User Manual

Permanent Oil Vapour Monitor

Model: PUR1

Table of Contents

Notices & 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 product. Should the product 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 application described in this manual. Use of this product in conditions not specified in this manual or, contrary to the instructions provided by the manufacturer, is considered improper handling (mishandling) of the product and will void the warranty. The manufacturer will not be held liable for any damages resulting from improper use or mishandling 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.**

CAA Sensors 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 CAA Sensors.

Warnings

Ignoring 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

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 pressure range.
- Only use pressure rated installation materials and parts.
- Make sure hoses, tubes, fittings and air tools are in good condition and attached correctly.
- Ensure the system is not under pressure when performing repair & maintenance.

Electrical Safety

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.

Do not use this product in explosive environments.

The system must be disconnected from any power supply during maintenance work.

Any electrical work on the system is to be performed by authorized personnel only.

Battery Safety

Only use accessories or chargers recommended by the manufacturer.

The built-in battery cannot be dismounted. Please contact the manufacturer for repair if necessary.

Transportation and Storage

The product should be transported and stored in its original packaging.

Make sure the product is stored at a temperature between -20°C to +45°C (-4°F to +113°F) and the humidity is <40%, no condensation.

Avoid direct UV and solar radiation during storage.

The manufacturer is not responsible for incidental damage caused by transportation or storage.

Cleaning

If you need to clean the product we recommend using a clean, dry cloth. For stubborn marks, use distilled water or isopropyl alcohol only.

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

Oil Vapour Monitor

Intended Use

CAA Sensors' Oil Vapour Monitor is suitable for use in manufacturing, pharmaceutical, industrial and base building environments providing the products specifications are met. This includes:

- The product is used in dry, non-corrosive and non-explosive gases e.g. air, oxygen, nitrogen
- Oil vapour range is between 0.001 to 5.000 mg/m³
- Gas pressure is between 0.3 to 17 bar (4.4 to 247 psi)
- Gas temperature is between 0°C to +50°C (32°F to +122°F)
- Power supply is between 96 to 264 vAC
- The product is not used in explosive areas.

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

The oil vapour monitor measures oil vapor concentrations and simultaneously monitors pressure dewpoint, gas pressure, and gas temperature.

Oil Vapour Monitor

The Oil Vapour Monitor does more than measure oil vapour. It also:

- monitors pressure dewpoint, pressure and gas temperature and
- gives the oil vapour class and moisture class based on the principles of ISO8573-3 and ISO8573-5.

The device has excellent repeatability and stable performance. The automatic calibration and self-cleaning ensures reliable accuracy and extended sensor life.

The optional 7" touchscreen provides real-time information, data recording, and USB export (CSV format). With 25 GB of onboard storage, users can easily perform data analysis directly on the screen or download data to their computer for further analysis.

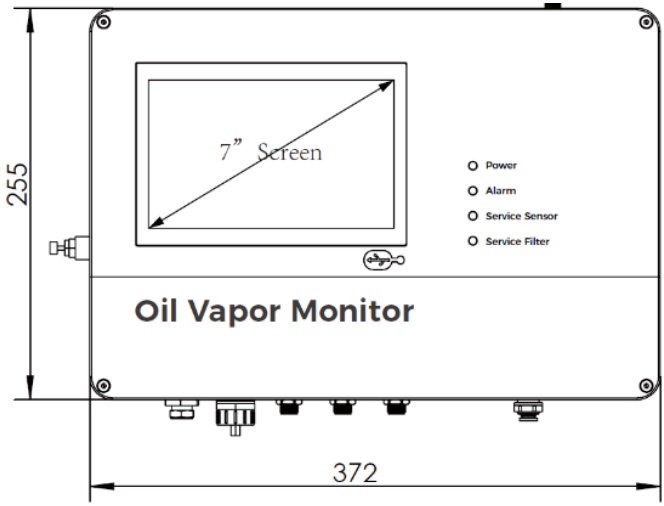
The Oil Vapour Monitor is easy to install via 6 mm PTFE tube and quick-connect tube fittings.

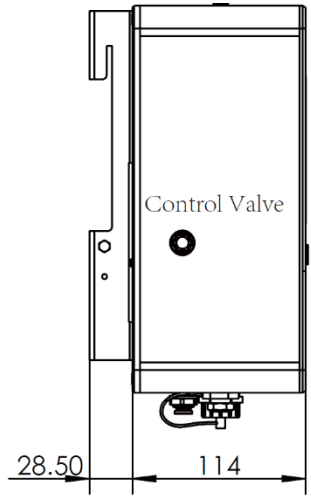
Specifications

Oil Vapour		
Measuring Range	0.001 to 5.000 mg/m³	
Accuracy	±1.5%RD + 0.003 mg/m³	
Resolution	0.001	
Dew Point		
Measuring Range	-110 to +20 °Ctd	166°F to +68°F
Accuracy	±2 °Ctd (-60 ... +20 °Ctd) ±3 °Ctd (-110 ... -60 °Ctd)	
Pressure		
Measuring Range	0 to 1.7 Mpa(a)	0 to 246 psi
Accuracy	±0.3 %FS @23℃	
Resolution	0.01	
Temperature		
Measuring Range	0 to +50 ℃	32°F to +122°F
Accuracy	±0.3 ℃	
Resolution	0.01	
Display & Data Logger & Alarm Relay (optional)		
Display	7" IPS touch LCD	
Display Options	1280 × 800 px	
Storage	25 GB	3,000,000,000 values
Alarm Output	2 × Relay alarm channel (Oil Vapor, Dewpoint)	
Signal Output		
Analogue Output	With Display	4-20mA (1 signal only)
	No Display	4-20mA (1 signal only)

Digital Output	With Display	Modbus RTU (RS485) and Modbus TCP (Ethernet)	
	No Display	Modbus RTU (RS485)	
USB	With Display	USB Type-C	.csv format
	No Display	NA	
Power			
Supply Voltage & Power	100 to 240 VAC Max 65 W		
Power Supply	Included		
Operating Environment			
Measuring Medium	Compressed air and non-corrosive, non-explosive gases		
Medium Temperature	0 to +50 ℃	32°F to +122°F	
Medium Pressure	0.3 to 1.7 Mpa(a)	0 to 246 psi	
Relative Humidity	0 to 40 %RH (Non-condensing) @20℃, 100KPa		
Sample Gas Flow Rate	0.5 to 2 NL/min		
Environment Temperature	-20 to +45 ℃	-4 to +113°F	
Storage Temperature	-20 to +45 ℃	-4 to +113°F	
Other			
Zero Filter Life Time	2 Year @ 2 ppm		
UV Lamp Life Time	8,000 hours		
Case Material	Aluminium Alloy		
Dimensions	445 × 319 × 177 mm (L×W×H)		
Weight	10 kg	22 pounds	
Installation	Permanent or Temporary		
Warranty	12 months		

Dimensions


255
7” Screen
Power
Alarm
Service Sensor
Service Filter
Oil Vapor Monitor
372


Control Valve
28.50
114

Oil Vapour Monitor Kit

The Oil Vapour Monitor Kit comes with:

- Oil Vapour Monitor – with or without display
- 6mm Teflon Tube
- Power Cable
- Nitto Fittings
- 3 x M12 connectors
- Mounting bracket and screws

Oil Vapour Monitor

Nitto Fittings

M12 Connectors

Teflon Tube

Power Cable

Installation

Installation Overview

Mechanical Installation

Step 1 – Find a suitable location to install the oil vapour monitor

Step 2 – Check for liquid oil or oil aerosols

Step 2 – Connect the monitor to gas flow

Electrical Installation

Step 3 – Connect the product to power

Step 4 – (Optional) Connect Communication and Alarm relays

Sensor Configuration

Step 5 – Set sensor settings

Tools and Equipment needed for installation

Drill

Screw Driver

Clean, white cloth

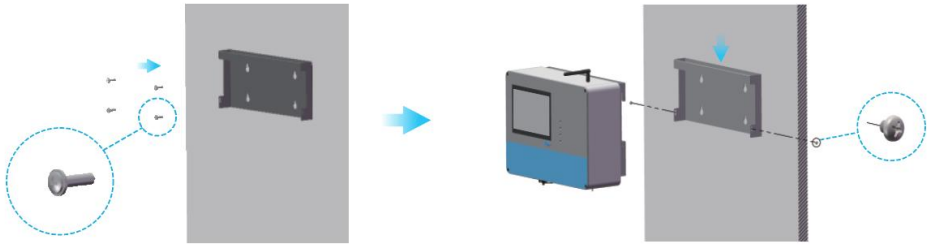
Installation – Mechanical

Notes:

- Refer to the **Notes and Warning** section at the start of this document for safety and product handling information.
- Before installing the product, make sure it is rated for your system (refer to the Specifications section).
- Do not use this product if liquid oil or oil aerosols are present.
- Do not use this product in explosive areas.
- This product is for indoor use only.

Step 1 – Find a suitable location for the oil vapour monitor

- The oil vapour monitor must be installed on a solid, vertical surface (eg a wall or post). Make sure the oil vapour monitor is installed near a power point.
- The oil vapour monitor should be installed above the gas connection point. This is to prevent liquid entering the oil vapour monitor.
- Take out the wall-mounting bracket and the four M6 screws and secure the bracket to the wall using the screws.
- Hook the product backplate bracket onto the wall bracket from above, then secure both sides with two M4 screws.



Step 2 – Check for liquid oil or oil aerosols

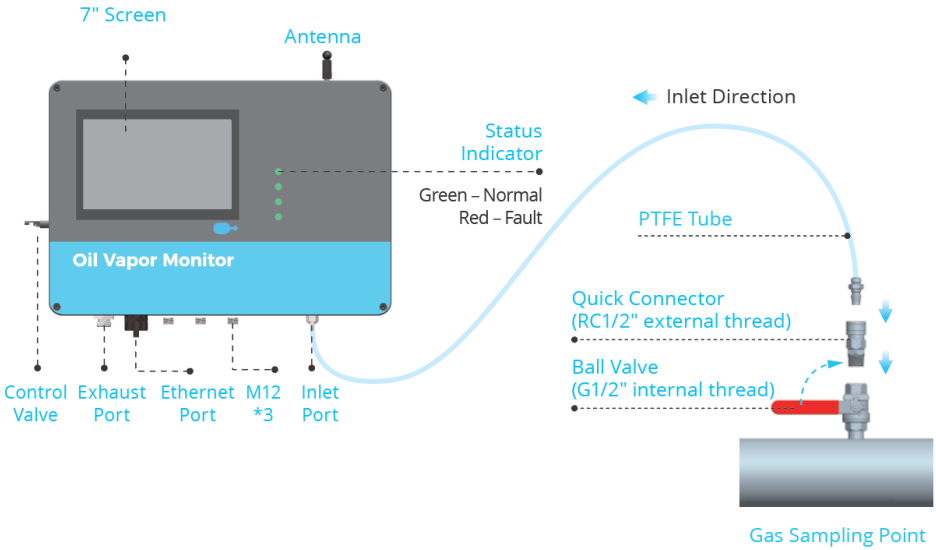
- Get a clean, white cloth
- On the gas sampling point, open the ball valve slightly
- Hold the cloth in the gas flow for 1 minute
- Close the ball valve
- Check the cloth for visible signs of oil.

If oil is present on the cloth, **do not** use the oil vapour monitor. Visible signs of oil indicate that the oil exceeds the products specifications.

- If no oil is visible on the cloth, proceed to Step 3.

Step 3 – Fit Oil Vapour Monitor

- Screw the quick connector (RC1/2” external thread) onto the pre-installed gas ball valve (G1/2” internal thread)
- Insert one end of the Teflon tube into the equipment's air inlet and the other end into the quick connector
- Connect the quick connect fittings
- Open the ball valve
- Slightly open the Control Valve (on the other side of the unit) until you feel gas being released from the outlet.



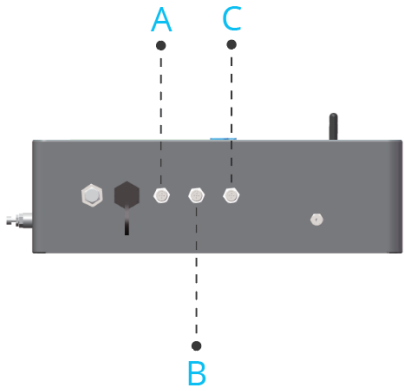
Installation – Electrical

Notes:

- Refer to the **Notes and Warning** section at the start of this document for safety and product handling information.

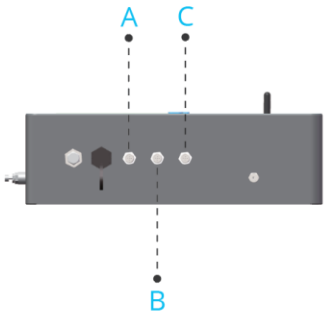
Step 3 – Connect the Oil Vapour Monitor to power

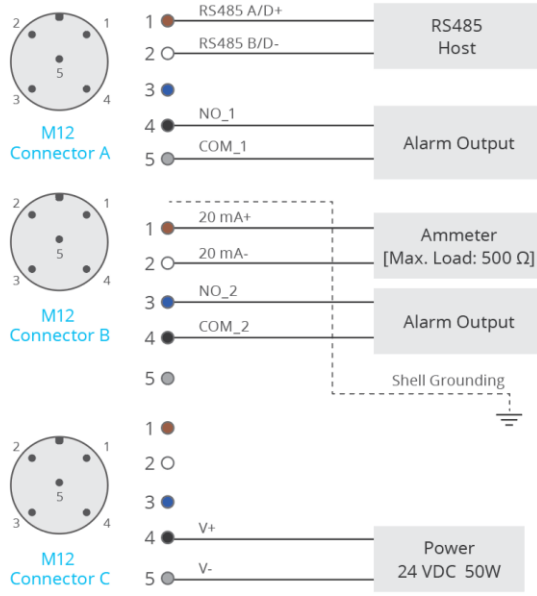
- Plug in the power cord into the Oil Vapour Monitor
- The oil vapour monitor will enter the measurement preparation stage
- Do **not** screw the M12 connector using force, otherwise it may damage the connection pins.



Connection	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5
Connector A	RS485 A/D+	RS485 A/D-	NA	NO_1	Com 1
Connector B	20mA+	20mA-	NO_2	Com 2	NA
Connector C	NA	NA	NA	V+	V-

Wiring Diagram





Operation

Functions

The Oil Vapour Monitor continuously samples gas for both oil vapour and moisture (dew point). The sample gas should be allowed to flow until a stable reading is achieved. This can be seen in the graph on the display. It is normal for the reading to fluctuate up and down slightly with changes in the operation of the gas being sampled, however the overall trend should show a level line on the graph.

Oil vapour measurements won't start until dew point is less than +10ºC (+50ºF)

To protect the oil vapour sensing unit the dew point must be below +10ºC (+50ºF). When first powering the device, the oil vapour sensing unit will be isolated from the gas supply until the dew point value has reached this minimum value. If the dew point is above +10ºC (+50ºF) an internal valve will remain closed and no gas will flow through the oil vapour sensing unit. No oil vapour value will be shown at this time. Once the minimum dew point value is reached the internal valve will open and gas will be supplied to the oil vapour sensing unit.

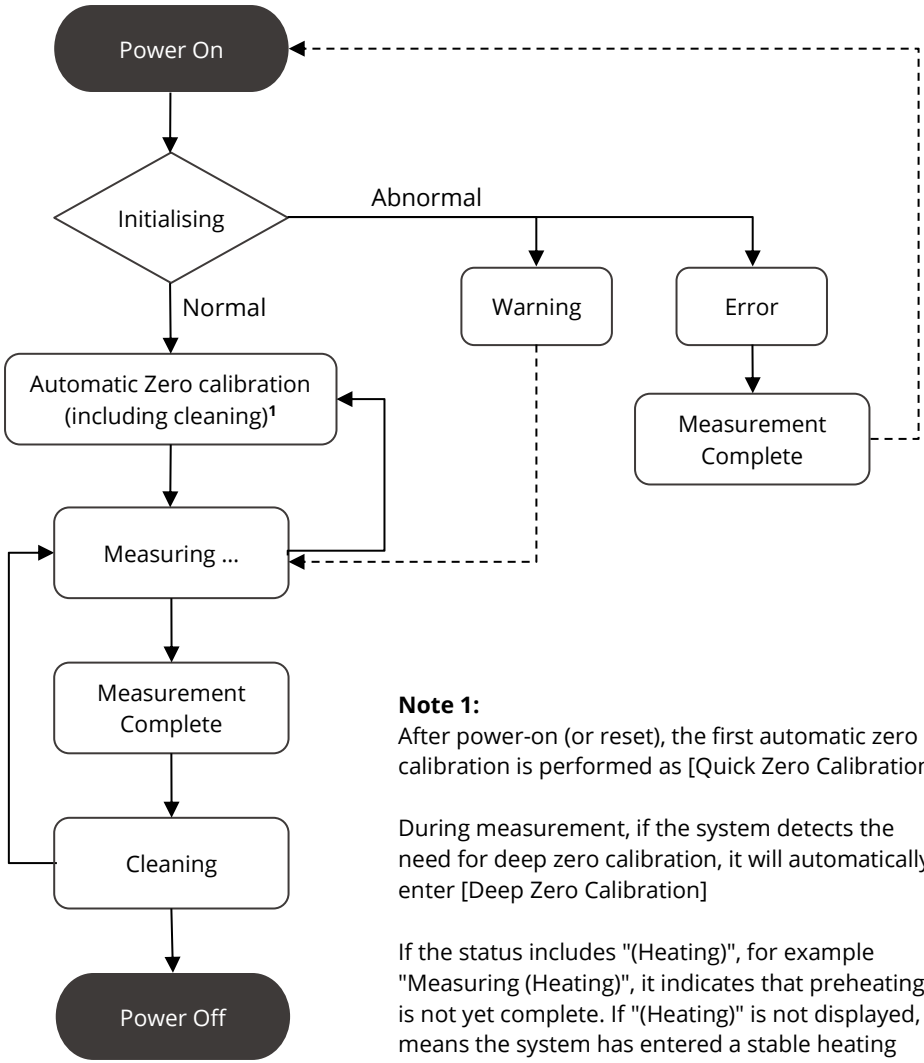
Self-cleaning / zero calibration test

When starting, stopping and periodically throughout the operation, the oil vapour sensing unit will automatically run a zeroing (self-cleaning) calibration test. The status is shown at the top of the screen with a percentage (%) indicator. This process should be allowed to complete prior to powering the unit off.

During the zeroing process either no value or the last value will be shown as the oil vapour level. This displayed value will be locked until the zeroing process is completed, any value shown during the zeroing process should not be used as the representative value of the gas being tested. On the graph, you will see a flat line with no variation during the zeroing process.

Once the zeroing process is completed, the gas will flow through the oil vapour sensing unit again, a new value will be displayed within 1-2 minutes, and the graph will start to show some variation in value. In some instances, particularly where the oil vapour content of the gas is very low, several zeroing processes may be required to achieve a stable reading. In this case, you will notice a step change in the oil vapour value shortly after each zeroing process has been completed. Only once the value remains consistent from one zeroing process to the next is the true value shown.

Measurement Process



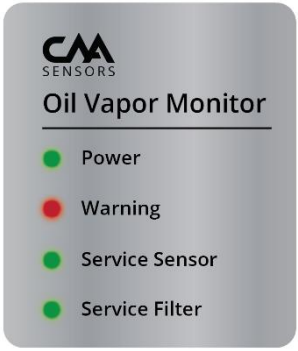
Note 1:
After power-on (or reset), the first automatic zero calibration is performed as [Quick Zero Calibration]

During measurement, if the system detects the need for deep zero calibration, it will automatically enter [Deep Zero Calibration]

If the status includes "(Heating)", for example "Measuring (Heating)", it indicates that preheating is not yet complete. If "(Heating)" is not displayed, it means the system has entered a stable heating state

LED Indicator

The Oil Vapour Monitor has a multi-coloured LED panel with the following functions.



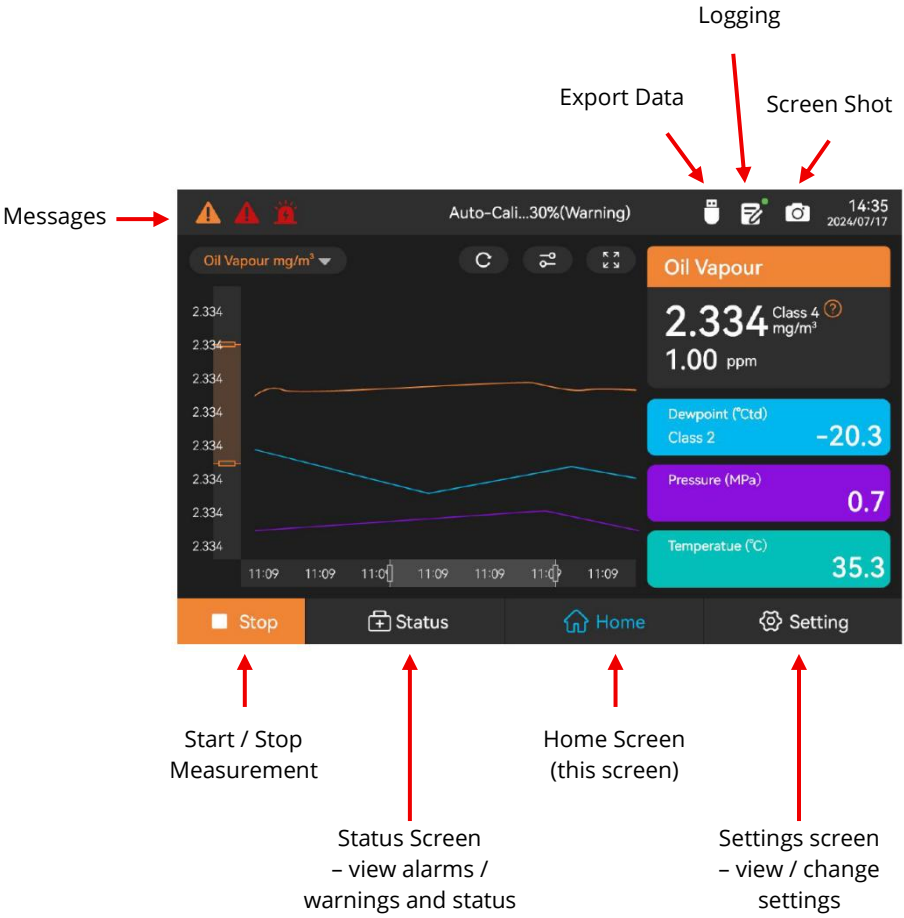
LED	Function	LED Colour	Description
Power	Indicates the power status	Green	Power supply is normal
		Red	Power supply is abnormal
Warning	Indicates the measurement environment status	Green	Measurement environment (pressure, temperature, internal communication) is normal
		Red	Measurement environment (pressure, temperature, internal communication) is abnormal. Check the Alarm Screen for more information.
Service Sensor	Indicates whether the PID sensor needs to be serviced	Green	PID sensor status is normal
		Red	PID sensor status is abnormal. Time for a service
Service Filter	Indicates whether the Zero Filter needs to be replaced	Green	Zero filter status is normal
		Red	Zero filter status is abnormal. Time for a service

Operation

Note: Due to software upgrades, interface functions may vary from those in the user manual.

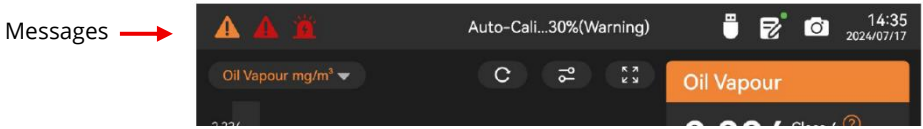
Home Screen

After the device is powered on successfully, the Home screen is displayed.



Messages

On the Home screen, the top row will show any messages you need to be aware of.

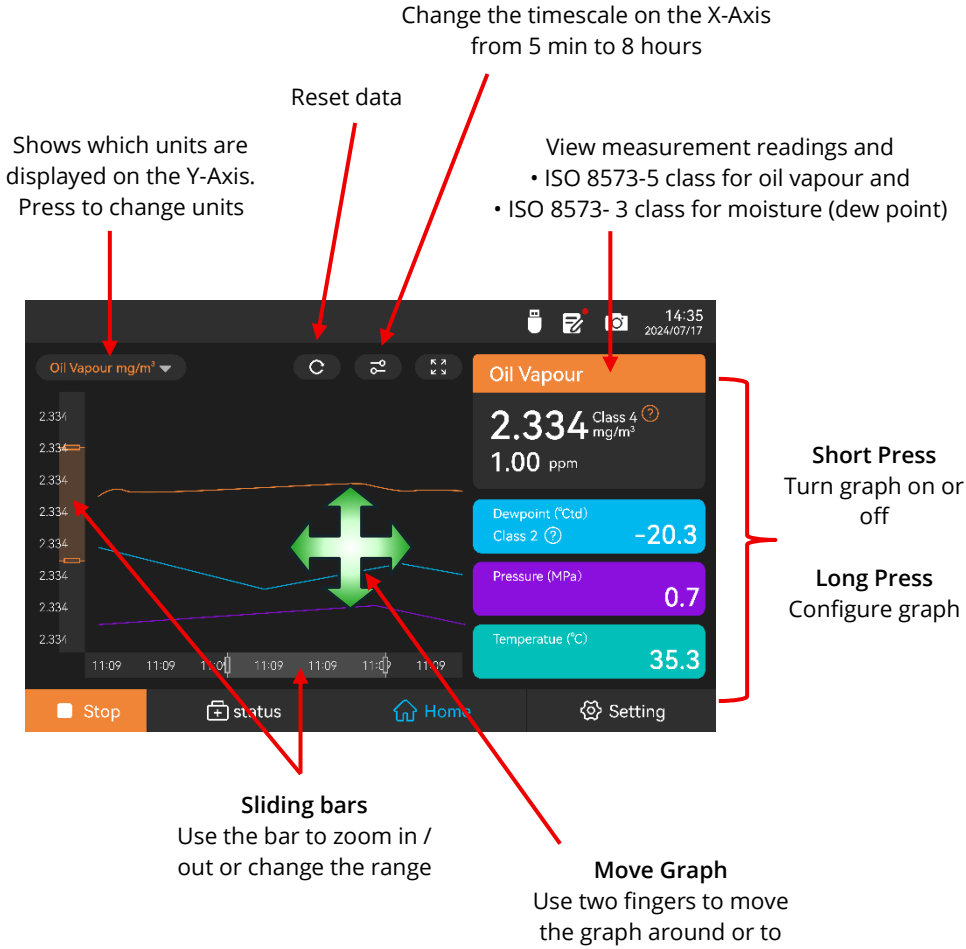


Message		Description
	Orange Status Warning	The measured values are for reference only and may not be accurate. Please check the [Status] page for details
	Red Status Warning	There is an issue with the measured values. Please check the [Status] page for details
	Red Alarm Icon	Alarm triggered. Please check the [Status] page for details
Initializing... 30%		Checks if the measurement environment meets requirements
Zeroing (Warming)...30%		Starts warming up zero calibration. The oil vapor values displayed are invalid during this phase
Measuring (Warming)...		Measuring, but warming is incomplete. The oil vapor values may not be accurate
Measuring...		Measuring with stable temperature. The oil vapor data is accurate and reliable.
Cleaning...30%		The device is running an auto self-cleaning or manual cleaning program. To ensure sensor life and accuracy, do not interrupt unless necessary
Stop (Warning)		When this message occurs, please check the [Status] page for the cause. The system will automatically start measurement once the issue is resolved
Stop (Error)		When this message occurs, please check the [Status] page for the cause. You must manually start measurement once the issue is resolved

Home Screen

The Home screen displays:

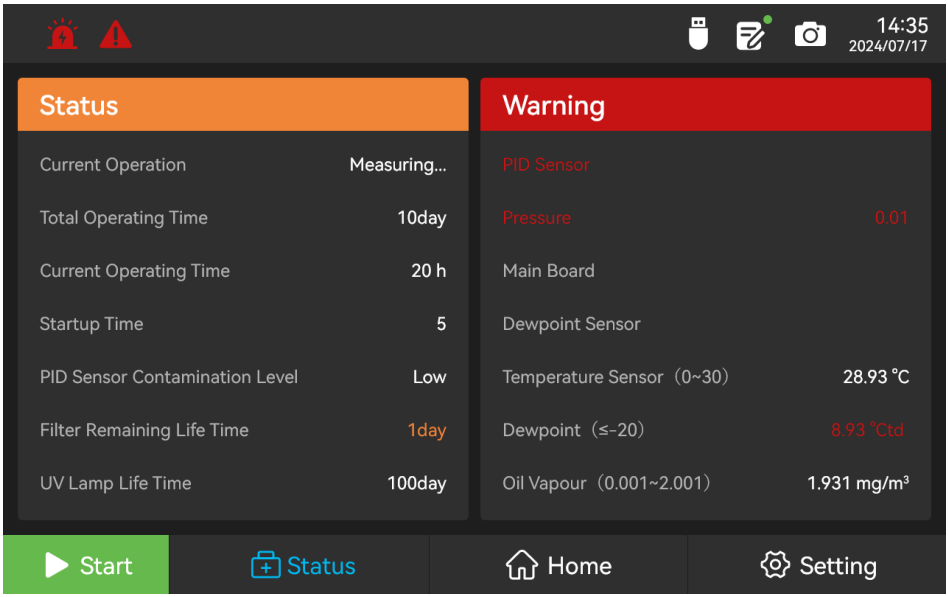
- messages you need to be aware of
- measurement values
- ISO 8573-5 class for oil vapour
- ISO 8573- 3 class for moisture (dew point) and
- measurement graph.



Status Screen

The Status screen displays:

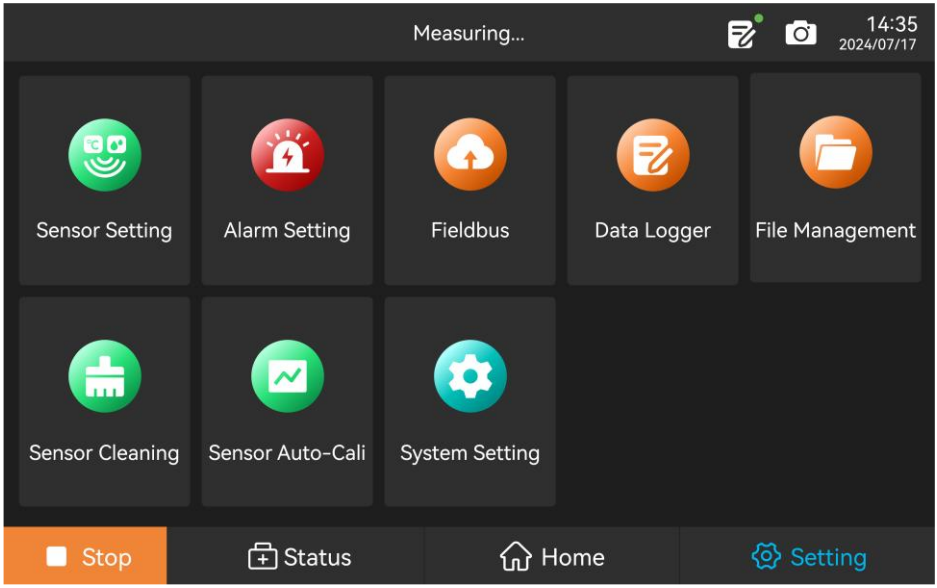
- the current operation of the unit (eg measuring)
- the contamination level of the PID sensor
- the remaining life of the zero filter (max lifetime of 2 years @ 2ppm)
- the remaining life of the UV lamp (max lifetime of 8000 h)
- duration of the current measurement program
- total operating hours and number of times the unit has been started
- warnings



Setting Menu

On the Settings screen you can:

- View / change alarms
- View / change Fieldbus (Modbus) settings
- Start / stop the data logger
- View and download files and screenshots
- View change system settings:
  - Screen settings
  - Languages
  - Date and time
  - View system information
  - Restart the system



Setting Menu

Setting Menu	
Sensor Settings	
Pressure Unit	Set pressure units
Temperature Unit	Set temperature units
Oil Vapour Molar Mass	View / edit molar mass
4-20mA Channel Unit	Select which channel to output via 4-20mA
4-20mA Scaling Low	Set 4-20mA lower limit
4-20mA Scaling High	Set 4-20mA upper limit
Alarm Setting	
Alarm channel	Add, edit, delete alarms
Alarm Triggered	Set what happens when an alarm is triggered
Fieldbus	
Modbus RTU	View / edit Modbus RS485 settings **Default Settings:** • Address: 1 • Baud Rate: 9600 • Data Length: 8 • Parity bit: None • Stop bit: 1 • Response Timeout: 1 second • Response delay: 0ms • Frame interval (char): 1 • Frame interval (us): 100
Modbus TCP	View / edit Modbus TCP (ethernet) settings **Default Settings:** • Automatically obtain an IP address (DHCP)
Protocol	View / download the Modbus Register Address table.

Data Logger	
Data Logger	• Configure the data logger • Start / Stop logging **Note**: When the unit is logging data, a data logging icon will appear in the status bar. When the unit stops logging data, the data logging icon will disappear
File Management	
Record Files	View, export or delete recorded data
Screenshots	View, export or delete screenshots
Sensor Cleaning	
-	Run sensor clean
Sensor Auto-Cali	
-	Run sensor auto-calibration
System Setting	
Language	Select your language

Screen Setting	• Adjust screen brightness
	• Set the 'off screen' time duration.
	  ○ The screen goes dark after this time.
	  ○ Touch the screen to wake it up / brighten the screen

Date & Time	Adjust the system current date and time.
System Upgrade	Update the HMI firmware
System Restart	Restart the system
System Information	• View the hardware and software information • View the IP address used by the HMI • View the CPU temperature • View Memory information • View the number of times the HMI has been restarted

Turning Off the Unit

You must let the Oil Vapour monitor complete its cleaning cycle before you turn it off.

To turn off the unit:

- Stop the measurement
- Let the unit go through its cleaning cycle
- Then you can switch off power to the Oil Vapour Monitor.

Warranty

Warranty

CAA Sensors provides a 12-month warranty for all products. 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 CAA Sensors 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 (e.g. dents, marks), are not included unless responsibility is legally binding.

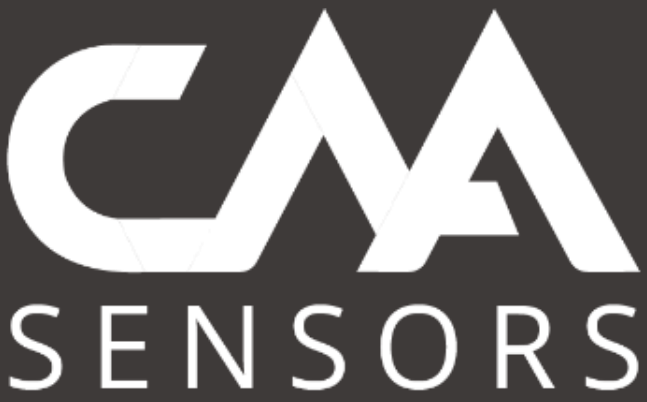
Calibration

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

The Oil Vapour Monitor requires calibration to remain accurate. The frequency of calibration depends greatly on the level of contamination within your system.

We recommend you calibrate the product every year. Calibration is excluded from the product warranty. For more information, contact CAA Sensors:

- Phone: +61 494095632
- WhatsApp: +61 494095632
- E-mail: sales@caasensors.com



CAA Sensors Pty Ltd

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

Phone / WhatsApp: +61 494 095 632

E-mail: sales@caasensors.com

Website: www.caasensors.com