# User Manual

# Flow Meter – Thermal Mass (Outdoor, Insertion)

# Model: FLO

# Table of Contents

# 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 that 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 personal 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 sensors 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 environments.

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.

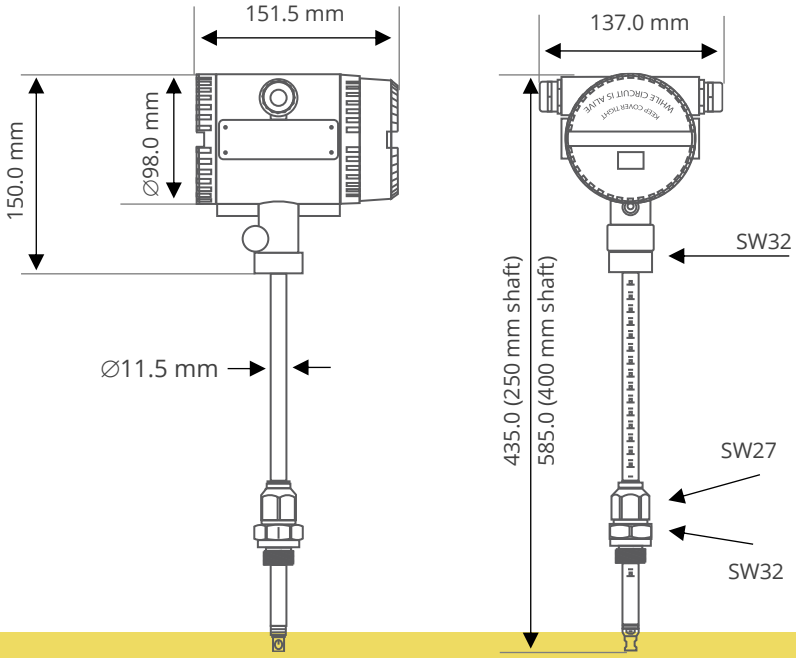
- **insertion type sensors** which are easy to install under pressure through a 1/2" ball valve.
- **inline type sensors** are more suited to permanent installations or where shutting down the system to calibrate the sensor is not an issue.

# 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)<br>*Accuracy is affected by the installation location, on-site conditions and contaminants such as oil, high humidity or other impurities* | |
| | Measurement Ranges | |
| Flow Measurement | 0.1 to 250 Nm/sec | 0.3 to 820 ft/sec |
| Pressure Measurement | 0 to 50 bar (725 psi)<br>(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 / Pulse output<br>Digital: RS485 Modbus / RTU | |
| Output Signals | Flow, mass flow, consumption and temperature | |
| | Power | |
| Power Supply | 18 to 30VDC / 5W@24V | |
| Electrical Connection | Terminal Strip | |
| EMC | According to IEC 61326-1 | |
| | Display | |
| Display | 2.8” LCD with touch panel | |

| | Other Information | |
|---|---|---|
| Bi-directional | No | |
| Data Logger | No | |
| Pipe Size | DN20 to DN300 | |
| Shaft Lengths | 250 mm **or** 400 mm | 9.8" **or** 15.7" |
| 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 *provided the sensor is not exposed to relative humidity above 85%* | |
| Warranty Period | 12 Months | |
| Reference Conditions | 20°C, 1bar(a), ISO1217 | |

## 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)
- ✓ Calibration Certificate

**Flow Meter Pack**

Flow Meter

O-Ring

Adjustment tool

# 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 flow direction is indicated on the housing.
- Avoid condensation on the sensor element as this will affect the accuracy enormously.
- The sensor can be used indoor or outdoor.
- 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.

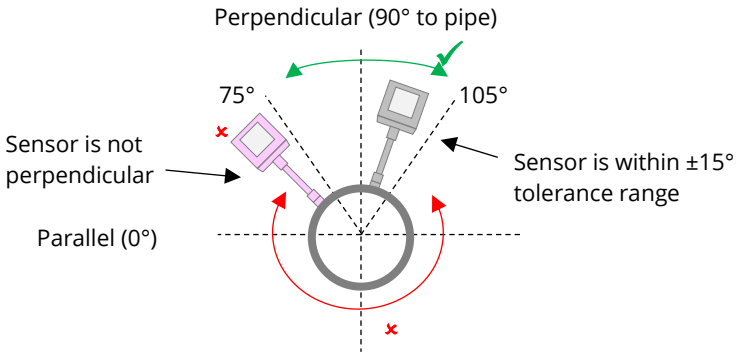
## Step 1 – Find a suitable section of pipe

The sensor **must** be installed:

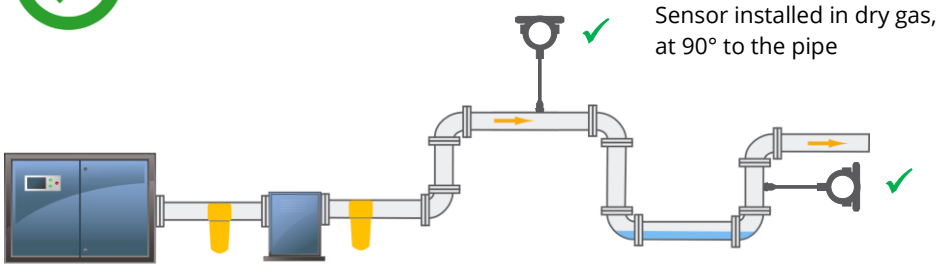
- ✓ at 90° to the pipe, +/- 15° (ie within 75° to 105°).
- ✓ vertically or horizontally,
- ✓ away from bends, edges, seams, changes in pipe size and other obstructions,
- ✓ in dry gas (gas humidity should be less than 80% relative humidity (RH)).
- ✓ in clean gas (the sensor should be installed after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

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

**Install 90° (perpendicular) to pipe**

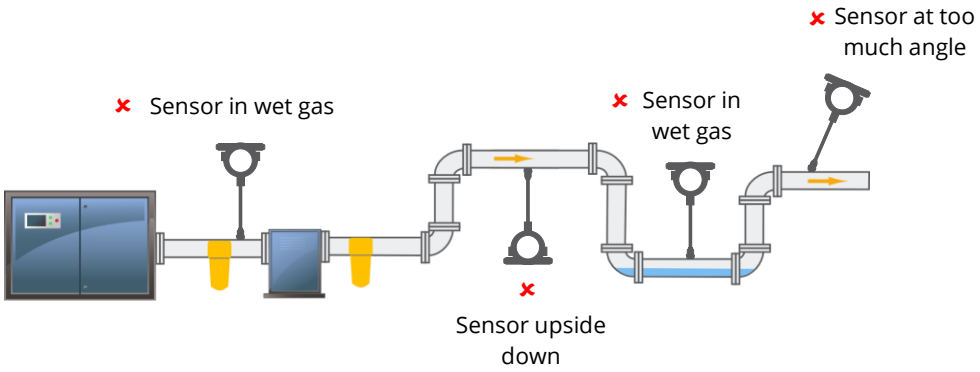


## Correct Installation




## 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, curves, 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.

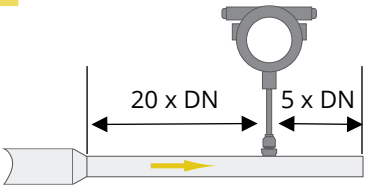
### Notes

- 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.

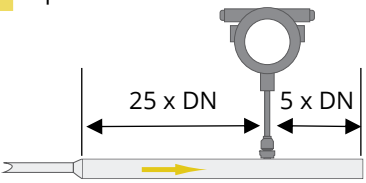
## Correct Installation

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.

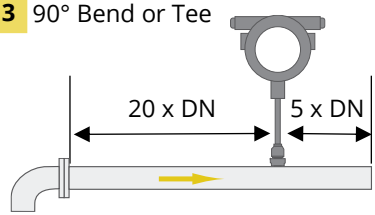
**1** Reduction



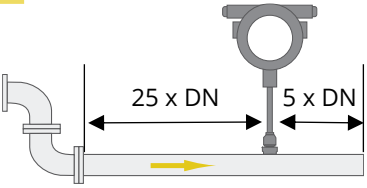

**2** Expansion



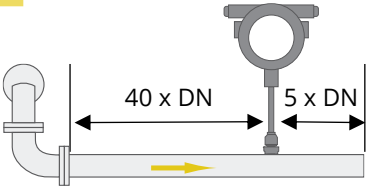

**3** 90° Bend or Tee



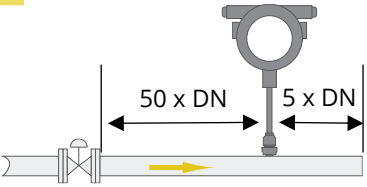

**4** 2 x 90° Bends



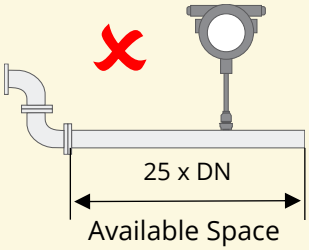

**5** 2 x 90° Bends (3 dimension)




**6** Valve or Regulator



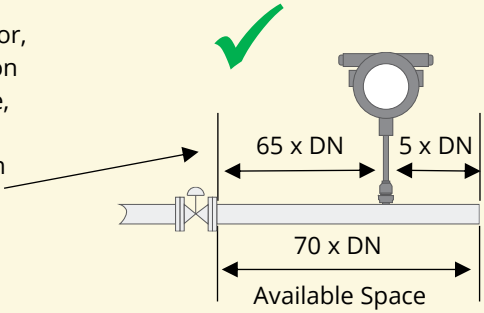
## Examples



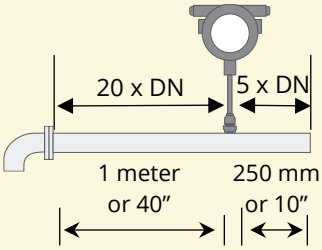

- To install a flow meter near 2 x 90° bends, you need at least 30 DN of space (25 DN on the inlet side + 5 DN on the outlet side, see diagram 4 on previous page)
- Only 20 DN is available.
- Therefore, the sensor should **not** be installed in this location

---

- 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




---




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

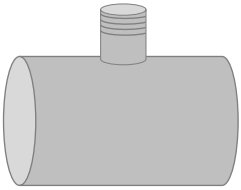
To install the sensor, you need a connection point on the pipe, eg a ball valve or a nozzle or nipple. The thread must be G 1/2".

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 unpressurised pipes. See the Compressed Air Alliance website for information on hot tap drills and clamps.

Ball Valve
(full bore)

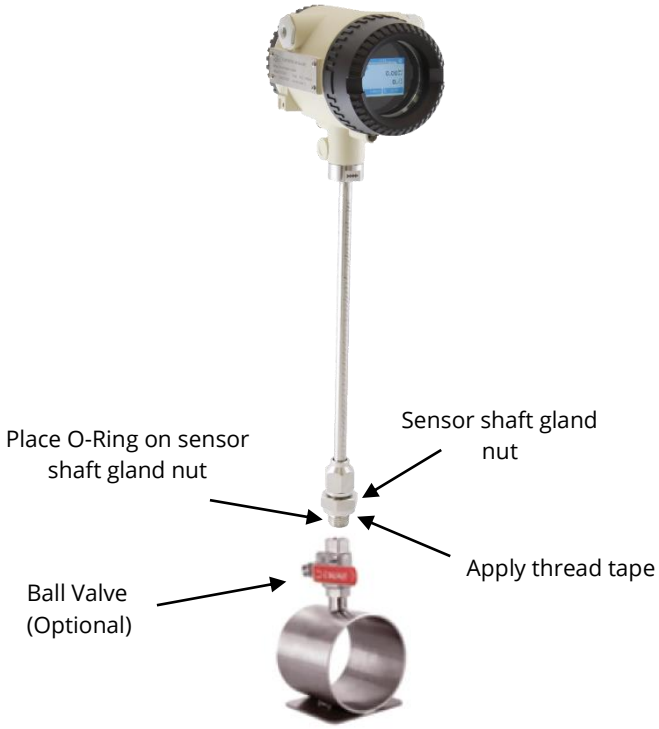
**OR**



Welded nipple on pipe

## Step 3 - Fit Flow meter

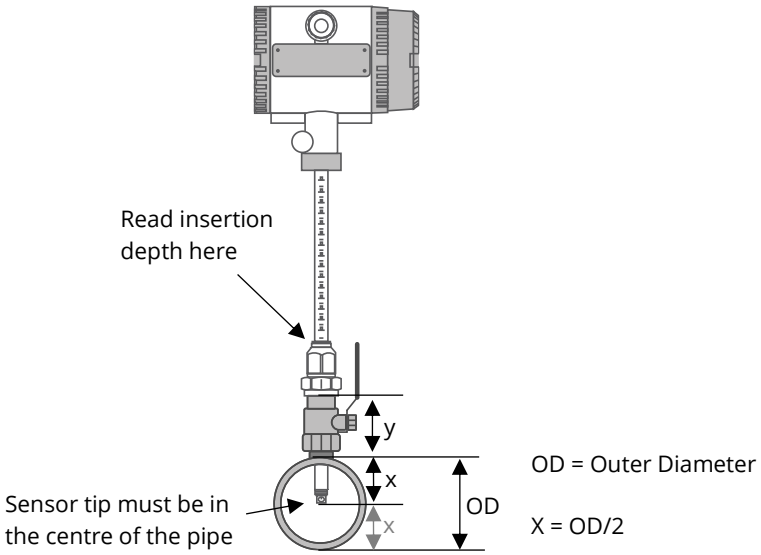
- Place O-Ring on sensor shaft gland nut.
- Wrap thread tape / sealant tape around sensor thread. Do not let tape enter pipe.
- Screw the sensor into the connection point.
- If using a ball valve, open the valve.



- 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.

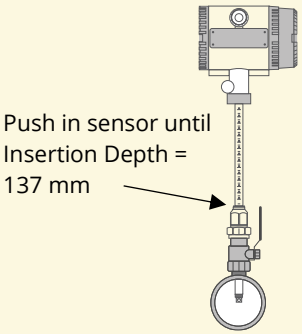



**Example**

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.

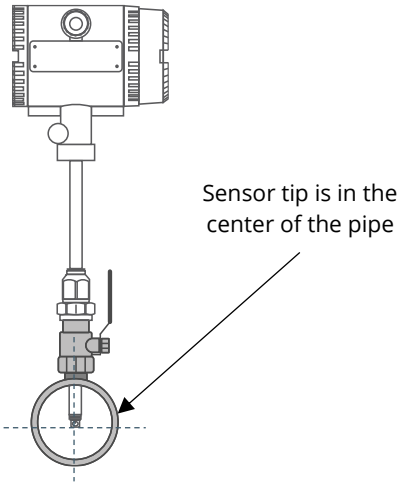
The Insertion Depth = OD/2 + y
where y = height of the ball valve.

Therefore, the Insertion Depth =
100 mm / 2 + 87 mm = 50 mm + 87 mm = 137 mm.



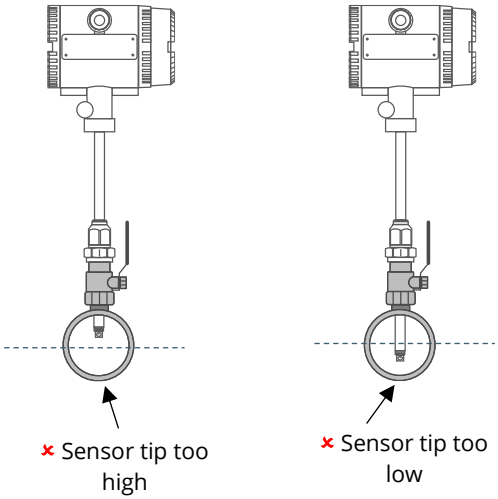
## Correct Installation

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

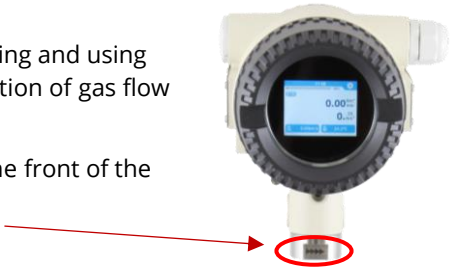



## Incorrect Installation

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



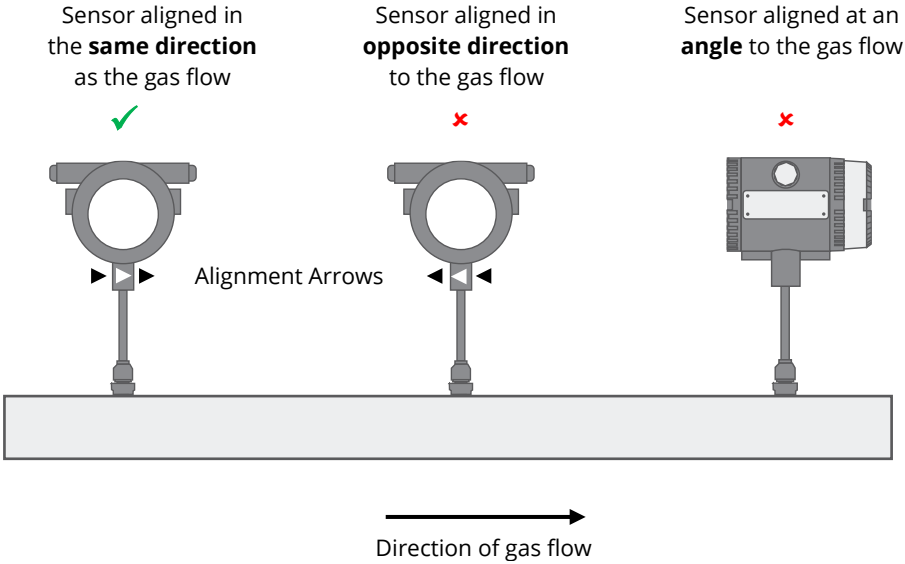
## Step 4 – Align sensor with the direction of flow



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 is flow is marked by 4 arrows on the front of the sensor head.

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



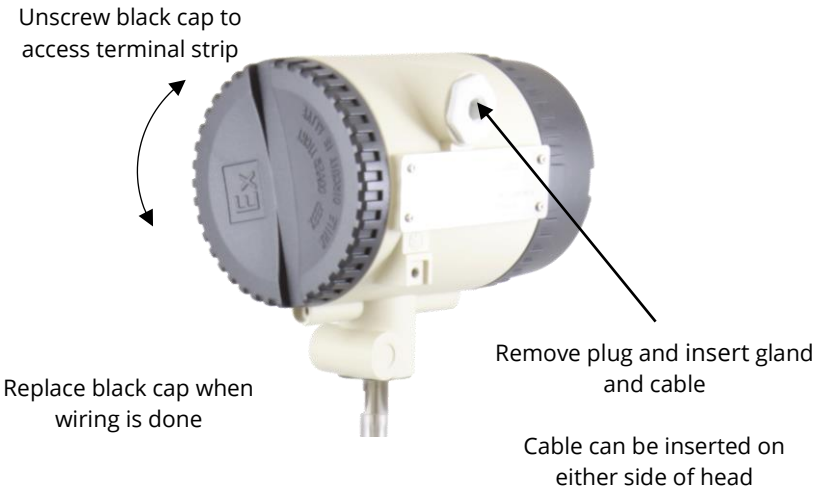
# Installation – Electrical

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

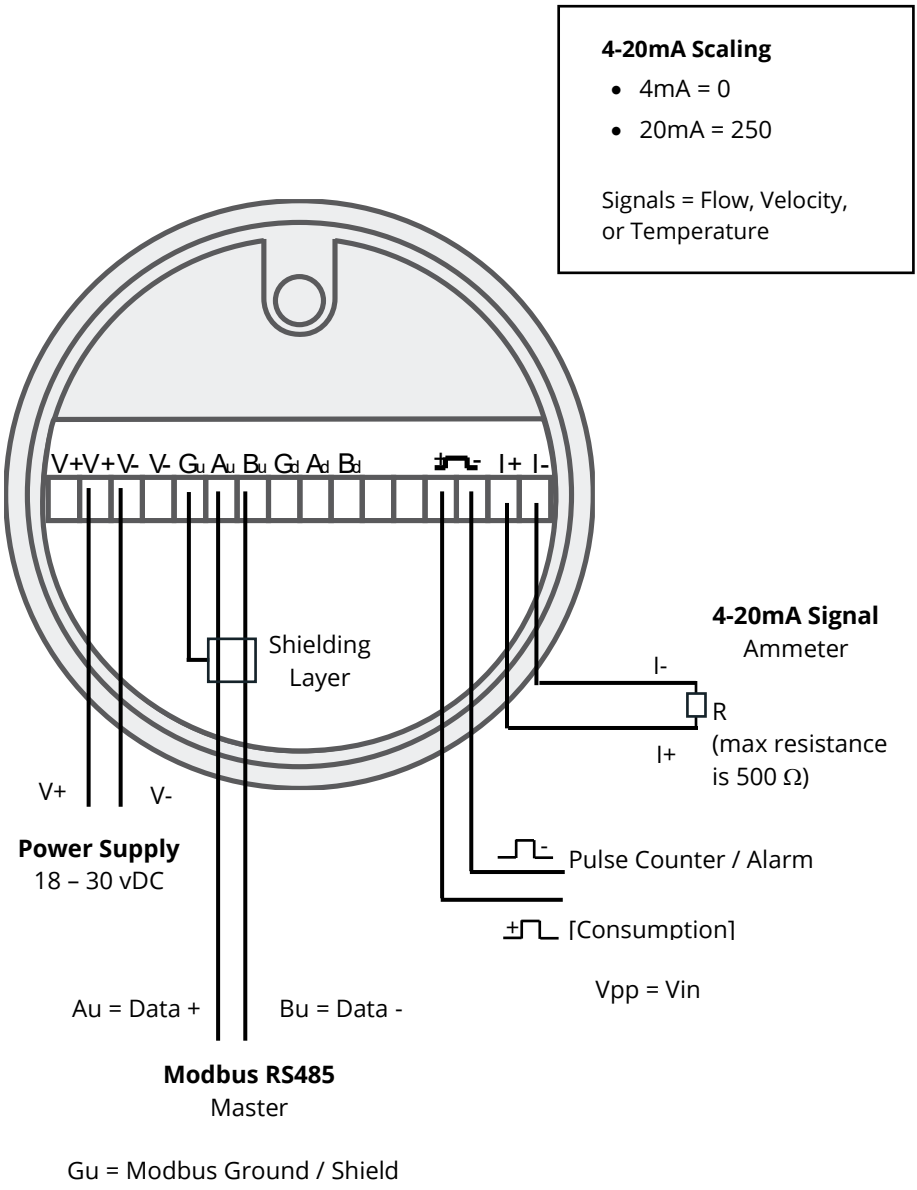
## Notes:

- 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 personnel.
- Compressed Air Alliance recommends the use of bootlace terminals

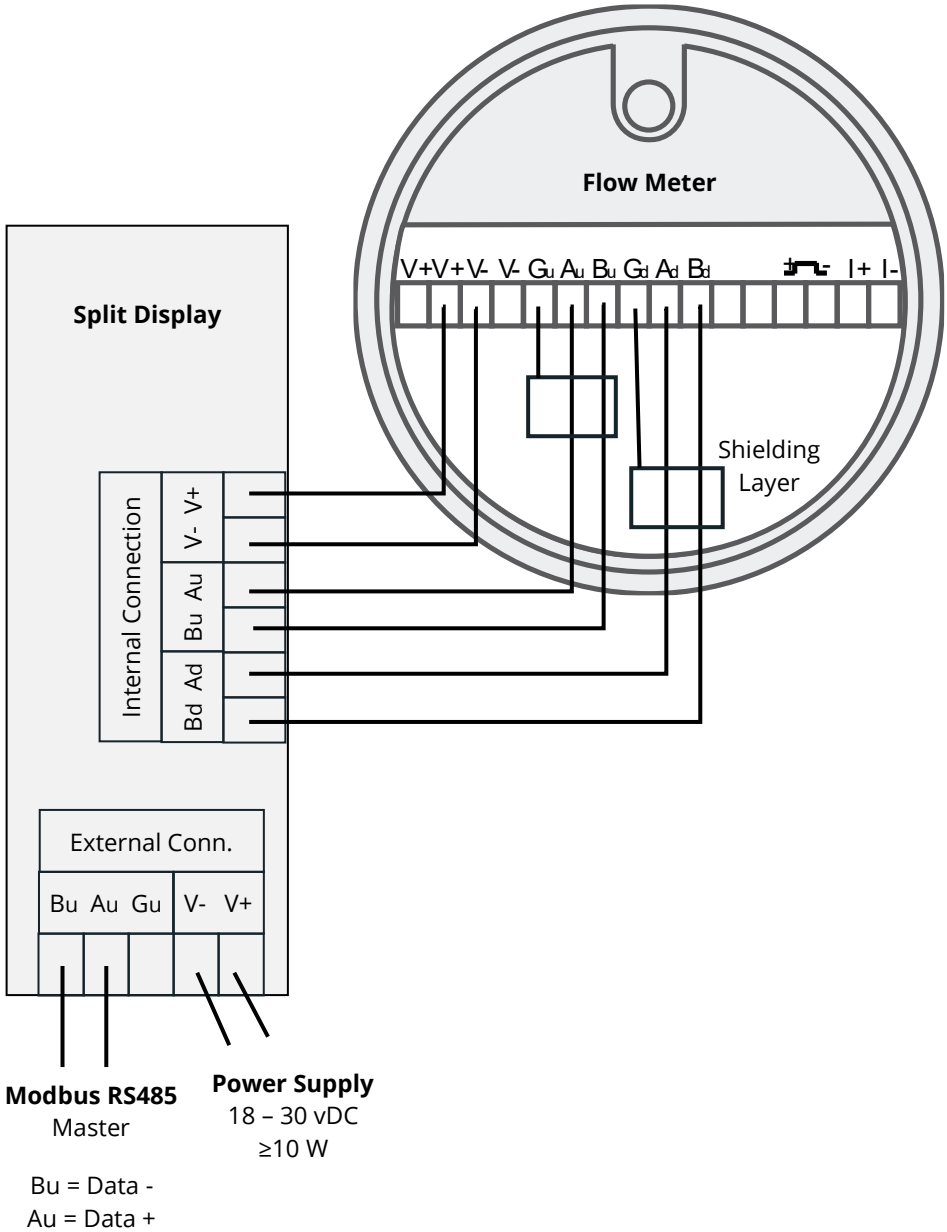
## Step 5 - Wire the sensor for 24vDC power & communication



## Wiring for Flow Meter with Inbuilt Display



## Wiring for Flow Meter with Separate / Split Display



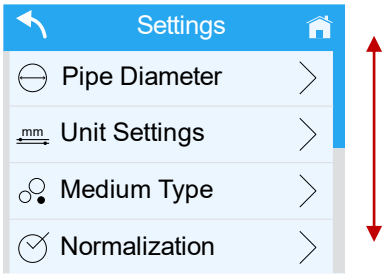
# Configuring the Flow Meter

## Step 6 - Set sensor settings

Unscrew black cap to access touch screen.

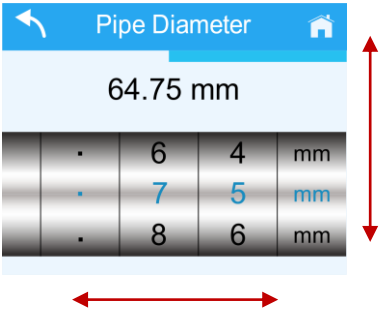
Replace cap when done

Press the Settings icon to view / change settings




Scroll up and down to see more options

Tap to select that menu




Scroll left and right to see more options

Scroll up and down to select the number. (Selected number is on the middle row)

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**.
- Enter new **inner** diameter of the pipe, in millimeters (mm)
  - You will need to swipe left and right to see all options
  - You will need to scroll up and down to select the number.
- 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)

# Modbus Settings

## Default Settings

| 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 ms | 7 Characters |

## Modbus Registers

Settings can be changed to suit system requirements. **Note**: These settings will take effect after writing a "1" to the holding register address 50. Then Modbus master must change communication settings accordingly in order to communicate with the slave.

**Holding register definition**

- Modbus read command: 0x03

- Modbus write command: 0x06 for single register, 0x10 for multiple register

- Coil registers write command: 0x05

**Byte Order**

Data is little end, and least significant bit transmitted first

32bit: CD AB 64bit: GH EF CD AB

| Registers | | | | | |
|---|---|---|---|---|---|
| Holding Register Adress | Data Type | Byte Length | Data / Description | Comments | Read / Write |
| 0 | FLOAT_L | 4 | Flow | | Read |
| 2 | FLOAT_L | 4 | Velocity | | Read |
| 4 | DOUBLE_L | 8 | Consumption | Write “0” to clear value | Read/ |

| Registers | | | | | |
|---|---|---|---|---|---|
| Holding Register Adress | Data Type | Byte Length | Data / Description | Comments | Read / Write |
| | | | | | Write |
| 8 | FLOAT_L | 4 | Temperature | | Read |
| 22 | UNSIGNED LONG | 4 | Consumption | 4 byte valve type<br>Write “0” to clear value | Read/ Write |
| 26 | UNSIGNED INT | 2 | Gas Type | **0 = Air (Default)**<br>1 = Oxygen (O2)<br>2 = Nitrogen (N2)<br>3 = Hydrogen (H2)<br>4 = Carbon monoxide (CO)<br>5 = Carbon dioxide (CO2)<br>6 = Sulfur hexafluoride (SF6)<br>7 = Argon (Ar)<br>8 = Helium (He)<br>9 = Nitrous oxide (N2O)<br>10 = Methane (CH4)<br>11 Ethane (C2H6)<br>12 Propane (C3H8)<br>13 Butane (C4H10) | Read/ Write |
| 27 | UNSIGNED INT | 2 | Flow Unit | 0 = m³/h (Nm³/h)<br>**1 = m³/min (Nm³/min) (Default)**<br>2 = m³/s (Nm³/s)<br>3 = l/min (Nl/min)<br>4 = l/s (Nl/s)<br>5 = cfm (Ncfm)<br>6 = kg/h<br>7 = kg/min<br>8 = kg/s | Read/ Write |
| 28 | UNSIGNED INT | 2 | Velocity Unit | **0 = m/s (Nm/s) (Default)**<br>1 = ft/s (Nft/s) | Read/ Write |
| 29 | UNSIGNED INT | 2 | Consumption Unit | **0 = m³ (Nm³) (Default)**<br>1 = ft³ (Nft³)<br>2 = kg | Read/ Write |
| 30 | UNSIGNED INT | 2 | Temperature Unit | **0 = °C (Default)**<br>1 = °F | Read/ Write |

| Registers | | | | | |
|---|---|---|---|---|---|
| Holding Register Adress | Data Type | Byte Length | Data / Description | Comments | Read / Write |
| 32 | FLOAT_L | 4 | Pipe Inner Diameter | | Read/ |
| 50 | UNSIGNED INT | 2 | Restart device<br>Write “1” to restart device | | Write |
| 51 | UNSIGNED INT | 2 | Device address | Range = 1-247<br>Default = 1 | Read/ Write |
| 52 | UNSIGNED INT | 2 | Baud Rate (bps) | 12 = 1200<br>24 = 2400<br>48 = 4800<br>**96 = 9600 (Default)**<br>144 = 14400<br>192 = 19200<br>384 = 38400<br>560 = 56000<br>576 = 57600<br>1152 = 115200 | Read/ Write |
| 53 | UNSIGNED INT | 2 | Parity | **0 = None (Default)**<br>1 = Odd<br>2 = Even | Read/ Write |
| 54 | UNSIGNED INT | 2 | Stop Bit | **1 = 1 bit (Default)**<br>2 = 2 bit | Read/ Write |
| 55 | UNSIGNED INT | 2 | Response Time Out | Range = 0 to 255 ms in 1 ms/step<br>Default = 0 ms | Read/ Write |

# Using the Flow Meter

# Operating the Flow Meter

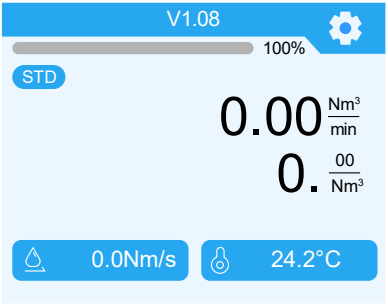
**WARNING!** Make sure the sensor is installed and wired correctly before powering up the sensor. Only use 24vDC to power the sensor.

## 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).



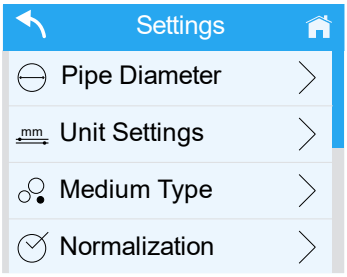

Flow Meter home screen. The sensor is ready to configure

# Using the Display

Unscrew black cap to access touch screen.

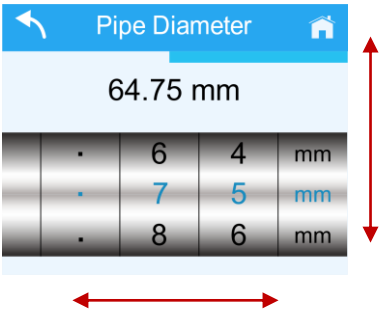
Replace cap when done

Press the Settings icon to view / change settings




Scroll up and down to see more options

Tap to select that menu




Scroll left and right to see more options

Scroll up and down to select the number. (Selected number is on the middle row)

## Menu Options

| Menu | Sub Menus | Options / Comments |
|---|---|---|
| Pipe Diameter | - | Set inner pipe diameter.<br>**This must be set when you install the flow meter** |
| Unit Settings | Flow Unit | $m^3/h$ l/min Kg/h<br>$m^3/min$ l/s Kg/min<br>$m^3/s$ cfm Kg/s |
| | Velocity Unit | m/s ft/s |
| | Consumption Unit | $m^3$ $ft^3$ kg |
| | Temperature Unit | °C °F |
| Medium Type | - | Air<br>Argon (Ar)<br>Carbon dioxide (CO2)<br>Carbon monoxide (CO)<br>Helium (He)<br>Hydrogen (H2)<br>Nitrogen (N2)<br>Nitrous oxide (N2O)<br>Oxygen (O2)<br>Sulfur Hexa (SF6)<br>Methane (CH4)<br>Ethane (C2H6)<br>Propane (C3H8)<br>Butane (C4H10) |
| | **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 | |
| Normalisation | Temperature | The Normalization screen lets you change the reference conditions of the flow meter. The Flow Meter will readjust is calculations to suit the new normalization valves.<br>The normalization setting should only be changed if the flow meter is installed under conditions that differ from the |
| | Pressure | |

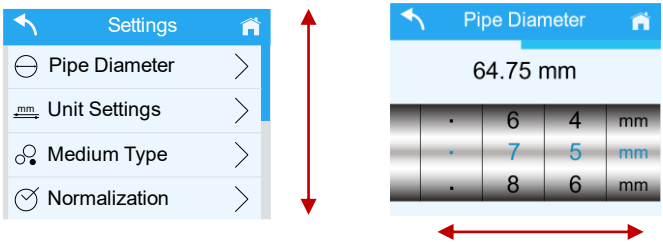
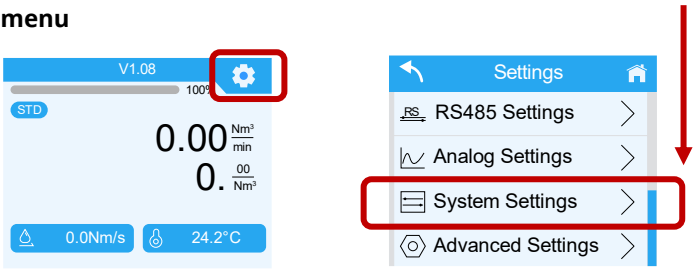
| Menu | Sub Menus | Options / Comments | |
|---|---|---|---|
| | | standard calibration (20°C, 1 bar, 0% relative humidity).<br><br>Default Values:<br>• Temperature = 20°C<br>• Pressure = 100.00kPa | |
| RS485 Settings | | **Options** | **Default Settings** |
| | Device Address | 1 to 247 | 1 |
| | Baud Rate | 1200<br>2400<br>4800<br>9600<br>14400<br>19200<br>38400<br>56000<br>57600<br>115200 | 9600 |
| | Parity | None<br>Odd<br>Even | None |
| | Stop Bits | 1<br>2 | 1 |
| | Response Delay | 0 to 999 ms | 0 |
| Analog output | | **Options** | **Default Settings** |
| | 4-20mA Channel | Flow<br>Velocity<br>Temperature | Velocity |
| | 4-20mA Scaling Low | ±0 to ±9999999.99 | 0.00 Nm/s |

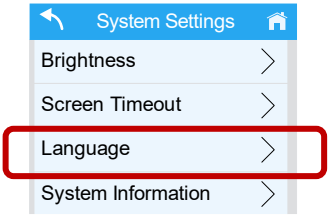
| Menu | Sub Menus | Options / Comments | |
|---|---|---|---|
| | 4-20mA Scaling High | ±0 to ±9999999.99 | 250.00 Nm/s |
| | Pulse Settings | 1m$^3$/Pulse<br>5m$^3$/Pulse<br>10m$^3$/Pulse | 5m$^3$/Pulse |
| System Settings | Brightness | View / change screen brightness | |
| | Screen Timeout | View / change timing for screen lock from 15 seconds to 10 minutes | |
| | Language | Change language – English or Chinese | |
| | System information | • **Power Up Times**: Number of times the sensor has been disconnected and reconnected to power<br>• **Sensor Information**: Serial Number, hardware version and software version<br>• **Display Information**: Serial Number, hardware version and software version | |
| Advanced Settings | | These settings are password protected. They should not be changed as they will affect the flow meter readings and accuracy. Advanced settings let you change:<br>• Velocity Offset Ratio<br>• Consumption<br>• Cut Off Velocity<br>  ○ 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.<br>• Velocity Filter Grade<br>• Change Password | |

# Trouble Shooting

# 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<br>• Is the flow meter at 90° to pipe<br>• Is flow meter upside down?<br>• Is flow meter too close to bends, obstructions, etc?<br>• Is the sensor tip in the centre of the pipe?<br>• Do the arrows on the flow meter head match the direction of gas flow? |
| | Flow meter is wired incorrectly | Check Wiring |
| | Flow meter not configured for system | Check / update the following settings:<br>• Inner Pipe diameter (not outer diameter)<br>• Unit of Measurement<br>• Gas Type<br>• Communication settings (RS485 or Analog) |
| | Gas is off | Turn gas on.<br>Open isolation valves |
| | Normalization data has changed | Reset normalisation to factory default:<br>• Temperature = 20°C<br>• 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. |
| 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 |
| The screen is in the wrong language | Step 1 – Select the Settings icon<br>Step 2 – Scroll to the bottom of the page and select the **2nd last menu**   | |

| Problem | Possible Causes | Suggested Action |
|---|---|---|
| | | Step 3 – Scroll to the bottom of the page and select the **2nd last menu**<br><br>Step 4 – Select desired language<br><br>Step 5 - Press the arrow button  to save your selection and return to the previous screen<br><br>  |

# 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<br>Velocity Unit<br>Consumption Unit<br>Temperature Unit | $Nm^3$/min<br>Nm/s<br>$Nm^3$<br>°C |
| Gas Type | Air | |
| Normalisation | Default Temperature<br>Default Pressure | 20°C<br>100kPA |
| RS485 Setting | Baud Rate<br>Parity<br>Stop Bits<br>Response Delay<br>Device Address | 9600<br>None<br>1<br>0<br>1 |
| Analog Setting | 4-20mA Channel<br>4-20mA Scaling – Low<br>4-20mA Scaling – High<br>Cubic Meter/Pulse | Velocity<br>0<br>250<br>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

# Compressed Air Alliance Pty Ltd

Address: 2/7 Narabang Way, Belrose NSW 2085, Australia

Phone / WhatsApp: +61 494 095 632

E-mail: sales@compressedairalliance.com

Website: www.compressedairalliance.com