



User Manual

Flow Meter – Thermal Mass (Insertion)

Model: FLT



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Notices and Warnings

Notices

Please **read all of this manual** before you install, operate or maintain this product. Pay attention to notes, warnings and instructions. 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 / use 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 Safety

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.
- Only use pressure rated installation materials and parts.
- Avoid getting hit by escaping air 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 even death. The user shall take all measures necessary to protect against electrical shock.

Follow 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

- Make sure that the transportation temperature of the sensor is between -10°C to 60°C (14°F to 140°F).
- Please make sure that the storage temperature of 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.

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.

Introduction



About Flow Meters

Intended use

Compressed Air Alliance's flow meters are suitable for use in manufacturing, industrial and base building environments providing the sensor's specifications are met. This includes:

- Sensor is used in inert gases, eg air, oxygen, nitrogen, carbon dioxide
- Sensor is used in clean, dry gas
- Gas flow rate is between: 0.1 to 250 Nm/s (0.3 to 820 ft/sec)
- Gas pressure is between: 0 to 50 bar (725 psi)
- Gas temperature is between -40°C to +150°C (-40°F to +302°F)
- Power supply is between: 18 to 30 vDC
- The flow meter is **not** used in explosive areas.

Refer to the *Specifications* section (next page) for full requirements.

The thermal mass flow meter measures standard flow, mass flow, consumption and temperature.

•

Thermal Mass Flow Meters

Thermal Mass flow sensors are perfectly suited for measuring clean, dry compressed air and inert gases. The streamlined sensor tip is designed to ensure minimal impact on gas flow while maintaining accuracy over a wide flow range.

Compressed Air Alliance's thermal mass flow meter measures standard flow, mass flow, consumption and temperature. It has full digital signal processing instead of traditional analog bridge design, making the flow meter more accurate and able to measure across a wider range.

Thermal mass flow meters are widely used in industrial processes, chemical, petrochemical, power engineering, etc. They are suitable for temporary or permanent installations.

Our thermal mass flow meters are available as insertion style or inline style.

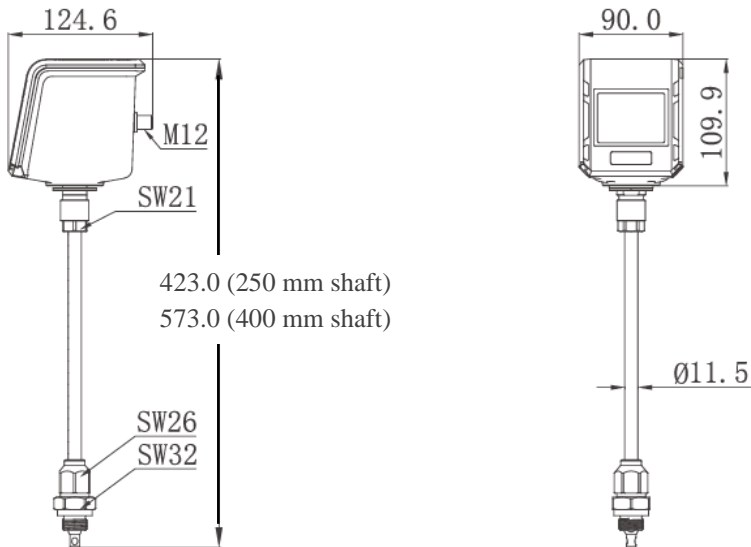
- **insertion type sensors** which are easy to install under pressure through a 1/2" ball valve.
- **inline type sensors** are more suited to permanent installations or where shutting down the system to calibrate the sensor is not an issue.

Specifications

Thermal Mass Flow Meter - Insertion		
Technology	Thermal mass, Insertion design	
Application	Manufacturing and Industry	
Gases	Air, Argon, Carbon Dioxide, Helium, Hydrogen, Natural Gas, Nitrogen, Nitrous Oxide, Oxygen	
Gas Quality	Clean and dry gas	
Accuracy	±(1.5% reading + 0.3% 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	0.1 to 250 Nm/sec	0.3 to 820 ft/sec
Pressure Measurement	0 to 50 bar (725 psi) (installation device required for over 16 bar / 232psi)	
Gas Temperature Measurement	-40°C to +150°C	40°F to +302°F
Outputs		
Output	Analog: 4 to 20mA (4-wire, Isolated) / Pulse output Digital: RS485 Modbus / RTU	
Output Signals	Flow, mass flow, consumption and temperature	
Power		
Power Supply	18 to 30VDC / 5W@24V	
Electrical Connection	2 x 5 pin M12, female	
EMC	According to IEC 61326-1	
Display & Data Logger		
Display	2.8" LCD with touch panel	
Data Logger	10,000,000 samples	
Sampling Rate	> 20 samples / second	

Thermal Mass Flow Meter - Insertion		
Other Information		
Bi-directional	No	
Pipe Size	DN20 to DN600	
Shaft Lengths	250 mm or 400 mm	9.8" or 15.7"
Weight	FLT1 (shaft length = 250 mm or 9.8") FLT2 (shaft length = 400 mm or 15.7")	0.75 kg 0.90 kg
Process Connection	ISO G1/2" thread	
Ambient Temperature	-30°C to +70°C	-22°F to +172°F
Installation Type	Permanent or temporary installation	
Calibration Frequency	Every 2 years <i>provided the sensor is not exposed to relative humidity above 85%</i>	
Warranty Period	12 Months	
Reference Conditions	20°C, 1bar(a), ISO1217 (Programmable)	

Dimensions (mm)



Flow Range

Pipe Size		Flow Range (Nm3/h)		Flow Range (cfm)	
DN	ID (inches)	Min Flow	Max Flow	Min Flow	Max Flow
20	0.75"	0.1	282	0.1	166
25	1"	0.2	441	0.1	259
32	1.25"	0.3	723	0.2	425
40	1.5	0.5	1,131	0.3	665
50	2"	0.7	1,767	0.4	1,040
65	2.5"	1.2	2,986	0.7	1,757
80	3"	1.8	4,523	1.1	2,661
100	4"	2.8	7,068	1.6	4,158
125	5"	4.4	11,044	2.6	6,498
150	6"	6.4	15,904	3.8	9,357
200	8"	11.3	28,274	6.6	16,635
250	10"	17.7	44,178	10.4	25,991


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 Thermal Mass Flow Meter – Insertion style, configured for your gas type.
- ✓ 1 x O-Ring
- ✓ 1 x Adjustment tool (used to align flow meter correctly)
- ✓ 1 x USB C to USB A adapter (used to download data to a USB)
- ✓ **Connector Options** - 2 x M12 female connectors **or** 2 x 5 meter data cables with M12 connector on one end
- ✓ Calibration Certificate

Flow Meter Pack



Flow Meter



O-Ring



USB C to USB A adapter



Adjustment tool

Connector Options



2 x M12 female
connectors

OR



2 x 5 meter cable with M12
connector on one end

Installation



Installation Overview

Mechanical Installation

Step 1 – Find a suitable section of pipe

- The sensor must be installed vertically or horizontally, in clean, dry gas
- The sensor must be installed away from bends, edges, seams, changes in pipe size and other obstructions
- Do **NOT** install the sensor in wet gas or 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

Electrical Installation

Step 5 – Wire the sensor for 24vDC power and communication

Sensor Configuration

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

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

- **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.
- Pay attention to the installation location and gas contamination levels to ensure accuracy is maintained.
- The flow meter is **not** bidirectional. When installing and using the flow meter, please pay attention to the direction of gas flow and the alignment of the sensor. The direction is indicated on the housing.
- Avoid condensation on the sensor element as this will affect the accuracy enormously.
- 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 follow local and national regulations before/during installation and operation.
- This product must be installed properly and calibrated regularly, otherwise it may lead to inaccurate measurements.

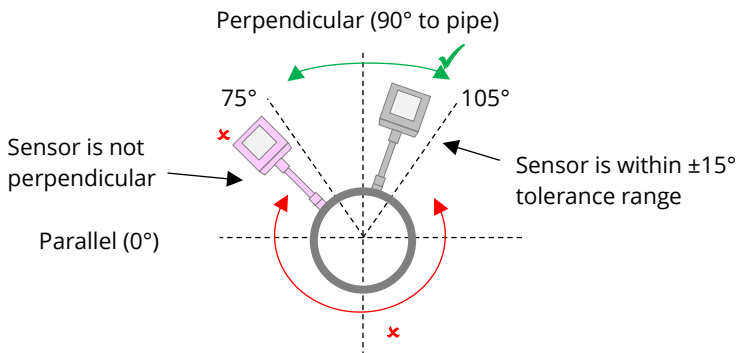
Step 1 – Find a suitable section of pipe

The sensor **must** be installed:

- ✓ at 90° to the pipe, +/- 15° (ie within 75° to 105°).
- ✓ vertically or horizontally,
- ✓ away from bends, edges, seams, changes in pipe size and other obstructions,
- ✓ in dry gas (gas humidity should be less than 80% relative humidity (RH)).
- ✓ in clean gas (the sensor should be installed after filters and dryers)

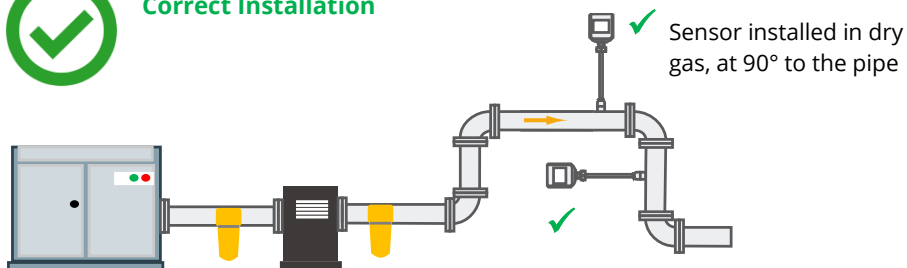
Make sure the insertion location has enough room around the pipe to install the sensor.

Install 90° (perpendicular) to pipe





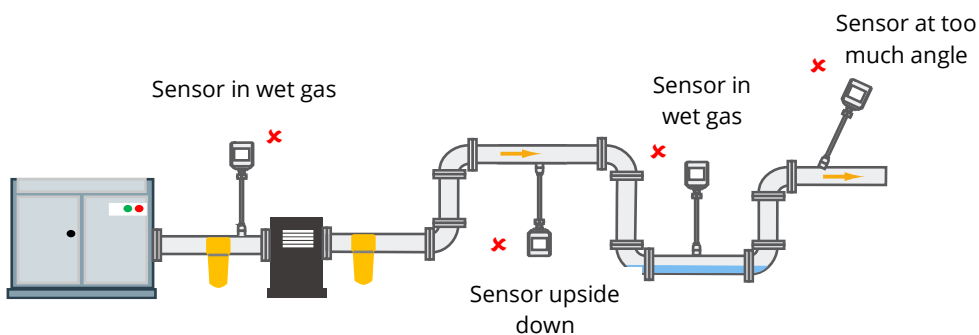
Correct Installation



Incorrect Installation

Do **NOT** install the sensor in wet gas

Do **NOT** install the sensor upside down or at an angle. This can result in water accumulating in the shaft or head of the sensor. This can damage the sensor and void the warranty.



Choose insertion location, away from obstacles

To achieve and maintain the accuracy stated in the specifications, 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 / gasses and/or create turbulence near the obstruction. Placing the sensor too close to the obstruction will result in inaccurate readings.



Notes

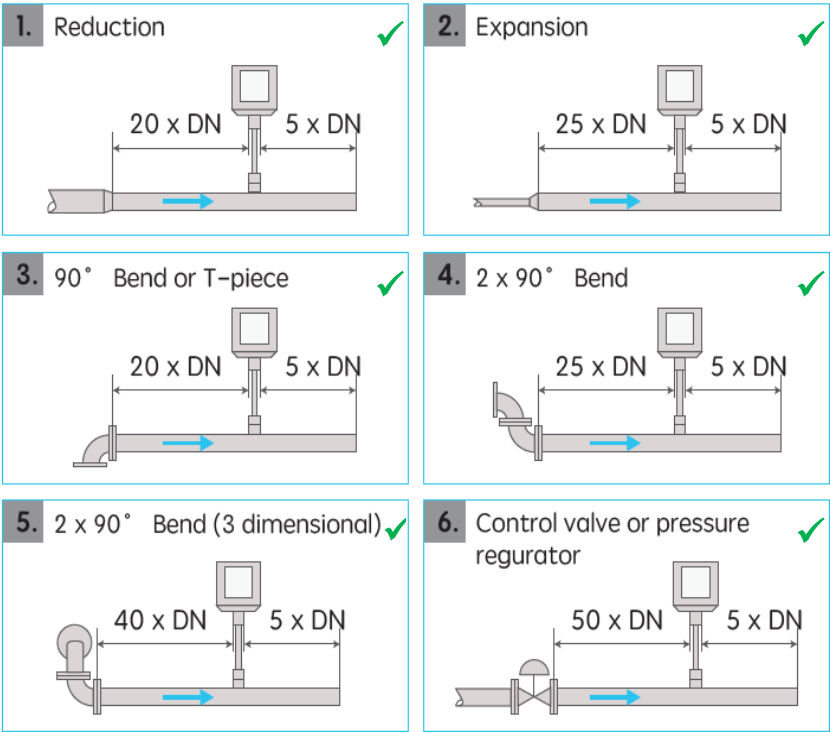
- Pay attention to the distance between the sensor's inlet and outlet sections and points of turbulence (eg bends, valves, etc).
- Make sure that the insertion location has enough straight pipe on either side of the sensor, as shown in the diagrams below.
- Obstructions can cause counter-flow turbulence as well as turbulence in the direction of the flow. Turbulence will reduce the accuracy of flow readings and result in inaccurate data.



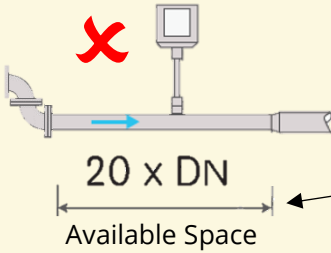
Correct Installation

The diagram below shows the **minimum** allowable distance between the sensor and any bends, changes in pipe size or other obstructions. Distances are shown in multiples of pipe diameters (DNs). For best results, choose a long, absolutely straight, section of pipe that is free of obstructions.

DN = Pipe Diameter

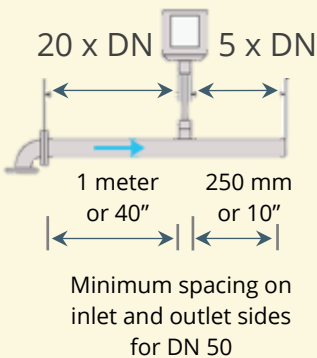
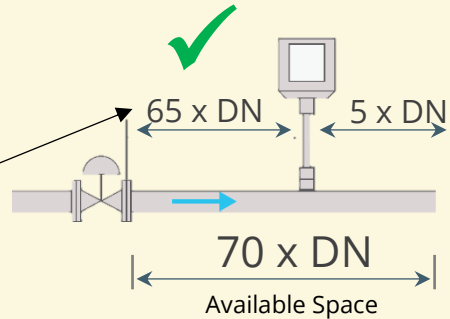


Examples



- 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 4 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 6 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



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
 $= 20 \times 2" = 40"$ or
 $= 20 \times 50\text{mm} = 1,000\text{mm} = 1 \text{ meter}$
- Outlet side: 5 x DN from any other obstruction
 $= 5 \times 2" = 10"$ or
 $= 5 \times 50\text{mm} = 250\text{mm}$

Step 2 – Install connection point

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

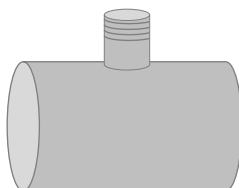
Use of a ball valve is optional - You do not need to use a valve to install the sensor. However, using a valve will make removing the sensor easier (eg when you need to remove the sensor for calibration).

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

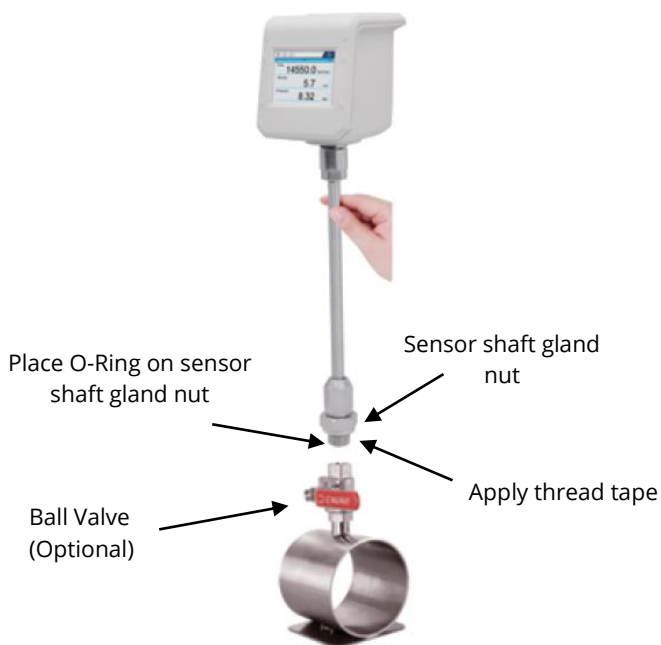
OR



Welded nipple on pipe

Step 3 - Fit Flow meter

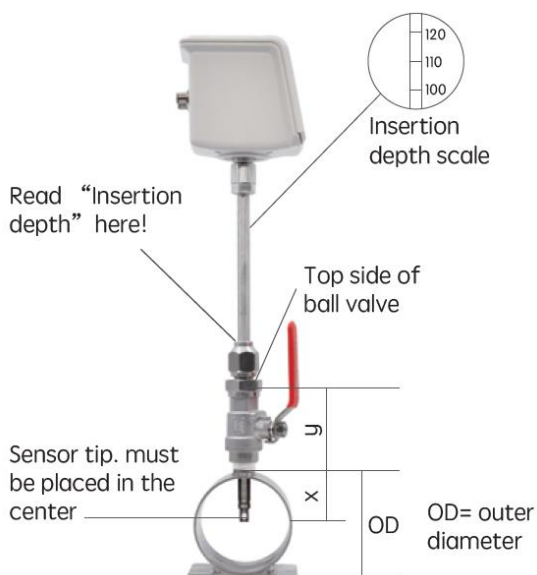
- Place O-Ring on sensor shaft gland nut.
- Wrap thread tape / sealant tape around sensor thread. Do not let tape enter pipe.
- Screw the sensor into the connection point.
- If using a ball valve, open the valve.



- 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 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.

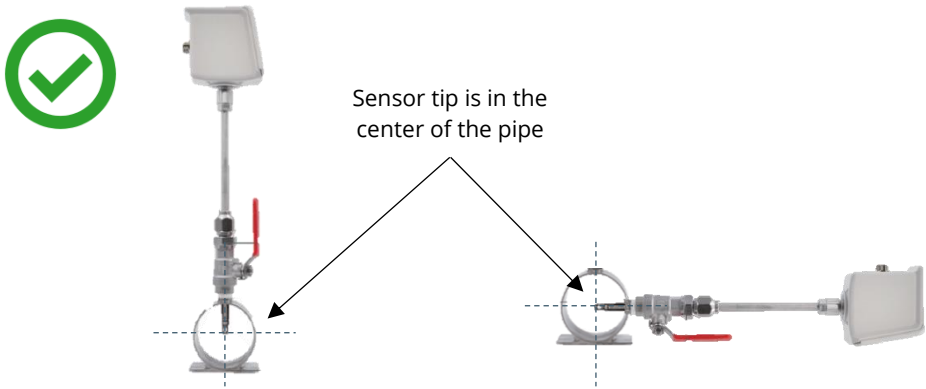
Therefore, the Insertion Depth =
 $100 \text{ mm} / 2 + 87 \text{ mm} = 50 \text{ mm} + 87 \text{ mm} = 137 \text{ mm}.$

Push in sensor until
Insertion Depth = 137 mm



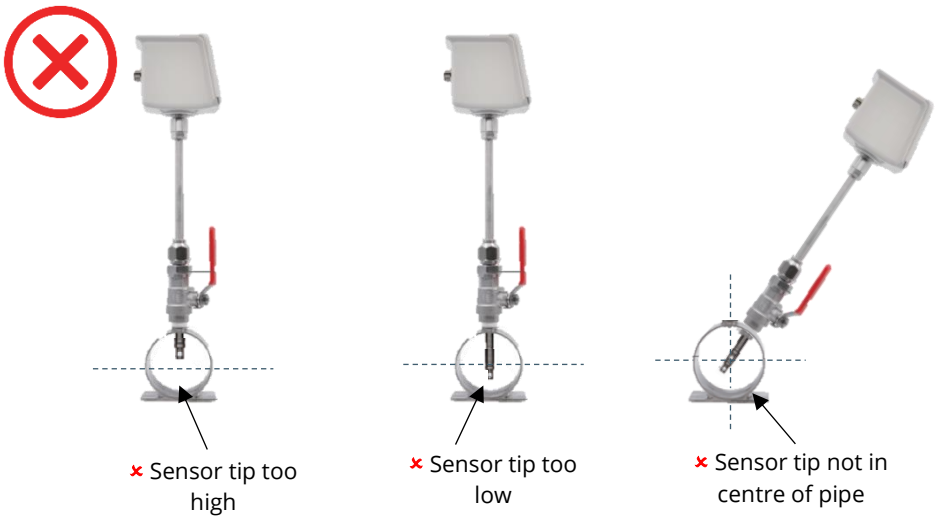
Correct Installation

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.



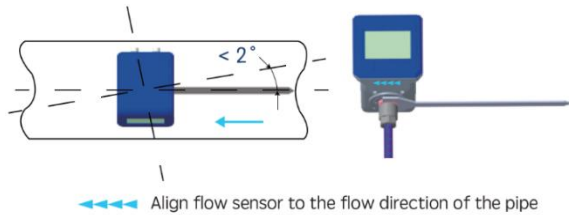
Step 4 – Align sensor with the direction of flow

The flow meter is **not** bidirectional. When installing and using the flow meter, please pay attention to the direction of gas 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.

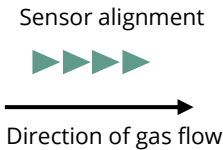


Use the alignment tool to align the sensor with the pipe. Ensure the arrows on the sensor match the direction of flow.



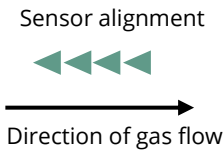
Correct Installation

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



Incorrect Installation

The sensor is aligned in the opposite direction to the gas flow.



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.
- Follow 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.

Step 5 - Wire the sensor for 24vDC power and communication

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.

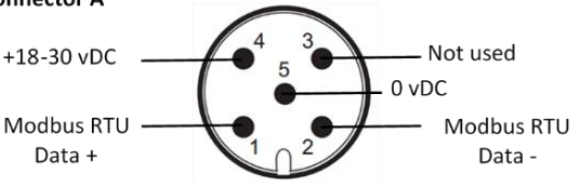
- Connector **A** is used for power and Modbus
- Connector **B** is used for 4-20mA and pulse



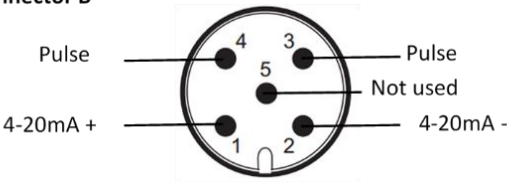
If you ordered a cable with the sensor, the cables will be coloured coded as shown in the table below.

Connector A (Power & Modbus)		Cable Colour	Connector B (Pulse & Analogue)	
Pin 1	RS845, Data + (A)	Brown	Pin 1	4-20mA +
Pin 2	RS845, 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



Configuring the Flow Meter

Step 6 - Set sensor settings

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

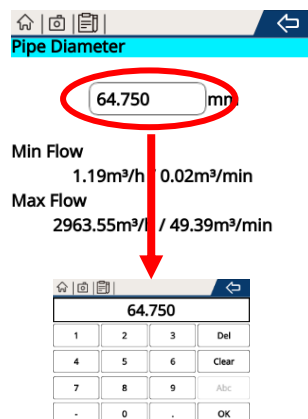


Pipe diameter refers to Inner Pipe diameter.
Not the outer diameter.

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

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	Address	Data Type	Byte Length	Description	Comments	Read / Write
0	0	FLOAT	4	Flow	Options: m ³ /min, m ³ /hr CFM	Read
3	2	FLOAT	4	Velocity	Options: m/sec f/sec	Read
9	8	FLOAT	4	Temperature	Options: °C °F	Read
23	22	UNSIGNED INTEGER	4	Consumption/ Totaliser	Options: m ³ CF	Read
51	50		2	Restart device Write "1" to restart device		Write
52	51		2	Device address (1-247)	Default = 1	Read/ Write
53	52		2	Baud Rate 12 = 1200 bps 24 = 2400 bps 48 = 4800 bps	Default = 9600	Read/ Write

Modbus Registers						
Holding Register	Address	Data Type	Byte Length	Description	Comments	Read / Write
				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	Default = 0 (None)	Read/ Write
55	54		2	Stop Bit 1 = 1 bit 2 = 2 bit	Default = 1 bit	Read/ Write

Using the Flow Meter



Operating the Flow Meter



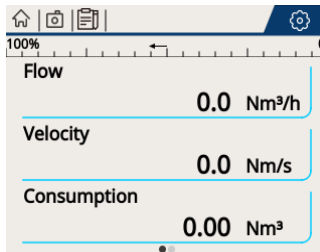
WARNING! Make sure the sensor is installed and wired correctly before powering up the sensor. Only use 24vDC to power the sensor.

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.

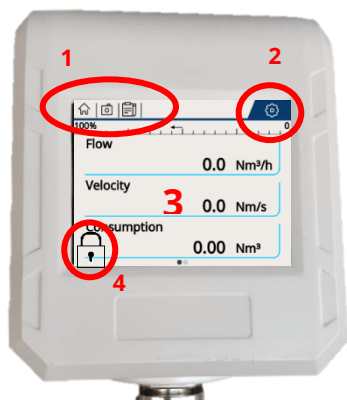
On powering up:

- The Compressed Air Alliance logo will appear on the screen.
- After a few seconds, you will see flow meter home screen. The flow meter is now ready to configure (see next page).

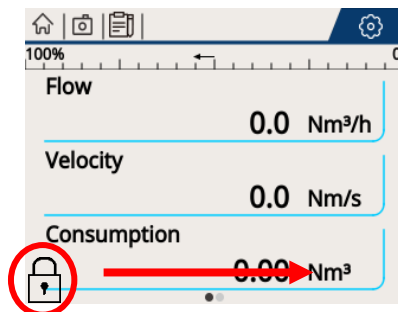


Flow Meter home screen. The sensor is ready to configure

Using the Display



Unlock the screen




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

The screen is set to automatically lock after 60 seconds.

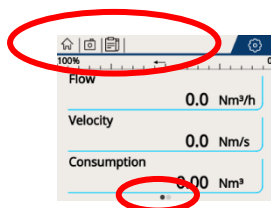
If the **lock screen symbol**  is present, press the symbol, hold and drag it to the right of the screen.

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

Menu Options


Menu	Sub Menus	Comments
Pipe Diameter		Set inner pipe diameter. This must be set when you install the flow meter
Unit Settings	Flow Unit Velocity Unit Consumption Unit Temperature Unit	Select units of measure
Gas Type		Select gas type
Data Logging	Logging	Set, start / Stop data logging
	History	Download data
Screen Shot		View and download screenshots
RS485 Settings	Baud Rate Parity Stop Bits Response Delay Device Address	View / update modbus communication settings
Analog output	2-20mA Channel 4-20mA Scaling Cubic Meter / Pulse	View / change 4-20mA settings
Normalisation		View / change the reference conditions of the flow meter
System Settings	Screen Settings	View / change screen rotation, screen brightness, timing for screen lock
	Language Setting	Change language – English or Chinese
	System information	View hardware / software information
	System Update	Update the firmware






Home Screen



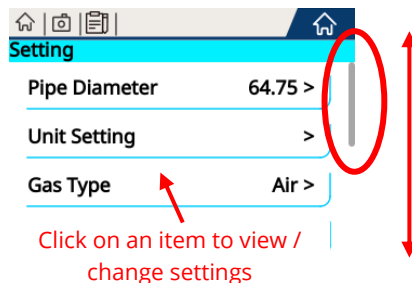
Scroll left or right to see other screens

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 () > System Setting.
- ✓ The **Notepad** icon () to access the Data Logging information
- ✓ If you have a USB drive 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.

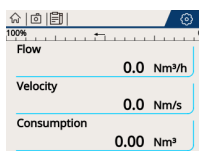
In the Settings Menu you can change / set up:

- ✓ Pipe diameter
- ✓ Units of measurement
- ✓ Gas type
- ✓ Data logging
- ✓ RS485 settings
- ✓ Analog output
- ✓ Screen shots
- ✓ Normalisation and
- ✓ System settings.

Inner Pipe Diameter



Min Flow
1.19m³/h / 0.02m³/min
Max Flow
2963.55m³/h / 49.39m³/min



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.

Unit of Measurement



Flow Unit Nm³/h >

Velocity Unit Nm/s >

Consumption Unit Nm³ >

Temperature Unit °C >

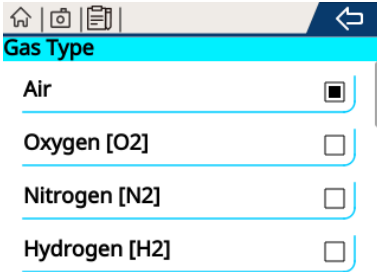
You can select from the following units of measure:

Measure	Units	
Flow	m³/h	cfm
	m³/min	Kg/h
	m³/s	Kg/min
	l/min	Kg/s
	l/s	
Velocity	m/s	
	ft/s	
Consumption	m³	kg
	ft³	
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.

Gas Type



You can select from the following gas types:

Gas Types
<ul style="list-style-type: none"> ✓ Air ✓ Argon (Ar) ✓ Carbon dioxide (CO2) ✓ Helium (He) ✓ Hydrogen (H2) ✓ Natural Gas ✓ Nitrogen (N2) ✓ Nitrous oxide (N2O) ✓ Oxygen (O2)





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.

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.

RS485 Setting



RS485 Setting

Baud Rate	9600 >
Parity	None >
Stop Bits	1 >
Response Delay	0 >

You can change the modbus settings – baud rate, parity, stop bits, response delay and device address.





Default Modbus settings are:

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

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

Analog Output



Analog Output

4-20mA Channel	Velocity >
4-20mA Scaling	0~250 >
Cubic Meter/Pulse	1 >

Here you can set / change:

- ✓ The 4-20mA scaling (high and low)
- ✓ Cubic meter / Pulse
- ✓ 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	

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

Normalization

Normalization

Flow Unit Prefix

☒ Normal ☐ Standard ☐ FAD

Default Temperature 20°C

Temperature °C

Default Pressure 100kPa

Pressure kPa

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

System Settings

System Setting

Screen Setting >

Language Setting >

System Information >

System Update >


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

Screen Settings

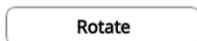
The screen settings let you change:

- ✓ 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.

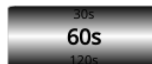
Change Screen Brightness



Rotation: Rotate

Brightness:

Screen Timeout:

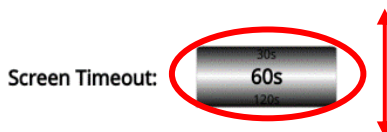



- To change the screen brightness, drag the bar left or right

Change Screen Timeout

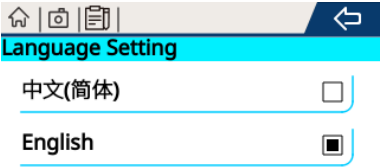
The screen is set to automatically lock after 60 seconds.

- 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.


Language Setting



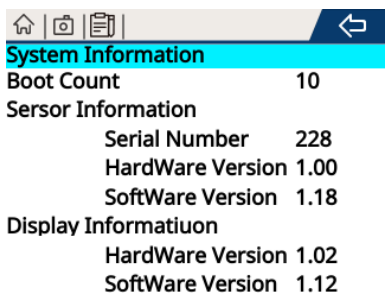
The Language Setting allows you to change between English and Chinese.

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

System Information



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** = Short serial number of the unit. The full serial number is 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 on a micro USB.

To update the firmware:

- Plug the USB drive 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

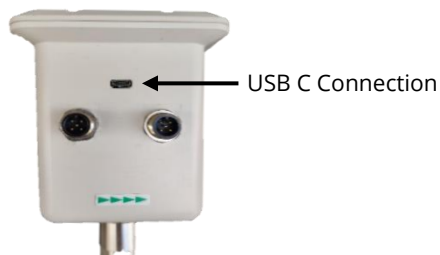
Advanced Settings

If you need to access the advanced settings, please contact your local dealer. Alternatively, contact Compressed Air Alliance.

Advanced settings let you change:

- Velocity Offset Ratio
- Velocity Filter Grad
- Consumption
 - 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 0.1m/s.
- Set new password
- Password Reset



Data Logging

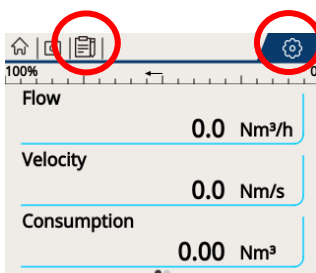



You can record data to a USB drive and download data as a CSV file. The USB C connection is on the back of the flow meter head.

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

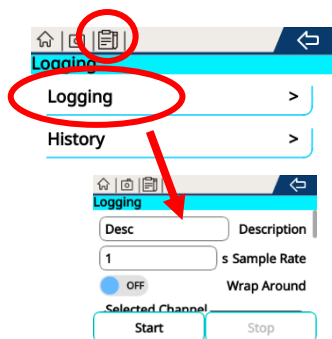
To set up data logging, view data logging history and start or stop data logging go to the **"Logging"** menu. You can access the data logging menu via:

- ✓ 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 drive, press the **USB icon** () on the top left of the screen to safely remove the USB.

Set up Data Logging


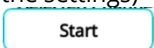
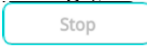



To set up data logging:

- 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 drive into the back of the flow sensor
- Press Export
- Press the arrow () to save settings and return to the previous screen

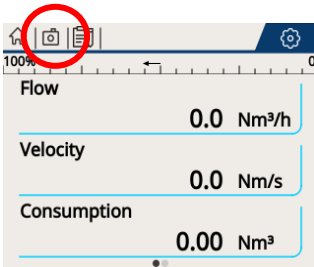
Delete Data


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.



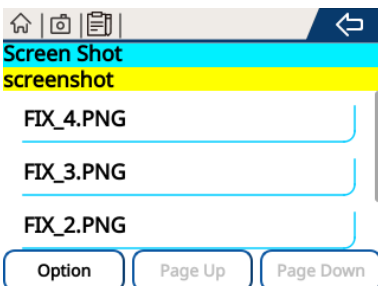
To access the screen shots, go to the **Settings Menu** () > **Screen Shots**.

Here you can:

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

View a picture

Press the picture name to view the picture.

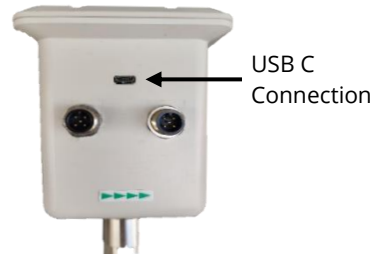


Delete Pictures

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

Trouble
Shooting



FAQ

How much data will the flow meter record?

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

Example: Recording flow, consumption and temperature at 1 second increments will record three (3) samples (flow, consumption, temperature) per second. Therefore $3 \text{ samples} \times 60 \text{ seconds} = 180 \text{ samples per minute}$. $180 \text{ samples/min} \times 60 \text{ minutes} = 10,800 \text{ samples per hour}$. $10,800 \text{ samples/hour} \times 24 \text{ hours} = 259,200 \text{ per day}$. So $10,000,000 / 259,200 \text{ samples per day} = 38 \text{ days of data recording}$.

Example: Recording only one measurement (eg flow) will record one (1) sample. If you record flow at 10 second increments you can record: $1 \text{ sample} \times 6 = 6 \text{ samples per min} \times 60 \text{ min} = 360 \text{ samples / hour} \times 24 \text{ hours} = 8,640 \text{ samples per day} \times 365 \text{ days per year} = 3,153,600 \text{ per year}$.

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 DAS system (a cloud based compressed air and energy management system) or your own SCADA.

If the flow meter losses 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).



How do I get the Compressed Air Alliance App?

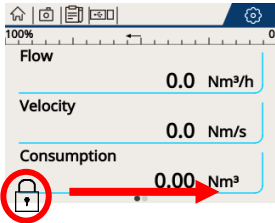
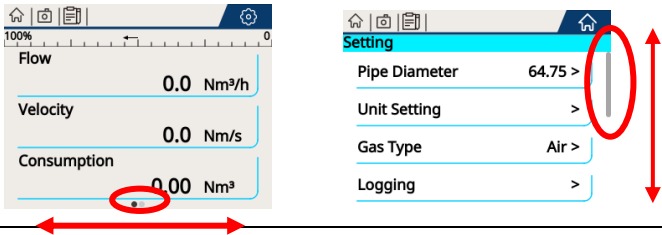
Contact Compressed Air Alliance or your local dealer for the App.

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

Problem	Possible Causes	Suggested Action
Readings are different than expected	Flow meter installed incorrectly, eg upside down, too close to bends	Check installation <ul style="list-style-type: none"> • Is the flow meter at 90° to pipe • Is flow meter upside down? • Is flow meter too close to bends, obstructions, etc? • Is the sensor tip in the centre of the pipe? • Do the arrows on the flow meter head match the direction of gas flow?
	Flow meter is wired incorrectly	Check Wiring Check wire colours match pins
	Flow meter not configured for system	Check / update the following settings: <ul style="list-style-type: none"> • Inner Pipe diameter (not outer diameter) • Unit of Measurement • Gas Type • Communication settings (RS485 or Analog)
	Gas is off	Turn gas on. Open isolation valves
	Normalization data has changed	Reset normalisation to factory default: <ul style="list-style-type: none"> • Flow Unit Prefix = Normal • Temperature = 20°C • Pressure = 100 kPa.
	Flow meter is due for calibration	Calibrate sensor. Compressed Air Alliance can help with calibration

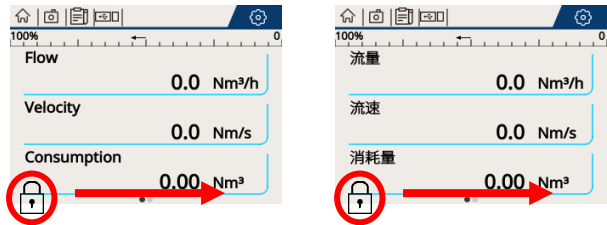
Problem	Possible Causes	Suggested Action
	Incorrect flow meter for your system	Check that the sensor's specifications are suitable for your system.
The touch screen isn't working	You are using hard objects to operate the display, eg fingernails, pens	Use the fleshy part of your finger to touch the screen. The touch screen does not work if you use finger nails or pens.
	Screen is locked	The screen automatically locks when not in use. To unlock the screen, slide the lock symbol (🔒) to the right.
		
I can't see all menu items	On some menus, you will need to scroll up and down (or left and right) to see all items.	
		
I can't access the CAA App	Trying to use App on iPhone	The CAA App only works on Android phones.
	Update needed	Contact your local distributor or CAA to get the latest version of the CAA App

Problem	Possible Causes	Suggested Action
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The screen is in the wrong language

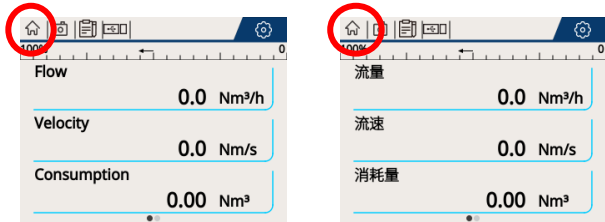
Step 1 – Unlock Screen

Slide the lock symbol (🔒) to the right.



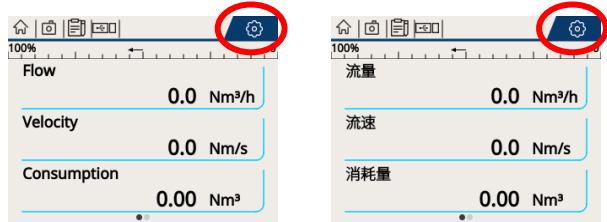
Step 2 – Go to the home page.

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.



Problem	Possible Causes	Suggested Action
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Step 4 – Go to System Setting

Scroll to the bottom of the settings screen. Press the “System Setting” menu – **2nd menu from bottom**




Step 5 – Go to Language Setting

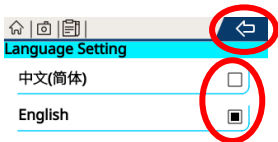
Scroll to the top of the System Settings screen. Press the “Language Setting” menu – **2nd menu from top**



Step 6 – Select desired language

Select the desired language

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



Default / Factory Settings

To reset the flow meter to factory settings or default settings, you will need to manually adjust the following settings:

Setting	Default Value / comments	
Settings		
Pipe Diameter	64.75	
Unit Setting	Flow Unit	Nm³/min
	Velocity Unit	Nm/s
	Consumption Unit	Nm³
	Temperature Unit	°C
Gas Type	Air	
Normalisation	Flow Unit Prefix	Normal
	Default Temperature	20°C
	Default Pressure	100kPA
RS485 Setting	Baud Rate	9600
	Parity	None
	Stop Bits	1
	Response Delay	0
	Device Address	1
Analog Setting	4-20mA Channel	Velocity
	4-20mA Scaling – Low	0
	4-20mA Scaling – High	250
	Cubic Meter/Pulse	5
System Settings	Screen Setting > Screen Timeout = 60s	

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:

- Phone:
 - Australia: 1300 558 526
 - International: +61 494095632
- What'sApp: +61 494095632
- E-mail: sales@compressedairalliance.com



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