation location, on-site conditions and contaminants such as oil, high humidity or other impurities</i>	
Measurement Ranges		
Flow Measurement	5 – 300 Nm/s	17 to 984 ft/sec
Pressure Measurement	0 to 17 bar (247 psi)	
Gas Temperature Measurement	-40°C to +150°C	40°F to +302°F
Outputs		
Output	Analogue: 4 to 20mA (4-wire, Isolated) / Pulse output Digital: RS485 Modbus / RTU	
Output Signals	Flow, consumption, pressure and temperature	
Power		
Power Supply	18 to 30VDC / 6.5W@24V	
Anti Condensate Power Up	18 to 30VDC / 24W@24V	
Electrical Connection	2 x 5 pin M12, female	
EMC	According to IEC 61326-1	

Anti Condensation Features		
Heating Function	Constant temperature control of flow meter head to prevent condensation build up inside the sensor when used in wet conditions	
Purge Function	Clicks will be heard when the intermittent tube cleaning system is operating.	
Display & Data Logger		
Display	2.8" LCD with touch panel	
Data Logger	10,000,000 samples	
Sampling Rate	> 20 samples / second	
Other Information		
Compressed Air Alliance App	Yes – you can access the flow meter to view readings and update settings via the Compressed Air Alliance App	
Bi-directional	Optional	
Pipe Size	DN25 to DN300	
Shaft Lengths	250 mm or 400 mm	9.8" or 15.7"
Process Connection	ISO G1/2" thread	
Ambient Temperature	-20°C to +60°C	-4°F to +140°F
Installation Type	Permanent or temporary installation	
Calibration Frequency	Every 2 years <i>Annual calibration is required if the sensor is exposed to relative humidity above 85%.</i>	
Warranty Period	12 Months	

Flow Range

Pipe Size		Flow Range (Nm ³ /h)		Flow Range (cfm)	
DN	ID (Inches)	Min Flow	Max Flow	Min Flow	Max Flow
25	1"	8.8	530	5	312
32	1.25"	14.5	868	9	511
40	1.5	22.6	1,357	13	798
50	2"	35.3	2,120	21	1,247
65	2.5"	59.7	3,583	35	2,108
80	3"	90.5	5,428	53	3,193
100	4"	141.4	8,482	83	4,990
125	5"	220.9	13,253	130	7,797
150	6"	318.1	19,085	187	11,228
200	8"	565.5	33,929	333	19,962
250	10"	883.6	53,014	520	31,190
300	12"	1,272.3	76,340	749	44,913

Compressed Air Alliance App

Flow Meter App - View data and edit settings on your phone

The Compressed Air Alliance App allows you to view data and check / update settings on your phone.

This feature is great for viewing flow readings when your flow meter is installed in high locations.

Contact Compressed Air Alliance or your local dealer for more information.



Flow Meter Pack

Each flow meter pack comes with:

- ✓ 1 x Pitot Tube Flow Meter – Insertion style, configured for your gas type.
- ✓ 1 x O-Ring
- ✓ 2 x M12 female connectors
- ✓ 1 x USB C to USB A adapter
- ✓ 1 x Adjustment tool

Optional: 5 meter data cable with M12 female connector



Pitot Tube
Flow Meter



O-Ring



USB C to USB A adapter



2 x M12 female
connectors



Adjustment tool

Optional Accessories

The following accessories are available for the flow meter. Talk to your local dealer or Compressed Air Alliance for pricing.



Data Cables



Cloud-based Data Acquisition and
Analysis software

Installation Overview

Step 1 – Find a suitable section of pipe

- The sensor must be installed vertically or horizontally (on pipe with upward gas flow)
- The sensor must be installed away from bends, edges, seams, changes in pipe size and other obstructions
- Do **NOT** install the sensor upside down

Step 2 – Install connection point, eg ball valve or nipple

Step 3 – Fit flow meter

Step 4 – Align sensor with direction of gas flow

Step 5 – Wire the sensor (see '*Installation – Electrical*')

Step 6 – Set sensor settings:

- Inner Pipe Diameter
- Unit of Measurement
- Communication settings (RS485 or Analog)
- Optional – Confirm other sensor settings

Step 7 (optional) – Connect the sensor to your SCADA or energy management system

Step 8 – Fill out the Commissioning Report (last page of this manual)

Tools and Equipment needed for installation

(not included with Flow Meter Pack)



Wrench /
Spanner



Screw Driver



Ball Valve
(optional)



Thread Tape /
Sealant

Installation – Mechanical



WARNING! Incorrect installation can damage the sensor or cause it to work incorrectly.



Notes

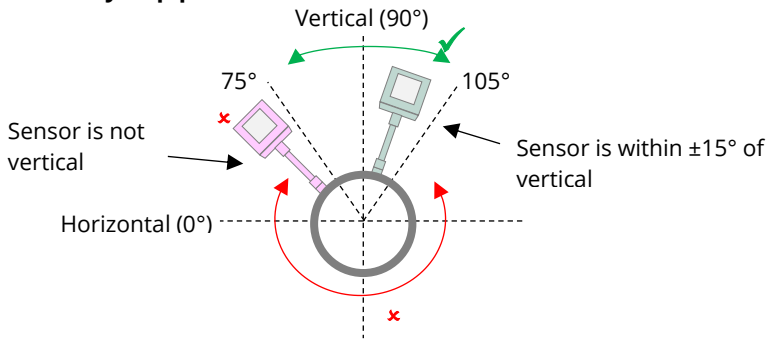
- **You need to maintain a minimum flow velocity of 5 Nm/s (17 ft/sec)** for the pitot tube to work correctly. Below this minimum velocity, the flow meter reading will be zero.
- **Before installing the sensor, make sure it is rated for your system** (refer to the “Specifications” section).
 - Use of the product outside specified ranges or operating parameters can lead to malfunctions and may damage the product or system.
- Do not use this product in explosive areas.
- Close attention should be paid to the installation location and contamination levels to ensure accuracy is maintained.
- When installing and using the flow meter, please pay attention to the direction of air flow and the alignment of the sensor. The direction is indicated on the housing.
- The sensor is for indoor use only. If installed in an outdoor installation, the sensor must be protected from sun and rain.
- Only use pressure rated materials and parts when installing and maintaining the product.
- Do not disassemble the product.
- Please observe local and national regulations before/during installation and operation.
- The product must be installed properly and calibrated regularly, otherwise it may lead to inaccurate measurements.

Step 1 – Find a suitable section of pipe

- ✓ at 90° to the pipe, +/- 15° (ie within 75° to 105° of vertical).
- ✓ vertically
- ✓ horizontally on pipe with upward gas flow
- ✓ away from bends, edges, seams, changes in pipe size and other obstructions,

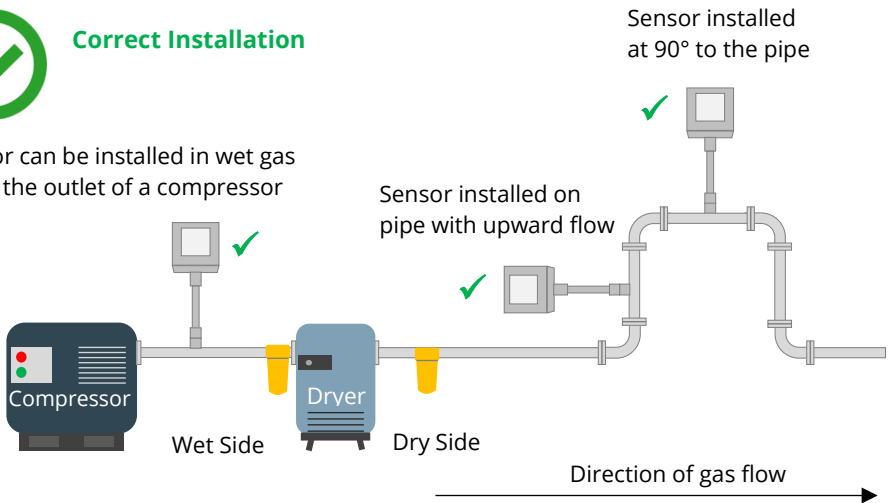
Make sure the insertion location has enough room around the pipe to install the sensor.

Install vertically to pipe



Correct Installation

Sensor can be installed in wet gas or on the outlet of a compressor



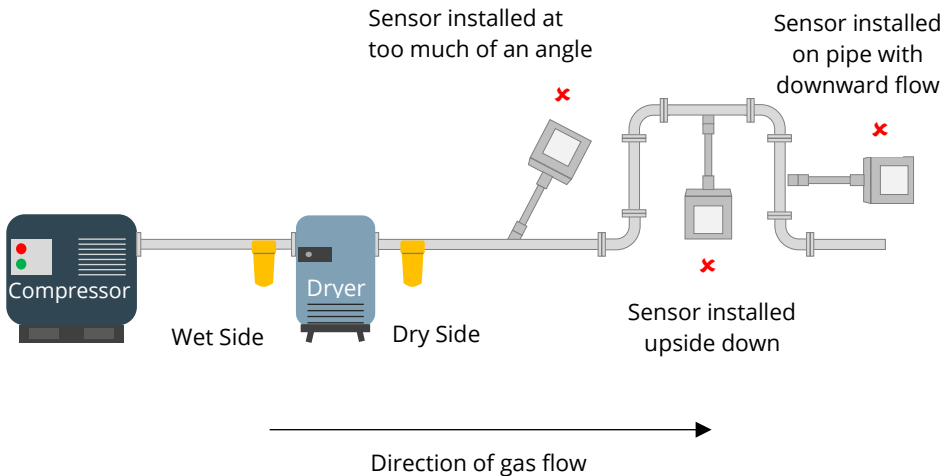


Incorrect Installation

Do **NOT** install the flow meter:

- x** upside down
- x** at too much of an angle
- x** on pipe with downward gas flow.

Incorrect installation can result in water accumulating in the shaft or head of the sensor which can damage the sensor and void the warranty. It can also result in inaccurate measurement.



Choose insertion location, away from obstacles

To achieve and maintain the accuracy stated in the technical data, the sensor must be inserted away from bends, edges, seams, curve, changes in pipe size, control valves, etc.

For best results, choose a long, absolutely straight, section of pipe that is free of obstructions.

Pipe obstructions (eg bends, edges, seams, curves, changes in pipe size, control valves, etc) change the velocity of compressed air / gas and/or create turbulence near the obstruction. Placing the sensor too close to the obstruction will result in inaccurate readings.



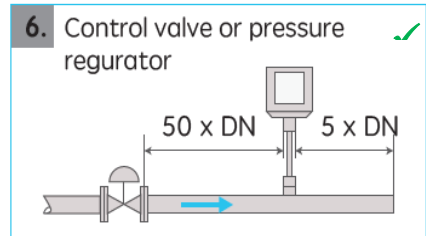
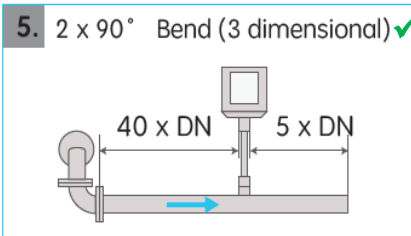
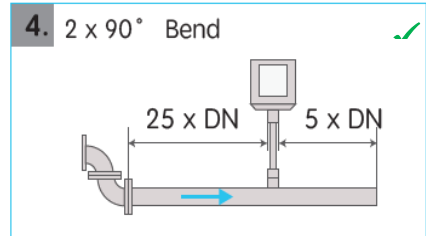
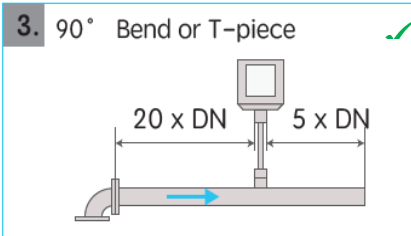
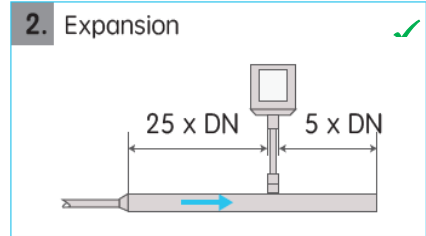
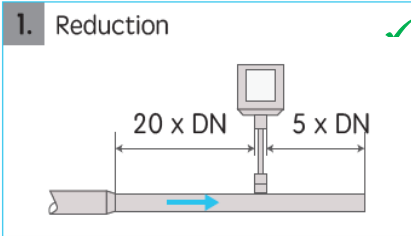
Notes

- Pay careful attention to the distance between the sensor's inlet and outlet sections and points of turbulence (eg bends, valves, etc). Make sure that the insertion location has enough straight pipe on either side of the sensor, as shown in the diagrams on the next page.
- Obstructions can cause counter-flow turbulence as well as turbulence in the direction of the flow.
- The diagrams below shows the **minimum** distances (in multiples of pipe diameters (DNs)) that the sensor must be installed away from bends, changes in pipe size and other obstructions.

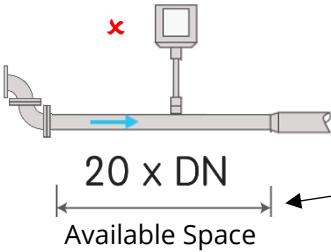


Correct Installation

DN = Pipe Diameter

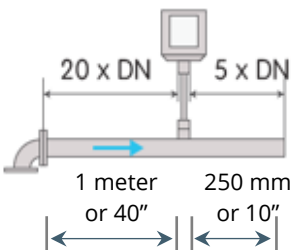
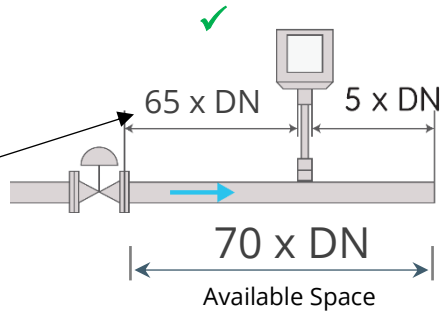


Examples



- To install a flow meter near 2 x 90° bends, you need at least 30 DN of space (25 DN on the inlet side + 5 DN on the outlet side, see diagram on previous page)
- Only 20 DN is available.
- Therefore the sensor should **not** be installed in this location

- To install a flow meter near a control valve or pressure regulator, you need at least 55 DN (50 DN on inlet side and 5 DN on outlet side, see diagram on previous page)
- This section of pipe has 65 DN on the inlet side and 5 DN on the outlet side
- Therefore the sensor **can** be installed in this location



Minimum spacing on inlet and outlet sides for DN 50

A flow sensor will be installed on a section of pipe, just after a bend (as shown in the diagram on the left). The pipe has a DN of 50 (ie, it's a 2 inch or 50 mm pipe).

Therefore the sensor must be installed:

- Inlet side: 20 x DN from the bend
 = 20 x 2" = 40" or
 = 20 x 50mm = 1,000mm = 1 meter
- Outlet side: 5 x DN from any other obstruction
 = 5 x 2" = 10" or
 = 5 x 50mm = 250mm

Step 2 – Install connection point

To install the sensor, you need a connection point to the pipe, eg a ball valve or a nozzle or nipple. The thread must be G 1/2".

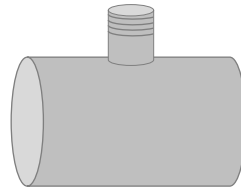
Use of a ball valve is optional - You do not need to use a valve to install the sensor. However, using a valve will make removing the sensor easier (eg when you need to remove the sensor for calibration).

If installing a ball valve, you can use a hot tap drill and clamp to create a connection point on pressurized or unpressurized pipes. See the Compressed Air Alliance website for information on hot tap drills and clamps.



Ball Valve

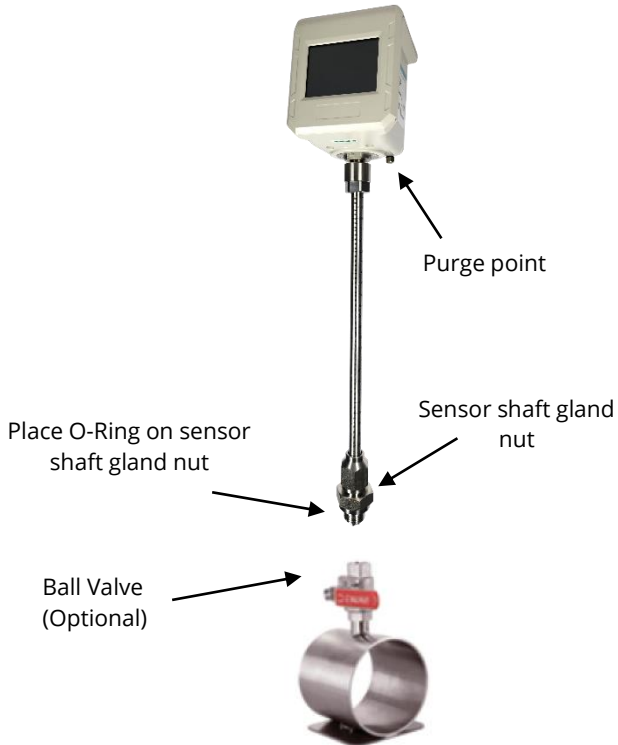
OR



Welded nipple on pipe

Step 3 - Fit Flow meter

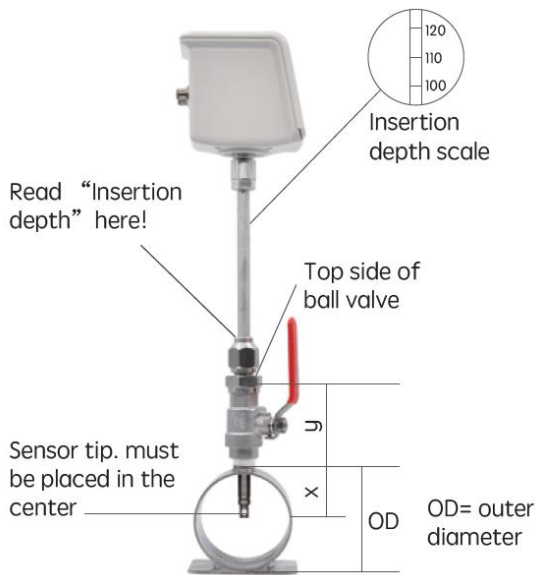
- Place O-Ring on sensor shaft gland nut.
- Screw the sensor into the connection point.
- If using a ball valve, open the valve.



- Use the depth scale on the sensor shaft to place the tip of the sensor in the middle of the pipe.
- Once the tip is in the centre of the pipe, tighten the gland nut to hold the sensor in place.

$$\text{The Insertion Depth} = x + y = \frac{OD}{2} + y.$$

Where OD = outer diameter of pipe and Y = ball valve or nipple height.

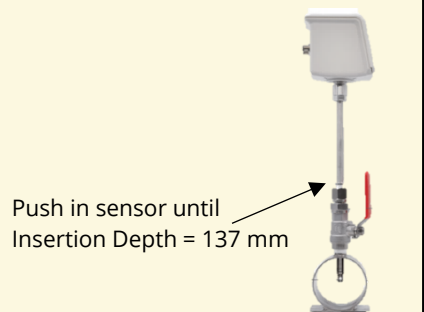


Example

A flow meter is being installed in a cooper tube with a DN of 100. This equates to an outer diameter (OD) of 100 mm. The ball valve is 87 mm high.

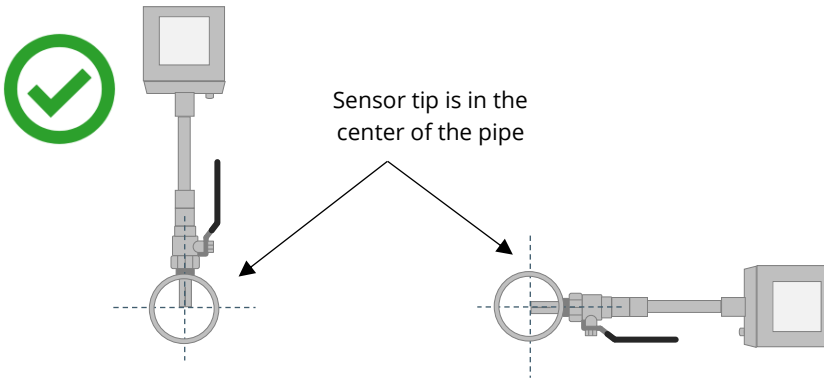
The Insertion Depth = $OD/2 + y$
 where y = height of the ball valve.

Therefore, the Insertion Depth =
 $100 \text{ mm} / 2 + 87 \text{ mm} = 137 \text{ mm}.$



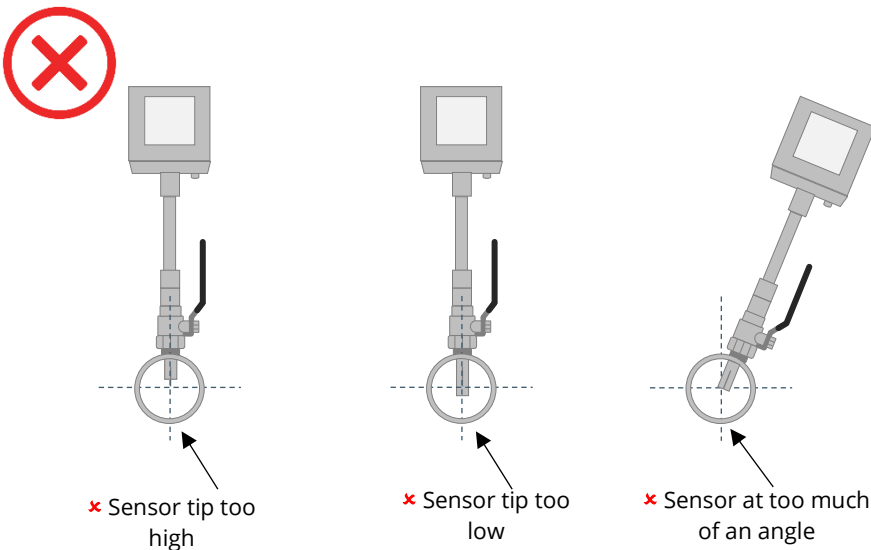
Correct Installation

The sensor tip must be in the center of the pipe / tube.



Incorrect Installation

Note: Inaccurate measurement may occur if the sensor is installed incorrectly.



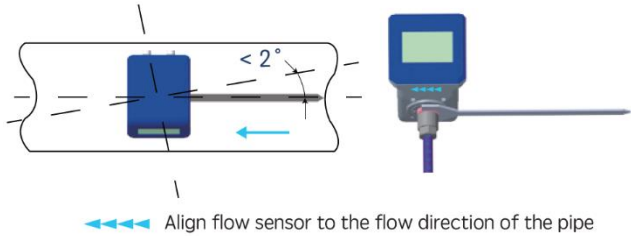
Step 4 – Align sensor with the direction of flow

When installing and using the flow meter, please pay attention to the direction of air flow and the alignment of the sensor.

The direction of flow is marked by 4 green arrows on the back of the sensor and underneath the sensor.

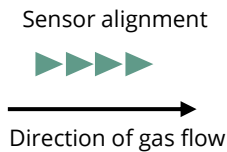


Use the alignment tool to align the sensor with the pipe. Ensure the arrows on the sensor match the direction of flow.



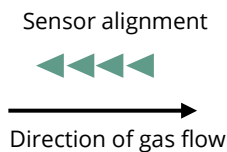
Correct Installation

The sensor is aligned in the same direction as the gas flow.



Incorrect Installation

Note: Inaccurate measurement may occur if the sensor is installed incorrectly.



Installation – Electrical



WARNING! Incorrect wiring can damage the sensor or cause it to work incorrectly.

Notes:

- Do **not** screw the M12 connector using force, otherwise it may damage the connection pins.
- Always check the M12 connectors to make sure they are wired correctly.
- Consider all local and national safety requirements and regulations for electrical installations.
- **The system must be disconnected from any power supply during installation and maintenance work.**
- Any electrical work on the system is only allowed by authorised and qualified personal.

The flow sensor has two x 5 pin M12 connector plugs - "A" and "B". Cables are connected to the sensor through the M12 connector plugs.

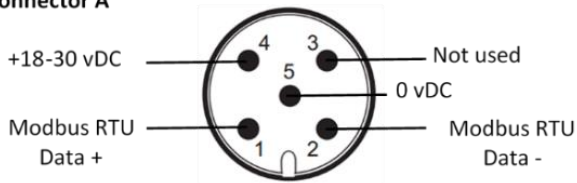
- Connector **A** is used for power and Modbus
- Connector **B** is used for 4-20mA and pulse



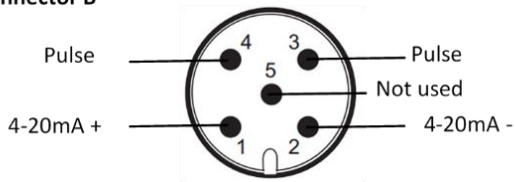
If you ordered a cable with the sensor, the cables will be coloured coded as shown in the table below.

Connector A (Power & Modbus)	Cable Colour	Connector B (Pulse & Analogue)
Pin 1 RS485, Data + (A)	Brown	Pin 1 4-20mA +
Pin 2 RS485, Data - (B)	White	Pin 2 4-20mA -
Pin 3 N/A - Not Used	Blue	Pin 3 Pulse
Pin 4 +18-30 vDC	Black	Pin 4 Pulse
Pin 5 0 vDC (Ground for Modbus)	Grey	Pin 5 N/A - Not Used

Connector A



Connector B



Operating the Flow Meter



WARNING!

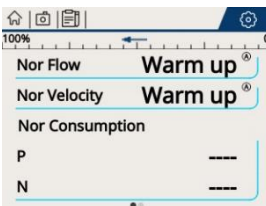
- Make sure the sensor is installed and wired correctly before powering up the sensor. Only use 24vDC to power the sensor.
- The flow meter head will get hot. This is normal and is the tube cleaning system / purge system working.

Turning On

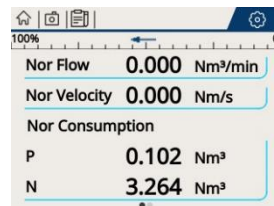
Connect the flow meter to 24vDC power. The sensor will start powering up automatically. There is no on/off switch on the sensor.

On powering up:

- The Compressed Air Alliance logo will appear on the screen.
- You will hear some clicks. These clicks are normal and are the scleaning system / purge system working.
- After a few seconds, the Warm Up screen will appear (see image below, left). During warm up the current draw will be higher than normal as the flow meter head is brought up to temperature.
- After a minute you will see flow meter home screen. The flow meter is now ready to configure (see image below, right).



Warm up screen when Flow Meter powered on



Flow Meter home screen. The sensor is ready to configure

Configuring the Flow Meter

You must configure the flow meter to make sure it is reading accurately.

- You **must** set the (inner) pipe diameter.
- You should check / adjust the gas type, units of measure, communication settings (4-20mA and/or Modbus) and screen rotation.

Mandatory Configuration - Pipe Diameter

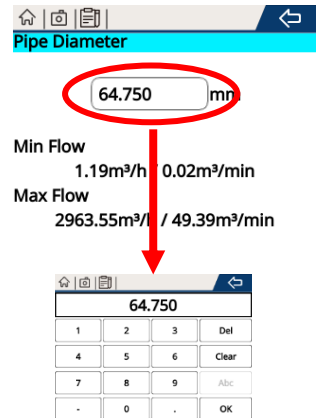


Pipe diameter refers to Inner Pipe diameter. **Not** the outer diameter.

To set the inner pipe diameter:

- Go to **Settings** (⚙️) > **Pipe Diameter**.
 - If the **lock screen symbol** (🔒) is present (on the bottom left of the screen), press the symbol, hold and drag it to the right of the screen. The screen is set to lock after 60 seconds.
- Press the diameter size, in millimeters (mm)
- Enter new **inner** diameter of the pipe
- Press OK

Press the arrow (⬅️) to save your settings and return to the previous screen.

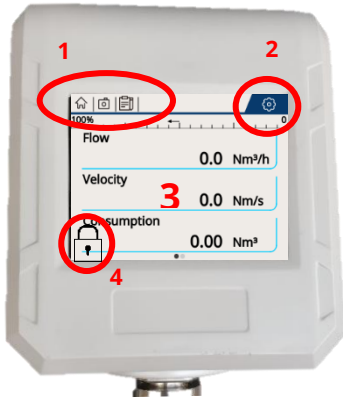


Optional configuration

We recommend you check the following settings on the flow meter. See the next section - "Using the Display" for instructions on checking / updating settings.

- Gas type
- Unit of Measurement
- Communication settings (RS485 or Analog)
- Screen Rotation

Using the Display



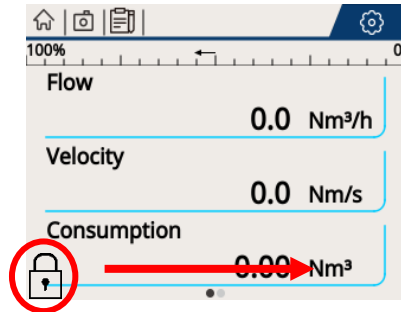
The flow meter has a touch screen interface.

1. Menu options
2. Settings
3. Data / Measurement Readings
4. Locked screen icon


To navigate the interface:

- scroll up and down (↑ and ↓) to see other options
- scroll left and right (← and →) to see other screens
- Press an item to access that feature

Unlock the screen

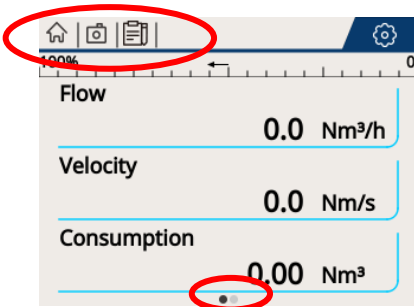


The screen is set to automatically lock after 60 seconds.

If the **lock screen symbol**  is present, press the symbol, hold and drag it to the right of the screen.





You can change the timing for the lock screen in the “Screen Settings” menu (Settings > System Settings > Screen Settings)






Home Screen



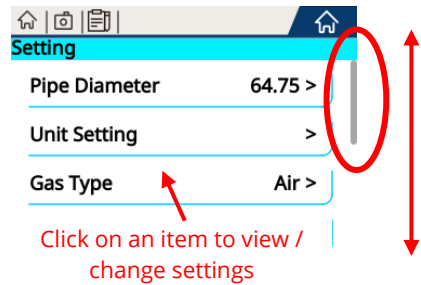
Scroll left or right to see other screens

The home screen has two pages, as shown by the two dots (..) at the bottom of the screen. Move the screen left or right to move between screens.


When you press the **Menu** icon (   ) a pop up screen appears. Press:

- ✓ The **Home** icon () to return to the home screen
- ✓ The **Camera** icon () to take a screen shot of that screen
 - To access screen shots, go to the Settings Menu () > Screen Shot.
- ✓ The **Notepad** icon () to access the Data Logging information
- ✓ If you have a USB installed, press the **USB icon** () to safely remove the USB.

Settings Menu



Click on an item to view / change settings

Press the **settings** icon () in the top right corner of the screen to access the settings screen.

In the Settings Menu you can view / change:

- ✓ Pipe diameter
- ✓ Units of measurement
- ✓ Gas type
- ✓ Data logging
- ✓ Screen Shots
- ✓ RS485 settings
- ✓ Analog output
- ✓ Pressure Calibration
- ✓ Normalisation
- ✓ System settings and
- ✓ Advanced Settings.

Setting Up the Flow Meter



Before you use the flow meter, you:

- **must** set the (inner) Pipe Diameter (see below).
- should check the:
 - gas type
 - **Note:** The flow meter is calibrated in air. If you select another gas type, the flow meter will automatically adjust its readings to match the gas selected.
 - units of measurement
 - communication settings (modbus or 4-20mA settings) and
 - screen rotation.

Inner Pipe Diameter

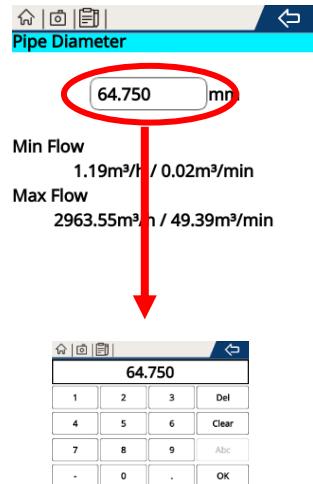


Pipe diameter refers to inner Pipe diameter. **Not** the outer diameter.

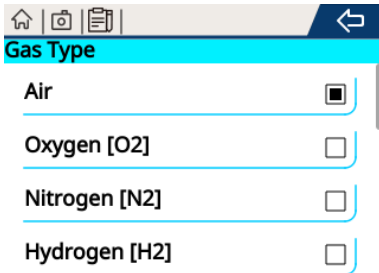
To change the (inner) Pipe Diameter, go to **Settings** (⚙️) > **Pipe Diameter**.

- Press the diameter size, in millimeters (mm)
- Enter new **inner** diameter of the pipe
- Press OK

Press the arrow (⬅️) to save your settings and return to the previous screen.



Gas Type



To change the Gas type, go to **Settings (⚙️) > Gas Type:**

- Select the desired gas type
 - You might need to scroll up or down to see all options
- Press the arrow (⬅️) to save your setting and return to the previous screen.

You can select from the following gas types:

Gas Types	
✓ Air	✓ Hydrogen (H2)
✓ Argon (Ar)	✓ Methane (CH4)
✓ BioGas	✓ Natural Gas
✓ Butane (C4H10)	✓ Nitrogen (N2)
✓ Carbon dioxide (CO2)	✓ Nitrous oxide (N2O)
✓ Carbon monoxide (CO)	✓ Oxygen (O2)
✓ Ethane (C2H6)	✓ Propane (C3H8)
✓ Helium (He)	✓ Sulfur hexa (SF6)

Note: The flow meter is calibrated in air. If you select another gas type, the flow meter will automatically adjust its readings to match the gas selected.

If you require calibration in real gas, contact Compressed Air Alliance or your local dealer.

Unit of Measurement

Unit Setting

Flow Unit Nm³/h >

Velocity Unit Nm/s >

Consumption Unit Nm³ >

Temperature Unit °C >

You can select from the following units of measure:

Measure	Units	
Flow	m ³ /h m ³ /min m ³ /s l/min l/s	cfm Kg/h Kg/min Kg/s
Velocity	m/s ft/s	
Consumption	m ³ ft ³	kg
Pressure	Pa hPa kPa Mpa	Mbar Bar PSI
Temperature	°C, °F	

To change the Unit of Measure, go to **Settings** (⚙️) > **Unit Setting**:

- Select the desired unit of measure
 - You might need to scroll up or down to see all options
- Press the arrow (⬅️) to save your setting and return to the previous screen.

Analog Output

Analog Output

4-20mA Channel Velocity >

4-20mA Scaling 0~250 >


Cubic Meter/Pulse 1 >


Here you can set / change:

- ✓ Which measurement is transmitted via the analog channel. **Note:** Only one measurement can be transmitted via the analog setting.

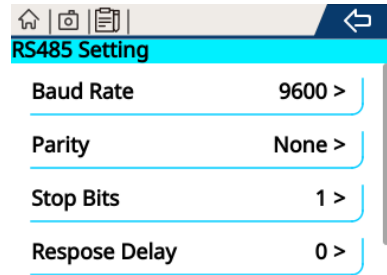
Measurement transmitted via 4-20mA	
✓ Flow	✓ Normal Flow
✓ Velocity	✓ Normal Velocity
✓ Pressure	
✓ Temperature	

- ✓ The 4-20mA scaling (high and low)
- ✓ Pulse Out Mode:
 - Actual consumption – ie consumption at actual pressure and temperature conditions
 - Normal consumption (default option) - ie consumption at reference conditions
- ✓ Cubic meter / Pulse

To change the Analog (4-20mA) settings, go to **Settings** () > **Analog Output:**

- Press the setting you want to change
- Select the desired setting.
 - You might need to scroll up or down to see all options
- Press the arrow () to save settings and return to the previous screen

Modbus RS485 Setting





You can change the modbus RS485 settings via the display.

The **default Modbus settings** are:

- ✓ Baud Rate: 9600
- ✓ Parity: None
- ✓ Stop Bit: 1
- ✓ Response Delay: 0
- ✓ Device Address: 1

For more Modbus settings, refer to the next page.

To change the Modbus settings, go to **Settings** () > **RS485 Setting:**

- Press the setting you want to change
- Select the desired setting.
 - You might need to scroll up or down to see all options
- Press the arrow () to save settings and return to the previous screen

Default Modbus Settings

Settings can be changed to suit system requirements.

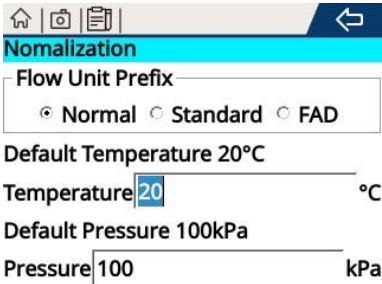
Default Modbus RTU (RS485) Settings					
Address	Baud Rate	Frame / Parity / Stop Bit	Response Time	Response Delay	Frame Spacing
1	9600	8 / N / 1	1 Sec	0 Milliseconds	7 Characters

Modbus Registers					
Holding Register	Data Type	Byte Length	Description	Unit	Read / Write
0	FLOAT	4	Flow	m ³ /min, m ³ /hr, CFM	Read
2	FLOAT	4	Velocity	m/sec or f/sec	Read
8	FLOAT	4	Temperature	°C or °F	Read
10	FLOAT	4	Pressure	Pa, bar, PSI	Read
24	UNSIGNED INTEGER	4	Consumption/ Totaliser	m ³ or CF	Read
41	FLOAT	4	Atmosphere Pressure	kPa	Read/Write

Communication Configuration					
Holding Register	Address	Byte Length	Description	Default	Read / Write
51	50	2	Restart device Write "1" to restart device		Write
52	51	2	Device address (1-247)	1	Read/Write
53	52	2	Baud Rate 12 = 1200 bps 24 = 2400 bps	9600	Read/Write

Communication Configuration					
Holding Register	Address	Byte Length	Description	Default	Read / Write
			48 = 4800 bps 96 = 9600 bps 144 = 14400 bps 192 = 19200 bps 384 = 38400 bps 560 = 56000 bps 576 = 57600 bps 1152 = 115200 bps		
54	53	2	Parity 0 = None 1 = Odd 2 = Even	0 (None)	Read/Write
55	54	2	Stop Bit 1 = 1 bit 2 = 2 bit	1 bit	Read/Write
56	55	2	Response Time Out 0 – 255 ms 1 ms / step Value range: 0 - 255	0	Read/Write

Normalization



The Normalization screen lets you change the reference conditions of the flow meter. The Flow Meter will readjust its calculations to suit the new normalization values.

The normalization setting should only be changed if the flow meter is installed under conditions that differ from the standard calibration (20°C, 1 bar, 0% relative humidity).

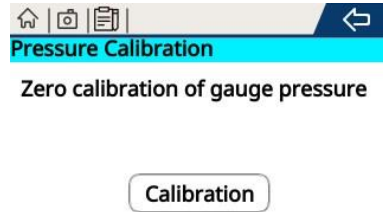
The **default Normalisation** settings are:

- ✓ Flow Unit Prefix: Normal
- ✓ Temperature: 20°C
- ✓ Pressure: 100kPa

To change the Normalisation settings, go to **Settings (⚙️) > Normalisation**.

- Press the setting you want to change
- Enter the new setting and click OK
- Press the arrow (⬅️) to save settings and return to the previous screen

Pressure Calibration

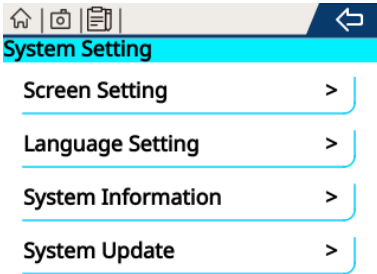


The Pressure Calibration screen lets you do a zero calibration of the gauge pressure.

To run the Pressure Calibration, go to **Settings (⚙️) > Pressure Calibration**:

- Press the 'Calibration' button
- A pop up message will appear. Click OK
- Press the arrow (⬅️) to save settings and return to the previous screen

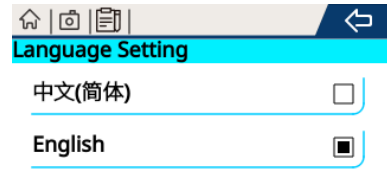
System Settings



Under System Settings, you can:

- ✓ Change Screen Settings:
 - Screen rotation
 - Screen brightness
 - Timing for screen lock
- ✓ Change the Language
 - Chinese
 - English
- ✓ View system information
- ✓ Update the Flow Meter's firmware

Language Setting



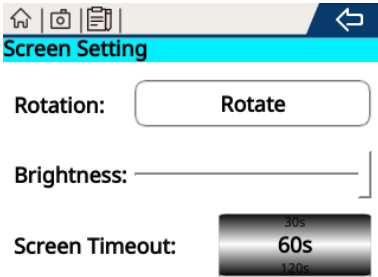
The Language Setting allows you to change between English and Chinese.

The **Troubleshooting** section (at the end of this document) shows you how to access this setting if you are in the wrong language.

To change the language settings, go to **Settings Menu (⚙️) > System Setting > Language Setting**:

- Select the desired language
- Press the arrow (←) to save settings and return to the previous screen

Screen Settings



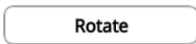
The screen settings let you change:

- ✓ Screen rotation
- ✓ Screen brightness
- ✓ Timing for screen lock

To access the screen settings, go to the **Settings Menu (⚙️) > System Setting > Screen Setting**.

Rotate the screen 90 degrees

- To rotate the screen 90 degrees, press the 'Rotate' button.



- Keep pressing to rotate to 180 degrees, 270 degrees and 360 degrees.

Change Screen Brightness

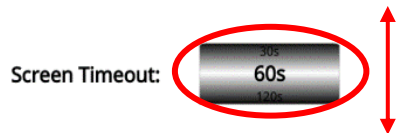
- To change the screen brightness, drag the bar left or right



Change Screen Timeout

The screen is set to automatically lock after 60 seconds.

- To change the timing, move the dial up or down.
- You can set the screen to never lock.



Press the arrow (⬅️) to save settings and return to the previous screen.

System Information

System Information	
Boot Count	10
Sensor Information	
Serial Number	228
HardWare Version	1.00
SoftWare Version	1.18
Display Informatioun	
HardWare Version	1.02
SoftWare Version	1.12

This screen displays information about the sensor and its firmware.

- **Boot Count** = Number of times the sensors has been disconnected and reconnected to power
- **Serial Number** = Serial number of the unit. This information is also on the label on top of the sensor
- Hardware **Version** and **Software Version** for both the sensor technology and the display unit.


Press the arrow () to return to the previous screen

System Update

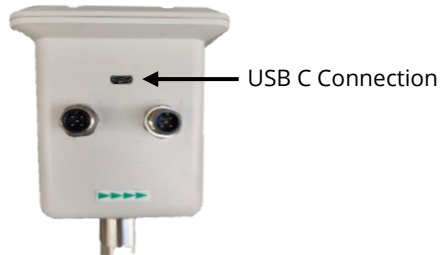
Firmware updates are generally not required.

If a new version of the firmware is released, your local dealer will send the software to you.

To update the firmware:

- Plug the USB into the back of the sensor
- On the Flow Sensor's touch screen, go to the **Settings Menu** () > **System Setting** > **System Update**
- Follow the prompts



Data Logging

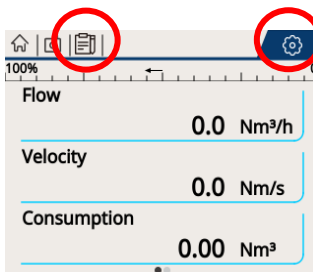



You can record data to a USB and download data as a CSV file. The USB connection is on the back of the flow meter head.

Alternatively, you can connect the flow meter to Compressed Air Alliance's CALMS system (a cloud based compressed air and energy management system) or your own SCADA.

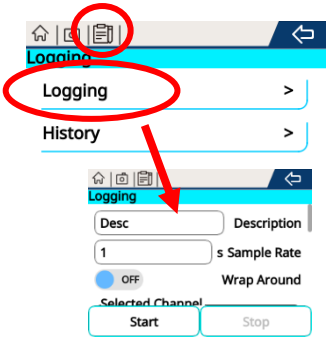
To set up data logging, view data logging history and start or stop data logging go to the **"Logging"** menu. You can access the data logging menu via:

- ✓ Notebook icon () on the top left of the screen, or
- ✓ Via the Settings menu () on the top right of the screen (Settings > Logging).




Before you remove the USB card, press the **USB icon** () on the top left of the screen to safely remove the USB.

Set up Data Logging


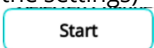
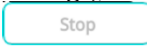



To set up data logging:

- Enter a Descriptive Name for the data
- Enter the sample rate, in seconds
- Turn on / off "Wrap Around"
 - If you turn **on** "Wrap Around" the data will write over old records when the memory card is full
 - If you turn **off** "Wrap Around", the data will stop recording when the memory card is full
- Select which channels you want to log. You can select one or more from the list below:
 - Flow, velocity, consumption and/or temperature
- Enter the system date and time
- If you want the data logging to start at a specific time, enter the START date and time
- If you want the data logging to stop at a specific time, enter the STOP date and time


- Press the arrow () to save settings and return to the previous screen

Start / Stop Logging

- Press the Notebook icon () on the top left of the screen
- To start data logging (without changing any of the settings) press Start icon 
- To stop data logging (without changing any of the settings), press the Stop icon 
- When data logging is active, the pencil on the notebook icon () will move.

Download Data

To download data as a CSV file


- Press the History option.
- Select the data to download
- Insert a USB into the back of the flow sensor
- Press Export
- Press the arrow () to save settings and return to the previous screen

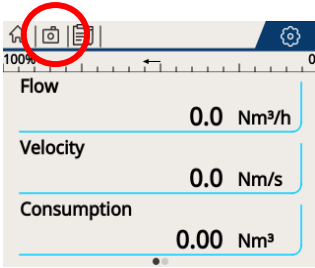
Delete Data


To delete historical data records

- Press the History option.
- Select the data to delete
- Press Delete

Screen Shot

You can take a screen shot of any screen by pressing the camera icon () on the top left of the screen.



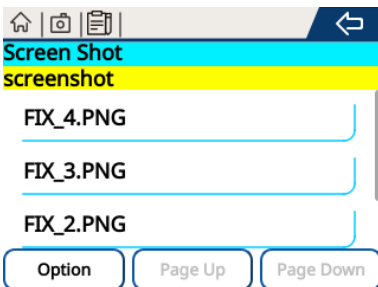
To access the screen shots, go to the **Settings Menu** () > **Screen Shots**.

Here you can:

- ✓ View the picture
- ✓ Export the picture to a USB
- ✓ Delete pictures

View a picture

Press the picture name to view the picture.

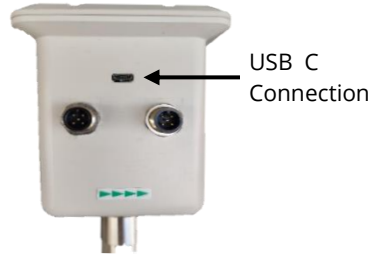


Delete Pictures

To delete pictures:

- Press the Option icon
- Option
- Select the images you want to delete
 - Press the **Delete** icon

Export / Download Pictures



To export pictures:

- Insert a USB into the back of the flow sensor
 - Press the Option icon
- Option
- Select the images you want to download
 - Press the **Export** icon

Advanced Settings



It is not recommended to change these settings. If you need to access the advanced settings, please contact your local dealer. Alternatively, contact Compressed Air Alliance.

The 'Advanced Settings' let you change the following features:

Setting	Default Value / comments	
Velocity Offset Ratio	1	
Velocity Filter Grad	10	
Consumption	Actual Consumption: Positive: 11.261 Negative: 20.328	Normal Consumption: Positive: 11.679 Negative: 20.963
Anti-condensation heating function	On Note: The Anti-condensation heating function should be left on when using the flow meter in wet gas. Turning the Anti-condensation heating function off when the sensor is used in wet air can damage or destroy the sensor.	
Constant Temperature	65°C This is the temperature of the Anti-condensation heating function. If the Anti-condensation heating function is turned off, you can not access this feature.	
Actual Channel	Off	
Cut Off Velocity	5 m/s This is the minimum velocity the flow meter can detect. If the flow is less than the cut off velocity, the flow meter will read '0'. The flow meter is not calibrated for velocities less than 5m/s.	
New Password		
Password Reset	Resets the password to the default value.	

Warranty

Compressed Air Alliance provides a 12-month warranty for all sensors. The warranty covers materials and workmanship under the stated operating conditions from the date of delivery. Please report any findings immediately and within the warranty time.

If faults occur during the warranty period Compressed Air Alliance will repair or replace the defective unit, without charge for repair labour and material costs but there is a charge for other services such as labour to remove or reinstall the instrument, transport and packing. Warranty repairs do not extend the period of warranty.

The following damage is excluded from this warranty:

- Improper use and non-adherence to the user manual.
- Use of unsuitable accessories.
- External influences (e.g. damage caused by vibration, damage during transportation, excess heat or moisture).

The warranty is cancelled when one of the following situations occurs:

- The user opens the measurement instrument without a direct request written in this manual.
- Repairs or modifications are undertaken by third parties or unauthorised persons.
- The serial number has been changed, damaged or removed.

Other claims, especially damage occurring on the outside of the instrument (eg dents, marks), are not included unless responsibility is legally binding.

Calibration

The sensor is calibrated before delivery. The calibration date is printed on the certificate which is shipped with the sensor.

Flow Meters require calibration to remain accurate. The frequency of calibration depends greatly on the level of contamination within your system.

We recommend you calibrate the sensor every 2 years (provided the sensor is not exposed to relative humidity above 80%). Calibration is excluded from the product warranty. For more information, contact Compressed Air Alliance.

FAQ

Why is the flow meter head warm / hot?

During normal operation, the Pitot Tube Flow Meter head will be warm (approximately 65°C inside the flow meter head). This is normal and is the tube cleaning system / purge system working.

If you are using the Pitot Tube Flow Meter in dry gas (ie, after a dryer), you can turn the warming function off via the 'Advanced Settings' menu.

Why is the flow meter head clicking?

These clicks are normal and are the tube cleaning system / purge system working. You can't turn off the purge system.

How much data will the flow meter record?

The flow meter will record a maximum of 10,000,000 samples.

How can I download data from the flow meter?

To download data, you need to connect a USB drive to the flow meter and export the data as a CSV file. Alternatively, you can connect the flow meter to Compressed Air Alliance's CALMS system (a cloud based compressed air and energy management system) or your own SCADA.

If the flow meter loses power, will the data logger restart automatically?

No. If you lose power to the flow meter, you must manually restart the data logging function. You can do this via the flow meter screen or the Compressed Air Alliance App (see below).

Can I access the flow meter via my phone?

You can access the flow meter screen and update the flow meter settings via the Compressed Air Alliance App. The app only works on Android phones. It doesn't work on iPhones (iOS).



Can I install a local display to view data?

Yes – if your flow meter is installed in a high location or an awkward location, you can install a local display and connect it to the flow meter. This will let you view data at ground level.

Trouble Shooting

My sensor isn't reading correctly

If your sensor is not reading the correct values, follow these steps.

1. Make sure the sensor is suitable for your system. Refer to the "*Specifications*" section for details.
2. Make sure the sensor is calibrated. Sensors should be calibrated every 2 years. Contact your local dealer or Compressed Air Alliance for calibration. Make sure the sensor is installed correctly. Refer to "*Installation - Mechanical*" section for more information. **Typical mechanical installation errors include:**

- ✘ Installing sensor upside down
- ✘ Installing sensor on a horizontal pipe with downward gas flow
- ✘ Installing sensor too close to bends and other obstructions

3. Make sure the sensor is wired correctly. Refer to "*Installation - Electrical*" section for more information.
4. Make sure the following sensors settings are correct:
 - Inner Pipe diameter (not outer diameter)
 - Unit of Measurement
 - Gas Type
 - Communication settings (RS485 or Analog)

Refer to the "*Setting Up the Flow Meter*" and "*Communication Settings*" sections for more information.

5. If you have adjusted Normalization or Advance Settings, reset these to factory default.
 - Normalization default setting: Temperature = 20°C and Pressure = 100 kPa.
6. Is your associated equipment compatible with the flow meter?
7. Is your associated equipment compatible with the flow meter output?

Still need help? Contact Compressed Air Alliance via email: sales@compressedairalliance.com or phone (Australia): 1300 558 526

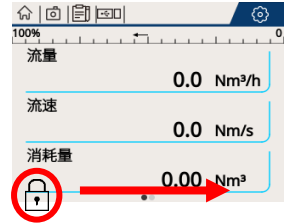
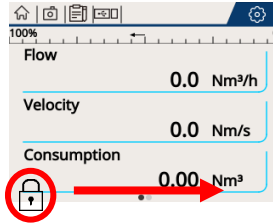
My sensor is in the wrong language

If you need to change the language:

Step 1 – Unlock Screen

If the lock screen symbol is present, press the symbol, hold and drag it to the right of the screen.

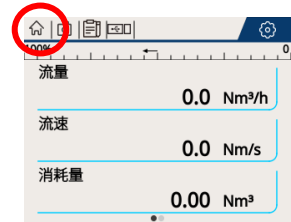
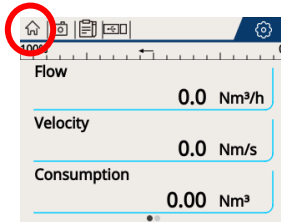
If the screen lock symbol is not present, skip this step.



Step 2 – Go to the home page.

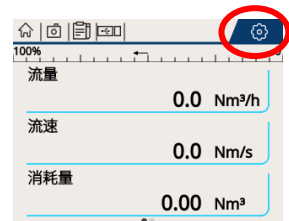
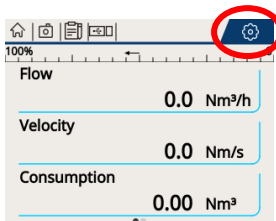
Click on the Menu icon on the top left of the screen, then click on the home icon.

If you are already on the home page, you can skip this step.



Step 3 – Go to Settings

Click on the Settings icon on the top right of the home page.



Step 4 – Go to System Setting

Scroll to the bottom of the settings screen.

Press the “System Setting” menu – **2nd menu from bottom**



2nd menu from bottom of page
You may need to scroll down to find this

Step 5 – Go to Language Setting

Scroll to the top of the System Settings screen

Press the “Language Setting” menu – **2nd menu from top**

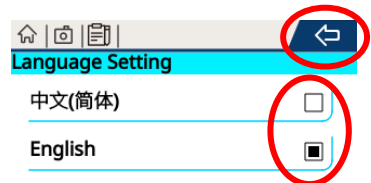
2nd menu from top of page



Step 6 – Select desired language

Select the desired language

Press the arrow button  to save your selection and return to the previous screen



Commissioning Report

About the Sensor

Part Number (eg FLP100001)			
Serial Number			
Installed by		Installed Date	

Installation

Step	Task	Yes	NA	No	Comments	Sign
1	Flow meter installed in correct location and orientation? (refer to "Installation - Mechanical")					
2	Is the Flow Meter wired correctly? (refer to "Installation - Electrical")					
3	Sensor settings configured for: <ul style="list-style-type: none"> • Inner pipe diameter • unit of measurement • communications 					
4	Modbus and 4-20mA settings checked?					
5	Readings (flow, velocity, consumption & temperature) visible on display					



Compressed Air Alliance Pty Ltd

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E-mail: sales@compressedairalliance.com

Website: www.compressedairalliance.com